The Long Road to the Industrial Revolution
Global Economic History Series

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VOLUME 1
‘For income growth to occur in a society, a large fraction of people must experience changes in the possible lives they imagine for themselves and their children, and these new visions of possible futures must have enough force to led them to change the way they behave, the number of children they have, and the hopes they invest in these children: the way they allocate their time. In other words….economic development requires “a million mutinies”.

Robert Lucas, 2002
To Lenny, Bas and Joost
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INTRODUCTION
THE LONG ROAD TO THE INDUSTRIAL REVOLUTION

The Industrial Revolution was arguably the most important event in (recent) history. Before the Industrial Revolution, which began in the second half of the eighteenth century, living standards increased painstakingly slowly, if at all. In the two centuries after 1820 the average real income of the world’s population has grown from $667 in 1820 to $1525 in 1913 to $6012 in 2000 (all expressed in 1990 international dollars). More to the point, in the industrialized world, income per capita increased 15–20 times between 1800 and the present (Maddison, 2001). Before 1800 economic dynamism, most of the time, fuelled an increase in population numbers, although in some regions – for example, in Sung China, during the Roman Empire, in the Middle East from 800 to 1100, or in medieval Italy – there may have been an increase in GDP per capita which was substantial and semi-permanent. Before 1800 however, such phases of growth always petered out within a few generations. The countries or regions involved became caught up in a ‘high level equilibrium trap’, a phrase coined by Mark Elvin (1973) to describe the ‘stagnation-at-a-high-level’ supposedly characteristic of China after the Sung dynasty. In short, before 1800 economic change did not produce the cumulative growth characteristic of the nineteenth and twentieth centuries (Clark, 2007).

Not only was the Industrial Revolution a major historical breakthrough, it is also clear that the degree to which nations have managed to participate in the economic and technological processes that began in the eighteenth century, has to a large extent determined their economic prospects. ‘Modern economic growth’, a phrase introduced by Simon Kuznets (1966) to describe the process of a sustained increase in per capita income combined with structural change, was the outcome of the industrialization process. Gradually industrialization and related changes in agriculture and the services sector, which had begun in Great Britain in the second half of the eighteenth century, spread to Western Europe and North America during the first half of the nineteenth century. In the second half of the nineteenth century, Japan joined the ‘convergence club’, the group of nations undergoing modern economic growth, and after 1945 the ‘Asian Tigers’ followed.
In the final decades of the twentieth century, the process of modern economic growth spread to large parts of Asia; now, China, India, and other parts of Asia are beginning to catch up rapidly. Two centuries after the first stirrings of the Industrial Revolution, more than half the world’s population has become involved in the process of modern economic growth (Földvari and Van Zanden, 2006). At the same time, the relatively slow spread of industrialization and modern economic growth has resulted in an enormous increase in global inequality, which has become a distinct feature of the world economy since the middle decades of the nineteenth century. The Industrial Revolution therefore not only contributed to the high living standards that some parts of the world population now enjoy, it has also created a sharp inequality in income and production on a global scale.

The Industrial Revolution demarcates the world in which incomes were very low and almost always stationary in the long run from a world in which growth and increased standards of living have become the norm for increasing shares of the global population. For those who enjoyed the fruits of this revolution, it has made the difference between poverty and prosperity. Understanding the origins and causes of this radical break in economic history during the (late) eighteenth century is one of the most important tasks of the economic historian. Which forces caused this radical change? Was it initiated by a more or less accidental wave of gadgets, a sudden increase in innovation that occurred in eighteenth-century England? Was it the result of the more efficient institutions introduced after the Glorious Revolution of 1688, such as financial innovations (a funded public debt, a central bank), or patent legislation that protected inventors and innovators? Or was the agricultural sector the real engine of economic change, enabling the migration of labour from the countryside to the rapidly growing cities? Or were its roots in the imperialist expansion of Western Europe in the centuries following 1492, a long process that restructured the world economy so that the ‘West’ became its dynamic core and the ‘rest’ a stagnating periphery?

In the 1950s and 1960s research on the Industrial Revolution concentrated on what had taken place in England during the eighteenth century: which technological, economic, and institutional changes had accelerated the industrial growth that had occurred after 1780 (Deane and Cole, 1962; Deane, 1965). Some of the key issues were: why in England – and why not in France or the Low Countries? Did the break occur after 1760, or 1780 – or even after 1830? Which industries and
technologies provided the impetus for this sudden upsurge in industrial growth? In the course of discussing these issues the concept of the Industrial Revolution has been gradually expanded: we now understand that revolutions in agriculture, transport, and finance developed simultaneously to those in politics and industry, or may have even preceded industrialization. Moreover, it has become clear that this ‘revolution’ was not a sudden surge in the pace of economic growth, but a gradual acceleration of growth, which cannot really be characterized as a clear ‘revolution’ (Crafts, 1985). ‘Proto-industry’ – rural, small-scale industries in which the labour force combined agricultural activities with industrial work for the world market – was discovered as an engine of industrial and demographic growth that had preceded the industrial transformation. The catalytic role played by London as an engine of growth was emphasized; it was a source of urban demand and focus of specialization in the best traditions of Adam Smith. This was a source of growth that transformed England from the sixteenth century on (Wrigley, 1967). Changes in consumption patterns: the rise of new consumption goods such as coffee and tea, or cotton clothing, and in the underlying decision-making processes of households that made it possible for large parts of the population to acquire these new products were also identified as important. These may have induced households to expand their labour input to market production, and generated an ‘industrious revolution’ that perhaps facilitated industrialization (De Vries, 1994). Finally, North and Weingast have argued that the institutional pre-conditions for the Industrial Revolution had been created in the years following the Glorious Revolution of 1688, when England adopted financial institutions developed on the Continent and introduced a system of Parliamentary rule that constrained the behaviour of the King (North and Weingast, 1989).

During the 1980s and 1990s the discussion about the causes of the Industrial Revolution that had begun in the 1950s and 1960s expanded into a debate about the dynamic of the European economy in the early modern period (1500–1800). This dynamic led to a significant increase in urbanization, a rapid growth in long-distance trade and finance, and increased output and productivity in the agricultural sector. Moreover, economic development interacted with the process of state formation that (at least in some cases) further stimulated economic growth. The new view of the causes of the Industrial Revolution that emerged from this ‘revolt of the early modernists’ of the 1980s and 1990, as it was characterized by one of its most distinguished representatives, Jan de Vries
(1994), was that the European economy, in particular the economy of north-western Europe, was already very dynamic in the centuries before 1800. The Industrial Revolution could be interpreted as the culmination of a process of economic expansion that had begun in the sixteenth century, or perhaps even earlier, in the Middle Ages (see Van Zanden, 2002a for a review of the discussion). A new orthodoxy emerged that Western Europe, and in particular the region bordering the North Sea, was already different long before the Industrial Revolution, i.e. more dynamic, competitive, and creative than the rest of the world. This new view was popularized by several leading economic historians such as Eric Jones (1987), Angus Maddison (2001) and David Landes (1998).

It can be argued, however, that the revolt of the early modernists did not really answer all the questions about the origins of European dynamism. The boldest example of this revisionism, the seminal study by Jan de Vries and Ad van der Woude (1997) of the Dutch Republic, which they describe as ‘the first modern economy’, does not address the issue of when and why the relatively modern institutions that they saw as crucial for the success of this economy emerged. In fact, the economic and socio-political structures that are the starting point of their story were already strikingly modern at the start of the period under study; for example, in Holland at the beginning of the sixteenth century only about 25% of the population was active in agriculture, and almost half lived in cities and towns (Van Zanden, 2002b). Where did these modern structures and institutions come from?

Similarly, studies of the long-term evolution of the interest rate – as we will see in the next chapter, an important index of the quality of the institutional framework– have concluded that the most important changes had occurred from 1350 to 1450 (when interest rates in many areas of Europe fell from 10–12% to 5–6%) (Clark, 1988; Epstein, 2000). The decline in interest rates in late medieval Europe may have been part of a much broader process: recent work by a team of scholars led by Peter Lindert focusing on the study of relative prices and wages in the very long term has produced new hypotheses about the distinct features of Western Europe’s economies. Lindert et al. (2002) formulated the working hypothesis that ‘Northwest Europe led in the development of non-agricultural productivity concentrated in the capital-goods and knowledge-intensive sectors’. Their paper hypothesized that capital goods and knowledge intensive products were relatively inexpensive in this part of the world, and, related to this, interest rates were relatively low, whereas agricultural products and foodstuffs (and land) were
relatively expensive (Lindert et al., 2002). So, perhaps from the late medieval period onwards, Lindert et al. hypothesize, Western Europe had a comparative advantage in high tech products that required large amounts of human and physical capital.

In a review of the discussion on the roots of the Industrial Revolution, the present author called for a ‘revolt of the medievalists’ to analyze and explain why it was that long before 1500 relatively modern economic institutions already existed on which the transformation during the early modern period was based (Van Zanden, 2002a). When did the real breakthrough of these new institutions occur? Who (or which groups) provided the new rules of the game that became characteristic for European economy and society – and why? What developments during the ten centuries from 500 to 1500 explain the growing dynamism of Western Europe in this period?

This book studies the ‘deep’, or ultimate causes of the Industrial Revolution, and aims to show that the late medieval and early modern period was ‘a long runway’ to the ‘take off’ of the Industrial Revolution. In fact, I conclude that in many respects the medieval period was more dynamic than the three centuries from 1500 to 1800. During the major boom from 900 to 1300, growth occurred on a pan-European scale, with strong population growth and long-term increases in real income per capita going hand in hand. From 1500 to 1800, on the other hand, growth was restricted to the North Sea region – to Flanders in the sixteenth century, the Netherlands during its Golden Age, and England (and Scotland) in the period after about 1610 – while per capita income in the rest of Western Europe was constant at best. One of the aims of this book will be to explain this change in growth pattern from pan-European expansion before 1300 to a concentration in the North Sea region after 1400.

This addresses three different debates about the origins of the industrial breakthrough of the late eighteenth century: the debate on the ‘Great Divergence’, on the role played by human capital formation in preparing this ‘revolution’ (a debate inspired by endogenous growth theory), and on the role of institutions in economic development. To position the contribution of this study, a brief review of these discussions is necessary.

The view that the Industrial Revolution was the result of a slow build up during the preceding centuries has recently been questioned by a number of scholars, most prominently by Roy Bin Wong (1997),
Bozhong Li (1998) and Kenneth Pomeranz (2000), who maintain that before 1800 Europe was not so ‘special’. They argued that China, and possibly other parts of Asia as well, was on the same growth trajectory as Europe, and that during the eighteenth century levels of income and productivity in both parts of the Eurasian continent were very similar. In their view the decisive acceleration of Europe after about 1800 – what Pomeranz (2000) characterizes as ‘The Great Divergence’ – is not the consequence of fundamental differences in growth potential, because both regions were experiencing a similar process of ‘Smithian growth’ before 1800, and markets and institutions were equally well developed. Rather, Europe and in particular England owed its spectacular performance after 1780 to two, almost accidental factors: a cheap and ready supply of coal, enabling the revolution of the steam engine, and the possession of large colonies guaranteeing a cheap supply of land-intensive products such as cotton and sugar, thereby substantially alleviating the land constraint. In China, on the other hand, coal was available in the wrong places, in areas that did not allow it to be transported easily to the centres of growth in the Yangtze Delta. Moreover, China was restricted to using its own land to solve the problem of feeding a growing population, because it did not have access to the ‘ghost acreages’ of colonial possessions that Great Britain (and the Netherlands) had (see Vries, 2001 for a review of these ideas). By putting the Industrial Revolution into this comparative context, Pomeranz (2000) again perceived it as a sudden break in economic development during the second half of the eighteenth century. Moreover, this debate on the ‘Great Divergence’ gave a strong stimulus to the development of ‘global economic history’, with the aim of comparing the growth trajectories of different parts of the world from this perspective (Brenner and Isett, 2002; Pomeranz, 2002; Broadberry and Gupta 2006; Allen et al., 2005).

This new view forces us to carefully reassess Europe’s development trajectory in a global historical perspective, comparing its performance with that of other parts of Eurasia. It also leads to questions about the basis for such a comparison. Is it possible to test quantitatively the traditional view that European institutions were creating the right incentives for long-term economic growth, while institutions in other parts of the world were less ‘efficient’? Or does such an inquiry endorse the claim by Pomeranz, Wong and Li that institutions and markets in different parts of Eurasia (India, China, Japan and Western Europe) were equally efficient? And secondly, how can we measure the perfor-
mance of the economies of Japan, China, or India and compare them with Western Europe?

The second reason for reassessing the pre-history of the Industrial Revolution is that economists have also begun to investigate this major rupture in history; they, too, have suggested explanations for it and have begun to build models of its possible course and causes. Such models have produced new insights into what may have been its long-term causes. New growth theorists like Lucas (2002) have focused on factors such as the accumulation of knowledge, investment in human capital, and changes in demographic patterns, but this focus has not played a central role in recent economic-historical research. The first generation of growth theories tended to concentrate on the accumulation of capital and (exogenous) technological change as the main factors for the growth; the famous Solow (1956) model is the best example of this approach. The new or endogenous growth theory developed by Lucas (1988) and Romer (1986) focuses on other factors. From the perspective of endogenous growth, the issue is why, where, and when human capital formation and accumulation of knowledge began to accelerate before the Industrial Revolution. An even more recent development is unified growth theory, which is developing new insights into the possible explanations of the ‘stability’ of the pre-1800 world and the acceleration of growth that occurred afterwards (Galor, 2005).

Various mechanisms have been suggested to explain the radical break in growth patterns around 1800. One approach has focused on changes in demographic patterns. It assumes that parents had a choice between having many children (optimizing quantity of offspring) or having few children in whom they invested a great deal (optimizing quality). Proponents of this view perceive the Industrial Revolution as having been preceded by a change in demographic pattern that was characterized by high levels of human capital formation, i.e. a focus on quality rather than quantity of offspring (Becker, Tamura and Murphy, 1990; Lucas, 2002). High levels of human capital formation then triggered the search for new technologies which made it possible to increase output per capita, while societies with a demographic pattern that maximized quantity will eventually encounter Malthusian constraints. One of the interesting aspects of this approach is that it links economic growth – the genesis of the Industrial Revolution – to the behaviour of households at the micro-level (cf. Lucas, 2002). But so far economic historians have not found much evidence for such a
demographic change in the centuries before 1800 (Mokyr, 1990; Clark, 2007). Here it will be argued, however, that such a demographic change did occur. In the North Sea region a new demographic pattern, the European Marriage Pattern, emerged in the late medieval period, which was indeed characterized by high levels of human capital formation and a substantial involvement in market exchange in general. It was the new pattern that made this part of Western Europe different from the rest of the continent: while the West continued to expand after 1400, the rest of the continent stagnated (see Chapter 4).

Bridging the gap between new growth theory and economic history is one of the goals of this study. While new growth theory has developed new insights on possible causes of the Industrial Revolution, most economic historians ignored or rejected such interpretations of the industrialization process. The book will not attempt to reconcile these two approaches by producing new models to explain the Industrial Revolution, but rather study how human capital formation and the growth of knowledge developed in the centuries before 1800. This is based on new datasets about important elements of the knowledge economy. The hypothesis is that consistent with endogenous growth theory (and unified growth theory), increased knowledge accumulation and increased investment in human capital through education preceded the emergence of modern economic growth. Because the normal data for the analysis of human capital – such as estimates of the literacy rate or of educational attainment – are often not available, this book suggests a number of alternative quantitative measures that reflect the long-term evolution of human capital formation, measures such as book production and the skill premium. These measures can also be used to put the European experience in a comparative perspective, creating a global picture of levels of educational achievement.

A third reason for reassessing the pre-history of the Industrial Revolution is related to the relevance of still another theoretical approach, new institutional economics, developed by economists and economic historians to analyze and understand long-term economic performance. The starting point of this approach as formulated by Douglass North (1981) is that a society has to organize the way in which producers, consumers, and the state interact and cooperate. It needs (or in fact has) ‘institutions’ such as laws promulgated by the state (to protect the property rights of producers) as well as informal rules (modes of conduct) that govern this interaction. If these institutions are relatively efficient – if they enhance trust that property rights will be protected –
the cost of carrying out transactions will be relatively low and markets will flourish. If, on the other hand, the state is ‘predatory’ – if rulers plunder the inhabitants of their realm – or if property rights are not respected and might rather than right predominates, incentives to carry out market transactions will be small. In such a situation people will tend to concentrate on subsistence production, which inhibits economic development. In short, the issue is whether a society develops the right rules of the game to stimulate exchange and market production, enabling specialization and growth. Studies focused on developing this hypothesis in this particular context – an explanation of the genesis of the Industrial Revolution in Western Europe – have mainly concentrated on the efficiency implications of certain major institutional innovations introduced in Western Europe before 1800. Perhaps the best example is North and Weingast’s (1989) analysis of the changes in capital market institutions following the Glorious Revolution of 1688. The new ‘rules of the game’ introduced on the accession of William and Mary implied that Parliament gained control over the financial business of the state, and that new institutions such as the Bank of England were created to maintain the new balance of power between the King and Parliament. This created more confidence in the state and fuelled a financial revolution that included establishment of a funded debt at very low interest rates.

This approach has generally led to studies that analysed the efficiency and effectiveness of certain institutions – of merchant and craft guilds, fairs and other markets, commons, and different forms of tenure in agriculture (such as share cropping). There are a number of problems with this approach: one is that almost all these studies tended to conclude that the institutions they studied were efficient, in contrast to the older literature that often suggested such institutions (for example, guilds or manors) did not work well. By arguing in favour of the efficiency of guilds, sharecropping, specific aspects of feudalism, or even slavery, these studies contributed significantly to a reassessment of the medieval and early modern economies, which were, as these scholars tend to point out, much more ‘rational’ and efficient than scholars had thought. Critics have argued that this tends to lead to the conclusion that ‘what is, is right’, or that we live in the ‘best of all possible worlds’, much as the philosopher Leibniz taught Candide in Voltaire’s novel (see Ogilvie, 2007). In reality, however, institutions are sometimes quite inefficient, but economists and economic historians have not concentrated sufficiently on distinguishing the inefficient institutions
from the efficient ones. In the next chapter I suggest an alternative approach to the issue of the efficiency of a set of institutions, focusing on a number of characteristics that can be quantified. This will allow us to measure various dimensions of the efficiency of the institutional framework of Western Europe, and compare them with other parts of the world, thus establishing to what extent – and perhaps also when and why – Western Europe became ‘different’ in the centuries before the Industrial Revolution.

The analytical scheme underlying this study is outlined below (Figure 1). Following the new institutional economics, I am interested in the efficiency of institutions (see Chapter 1), as well as their genesis: when and why did the institutions peculiar to Western Europe arise: Chapters 2 (for the period 950–1300), 4 (1300–1500), and 7 (1500–1800) deal with this topic, albeit in different ways. How these institutions affected human capital formation is the other important aim of the book: Chapter 3 charts the growth of human capital in the Middle Ages, Chapters 5 and 6 take this story up to 1800. It will be argued that these changes in institutions and human capital formation significantly affected economic development, which is measured in Chapters 3 and 8; the latter chapter also raises the question of when the process of modern economic growth began. Almost all chapters contain explicit comparisons with regions outside Europe, with China, Japan, India, or the Middle East. Chapter 9 returns to these comparisons more systematically, looks at what was revealed about institutions and human capital formation in these parts of Eurasia, and tries to address the long-term development of these economies in the early modern period.

In its attempt to address these issues, this study employs newly developed datasets that try to quantify long-term developments. Among these, the book presents:

- measures of the efficiency of the institutions found in Western Europe and elsewhere;
- measures of the extent to which human capital formation and investment in knowledge and ideas occurred in Western Europe and elsewhere;
- measures of the economic performance of (parts of) Western Europe and parts of Eurasia.

Much attention will be paid to placing the European development in a global historical perspective; the major questions of whether Western
Europe was really different, and if so, when such difference became manifest, can only be addressed by making detailed, quantitative comparisons of various indices of institutional efficiency, human capital formation, and performance. This approach will also enable us to study the interrelationships among these phenomena – between institutions and human capital formation, and between human capital formation and economic growth. As this study hopes to demonstrate, Western Europe from the late Middle Ages onwards was exceptional (but not by definition superior) in all three aspects (institutions, human capital formation and economic performance). From the late Middle Ages onwards, in particular the North Sea region (the Low Countries and England) stands out in all these respects. Therefore, this book will devote particular attention to this region of Western Europe. But the success of the economies of Flanders, Brabant, Holland, and England in the late medieval and early modern periods was rooted in institutions that emerged in the High Middle Ages, the crucial transformative period when Western Europe emerged as a dynamic, innovative economy.

One of the questions central to this book is why and when a knowledge economy emerged in Western Europe. Such an economy is defined as one that produces sufficient ‘useful’ knowledge to generate a process of modern economic growth (Mokyr, 2002). Which long-term processes and institutions favoured the formation of human capital and the accumulation of ideas so that Western Europe was indeed
able to experience such a transformation to a knowledge economy, and consequently, modern economic growth? We trace the story chronologically, starting with the medieval foundations of the process of knowledge accumulation and human capital formation, especially developments from 900 to 1300, when a European-wide economic expansion occurred and the fundamental institutions of the Latin West were created (Part I). The second part of this book focuses on the late Middle Ages (1300–1600), when one part of Europe, the North Sea region continued to expand rapidly, despite the fact that the rest of Europe experienced an economic slow-down. We seek to explain this ‘Little Divergence’ by looking at the micro-level: at the marriage pattern and the degree to which households participated in labour and capital markets (Part II). The third part examines the rise of the knowledge economy in Western Europe (especially the North Sea region) from 1400–1800, arguing that developments there set in motion a process of accumulation of human capital and knowledge that was unique, and formed the background to the strong economic performance of the North Sea region in the centuries before 1800. In the fourth part we take the story up to the ‘dual revolution’ of the late eighteenth century, continuing the analysis of the interaction between institutions (such as the institution of citizenship) and economic development. The term ‘dual revolution’ has been introduced by Hobsbawm (1962) to denote the combination of political revolution (the French Revolution of 1789)1 and the economic revolution of industrialization that took place across the Channel – the dual ‘grand finale’ that concluded the long-term processes of institutional and economic change of the 1000–1800 period. On the one hand, we try to determine exactly when modern economic growth began, when a process of sustained per capita income growth, combined with structural transformation of the economy originated. On the other hand, based on a case study of the Dutch Republic, we study the relationship between early modern citizens and the state, and try to reconstruct the link between the medieval institution of communal ‘citizenship’ and the modern citizenship that emerged after 1789 (bringing the story up to the French Revolution). In the fifth and final part, we compare developments in Western Europe with what we know

1 But the French Revolution should also be seen in the context of a wider political transformation that has been called the Atlantic Revolution (Palmer, 1959), starting with the American Revolution of 1776 and ending with the Latin American wars of liberation of the early 1820s.
happened in Eurasia in the early modern period, trying to determine just how 'special' the rise of the West was. Moreover, each of the five parts of the book starts with a brief statement of the question that is specifically addressed there, followed by a number of chapters that try to deal with the specified issue.

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A last remark about geography: this is a book about Western Europe, the region to the west of a line running from Petersburg to Trieste, which, following Hajnal (1965), is probably best characterized by its demographic system. This definition of Western Europe also corresponds to the ‘Latin West’, the region strongly influenced by the institutional, and socio-political changes that occurred from 900 to 1300. The other important regional entity I frequently refer to in this book is the North Sea region, which here comprises the Low Countries and England; for reasons explained in part II, this part of Western Europe developed its own dynamics in the late Medieval period.
PART ONE

MEDIEVAL FOUNDATIONS
CHAPTER ONE

INTRODUCING THE PROBLEM: THE EMERGENCE OF EFFICIENT INSTITUTIONS IN THE MIDDLE AGES

New Institutional Economics and the Efficiency of Institutions

Economic historians, inspired by Douglass North and his broad reassessment of new institutional economics, tend to believe that the quality of the institutional framework of a nation or region has direct bearing on its economic performance. As explained in the introduction, the core assumption of this approach is that efficient institutions (‘rules that constrain behaviour’) reduce transaction costs and thus increase market exchange, specialization, and therefore economic growth. The way to test such a hypothesis would be to develop methods for measuring the efficiency of institutions, and link such measurements to observable economic performance. Much of the work in this field has, however, focused on the supposed efficiency of certain specific institutions, such as merchant and craft guilds, systems of property rights and tenure (how efficient is sharecropping?), or on the efficiency of the commons and their abolition via enclosures. Typically, new contributions to this literature have suggested that institutions that were previously considered ‘conservative’ and ‘inefficient’ – such as guilds and commons, manors, or sharecropping – were surprisingly efficient, if the functioning of these institutions were examined more closely. Guilds, for example, took care of the efficient transfer of knowledge and technology between generations (and between regions via wandering journeymen), stabilized labour and product markets, guaranteed the quality of products (necessary for domestic consumption and export), and were an efficient source of taxation for (local) government (Epstein, 1998). Some have argued that this sounds too good to be true, and that revisionism ignores the ‘dark side’ of institutions such as the guilds – namely, that they excluded outsiders (e.g. women), monopolized markets, and tried to suppress innovation (Ogilvie, 2007).

One of the problems with this approach, which tries to determine how efficient different institutions were, is that all institutions are
embedded in a specific social, political, and cultural context, and therefore are interdependent and interconnected. Moreover, there is a complex relationship between specific institutions and the ‘problems’ they are supposed to solve: particular institutions (such as, for example, a merchant guild) are often associated with more than one problem, and the solution to one particular problem by a specific institution often has consequences for the way other problems are handled as well (Gelderblom, 2008).

A closely related issue is that it proved very difficult, if not impossible, to measure the effects of individual institutions on transaction costs and performance. The quantitative measures of the success of institutions that have been developed in the past few decades are almost always proxies of the degree of efficiency of markets; they therefore measure the results of a complex set of interrelated institutions that in combination cause markets to perform better or worse. Hence, they do not measure the effects of individual institutions as such. The discussion on the long-term effects of the Glorious Revolution is a case in point: different ways of assessing its impact have resulted in very different measures of its success, or lack thereof (North and Weingast, 1989; see Clark, 2007 for a contrasting view). The point is that the institutions of a given society form a more or less coherent system, which makes it almost impossible to assess the efficiency and growth enhancing effects of individual ‘rules of the game’. It seems that, in order to test the links between institutions and performance that are suggested in the theoretical literature, we have to focus on the institutional systems as integrated wholes to try to establish the effects they have on growth, rather than try to establish the effect of any specific institutions.

In the light of the Great Divergence debate we can specify this question to one about the relative efficiency of the set of institutions governing economic life in Europe and Asia. The question is therefore: can we assess the relative efficiency of the institutions of Western Europe with respect to those in other parts of the world (China and Japan, specifically); and, if Western Europe appears to have comparatively high-quality institutions, when did they arise – and why?

The literature suggests a number of ways to assess the quality of the institutional framework of an economy, although the amount of systematic historical research on this issue is surprisingly small.¹ What

¹ See Acemoglu and Johnson (2005) for various indicators of the efficiency of current institutions, which can however not easily be applied to historical research.
we propose here is to develop specific comprehensive measurements to
assess the quality of the institutional framework of a society, and use
these measurements to determine how efficient institutions in Western
Europe were, and how they compared with institutional frameworks
elsewhere. There are three groups of elements that can shed light on
institutional efficiency.2

The first group consists of elements that can measure the extent to
which institutions guarantee property rights and promote trust:

• The interest rate is probably the classic measure of the extent to
which the institutions in a particular society protect property rights
(of debtors and creditors) and enhance the amount of trust in a
society, and therefore a low interest rate is arguably the best proxy
of the quality of the institutional framework (North, 1981; De Soto,
2000; Reis, 2007).

Interest rates are not always easily to observe (due to lack of sources);
indirect indicators, which are linked to interest rates, are:

• The skill premium, the difference between the wage of a skilled
labourer and that of an unskilled labourer, is closely related to the
interest rate; as we will see in Chapter 5, the skill premium is the
reward for investment in human capital; this investment in human
capital involves not earning an income during (for example) an
apprenticeship period, in return for the higher income that is going
to be earned after the training period; when interest rates are low, a
relatively low skill premium will already be sufficient to make such
an investment worthwhile (but, as we will see in Chapter 5, the skill
premium also measures the extent of efficiency of labour market
institutions); in brief, a low skill premium reflects the trust one can
have in getting future returns on skill formation.

• The seasonal variation in grain prices, which, following the seminal
paper by McCloskey and Nash (1984), can also be interpreted as a
proxy for interest rates (and related storage costs).3

2 A fourth approach to measuring the efficiency of various kinds of institutions
also making it possible to distinguish between horizontal and vertical institutions, is
developed in Bosker, Buringh and Van Zanden (2008).
3 The McCloskey and Nash (1984) hypothesis is that the higher the interest rate,
the more expensive it will be to store (for example) grains after the harvest, the larger
the seasonal variation in grain prices will be; in fact, the price of these grains in month
A second group aims to measure the extent of market integration in an economy, the assumption being that efficient institutions reduce transaction costs, and therefore lead to high levels of market integration. Direct measures of market integration are:

- The variability of (annual) prices, reflecting the extent to which markets are able to cushion shocks via trade: generally, there is low variability in market systems with low transaction costs and high volumes of trade, where such shocks can easily be absorbed by trade, and high variability in poorly developed market systems;
- The convergence of prices: the extent of correlation and mutual dependence of markets – high convergence pointing to a highly developed market system and vice versa; Studer (2007) demonstrates in an analysis of grain markets in eighteenth and nineteenth-century India that the different criteria for assessing the efficiency of markets – variability of, and correlation between markets – yield very similar results, indicating that these measures all relate to the efficiency of the underlying institutions.

In practice, most historical studies of the extent of market integration measure the depth and breadth of the market for grain, but similar methods can and have also been applied to financial markets (Neal, 1990, for example, studying the eighteenth century).

It may be possible to add a third group of indicators that measure the level of development, the ‘depth and breadth’ of factor markets. Historically, in most societies members of a household can earn their livelihood by becoming wage labourers or by keeping the market ‘at arm’s length’ via subsistence production. Transaction costs will (partially) determine this decision: when factor markets are weak and unreliable and trust in markets is low, in short, when transaction costs are high, the alternative of subsistence production will be more attractive than in a situation of perfectly working markets which can be relied upon. Therefore, if a large part of the population is active on the labour market, this may indicate that institutions are efficient and transaction costs relatively low. On the basis of a similar logic, the

\[ t+1 = \text{price in month } t + \text{monthly interest rate} + \text{additional storage costs}; \] see also Poynder (1999).
the emergence of efficient institutions 21
extent of participation in the capital market (via savings or borrowing money) may be a proxy of its efficiency.

Theoretically, all these criteria would be expected to point in approximately the same direction: once institutions are efficient and transaction costs are low, institutional economics predicts low interest rates, high levels of market integration, and dense markets. The factors enhancing exchange also seem to reinforce one another. Economic theory postulates that reputation mechanisms are very important for sustaining exchange – they are a key institutional ingredient in any market economy (Greif, 2006). Reputation mechanisms cause people to behave well (to keep their promises and adhere to their contracts) because they fear being excluded from future transactions if they renege on promises. Such a sanction will depend on the number of transactions that can be expected in the future (from the network in which the actor operates), and on the interest rate (which translates the value of future transactions to their present worth). In short, people will tend to behave well and enhance trust in their behaviour when interest rates are low and the current value of future transactions is therefore high, and when they expect many transactions to occur in the future. The level of markets exchange in general and of interest rates in particular will therefore explain to a large extent (if this theoretical approach is correct) the efficiency of trade networks and the degree of trust on which they are based (see the more detailed analysis in Grantham, 1999). It also follows that there may be multiple equilibria in the long-term move from thin markets and high transactions costs (and therefore high interest rates) towards high levels of market participation and low transaction costs. It has, for example, been observed that South-East Asia seems to have been on a thin markets/high interest rates trajectory for the past few centuries, and appears to be unable to move to another equilibrium (Henley, 2008; Van Zanden, 2004).

An important distinction that can be added, made by Acemoglu and Johnson (2005), is between political (or property right) and economic (or contracting) institutions. Greif (2006) has argued that the dynamic commercial (and urban) development of Western Europe compared to the Arab World was based on the superiority of its institutions regulating market exchange. His views differ from those of North (1981, 1990), who has maintained that it were mainly the political institutions constraining the predatory behavior of states that made Western Europe exceptionally successful. All measures suggested here, to some extent reflect both aspects of the equality of the institutional framework of
a region or country, but the level of market integration (controlled for distance between markets) probably comes closest to measuring the ‘horizontal’ institutions that Greif thinks are most important, and interest rates, as suggested by North (1990, p. 69), arguably to a large degree reflect long term trust and property rights protection.

With this list of criteria for institutional efficiency we can try to answer the question: how efficient were European institutions before the Industrial Revolution? And if so, when did this increased efficiency begin? The main argument of this chapter will focus on the first group of criteria, especially on interest rates, as they are the easiest to measure, but other indicators will be used as well.

Global Distribution of Interest Rates and Other Measures of Institutional Efficiency

Interest rates are a good starting point. Studies by Clark (1988, 2007) and Epstein (2000) have demonstrated that in Western Europe interest rates declined significantly during the late medieval period and reached a level of 5 to 6% as early as the fifteenth century. This level of interest is still normal today. These results are consistent with studies that analyse seasonal patterns in grain prices by McCloskey and Nash (1984) and Poynder (1999), which also point to a sharp fall in interest rates (and seasonal variation) in the late Medieval period. In addition, Figure 2 provides the results of recent research on interest rates in the Netherlands by Zuijderduijn (2007), showing the typical long-term pattern of the decline of interest rates in this part of Western Europe (see the almost identical figure in Clark, 2007, p. 169).

The transition to an economy characterized by relatively low interest rates occurred in Western Europe during the fourteenth and fifteenth centuries. But what do we know about interest rates in the rest of Eurasia? Adam Smith was convinced that interest rates in Europe, especially in Great Britain and the Netherlands, were much lower than in China: ‘twelve per cent accordingly is said to be the common interest of money in China’, he stated, whereas he considered 3 to 4.5 per cent to be normal in Great Britain (Smith, 1776/1976, p. 198). The extreme

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4 The number of observations before 1250 is limited, due to the fact that the capital market was rather thin at that time, but this does not affect the main point of Figure 2, that is that during the 13th century a capital market emerged with already relatively low interest rates.
of the spectrum of interest rates was probably Southeast Asia. Recently a discussion began about the causes of the ‘high interest rates/thin capital markets’ equilibrium trap, which characterized this region in the seventeenth century – and in which it still seems to be trapped (see Henley, 2008). The ‘normal’ interest rate found by Boomgaard (1986), for example, in an in-depth study of the capital market in Buitenzorg (near present-day Jakarta) in 1805 was 40 to 50% (also Van Zanden, 2004). In another paper about interest rates for credit transactions of the East India Company in seventeenth-century South and Southeast Asia, he shows that such high rates were not unusual in Southeast Asia, but that in general they were somewhat lower: 24–36% in Jambi (on Sumatra), 18–24% in Banten (on Java), and about 24% in Thailand. In India, the VOC (East India Company) paid or received (the Company was both a debtor and a creditor) 12–18% in Coromandel and Bengal, and somewhat less in Surat (Boomgaard, 1996). At the same time, in the Netherlands the Company was able to borrow at 3.5 to 5%. Other sources confirm that relatively high interest rates were normal in South Asia. Divekar (1989, p. 44), for example, in his study of ‘Prices and Wages in Pune Region’ quotes sources stating that 24% was considered the usual rate of interest, but that small sums were often borrowed at higher rates (up to 75% for small loans in kind).

But perhaps it is more relevant to look at China, especially the lower Yangtze delta, where, following Pomeranz (2000) and Li (1998) relatively advanced institutions were found. James Shih (1992, p. 29) observed that, during the early Ming period in the lower Yangtze delta, ‘customarily,
if one borrowed one shi of rice, one had to pay back two shi after the autumn harvest; if one borrowed money (i.e., silver or copper cash), one had to pay 50 percent yearly interest. In the same period, the fifteenth century, the normal return on loans among merchants in Suzhou was a monthly 2 percent (Marmé, 2005, p. 145). In the seventeenth and eighteenth centuries, Chinese interest rates had clearly come down from these very high levels. It is an interesting reversal from European patterns, where wealthy merchants were always the source of royal credit, that the great salt merchants of Yangzhou borrowed large sums of money from the Imperial Household Department in Beijing at a ‘rock-bottom’ interest rate of 10%. (Finnane, 2004, p. 121). The best information on eighteenth-century interest rates is in the study by Paul van Dyke (2005, pp. 154–56) on the Canton Trade, analysing the many credit transactions between European and Chinese merchants in this period. Europeans borrowed money from other Europeans (and sometimes from Chinese merchants) at about 10 to 12% annually, whereas interest rates on loans to Chinese merchants were much higher, at 18 to 36% (or 1.5 to 3% per month for short-term loans). We can conclude that Adam Smith was right: interest rates in China were much higher than in Western Europe, even when they probably showed a declining trend in subsequent centuries.

The available data for Korea point in the same direction; according to Jun and Lewis (2007) the interest rate in eighteenth and nineteenth-century Korea fluctuated from 25 to 50%, with an average of 37%. Japan is probably the major exception in Asia. Studies of the Osaka capital market that emerged in the seventeenth century indicate that even from the start interest rates on credit between the large merchant houses were between 12 and 15% (Crawcour, 1961). Recent research by Saito and Settsu (2005) has shown that the long-term trend in Osaka was also clearly downward: interest rates on loans to daimyo declined from 12 to 13% in the first half of the eighteenth century to about 8% in the first half of the nineteenth century, a decline that was also found in other markets. Although not as low as in Western Europe, these low

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5 Shih (1992, p. 29); before 1367 a ‘normal’ rate of 4% per month is quoted, although the statutory ceiling was 3% per month (pp. 46, 271, note 44); on pp. 59–60 he also mentions a number of interest rates for late Ming which are lower (24% per year for example).
interest rates point to an increasingly efficient way of organizing capital market transactions.

When looked at from this angle, the view that Western Europe had already acquired an institutional framework that was relatively efficient in the Middle Ages – more efficient than institutions regulating the capital market and property rights elsewhere – seems to be confirmed by the evidence on interest rates. The study of the skill premium, which is the focus of Chapter 5 and will therefore only be summarized very briefly here, points in the same direction: from the late Middle Ages onwards the skill premium was quite low in Northwest Europe, much lower than in, for example, Korea, India, or Indonesia. The decline in the skill premium in Europe – which was concentrated in the period between 1350 to 1450 – appears to be concurrent with the decline in interest rate in the post-Black Death years, suggesting a link between the two (although, as Figure 2 makes clear, a large part of the decline of the interest rate occurred already in the twelfth or early thirteenth centuries). Two Asian regions seem to have approached the European level of skill premium: the south of China and Japan probably both had a skill premium (and therefore efficient institutions regulating the supply of skilled labour) comparable to the western European level, although the evidence for Japan is mixed. The North of China (including Beijing) had a relatively high skill premium (see Chapter 5 for details).

A different approach to the same issue – measuring the efficiency of market institutions – is to look at how markets for agricultural products such as wheat or rice actually performed. When transaction costs are low, one would expect high levels of market integration, and, as a result of the fact that local demand and supply shocks can be cushioned by trade between markets, a low volatility of prices. Söderberg (2004), for example, used measures of the volatility of markets to establish that grain markets in North Western Europe in Medieval Europe were much less unstable than those in the Middle East in the same period. In the early modern period some additional increase in market efficiency may have occurred (Persson, 1988; Jacks, 2004), but this has been contested by Bateman (2006), who has pointed out that already in the 15th century levels of market integration were already similar to those attained in the 18th century. If Bateman and Söderberg are correct, we have to go back to the late Middle Ages to find the genesis of the efficient markets characteristic of European economic development.
Recent research suggests that Indonesia (in particular Java) is a case of a rather poorly performing market system (Van Zanden, 2004); rice markets on Java in the first half of the nineteenth century were extremely volatile, which can be linked to the poor quality of institutions and the low level of commercial development of the region. An analysis of seasonal patterns also demonstrated that Javanese markets performed much more poorly than those of Qing China of early modern Europe (Van Zanden, 2004).

In order to add Japan, China and India to this comparison, we follow the lead of Shiue and Keller (2007) and Studer (2008) who have applied a common methodology to measure the degree of market integration in different parts of the world. They measure the correlation coefficients between pairs of markets, and relate them to the distance between them. There obviously is such a relationship, as transport and other transaction costs will increase with distance. By controlling for this, clear patterns of market integration can come to light: Studer, for example, demonstrated that levels of market integration in eighteenth century India were rather low, much lower than the high levels found in early modern Europe and China. Shiue and Keller pointed out that over long distances Chinese markets seem to have been more integrated than European ones, whereas on short distances correlation coefficients between European markets was (slightly) larger. For Japan Iwahashi (1981) has published a dataset for 14 market places between c. 1710 and c. 1860 which make it possible to establish the relationship between distance and correlation coefficients; for Indonesia the first set of similar data relate to 1878–1896. The details of this analysis will be presented in Chapter 9; here we present the most striking results (Figure 3). They demonstrate that in Japan between 1760 and 1809 markets are already highly integrated; the correlation coefficients are comparable and sometimes even higher than those found in Europe and China (for example, on the distance between 150–300 km, European values of the correlation coefficient range from .65 (1770–1794) to .94 (1931–1855), China for 1770–1794 is .74, and Japan is slightly higher at .75) (Studer, 2008, p. 407). Eighteenth century India is the other

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6 The price data have been made available on the website of the Global Price and Income History Group at UCDavis (at http://gpih.ucdavis.edu/); I thank Osamu Saito for his kind assistance in interpreting the price data; more details about these data and their analysis will be presented in Chapter 9, where the Indonesian data will also be discussed.
extreme; at 150–300 km distance the correlation coefficient is only .26. Only in the late nineteenth century, after the transport revolution of railways and steamships, is Indian market integration comparable to that of eighteenth century Japan. In Indonesia levels of market integration at the end of the nineteenth century are still smaller than in Japan in the previous century, which is a striking result. The high level of market development in Japan is confirmed by other evidence. Osaka, the central hub of the commercial network in Tokugawa Japan had already in the late seventeenth century developed a futures market for rice (Takatsuki, 2007). One of the reasons for comparing Japan and Indonesia is that they have a similar geography, making it possible for a large part of the trade to use low cost coastal shipping. This may help to explain why Japan was able to have such a highly integrated market system by the 18th century; in Western Europe levels of market integration were on average much higher in the North-Sea and Baltic region than in the inland zone (Bateman, 2006). The fact that under similar geographical circumstances Indonesia did much more poorly, points to the importance of other factors, such as the efficiency of the institutions regulating exchange.

Figure 3. Market integration in Japan, Indonesia and India

Sources: Studer (2008), Shuie and Keller (2007), and own calculations based on Iwahashi (1981) rice price data in annual Colonial Reports of Indonesia (Indisch Verslag, 1878–1896)
Estimates of the size and extent of labour and capital markets are more difficult to find and compare internationally. The literature on the development of the labour market in Northwest Europe suggests however that as early as the fourteenth or fifteenth century a large part of the population – ranging from one-quarter to one-half, and in some cases even more – was active in the labour market at least for part of the year (Dyer, 1989; Van Bavel, 2003, 2006). Over the life cycle, the extent of the labour market participation may even have been larger than that; in their teens and (early) twenties much more than half the population engaged in wage labour (or as servants or apprentices), and wage employment was a normal aspect of the life cycle for almost everyone living in either the countryside or the towns of England and the Low Countries. Chapter 4 discusses this feature of the labour market of the North Sea region in more detail, linking it to the demographic pattern in this part of Western Europe, which was characterized by small nuclear families. We have no similar studies for early modern China, India, Japan, or Indonesia, but the general impression that emerges from the relevant literature is that wage labour was much less common there (Saito, 2005b: for Japan; Boomgaard, 1990, 2005: for Southeast Asia). The only estimate in the literature is that in late Ming (sixteenth century) China, perhaps 1% of the rural population engaged in wage labour – a figure that is very different from the 30 to 60% estimated for England and the Netherlands (Xu et al., 1999, p. 37).

The conclusion that emerges from this survey of the various measurements of institutional efficiency is that from the late medieval period Western Europe already had a relatively efficient set of institutions, which led to low transaction costs, large-scale involvement of households in factor (and product) markets, and a high degree of market integration. In particular, the very low interest rates suggest that property rights were well respected, and that a relatively high level of trust was common in Western Europe, which was especially important for the development of labour and capital markets. The comparison of levels of market integration suggests that Europe did not perform better than Japan and China in that respect. The relative advantage of Europe was therefore probably related to the quality of its ‘vertical’ institutions, regulating the relationships between state and citizens; ‘horizontal’ contracting institutions may have been equally efficient in eighteenth century China and Japan. Acemoglu and Johnson (2005) have pointed out that for the explanation of recent economic performance these
vertical institutions seem to be much more important than horizontal institutions, a conclusion consistent with recent economic historical research (Bosker, Buringh and Van Zanden, 2008). Viewed from this perspective, it should come as no surprise that this part of the world was able to generate long-term economic change to an extent that was probably unknown in other parts of the world as predicated by new institutional economics. In other words, the genesis of ‘modern economic growth’ in Western Europe was not accidental, but the result of the relatively efficient institutions that were characteristic of the region from at least the fifteenth century onwards.

By all measures the institutional efficiency of Western Europe contrasts sharply with the poor performance of institutions in south and south-east Asia (India and Indonesia in particular), where markets were much less integrated, interest rates were high, and also the skill premium was much higher than anywhere else. Before 1850 labour markets are relatively marginal, even in the more densely populated regions such as Java (Boomgaard, 1990); parts of India are the exception here, because we do find relatively high levels of wage labour in a few areas of the subcontinent (Lucassen, 2005).

This survey also suggests that the only regions that compare well with Western Europe in terms of skill premium, and in particular in the degree of integration of rice or grain markets were, unsurprisingly, Tokugawa Japan and Qing China. From the (late) seventeenth century onwards, both regions showed similar signs of institutional maturity, although in some respects – for example, their participation in the labour market – they remained significantly different from Western Europe. Moreover, since (at least) the same level of institutional maturity had already been realized by Western Europe in the century following 1350, this implied that Europe had a head start of at least a few hundred years. Looking at interest rates and capital market efficiency alone, the leading position of Western Europe was completely unchallenged: no part of the world had interest rates as low as 3 to 5%, as were by then usual in seventeenth and eighteenth-century Netherlands and England.

The question that is addressed in Part I is why, as early as the fifteenth century, institutions in Western Europe were notably efficient. When exactly did these relatively efficient institutions emerge? The century after the Black Death of 1347/48 is perhaps the obvious candidate, because the decline in interest rates from about 10–12% to 6% occurred
at that time (Figure 2). This period has therefore so drawn the attention of economic historians (Clark, 1988, 2007; Epstein, 2000; Zuijderduijn, 2007); Clark (2007, pp. 171–175) has, for example, speculated about a rather sudden change in time preference in this period. Our global overview of interest rates suggests, however, that the pre-Black Death level of 10% was already quite low (in the Yangtze Delta, for example, interest rates were 24% or more). Moreover, the decline between 1350 and 1450 can to a large extent be explained by factors related to supply and demand, which brought interest rates closer to the minimum that reflected transaction costs. The first stage of the fall in interest rates, which occurred well before 1300, was more fundamental and was related to important changes in the institutional structure of European medieval society. These changes also facilitated the second stage of decline after 1350, as will be explained in chapter 4, which deals with institutional change in the late Medieval Period.

That the decline in interest rates after 1350 may be caused by changes in demand and supply is clear from a brief review of these factors. The period before the Black Death of 1348, or perhaps before the Great European Famine of 1315–17, which was probably the turning point in many parts of Western Europe, was one of rapid population growth and strong economic expansion. Investment activity was extremely high for both religious and economic reasons. This was the period during which the great reclamations of agricultural land occurred, and the large forests that still covered substantial parts of Europe before 1100 disappeared, in which the basic infrastructure of roads and bridges in Europe was constructed, in which cities emerged and their walls and churches were built, and in which many thousands of fortified castles sprang up in the countryside. This spectacular investment boom ended in the first half of the fourteenth century, as is clear from the number of church building projects started in England in these years (from Dyer, 1998, p. 102). Moreover, the process of urbanization – one of the driving forces behind the investment boom – began to slow during the thirteenth and fourteenth centuries (see chapter 2).

The Black Death of 1347–49 suddenly changed the parameters of this economy. Investment activity dropped dramatically, perhaps for lack of funds but also because there was no longer any need to invest in new buildings or infrastructure. Because the population declined by one-third (ranging from perhaps 20% in the Low Countries to perhaps as much as one-half in England), and capital stock was unaffected by these changes, the ratio between available capital and population...
changed suddenly. The demand for capital fell dramatically, but real incomes went up, which may have increased savings per capita. At the same time, demographic changes, resulting in the emergence of the nuclear household and the European Marriage Pattern, also enhanced savings (Chapter 4). In sum, the strong decline in population from 1350 to 1450 led to an increase in savings per capita and a decline in investment, both favouring reductions in interest rates. The halving of interest rates in this period can thus be explained by changes in supply and demand. As a result, Western Europe, which had been a capital scarce and labour abundant economy before 1315, now became an economy with low interest rates and high real wages.

What follows from this interpretation of the decline in interest rates from 1350 to 1450 is that the most important institutional changes, which helped bring along the very low levels of interest rates characteristic of post 1450 Western Europe, may already have occurred before 1300. As Figure 2 suggests, the first phase of the decline in interest rates took place during the twelfth and thirteenth centuries, when rates fell from levels that were ‘normal’ in the world economy at the time (about 30% and more) to the 10–12% that was characteristic for pre-1300 Western Europe. It is to the medieval foundations of this development, which were laid during the centuries from 950 to 1300, that we now turn for an explanation of why Western Europe in the centuries before 1300 managed to develop a set of institutions that were more efficient than those found elsewhere.

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7 Income redistribution favoring low income earners may however have cancelled out some of this effect: real wages, for example, approximately doubled, whereas incomes from land and capital fell relative to other sources of income.
CHAPTER TWO

WHY THE EUROPEAN ECONOMY EXPANDED RAPIDLY IN A PERIOD OF POLITICAL FRAGMENTATION

Introduction

Around 1000 Western Europe was an economically underdeveloped and marginal part of the Eurasian continent. It was undeniably backward when compared to the flourishing societies of Sung China and the Arab world, which both experienced a period of brilliant expansion in these years. The Latin West, as the region was often called at the time, was also relatively small compared to its close and distant rivals. Apart from the former Carolingian Empire, it included the British Isles and Southern Italy and, increasingly, from 950 to 1350, Central Europe and Scandinavia, while Islamic civilization covered an area stretching from the Umayyad Caliphate, centred around Cordoba in southern Spain, to Samarkand in Uzbekistan, and at times reached to China. Moreover, Europe was sparsely populated; both Sung China and the Islamic world had a much larger number of inhabitants. More importantly, Europe was principally agricultural, with a low level of urbanization (this was true even in Italy, the urban centre of the region before 500), backward technology, low levels of commercialization and market exchange (again, compared to China and the Middle East), and a predominantly illiterate population.

All this changed radically in the course of the High Middle Ages. During the long period of prosperity that lasted from about 950 to 1300, Western Europe probably became the most highly urbanized region in the world. Joseph Needham (1970, p. 414), the expert on Chinese civilization and technology, estimated that by the fourteenth or fifteenth century, Europe's economic development surpassed China's development, and it had by then probably already overtaken the centres of economic development in the Middle East. During the 'big boom' of the Middle Ages, Europe's population increased by 100 to 150%. Moreover, the Western European economy became very dynamic and innovative, both by importing new technology from abroad (mainly from the Middle East) and by developing its own new techniques. In short, a veritable economic revolution occurred, which also established
After sketching the outline of the ‘big boom’ between 950 and 1300, this chapter focuses on the underlying institutional changes behind the revival of Europe’s economy. What is especially striking is that this transformation of the European economy occurred in a period of political fragmentation. The number of states in continental Western Europe increased from fewer than 10 in 800 – when Europe was dominated by the giant empire of Charlemagne – to more than 200 in 1300. The exact number depends on how exactly an ‘independent’ political entity is defined. How, for example, should we classify the Holy Roman Empire in different periods and regions, and when does a semi-independent city become a city-state? That the number of political entities by any definition increased dramatically is quite clear, however. The combination of rapid economic development and political fragmentation is counter-intuitive. There is a certain logic to the argument that economic growth, especially the growth of trade, is positively related to the size of political entities (Epstein, 2000). Large empires have in the past often produced flourishing economies. An important argument in the recent reassessment of Chinese economic development during the Ming and Qing, for example, is that it was able to generate large internal trade flows, possibly comparable in size, and perhaps even larger, than trade flows within the European economy at the time (Pomeranz, 2000; Shiue and Keller, 2007). The Pax Romana is another striking example: the establishment of long-lasting peace and (a certain measure of) stability in the Mediterranean as a result of the Roman conquests without a doubt had a strong positive impact on the economy of the area. The conquest of the Middle East by the Muslims in the seventh and eighth centuries resulting in the creation of the Umayyad empire also led to a booming economy, as barriers to trade disappeared, the region was unified by one ruling class speaking one language and imposing the same institutions (Bosker, Buringh and Van Zanden, 2008). Similar, but less spectacular perhaps, was the impact of the Carolingian Empire created during the eighth century. Again we see a significant expansion of trade linking the various parts of the Empire together, from Pavia

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1 Cf. Tilly (1990) for a discussion of these issues; he seems to arbitrarily set the number of states in Europe in 1490 at 200, arguing that “no plausible set of definitions yields fewer than 80 distinct units or more than 500”. 
in the south to Dorestad in the north (McCormick, 2001). It can be argued that the development of the process of European economic integration after 1945 was driven by the same idea: greater political unity enhances trade, specialization, and growth. It is also not difficult to find examples of political disintegration that led to economic decline. The twentieth century has many examples, such as the disintegration of the Habsburg and Ottoman Empires, let alone what occurred in Western Europe after the collapse of the Roman Empire in the fourth to sixth centuries. Post-Moghul India during the eighteenth century is another case in point (Bayly, 1983).

This chapter deals with what at first sight appears to be an exception to this general pattern: Western Europe from 900 to 1300 experienced increased political fragmentation yet saw a spectacular expansion of its economy. Not only does the number of states ‘explode’, at the same time (especially during period from 950 to 1050), many of these political entities showed signs of ‘implosion’, of a declining ability to bring law and order to their realms. This has been termed (perhaps somewhat inappropriately) the ‘Feudal Revolution’, as the fragmentation of political authority at higher levels went together with the rise of ‘strong men’ at lower levels of authority, who began to build their own mini-states around their castles. This decentralization of political power often resulted in continuous warfare among the local lords, but at the same time led to an intensification of power at the local level.2

At the time of this political fragmentation, we nonetheless also see a remarkable and continuous growth of trade and industry. This boom is clearly visible during the eleventh to thirteenth centuries, but may have already begun in the second half of the tenth century following an initial setback during the first half of that century, partly due to invasions by Magyars and Vikings.3 At the same time, the population grew rapidly and the level of urbanization increased continually. In sum, one of the most spectacular and long-lasting periods of economic expansion in European history occurred simultaneously with an extreme fragmentation of the political system. The aim of this chapter is to try to answer why this happened and which institutions facilitated these apparently

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2 See the discussion about the ‘Feudal Revolution’ by Bisson (1994) and Wickam (1997).

3 Cf. Lopez (1976), who, as do historians before and after him, dates the start of the ‘big boom’ at about 950.
Why the European Economy Expands Rapidly

The literature offers two hypotheses to explain this paradox. The first argues that the power vacuum left by the disintegration of the Carolingian Empire was to some extent filled by the Church and its institutions (such as monasteries), which were able to create a new institutional framework for European society in the process—a framework that also enhanced economic exchange. This hypothesis is, for example, suggested by Michael Mann’s *The Sources of Social Power*, where he argues,

> The social structure that stabilized Europe after the ending of the barbarian migration and invasions…was a multiple cephalous federation. Europe had no head, no centre, yet it was an entity composed of a number of small, crosscutting interaction networks…. Consequently no single power agency controlled a clear-cut territory or the people within it…. But the relationships between these multiple power networks were regulated. Order and not chaos prevailed. The major regulatory agency was Christendom, by far the most extensive of the power networks’ (Mann, 1986, pp. 376–7).

And similarly, ‘Christianity as a normative system has been neglected as a causal factor in the emergence of capitalism. It was not only the psychological impact of its doctrines (as in Weberian approaches to the problem) that boosted capitalism, but also that it provided normative pacification, in a Durkheimian sense’ (Mann, 1986, p. 377). The legal historian Harold J. Berman (1983), who analyzed the genesis of the European legal system and legal tradition in the wake of the ‘Papal Revolution’ of the eleventh century, saw this as the defining moment for the development of ‘Christianity as a normative system’.

The alternative hypothesis is that the power vacuum left by the disintegration of the Carolingian Empire created the preconditions for a process of ‘bottom up’ institution-building, of which the guilds—both merchant and craft guilds—and the (urban and rural) communes are the best examples. This argument has been developed in great detail in Greif’s (2006) analysis of the role of Italian merchant guilds. He perceived the genesis of a modern institutional framework for exchange in this period, and focused on the merchant guilds’ contribution to the reduction of transaction costs. Guilds were the underpinning of a ‘community responsibility system’ in which communities (i.e. towns) threatened to boycott one another if individual members of these
communities did not honour their obligations (for example, if they defaulted on their debts) (see also Greif, Milgrom and Weingast, 1994). In a recent paper, De Moor (2008) argued that the emergence of the guilds was part of a much broader process of ‘bottom up’ institution-building, a ‘silent revolution’ that consisted of the formation of communes, commons, and craft guilds. She makes the point that these new organizations, which all took the form of public bodies (*universitates*), played a key role in the creation of new institutions that enabled the strong growth of exchange in this period. I will refer to this interpretation as the Greif-de Moor hypothesis.

Additionally, there was a third way of filling the power vacuum that emerged in Western Europe after 950: the feudal revolution of local knights, already mentioned above. These local knights greatly intensified their control over rural resources in the tenth and eleventh centuries, leading to the rise of banal lordship and manorialism in large parts of the continent. The combination of these three institutional changes had important long-term consequences for Western Europe. It will be argued that especially the ‘top down’ and ‘bottom up’ movements reinforced one another. The strength, durability, and success of the ‘bottom up’ process of institution-building, for example, cannot be explained without the (partial) ‘top down’ pacification by the Church, which also supplied the legal and political concepts for the ‘silent revolution’. More importantly, it is the combination of these responses to political fragmentation that explain the unique institutional framework that emerged in Europe from 1000 to 1300.

One dimension that should be added to this discussion, because it is so central to both developments, is the growing importance of the written word as a source of information, which was happening during these centuries, and which markedly accelerated in the course of the eleventh and twelfth centuries (Mostert, 2006). I argue that this process was intimately linked to the fundamental changes in the power structures of Western Europe that occurred in these years; again the Catholic Church and its institutions, such as the monasteries, played a fundamental role. As an important spin-off, the process created a greatly expanded demand for literacy and related skills, which set in motion the process of knowledge accumulation that would prove to be of fundamental importance for long-term economic development in Western Europe.
Did Political Fragmentation Affect Economic Development?

How harmful to economic development was the process of political fragmentation in the centuries from 900 to 1300? One of the ways to understand the links between these processes is to look at the various regions of Western Europe, which to some extent had their own economic and socio-political trajectories. Fragmentation was the overall trend in European political and institutional history in these centuries, but not all regions experienced this process to the same extent. Developments on the continent were different from those on the British Isles. The former was largely united in the eighth century by Charlemagne, although this empire disintegrated quickly after 830. It was precisely in the core region of the Carolingian Empire, in contemporary France, that the implosion of political authority was worst in the tenth century; much of the literature on the feudal revolution is based on sources dealing with the western part of the former Carolingian Empire (cf. Bisson, 1994). By contrast, from the ninth century onwards and especially after the Norman invasion of 1066, the British Isles were already involved in a process of centralization that created the beginnings of a unified state. But even on the continent the pace of political change differed from region to region: unlike the implosion of the state in the French regions, the Holy Roman Empire continued to do well until the late eleventh century (when it was undermined by the struggle between Pope and Emperor). But from the mid-eleventh century onwards, these two regions went in opposite directions: political disintegration accelerated in the central belt of Europe stretching from Northern Italy to the Low Countries, driven by the ‘bottom up’ processes that will be analyzed below, whereas the first signs of renewed state-building appeared in France and Denmark (and the process was already in progress in England). By 1300 new polities outside this urban belt, in England, France, Iberia, and Denmark, had emerged that formed the nucleus of the nation-states that developed there in the early modern period.

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4 A series of maps illustrating these processes is available on http://www.euratlas.com/history_europe/europe_map_0800.html.
One way to test if fragmentation mattered – or if alternative institutions had emerged that were able to compensate for the effects of political fragmentation – is to look at how different parts of Western Europe developed in these years. Did politically centralized parts (such as England) develop more rapidly than fragmented regions? Finding answers to this question is not easy, however. Estimates for even the most basic facts, such as the size of population, are very rough and fragmentary. Still, it is possible to put together estimates of certain key indicators that suggest some of the important long-term trends.

There is no doubt that the population of Western Europe as a whole greatly increased from 900 to 1300. Estimates by Russell (1972) and McEvedy and Jones (1978) suggest that population growth during the High Middle Ages was to a large extent determined by distance from the Mediterranean, where population density was highest initially. During the great medieval boom, population levels in Iberia and Italy increased by 100 to 150%, whereas in the Low Countries and England the increase was much more dramatic, perhaps as high as 300%. Other parts of Europe, such as Germany and France, experienced increases between these two extremes. A link with the process of political fragmentation is not clear from this evidence; politically fragmented regions (the Low Countries or Italy) grew as much as comparable unified states (England and Spain).

Urbanization is probably an even better index of economic development than the growth of population as such. The Arab historian Ibn Khaldûn (c. 1375) already made the point that “The more numerous and the more abundant the population in a city, the more luxurious is the life of its inhabitants” (Boulakia, 1971), or that income per capita increases with the level of urbanization and the size of cities. Thanks to Bairoch et al. (1988), it is possible to approximate very roughly the development of the urbanization ratio, defined as the portion of the population living in cities of more than 10,000 inhabitants (see Table 1). All estimates for the period before 1000 are very tentative, and probably urbanization was underestimated because sources are extremely scarce. On the other hand, large cities of more than 10,000 inhabitants can be expected to have left at least some traces. The last column of Table 1 contains the estimates of the urbanization ratio for 1500 by Jan de Vries (1984a), which are roughly consistent with the Bairoch estimates for the fifteenth century.

Table 1 shows a number of interesting patterns. In Iberia there was a sudden rise in urbanization after the Islamic conquest in the eighth
century, followed by a gradual decline in urbanization in the centuries after 1000.\textsuperscript{5} Italy experienced greater continuity in its urban pattern than the rest of Western Europe, and levels of urbanization were relatively high there even before 900. This area was also very much part of the general increase in urbanization from 900 to 1300 (see also Malanima, 2005, p. 108). In the northern part of Western Europe, the number of large cities was very limited before 900, and the growth of urbanization was more gradual, largely coinciding with the big boom in population levels. But it also appears that the urbanization process accelerated as early as the tenth century, when the total number of inhabitants in these cities doubled, and again showed a major spurt from 1100 to 1300 (see also Dyer, 1995 for a very similar chronology of urban development in England; and Verhulst, 1989). This increase in urbanization ended in the twelfth or thirteenth century in most countries, but continued into the ‘crisis of the late medieval period’ in the Low Countries.

Perhaps more important – but almost impossible to quantify – was the underlying development in the urban system. In large parts of Western Europe an integrated urban system arose, for which cities with more than 10,000 in habitants were only the tip of the iceberg. Actual levels of urbanization were much higher than suggested in table 1: 15% to 20% in England, for example (Dyer, 1995). Moreover, quantitative analysis of the degree of interaction within the urban system demonstrated that between 1000 and 1200 those towns and cities were increasingly linked in an integrated system (Bosker, Buringh and Van Zanden, 2008).

Before 1000 the size of states seems to have had a favourable effect on urbanization: the Carolingian Empire resulted in a modest increase in urbanization in Germany and France (and in the Low Countries; see Verhulst, 1989), and the highest levels of urbanization were found in the emirate of Cordoba, which dominated Iberia and parts of North Africa until the first half of the eleventh century. After about 1100 the

\textsuperscript{5} Bairoch et al. (1988); the estimates were corrected for a few extreme outliers: Cordoba (on the basis of Glick, 1979) and Palermo (email exchanges with Jeremy Johns and Larry Epstein April 2006); according to Bairoch et al., Cordoba was supposed to have had 450,000 inhabitants in 1000 (but only 110,000 according to Glick), Palermo’s size was 350,000 according to Bairoch et al., whereas our estimate is 60,000; the other estimates in the Bairoch dataset look more realistic; also the estimates for London in the Bairoch dataset are too low and inconsistent with recent work (see Campbell, 2000, pp. 429–433). These estimates are available on the Website http://www.iisg.nl/bibliometrics/urbanisation800–1500.xls.
relationship shifted to a negative association between urbanization and political centralization. More or less unified states such as England or France tended to have (slightly) lower levels of urbanization than the politically fragmented central belt of Europe, especially compared to the extremes in the Low Countries and Northern Italy. Political fragmentation was to some extent the result of an increase in the size and power of cities, making it difficult if not impossible for kings to maintain the integrity of their domains or to create a centralized state structure (cf. Tilly, 1990). Moreover, centralized states may have repressed the growth of cities or induced patterns of urban growth in which the urban landscape was dominated by one large capital city (such as London).

The next chapter presents estimates of the development of book production in the various parts of the subcontinent, which can also shed some light on the long-term trends in the Medieval economy (see Table 3 in Chapter 3). These data reflect developments discussed so far: the increased prosperity of the European economy during the Carolingian Renaissance of the eighth and ninth centuries, when the centre of gravity of book production moved from the south (Italy) to the core region of the Carolingian Empire in northern France and neighbouring areas of contemporary Belgium and Germany. This was followed by a marked, almost pan-European decline in book production.

### Table 1. Estimates of urbanization ratio (portion of the population living in cities with more than 10,000 inhabitants), sixth to fifteenth centuries

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<th>13</th>
<th>14</th>
<th>15</th>
<th>1500</th>
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<tr>
<td>Bohemia</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.6</td>
<td>0.9</td>
<td>2.0</td>
<td>4.3</td>
<td>5.9</td>
<td>1.7*</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>British isles</td>
<td>0.0</td>
<td>0.4</td>
<td>2.4</td>
<td>3.1</td>
<td>2.2</td>
<td>2.2</td>
<td>2.5</td>
<td>2.1</td>
<td>2.0</td>
<td>4.2</td>
<td></td>
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<tr>
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<td>0.5</td>
<td>2.1</td>
<td>2.9</td>
<td>3.6</td>
<td>4.9</td>
<td>5.7</td>
<td>5.5</td>
<td>6.1</td>
<td>6.7</td>
<td>4.2</td>
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<tr>
<td>Belgium</td>
<td>0.0</td>
<td>0.0</td>
<td>3.0</td>
<td>9.9</td>
<td>12.5</td>
<td>15.0</td>
<td>26.2</td>
<td>29.6</td>
<td>21.1</td>
<td>15.8</td>
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<tr>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.0</td>
<td>2.2</td>
<td>4.1</td>
<td>4.7</td>
<td>10.4</td>
<td>15.8</td>
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<tr>
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<td>0.9</td>
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<td>3.5</td>
<td>4.8</td>
<td>5.8</td>
<td>5.3</td>
<td>4.7</td>
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<td>5.0</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.5</td>
<td>1.0</td>
<td>1.3</td>
<td>1.3</td>
<td>1.7*</td>
<td></td>
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<tr>
<td>Italy</td>
<td>3.0</td>
<td>1.8</td>
<td>3.0</td>
<td>4.3</td>
<td>9.9</td>
<td>14.3</td>
<td>13.0</td>
<td>13.2</td>
<td>13.6</td>
<td>13.1</td>
<td>12.4</td>
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<tr>
<td>Iberia**</td>
<td>0.0/4.5</td>
<td>0.6/10.0</td>
<td>2.4/13.5</td>
<td>3.5/16.4</td>
<td>3.2/13.2</td>
<td>5.6/36.2</td>
<td>7.6/23.3</td>
<td>9.6/13.8</td>
<td>5.7</td>
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<tr>
<td>European average**</td>
<td>0.6</td>
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<td>3.5</td>
<td>4.8</td>
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<td>6.1</td>
<td>6.7</td>
<td>6.9</td>
<td>5.6</td>
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</table>

* Austria and Bohemia are included together
** Iberia: first figure the Christian part only

Sources: Calculation based on Bairoch et al. (1988); Bosker, Buringh and Van Zanden (2008), and backward extrapolations on the basis of the 800-estimates; column 1500: De Vries, 1984a, p. 39 (in bold)
during the tenth century, reflecting the consequences of war and the absence of law and order. It is striking that this decline was especially pronounced in France, while Germany continued to do fairly well during the Ottonian Renaissance of the late tenth and early eleventh centuries, and the British Isles showed continued prosperity during the tenth century. All this suggests a positive link between state formation and economic performance in the period.

After 1100 these trends changed: politically fragmented regions (Belgium, Germany, and Northern Italy) perform very well, especially per capita. In the fourteenth century, the highest levels of book production can be found in these areas, and the link between political centralization and economic performance seems to be completely reversed. The shifting structure of urbanization helps explain the changes in the spatial patterns of book production, but it is not the complete story: monasteries, which were the most important centres of book production during the Middle Ages, were located mainly in the countryside (see Chapter 3).

What is perhaps even more striking about these trends is that – apart from the special pattern in Iberia (and to some extent Ireland, which is buried in the overall figures for the British Isles) – developments in the various regions in Western Europe show marked similarities, suggesting a pan-European trajectory during the Middle Ages. The Carolingian Renaissance had an impact everywhere in the Latin West, and the boom of 950–1300 was a truly European-wide phenomenon. The exception to these long-term processes appears to have been Iberia, which had a much earlier start (following the Muslim conquest), resulting in the flourishing of both urbanization and book production in the tenth-eleventh centuries, which was again followed by a gradual relative worsening economic situation. Therefore, one of the most important questions in European economic history is what was responsible for this uniformity; what caused the ‘Europeanization’ of Europe, to use a term coined by Bartlett (1993).

Current explanations of the causes of the big boom of the high Middle Ages focus on the supply side of the economy, in particular on changes in agricultural techniques preceding it. The early Middle Ages were a period of technological creativity, as, for example, Mokyr (1990, p. 31 ff.) has shown in a review of the literature. Lynn White (1962), the leading authority, hypothesized how an interrelated set of new agricultural techniques – the heavy plough, the three-field system, and techniques...
linked to using the horse as a source of power (the stirrup and the horse collar) – revolutionized agriculture, or at least created preconditions for a much higher level of agricultural productivity. Outside agriculture, there was the development of the water mill (later followed by the windmill), which, at least potentially, had a major impact on activities such as grain milling, fulling, and the iron industry (Mokyr, 1990, pp. 34–35).

The supply side explanation of the big boom has come under attack because some of the innovations probably had already occurred well before the Middle Ages. It is often almost impossible to exactly date the technological changes that were considered crucial (see the discussion in Verhulst, 1995, pp. 483–7; Fossier, 2000, pp. 54–57; Fossier, 2004, pp. 40–44). More importantly, this technological interpretation of the medieval boom ignores the fundamental problem of exchange, the problem of how institutions and trust can be created that make exchange possible (Greif, 2000, 2006). Agricultural historians have concluded that there were no serious supply constraints in pre-modern Europe: the flexibility of the agricultural system was such that increased demand could easily be met by growing supply. It was the growth of cities and international trade that caused the increase in demand, which in turn made possible an increase in agricultural productivity (the best survey of the relevant literature is Grantham, 1999). Therefore, important innovations in the agricultural sector as analyzed by Lynn White and others cannot have been the single cause of the economic boom of the period. To explain the boom, we need to establish what caused transaction costs to go down, and thus to promote market exchange, that in turn made possible the process of urbanization that occurred in this period. The explanation must be sought in pan-European processes specific to the Latin West (leaving the development of Islamic Spain aside), and which made it possible to compensate for (or perhaps even profit from) the political fragmentation occurring in the same period.6 Therefore, we

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6 An alternative hypothesis related to the development of trade was formulated by Pirenne (1922); he argued that the ‘exogenous’ closing of trade routes around the Mediterranean, the result of the conquests by the Muslims in the seventh and early eighth centuries, was the cause of the beginning of self-sufficiency and lower levels of income during the eighth and ninth centuries; similarly, the revival of international trade routes during the tenth century caused a transition that led to the boom of the High Middle Ages; his hypothesis about the development of international trade (and related indicators of economic performance) has been falsified by recent research (see Verhulst, 1989; McCormick, 2001).
need to address what the institutions were that developed in Europe in the period from 900 to 1300 which made possible this combination of a decentralized, if not fragmented, political structure and economic prosperity, a combination that was so unusual in world history.

*The Mann-Berman Hypothesis*

Our starting point is the disintegration of the Carolingian Empire and the further implosion of some of the polities that succeeded it in the following two centuries. It should be remembered, of course, that the power structure of the Empire was already closely intertwined with the Catholic Church: bishoprics and monasteries played an important role in keeping together the extensive power structures on which the Carolingian Empire rested. However, its disintegration set in motion a number of processes that would greatly increase the power of the Church. The reform of the monasteries through the movement originating in Cluny in 909 can be seen as a first response to political disintegration.\(^7\) An important element of the reforms proposed and carried out by the reformers from Cluny was that monasteries should no longer be semi-independent (as Benedictine monasteries had been), but should be part of a hierarchy controlled by abbots from Cluny itself, and indirectly by the bishop of Rome. This reform movement was an immediate success: estimates of the number of new monasteries show a significant increase during the tenth century, which seems to have preceded the economic upswing of the late tenth and eleventh centuries (Table 2). In what was the core area of feudal Europe – France, Belgium, Germany, Northern Italy, and the adjacent parts of Spain and England – the number of monasteries increased spectacularly.

The growth in number of monasteries had several consequences: it increased the number of men (and women) able to read and write, as well as the output of books and other written products.\(^8\) Monasteries also developed new ways to secure their growing riches. Perhaps in

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\(^7\) It may be significant that the disintegration of the Roman Empire in the fifth century was also followed by a wave of monastic reforms, of which the foundation of the first Benedictine monastery in about 525 was the most important.

\(^8\) See the next chapter, where the link between monasteries and book production is analyzed.
response to growing insecurity arising from the disintegration of the Carolingian Empire, they began to record their properties (or the gifts they received; i.e. changes in property titles) in charters, as proof of the fact that they owned a particular plot of land. Moore (2000, p. 86) also suggests that the monasteries in this period introduced new ideas of ‘modern’ undivided property rights in this way: ‘The monasteries responded to this crisis in their relations with lay society by offering a dramatic clarification and redefinition of the terms upon which they held their lands’. These men of letters assumed that written evidence in the form of charters was better proof of property rights than human memory, an assumption rooted in Roman Law, which in due course became the cornerstone of the European legal tradition. The argument for written records has been summarized by Clanchy (1979, p. 117), citing William de Braose, a mid twelfth-century monk: ‘since memory is frail, and as the sage has said “old age runs in from the first”, it is necessary that things which are said or done be reinforced by the evidence of letters, so that neither length of time nor the ingenuity of posterity can obscure the notice of past events’.

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<th>Century</th>
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Source: Buringh, 2008
It was also to protect their properties and people that the Church initiated the ‘Peace of God’ movement, in which the Cluniac monasteries again played a significant role. The first clear examples of Church councils trying to impose some kind of peace on their population date from 975 (Le Puy, in central France): Bishop Guy called together an open-air meeting of the knights and peasants in his diocese ‘to hear from them what advice they had to give about keeping peace’ (Cowdrey, 1970, p. 43). Among the instruments used to enforce the peace of God was the threat of excommunication. Participants in the meetings took oaths, reinforcing their commitment to the idea of social peace. But often bishops and abbots could also call on relatives who were knights, or otherwise pressure people into taking the oath ‘to respect the goods of the church and of the pauperes’ (Cowdrey, 1970, p. 43). Soon the protected group was extended to include travellers (merchants and pilgrims), peasants (the paupers mentioned in the first texts), and women. A further development was the Truce of God, an attempt to stop all violence during certain periods, mainly Christian holidays; as time went on this idea was also applied to festivals and fairs. Although the success of these movements was limited, lay rulers and the papacy were able to build on them; as observed by Mann (1986, p. 382) ‘they gave rise to medieval distinctions between “just” and “unjust” wars and to rules governing treatment of noncombatants and the vanquished… the moralizing and the admonitions were felt to have some potential force, and they emanated not from within the state but from Europe as a whole’.

The Peace of God movement suggests that the Church stepped in where the state failed, attempting to pacify social and political relations and create law and order. In the process, it enlarged its power base and authority. The Church, therefore, clearly ‘profited’ from the power vacuum that emerged during the tenth century, and was able to strengthen its position (as a result of internal reforms such as the Cluniac movement) both economically and ideologically, developing a stronger power base in these years. The Papal Revolution of the late eleventh and twelfth centuries was in a sense the logical culmination of these processes.

Berman (1983) explains how the emergence of the Western legal tradition in the eleventh and twelfth centuries was a by-product of the Papal Revolution from 1070 to 1122. The legal system in Europe before the tenth century was a fragmented mix of Germanic and Roman legal
traditions, combined with rulings and doctrines issued by (different parts of) the Church, often (loosely) based on the Bible (both the Old and New Testaments). But, as Berman writes, ‘There were no professional judges or lawyers. There were no hierarchies of courts. Also lacking was a perception of law as a distinct “body” of rules and concepts. There were no law schools…. There were no developed theories of the sources of law’ (Berman, 1983, p. 85). This was all to change within a brief period, in the century from 1050 to 1150. An important element in this change was the rediscovery of Roman Law, as laid down in Justinian civil law, which led to a sudden increase of interest in law. But this occurred in a period when the central question was the relationship between Church law and secular law, a debate that resulted from the Papal Revolution that started in the 1070s.

The core issue was the right to appoint (invest) bishops and other religious dignitaries, a right previously held by (or shared with) secular authorities. By claiming this exclusive right for the Church, Pope Gregory VII declared the Church to be free from secular control and the sole religious authority, whereas previously kings had shared this authority as intermediaries between believers and God. In claiming an exclusive right, Gregory VII separated the religious from the secular: kings were stripped of this power, and separate spheres of authority and law were defined, a separation that would become characteristic for European development. In short, a separate legal order was created, and to underpin these claims, the legal system that governed the Church was systematized. From the various traditions and doctrines and the application of reason and logic, the canonists (in particular, Gratian, who in 1140 published the Decretum, the ‘bible’ of canonical law) developed a systematized set of laws governing the Church and many associated areas, such as family life. This included laws concerning wills and similar contracts (in which the Church for obvious reasons had a vested interest), as well as to protect the poor and the vulnerable (widows and orphans). The harmonization of canon law carried out by Gratian was based on a systematic inquiry into the hierarchy of legal principles – custom, for example, was considered to be subordinate to ‘natural law’ – and on the dialectic method that aimed to reconcile opposites. These principles and methods made it possible to bring order to the chaos of the various legal traditions that existed before the canonists (Berman, 1983, p. 145).

From 1072 to 1150, a systematic set of laws was created, regulating not only the governance of the Church, but also large parts of social
and economic (and political) life. In response to these claims by the Church for a decisive influence in secular affairs, the emerging states of Western Europe began to develop their own legal systems. The increased attention to law that resulted from this competition between Church and state, in combination with the rediscovery of Roman Law, led to a rapid increase of interest in legal systems, their development and (in)consistencies. Legal scholarship was born, taught, and practiced in the new universities that sprang up throughout Europe in the following century (Berman, 1983, pp. 160–164).

The new legal system that emerged in the Latin West in the centuries following the Papal Revolution had a number of characteristics. First, a strong belief in the rule of law developed, which applied in principle to all, the prince as well as his subjects. Underlying this idea of the rule of law was the idea of equality before the law, although in practice this was mitigated by the socio-economic inequality of the period: a knight would often be treated very differently from a peasant. A second important aspect was the coexistence of a great many different subsystems: canon law (governing the Church and its believers), urban law (governing the city and its inhabitants), feudal law (governing relations between the king and his vassals) and manorial law (governing relations between the lord of the manor and his serfs or free peasants). These, in combination with the emerging national legal traditions – often based on customary law, but increasingly influenced by Roman Law and conscious attempts to ‘engineer’ legal traditions – were all rationalized and systematized according to the newest scholastic procedures. This variegated legal tapestry was a source of dynamic change, and law was increasingly seen as subject to manipulation and engineering, rather than the product of an immutable past and unchanging customs. It

\* In the literature this rediscovery of Roman Law is sometimes stressed as the main engine of legal reform in this period (for example Stein, 1999), but 1/ much of Roman law (such as family law, which was very patriarchal) was ignored because it was inimical to Western European norms and practices and; 2/ the emperor had been the source of all power in Roman law (in particular according to the 6th century Justinian code which was actually rediscovered), whereas the newly emerging European legal tradition considered the king also to be subject to the law itself, and 3/ the popularity of Roman contract law was clearly a reflection of a societal demand for these kind of concepts, which might have been filled by other concepts and ideas if Roman Law had not been rediscovered. One might even argue that the increased popularity of Roman Law and its hierarchical concept of power in the late Middle Ages and Early Modern Period strengthened tendencies towards absolutism and patriarchy which were perhaps even counterproductive (see Chapter 7).
was perceived as forward-looking and able to adapt to changing circumstances. But it was not the spontaneous change of legal ‘tradition’ that was to characterize the European system of law, but the regulated change in learned debate (as carried out by the great canonists), the changes in written laws and constitutions, and written law books and learned compendia that was to become characteristic of the development of the new legal system.

Moreover, following a trend set by the monasteries in the tenth and eleventh centuries, the written word itself acquired a special significance. Laws were only valid if written down, and written evidence acquired a privileged position in court proceedings that was deemed superior to oral testimony based on memory. For the subjects of kings it meant that royal power could be restricted by the written word. First, the kings and nobles themselves began to hire clerics (literate men from the monasteries) to issue charters and define their rights and claims. But their subjects soon followed their ruler’s example: they understood that they could protect themselves against royal predation by rights that were written down in city charters or in royal charters such as the Magna Carta, which were all the result of negotiations between subjects and their princes. This strong emphasis on the written word in itself severely limited the power of the sovereign, because ‘real’, unrestricted power is the power to do whatever the ruler wishes, unrestrained by any code. Moreover, power that has been defined in such a way, by writing down what its limits are, is in itself restrained or constrained, and in a sense constitutionalized.

Finally, the fragmented legal system reflected the fragmentation of power that was a fact of life. The Papal Revolution implied that power within the Latin West would be divided between Pope and Emperor, the development of other legal systems further contributed to this. Whereas in other societies ultimate power usually rested in the hands of an emperor or king, and was therefore (in theory) ‘one and undivided’, in Western Europe kings had to share power with bishops and abbots, and lords had to share it with cities and their citizens. Power not only became constitutionalized, but also the subject of negotiations between a variety of power-holders, between the Emperor and the Pope, between kings and bishops, or kings and cities, and, at a lower level, between city

\[10\] Clanchy (1979, p. 231 ff.) dates this change in the thirteenth century, but England may have been a forerunner in this respect.
governments and guilds. The end of the investiture conflict, for example, was not a complete victory for either one of the two parties, but a compromise in which Emperor and Pope together shared the right to appoint a bishop, but final approval of the decision had to be given by the Pope. Compromises based on bargaining became essential elements in European power sharing arrangements.

To some extent the Church became the regulator in the fragmented system of polities and legal systems that emerged. As Mann (1986, pp. 379–80) observed:

The most extensive interaction network centred on the Catholic Church. Catholic Christendom extended over an area of something like a million square kilometres, about the same area as the most extensive empires of prior history, the Roman and the Persian. . . . The infrastructure of papal power over such an enormous terrain was severely limited. But by the late eleventh century, this ideological power network was firmly established throughout Europe in two parallel authoritative hierarchies of bishoprics and monastic communities, each responsible to the pope. Its communications infrastructure was provided by literacy in a common language, Latin, over which it enjoyed a near monopoly until the thirteenth century. Its economic subsistence was provided for by tithes from all the faithful and by revenues from its own extensive estates. . . . Ideologically, it was sustained by a monarchical conception of religious authority, asserted to be superior in an ultimate sense to secular authority.

Berman (1983, pp. 113–114) also stresses the state-like characteristics of the Church in this period:

It claimed to be an independent, hierarchical, public authority. Its head, the pope, had the right to legislate, and in fact Pope Gregory’s successors issued a steady stream of new laws. . . . The Church also executed its laws through an administrative hierarchy, through which the pope ruled as a modern sovereign ruler through his or her representatives. Further, the church interpreted its laws, and applied them, through a judicial hierarchy culminating in the papal curia in Rome.

So the net result of these two forces – the movement that started with the monasteries to write down property rights in charters and the much broader changes in the definition of power that resulted from the Papal Revolution – was that power became constitutionalized, defined and restricted by the written word, and negotiable. It was potentially a subject of negotiations between the parties involved, and therefore also partable (as the Pope and the Emperor had been able to share the investiture of bishops). This conception of power was fundamentally different from what obtained in most non-European societies in this
period (and in Antiquity), where power was in principle unified, top down, and monolithic.  

The Greif-De Moor Hypothesis

While the Peace of God movement led by bishops and abbots tried to contain and repress conflict and open warfare on the French countryside, an alternative strategy was being attempted in London, where the inhabitants of the town, ‘with the encouragement and support of King Athelstan’, formed a *gegildan* to maintain peace and security in the city (Epstein, 1991, p. 40). This is one of the first uses of the word ‘guild’ (dating from the 920s or 930s), but this ‘peace guild’ did not have the corporate characteristics that later guilds would acquire. The guild was considered identical to the group of persons that had solemnly pledged to support and defend one another, which also included to ‘honour deceased members with gifts for their soul and commemorative singing of the Psalms’ (Epstein, 1991, p. 40). The king’s involvement with this institution was limited; in Cambridge a similar guild was set up in the late tenth century, which appears to have been a private association, not regulated by the king (Epstein, 1991, p. 40).

It is only natural that the collapse of central authority was followed by bottom-up attempts by groups of individuals – merchants, citizens of a town such as London or Cambridge – to protect their property rights. Such initiatives were able to build on earlier examples; the Mediterranean as well as the North Sea region (building on Germanic customs) knew traditions of merchant collaboration, in which religious, social, and economic motives were often intermingled. Conviviality (fraternal dinners and drinking parties) was an important element in these still relatively informal ‘merchant guilds’ (Reynolds, 1984, pp. 68–70, pp. 158–166).

Such ‘horizontal’ institutions acquired a new significance in the century of the investiture struggle, from 1050 to 1150. In Northern Italy, the centre of the movement to establish communes (semi-independent

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11 Of course, in practice power was also shared and negotiated in Antiquity and in all other non-European societies. While the Chinese Emperor may have been in fact less powerful and more dependent on his ‘servants’ than the English king, the latter was in principle bound by the Magna Carta.
city governments), the first signs of increased stirrings by the inhabitants of towns to gain a greater degree of independence date back to the late ninth century; as early as the middle years of the tenth century ‘insubordination grew’ (to quote Jones, 1997, p. 131, who wrote the classic study on the movement), and ‘cities started seeking to limit, regulate, and in some degree appropriate government…developing further the habits if not the institutions of corporative action’ (Jones, 1997, p. 131). But the real breakthrough came later: ‘Formal and full self government, the final, crucial transition from “liberties” to “liberty”, civitas to commune, was the work of the later eleventh century, more precisely the critical years from 1075 to 1122’, when the cities were significantly helped by the imperial-papal schism (Jones, 1997, p. 134). This link between the rise of the communes and the ‘general turmoil’ of these years has also been documented by Hyde (1973, pp. 49–53), who provides examples from Pisa (1081), Genoa (1056), and Bologna to make the point.

Communes were ‘personal, sworn associations’ of the inhabitants of a town, who through their oath became veritable ‘citizens’, willing to defend and strengthen the rights of the town. Councils and parliaments were an integral part of the organization of the commune, which showed ‘quite a high degree of participation in the making of decisions’ (Hyde, 1973, p. 54). By the middle of the twelfth century, almost all cities in Northern Italy were governed by more or less independent communes, an independence that was recognized at the Peace of Constance (1183), after Emperor Frederick had been defeated by the Lombard League of Italian cities (Coleman, 2004, p. 41). Charters – in this case the Peace Treaty of Constance – played a crucial role in the process; cities jealously collected those ‘privileges’, deriving much strength from the written evidence of their ‘liberties’.

A second, independent centre of the communal movement was Northern France and neighbouring Flanders, where, from the 1070s onwards, starting in Le Mans (1070) and Cambrai (1077), the communal movement began to spread to large (and small) cities in northwestern Europe (Reynolds, 1984, p. 176; Stephenson, 1933, pp. 27–42; Verhulst, 1999, pp. 125–7). Within half a century the movement had spread to the large cities of Flanders, to the main city in the northern Netherlands (Utrecht), to many cities in the north of France (Laon had a famous commune from 1109 to 1112), and to Cologne (Reynolds, 1984, pp. 173–7).
There are close ties between the model of the commune and that of the guild – sometimes merchant’s guilds preceded establishment of a commune, and sometimes guilds were set up after some measure of urban self-government had been realized. In Italy the guilds followed the communes. Jones typifies guilds as

new organizations, products and instruments of expansion...[which] developed from the early twelfth century, comprising at first – except in the most commercial cities, Venice and partly Genoa, where trade interests required no incorporation – societies of mainly merchants and professional groups, justices and notaries (and in time even schoolmasters), then unions of shopkeepers and artisans. (Jones, 1997, p. 229).

In England, Northern France, and the Low Countries, predecessors of merchant guilds appeared before the communal movement; the best example is probably the merchant guild from Tiel, formed about 1000 (Reynolds, 1984, pp. 165–7; Verhulst, 1999, pp. 123–5). In England, where the communal movement was not as strong due to the greater power of a central monarch, the merchant guilds may to some extent have been a substitute for the growth of communal power (Britnell, 1996, pp. 27–28).

From the eleventh century onwards, such initiatives had much greater continuity, because corporate bodies emerged from these relatively informal groups. This was one of the key concepts developed during the legal revolution of the eleventh-twelfth century. At their core was the legal concept of regarding a collective body of people as a unit, a corporation, or universitas.

Legally a corporation (universitas) was conceived of as a group that possessed a juridical personality distinct from that of its particular members. A debt owed by a corporation was not owed by the members as individuals; an expression of the will of a corporation did not require the assent of each separate member but only of a majority. A corporation did not have to die; it remained the same legal entity even though the persons of the members changed. (Tierney, as cited in Huff, 1993, p. 134).

This idea of a group as comprising a single juridical entity, whose existence became independent from its individual members, was fairly old. The Church had constituted such a body, monasteries and fraternities (the latter also a relatively recent development) could be seen as bodies as well. Muslim law recognized the waqf, a foundation whose aims could (in principle) no longer be changed once it had been founded. By contrast, the medieval universitas was much more flexible: the majority
Why the European Economy Expands Rapidly

of members could in principle change its rules. This also gave the universitas a distinctly ‘democratic’ flavour: the rule of the body could indeed be changed when the members so decided, which meant that institutions were necessary to do so: meetings of members and (elected) councils representing the membership.

How did the corporate bodies of Western Europe that emerged in the centuries after 1050, when first the communes and merchants guilds arose, and subsequently, the craft guilds, help solve the ‘fundamental problems of exchange’? Greif (2006) pointed out that merchant guilds did so by regulating the ‘community responsibility system’. There is a large body of literature arguing that craft guilds fostered market exchange by ensuring quality controls, maintaining and transferring technical knowledge (across generations and from place to place), and by regulating prices and product quality, thereby lowering transaction costs (Epstein, 1998; Gustaffson, 1987; Persson, 1988; Prak, 1992, 2003). It is beyond the scope of this book to review the debate here; the element that De Moor (2008) added is to point to the similarities between different forms of ‘corporate collective action’, i.e. urban merchant and craft guilds and rural commons, that emerged in Western Europe in this period, and stress their links (as Greif did in his seminal work) to the developing market economy. The core of De Moor’s argument is that:

guilds and commons were forms of collective action that created a suitable modus vivendi to combine participation in the market with protection for the negative side effects of that market…. Both commoners and guild members tried to avoid the negative side-effects of the still weak and incompletely developed market by protecting their capital goods. [Commoners] tried to protect the valuable and exhaustible resources they had. If these could simply be sold on the market, this would threaten the sustainable government of the resources and thus also the income of the commoners, since they were dependent on the commons for their commercialised agricultural produce.

Moreover, ‘the guilds faced similar threats on their income if they didn’t put limits to the commercial benefits to be reaped from their members’ production. The capital goods they needed to protect were their knowledge and learned skills’ – their human capital. The guild regulated how this knowledge was made available to others who were not members of the guild, and regulated the ways in which this capital good was being exploited. The rules were aimed at guaranteeing a
reasonable (and fairly stable) level of income. ‘In situations with such unreliable markets, whereby large fluctuations can be expected in the returns on one’s investments, collective action institutions’ aimed at guaranteeing stability ‘can offer an attractive modus vivendi.’ (De Moor, 2008) Therefore, craft guilds were an essential element in the emergence of a market economy in these centuries.

A related argument for the importance of these corporate bodies – whether communes, merchants guilds, craft guilds, or commons – is that these universitates were relatively efficient modes for developing new institutions. The rapid growth of market exchange during the eleventh-thirteenth centuries meant that new rules had to be invented and implemented for regulating the market (in fact, about how to ‘invent’ the market, as the market itself was and is a set of rules). These corporate bodies were grassroots organizations whose members knew from experience what the problems were, and therefore could develop new rules (or copy ideas developed elsewhere) about the desired and optimal way of organizing market exchange. The flexibility of these corporate bodies – in which the members in principle had certain democratic rights to change the rules of the game – meant that rules could be relatively easily changed, although the ruler’s permission was often needed to do this; an amendment of the privileges of the guild or the city required the approval of the city and/or the king, but this obviously accorded with the negotiability of power that became the norm in the same period. At the same time these corporate bodies guaranteed stability of the market environment; they were in principle ‘eternal’, surviving the generations (in fact, many survived for several centuries), and therefore offered the stability necessary for regular market exchange. In short, these corporate bodies were good ‘instruments’ in the search process for developing efficient institutions that could govern market exchange.

This balance between flexibility and adaptability on the one hand, and stability and permanence on the other, is mirrored by the balance between regional and local variation and the ‘Europeanization’ of Europe. The search process made it possible to develop local or regional variations of the ‘rules of the game’. There were, for example, ‘families’ of city privileges (cities copying each other’s basic constitutions, but with important local variations), and there were families of commons ‘constitutions’ as well as many similarities between guild ordinances in the same cities or regions. But, and this is perhaps more striking, the
two processes described here – the revolutions from above and below – together produced a process of homogenization of European rules and practices. The same institutional models – communes, merchant and craft guilds, fraternities, religious and knightly orders, charters, markets, and fairs\textsuperscript{12} – were copied throughout the Latin West. The ease with which these models travelled within Europe – how the model of the commune, the self governing town, for example, was copied and adapted in the most distant corners of the subcontinent – testifies to the cultural homogeneity characteristic of these centuries. This greatly enhanced predictability: it made it possible to know in advance what kind of rules a merchant would have to deal with when doing business abroad, because, for example, the ‘community responsibility system’ was a pan European phenomenon (Greif, 2006), or because self-governing cities who administered justice themselves – and were therefore to some extent independent of royal or other interference in this respect – were everywhere.

\textit{A Third Response to the Power Vacuum: Feudalism and Manorialism}

The historical literature on social and economic developments in the Middle Ages usually devotes much space to feudalism. It is a difficult concept that has been used and interpreted in many different ways. In the context of this book, the ‘feudal revolution’ – i.e. the rise of banal lordship – can be seen as a third response by local lords to the power vacuum that occurred in parts of Western Europe in the tenth and eleventh centuries (for a recent discussion, see Fossier, 2000; Bisson, 1994; Wickham, 1997). Local lords acquired a degree of independence from their overlord, and used that increased power to create a kind of mini-state around their castles (the physical parallel to this was the spread of mounds or \textit{mottes} in the tenth and eleventh-century countryside, symbolizing the growing power of the castellans). The local lords used their authority to impose new taxes and duties or to re-impose old ones (Fossier, 2000, pp. 50–53), resulting in growing pressure ‘exerted by seigneurial power on productive forces’, i.e. on their ‘personal dependents’ (Duby, 1974, pp. 177, 181). While the disintegration of the Carolingian Empire seems to have led to the decline of the large

\textsuperscript{12} See Britnell (2001) for the rapid and pan-European spread of institutions related to market exchange in this period.
estates characteristic of the period (seventh-ninth centuries), the tenth and eleventh century saw a (renewed) rise of manorialism based on the exploitation of demesnes using dependent labour.\footnote{Verhulst (1995, pp. 495–7) for the decline of the Carolingian estates; Fossier (2000, pp. 42–45) and (Duby, 1974); the principal difference between the Carolingian estates and the post-Carolingian manors was that the latter did not use slave labour anymore, and all forced labour was carried out by serfs, who had certain claims to the land they used.}

Probably linked to this redefinition of power relationships between lords and peasantry, was the transformation of the bonds between lords themselves, between local lords and kings or counts. The classic interpretation of the rise of feudalism explains that the relationships between lords and kings became bonds of vassalage, based on the taking of oaths by men of honour; this part of the ‘feudal mutation’ has however been subject to much criticism (for example, Reynolds, 1994).

In his seminal study on the early growth of the feudal economy, Duby (1974) argued that it was the increased pressure on the peasantry that produced the surpluses that set in motion the growth of the European economy in the tenth and eleventh centuries. Increased surplus production for the feudal elite (kings, local lords, and monasteries) led to a growing demand for luxury commodities, requiring the formation of focal points of exchange, often near castles and abbeys. In this way the rise of the \textit{seigneurie} was the main driving force behind the revival of international trade in the first phase of the big boom; this was reflected in the increased level of urbanization during the tenth century. The significant growth in the number of monasteries is also linked to these processes because the monasteries were embedded in the new rural institutions that evolved during the feudal revolution (often they may have taken the initiative as well). The ‘new’ lords also helped set up new markets (which they could tax), and tried to profit in many different ways from the changes they had to some extent instituted themselves. They taxed the inhabitants of the new towns by introducing and extending tolls on rivers and other similar measures. This gave these lords an incentive to promote trade, for example, by issuing privileges for towns in their territory.

But in itself the new set of institutions developed in the course of the feudal mutation did not really address the fundamental problem of exchange; on the contrary, the rise of the \textit{seigneurie} created a fragmented patchwork of local rulers that fought with one another, which
was very harmful for trade. Feudalism and the rise of the *seigneurie* were as much part of the solution as part of the problem. The actions of the Church and the merchants, who were driving the revolutions from above and below, were to a large extent aimed at pacifying the contentious relationships between these semi-independent local lords. The feudal mutation of the tenth and eleventh century therefore had a dual impact on Western European society: it generated new demand for luxury products and the means to pay for them (by increasing pressure on the peasantry), but it also led (as in France around 1000) to political fragmentation that in turn produced internecine warfare that affected market exchange adversely. The potential gains from institutional improvements that would pacify the knights and improve conditions for market exchange increased greatly as a result, as we have seen in both the top down and bottom up attempts to resolve this tension.

So, feudalism and manorialism played important roles in the rise of Europe in this period, but this third response to the power vacuum did not create the new institutions that would make the difference. It is also significant that, under the influence of growing commercialization, manorialism and serfdom began to decline in Continental Europe from the twelfth century onwards, as wage labour and the payment of rent proved to be more efficient than forced labour (cf. Poynder, 2003; Van Bavel, 2008). The most enduring legacy of feudalism was probably in the area of state formation: it created the building blocks for the territorial states of Western Europe that would emerge in the late medieval period (Tilly, 1990).

Sometimes the absence of a feudal legacy is seen as a positive factor in economic development. De Vries and Van der Woude (1997, p. 160), for example, in their analysis of the roots of ‘the first Modern Economy’ argue that this type of economy arose in the Netherlands because that part of Western Europe lacked such a legacy. Individualism also plays a role, albeit in the background, in Greif’s analysis of the emergence of guilds in Western Europe. One of the fundamental problems is why did Western Europe in the ninth-thirteenth centuries select the institutions it did. Greif stresses the similarities between the institutions that emerged during the Middle Ages and those that arose in the early modern period: ‘central to both [periods] are individualism; corporatism (including at the national level), particularly in the form of non-kin corporations; man-made formal law; self-governance; and institutionalized processes for setting rules (in which those subject to them have a voice
and influence)’ (Greif, 2006, p. 390). He concluded: ‘To the extent that the Rise of the West is due to its underpinning institutions, the roots of this rise may have begun to take hold as early as the late medieval period.’ In fact, I would argue that this is not a coincidence, but is based on the fundamental continuity of western European institutions: the guilds of the Middle Ages, for example, were not fundamentally different from those of the early modern period (although many may have lost their religious function in the sixteenth century), and the city-states of the early modern period – including perhaps the coalition of city-states that formed the Dutch Republic – were fairly similar, and were based on the communes and cities of the late medieval period (see chapter 7). But why did Western Europe select those ‘individualistic’ institutions, in which kinship ties were replaced by functional ties: the ties of citizenship, common profession, and social class?

Here the Church again played a role, as is also argued by Greif (2006, p. 252). Glick (1979), in a fascinating study of ‘Islamic and Christian Spain in the Early Middle Ages’ came to similar conclusions; he saw a gradual weakening of kinship ties in the Christian north, but no such corresponding development among the Arabic and Berber populations. In Christian Spain (Glick, 1979, pp. 141–2) there was a more clear, more deliberate evolution which saw the extended family…yielding in the face of a socio-economic context that favoured the stem or nuclear family. The stem family was powerfully supported not only by certain social and economic advantages accruing from the special conditions of frontier life, but also by ideological support from the Church. Here is the second distinct element of differentiation: Islam provided a framework which legitimated tribal values and gave them religious significance; Christianity tended to work in the opposite direction, toward the development of inter-personal, rather than inter-group bonds.

Most interesting as well is an example he uses to show the way water management systems were organized:

Christians, upon conquering and occupying al-Andalus, had frequently to replace institutions which had been tribally organized with non-tribal organizations…. A case in point is the communally organized irrigation systems of southern and eastern Spain. We know that previously irrigation canals, especially those in areas of Berber settlement, were organized along tribal lines…. In tribal societies, as in certain irrigated districts of Morocco today, such canals are administered through the normal workings of tribal political organizations: the community of elders decides distribution arrangements, settles disputes, determines the custom, and
provides executive authority. When the Christians took over these canals, the customary arrangements... were learned from the Muslims but were subsequently administered either by town councils... or by autonomous communities organized along guild lines. (Glick, 1979, pp. 145–146).

In short, corporate bodies took over from tribal organizations.

Why this weakening of family ties by the Church, or in the Christian parts of Western Europe in general? Jack Goody (2000, p. 30) hypothesized that the Church tended to weaken family ties for its own gain; when a will had to be drawn up, or more generally, when somebody had to decide what to do with his (or her) property, donating to the Church and its institutions competed with keeping it in the family.

In this process the church in effect threw its weight against the existence of strong kin groups, especially patrilineal clans or lineages. Such groups might threaten the work of the church, and in particular the accumulation of funds.

And

All religious activity necessarily involves gifts from mankind to the gods (through their representatives on earth) in the form of offerings, sacrifice, prayer, art and ritual. Gifts to the gods require an alienation (a ‘sacrifice’) from the individual or from the family, as is the case with all charity to whomever directed.... The church depended upon such gifts to establish itself as a ‘great organization’, for the build-up and maintenance of its plant, its personnel and its manifold activities, scholarly, charitable, and sacerdotal. (Goody, 2000, pp. 31–32).

There is certainly some truth to this. As will be argued in Chapter 4, the doctrines of the Church concerning marriage, for example, led to a weakening of parental authority, although it is not at all certain that the kind of materialist arguments used to explain this strategy by the Church really supported the development of the doctrine that marriage should be based on spousal consensus. There were definitely limits to the Church’s influence in these matters; in Ireland and other parts of the Celtic fringe of Europe, for example, as Marc Bloch (1961, p. 142) already observed, kinship ties were so strong that feudalism (another bond, not primarily based on family ties) did not develop there. Glick (1979, p. 145) has a similar interpretation “The weakness of kinship ties explains why people seek, or accept, other kinds of relations that offer security and protection’, adding ‘one might say that feudal relationships come into existence only at the expense of kinship arrangements which they were designed to replace or to compensate for’. Glick then argues
that due to strong kinship ties, feudalism also did not develop in the Arabic/Berber parts of Spain.  

Conversely, De Moor (2008) makes the point that the corporate bodies of the Middle Ages can often be seen as substitutes for family ties. She quotes Anthony Black (1984), who considers the European guilds as ‘artificial families’, fulfilling many of the needs of social networks and social services covered by genuine families in other societies. The ‘silent revolution’ of the Middle Ages presupposed a household and family structure with relatively weak kinship ties.

But was this all linked to the substance of Christianity, the religious beliefs underlying the actions of the Church? Goody would probably deny such a link; Michael Mann seems to argue the opposite position. Of course, arguing that religion was one of the important determinants of human behaviour in the past has almost become taboo among economic and social historians. It is as if past generations of historians, convinced they were free of religious ideologies, refused to consider that such beliefs may have been important determinants of social and political behaviour in the past (something that historians of culture and mentalité would readily acknowledge). Michael Mann is a refreshing voice in this field, finding his inspiration in Weber, but giving an important twist to the Weberian argument about the role of religion in economic development. He stresses the ‘emancipatory’ character in (early) Christianity, the fact that it was relatively democratic (all people were equal before God) and ethical (Mann, 1986, pp. 325–6). Perhaps it is no coincidence that the actions of the Church during the Middle Ages helped to establish an institutional order that was relatively democratic and ethical (as, for example, is clear from the idea that everyone, including the king, was subject to the rule of law).

**Brief Comparison with the Arab World**

Attempts to explain the success of Western Europe should perhaps also try to account for the relative economic decline in other parts of the world. It has been argued so far that one of the reasons for this success was that Western Europe, because of a combination of top down

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14 This perhaps somewhat qualifies the opinion of De Vries and Van der Woude (1997) that the absence of a feudal legacy was positive for economic development, in particular when this absence was caused by strong kinship ties.
and bottom up initiatives, developed relatively democratic institutions that facilitated market exchange. But why didn’t Islam, which is equally ‘democratic’ (in the sense that it has a similar notion of equality before Allah), develop comparable institutions? Islamic economic development began brilliantly. Within one or two generations after being conquered by Islamic warriors, those regions became highly urbanized and monetized economies – to a much greater extent than they had been before the rise of Islam (Kennedy, 2002). There is no doubt that Western Europe borrowed a great deal from Islam: from the (translated) works of the Ancient Greek thinkers (many of whom were introduced to Europe via Islam) to important innovations such as the bill of exchange, paper, the windmill, not to mention the concept of zero, and (Hindu) Arabic numerals. But undeniably, from the eleventh or perhaps the twelfth century onwards, the rate of progress in the Arab economy slowed, while at the same time European expansion accelerated (see, for example, Glick (1979) for an illuminating comparison between northern and southern Spain in this period). What did the Latin West develop that was absent in the Middle East? This is clearly one of the major questions in economic history.

Here I can only try to sketch some of the factors behind the ‘failure’ of the Middle East to sustain its dynamic development. An interesting approach has been suggested by Toby Huff (1993), who, in his detailed study of the rise of early modern science in Western Europe, analyzed the diverging institutional developments of both regions. He tried to address why modern science developed in Western Europe rather than in the Middle East, although scientific inquiry had achieved a very high standard there. His answer is too complex to repeat in detail here, but parts are especially relevant for our analysis.

One of the important differences between the two regions was institutional: from the twelfth century onwards, Europe developed universities, independent bodies of scholars and students that not only allowed for a much greater continuity than the Islamic madrasas (which were more tied to the prestige of specific teachers and flourished and declined with a particular teacher’s life cycle), but also encouraged a separate space for independent inquiry and conflicting opinions, even independent from the teachings of the Church. This was not the case in the Muslim world, Huff argues; there scientific enquiry had to be located outside the madrasas, which were exclusively focused on the study of the Quran (Huff, 1993). Islam also had ‘independent bodies’ such as the waqf, but their role and function was much more limited.
than that of the corporate bodies of De Moor’s ‘silent revolution’. The Waqf were foundations that fulfilled many different purposes – charity, medical care, and other social needs – but lacked the flexibility that would allow them to change course if their members decided it would have been important to do so. Such flexibility was one of the important advantages of the European corporate bodies.15

Islam also developed commercial partnerships (such as the commenda), which were precursors to the commercial corporate bodies of the late medieval period. Kuran has, however, shown that the relative inflexibility of Islamic law, and in particular its failure to develop the idea that a partnership could be considered a separate body independent of its members, created structural problems. ‘Whatever its exact form, an Islamic partnership ended with the demise of any of its members…. The heirs of a deceased partner did not automatically replace him. If the enterprise was to continue, a new partnership had to be negotiated. Every additional partner thus increased the risk of premature liquidation, so there were advantages to keeping partnerships small and limiting their planned duration.’ (Kuran, 2003, p. 421). The strength of kinship ties and the complexities of the Islamic inheritance system also played a role. The number of heirs was strictly regulated by the Quran, and there were few possibilities for individuals to deviate from those rules; ‘the imposed testamentary restrictions clearly subordinated the individual’s personal preferences to the extended family’s need for financial security and predictability’ (Kuran, 2003, p. 428). This meant that on the death of one partner, the partnership had to be renegotiated with a large number of heirs, which could easily lead to premature dissolution. Thus, the combination of strong kinship ties together with its failure to develop the concept of a ‘corporate body’ hindered Islam from developing the corporate entities that were so important to European economic expansion.

Another fundamental difference was that Islamic law continued to rely on memory and personal testimony, and did not make the switch to the written record that became characteristic of the new legal system in the Latin West. In Islamic courts the reliability of written documents

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15 In fact, Kuran argued that the rigidity of the Waqf, once they had been established, undermined the long-term trust in their functioning (Kuran, 2001). 'In practice, the founder’s directives were often circumvented. An unintended consequence was an erosion of the waqf system’s legitimacy. In any case, legally questionable adaptations proved no substitute for the legitimate options available to corporations.'
had to be demonstrated by witnesses, exactly the opposite from what was happening in Western Europe, where written documents were increasingly considered as more reliable than human memory (Lydon, 2007). We have already seen how this movement, which started with the issuing of charters by and for monasteries in the eighth and ninth centuries (as proof of the acquisition of certain properties), began to spread to other spheres and formed a crucial element in the ‘silent revolution’ of 1050–1300: written charters issued by emperor and king became the constitutions of cities, statutes issued by city governments defined the rights and duties of guilds and fraternities, as did charters such as the Magna Carta between monarchy and nobility. It was this cumulative growth of the use of the written word – to some extent documented by the enormous growth of book production in these same centuries (see Chapter 3) – that was unique in Europe.\(^\text{16}\) The growing demand for literacy and legal skills that arose as a result of these processes was a determining factor behind the emergence of universities, a process of fundamental importance to Huff’s interpretation of the rise of modern science in Western Europe (Huff, 1993). To some extent universities were a spin-off of the legal revolution of the twelfth century: it was the demand for legal opinion, for literate and educated lawyers, clergymen, or clerks that stimulated the development of universities as universitas, and almost accidentally also created the institutions and the platform for the (other) sciences to flourish.

A further major difference between the two societies was the status of their cities. European cities had acquired the (semi)independent status of corporate bodies, and were governed by merchant elites. Jones summarized the process by arguing that ‘by functionally divorcing town and country and surrendering towns to trade, Europe erected something new and for centuries unique: a trading class with corporate identity, the first bourgeoisie. No single fact better explains or demonstrates the economic and social innovation of the Middle Ages’ (Jones, 1997, p. 33). Nothing like this happened in the Islamic world. Kennedy (2002) demonstrates that the spectacular growth of cities following the Islamic conquest mainly came about because the state decided to pay its military in money, rewarding its soldiers with handsome profits

\(^{16}\) Attempts to quantify the process can be found in Clanchy (1979, pp. 42–46) and Burgers and Mostert (2003, pp. 137–9) and in the estimates of book production presented in the next chapter.
from the conquest and from new taxes. Large cities were military encampments, spaces that housed significant numbers of (retired) military men. Because the state paid them in money, this led to a sudden increase in demand for goods in these areas, stimulating the growth of a commercialized economy, with an infrastructure that was already there. These cities showed a spectacular increase in the years directly after the conquest, followed by a slow decline once the initial impetus began to diminish.\textsuperscript{17} Part of the process of commercialization may have been irreversible, however; the commercial revival was also an impetus for a much more developed economy able to sustain higher levels of taxation, making it possible to finance a larger state bureaucracy and military force, which in turn supported demand.

Cities that were essentially military settlements and based on the extractive power of the state developed very differently from the merchant republics of Western Europe. These were dominated by the gradual growth of (international) trade, which from about 900 to perhaps 1050 been the result of increased feudal exploitation of the peasantry. At some point in the eleventh/twelfth century, the growth of urban demand became a self-sustaining process, and the effects of improvements in institutions to address the fundamental problem of exchange began to count (Bosker, Buringh and Van Zanden, 2008). This combination resulted in a second phase of expansion: the brilliant finale of the big boom during the twelfth and thirteenth centuries. That this growth continued after 1100 when the impetus of increased feudal exploitation was becoming a less significant factor, was mainly due to the two movements of ‘top down’ and ‘bottom up’ institution-building analyzed in this chapter.

Conclusion

It is perhaps no exaggeration to say that the great medieval boom from 900 to 1300 is one of the most under-researched phenomena in economic history. Our understanding of it is extremely limited because of the paucity of records, the lack of detailed data charting relevant processes, and the near absence of challenging hypotheses to explain the

\textsuperscript{17} The cities of Cordoba and Palermo are probably the best examples of such a growth curve in Western Europe; see the Bairoch et al. (1988) dataset at http://www.iisg.nl/bibliometrics/urbanisation800–1500.xls.
process. This chapter has attempted to partially fill the gap by culling from the recent literature (old and) new ideas and suggestions about what might have happened, and why. It has looked at three different attempts to fill the power vacuum that emerged in the tenth/eleventh centuries to create state-like institutions that could re-establish law and order. It was, perhaps, the unique combination of, on the one hand, a relatively skilled population (especially the rapidly growing population of the monasteries, but increasingly also in the emerging cities) and, on the other hand, a power vacuum that allowed room for experimentation (and created strong incentives to succeed in those experiments) that may help explain the occurrence of this sudden ‘wave of institutional gadgets’ so characteristic of Western Europe from 950 to 1300. Many institutions emerged from this long period of institutional creativity that have since been considered typical for Europe.

How did these developments result in the efficient institutions that made possible the low transaction costs and interest rates documented in Chapter 1? Douglass North (1981; 1990) has argued that the core issue is the protection of property rights of economic agents against the actions of a predatory state. This implies that those without power – the poor, the peasantry, even the merchants and the middle classes – have to be protected from those in power, and preferably by those in power. The core of an efficient set of institutions is therefore that counterbalances are created against the ‘natural’ inclination of the wealthy and the powerful to use this power for their own purposes – at the expense of those without power. This requires the ‘right’ legal ideas, and the ‘right’ (legal) practices. These legal ideas were supplied by the legal revolution of the eleventh and twelfth centuries, which established, at least in principle, the ‘rule of law’, and created the basis of the Western European legal tradition. This is the ‘idealistic’ part of the story, but that is not enough: the powerless need to have the instruments to enforce these ideas. A powerful instrument, developed by the monasteries to protect their property rights, was the concept of the superiority of the written word. For clergymen, who monopolized the written word – as the knightly elites were probably largely illiterate – this was an obvious way to strengthen their position. It became widely accepted, in the long run strengthened the position of those who did not carry the sword,

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18 The Industrial Revolution has sometimes been analyzed as having been caused by a ‘wave of technological gadgets’.
and lead to the ‘constitutionalization’ of power (and, as an important ‘spin off’, to the gradual increase in literacy in this period). At the same time, perhaps due to the power vacuum of the period, citizens managed to solve some of the problems of collective action, and organized themselves in communes, guilds and other corporate bodies to foster their interests. These corporate bodies were the crucial ‘countervailing power’ within the political economy of Western Europe that managed to protect the interests of the ‘powerless’ against the powerful. In various parts of Europe the balance between these ‘bottom up’ institutions and the state developed differently, which lead to the trajectories of state formation analysed by Tilly (1990); economic development was most dramatic in those regions where these corporate bodies acquired a very strong position within the political economy (in Italy, parts of Germany, and the Low Countries).

It is important to note that in these developments the Catholic Church played an important role, but that I do not consider Christianity as such to be a major explanation of these trends. A ‘proof’ of this is that in Byzantium/Constantinople, where there was continuity with the hierarchical political structures of the Roman period, a comparable redefinition of power and the relationships between state and church did not happen. By contrast, Byzantium developed perhaps even more hierarchical characteristics, as religious and secular authority merged into the person of the emperor. To quote Angeliki Laiou (2007a, p. 19) about the Byzantine Empire of the tenth century: ‘The emperor was the center of government; power and authority emanated from his person. The Byzantines recognized only one true emperor; one sovereign authority over the Christian world, as there was only one God in heaven. The coronation of the emperor by Christ, as represented in Byzantine art, expresses this view of the imperial office. The large civil bureaucracy and the military derived their power from the emperor…’. In global perspective, this was a more or less normal state of affairs – elsewhere emperors claimed the same position, although the degree to which they could really exercise their power differed from one situation to another. The comparison with Byzantium demonstrates however how, for Western Europe, fundamental the radical break with the Roman past had been; the dramatic process of institution building occurring between the tenth and the thirteenth centuries would have been impossible had there been the same kind of continuity with power structures of the past.
It was the combination of feudalism and manorialism that played an important role in kick-starting economic development in the tenth and eleventh centuries, via increased pressure on the peasantry leading to growing demand for luxury commodities, to the renewed emergence of markets and fairs near those centres. But feudalism was as much a cause of the problem as part of the solution; the extremely high transaction costs in tenth-century Western Europe were mainly caused by the internecine warfare between knights and princes characteristic of the system.

The initial impetus to the European economy provided by the successful feudal exploitation of the peasantry was followed by a process of commercialization that changed the direction of development. In this process the cities played an increasingly dominant role. The new institutions developed during these centuries enabled the acceleration of growth after 1100. The economic boom of the twelfth and thirteenth centuries was no longer driven by feudal exploitation, because in many parts of the continent commercialization and rapid population growth led to a dissolution of manors and the disappearance of serfdom (only in England did commercialization lead to an increase or return of manorialism) (Poynder, 2003). The institutions that emerged from the two medieval answers to the ‘fundamental problem of exchange’ sketched here became the real driving forces of economic growth.

The three movements discussed above also set in motion a process of state formation that rested on two foundations: 1) cities in which there was close and relatively harmonious relationships between rulers and ruled (see Chapter 7) and 2) territorial states which gradually transformed the feudal relationships between lords and peasants into more modern relationships between princes and subjects (cf. Reynolds, 1984, pp. 250 ff.). As Charles Tilly (1990) demonstrated in his seminal study of the European process of state formation, this led to two trajectories of state formation that dominated the process from 990 to the beginning of the nineteenth century: a capital intensive one, characteristic of the city-states and the urban belt of Western Europe, and a coercion intensive one in the rest of the sub-continent. It also accounted for the

19 Britnell (1996) dates this second phase of expansion from the 1180s to the 1330s; perhaps it began earlier on the continent.
particular combination of political fragmentation and economic dynamism that was characteristic of Western Europe in the centuries from 1000 onwards: the competitive state system of the subcontinent, which has been identified as one of the crucial factors explaining the success of the West, emerged from 950 to 1300. What may have been even more crucial, however, was not that there were many small and medium-sized states, but that despite the political fragmentation, international trade was conducted on a very large scale, that transaction costs were low, and, most importantly, that property rights were protected in many ways. It was not the competitive state system as such that explains (or helps explain) the European ‘miracle’, but the combination of political competition and economic cooperation (through trade) that was crucial for the long-term success of this part of the world.

The processes described above defined the character of Europe for centuries to come: it became relatively democratic, literate, with a dense socio-political infrastructure (including high levels of social capital), where people (often) obeyed the (written) law, and possessed relatively efficient methods for developing and adapting new and old institutions (such as guilds, universities, communes, citizenship, law courts, councils, meetings and parliaments, charters and privileges, markets and fairs). It became, in short, a subcontinent on the road to modern economic growth. But how this specific institutional framework delivered long-term economic expansion is the story of the rest of this book.

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20 Hyde (1973, p. 54) stated that the communes ‘show[ed] quite a high degree of participation in the making of decisions on behalf of the community’, but also adding, ‘Not, of course, that they were democratic in either the ancient or the modern sense’. But at the same time he pointed to the ‘principle that authority was granted by the community’.
CHAPTER THREE

BOOK PRODUCTION AS A MIRROR OF THE EMERGING MEDIEVAL KNOWLEDGE ECONOMY, 500–1500

With Eltjo Buringh

Introduction: What the Production of Books Tells Us

The first two chapters dealt with the emergence of efficient institutions to regulate market exchange in medieval Europe, including a discussion about how a legal tradition emerged in which the written word was considered of fundamental importance, which also gave rise to an increased demand for reading and writing skills. This chapter adds to this by looking at the written word, more specifically the manuscript and the printed book, as the carrier of knowledge, and at the rise of human capital that can be gauged from a study of the development of book production and consumption. To provide quantitative measures of how quickly the knowledge base in Western Europe expanded in these centuries, this chapter concentrates on estimates of the increase in the number of manuscripts and printed books produced in Western Europe in the course of the millennium between 500 and 1500. First, we indicate what can be learned from studying book production, and then we analyze the development of this index of knowledge and human capital. In this section we show how dramatic the increase in book production was, where it was concentrated, and most importantly, what drove the process.

Books were very strategic commodities. They were a crucial part of the information infrastructure of society, a kind of ‘hardware’ in which all ideas were stored – a function they continue to have until the present. The production and accumulation of books can therefore be used as a proxy for the production and accumulation of ideas – an important variable in endogenous growth theory (Kremer, 1993). The demand for books will also to a large extent be determined by the level of literacy in a given society, although other variables such as income per capita and the relative price of books also played a role, as well as cultural influences such as religion. In short, the production of books is linked
to several variables used in new growth theory, such as human capital and knowledge production.

Second, books and manuscripts are luxury products whose demand increases with income. Economic prosperity will therefore generally lead to the expansion of this industry; depressions (and warfare, invasions, and civil unrest) will result in a decline in demand and production.¹ Finally, we deal with real artefacts from the period itself, many of which have been preserved in libraries and private collections, and can be counted and analyzed. A substantial body of literature exists on the production of books in this period, which helps to date and count them. For manuscripts and printed books, information about where and when they were transcribed or published is often available, allowing us to develop datasets containing this information. These datasets form the basis for estimating the total number of manuscripts and printed books produced in the period from 500 to 1500.

These arguments suggest that the number of manuscripts and printed books produced in a given society are multifaceted measures of economic performance and societal capabilities, and are therefore a valuable guide to the study of long-term economic change. This was probably already true for the Carolingian period. As Rosamond McKitterick (1989, p. 163) argues:

Book ownership as much as land ownership was a mark of social status and means. As part of the trade in luxury items (which many would have regarded as necessities), the book trade deserves to be recognized as a crucial indication of what men and women were prepared to spend their money on. Furthermore, the books surviving from the Carolingian period are a clear and rarely fully appreciated index of Carolingian prosperity. No historian can afford to ignore the evidence of the book produced and owned when assessing the level and the range of economic activity under the Carolingian rulers. It was an economy in which the cultivation of literacy and learning played a fundamental part.

If this is true for this early period, which, as we will show, had a relatively low level of ‘investment’ in books, it must be equally true for later periods, when an increased portion of income was spent on this luxury product. Therefore, quantification of book production makes it

¹ On the basis of recent (ca. 1995) data, it is possible to establish that the correlation between book production and GDP per capita is very strong, r being .90 or higher; data on the production of book titles from http://www.ipa-ue.org/statistics/annual_book_prod.html; GDP per capita from Maddison (2001).
possible to address some of the larger issues in the economic history of Europe. These relate to the timing of growth: when, for example, was the European economy at its lowest point following the collapse of the Roman Empire? Was this in the sixth and seventh centuries, or did recovery only start in the tenth century? How dynamic was book production (and the economy generally) during the High Middle Ages, and how did book production react to the famous ‘crisis’ of the late medieval period? Or was the period after the Black Death, by contrast, a time of economic prosperity? What effects did the invention of the printing press in the 1450s have on book production?

Equally important are issues related to the regional pattern of the European economy: a shift in the centre of book production from south to north, from the Mediterranean to the North Sea area could indicate underlying economic changes. Was it a single shift, or can we discern a number of shifts in economic gravity within the Latin West?

Further, why did book production increase so dramatically in the very long term? How did income growth and urbanization affect this growth? How did the monastic movement affect book output, and was there a link to the rise of universities (from the eleventh century onwards)? How can we explain the continuous strong growth of book production and consumption (per capita), while other indicators of human welfare do not show such long-term progress, as the evidence collected by Koepke and Baten (2005) suggests? In sum, which forces drove the accumulation of knowledge and human capital in the centuries from 500 to 1500?

We will first present the datasets and estimates on which our series on book production is based (Section 2), and then turn to a chronological and regional analysis of these patterns (Section 3). Together, these sections address the questions of when and where. Next, we deal with the factors that determined the growth of book production from 500 to 1500 (Section 4), and finally, we examine several other indicators in the growth of human capital in this period.

Datasets and Estimates

The aim of this section is to present our estimates of the output of manuscripts and printed books from 500 to 1800. The dataset consists of two parts: estimates of manuscripts produced between 500 and 1500 and of books printed between 1454 and 1800. The unit of analysis of the
first part is the individual manuscript, the unit of analysis of the second part is the (new) title or edition; we have made additional estimates of average print runs from 1454 to 1800, resulting in estimates of total book production for that period as well. The region studied is Western Europe; we use the current boundaries for the following countries: British Isles (for printed books a distinction is made between Ireland and Great Britain), the Netherlands, Belgium, Germany, Switzerland, Italy, France, the Iberian Peninsula (for printed books only Spain), Austria, Bohemia (Czech Republic), and Central Europe (comprising Hungary, Slovakia, Poland, and the Scandinavian countries). For printed books Poland, Sweden, and (very tentatively) Russia have been analyzed separately, but the Russian figures are not included in the estimates for Western Europe.

In separate appendices we lay out the method for estimating the output of manuscripts and printed books in greater detail, giving details of the production of manuscripts from the sixth to the fifteenth centuries. For the manuscripts, we constructed (on the basis of literature references), a database of 17,352 manuscripts produced in eleven regions of Western Europe between 501 and 1500. The representativeness of the database was tested by comparing its results with detailed studies of, among other things, Latin gospel books from the fifth to eighth centuries, ninth-century monastic catalogues, Latin bestiaries from the eleventh to fifteenth centuries, and the entire European corpus of more than fifteen thousand dated manuscripts (*Catalogue des Manuscrits Datés, housed in libraries in Austria, Belgium, France, Germany, Great Britain, Italy, Netherlands, Sweden, Switzerland and Vatican City*).

Then we performed a number of mathematical operations to correct for the inevitable geographical and selection biases in the database. First we standardized the spatial distribution of the manuscripts in the database by applying a spatial calibration factor that quantifies the relative geographical over – or underrepresentation as compared to the overall average in the database. Next we determined the relative temporal distribution of manuscripts in the database and divided this by the distribution over time of manuscripts presented by Neil Ker (1964); the resulting reciprocal factor was multiplied by the above-obtained spatially calibrated geographical distribution. The now produced temporal dis-

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2 The appendices are available on the “global historical bibliometrics” website at http://www.iisg.nl/bibliometrics/.
tribution is still a relative one, which has to be scaled for the different centuries to find the absolute numbers of surviving manuscripts from the Latin West. For the sixth, seventh and eighth centuries we determined the value of the scaling factor by using the absolute numbers of surviving manuscripts presented by Elias A. Lowe (1934–1971) in the series *Codices Latini Antiquiores* and their addenda. For the ninth century we determined the value of the scaling factor from the estimated survival of continental manuscripts from the Latin West presented by Bernhard Bischoff and Birgit Ebersperger, to which we added the numbers of surviving ninth-century Visigoth and Anglo-Saxon manuscripts (Bischoff, 1998, and Bischoff and Ebersperger, 2004). For the thirteenth century we determined the value of the scaling factor by using the numbers of surviving English bestiaries presented by Ron Baxter (1998) and by comparing those with the distributions of Neil Ker (1964) and the database. For the tenth to twelfth centuries we interpolated the scaling factors between those of the ninth and thirteenth, while we extrapolated them for the fourteenth and fifteenth centuries.

When the now obtained absolute distributions of surviving manuscripts are multiplied by a century specific factor to compensate for the fraction that was lost since their manufacture we can estimate the original production. We arrived at the (geometric) average loss rates for the twelfth to the sixteenth centuries from data presented by Neil Ker (1964). For the loss rates before the twelfth century we estimated a medieval loss per century of some 25% for each extra century backwards in time. With these values of the loss rates we calculated the fraction that was not lost and by dividing the surviving numbers of manuscripts per century by this fraction we finally estimated the medieval production of manuscript books.

The estimates of the output of printed books are based on the number of titles or editions that appeared in Western Europe from 1454 to 1500, multiplied by estimates of the average size of print runs. The definition of title and edition (and re-edition) is derived from the OECD, which collects this kind of data for the present. A title is ‘a printed publication
which forms a separate whole, whether issued in one or several volumes. Different language versions of the same title published in a particular country should be considered as individual titles. This includes first editions and re-editions, the latter being a ‘publication distinguished from previous editions by changes made in the contents (revised edition) or layout (new edition) and which requires a new ISBN’. Titles may be books (which have by definition more than 49 pages) or pamphlets (e.g. smaller publications). The first printing of Gutenberg’s Bible is one title, new editions of the Bible will again be counted, but a reprint of exactly the same manuscript would not be included.

The most important sources for counting new titles are meta-catalogues (or short title catalogues) that are based on books in library catalogues and present inventories of editions published in various countries and/or languages. An important meta-catalogue is available for Incunabula, i.e. all books printed in Western Europe before 1500. 

Additionally: for books printed in the Netherlands and Belgium, for books in English (covering not only Great Britain but also Ireland, the United States, Canada, etc.), and – but this catalogue is sometimes incomplete – for books published in Western Europe from 1454 to 1830 (the so-called Hand-Press Book File). For a few countries – in particular Sweden and Switzerland – the latter catalogue appears to be complete. For other countries the degree to which this source underestimates new titles can be estimated by comparing it with the much more complete Incunabula Short Title Catalogue. For the period 1454–1500, this results in an estimate of the extent to which the former dataset underestimates book production, a ratio that varies from 27.5% (France) to 48.4% (Italy). In order to estimate total book output per country, the number of books according to the Hand-Press Book File have been corrected by this ratio, which gives a systematic series of book production from 1455 to 1800. The problem with this procedure is that it assumes that the underestimates of the Hand-Press Book File are constant in time, which may not be the case (for example, there appears to be a discontinuity in the number of Spanish titles included in the file, as the number suddenly drops from 742 in 1700 to 175 in 1701 and 133 in 1702). Therefore, we checked the results of this procedure on a country-by-country basis, using the available literature on book production in those countries, see the Appendix II for details, available at http://www.iisg.nl/bibliometrics. The same method for estimating new titles can be applied to Germany and Poland (and Russia), but the resulting estimates are much lower than the number of new titles mentioned in the catalogues of the Leipziger and Frankfurter Buchmesse for those years (a series which begins in 1565); so the Hand-Press Book File and the additional corrections seriously underestimate the output of new titles in these cases. For these countries we have therefore relied on the figures of the book fairs, although these are also low estimates (not all books were 

Our figures should be interpreted as lower-bound estimates: we do not correct for books for which all trace has been lost, nor for the fact that at the book fairs only part of the production was presented. Serial publications are also not included. The estimates of print runs are conservative: we follow the literature which suggests that average sizes of editions from the 1450s to 1500 probably increased from 100 to 700; there is ample evidence that this increase continued after 1500, but at a slower pace.6

For the second half of the fifteenth century it is possible to compare both methods of estimating book production. Wikipedia presents a list of 18 libraries having the most important collections of incunabula and the numbers they contain. It is possible to calculate the ratio between the total numbers of manuscripts in these 18 libraries (calculated from the manuscript database) and the number of incunabula there, which is 1:4.95. The total number of surviving manuscripts has been estimated at 2.9 million, thereby implying an estimate of 590,000 incunabula that currently still exist globally. Neddermeyer (1998, p. 77) estimates the average survival of incunabula at 4.2%, which leads to an average estimated production of 13.9 million incunabula. This estimate accords well with the estimates acquired from counting editions and multiplying by the average print runs, which comes to 12.6 million for the same period. Thus, for the incunabula both approaches yield very similar results.

**Long-Term Patterns**

European book production increased enormously in the period under study, from somewhat more than 12,000 manuscripts per century (or presented there). Finally, for six countries – Norway, Denmark, Portugal, Hungary, Austria, and Bohemia (Czechoslovakia) – we were unable to estimate book production directly, as the numbers in the Hand-Press Book File and the catalogues of the book fairs were very small. To obtain total estimates for Western Europe comparable to those for manuscript production before 1500, we estimated the total volume of the printing industry on the basis of the portion of these six countries in the Hand-Press Book File – but this was extremely small (it increased from 0.18% in 1454–1500 to 1.54% during the eighteenth century).

6 We tentatively estimate that it went up to 1,000 in 1800, again this is a conservative estimate; Harris (1984), for example, assumed this level had already been reached in the sixteenth century, but that is probably an overestimate. For a discussion of print runs, see Febvre and Martin (1976, pp. 216–22); St Clair (2004, pp. 458 ff. p. 466); and Harris (1984, p. 121).
120 per year) from 500 to 700, to more than 5 million manuscripts and 12.5 million books in the fifteenth century (Table 3). Because this covers such a long period, the average rate of growth does not seem excessive: slightly more than 1 percent per year for Western Europe as a whole. Table 3 also shows the ups and downs of book production. First there was a decline from the sixth and seventh centuries: the latter represents the lowest point in the series, consistent with recent interpretations of the long-term development of the West European economy following the disintegration of the (west) Roman Empire. The decline is followed by the Carolingian Renaissance of the eighth and ninth centuries, which was one of the periods with the most rapid growth in book production, albeit starting from a very low level (see McKitterick, 1989 for the expansion of book production in this period). The tenth century witnessed another decline, which was most apparent in France and Austria, presumably as a result of the disintegration of the Carolingian Empire and invasions from the north and east (by Vikings and Magyars). The eleventh century shows a recovery (to the level of the ninth century), which was sustained, extending to a significant expansion of Europe’s medieval economy in the next 250 years. Especially noteworthy are the leaps from the eleventh to the thirteenth centuries.

The Black Death of 1348 and the resulting decline in population levels had a complex effect on book production. In the short term, output probably declined significantly, as is shown in figure 3.1, which contains more detailed (decade by decade) estimates of dated manuscripts from German-speaking countries from 1300 to 1500, derived from Neddermeyer (1996). The rapid growth that occurred in the first half of the fourteenth century suddenly stopped, and the creation of new manuscripts from 1340/49 to 1360/69 declined by some 50 percent.

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7 See McCormick (2001) and Verhulst (1989, 1999) for recent overviews of this discussion.

8 This is suggested from the fact that production decline was most dramatic in France, where during the tenth century a power vacuum emerged as a result of the disintegration of the Empire; this led to the Peace of God movement that tried to restore law and order there; see, for example, Cowdrey (1970); other parts of Western Europe were less affected, as is clear from the relatively favorable performance of Germany, where the Holy Roman Empire witnessed an ‘Ottonian Renaissance’ in the late tenth century, and by the continued growth of book production in England and Ireland, where both political developments (a certain centralization of power) and the flourishing of monastic life led to a further increase in book production.

9 Central Europe here is the German-speaking part of the continent, including Germany, Austria, and parts of Switzerland.
Table 3. Manuscript production in absolute numbers per century (sixth to fifteenth centuries)

<table>
<thead>
<tr>
<th>Century</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Europe</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3,983</td>
<td>27,530</td>
<td>120,987</td>
<td>301,833</td>
<td>376,650</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>657</td>
<td>1,136</td>
<td>5,377</td>
<td>42,066</td>
<td>45,363</td>
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<tr>
<td>British Isles</td>
<td>81</td>
<td>1,026</td>
<td>5,474</td>
<td>7,926</td>
<td>9,793</td>
<td>20,360</td>
<td>81,044</td>
<td>200,654</td>
<td>155,513</td>
<td>208,729</td>
</tr>
<tr>
<td>France</td>
<td>1,682</td>
<td>2,441</td>
<td>15,920</td>
<td>74,190</td>
<td>12,752</td>
<td>45,061</td>
<td>197,831</td>
<td>510,828</td>
<td>564,624</td>
<td>1,195,783</td>
</tr>
<tr>
<td>Belgium</td>
<td>0</td>
<td>127</td>
<td>1,111</td>
<td>3,029</td>
<td>1,555</td>
<td>8,529</td>
<td>43,219</td>
<td>119,588</td>
<td>106,148</td>
<td>572,124</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0</td>
<td>26</td>
<td>60</td>
<td>82</td>
<td>58</td>
<td>354</td>
<td>1,731</td>
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<td>13,179</td>
<td>171,974</td>
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<tr>
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<td>0</td>
<td>0</td>
<td>7,503</td>
<td>59,771</td>
<td>45,703</td>
<td>49,548</td>
<td>166,876</td>
<td>270,392</td>
<td>293,814</td>
<td>515,116</td>
</tr>
<tr>
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<td>0</td>
<td>30</td>
<td>594</td>
<td>5,330</td>
<td>1,799</td>
<td>1,090</td>
<td>2,355</td>
<td>3,821</td>
<td>6,349</td>
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<td>0</td>
<td>0</td>
<td>2,735</td>
<td>9,414</td>
<td>0</td>
<td>2,808</td>
<td>37,370</td>
<td>37,408</td>
<td>39,777</td>
<td>88,623</td>
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<tr>
<td>Italy</td>
<td>10,194</td>
<td>4,478</td>
<td>6,536</td>
<td>20,307</td>
<td>15,215</td>
<td>38,768</td>
<td>95,207</td>
<td>253,013</td>
<td>879,364</td>
<td>1,423,668</td>
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<td>Iberia</td>
<td>1,594</td>
<td>2,512</td>
<td>3,770</td>
<td>21,693</td>
<td>48,763</td>
<td>40,871</td>
<td>114,422</td>
<td>237,818</td>
<td>344,284</td>
<td>390,478</td>
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<td>Western Europe</td>
<td>13,552</td>
<td>10,639</td>
<td>43,702</td>
<td>201,742</td>
<td>135,637</td>
<td>212,030</td>
<td>768,721</td>
<td>1,761,951</td>
<td>2,746,951</td>
<td>4,999,161</td>
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</table>

Increase per Century (%)

<table>
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<th>6</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>–21</td>
<td>311</td>
<td>362</td>
<td>–33</td>
<td>56</td>
<td>263</td>
<td>129</td>
<td>56</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>

Sources: The appendices are available on the ‘global historical bibliometrics’ website at http://www.iisg.nl/bibliometrics/
but the population also fell, probably by about one-third in the same period. After this temporary decline, however, production rebounded significantly, and an even sharper increase in output began, resulting in an almost tenfold increase in the next hundred years; the average rate of growth was 2.2 percent in the period from 1360/69–1460/69, whereas it had been 1.8 percent in the first half of the fourteenth century. The strong decline in manuscript production after 1470 shown in Figure 4 was an effect of the invention of printing and can be found everywhere in Europe. But it is clear that the production of books per capita continued to grow in the century and a half following the Black Death, a period sometimes referred to as the ‘crisis of the late medieval period’ (Epstein, 1991; Hatcher and Bailey, 2001). This probably accelerated after 1370, and again after 1470 as a result of the invention of the printing press. The number of incunabula produced between 1450 and 1500 was already 150 percent higher than manuscript production in the entire fifteenth century, which was in turn almost twice as high as manuscript production in the fourteenth century (see Table 3).

Let us now take a closer look at patterns that can be observed in the different countries. Two indices are used to study this: the regions that produce the bulk of book output, which is dominated by the large countries, and those with the highest per capita production (here the small countries stand out) (see Tables 3 and 4). One of the problems with this approach is the unequal size of the countries; if we had more detailed data on, for example, northern Italy or the north of France (including Paris), these regions would probably have higher per capita numbers.

During the sixth and seventh centuries, levels of book production largely reflect the extent to which the information infrastructure of the Ancient economy had remained intact during the mass migrations that followed the disintegration of the Roman Empire. Italy in the sixth century was (still) the most important centre of book production, both in absolute terms (it produced about two-thirds of total output) and per capita. This was arguably the last major renaissance of the Roman Empire, or the Ostrogothic client state of Byzantium, headed

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10 See also Bozzolo et al. (1984) who present similar time series of manuscript production in Italy, Germany, and France, showing a strong increase in output during the second half of the fourteenth and fifteenth centuries.
by Theodoric in the north, with Ravenna as its capital city.\footnote{Bertelli (1998, p. 55), demonstrates that “No other western centre witnessed such an intense activity of book production and in the book market as Ravenna at the time of the Ostrogothic kings.”} In the seventh century book production in Italy went down substantially, a decline that was only partially compensated by growth elsewhere, in particular in France, Spain, and the British Isles. Per capita, Ireland probably became the leading producer in the eighth and ninth centuries, since it produced, according to our database, 36 percent (seventh century) to 28 percent (ninth century) of the total manuscripts for this area, whereas its population was perhaps no more than 20 percent of that of the British Isles as a whole.

The new structure of book production that emerged during the Carolingian period included the core region of Charlemagne’s empire (northern France, Belgium, and western Germany) which produced the bulk of the manuscripts, with additional important production emanating from Switzerland, Austria, and Spain. In the tenth century Spain was temporarily the European leader, reflecting the importance of the (Islamic part of the) Spanish economy in this period (Glick, 1979). Again, in the twelfth and thirteenth centuries, France and Germany were the most important production centres, and neighbouring Belgium had the highest output per capita. So the period from 800 to 1300 – with
the exception of the crisis of the tenth century – shows a remarkable
degree of continuity in which the core area of the (former) Carolingian
Empire dominated the industry.

During the Renaissance Italy emerged again as the most important
centre of book production, whereas production in Germany and France
stagnated in the fourteenth century, and even declined in the British
Isles and Belgium, although the latter country remained leader in per
capita production. The same pattern emerges from the production of
incunabula, from 1454 to 1500: in spite of the fact that Gutenberg’s
innovations occurred in southern Germany, Italy (Venice in particular)
soon became the most important producer. Italy was also the only large
country that, from 1454 to 1500, could compete with small countries
such as Switzerland and the Netherlands in per capita production.
Thus, the growth spurt in (northern) Italy led to a new pattern in
which the core area of the Carolingian Europe (Belgium, the western
and southern parts of Germany, and eastern and northern France) was
linked to northern Italy. The Renaissance thus witnessed the emergence
of the urban belt of Western Europe, stretching from northern Italy,
via southern Germany to the Low Countries as the new core area of
Western Europe (De Vries, 1984a).

**The Europeanization of Europe: Convergence in Levels of
Book Production**

One way to look at the spectacular growth in book production in the
centuries before 1500 is to think of the book as a new innovation that
matured in the centuries from 300 to 800. From the 2nd to the fourth
centuries the codex, or bound book, was ‘invented’, which gradually
replaced the unwieldy scroll (Brown, 2003, p. 23). Around 600 Irish
monks developed a system of writing that separated individual words,
which greatly facilitated reading. Finally, around 800, modern punc-
tuation, uniform script, and paragraph division were introduced, all
greatly helping the reader to understand the text quickly. In sum, a
new information technology was created, which, as Ulrich Blum and
Leonard Dudley (2003) argued, helped launch the European economy
in the period that followed. The growth of book production shown in
Tables 3 and 4 is generally consistent with this view: initially growth
rates are spectacular, especially during the eighth and ninth centuries,
a growth that is accompanied by the spread of book production from
a small core region in Italy to Western Europe as a whole. Moreover, thanks to additional innovations in the High Middle Ages, such as substituting paper for parchment, but also the spread of more efficient ways of hand copying manuscripts, such as the pecia system (Rouse and Rouse, 2000), and in the fifteenth century the printing press, the price of books was much reduced, providing an additional impulse to the growth process. What is striking in Figure 5, which shows the long-term trends in per capita book production in three different regions and in Western Europe as a whole, is how synchronized the long-term changes in these different parts were, at least from the seventh century on. The spectacular growth in book production occurred in all regions (with only one or two exceptions, such as Ireland after 1000) at approximately the same pace, testifying to the unity of Western European in this respect.

The tale is more complex, however. Supply and demand changed fundamentally in the millennium from 500 to 1500. During much of the Middle Ages, a close connection existed between the monastic movement and book production: monasteries were not only the most important sources of supply, they also were the largest source of demand for books. Performing their religious duties and studying the word of God

Table 4. Per capita production of manuscript books per annum (per million inhabitants), sixth to fifteenth centuries

<table>
<thead>
<tr>
<th>Region</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Europe</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>10.8</td>
<td>72.4</td>
<td>186.1</td>
<td>443.9</td>
<td>509.0</td>
</tr>
<tr>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>8.2</td>
<td>10.3</td>
<td>35.8</td>
<td>247.4</td>
<td>283.5</td>
</tr>
<tr>
<td>British Isles</td>
<td>0.9</td>
<td>11.4</td>
<td>54.7</td>
<td>61.0</td>
<td>54.4</td>
<td>88.5</td>
<td>270.1</td>
<td>466.6</td>
<td>370.3</td>
<td>485.4</td>
</tr>
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<td>3.5</td>
<td>5.1</td>
<td>32.5</td>
<td>142.7</td>
<td>22.0</td>
<td>62.6</td>
<td>217.4</td>
<td>384.1</td>
<td>418.2</td>
<td>919.8</td>
</tr>
<tr>
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<td>4.2</td>
<td>37.0</td>
<td>101.0</td>
<td>38.9</td>
<td>170.6</td>
<td>540.2</td>
<td>1087.2</td>
<td>1061.5</td>
<td>5721.2</td>
</tr>
<tr>
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<td>1.3</td>
<td>3.0</td>
<td>4.1</td>
<td>1.9</td>
<td>8.9</td>
<td>34.6</td>
<td>29.5</td>
<td>188.3</td>
<td>2149.7</td>
</tr>
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<td>0.0</td>
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<td>181.1</td>
<td>134.4</td>
<td>130.4</td>
<td>333.8</td>
<td>360.5</td>
<td>376.7</td>
<td>660.4</td>
</tr>
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<td>1.0</td>
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<td>47.1</td>
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<td>0.0</td>
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<td>339.7</td>
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<td>47.2</td>
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<td>71.8</td>
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<td>294.2</td>
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<td>312.9</td>
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<td>550.0</td>
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<td>88.1</td>
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<td>206.1</td>
<td>330.0</td>
<td>507.8</td>
<td>929.2</td>
</tr>
</tbody>
</table>

Coefficient of variation 2.37 1.56 0.83 0.81 1.06 0.80 0.77 0.90 0.67 1.23

Source: Table 3 divided by population data from McEvedy and Jones (1978)
were the core business of these ‘powerhouses of prayer’. Because, from early Christian times, even minor deviations from official formulae were believed to render a religious service ineffective, written instructions on the correct wording were essential, and hence the permanent monastic and ecclesiastical emphasis on written texts. In the early Middle Ages, when markets were thin or non-existent, books had to be produced in-house, financed by the monastic surplus of agricultural products. These connections are illustrated by Michael Gorman (2002, p. 229), whose research on the production of manuscripts in Monte Amiata, one of the most important monasteries in eleventh-century Tuscany, Italy, unveils the close connection between the financial position of this monastery and its library:

It is worthwhile to highlight the abbey’s economic history because manuscript production coincides with favourable economic factors. An active scriptorium depends upon a great library, full of exemplars, and
both require significant financial resources. Many peasants must work hard to raise the sheep, make the parchment and produce the wealth to be consumed by the monks toiling away in the abbey’s library and scriptorium.

We may therefore hypothesize that during the early Middle Ages book production was to a large extent driven by the number and size of monasteries, which was in turn determined by the share of the agricultural surplus that regions and countries directed to this part of the economy.

To test this hypothesis, we derived estimates of the numbers of monasteries in the various regions and centuries from several sources (Chapter 2, Table 2), which can be plotted against book production in the same time and place (see Figure 6).\textsuperscript{12} The correlation between the two variables is fairly consistent, confirming the important role monasteries played in this development.

\textsuperscript{12} Zero values for either the number of monasteries or book production have not been included in Figure 3.
The proliferation of monasteries in the Middle Ages shows a pattern of continuous growth during the first half of the period, when more than a thousand were added to the stock each century, followed by a boom in the tenth to twelfth centuries. This boom is partially explained by the reform movement begun by Cluny in the early tenth century, which gradually spread to other parts of the Latin West. Apparently, these reforms enhanced trust in monasteries and the services they supplied (such as prayers for the souls of the deceased), resulting in increased investment in this form of religious service. The tenth and eleventh centuries witnessed the rise of the seigneurie, local lords who were increasingly able to control the countryside around their castle and used their power to impose new taxes and duties or to re-impose old ones (Fossier, 2000; Bisson, 1994; Wickham, 1997). Monasteries profited directly and indirectly from these changes. All this caused a dramatic growth in the monastic movement from 900 to 1300, which greatly increased the production of books. After about 1300 this rapid growth of the monastic movement came to a halt, and from 1300 to 1500 the number of monasteries in the Latin West stabilized at approximately 21,000.\(^{13}\)

The literature suggests that at the height of the Middle Ages other sources of demand – the cities, universities, and more generally, the growth of literacy among the lay population – were becoming increasingly important (Rouse and Rouse, 2000). Elsewhere we tested these hypotheses about the determinants of book production (Buringh and Van Zanden, 2008). The regressions presented there confirm the hypotheses found in the literature about the importance of monasteries during the early Middle Ages and of universities and cities from 1000 to 1500, but they also show that even before 1000 urbanization had an impact.

Another way to explain the growth of output is via a reconstruction of the composition of the demand for books, which has been done by Buringh (2008). On the basis of tentative estimates of the number of clergy, parishes, the urbanization ratio, and the development of demand for books by the urban elite, he was able to attribute the growing supply

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\(^{13}\) Only the Netherlands was an exception to this trend, as its numbers continue to grow (the rapid expansion of relatively small and mainly urban monasteries during the fifteenth century is probably related to the Modern Devotion of that period, which was concentrated in the northern Netherlands).
of manuscripts to different sources of demand (Figure 7). Demand by the clergy dominated book production before 1000, but later on the parishes (which developed a dense network in this period), and after 1200 the urban elite became more important. In the fourteenth and fifteenth centuries the transition towards a market driven system was completed, and more than 60% to over 80% of the market consisted of urban demand.

**Other Evidence: Literacy and Age Heaping**

The enormous growth in book production during the millennium from 500 to 1500 points to a rapid accumulation of human capital from, we have to keep in mind, very low initial levels. This process was largely driven by the monastic movement, but from the high Middle Ages onwards, a much broader process of human capital formation began that had its roots in the newly expanding cities. So what was the general level of literacy, numeracy, and human capital formation at the end of the Middle Ages?

Chapter 6 contains estimates that are derived from the data on book production for the period 1450–1800, checked against and confirmed by other studies. These estimates show that at the end of the Middle Ages probably about one-eighth of the population of Western Europe

Source: Buringh, 2008
was literate. In practice such literacy usually meant only the ability to sign one’s name under a contract (often a marriage contract or a birth certificate) – yet, a 12% literacy rate was a considerable achievement at the time, after the very low levels of human capital formation which had been normal during the Early Middle Ages. The highly tentative estimates of literacy levels for the previous centuries are: eleventh: 1.3%, twelfth: 3.4%, thirteenth: 5.7%, fourteenth: 6.8%, first half of the fifteenth: 8.6% (1451–1500: 12%) (see Chapter 6 for details). These percentages suggest a slow rise in the rate of literacy, with a distinct acceleration of the rate of growth in the century and a half after the Black Death, when incentives for human capital formation became stronger.

There were however large regional variations, and often the differences between town and countryside, and between men and women, were substantial. Literacy was probably highest in the urban belt that ran from Northern Italy to the Low Countries, but even there we observe large regional differences. Alain Derville (1984) found that in the north of France (the urban region close to Flanders) the level of literacy rose significantly in the period from 1420 to 1550, consistent with an increase in the availability of schooling in the late medieval period. More qualitative sources speak of high levels of literacy in (for example) Holland; one such source is Lodovico Guicciardini’s travel report from the 1560s. He states that almost everyone in the Netherlands could read and write, including people living in the countryside (Van der Woude, 1980 p. 257).

One of the ways to get some idea of the quantitative dimensions of the development of human capital formation in the late Medieval period, is to measure the degree of ‘age heaping’. Age heaping refers to the practice, by people who are not literate or numerate, of approximating their age when asked how old they are: they will not say ‘39’, but ‘40’, or ‘about 40’, because they do not exactly know, and are not used to keeping track of their age from year to year. What can be estimated from censuses and similar sources of the period is the portion of people who round off their age. Normally about 20 percent of people would have an age ending with 5 or 0, but when age heaping occurs, this percentage will be much higher. One of the ways to measure it is the Z-factor, which simply registers the percentage points over 20 percent: the higher Z is, the greater the age heaping. Research shows a clear link between the percentage of age heaping and the level of numeracy in a given population – which is again closely linked to the level of literacy (A’Hearn, Baten and Crayen, 2006).
For the Low Countries we were able to identify several sources from the fifteenth and sixteenth centuries that enabled us to measure age heaping (De Moor and Van Zanden, 2008). It concerns data for Bruges from about 1500, the countryside near Bruges in the same period, and for Holland and Zeeland in these years (Table 5). We compared these data with similar estimates for England in the fourteenth century (perhaps reflecting a more normal pattern for medieval Europe), and for what was probably the richest region of Western Europe during the fifteenth century, Florence and Tuscany. The results are striking: levels of age heaping in the Low Countries are extremely low, and what is perhaps even more surprising, there are no differences between town and countryside nor between men and women. On the basis of these data it can be argued that the average level of human capital formation in poor Wenduine (the village from which the data for the countryside of Flanders come), the poor neighbourhoods of Bruges, or the countryside of Holland and Zeeland is much higher than in Florence with its enormous wealth! The patterns in Tuscany are as expected: large differences between men and women and between urban and rural citizens, but both sources of differentiation are totally absent in the data from the Low Countries. Surprisingly, the rural and urban elites, which reported their ages in 1514 to a government inquiry, did poorly compared to the non-elite population that was registered in the other sources used.14

The data on age heaping suggest that in the late Middle Ages the Low Countries were already a pocket of high literacy and numeracy, characterized by an absence of differences between city and countryside and, perhaps even more interesting, between men and women. The high level of literacy in this region is supported by more qualitative evidence, such as the spread of the Modern Devotion in the fifteenth century, a religious movement focused on studying books (the Bible and Thomas à Kempis’ Imitatio Christi). Women formed at least 60 percent of the membership in this movement. Derville (1984), in his review of the evidence on the rise of literacy in this period, concluded that the spread of the Reformation in this part of Western Europe was probably closely linked to the previous increase of literacy there.

14 Dupont (2001) who did a detailed analysis of the social composition of the sources related to Bruges, concluded that a many of the women included were probably prostitutes, showing that we are really dealing with a non-elite population.
In the next part of this book, especially in Chapter 4, we will further explore the specific development of the North Sea area, its high level of human capital formation from the late medieval period onwards, and we offer an explanation for why women seem to be so literate in this early period.

**Conclusion**

The estimates of book production presented in this chapter show a remarkable and consistent rate of growth in the long period studied here. Growth rates during the Carolingian Renaissance of the eighth and ninth centuries, the high Middle Ages (eleventh-thirteenth centuries), and the ‘Crisis of the late medieval period’ (1350–1500) are fairly high, showing how dynamic the medieval knowledge economy was. After 1454 the invention of movable type led to a further acceleration of growth.

All regions of Western Europe contributed significantly to the growth of book production. Initially, during the sixth century, Italy was still the dominant producer of manuscripts, but as early as the Carolingian Renaissance the centre of production shifted to Northern France, Western Germany, and Belgium, which remained the core region until the fourteenth century. Other countries – Ireland, Britain, and Spain – at times also contributed substantially to the flourishing medieval manuscript production. During the Renaissance of the fourteenth and fifteenth centuries the centre again shifted to the south (northern Italy),
forming a belt of regions with high levels of book production and consumption stretching from Tuscany to the Low Countries.

The enormous expansion of book production in all parts of Western Europe is an important clue to the processes of economic growth and knowledge accumulation that took place. It points to the pan-European character of growth in the Middle Ages. Moreover, we have been able to identify some of the forces driving these processes, such as the growth of the monastic movement and the emergence of universities and the rise of urbanization. In the earliest period Christianization was an important element in the spread and growth of manuscript production. Areas in central and Western Europe where the Church was not yet present in the sixth and seventh centuries had virtually no output, as opposed to those areas where the Roman Catholic Church had been established as the state religion. Missionaries and monasteries were instrumental in spreading the Christian religion in the rest of the Latin West in this early period. And it was in this period that the monasteries dominated manuscript production in large parts of Europe – only in Spain and in Italy did urbanization play a role. In the second half of the first millennium, manuscript production was not yet a market. Carolingian production was based on orders by ecclesiastical and secular dignitaries and had a primarily spiritual function. Acceleration of growth after 1000 reflected the growth of the monastic movement in this period.

From the eleventh to twelfth centuries on, however, the market took over the role of the monasteries. Urban demand and demand associated with universities drove the continuous growth of the book industry in the late medieval and early modern periods. The growing literacy of the (urban) population, the long-term increase in their incomes (which accelerated after 1348), and, in particular after 1454, the ongoing, rapid technological changes in the production of books dominated the process.

Often, accounts of the rise of the European knowledge economy start with the invention of movable type by Gutenberg as the decisive moment in the growth of book production and knowledge accumulation (Eisenstein, 1979). The very dynamic development of the manuscript production in the centuries before 1450 (and in particular following the Black Death of 1348) shows that movable type should be seen more as a response to the rapidly growing demand for books in this period. In many ways, Gutenberg’s invention (or re-invention, because a similar technique had already been developed in China) can be seen
as a culmination of existing trends in the medieval economy. As will be explained in more detail in Chapter 6, it was not only a response to the expanding market for books, but also to the relative prices of labour, capital, and skills that led Gutenberg to select this ‘high tech’ option: it used highly skilled labour and physical and financial capital, factors of production abundantly available in Western Europe, and was highly labour saving; labour had become scarce after 1348. What is also striking was the rapidity of the spread of the innovation: within one generation after the printing of the Gutenberg Bible in the mid-1450s, there were printers in almost every corner of Western Europe. This testifies to the dynamic character and the strong integration of the medieval economy in this period.\textsuperscript{15}

Why did book consumption increase so spectacularly despite the fact that the biological standard of living of the majority of the population did not increase or at all (Koepke and Baten, 2005)? For most of this period, books were luxury products consumed by the elite – the religious elite initially, but after 1100 increasingly the urban and academic elites. Apparently, they were able to mobilize a growing portion of their income to spend on these (and similar) luxury goods. Urbanization probably led to a significant increase in income inequality (Van Zanden, 1995), favouring the class of merchants and professionals who became large scale consumers of the product. Increased income inequality may therefore be part of the explanation. The strong decline in the price of books also played a role in explaining this paradox. The codex was ‘invented’ at the start of this period, rapidly replacing the scroll, and further innovations in script occurred that tended to lower access costs to the information included in the books. But the growing demand for books also had a religious and socio-cultural dimension: in the period from 900–1300 a society emerged that believed in the power of the written word, and preferred the written text as evidence in court and as the ‘container’ of rights and privileges over human memory. It is understandable that people started to believe that the only direct access to religious truth was by reading the Bible (and other holy documents) themselves – and in the late Middle Ages religious movements spread throughout Western Europe that emphasized this. The Reformation

\textsuperscript{15} In fact, the spread of what was arguably the next ‘macro innovation’, the Newcomen steam engine, was much slower: it took more than a century before the steam engine crossed the Channel in sizeable numbers, but that new technology was very context-dependent, and initially not more than a pump for mining activities.
was – as already argued by Derville (1984) – very much a consequence of this grassroots growth of literacy. The ending of the Middle Ages, traditionally linked to the invention of the printing press, the Protestant Reformation (and the Great Discoveries), was therefore not a sudden exogenous development, but the logical culmination of trends set in motion in the preceding millennium.
PART TWO

THE LITTLE DIVERGENCE WITHIN EUROPE
INTRODUCING THE PROBLEM
THE LITTLE DIVERGENCE WITHIN EUROPE, 1400–1800

Part I of this book has demonstrated how from 900 to 1300 economic growth was a pan-European phenomenon, characterized by significant increases in population, urbanization levels, and real income almost everywhere on the sub-continent. Europe changed from an economic periphery into a dynamic centre of growth and innovation. The European boom from 900 to 1300 may have arguably been its most remarkable period of expansion before the industrialization of the Europe in the nineteenth century.

By the early modern period (1500–1800), however, the situation was very different. Growth was now largely concentrated in a relatively small part of Western Europe: in the Low Countries and the British Isles. This North Sea region was already very dynamic during the Middle Ages, when Flanders became the urban centre of northwest Europe, and continued to perform well during both the post-1348 ‘crisis’ and the centuries from 1500 to 1800. In the sixteenth century growth was probably concentrated in the southern Netherlands; in the seventeenth century Holland and the rest of the Dutch Republic became the focal point of expansion, and in the eighteenth century England and Scotland took the lead. At the same time, northern Italy went into decline: it had probably reached its peak GDP per capita during the fifteenth century, stabilized at a high level until about 1600, and saw its per capita income fall in the next two centuries (Malanima, 2003). Similarly, Spain’s economic performance in the period of 1500–1800 was one of near-stagnation in income per capita, which was, as will be elaborated in more detail in Chapter 8, fairly ‘normal’ in large parts of Western Europe (Van Zanden, 2001a; Nogal and Prados de la Escosura, 2007).

The divergence between the North Sea area and the rest of Western Europe is also very clear from evidence on the long-term development of real wages from 1400–1800. Bob Allen (2001), in a pioneering paper, developed a method for estimating the standard real wages of unskilled and skilled craftsmen for a large set of European cities in this period that most clearly demonstrates the ‘little divergence’ that occurred. Figure 8 gives Allen’s estimates for the unskilled labourers, to which I added similarly estimated real wages for Stockholm (see
Baten and Van Zanden, 2008). In the fifteenth century real wages were relatively high across Europe, but from the second half of that century onwards we see two patterns emerging: in the North Sea area (Antwerp, Amsterdam, and London) there is a long-term stabilization of real wages at the level reached following the Black Death, whereas elsewhere a long-term decline began that ended in the late eighteenth century, and in some countries continued into the first decades of the nineteenth century. Trend lines for London, Amsterdam, Strasbourg, and Florence have been added to Figure 8 to bring out the ‘little divergence’ more clearly.

When did this divergence within Europe begin? Allen (2001) pointed to the seventeenth century, but there are reasons to date it earlier (see also Pamuk, 2007). As Figure 9 demonstrates, the difference between the average wages in the Antwerp, Amsterdam, and London on the one hand, and the rest of Europe on the other hand, already began to emerge during the second half of the fifteenth century. There are two versions of average wages in ‘the rest of Europe’ in this Figure: the first is the average wage for seven cities for which we have consistent series for the entire 1400–1800 period, the second series also includes all cities for which we have information for a shorter period. For example, the Stockholm series begins in the sixteenth century, and is therefore not included in the first series, but only included in the second. Analysis of the coefficient of variation of the entire set of series leads to a similar conclusion: real wage differences within Europe are very small in the first half of the fifteenth century, when the coefficient of variation fluctuates around .16, but start to increase after 1450 (the average coefficient of variation for 1450/99 was .20), and continue to grow until the end of the eighteenth century (1750/99: .43, and it is as high as .50 towards the end of the eighteenth century).

How can we explain this divergent development for northwest Europe? Why did only the North Sea area continue the dynamic course of the European economy set after 900, whereas the rest of Western Europe saw long-term stagnation in the early modern period? Of course the starting point of these series – the early fifteenth century, after the rapid increase in real wages following the decline in population from the Black Death of 1348 – does have some effect on its interpretation. One way to look at it is that in the rest of Europe the population recovery after circa 1450 or 1500 led to a return to ‘normality’ – to a decline to wage levels that were the norm before the Black Death. In the Low Countries and England this did not happen. There, a breakthrough to
Sources: Allen, (2001) database (available at http://www.economics.ox.ac.uk/Members/robert.allen/WagesPrices.htm) and additional unpublished real wage estimates for Stockholm put together by Christiaan van Bochove

Figure 8. Estimates of real wages of unskilled construction labourers in European cities, 1400–1800
higher levels of productivity was achieved, which allowed real wages to stabilize in the long run, despite the strong growth in population. As a matter of fact, from 1500 to 1800 the population in the North Sea area increased more than in the rest of Europe (Van Zanden, 2001a).¹

This then raises two questions: what did England and the Low Countries have in common that might explain their similar experience after 1400? And why did this transition to a more productive economy begin in the late Middle Ages, during what has been called the ‘crisis of the Middle Ages’? It is difficult to think of two regions within Europe that were less similar than England and the Low Countries in terms of their socio-political institutions. England was a centralized monarchy (and had been since William the Conqueror) with a classic feudal heritage. In no other part of Western Europe did manorialism remain as important as in England: in 1300 manors still accounted for 20% of the agricultural land and probably output (Campbell, 2000, p. 58). On the continent the classic manor had largely disappeared between 1180 and 1320. In terms of political economy, England was a typical ‘feudal’ state: besides the king, the nobility held most political authority, while the cities were relatively weak, both for institutional reasons and

¹ See Chapter 8 for an analysis of the relationships between population, real wages, and economic growth.
because the level of urbanization was relatively low. By contrast, the Low Countries consisted of a fragmented collection of polities, the most important of which (Flanders, Brabant, Holland, and Zeeland) were heavily urbanized; the large cities had acquired a great degree of control over political issues, albeit with variations from province to province. A process of political scale enlargement had set in, mainly due to the rise of the Burgundian state, which was gradually incorporating various parts of the Low Countries, but this process had not yet been completed by 1500. The nobility was relatively weak, in particular in the western, most developed parts of the region, and manorialism and serfdom had already disappeared during the eleventh and twelfth centuries, or had never been important at all, as for example in Holland.

The structure of the two economies was also remarkably different. England was primarily an agricultural country, with perhaps as much as 60 to 70% of the population actively engaged in that pursuit (see Chapter 8 for more details). It was a major exporter of agricultural products: wool mainly, the great staple of the country, but also grains and some minerals, the result of mining activities in, amongst other places, Cornwall and Devon. The underpinning for this was a relatively favourable land/man ratio. In short, England was resource rich. By contrast, the economy of the Low Countries was dominated by export industries, producing cloth, based on the processing of English wool, but many other products as well, such as beer, linen, herring, and high value-added products such as books and paintings, and by the international trade and services that were at the base of this precocious export-oriented economic structure. The food supply, especially in Holland, but also in Flanders and Brabant, depended on imports from the Baltic and northern France. The economic structure of Holland in 1514 may serve to illustrate the point: only one-quarter of the labour force was active in agriculture, another 15% in other primary activities (digging peat, fishing), 20–25% in services (trade and transport in particular), while a staggering 38% was occupied in industry (Van Zanden, 2002b).

2 Because England had been centralized since the eleventh century, and, unlike continental Europe, there were no local power vacuums for the cities to fill in the high Middle Ages, they were unable to establish their freedoms, although they did gain in strength and influence later on.

3 In the period after 1500, their political economies would to some extent converge, in particular after the two successful revolts of the early modern period: the revolt against the Spanish (after 1572) and the Civil War and Glorious Revolution, both introducing and/or maintaining strong restrictions on the executive, is the subject of Chapter 7.
The economic structure of the two parts of the North Sea region were to a large extent complementary, and perhaps they should be considered a single integrated economic system in which the centre of gravity was shifting from Flanders (eleventh-fifteenth centuries) via Brabant (sixteenth century) and Holland (seventeenth century) to England (seventeenth-eighteenth centuries). But even if the major differences in economic structure are interpreted this way, it is still not clear why the two parts of this ‘economic system’ both experienced a very similar growth in (labour) productivity in the centuries from 1400 to 1800, while the rest of Western Europe failed to continue the dynamic growth path that had been set from 950 to 1300.

Given the significant differences in economic structure and political economy between the Low Countries and England in the late medieval period, it is difficult to explain the strong economic performance of the two parts of the North Sea region if we only consider factors linked to these macro structures. The argument that will be developed in the next chapter is that we should turn to the micro level, the demographic behaviour of households and how they interacted with markets for goods, labour, and capital, to find the crucial similarities between England and the Low Countries. We will argue that it was at this level that new strategies to adapt to the new market environment were developed by households that were unique for the North Sea area, and it is precisely this that caused the ‘Little Divergence’. In the North Sea area a particular household and family structure developed (the European Marriage Pattern) that was essential to the dynamic economic development of the region.
CHAPTER FOUR

GIRLPOWER. THE EUROPEAN MARRIAGE PATTERN (EMP) AND LABOUR MARKETS IN THE NORTH SEA REGION IN THE LATE MEDIEVAL PERIOD

With Tine de Moor

+ How good to be a woman, how much better to be a man!
+ Maidens and wenches, remember the lesson you’re about to hear
+ Don’t throw yourself into marriage far too soon.
+ The saying goes: ‘where is your spouse? Where’s your honour?’
+ But one who earns her board and clothes
+ Shouldn’t hurry to suffer a man’s rod…
+ Though wedlock I do not decry;
+ Unyoked is best! Happy the woman without a man

Poem by Anna Bijns (1493–1575) on the benefits of celibacy and late marriage (Wilson, 1987, p. 32).

The Problem: Janne Heyndericx and the Hajnal Thesis

In 1505 Janne Heyndericx, 31 years old and living in the village of Kouwenkerke in Zeeland, told a committee of inquiry on the malpractices of the local magistrates the following story: eight years ago she promised to marry a young man, Adriaen Jacopsz, and he returned the promise. They slept together and continued to do so, without ever officially marrying as was required by the law of the holy Church, and the marriage was postponed to a more convenient time. She still lived with her mother and stepfather, who refused to maintain her, so that she was forced to find employment elsewhere and went to earn a wage.

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1 We would like to thank the participants of the GEHN workshop on ‘The rise, organization and institutional framework of factor markets’, Utrecht 23–26 June 2005, and in particular Peter Boomgaard, Bruce Campbell, Marcus Cerman, Ken Pomeranz, and Maarten Prak for their comments on a first draft of this paper.

2 The malpractices concern the levying of arbitrary fines on people living together without being officially married by the Church. It is perhaps significant that an official inquiry into this was conducted in 1505, and that people like Janne had officials record their life stories in this way. She obviously took the opportunity to complain.
When she came to work in Kouwenkerke she lived together with another young man, with whom she had a child. Four or five years ago Adriaen tried to be released from his promise to marry her, although they still saw each other regularly and slept together. She still wanted to marry him because, although they had not been married in the Church, they were indeed married before God. Moreover, it was also his fault that she had come so far (that is, had a child by another man), because he had kept her waiting so long (Bange and Weiler, 1987, pp. 404–405).

This story of Janne is strikingly modern. Viewed from a global perspective, Janne’s behaviour was very exceptional; such an informal ‘marriage’ occurring in other parts of the world at that time would have been difficult to imagine. It was however typical for the North Sea region in the late Middle Ages, where a new marriage pattern emerged that had all the features of Janne Heyndericx’s story. One of the elements that makes this story so modern is that the decision to marry was taken, not by parents or other members of the older generation, but by the two partners themselves, Janne and Adriaen, who promised to marry one another, and considered this the same as being married before God (in this they followed the teachings of the Church, see below). Second, mother and stepfather only intervened in this story because they decided that this ‘marriage before God’ should result in the formation of a new household: they refused to maintain Janne any longer, thus forcing her to leave the parental household. The third strikingly modern aspect is the fact that Janne was actually able to do this and could find employment as a wage-earner elsewhere: access to the labour market made this kind of behaviour possible by parents as well as children.

This brief story tells us a great deal about the European Marriage Pattern (EMP) as it developed in the late Middle Ages, and then became characteristic for Western European society in the early modern period. The literature on this topic has primarily focused on other demographic aspects that were typical for this marriage pattern: the average age of marriage, the portion of the population that never married, and the effects on fertility and population growth. In this, the literature followed Hajnal’s seminal paper (1965) in which he stressed these ‘distinctive features’ of the EMP (Hajnal, 1965, p. 101). Far less attention has been paid to the underlying structures or mechanisms that led to these outcomes, to the causes of the EMP, which are arguably one of the major mysteries of the demographic and social history of the early modern period. Hajnal’s classic 1965 paper does provide a
clue to these underlying mechanisms. He mentions, for example, that “the conviction that marriage should be decided upon only after the future spouses have got to know each other well” was to be regarded as “a relevant factor which distinguishes modern Western populations from the majority of societies” (Hajnal, 1965, p. 126). Besides the importance of mutual consent, there are similar hints that, unlike many other societies where marriage consisted of an arrangement between the heads of households, who exchanged a spouse against a wedding gift, marriage in northwest Europe meant that the spouses themselves would set up a new household, and therefore would need a conjugal fund. This neo-localism meant that many were unable to marry because they could not afford such an investment.³ In this chapter we will try to develop these leads, attempting to explain the structures behind the story of Janne Heyndericx and Adriaen Jacopsz.⁴

Central to our argument is the view that a household is a cooperative economic unit aimed at fulfilling the physical and emotional needs of its members and characterized by certain inequalities (power imbalances) between generations and sexes. It is based on implicit or explicit contracts between the members of the household, of which the marriage contract is the most fundamental; cooperation within the household is however also governed by implicit contracts between the generations. The hypothesis of this chapter is that the European Marriage Pattern (EMP) is characterized by power balances between man and wife and between parents and children which are very different from common forms of marriage and household formation in other societies. In the EMP women have a relatively large say in marriage itself, because it is based on the consent of both spouses, and the position of children, in particular when they start to contribute to the income of the household, is also relatively strong. The particular features of the EMP – late and non-universal marriage – are the result of its relatively democratic character.

The EMP was an institutional adaptation of marriage, and more generally of human reproductive behaviour, to a situation of rapidly

³ In his 1982 paper, these thoughts were specified in much greater detail. See Hajnal (1982, pp. 113 and 115).
⁴ This point was made by Richard Smith in 1979: “The search for the European marriage patterns as a ‘statistical’ artefact is intriguing, but it would be unfortunate if, in being so preoccupied with actual ages… we failed to detect the wider social structural features that sustained it. Without this, any means of understanding the precise determinants of this unique arrangement will be thwarted.” Smith (1979, pp. 101–102).
expanding employment opportunities and relatively high remunerations in the century after the Black Death. In brief, it was a reproductive strategy developed by wage earners – male and female – and it was embedded in a larger institutional framework in which market exchange and trust in the functioning of markets were of fundamental importance. Not only did wage income become a very large part of household income, but these households also had access to capital markets and to markets for consumer goods, a large part of which they did not produce themselves, as their main income consisted of wages. At the same time, they developed new strategies for long-term survival to enhance their success and that of their children in the new market environment. Among these strategies were increased investment in formal schooling, in training as apprentices or as servants in other households, and in social capital to ameliorate the problems attendant on old age or single parenthood. The result was a society in which 30 to 60% of the population was partly or completely dependent on wage labour (men, women, and children), in which markets permeated all aspects of economic life, and in which small, conjugal households became increasingly interwoven with a social infrastructure which sustained their reproduction. This society emerged in the late Middle Ages in the North Sea region, in England and the Low Countries in particular. It was, we claim, the long-term dynamism of this structure which helps explain the long-term success of this region in the world economy of the early modern period.

The special characteristics of the EMP and its importance become especially clear when it is compared to situations elsewhere in the world: that is, the marriage practices east of Hajnal’s imaginary line between Trieste-Saint Petersburg, and especially in China. What makes the situation of the North Sea region so specific, and gave this area its economic lead, is particularly revealing when it is compared with Southern and Eastern Europe. Hajnal, Herlihy, and Reher found that within Europe there was considerable variety in marriage practices, and we use their

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5 It is possible to distinguish a core area – Flanders, the coastal provinces of the Netherlands, and the eastern counties of England – where we find the features of the system most clearly, and a ‘larger’ North sea region, including the inland provinces of the Netherlands, Belgium, Northern France and the rest of England, where socio-economic conditions were often different and the system can not always be found in its ‘pure’ form.
geographical division to better explain the circumstances leading to the emergence of the EMP in the Low Countries and England.

The Emergence of the EMP

A combination of three social-economic and ideological conditions made the EMP possible:

- consensus versus parental authority
- intergenerational transfers of property
- access to the labour market.

a. Consensus versus parental authority; neo-local versus patrilocal households

The story of Janne Heyndericx illustrates how marriage amongst wage earners in the late Middle Ages was to a large extent based on consensus between the two spouses, a factor already mentioned by Hajnal as distinctive for Europe. This idea is clearly so fundamental for the EMP, that the chronology can to some extent be derived from the emergence of this doctrine. In the early Middle Ages, marriage was according to Peter Biller basically ‘a lay and secular matter, whose essentials were the handing over of a girl, by her father, to the groom, the exchanging of gifts, and perhaps the girl’s deduction in domum, her “being brought into the house” of the groom or his family (Biller, 2000, p. 22). This changed as a result of the Papal Revolution of 1054–1150, when the Church slowly took over and ‘established a near-exclusive competence over marriage in most regions of Latin Christendom’, a change that was also symbolized by a move from the house of the family of the groom to the church as the location where the marriage took place (Berman, 1983; Biller, 2000, p. 22). At the same time, the Church decided how to define marriage, whether it was based on mutual consent or on copula carnalis (physical union), a discussion going back to St. Augustine (Gies and Gies, 1989, p. 138). It is significant that the North and the South had different views on this. Paris, representing the North, emphasized consent and Bologna the fact of consummation; scholars at the time were aware that this represented contrasting regional customs (Biller, 2000, pp. 53–54). Around 1140 Gratian established that according to canon law it was mutual consent and not the consummation of marriage that confirmed the bonds of marriage, because “where there is to
be union of bodies there ought to be union of spirits” (Noonan, 1973, p. 425).\textsuperscript{6} Gratian and followers frequently pointed towards evidence that marriages arranged against the wishes of the partners usually brought about bad results (Noonan, 1973, p. 434). Gratian’s work formed the basis for further theological discussion\textsuperscript{7} and eventually led to the inclusion of the doctrine in the decretals of Gregory IX (1234).\textsuperscript{8} Thus, boys and girls of a legally marriageable age (fourteen for boys, twelve for girls) were henceforth permitted to perform the sacrament of marriage themselves. Marriages were made by God (which was also the conviction of Janne); a priest only proclaimed his will for a couple after the fact. The doctrine would however also lead to the problem of secret marriages, marriages that occurred privately without witnesses and disconnected from any public institution, which was one of the reasons why it came under attack during the Reformation (Ozment, 1983, pp. 25–27).

\textsuperscript{6} For a more detailed description of how this marriage theory, based on consensus, came into being within the catholic church, see the chapter on “Choice of marriage partner in the Middle ages: development and mode of application of a theory of marriage”, by Sheehan and Farge (1996, pp. 91–117).

\textsuperscript{7} In Gratian’s opinion two people were joined in marriage if they had agreed so in consensus and after sexual consumption of the marriage; Peter Lombard (another twelfth century legal theorist) thereafter claimed that there was no need for \textit{copula carnalis} because Mary and Joseph were married on basis of consensus but did not consume marriage (marriage had been consummated by verbal consent alone). Lombard thus claimed that a marriage was both valid and sacramentally sealed at the moment a couple who were at age and without impediments freely promised one another in good faith to be man and wife. This became known as “present vows o marriage” (\textit{sponsalia per verba de praesenti}) which is different from the marriage vows in the future (\textit{sponsalia per verba de futuro}), or “engagement”. See Ozment (1983, p. 26) and Sheenan and Farge (1996).

\textsuperscript{8} The parts on marriage in the Decretals of Gregory IX were based on the decrees of Pope Alexander III, who according to Brundage thus “consistently sought to free marriages from the control of parents, families, and feudal overlords and to place the choice of marriage partners under the exclusive control of the parties themselves”, see Brundage (1990, pp. 332–33); whereas considering the effects on male supremacy and the equality of sexes as unintentional, others such as Goody, are convinced that the true reason behind the Church’s opposition to arranged marriages was its never ending hunger for accumulation of property. By encouraging love matches, testators became freer to donate their properties, to, e.g. the church. See Goody (1983, pp. 103–156). Some support for this theory can be found in for example the recent work by Katherine L. French. She found out on the basis of wills that English women – much more than men – in the period after the Black Death were willing to donate goods to the parish. This might confirm that the ’breaking’ of the father’s power by the promotion of the conjugal marriage had a positive effect on the Church’s property. See French (2007, pp. 40–41); see also the discussion in Smith (1992, pp. 18–21).
Although in practice the father’s authority in deciding on the marriage partner probably remained strong, Gratian’s canons acknowledged that the rights of the individual did not depend on his or her family, by recognizing an area of freedom where parents should not trespass: “Gratian recognised the place of individualistic, unsocial decision-making in the choice of spouses” (Noonan, 1973, p. 425). If a father had beaten his daughter severely to enforce his choice, the marriage was nullified. It was also considered coercion if the father threatened to disinherit his daughter, thus giving her an argument to have the marriage declared as not having taken place. If parents had coerced their daughter, they could be refused the sacraments, because this behaviour was considered a sin (Noonan, 1973, p. 434). Sanctions on coercion were not frequently enforced. The teaching was more significant than the sanctions as such (Noonan, 1973, p. 434).

Although it has been shown that there was resistance among the aristocracy to the doctrine, it did reach the common folk via conciliar and episcopal legislation and sermons. On the basis of an analysis of English pastoral manuals that were increasingly used after the fourth Lateran Council of 1215 to instruct local pastors about guiding the laity, Murray concluded that the doctrine of consensual marriage had spread widely and quickly to the parish level by the middle of the fifteenth century (Murray, 1998, pp. 140–144). The problems that resulted from

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9 Noonan (1973), refers to an example whereby a father could be denied absolution on his deathbed if he disinherited a daughter if she refused to marry as he directed.

10 Compare this to Protestantism in the sixteenth century. Luther, on marriage by force: Luther claims that a marriage that has been forced upon a woman cannot be dissolved, contrary to the Catholic Church: “What if a child has already been forced into marriage? Shall this be and remain a marriage? Answer: Yes, it is a marriage and shall remain one, for although she was forced into it, she still consented to this coercion by her action, accepted it, and followed it, so that her husband has publicly acquired conjugal rights over her, which no one can now take from him. If she feels that she is being coerced, she should do something about it in time, resist, and not accept it, call upon some good friends, and if that were of no avail, she should appeal to the authorities or complain to the pastor or give public, verbal testimony that she did not want to do it, and thus cry out openly against the compulsion…. However, if a case could be found where a child was closely guarded and could not gain access to these means and was betrothed without her cooperation through intermediaries who married her off by force, and she could afterward furnish witnesses that she had not given her consent, I would pronounce her free, even after the consummation….” Taken from Luther’s work of 1530; Karant-Nunn and Wiesner (2003, pp. 113–114).

11 For the Low Countries: Bange and Weiler (1987); Hoppenbrouwers (1985, pp. 73–74). Dissemination of the doctrine of consensual marriage went hand-in-hand with the spread of the Church’s ideas on the right to remarried for widows. In 1160 Bartholomew, Bishop of Exeter, wrote a penitential that confirmed the Church’s doctrine
the application of the new doctrine – such as bigamy and clandestine marriage – were already increasingly addressed by the manuals in the thirteenth and fourteenth centuries.\textsuperscript{12}

The fact that both the man’s and wife’s consent was necessary for marriage meant that it was a contract between equals, since neither man nor wife could force the other partner’s agreement. This means that, at least in principle, the bargaining position of a woman in such a marriage pattern is relatively strong: she can try to select the kind of husband that suits her. In the more romantic interpretations of the EMP, marriage was based on love between the two partners, which must also have had a strong equalizing effect, as love presupposes a certain amount of equality between partners. This equalizing effect was also evident in the way partners dealt with their property.\textsuperscript{13}

As a result, we would expect inequality within marriage to be much less than in marriage systems in which the wife’s consent was not required. Of course, the extent to which young women really had a say in this certainly varied from time to time and from place to place (Laiou-Thomadakis, 1993). By contrast, in China, marriage was a contract not between two individuals, but between two families; “marriage is a bond between two surnames”, a family matter, by the family, for the family (Eastman, 1988, p. 24). In China, even today, the principle of lineage plays a dominant role in all parts of society. Chinese girls usually met their husbands for the first time on their wedding day, even though they were groomed from birth for marriage; the marriage partners were chosen by their families, with a matchmaker making the arrangements (Maynes and Waltner, 2001).

\textsuperscript{12} See for Ghent, Nicholas (1985 p. 54).

\textsuperscript{13} To illustrate this: Schmidt mentions that in seventeenth century Leiden, in more than three quarters of the testaments, partners indicated each other as the most important heirs, and thus not their children or other relatives, and in some cases they indicated in the testament that they did this because of ‘conjugal affection’ or ‘love’. See Schmidt (2001, p. 186); Goldberg (1992, p. 273). For an overview of the debate on the emergence of the companionate marriage, see the recent work by Crawford (2007, pp. 13–19). See also Goody (1983, pp. 128–129) on the relationship between age gap, companionate marriage and monogamy.
The fact that in Western Europe marriage was based on the consent of the two spouses meant that the power of the male head of the household was much more circumscribed than in other systems. David Herlihy was convinced that

The father... could neither force a son or daughter into an unwanted marriage, nor prevent him or her from marrying.... The Church’s doctrine was a damaging blow to paternal authority within the medieval household, and by itself assured that the medieval family could never develop into a true patriarchy (Herlihy, 1985, p. 81).

Similarly, Theo Engelen stated that the essence of the EMP was that European fathers (and mothers, for that matter) “lacked the means of controlling their adult children. They therefore let them find their own way in the world and hired other people’s children to do the work that in China would have been done by their own children” (Engelen, 2005). In his view, differences in parental authority – strong in China, weak in Europe – explain why in Europe children were allowed to choose their wedding partner and to set up their own household.

Critics of the idea that marriage based on consent was related to the teachings of the Catholic Church maintain that if this were indeed the case, the EMP would have existed where the Church had a strong influence. In fact, however, it arose only in the northwestern part of the continent, while “in other parts of Christian Europe,... families maintained sturdy patriarchal marriage strategies, often in open defiance of ecclesiastical dictates” (Hartman, 2004, p. 98). This is an important point, although it must be acknowledged that eventually the EMP did become the dominant marriage pattern in Europe west of the Trieste-Petersburg line, which roughly coincided with the medieval presence of the Catholic Church. It is highly unlikely that that was coincidental. But the point made by Hartman and others is that other factors must have been responsible for the EMP having emerged first in northwestern Europe, especially in England and the Low Countries. In both regions we find that as early as the fifteenth century the marriage pattern was dominated by consensus between the partners, although average ages of marriage were still relatively low at the time.14

14 In his 1965 paper Hajnal concluded that the EMP was not yet in place in the late Middle Ages, a conclusion largely based on his analysis of the 1377 poll tax; it has been argued that he misinterpreted this source, and that the “level of marital incidence...is fully compatible with the European type in late fourteenth-century England”, see the discussion in Smith (1999, pp. 19–49, esp. pp. 41–42).
We will now turn to the other factors that have contributed to the formation of the EMP, and help to explain why its genesis occurred in the North Sea area: the transfer of property and access to the labour market.

b. Intergenerational Transfers

One of the factors that can contribute to understanding the emergence of the EMP in northwestern Europe and not in the south is the difference in intergenerational transfers. In general, European women already had an exceptional position with respect to inheritance compared to the rest of the world. Goody stresses that one of the distinguishing features of the Western inheritance system was women’s rights to inherit, and the possibility of transferring landed property to and through women, as inheritances or as dowers. Within Europe, both the groom and the bride had property rights in their union. But there were a great many regional differences, in particular, the timing when women were able to access their share of the inheritance. Marriage played a crucial role in this timing: the daughter’s share of the inheritance was either transferred to her at the start of her marriage, in the form of a dowry, or at the end of her parents’ marriage. The first was more typical of southern Europe, the second of the North.

The border between the two regions was in France, where these differences have been studied carefully. In the South (of France), what is referred to as the pays d’écrit or the land of written law, marital property regimes were, for ordinary people as for elites, dotal in form. In the pays d’écrit regions, decisions about marital property relations and succession were made in rough accordance with principles of law derived from Roman law, and the rules were written down, commented upon, and authorized by legal scholars, judges, and magistrates. In this system, custom did not govern inheritance as it did in the North. Individuals had choices about how property was used and transferred, and those people considered as owners of family assets were given much more leeway than Northerners in these decisions. In theory, it was possible for fathers to endow children differently at marriage, for example because the dowry was part of negotiations with the family of the other spouse. These differences also concerned the way in which property was held

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15 Such regimes are called ‘diverging devolutionary’ because property can be given to both sons and daughters, and ‘diverges’ as it descends (or ‘devolves’); Goody (1976).
within the marriage. The southern European system is often referred to as ‘separatist’ because the property of either spouse brought into the marriage was considered distinct, and no conjugal fund was created at wedlock. The Northern European situation is described as ‘conjugal’. In much of the Northern region of customary law, we find systems that were “communal” and not “separatist” in spirit. In these regimes, the property a bride brought into the marriage was not held apart as it was in the South, but was instead, contributed to a communal account that was under the full control of the husband but to which the widow had rights (Howell, 1998, p. 199). Wealth accumulated during the marriage also ended up in the conjugal fund.

This created – at least in theory – different incentives for economic activities of women during marriage: in the north they could contribute to the conjugal fund and profit from its growth, in the south their wealth was more or less fixed, no matter what economic activities they undertook. It also mattered for their position after marriage – as widows; having the right on a share in the accumulated wealth gave greater opportunities for widows to start a new business and to find a new partner. Here again, the practice might have been quite different from the theory. Couples in the North could by marital contract demand a separation of property and Howell writes that the South was not uniform in this practice and considerably less devoted to the notion of separatism. At least until about 1500, marital property law in the South was like Northern communal systems in its hybridity and mobility (Howell, 1998, pp. 212–213).

The distinction between the North and the South was perhaps more important if we look at the differences between property transfer from parents to children. The continued importance of the dotal regime in the south among all layers of society becomes clear on the basis of institutions such as the monti dell’ dotti, as set up in Tuscany during the 15th century, whereas in the North the dowry only remained an aristocratic practice for a long time (Kirshner and Molho, 1978). Chojnacki claims that in the Roman dowry practice, the main purpose of the dowry was to help the groom bear the burden of matrimony (sustinere onera matrimonii). In its medieval Italian version, however, the Roman

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16 The principles of marital property law in the South have long been labelled “separatist” because the property either spouse brought to the marriage was considered distinct, and no conjugal fund was created by wedlock Howell (1998, p. 212).

17 See also Howell (1998), for examples of this flexibility.
dos had received a special twist. Unlike original Roman practice, the medieval Italian dowry came to be regarded as the girl’s share of the patrimony. This had several important effects. One consequence was that girls were excluded from a share in the patrimony (the *exclusio propter dotem*).\(^{18}\) The *fraterna*, or enduring joint inheritance, was for brothers alone: sisters, provided with dowries, had no further legal part to play in their paternal family’s economic life (Chojnacki, 1975, p. 575). These fraterna or frérèches are of some interest here, because they often resulted in an entirely different household structure; they were a form of peasant inheritance established in parts of the North of Italy (Tuscany, Lombardy and Venice) and central France in order to avoid fragmentation of the property. This phenomenon led to co-residence of several family members and thus a de facto situation of extended families (Gottlieb, 1993, p. 215). Laslett sees in the occurrence of these frérèches a distinctive feature of in particular the east and also the South of Europe. Whereas the proportion of frérèches among the households was described as absent in the West and low in central Europe, they could make up some 9% of all households in the east (Wall, 1983, pp. 527, 533).

In the North (of France), in contrast, dowries were much less important, and the status of heirs and their property rights were determined by birth, not by fiat. There, one did not have the same freedom of choice in terms of endowing at marriage or inheritance when the husband deceased. In the few cases where they did have some freedom of interpretation (as in e.g. Douai), they owed their freedoms to a peculiar interpretation of ‘community’ rather than to general principles that vested absolute ownership rights in individuals (Howell, 1998, p. 212).

To a certain extent we have to speculate about the potential effects differences in property transfer regimes had on marriage and household formation. Firstly, we claim that there was probably a direct relationship between marriage age and property transfer between parents and children, and one that did not only influence the parents’ desire to marry off their girls as soon as possible, but also had impact on the brides’ possible wish to postpone the marriage. If women had a right on part of their parents’ inheritance without having to marry, there

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\(^{18}\) At the risk of being too general, we cannot deal in full depth here with the precise evolution of the dotal system. We therefore refer to the works by the true experts such as Owen Hughes and Botticini. See Hughes (1978), and Botticini and Siow (2003).
was no financial incentive for hurrying into marriage. In contrast, the southern dowry system created incentives for both parents and the girls to marry young; women acquired their share in the estate as dowry (which was to return to the wife after her husband’s death); moreover, the size of her dowry was also dependent upon the goodwill of her parents, which created the leverage for parents to control the marriage process. Thus in areas with partible inheritance, where women were certain about their share of the parent’s cake, women could wait. We even may suggest that they used this time in a useful way by collecting some funds to make themselves more attractive as a marriage partner. In those areas where women were dependent on marriage to receive part of the parent’s cake, this process could be shortened by marrying. One could argue that dowry systems were also more paternal; it is here however that again the mutual consent argument comes into play: the presence of the Catholic Church – at least in theory – assured that also in the South of Europe, women had a right to decide upon their marriage partner. One could argue – on the basis of evidence for example England – that in the North girls did also get endowments without or before getting married (Smith, 1986). This only reinforces our argument as it could only diminish the importance of other marriage-related property transfer and thus make marriage age even less important in relation to intergenerational property transfer. The essential aspect of this argument hence is that property transfer in the North may have been more ‘detached’ from the event of marriage than in the South,¹⁹ which also fits into the picture of the consensus marriage, neolocality and the high number of singles in the North.

In a dowry system women had incentives to marry early. It probably created similar incentives for parents. Botticini comes to the conclusion for fifteenth century Tuscany, that the larger the contribution of the bride to the marital household (in terms of household work and the number of children she can still give birth to), the smaller the dowry her parents would have to pay to ‘convince’ the groom to accept their daughter. A woman waiting too long before marrying would become too expensive to “sell” in the marriage market: her parents would have to pay a larger dowry to compensate the groom’s household for the smaller net positive contribution the bride would provide in the marital

¹⁹ See also Leroy Ladurie (1976, p. 42) on the close relationship between parental authority and intergenerational transfers in southern France.
household (Botticini, 1999, p. 110). The younger the bride, the larger her net positive contribution to the marital household and, therefore, the smaller the dowry her parents had to pay. The importance of the young age of the brides also becomes evident from the fact that – as Molho has shown – many fathers presented their daughters younger than they were in the Catasto, in order to improve their marriage chances (Molho, 1988, pp. 193–203).

Moreover, we argue that these elements in combination with the separation of property within the household may have – in the Southern system – withheld women from becoming active on the labour market (after marriage) because it remained uncertain if they would ever benefit from their efforts, after the death of their husbands. But even if they had not had such overtly opportunistic ideas before moving into marriage, their early motherhood would probably have prevented them from being as active on the labour market as NW-European women anyway. In the North women contributed to their future share of the inheritance, realising that they would receive their fair share of the conjugal fund in the end. Such a set of rules also facilitated the rule that widows took over the businesses of their deceased husbands. The Southern system gave fewer opportunities to widows to continue the business of their husbands because they did not (necessarily) get their share of the inheritance, nor had they mostly been that actively involved – and thus trained – as their northern colleagues.

The interpretation of possible links between the inheritance system and the EMP are for the most part tentative. It remains unclear which kind of inheritance arrangements would have contributed to women’s decision to marry early and their participation in the labour market. In some cases it is argued that the lineal marital property regime was made to control women,20 others claim that dotal regimes might have been better for women than community property regimes because they protected wives from the misadventures or ill will of their husbands and gave them, as wives, some property of their own in the form of their dowries (Howell, 1998, p. 224).

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20 See examples given by Howell, 1998 (p. 223).
c. Access to the Labour Market

The teachings of the Church and the inheritance patterns may have made it easier for young men and women to defy parental authority, decide who they wished to marry, and set up an independent household. But it was the rise of labour markets in Europe at the time that gave men and women such as Janne Heyndericx the practical means to assert their independence vis-a-vis their parents. Even before 1348, in many parts of Western Europe, a well-developed labour market had emerged in which a significant share of the population earned a living. This trend accelerated after 1348, when the sudden fall in population levels after the Black Death led to a very strong demand for labour – by both men and women – resulting in a great increase in real earnings, in particular for women. This accelerated the general acceptance of the EMP in the century after 1348.

Initially, the EMP was the marriage pattern of the poor, the wage earners who did not own or rent a farm or any other substantial property. Barbara Hanawalt clearly shows this in her analysis of marriage patterns among English peasants. She points out that marriage among the poor was characterized by free choice by the partners themselves:

Marriage for love has traditionally been assumed to be the dubious privilege of those without property. The lord would not bother to impose a merchet, parents would have no property to bestow and thus have no control, and the Church would not dissolve a marriage even if all the young couple did was to agree to marry while lying together in a haystack. When a young woman, through her initiative and wages, managed to accumulate a bit of chattels and land and paid her own merchet, she could choose her own marriage partner. But the freedom in choice of marriage partner may have been a larger phenomenon, going far beyond those without property (Hanawalt, 1986, p. 202).

In the cities similar developments occurred, as is for example clear from Goldberg’s study of York. A particular important source of female wage labour (which is often linked to the existence of the EMP) was life-cycle servanthood. Goldberg concluded that in the century after the Black Death young men and women working as servants in the city of York were able to make marriage choices much more autonomously than

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were their counterparts in rural Yorkshire. He also compared the reactions of two societies (England and Tuscany) to the consequences of the Plague of 1348. ‘In England, the labour shortage produced by the huge increase of mortality from the plague prompted an influx of unmarried women into the towns, a rise in marriage age, and an increase in the proportion of women never marrying. In Italy, however, the employment of single women did not increase much in the post-plague era, nor did women’s marriage rate increase. . . . New employment slots in Italian cities were filled by men from the countryside, producing high urban male sex ratios by contrast with low ratios in northwestern European cities, where women often outnumbered men’. Although some authors disagree and claim that the number of female servants in the Italian towns has been underestimated due to the particularity of the Catasto, it would be hard to find situations – such as in late 14th and early 15th century Yorkshire – where the female servants are believed to be in the majority. Moreover, the life cycle period during which girls went into service, and the length of this service may in fact be more indicative of the differences between North and South: whereas Goldberg calculated that the Yorkshire female servants entered servanthood in their early teens and often stayed on until their mid-twenties – after which they married – the female servants in Florence and Barcelona already started at the age of eight, but left service before they turned twenty. Klapisch-Zuber notices that anyhow married women and widows outnumbered unmarried females in service in Florence, and that becoming a servant as an unmarried girl was a last resort only, as it may endanger one’s honour. Smith sees this as the fundamental difference between servanthood in North and South: in the North it

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24 Hartman (2004, p. 77), citation; Kowaleski (1998, pp. 50–51) and Lynch (2003, pp. 40–41), give additional evidence for the differences in sex ratio and share of single women in the population between north and south.
28 Klapisch-Zuber, 1986, pp. 72–73. See also Molho (1998, pp. 204–217), who gives a large number of interesting examples of the Tuscan’s ideas about the ideal age category of a bride: she should still be a fianculla, or a young girl in her early/mid-teens. Comparatively, her husband should anywhere from 20 to 35 years.
was based on free choice and aimed at collecting a ‘marriage budget’, whereas in the South it was a last resort that would on the contrary reduce the marriage options.29

A number of studies have documented the remarkable depth of the labour market in late medieval Western Europe, although there is still discussion about the evolution of size. In the Low Countries the trend was clearly upward, and in 16th century Holland and the Guelders River area up to 60% of the working population was dependent on wage labour.30 In England the estimates range from 25% to more than 50% of the population being (partially) active on the labour market; the most recent estimates by Chris Dyer suggest stability between ca. 1300 and 1520, at an extremely high level of about 50% – probably somewhat more than this in the most commercialized eastern counties, and less in the West.31 Or as Poos argues in her study of Essex (one of the eastern counties): in the North Sea region being a wage labourer was a normal part of the life cycle of a very large part of the population (Poos, 1991, pp. 183–229). These extremely high levels of wage labour can be compared with an estimate for Ming China, where perhaps 1 to 2 percent of the population was a wage earner (Xu, Wu and Curwen, 1999, p. 37).

We therefore hypothesize that the labour market for women played a key role in the genesis of the EMP; it was access to employment becoming more remunerative after the Black Death, which may have set a process in motion resulting in the features characteristic of the EMP. The information on wages for women in medieval Europe is quite scarce, but a few data are available which give an impression of what may have happened after 1348. Thorold Rogers (the only author who compared the development of wage trends of men and women over time) points out that ‘before the Plague, labour which is specially designated as women’s work is paid ordinarily at the rate of a penny a day’ (Rogers, 1866–1982, vol. 1, p. 281), which was about half of the daily wage of an unskilled labourer. The helpers of thatchers, for example, often women, earned a wage of about one third of that of

29 Smith (1992, p. 45).
the thatcher himself (1 versus 3 pence). After 1348 wages of thatchers’ helpers went up to 2 pence in the 1360s and almost 3 pence at the end of the fourteenth century whereas the wages of thatchers themselves increased by only a third to about 4 pence (Rogers, 1866–1982, vol. 1, p. 321; Rogers, 1866–1982 vol. 2, pp. 274–334). These thatchers’ wages are probably the best guide to the relative development of women’s wages levels after 1348. In addition, government regulation was also quite friendly to women: the Statutes of Labourers of 1444 set the wages of female labourers at four and a half pennies, which was in fact higher than that of male unskilled labourers (‘every other labourer’), which was set at three and a half pence.

A number of authors (Beveridge, Hilton) have noted this strong increase in nominal and real wages of women after 1348, also pointing out that women were almost always paid the same as men for the same kind of work – another remarkable feature of the labour market in the North Sea region. Hilton noted also that ‘around 1400, countrywomen were doing the same manual jobs as men, such as haymaking, weeding, mowing, carrying corn, driving plough oxen, and breaking stones for road-mending’ (Hilton, 1975, pp. 102–3; Beveridge, 1955–1956, pp. 18–35). We found evidence for a similar absence of a gender-gap in Holland from the mid 14th until the mid 16th century. A similar compression of wage levels occurred in Holland; wages of binders (mostly

33 Bardsley (1999), is not convinced that wages for women were improving relatively to those for men after 1348, and also doubts that (after 1348) they were often paid the same wages as men. Hatcher however – in Hatcher (2001) – argues that Bardsley’s conclusions are blurred by her focus on payment according to the time spent working, whereas piece-rate wages were far more dominant in agricultural work which is the type of work Bardsley focuses on. Women might have worked slower, but the payment per piece did not differ according to gender, writes Hatcher. The claim of wage discrimination due to the triumph of ‘patriarchal structures’ is according to Hatcher thus biased. Secondly, Bardsley insufficiently acknowledges the importance of labour productivity as a fundamental determinant of wages, whereby Hatcher refers to sources where women who could work as hard as men would receive equal pay. Though there clearly is a need for more source material, Hatcher sees it as proven that wage differentiation was more influenced by labour productivity and also institutional factors than gender prejudices. See also Bardsley (2001), for a reply to his comments.
34 See also the criticism by Bardsley (1999).
35 Work in progress on a more detailed paper discussing the wage gap between sexes in Holland and England; Proof for the similarity in wages for both men and women in Holland in this period can be found Hamaker (1876, II, pp. 423–4 and, pp. 440–465) for data on respectively carrying peat and working in chalk ovens. The work by Boschma-Arnoudse shows that the situation in the 1550s was still the same, see Boschma-Arnoudse (2003, pp. 342–44).
women) increased from one third of wages of mowers to about 75% in the 1450s, after which these wages seem to have diverged again (to about 50% in the 1490s and 44% in the early 1500s) (De Moor, 2000, pp. 103–106). In short: the Black Death caused a considerable improvement in the labour conditions of women, in terms of the number of jobs they had access to and in terms of their (relative) remuneration. The degree to which European women took advantage of this situation was, however, quite different from region to region: in the North Sea area these changes led to a strong increase in women’s participation in the labour market, in the South, where the relative wages of women also went up, other factors (such as the dowry system) constrained this process.

The expansion of the labour market, especially for women, fundamentally changed the power balance between generations. In China and elsewhere households were organized around the collaborative exploitation of a farm, and the material basis for the authority of the father was his control over productive resources. If, as happened in northwestern Europe during the late Middle Ages, the household did not own any substantial productive resources, the economic basis for parental authority was undermined. Moreover, if at the same time young adults gained access to a labour market, and it was possible to live in another household as a servant or maid, to be a casual day labourer in agriculture, to migrate to cities for the summer or a longer period – when, in short, young people had a variety of options to escape the authority of their parents, the power balance between generations would have to be fundamentally affected. Young adolescents, those older than 16 or 18, would be able to earn a considerable surplus over what they needed for subsistence: they could work hard, had probably finished their training, but their level of consumption was still relatively low, and they did not have the fixed costs that come with setting up a household. It was in the interest of parents to bind them to the household, as they were net contributors to the family income. At the same time, the youthful labourers were very attractive to employers, and often found it relatively easy to find jobs once labour markets were relatively well developed. This suggests that the rise of the EMP and the changing power balance between generations may to a large extent have been caused by the growth of labour markets and the proletarianization of the working population in town and countryside of late medieval Europe. This dramatic change was made possible by the
doctrines of the Church: they gave the necessary ideological support to the emancipation of the young (women), but the growth of the labour market created the material basis for it.

One can perhaps go one step further. Young women and men cast off parental control and established their own households. In the process they developed strategies which were completely oriented to the labour market: wage labour became a key stage in the life cycle, starting with the work girls did as servants or boys did as apprentices in their teens, during which they also acquired the skills and savings to set up their own household. The process of leaving the parental household at the age of 12 or 14 created a very mobile and flexible labour force that migrated to cities when job opportunities increased, or moved to other regions or jobs when prospects seemed better somewhere else. And even after marriage and setting up a new household, wage labour remained a very important, if not the most important source of income. So, not only did the booming labour market induce men and women to change their marriage pattern, but the changed marriage pattern itself resulted in an increased dependence on wage labour. This cumulative process – this co-evolution of marriage pattern and labour market – helps to explain the very high levels of proletarianization that can be found in the North Sea region in the fifteenth and sixteenth centuries. A number of studies have now documented the remarkable growth of wage labour in late medieval Western Europe. Estimates of the portion of the population that depended on wage income range from more one-quarter to a third for late medieval England. The estimates were as high as 60 percent for parts of the Low Countries (Dyer, 1989, p. 214; Van Bavel, 2006). These extremely high levels of proletarianization can be compared with an estimate for Ming China, where perhaps 1 to 2 percent of the population earned wages (See Xu et al., 1999). As soon as the supply and demand of labour conditions led to greater participation by women, the fact that youthful workers no longer lived at home also contributed to independent decision-making in matters of marriage. The father’s will was confined to the household sphere. Many young people left the family household to become servants before getting married, and thus also escaped their fathers’ authority. When they actually decided to get married, they had the marriage law to support them, even if their father preferred a different marriage partner.

Through their participation in the labour market, women could also develop a substantial amount of social capital for themselves and for their household members, which is again another asset they had
that women who are part of a patrilocal system did not. Although it is
difficult to measure the extent of this, the joint household system, in
which patrilocal residence was the norm, must have had considerable
disadvantages in the social capital of women who moved in with their
in-laws, which was usually in another village (Cornell, 1987, p. 146).
Those who could stay in the same family and village had considerable
advantages because of their longer relationship with members of the
family and their greater familiarity with the local community. A young
woman who left home to get married left behind all that was familiar
(Maynes and Waltner, 2001). To a certain extent this was also the case
for European young women who emigrated to work as live-in maids or
servants. But their participation in the labour market enabled them to
create new social capital for themselves and their future spouses.

We conclude that the emergence of the EMP was the result of the
interplay of three factors: ideology (the teachings of the Church), the
developing labour market (in particular, after 1348), and a specific sys-
tem of intergenerational transfers favouring (wage) labour by women.
Whereas the EMP before 1348 was just one of the possibilities in a
variety of alternative modes of family constitution, and mainly ‘the
dubious privilege of the poor’, the Black Death – by producing an
extraordinary set of circumstances that made EMP the preferred option
for large numbers of people – locked into place a self-perpetuating
and – enforcing system of wage-labour and family formation. Only
the upper layers of society, where the long-term management of the
family property was a vital consideration in marriage behaviour, were
probably to a large extent immune to these changes – there, parental
control remained relatively strong and arranged marriages continued
to be rather usual.

_Hajnal’s Distinctive Features of the EMP_

Now that we have analyzed the key factors in the emergence of the
EMP in more detail, and offered an interpretation that focuses on the
qualitative aspects of the EMP (consensus of the spouses, low parental
authority, and neo-locality), we can examine some of its ‘distinctive
features’, the high average age at marriage and greater (female) celibacy,
to see how they relate to these factors.
a. ‘Don’t Throw Yourself into Marriage Far too soon’: High Average Age at Marriage for Women

Because it was based on consensus, marriage under the EMP was the result of a search process that could only be undertaken by young men and women who were mature enough to select their own partner. Hence, an average age at marriage of 18–20 was the lower limit. By contrast, systems of arranged marriages are characterized by much younger average ages, especially for girls. But within the EMP a great deal of variation was possible, depending on the level of real wages and the general state of the economy. The few data we have for late medieval Holland and Zeeland, for example, point to a relatively young age of marriage. In the sources from 1505, from which we cited the story of Janne, we find a number of married men who were only 20, or a man who was 22 and had a wife and four children, and another man, Adriaen Jansz., citizen of Middelburg, who was 21 years old, and had married his wife Cornelie Adraen Vierloesdochter van Vijkenkercke three years before “clandestine[ly] and in order to get absolution”, probably against the will of her parents, who seemed to have been of noble descent. On the basis of this evidence, it seems that in 1505 in Zeeland the age of marriage, even for men, was somewhat lower than 20. There is another fragmentary source from 1540/41 that allows us to estimate the average age of marriage for a group of men and women in the countryside around Leiden. There the women probably married when they were 20 or 21 (n=10), whereas men were one or two years older (21 or 22) (n=29); still a large number of men and women married before they reached the age of 20 (Van Zanden, 1993, p. 28). These estimates are comparable to those for fifteenth century England, which show a range between about 18 and 23 years (for women); Goldberg suggests for example that rural women in Yorkshire married in their late teens and early twenties, but urban women waited until their early to mid-twenties. In both countries the average age at marriage increased considerably during the sixteenth century (Hartman, 2004, p. 39), so that it reached the levels that Hajnal thought were charac-

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36 On the other hand, the same sources reveal two men, 31 and 30 years old, who were still single and living with their mother, and in the first case, also with three unmarried sisters.

37 Data are very scarce, see Kowaleski (1998, pp. 41–45), offering the best recent overview, see also Kowalski (1998 (Appendix), p. 326); also Smith (1979) for a discussion of some of the evidence; and Youngs (2006, p. 135).
teristic of the EMP. In the 1580s and 1590s the mean age at first marriage for women in Amsterdam fluctuated between 23.5 to 25, and it remained at this level until the 1660s, when it started to go up even further. The mean age at marriage for men was about 1 to 1.5 years higher. Of 8,052 men who married in Amsterdam from 1578–1601, only 118 (1.5%) were younger than 20, and none was younger than 18, whereas almost half (47.5%) was older than 25 (Van Nierop, 1934). Similarly, in the first decades of the seventeenth century, the average age of (first) marriage in England had increased to more than 25 for women and about 27.5 for men (Wrigley, Davies, Oeppen, and Schofield, 1997, p. 134). Whereas Hajnal considered those high marriage ages to be one of the fundamental characteristics of the EMP, we propose that they were to some extent the result of the deterioration of standards of living during the sixteenth century subject to a system based on consensus and neo-locality.

Much of the literature on the EMP has concentrated on its long-term effects on population growth. The first generation of studies, based on Hajnal’s work, argued that the EMP used Malthusian preventive checks to stabilize population growth, postponing marriage until 25–30, and the fact that a relatively large part of the (female) population remained unmarried. When times were bad, marriages were postponed, and population growth slowed down. This was contrasted (following Malthusian arguments) with the Asian or Chinese patterns of marriage, which were supposed to result in unrestricted population growth because the preventive checks were absent. The new interpretation of Chinese population development, however, has shown that within marriage, levels of fertility were much lower than in Europe, which was partially the result of infanticide, of female babies especially, and partially the effect of a lower level of fertility within marriage as such (Lee and Wang, 1999, p. 8). Again, it may perhaps be argued that the contrasting levels of marital fertility are to some extent the result of the underlying structures sketched above. When marriage is based on consensus – on mutual love – there is usually a high ‘propensity to have sex’, even to have sex before the actual marriage ceremony takes place (increasing marital fertility even more), since once the decision to marry has been taken.

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38 Similarly, one finds lower mean ages of marriage in colonial America, where marriage continued to be based on these rules, but the economic conditions were much better than in Western Europe, cf. Gallman (1984, p. 613), who estimates a mean age of marriage of 20–22 years for women and of 24–26 years for men.
and consensus reached, the couple is married ‘before God’. The EMP therefore resulted in high levels of fertility immediately after and during marriage. Couples in arranged marriages may have a lower ‘propensity to have sex’, or, as argued by Kok, Yang, and Hsieh (2006) in a comparative study of fertility in nineteenth and early twentieth-century Taiwan and the Netherlands, “in arranged marriages, a large age difference between husband and wife may have obstructed the process of familiarization”. This seems especially true for ‘minor marriages’, which occurred in (parts of) China. In these marriages the intended bride is brought into the boy’s household when she is only a young girl, at a very early age, and the pair grows up together like brother and sister, and then are declared man and wife when they reach maturity. As Kok, Yang, and Hsieh (2006) convincingly show, these marriages are characterized by a low level of fertility, possibly because the spouses find it difficult to develop new sexual modes of behaviour; the literature suggests that at times they had to be forced to have sexual intercourse.39 Living under parental authority perhaps also restricted sexual development (Lee and Wang, 1999, pp. 90–92). More practical reasons that relate to the economic position of women within the household offer a further explanation of the lower-than-expected fertility. As women’s work was mostly domestic, mothers were able to breastfeed their children longer than in Europe, which not only extended the period between births but also enhanced the survival chances of their children.

The European behavioural patterns were based on a large degree of mutual trust: young people from the age of 10 or 12 (and sometimes even younger) were entrusted to the households of other individuals, the search process for a future spouse was entrusted to young adolescents, and women (and men) could actively engage in wage labour and the social interaction that accompanied it, often in places distant from their homes, without damaging their reputation. Perhaps the best examples of these high levels of mutual trust are the practices of courting and pre-marital sex that emerged. The EMP as it developed after 1500 – with couples marrying when they were older than 25 – did not mean that the individuals who wanted to marry but postponed setting up a household had to abstain from all sexual activity. Although the

39 This is not to say that other factors suggested in the literature to explain the low marital fertility in China did not play a role, such as malnutrition (see Wolf, 2005, p. 232) and/or the conscious planning of children (see Lee and Wang, 1999).
spheres of young unmarried men and women are strictly separated in patriarchal societies – in order to protect the virginity of the girl – in Western Europe practices of courting and pre-marital sex developed that did not lead to high levels of illegitimacy:

    couples hardly denied themselves all sexual activity. The important thing was to avoid having babies, and evidence on courting practices throughout northwestern Europe reveals that couples, especially those already betrothed, often engaged in socially sanctioned sessions of petting and fondling (Hartman, 2004, p. 62).

Jan Kok, in a similar analysis of these practices in the Netherlands, also pointed out that it was based on a remarkable degree of trust in the young ones, who were allowed to enjoy these ‘games’ – a degree of trust that in most cases was justified, as levels of illegitimacy were lower than elsewhere (Kok, 1990).

b. ‘Unyoked is Best’: High Celibacy Rates Among Women

    The second distinctive feature of the EMP was the relatively large portion of the (female) population that remained unmarried. Again, to a large extent this follows from the fact that the search process for a suitable partner started when the participants were older (say at 18), and that ended when consensus with another partner was reached; in fact, in the more romantic version: when they fell in love with one another.40 Hajnal (1965, p. 126) remarked that this individualized search process was a serious limitation of the EMP:

        the conviction that marriage should be decided upon only after the future spouses have got to know each other well…may render the finding of a marriage partner very difficult since people often have opportunities to become acquainted only with a few young persons of the opposite sex. If, by contrast, it is possible to arrange a marriage between people who have never met, the circle of potential spouses is greatly widened.

    It is therefore only natural that for part of the population the search process did not result in finding a suitable partner during the period when men and women are active on the marriage market, resulting in the fact that part of the population never married at all. In systems of

40 Besides the high rate of spinsters among women, the importance of convents also influenced the rate of celibacy among women.
arranged marriages this is much more unlikely;\textsuperscript{41} there, universal marriage – especially of girls, as there is often a shortage of women – is the norm because the costs of arranging a marriage are limited, while the potential benefits large, and the village and family networks can be mobilized to find a suitable partner.\textsuperscript{42}

In short, we consider the two ‘distinctive features’ of Hajnal’s EMP to be the result of the patterns analysed – of marriage based on consensus in particular.\textsuperscript{43} An additional feature is that differences in age between men and women were relatively small in the ‘classic’ EMP – again because it was the result of consensus between (near) equals – while age differences in southern Europe were in general much larger (Laslett, 1977).\textsuperscript{44} In fact, as the poem by Anna Bijns implies, it can be argued that the relative bargaining position of women before (and probably also after) marriage was positively affected by the relatively late age of marriage and by the small age difference between men and women.

**Implications of the EMP for Long-Term Economic Development**

a. *Labour Market Participation and Human Capital Formation*

The EMP as it emerged in the late Middle Ages was characterized by a fundamental adaptation of household structures and marriage patterns

\textsuperscript{41} Only 1 or 2\% of women in traditional China remained unmarried by the age of 30. In comparison: 15 to 25\% of women were unmarried in Western Europe (Maynes and Waltner, 2001).

\textsuperscript{42} Kowaleski, with her very useful overview and critique of known figures on single women in Europe, concludes that there was a massive difference between the North and the South, and that the number of single women might have been even higher in England than in the continental part of Northwestern Europe (Kowaleski, 1998, p. 46. See also her overview of average marriage ages and percentages of singlewomen in Table A1 on pp. 326–328).

\textsuperscript{43} This also distinguishes our approach from that worked out by Hartman (2004).

\textsuperscript{44} Laslett (1977). Goldberg also gives estimates of age differences for 14–15th century Yorkshire and comes to the conclusion that couples tended to marry one another at similar age, which is in accordance with the data found by Razi for the manor of medieval Halesowen, Goldberg (2004, pp. 9–11) and Razi (1980, pp. 61–63). The mean age difference for urban Yorkshire was 2.9 years, and for rural couples 3.8. Goldberg also noted that in those cases where men were substantially older, these were usually widowers marrying women for the first time. See also Wrigley, Davies, Oeppen, and Schofield (1997, p. 151 ff.) for a discussion on the age gap between spouses in England and do also compare to the rather large age difference between bride and groom in Early Modern Italy, as described by Herlihy and Klapisch-Zuber and put into its European context by Smith (1992, p. 33).
to market opportunities, in particular to the opportunities of the labour market. The adaptation also included adjusting to the markets for goods and services as wage labourers are obviously unable to produce their own subsistence. In that sense it was probably unique: we do not know of any previous comparable examples in which households became dependent on the market on such a vast scale. That wage labourers were prepared to develop and carry out that strategy is significant: it shows that they had sufficient trust in markets to rely on their functioning, not only for income, but also for consumption. This can be seen as an index of the efficiency of the market economy in the late medieval period in this region: it appears that it generated the necessary trust to make such a transformation possible.

Part of the life cycle that emerged in the later Middle Ages, and which would not change fundamentally until the nineteenth (and perhaps even the twentieth) century was an extended period of ‘on-the-job’ training and education. In this way the EMP was interwoven with the system of apprenticeship that had emerged mainly in the guilds in medieval Europe, and with patterns of ‘circulating’ servants, maids, and journeymen.45 These greatly increased the part of the life cycle taken up by training and education.

One of the links to broader socio-economic changes was through the supply and demand for domestic services. The distinctive Western European servant phenomenon is not found in parts of the world where early marriages are common. When it became possible for people to earn money without having to go through a stage as servants, they tended to marry a bit younger (Gottlieb, 1993, p. 60). Reher confirms this: on the basis of Hajnal’s 1965 article (in particular, his tables 2 and 3), it becomes clear that southern Europe did not fully fit the EMP of late and low levels of marriage, although it was not like the patterns of Eastern Europe either. In Mediterranean Europe, where there were far fewer servants than in central or northern Europe; women married earlier, too (Reher, 1998, p. 207). But they did not marry a great deal earlier. This led to what is still typical for Mediterranean countries: children ended up leaving home far later in Spain or Italy than they did in the North Sea region (Reher, 1998, p. 207). In most of the Mediterranean, young people did not leave their parents’ house before

45 On apprenticeship in medieval Europe, (see Epstein, 1991); there has been some discussion about the importance of servants; (see Bailey, 1996, p. 7; Fox, 1996).
marriage.\textsuperscript{46} And among those who were married, many continued living with their parents, thus creating multi-generational households.\textsuperscript{47}

The other phenomenon closely connected to changes in the labour market is the development of human capital. The link between the EMP and human capital formation is clearly a paradoxical one. It can be argued that the EMP was bad for investment in human capital because the extra income generated as a result of such an investment does not become available to the household itself – in particular, not to the parents who made the investment – but it went to the household set up by the new generation after marriage. In short, neo-locality might be bad for investment in human capital, whereas patri-locality, when a young man stays in his parents’ household and they can profit directly from the extra income he generates, may create better incentives.

But there is evidence that notwithstanding the neolocal system, western European parents did invest heavily in their children, and that, also from a theoretical point of view, ‘love marriage’ will lead to more investment in human capital than arranged marriage. In a pioneering paper Edlund and Lagerlöf (2006) demonstrate that ‘a shift from parental to individual consent moves resources in the same direction, favouring young men and young women over old men’, basically because young adults will have more incentives to invest in their offspring than old adults ‘who will be around fewer periods’. Another part of the explanation is that the new parents – ‘freed’ from control by their own parents – now may have had more means to do so. In a way, the Chinese and Indian household structures were focused on providing an income for parents in their old age, on performing the rites and ceremonies necessary for the well-being of the deceased, and on continuing the lineage

\textsuperscript{46} This is still the case today (see Reher, 1998, p. 208); there is possibly also a link to the dowry system, which was so prominent in Southern Europe.

\textsuperscript{47} Laslett claims that the proportion of multigenerational households was high in the South of Europe and very high in the East, unlike the North and West, where this proportion was very low (Wall, 1983, p. 526). There are also indications of a more psychological nature that suggest the possibility of earning money via wage labour might have delayed marriage, especially for women: in recent research, MacDonald, an American psychologist, found proof that the fertility behaviour of people is also driven by motivations to increase or maintain social status. As this may conflict with the desire to have many children, these motivations may influence fertility decisions. MacDonald’s explanation confirms our view of women’s choices in the high Middle Ages in northwest Europe: women could receive higher wages, especially after the Black Death, and were also welcomed on the labour market. This meant that they could save for ‘a better living’. Their desire for children was thus postponed because it conflicted with their desire to achieve higher social status (see MacDonald, 1999).
so that these rites would be performed forever. Parental authority was aimed at guaranteeing these income transfers; during the most productive years of their lives, children took care of their parents and devoted much of their time and energy to their well-being. The fundamental change that occurred with the rise of the EMP is that children stopped taking care of their parents in this way. This created a problem: who would take care of the elderly under the new system? And it created opportunities: it freed resources that apparently were spent on educating and training children. The increased investment in human capital should also be seen in the light of the commercialization of the environment of the household that occurred simultaneously. The measure of success in this new environment was no longer to succeed the father in managing the family farm (and continuing the lineage), but was linked to success in the market economy through maximizing the income that could be earned by wage labour. In such an environment investing in the education of children became critical.

In the North Sea area, levels of literacy rose significantly in the century and a half after the Black Death. This is relatively well documented for the Low Countries: the spread of new religious movements (Modern Devotion during the fifteenth century and the Reformation after 1517) is clearly connected to this trend (Derville, 1984; Uitz, 1990, p. 71). In the sixteenth century, probably a majority of the male population of Holland could read and write, and these skills were available in towns and the countryside (Van der Woude, 1980, p. 257). In 1585 about 55% of the bridegrooms and 32% of the brides could sign their name in the marriage registers of Amsterdam, the differences between immigrants and native Amsterdammers being insignificant (Van Zanden, 2004; Kuijpers, 1997). In England, there was a similar growth in education from 1340 to 1548, as has been well documented by Hoeppner Moran (1985) for York. In London, levels of literacy in the 1470s may already have been as high as those in Amsterdam, although that is less certain (Moran, 1985, p. 20; Hanawalt, 1993, p. 82). In the same region bordering the North Sea, the premium for skilled labour declined rapidly after 1348, and stayed at an extremely low level in the sixteenth-nineteenth centuries, which points to high levels of investment in this form of human capital as well (see Chapter 5). Both types of human capital

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48 Moran (1985, p. 20), citing an estimate by Sylvia Thrupp.
formation were also closely linked: guilds in the Low Countries and in England required their apprentices to be literate, or included training in reading and calculating abilities in their apprenticeships (Hanawalt, 1993, p. 82). In Amsterdam, the poor relief institutions also saw to it that orphans attended schools in order to be allowed access to apprenticeships (Kuijpers, 1994, p. 48). What is also striking is that gender differences were fairly small: parents in Western Europe invested in their boys’ and their girls’ education and training. Although men continued to have a lead over women in literacy, this lead was relatively small, again, compared to other parts of the world such as China and India (Van Zanden, 2004). Thus, as will be shown in more detail in Chapters 5 and 6, one of the distinguishing features of the North Sea region was its high level of human capital formation in this period, which prepared the region for rapid economic growth in the following centuries.

b. Institutions and Trust

The small nuclear families that resulted from the EMP were more vulnerable to the loss of individual members than were large extended families. This was especially true for the loss of a father or mother, because the family depended on wage labour and did not own many resources. Strong family ties – the best ‘traditional’ support network – were not a real alternative, as the EMP was based on self-sufficiency: young people left home at an early age, and set up their own household, often outside their parents’ residence, which all suggest that the EMP was based on loose family ties.\(^{49}\) This necessitated alternative social support networks based on solidarity within the community, the city, perhaps even the state, and on forging networks of mutual help not primarily rooted in bonds of blood.

The elderly were the obvious victims of the decline of parental authority and the trend towards neo-locality. Of course, when their children prospered, parents might profit from their prosperity as well. But such transactions, which were in a way ‘enforced’ by parental authority in patriarchal systems, in the Western European system were more voluntary transfers of money and goods (Smith, 1986, pp. 199–201). On the other hand, this may well have given parents an incentive to invest

\(^{49}\) Hoppenbrouwers (1985) documents the decreasing influence of family and the rise of ‘individualism’ in late medieval Holland in some detail.
emotionally in the relationship with their children. More importantly, however, it gave them clear incentives to start saving for their own old age during their life cycle. Here the developing capital market began to play a role: saving for the future became increasingly important in the new system, because simply having children no longer guaranteed care in one’s old age. During their teens and early twenties, men and women were supposed to save substantial sums to set up their own household at marriage, and during marriage they had to save to be assured of an income in their old age. So, to some extent inter-temporal income transfers by the same generation via the capital market regulated the problem of old age and took care of setting up new households that in patriarchal systems were taken care of by transfers between generations.

Therefore, the EMP not only depended on a vibrant labour market, but would have difficulties functioning properly when capital markets were extremely unreliable and inefficient. Fortunately, however, there is strong evidence that the efficiency of capital markets improved a great deal in the century or so after the Black Death (see Chapter 1) (Clark, 1988, pp. 265–294; Epstein S.R., 2000, pp. 18–25, 60–61). In the Low Countries one of the most popular innovations was the life annuity on which a relatively high interest was paid out during the lifetime of the man or woman on which the annuity was established. These annuities became very popular in the late medieval period, and were probably the most important source of urban (long-term) finance in the most commercial parts of the Low Countries (Flanders, Brabant, and Holland) (Zuijderduijn, 2007). The annuity was an ideal instrument for saving for old age (VerLoren van Themaat and Dokkum, 1983). In a case study of 15th and 16th century Edam and the surrounding countryside we also demonstrated that these *renten* were also used for inter-generational transfers; in return for handing over the farm or the workshop to the next generation, parents could vest a rent on their lives, to be assured of a decent income after retirement (de Moor, van Zanden and Zuijderduijn, 2009). Similar developments can be found in Medieval England, where pension contracts performed the same function; elderly

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50 A review of the debate on emotional bonds between parents and children in the late medieval period is included in Hoppenbrouwers (1985); on the basis of an impressive collection of evidence related to Holland, he shows the importance of emotional ties between members of the conjugal household.
surrendered the use of their lands and resources to family members or non-kin in exchange for individually arranged pension benefits.\footnote{Elaine Clark shows how in East Anglia about 40\% of both men and women already received a pension in the last half of the 13th century. In the period 1350–1457 about 38\% and 23\% of women and men respectively received pensions (Clark, 1981, p. 316).}

At the same time poor relief institutions developed, first under the auspices of the Church, but increasingly – and in particular after the Reformation – stimulated and/or regulated by city governments and, in England especially, the state. During the Middle Ages poor relief was primarily the responsibility of the Church, and part of the income of the parish had to be spent on ‘hospitality’, i.e. the accommodation of strangers or travellers, and on charity to the poor.\footnote{Cf. the analysis of the foundations of poor relief during the Middle Ages as supplied by canon law (Tierney, 1959).} In urban centres, this Church-related poor relief was frequently supplemented by new institutions, often the result of initiatives by pious citizens, but sometimes also initiated and managed by the cities themselves – to deal with the problems of mass poverty. In the Brabant city of Den Bosch these late medieval initiatives resulted in an accumulation of capital and land in poor relief institutions which supplied the funds for poor relief in that city during the following centuries (Prak, 1994). Similarly, in the city of Utrecht, the late Medieval period saw the emergence of a few dozen institutions taking care of different aspects of poverty and the ‘failure’ of families – of orphans, the elderly and the sick (Bogaers, 2008, pp. 497–577). In the cities Late Medieval period, poor relief was quite extensive, but also chaotic – the result of a multitude of ‘bottom up’ initiatives. In the sixteenth century the uncoordinated character of the poor relief institutions was increasingly criticized, and attempts were made to reform the ‘system’. In the Low Countries this led to the first national regulation introduced by Charles V in 1531, but further reform and proliferation of poor relief to a large extent relied on the activities of individual cities and provinces (Parker, 1998). In England, through the Elizabethan Poor Laws of 1572–1601, the state established a national system, which also built on the medieval heritage (Tierney, 1959, pp. 129–133). What these systems had in common, though, is that they were considered fairly generous for the standards of the time (Lindert, 1998). De Vries and Van der Woude (1997, pp. 657–60)
estimated, for example, that poor relief in the Netherlands may have redistributed as much as 3–4 percent of national income, and they link this to “the modest scope of informal, family-based income redistribution practices”. Seen from this perspective, the ‘relatively generous’ poor relief of the North Sea region can be considered a by-product of the demographic system that emerged in the late Middle Ages (Smith, 1986, pp. 199–201).

Another vulnerable group was at the other end of the age spectrum. There were fundamental differences between the way that Chinese and European families dealt with ‘unwanted’ children. In China and India infanticide, in particular of female babies, was common (Lee and Wang, 1999). This was associated with another important difference between the two patterns, the relative value of the two sexes. The Chinese pattern was in essence patri-local: after marriage the couple moved in with the boy’s parents, and it was the young couple’s task to take care of the parents in the years to come. Boys were, therefore, a real asset: a continuation of the lineage and a guarantee of care in old age. Girls were a liability: they were expensive to raise, required a dowry to get married, and then disappeared to another household to take care of the parents there. Such a stark contrast between girls and boys was absent from the EMP. There are indications that although infanticide did occur in the West, child abandonment was a more regular practice than infanticide to get rid of unwanted children, and there was generally a more equal sex ratio in the number of abandonments. In the late medieval period we see at least the gradual disappearance of (female) infanticide from Western Europe (Hartman, 2004, pp. 43–44). Instead, taking in foundlings was encouraged by the Christian Church: it introduced the principle of oblation during the sixth and seventh centuries, which allowed the donation of children to the service of God through ecclesiastical institutions; this can be considered a rationalization and institutionalization of abandonment. Around the middle of the thirteenth century new specialized urban institutions for the care of abandoned children began to be established, which spread through most of Europe in the sixteenth and seventeenth centuries (Boswell, 1988, pp. 401, 405–408). The ‘supply’ of foundlings was also closely related to the EMP: it was not only poverty that caused single and married mothers to abandon their children; in Paris, for example, two-thirds of the unwed mothers who abandoned their children worked as domestics, and were exposed to promiscuous situations as servants, far from parental supervision.
More than 80% of them had been born outside the city, and were thus left without a support network.\footnote{Taken from Fuchs, cited by Tilly (1992).}

Strong and weak family ties, and correspondingly weak and strong institutions, are fundamental in the explanation Reher provides for differences in family systems between northern and southern Europe. He also argues that the two-generation household, in particular if it was exclusively dependent on wage work, was much more fragile than the often much larger three-generation household characteristic of a patriarchal society, which usually also had some access to land or other resources. In southern societies the help given to vulnerable members of that society came from the family or from individual charity, while in northern societies this was largely accomplished through public and private institutions (Reher, 1998, p. 209). There were several ways to deal with the needy in Mediterranean Europe: by means of co-residence, by circulating the elderly among the households of their offspring, or by the proximity of the homes of the elderly to those of their children. In England, on the other hand, a smaller proportion of the elderly lived with their children (Reher, 1998, p. 209). The responsibility of the commonality for the well-being of the elderly that developed from this was epitomized in the Poor Laws (see also Smith, 1981).

Perhaps it stretches the argument to say that it is no coincidence that the development of a strong civil society – of strong community institutions which helped to spread risk in times of hardship – occurred in the same part of Europe where Reher (1998, p. 217) claimed:

The sense of individual responsibility for collective norms and needs, so essential for the concept of democracy and civil society in the West, is often conspicuously absent from southern European societies…. In sum, the countries of northern Europe and North America have well-developed civil societies that thrive on individual initiatives, but with a dark side shown by their lack of social cohesion and by the desperation and anguish so prevalent in them.

The Return of Patriarchy

In the sixteenth century the situation began to change for working women in the Western European labour market. The changes show clearly the close connections between the demand for labour (real
wages as indicator) and the relative bargaining position of women within marriage – the more so since the latter became increasingly undermined by Church and state. The sharply declining real wages in the sixteenth century made it increasingly difficult for women and men to survive on wage labour alone. Wages of women probably fell more than those of men: as the labour scarcity of the late Middle Ages turned into labour surplus again, a situation arose that probably depressed the wages of unskilled workers more than those of skilled labourers. Clark, for example, estimated that in England relative wages of women after 1599 were substantially lower than before 1599; they were on average 31% less before 1599 and 58% less after 1599 than the wages of unskilled men (Clark, 2005). In Sweden, the wages of women in construction were as high or almost as high as those of unskilled labourers until 1624; after that the two series diverge, and at the end of the seventeenth century women earned only half that level, and sometimes even less (Jansson et al., 1991). In Zeeland it was the same: before 1700 women were paid the same daily wage for weeding as men, but in the course of the eighteenth century the nominal wages of men increased, whereas those of women stayed constant (Priester, 1998, p. 643). As we have seen, the average age of marriage went up significantly, to the levels Hajnal considered typical for the system; from our slightly different perspective, it can be argued that the golden days of the EMP – of self-empowerment for men and women as a result of a booming labour market in the fifteenth-century – had come to an end in the North Sea region.

The general assumption is that the role of women in work and business declined from the sixteenth century onwards.  

54 This idea was first suggested in the work of Alice Clark's “Working life of women in the seventeenth century” in 1919. She claimed that women in England had important economic roles during the Middle Ages and the sixteenth century but that they lost this position in the seventeenth century. She claimed that before the rise of capitalism women took care of the clothing of the family. If married to a craftsman, they helped in the business, and even took over the business if the husband died. This was possible as long as becoming a master in a craft was a feasible option. Clark claims that beginning with the rise of capitalism it became less feasible for apprentices to become masters. Many were doomed to work for a master the rest of their lives. Their wives stayed at home; if their husbands earned enough, they could limit their activities to the household; if not, women also became wage labourers. The lack of organization of female wage labourers made it difficult for women to take advantage of their advantageous position: the demand for thread was always higher than the supply.
defenders of this assumption are Nathalie Zemon Davis (1986) and Martha Howell (1998). Howell compares the position of women on the labour market in terms of their autonomous disposal of resources and control over the production, distribution, and consumption of products. The greater this control, the higher a woman’s status. Until the end of the Middle Ages, women frequently possessed such a ‘high labour status’; thereafter, their autonomy and control declined, and by the eighteenth century women could hardly attain high status jobs. This does not necessarily mean that women participated less in the labour market, but that it became increasingly difficult for women to achieve well-paid positions in that market.

It seems no coincidence that in the ideological arena there was also a tendency to stress parental authority again, by both Protestants (following Luther) and Catholics, (following the Counter Reformation). Until the sixteenth century there was no sharp division between married and single people: there were many situations where a man and woman lived the life of a married couple without being married. From the sixteenth century on, Protestant and Catholic authorities as well as secular governments attempted to make the distinction between married and single sharper. Besides criticizing celibacy, Protestant attacked the Catholic belief that consent by the two partners was the only necessary element in a marriage, and suggested that these would result in irregular marriages. They stressed the necessity of parental consent, a public ceremony, and the presence of a pastor for a valid marriage. According to Luther (Karant-Nunn and Wiesner, 2003, p. 214).

55 Wiesner (1999, p. 196) explains the Protestant view on celibacy: “To the Protestant belief, celibacy was not superior to marriage since it was assumed that persons were too tempted by sinful passion to forgo God’s remedy of marriage. It was assumed that celibacy led often to homosexuality and concubinage and that it impeded the access to clerical service. Therefore celibacy was not set as a prerequisite for clerical service. Marriage was thus the right and proper thing for all or most individuals to do.” Wiesner claims that although this emphasis has traditionally been attributed to the Protestant Reformation, there are indications that in the decades before the Reformation, there were Christian humanists that praised marriage, and that city authorities viewed the marital household as the key political and economic unit. However, it is definitely true that the Protestants were fierce promoters of marriage and attackers of single people, “arguing that those who did not marry went against God’s command in the Garden of Eden and their divinely created and irresistible sexual desire”.
children ought not to get engaged without their parent’s permission [though] parents should not...either compel or hinder their children in accordance with their own wishes. Therefore, the son should not bring a daughter to his parents without their consent. But the father should not force a woman upon his son.

The Calvinists emphasized that marriage was not a sacramental institution of the Church, but a covenantal association of the entire community. A variety of parties played a role in the formation of the marriage covenant. The marital couple themselves swore their betrothals and espousals before one another and before God, making all marriages tripartite agreements with God as party, witness, and judge. The couple’s parents, as God’s bishops for children, also had to give their consent to the union.

Reforming Catholics answered this with the decree of Tametsi as approved by the Council of Trent. This required the presence of witnesses, including a parish priest, for an exchange of vows to be considered a valid marriage. The wedding ceremony was thus ‘homogenized’ and made uniform throughout the area of Catholic jurisdiction (Gottlieb, 1993, pp. 69–70). By the later sixteenth century both sides of the religious divide set clear boundaries between married couples and single people. They viewed the reform of marriage behaviour as a key aspect of their drive towards confessionalization and social discipline. Protestants as well as Catholics strengthened clerical, paternal, and state control of marriage (Wiesner, 1999, p. 196). The Reformation was thus responsible for a new view of marriage, and it had pressured the Catholic Church to change, although change was also brought about by internal criticism of the many difficulties that the arrangement of marriage caused.

By the sixteenth century two Christian models of marriage had been defined. England remained outside these reforms. This also explains Macfarlane’s suspicion that there is something peculiar about the English marriage system, but in this respect English ‘exceptionalism’ is a recent – post 1500 – phenomenon. He refers to Montesquieu, who pointed out that English daughters frequently married according to their own fancy without consulting their parents, because they were allowed to do so by law, whereas in France there was a law which ordained that they must wait for the consent of their fathers (Macfarlane, 1986, pp. 124–125). Engels noted a century later that in those countries governed by French law, the children were bound to secure the consent of their parents to marry. In countries governed by English common law, the
consent of the parents was by no means a legal qualification for marriage (Engels, 1972, p. 88).

Macfarlane claims that the reassertion of Roman law in much of continental Europe muffled the force of the doctrine of romantic love marriage that was established by canon law by the twelfth century. Roman law, which gained in status and force, particularly on the continent from the sixteenth century onwards, gave fathers greater power, rendering canon law ineffective. Only in England did Roman law never reassert itself. English common law emphasized that marriage was a contract between the two parties involved. As with all contracts, to be valid it required the parties’ consent. Macfarlane (1986, pp. 127–8) claims that “from the twelfth to the eighteenth centuries marriage for men from 14, for girls from 12, was valid against all pressures from the outside world...it was Hardwick’s marriage act of 1753 which inched English law for the first time towards the continental laws...the marriage of those under 21, not being widows or widowers, was made illegal without the consent of parents or guardians”. The Hardwick marriage act was relatively short lived, however; it was repealed in 1823. In the rest of Western Europe the consent of the partners was no longer enough in the seventeenth and eighteenth centuries: “In all classes in pre-modern Europe the choice of marriage partners was very much controlled and influenced by the immediate family, by relatives and by neighbours because the marriage partner could be of overriding importance to the family labour unit in the domestic economy” (Mitterauer and Sieder, 1981, p. 122).

Conclusion

The late Middle Ages is sometimes called the ‘golden age of the labourer’, but this period may have been even more of a golden age for women who wanted to be active in the labour market.56 In the North Sea region, relative earnings were high, and access to the labour market was easy, although women were still at a serious disadvantage in the labour force

56 It is perhaps significant that historians of feminism have identified the late medieval period as the ‘first wave’ of feminism; see, for example, Stuurman and Akkerman (1998). According to Joan Kelly, early feminism begins with Christine de Pisan’s The Book of the City of Ladies of 1406, Kelly (1984).
compared to men. Just as in the twentieth century increased relative pay and increased female participation in the labour force promoted women’s emancipation, which accelerated in times of labour scarcity (during the two World Wars and the period of rapid economic growth after 1950). If we continue this line of thought one might even mention the idea that demographers assume that increased relative earnings of women will lead to lower levels of fertility because of the opportunity costs of rearing children are higher. Perhaps such a link between female labour participation and fertility may help to explain the low levels of fertility that can be hypothesized for post-1348 England, which resulted in the stagnation of the population at the much reduced post-Plague level.57

We have argued that an unusual combination of forces was behind the emergence of the EMP in the late medieval period. These catalysts were: the teachings of the Catholic Church, the system of intergenerational transfers, the expansion of the market for labour outside the household, and the effect of the Black Death. The EMP was characterized by relatively low levels of authority and power that parents had over their children, and men over women.

The EMP was well adapted to the new commercial environment that emerged in the same period. Wage labour became an integral part of the life cycle of members of the small conjugal household, and other market transactions (such as the use of credit or the accumulation of savings) became part of their survival strategy. This co-evolution of the demographic regime and the emerging labour market helps to explain the strong commercialization of society and economy that occurred in this period, when one-third to perhaps as much two-thirds of the population became (partially) dependent on wage labour, and working for wages had become a normal part of the life cycle. The deep penetration of markets in late medieval and early modern Europe, in particular in the region around the North Sea, should be seen in this light.

The emergence of the EMP had important long-term consequences. We have argued that income transfers between generations changed dramatically as a result. First, the young profited from increased investment in human capital. To some extent the EMP, in which the later

57 A critical examination of this hypothesis in Bailey (1996); in this paper we have not concentrated on the ‘pure’ demographic effects but rather on the social and economic consequences of the EMP.
age of marriage limited the number of children, can be considered a reproductive strategy to increase the quality of the offspring at the expense of quantity. Investment in human capital by schooling and on the job training became a normal part of the life cycle of young men and women, which must also have delayed their entering the marriage market. Thus, instead of being backward-looking, i.e. taking care of the lineage and the parents, the household became forward-looking, i.e. investing in its offspring.

The elderly were probably the main victims of the new regime; their authority was undermined, and they did not receive the income transfers due to parents in patriarchal marriage systems. Saving for old age was one of the options open to them, and we speculate that there were connections between the emergence of the EMP and the strong development of capital markets in Western Europe in the late medieval period. Moreover, because households were smaller, the likelihood was greater that they might ‘fail’ (disintegrate) if one of the parents died. In response, new institutions emerged that to some extent formed safety networks for the old, the very young, and the infirm.

The ‘industrious revolution’ may be interpreted as a continuation of the changes that occurred during the late medieval period. The early modern period saw changes in the orientation of households that took advantage of the market opportunities, which resulted in an increased labour supply. Jan de Vries believes these changes preceded the Industrial Revolution of the eighteenth century, and he argues that women’s and teenagers’ labour played an important role in the economic transformation that occurred in the North sea region, resulting in the Dutch Golden Age of the seventeenth century and, even more important, the British Industrial Revolution of the eighteenth century (Vries, 1994). Increased participation in labour markets, increased investment in human capital, and the general development of labour and capital markets were clearly linked to the emergence of the EMP

58 See also the project "Women’s Work in the Northern Netherlands in the Early Modern Period c. 1500–1815": http://www.iisg.nl/research/womenswork.html.

59 In a recent paper by Voigtländer and Voth (2006) in which they addressed the question of why the Industrial Revolution occurred in England, they distinguish two underlying causes: the European Marriage Pattern and the generosity of Poor Relief. As we have tried to demonstrate, both were interrelated and rooted in the changes in reproductive strategies and labour market orientation of the late medieval period.
and the success of the North Sea region in after 1600. Although we do not claim that the EMP explains everything, it seems clear that the stubborn behaviour of Janne Heyndericx did make a difference.\(^{60}\)

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\(^{60}\) The comparison with China may again be revealing. Goldstone (1996) argues that there was a stage in the life of European women between puberty, in their early teens, and marriage, in their mid-twenties or later, during which they were available to the wage labour market, and that this enabled an Industrial Revolution to take place in Europe rather than in China. Chinese women did not experience such a stage and were not available to the wage labour market, although – as is commonly known – China did have the technical skills available. Factories could not compete with the household labourers that worked for less than nothing. Goldstone claims that the development of cotton spinning was slow in China because of the restrictions on the deployment of female labour outside the home, as a consequence of Confucian ethics. Thus, factory production could not compete with household production.
PART THREE

COMMON WORKMEN, PHILOSOPHERS AND THE BIRTH OF A EUROPEAN KNOWLEDGE ECONOMY
Economic growth, especially the ‘modern economic growth’ that is based on sustained increases in total factor productivity, is ultimately based on the accumulation of knowledge. In Part I we saw how relatively efficient institutions were created in medieval Europe, leading to a first phase of knowledge accumulation, as mirrored in the growth of book production from 500–1500. Then, in Part II, the ‘Little Divergence’ within Western Europe was discussed and linked to changes in underlying demographic structure – the rise of the European Marriage Pattern – which also had long-term consequences for human capital formation in the region. Here, in Part III, we return to the growth of human capital and knowledge by focusing on trends in the centuries leading up to the industrial revolution. We begin with Joel Mokyr’s interpretation of the long-term causes of the industrial revolution as the result of new technology, which was driven by the development of a ‘knowledge society’ in Western Europe in this period (Mokyr, 2002). His argument can be considered an elaboration of Adam Smith’s thoughts about the sources of technological development. It has been argued that Adam Smith did not really grasp the long-term consequences of the technological changes that were happening in Britain during his lifetime (Wrigley 1988, pp. 47–50), but in his discussion of the causes of what we now call ‘innovation’, he already identified two sources for the ‘improvement of machines’: “A great part of the machines made use of in those manufactures…were originally the inventions of common workmen who, being each of them employed in some very simple operation, naturally turned their thoughts towards finding out easier and readier methods of performing it”. He added that a second, more recent source of innovation was the result of scientific research: it concerned “improvements…made by the ingenuity of those who are called philosophers or men of speculation, whose trade is not to do anything, but to observe everything; and who, upon that account, are often capable of combining together the powers of the most distant and dissimilar objects” (Smith, 1776/1976, pp. 115–6; italics added).
This same distinction between two types of knowledge – that of
the common workmen and of the men of speculation – reappears in
Mokyr’s (2002) recent re-interpretation of the causes of the industrial
revolution. He reiterates the old claim, which can already be found in
Kuznets and other authors writing in the 1950s and 1960s, that the
genesis of ‘modern economic growth’ after 1780 was caused by the
systematic application of scientific knowledge to production processes.
His approach is much more refined, however: he distinguishes between
different kinds of knowledge – propositional or $\Omega$ knowledge and pre-
scriptive or $\lambda$ knowledge – and develops a theory about the interaction
between these two strands of expertise, concentrating on ways in which
$\Omega$ knowledge can be ‘mapped’ into $\lambda$ knowledge (Mokyr, 2002, p. 17).
The fundamental change that occurred around 1800, the breakthrough
of the industrial revolution, is that the interaction between these two
types of knowledge occurred for the first time in a systematic way:
practical men, engineers, began to use scientific modes of inquiry – sys-
tematic experimentation – and the results of scientific inquiry (i.e. the
newly discovered ‘laws’ of nature) to develop and test new technologies.
Before 1800 the epistemic basis of technical know-how had been weak,
and technological progress was based on trial and error, which meant
that even though new inventions were made, technological progress

This approach to the causes of the industrial revolution should be
included in the current debate among world historians about the ori-
gins and nature of the Great Divergence after 1800. As explained in
the introduction to this book, one of the issues on which this debate
concentrates is whether Western Europe was already different before
1750, whether the causes of the Great Divergence are rooted in the
medieval and early modern history of this region. Mokyr identifies as
the causes of the increased interaction between $\Omega$ and $\lambda$ knowledge the
Enlightenment of the eighteenth century, which was in turn based on
the scientific revolution of the seventeenth century (Mokyr, 2002, pp.
36–41). But he does not really explain why the scientific revolution or
the industrial revolution occurred in Western Europe when they did,
nor does he deal with whether other societies – China, Japan, or India –
underwent similar transitions, and if they did not, why not.

A more general problem with this approach is that to really distin-
guish one country or region from another, or one period from another,
quantitative measures of these processes are necessary. While it may
seem difficult to measure the development of ‘useful knowledge’ and
its application to economic processes, it is important and necessary to do so. One of the main objectives of this part of the book is to develop such measures. I will try to show that we can actually measure the production, price, and/or access costs to $\Omega$ and $\lambda$ knowledge. This will not only enable us to follow these processes over time, but also to compare what happened in Western Europe with what we know of similar developments in other parts of Eurasia.

The argument of this part rests on three elements:

• In Chapter 5 I will concentrate on how to measure the price of human capital, the skill premium, which can be considered as the price paid for $\lambda$ knowledge, or the skills acquired by ‘common workmen’ as described by Smith. This skill premium is determined by the long-run efficiency of the system of training and education in an economy, and is therefore of fundamental importance for economic development (it was also one of the indices for the efficiency of the institutional framework of an economy proposed in Chapter 1).
• In Chapter 6 I will measure the production and costs of access to $\Omega$ knowledge, again using the output of books as an index of scientific output, and the prices of books as a measure of access costs. I will argue that the invention of printing in the 1450s led to a revolution in the production and exchange of $\Omega$ knowledge, characterized by a sudden, dramatic decline in the price of books during the 1470s and 1480s, followed by an equally dramatic rise in book production and consumption, which had a lasting impact on the way $\Omega$ knowledge was produced and exchanged;
• Finally, the gap between common workmen and philosophers was gradually bridged from 1400 to 1800 by the rise of literacy, which was to a large extent the result of favourable conditions for investment in human capital and a response to the rise of book production and the falling price of books. The estimates of book consumption will be transformed in estimates of the development of literacy in Western Europe from 1450 to 1800, and the causes of this increase will be analyzed.

To summarize the argument and to clarify its complexity, the following scheme will be useful.

The three interrelated processes analyzed here – the decline of the skill premium of common workmen, the fall in book prices, and the rise of literacy – were concentrated in one part of Europe, the Low
Countries and Great Britain. Southern Europe and parts of Central Europe dropped behind after the sixteenth century, and Eastern Europe continued to lag throughout. Only parts of the northern periphery of Europe, which had been marginal during the Middle Ages – Sweden and Scotland – showed signs of catching up, especially in the eighteenth century. The hypothesis formulated in Part II, that from the fifteenth century onwards, the North Sea region invested more heavily than other areas in human capital, will be verified here. We will try to show that this region produced and consumed more knowledge (on a per capita basis) than other parts of Europe or Eurasia, and that a low skill premium and a high level of book production per capita are strongly related to economic performance. In fact, this higher level of human capital formation can be used to ‘predict’ the ‘Great Divergence’ of the nineteenth century.
CHAPTER FIVE

THE HUMAN CAPITAL OF COMMON WORKMEN
EUROPEAN SKILL PREMIUM IN A GLOBAL PERSPECTIVE

Introduction: What the Skill Premium Can Tell Us

Relative prices are the DNA of an economy. They are basic units of information that both reflect and define its structural features. They tell us about relative scarcities, and are the incentives that guide economic behaviour. In particular, in the period before the mid nineteenth century, when other sources of information (such as historic national accounts) are difficult to obtain and subject to large margins of error, relative prices and wages are crucial sources of information about the structure of the economy and its level of development.

The study of relative prices should therefore help us understand the backgrounds and dynamics of Western Europe in the centuries before the Industrial Revolution. As already mentioned in the introduction to this book, a team of scholars led by Peter Lindert has been assembled to find out if the study of relative prices and wages can contribute to the discussion about the ‘Great Divergence’. The first results of the ‘global history of prices and incomes’ presented in Buenos Aires in 2002 suggested that in the early modern period the structure of relative prices in northwest Europe may have been distinctive. It was argued that capital goods and knowledge intensive products were relatively inexpensive in this part of the world, that interest rates were relatively low there, whereas agricultural products and foodstuffs (and land) were relatively expensive (Lindert et al., 2002). So, perhaps from the late medieval period onwards, Western Europe had a comparative advantage in ‘high tech’ products in combination with a well-developed capital market.

This chapter investigates one aspect of this hypothesis: the remuneration of human capital. It tests whether Western Europe really had a comparative advantage in knowledge-intensive sectors by examining the long-term development of the skill premium in different parts of Europe and the most developed parts of Asia. It focuses on one particular skill premium that we know a great deal about: the difference in daily wages between skilled craftsmen (carpenters and masons) and
unskilled labourers in the construction industry, and offers some additional information on the skill premium in other trades.

Why study the relative wages of carpenters and masons – apart from the obvious reason that we know a great deal about the remuneration of this profession? One advantage in focusing on the construction industry is that technological change was relatively slow there, so the skills acquired by those craftsmen did not change much over time. Their skills were also very similar across the world, although some variation did occur, of course.\footnote{See Van Dyke (2005, p. 62) for an example in which captains of the ships of the Dutch East India company hired, when arriving in the port cities of Asia, ‘indigenous’ carpenters and other craftsmen to repair and maintain their ships, indicating that their skills could easily be used for that purpose and were to a large extent interchangeable with the skills of European craftsmen.} It can also be argued that carpenters and masons had very strategic skills. They were the builders and often the designers of capital goods: of houses, mills, ships, carts, and a large variety of other constructions made of wood and stone (see, for example, Goldthwaite 1990, p. 125 ff.). The relative price of their skills must therefore have affected the relative price of capital goods, and thus the profitability of investment. Moreover, it will be argued that studying this segment of the labour market helps us understand the conditions for human capital formation in the economy as a whole, and that the skill premium of construction workers can be used to develop and test hypotheses about the relative efficiency of institutions in general. Finally, the construction industry was organized in guilds in many parts of Europe. It has been argued in the past that the European guilds retarded economic development because they tried to monopolize markets and limit entry to the profession they controlled. More recently, their role has been reassessed, and the guilds are now seen by many scholars as relatively efficient ways to collectively manage the skills of a profession and transfer this human capital to subsequent generations (cf. Epstein, 1998). If the critics of the guild system are right, the skill premium (the relative pay of master craftsmen with respect to unskilled labourers) would be expected to be higher in regions and cities where guilds were strong, and lower outside these regions, which would be proof that indeed guilds restricted economic development by artificially keeping skills scarce. Comparing regions with and without guilds, comparing Western Europe, where guilds were very important, with other parts
The starting point of this inquiry is the hypothesis that a low skill premium reflects efficient institutions that produce high levels of human capital formation (see also Chapter 1). But demand may also play a role; an increasing skill premium may in certain circumstances also be indicative of a growing demand for highly skilled labour. There are a number of reasons to assume that the kind of evidence that will be presented here is more indicative of supply side factors: the type of labour (construction) and the time dimension (the relevant data covers many centuries, during which the skill premium perhaps tends to converge towards its long-term level, dominated by the actual costs of ‘producing’ the skills). That supply factors dominate the skill premium is also suggested by an examination of similar data from the mid twentieth century. Since the 1930s, the ILO has published data from the October census in its annual publication on international labour statistics, which is an inquiry that is very similar for all countries involved. It yields data on wage levels for various occupations. For 1950 the number of countries covered by this census was sufficiently large to enable studying the variation of the skill premium in construction on a global scale. Freeman and Oostendorp (2001), analysing those data for a more recent period, found a strong negative correlation between GDP per capita and various measures of the extent of variation in wages (or wage rates). A similar relationship between GDP and skill premium is evident from Figure 11, which only uses the information on the skill premium in construction, rather than the much broader sample of industrial wages used by Freeman and Oostendorp. It shows that in 1950 the skill premium ranged from almost 400% in Ethiopia (GDP per capita less than $400) to 6% in Denmark and Norway (GDP per capita about $6000). This suggests that the very partial measure of the skill premium used in this paper – the difference between skilled and unskilled wages in construction – reflects the same kind of forces as the more complex, integral measures of wage dispersion analyzed by Freeman and Oostendorp (2001).

Figure 11 also includes trend lines for various regions. These show that the relationship between GDP per capita and skill premium is not
exactly the same for all regions. Wage inequality in the Americas (there was no difference in this respect between north and south), Asia, and Africa is higher than in Europe. Regressions with the data, where skill premium is the dependent variable and GDP per capita the independent variable, confirm this picture: dummies for Europe consistently have a negative sign (and are highly significant), whereas dummies for the other continents have a positive sign. This shows that the skill premium was lower in Europe than in the rest of the world, even than North America; for example, the skill premium for the United States, the country with the highest GDP per capita, was still 71%.

The standard explanation for the negative link between wage inequality and level of economic development is that the supply of human capital increased more rapidly than did demand for it in the process of modern economic growth, as would be expected on the basis of new growth theory. The evidence suggests that a low skill premium is good
for economic growth, a result that has also been confirmed by Davin Chor (2005), who studied the association between real wages, the quality of institutions, and the skill premium in early modern Europe.

Western Europe around 1950 seems to be a bit of an outlier, however. It is unlikely that levels of human capital formation in the US and Canada, for example, were lower than in Western Europe; the data about levels of schooling suggest the opposite (Barro and Lee, 2000). Institutions, including perhaps the higher levels of unionization in Europe, may explain the fact that the skill premium became relatively low there. It is, however, to the historical roots of this very low skill premium that we now turn.

Europe 1300–1914

The work by Allen (2001) and Özmucur and Pamuk (2002) on wages for construction workers in European cities over the long term makes it relatively easy to construct time series for the skill premium in this industry from 1300 to 1914. The series have been clustered in several groups that represent different regions and patterns. Table 6 shows the estimates for individual cities, while Figure 12 presents the average skill premium for three such regions: Western Europe (Ghent/Antwerp, Amsterdam, Oxford, London, and Paris), Southern Europe (Florence, Milan, Naples, Valencia, Saragossa/Madrid, and Istanbul), and Eastern Europe (Danzig, Cracow, and Warsaw). The regions not presented in Figure 12 are Northern Europe (series for Scotland and Sweden, both starting in the sixteenth century) and Central Europe (Strasbourg, Augsburg, Leipzig, and Vienna). The clustering of the series is somewhat ad hoc – other classifications are possible as well (for example, Leipzig also fits in the Eastern European group) – but it generally reflects the different patterns than can be found. Moreover, all observations are subject to some margin of error and not completely free from biases. Although labourers and carpenters are relatively standard professions, some variation does occur. Sometimes Allen uses the wages of masons or other craftsmen, and there is probably some regional variation in the type of unskilled labourers included in the data: are they masons’ assistants or unskilled labourers? As the data from several cities show, the structure of summer wages may be slightly different from that of winter wages. By clustering observations from a number of cities in a particular region, part of the variation resulting from these measurement
problems can be disregarded, but not all. For example, it is striking that the lowest skill premiums are found not only in Western and Central Europe, but also in Valencia and Naples; I have not yet been able to find good explanations for the low skill premiums there (see Table 6).

An additional problem is that the time series for different cities do not always cover the same period. For the fourteenth century no series for Central, Eastern, and Northern Europe are available; for Southern Europe in the fourteenth century we have only data on Florence and Saragossa. But from the fifteenth century onwards data become more abundant, and we are on firmer ground, although there continue to be gaps in individual series (Table 6 gives an overview of the availability of the series for the different cities per 50-year period).

Figure 12 shows that during the first half of fourteenth century the skill premium in parts of Europe was relatively high, from 100 to 150% of the wage of an unskilled labourer. From the evidence available for England, it appears there may have been an increase in wage inequality.
Table 6. The skill premium of construction workers in Europe, 1300–1800 (averages per fifty-year period)*

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* defined as the difference between the wage of a skilled labourer (mostly a carpenter) and an unskilled labourer, divided by the wage of the unskilled labourer. For example, 100 means that the carpenter earns twice the wage of the unskilled labourer.

Sources: Allen (2001), which gives a series of unskilled and skilled construction workers. I used the underlying series available on http://www.economics.ox.ac.uk/Members/robert.allen/WagesPrices.htm, and made a few corrections for the 1540s (England) and the 1620s (Germany), when in periods of currency devaluation Allen did not always deal with the two series of labourers and craftsmen in a consistent way. Similar series were constructed for Istanbul: Özmcucur and Pamuk (2002); Holland from 1347 to 1500: Van Bavel and Van Zanden (2004); Saragossa in the fourteenth and fifteenth centuries: Palacios (1994, pp. 362–3); Scotland/Edinburgh: Gibson and Smout (1995); Sweden/Stockholm: Jansson et al. (1991).
in the first decades of the fourteenth century, and that in the 1330s (after the great European famine of 1315–1322) there was a decline.² The Saragossa series peaks in the 1310s, but in Florence and the Low Countries the decline of the skill premium begins after 1348. It then declined until the middle of the fifteenth century, when a level of about 50 to 60% was reached.

This decline from 1348 to 1450 is one of the most striking developments that need to be explained, especially since in large parts of Europe – in the Western and Central regions – there followed a period of more than 450 years in which the skill premium remained remarkably stable.³ In the other parts of Europe – in the South and Poland – there was a tendency for the skill premium to slowly rise again, however. To some extent the skill premium in these ‘peripheral areas’ seemed to change with the rhythm of population growth, increasing during the sixteenth century, stabilizing in the seventeenth century, and increasing again in the eighteenth and nineteenth centuries (I discuss this in detail below). The ‘little divergence’ between northwestern Europe and the rest of the subcontinent that starts in the early modern period can still be found in the twentieth century data: in 1936/37, according to the ILO data, the difference between the wages of carpenters and unskilled labourers was on average 56% in six East European countries (range: 28 and 95%), 45% in three Southern European countries (25 to 64%), and only 22% in four Western European countries (12 to 28%) (calculated from ILO Yearbook, 1938).

Central Europe, for which no data for the period before 1400 are available, follows the same pattern as Western Europe: the skill premium stabilizes there at low levels of 40 to 60%. A radically different pattern is found in the North, in Scotland and Sweden. There the first data are for the middle of the sixteenth century; they show a skill premium that is much higher than in the rest of the continent and fluctuates wildly, from 100 to 125% in both Edinburgh and Stockholm. This pattern remains unchanged until the second half of the eighteenth century: in the 1750s the skill premium in Edinburgh was about 100%, after which it declined to 33% in the 1770s and 1780s (Cullen, Smout and

² Clark (2005), for a slightly different timing of the decline of the skill premium in England; Phelps, Brown and Hopkins (1981, p. 8) indicate that the decline after 1350 had already been noted by Beveridge and Postan.
³ Phelps, Brown and Hopkins (1981, pp. 8–12); after 1914 it declined to an even lower level, to about 25% in 1936; from the ILO Yearbook 1936.
Gibson, 1988, p. 115); similarly, in Stockholm it was still 100% in the 1700s, but less than 40% after 1725. Northern Europe clearly catches up quickly in the eighteenth century.

Outside Europe

For other parts of Eurasia – India, Japan, Korea, China, and Indonesia – it is also possible to find similar data on the structure of wages for construction activities, which are presented in Figure 13. For India the data go back to the famous report on the state of the Moghul Empire in 1595, Abul Fazl’s Ain-i-Akbari, which provides a detailed list of the wages paid to various groups of workers and shows a much higher skill premium than in Europe (which is confirmed by other data for seventeenth and eighteenth-century India). The eighteenth and nineteenth-century observations for Indonesia and Korea suggest similarly high levels. Russia fits in the same picture; the data published by Hellie (1999, pp. 413–74) for the seventeenth century point to a 100% (carpenter/unskilled labourer) to 167% (mason/unskilled labourer) skill premium. For the Middle East (Egypt and Iraq) some wage data have been published by Ashtor (1969, pp. 64, 224–5), which go back to the eighth-thirteenth centuries, all indicating a skill premium of about 100%. The oldest is from Baghdad in 762–766, where a day labourer earned 2 to 3 habbas and a master mason 5.

The general picture appears to be that outside Western Europe the skill premium measured in this way was much higher than around the shores of the North Sea, but there are a few important exceptions. Japan is a difficult case. A few observations can be derived from Saito’s study of wages and economic development. These point to a fairly high level: a typical observation is that in 1802/04 a day labourer in Kyoto earned 0.92 monme per day, while the wage of a carpenter in the countryside (in Kami-Kawarabayashi) was 2.6 monme and that of an Osaka carpenter 4.3 monme per day (Saito, 1978).4 But records from the Dutch East India Company ships that visited Nagasaki in the seventeenth and eighteenth centuries show a smaller skill premium of slightly less

4 Nishikawa (1978, pp. 80–1) provides wages for skilled and unskilled workers in salt making in Choshu in the 1840s, which indicate a similar skill premium (4.6 monme for a skilled workers against 1.6 monme for an unskilled worker and .8 monme for an unskilled female labourer).
than 100%. Moreover, in the 1870s and 1880s, when national statistics become available, the skill premium is relatively low and comparable to levels in Western Europe (Van Leeuwen, 2007, appendix on wages and prices).

The most significant exception to the rule that the skill premium was quite high outside Western Europe, was southern China. A set of government regulations for wages of unskilled and skilled labourers in the north, in Beijing, in the seventeenth and eighteenth centuries point to a skill premium of 100%, similar to what was found in other parts of Asia (Moll-Murata, 2005; Moll-Murata, 2004). The most detailed, empire-wide regulation of wages and prices for public works, dated from 1769, the *Wuliao jiazhi zeli*, shows that there existed signifi-

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5 Archive East India Company, National Archive The Hague, no. 756, 1306–1354; the datasets of prices and wages in Nagasaki will be made available on www.iisg.nl/hpw.

6 Moll-Murata (2004); this latter paper presents regulations of wages of construction workers in Beijing for 1659, 1665, 1723, and 1736, all showing the same skill premium of 100%.
cant regional variations in the skill premium: in the North the 100% skill premium is confirmed, but in the South the skill premium was comparable to Western Europe (25–67%) (see Allen et al., 2005 for a detailed analysis of these wage data). The countrywide average of less than 40% was largely influenced by the much more densely populated south (Table 7). Although this source is not without problems, the skill premium that can be derived is probably fairly accurate; it is confirmed by other data based on actual wage payments, such as those of the East India Company ships entering the port of Canton (Allen et al., 2005; Van Dyke, 2005). Therefore, the South of China appears to be the only region outside Western Europe with a very low skill premium, which points to high levels of human capital formation there.

**Explanations: Human Capital as an Investment and its Link to Interest Rates**

These data raise a number of questions about the remuneration for human capital in different parts of the world. The first and perhaps most striking development is the sudden, spectacular decline in the skill premium in the century following the Black Death. The result was that during the Renaissance – from 1400 to 1550 – the skill premium was exceptionally low. The stability of the skill premium in Western Europe from 1450 to 1914 is the second striking phenomenon: how is it possible that in those four-and-a-half centuries the relative pay of craftsmen was ‘frozen’ at such a low level? The divergence of the south and the east in the centuries after 1650 (or perhaps 1450?) is perhaps the third remarkable development. What are the connections here to the development of real wages and the ‘little divergence’ that were analyzed in Part II? Finally, why was the skill premium in Western Europe so much lower than elsewhere, with the significant exception of southern China?

According to standard economic theory, the skill premium is the remuneration from investment in human capital, for not earning an income during the period in which an apprentice was being trained and for paying the fees to the master craftsman who trained the apprentice. Therefore, one possible approach is to argue that the skill premium is in the long term determined by: (1) the cost of the training, such as number of years needed for acquiring the specific skills (the unearned wage income during these years, the fees paid etc.), (2) the interest
rate linking higher future earnings to the present, and (3) the likelihood of earning a higher income after completing the training period, along with the number of years the skill premium can be expected to last (which may be related to life expectancy). This may seem a very modern idea, and the approach may perhaps be slightly anachronistic, but it can already be found in Adam Smith (as so often), who wrote of the skilled labourer that ‘the work which he learns to perform…must be expected, over and above the usual wages of common labour, will replace to him the whole expense of his education, with at least the ordinary profit of an equally valuable capital…. The difference between the wages of skilled labour and those of common labour is founded upon this principle’ (Smith, 1776/1976, pp. 203–4).

The outlines of the apprenticeship system in Europe are well known, and seem not to have changed fundamentally throughout the period under study (Epstein, 1991; Humphries, 2003). Therefore, it is possible to roughly simulate the relationship between the ‘equilibrium’ skill premium and the return on human capital, which will be related to the interest rate. The following assumptions are used in this simulation:

- a 7 year-apprenticeship period – the standard in English contracts – from 14 to 21 years old (Humphries, 2003, p. 75);7
- the unearned income for an apprentice is estimated at 20% of the annual wages of an unskilled labourer at age 14, increasing from 40% (at 15 years), to 60% (16 years), 70% (17), 80% (18), 90% (19), to 100% at 20;8
- after completing an apprenticeship, skilled craftsmen will earn the higher wage for a period of 45 years, from 21 to 65;9

Three variants have been calculated: the first is based on the assumption that an apprentice has a 100% likelihood of becoming a craftsman after finishing his seven years of training; the second variant assumes

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7 Also Epstein (1991, p. 142), who gives a 7-year apprenticeship period for carpenters in thirteenth century Genoa, but shorter periods for masons (5 or 6 years).
8 These rough estimates are based on two sources: Scholliers (1959) and Impens (1965), who give the wage profile of printers in Antwerp (Plantin) in the sixteenth–eighteenth centuries; Johnson (2003) gives the age profile of textile workers in England in the first half of the nineteenth century.
9 Relaxing the assumption of a working life of 45 years does not affect the experiment much, as later years hardly have any effect on the return on investment in human capital, in particular not when interest rates are high.
this likelihood to be 75% and that there is a 25% chance he will only earn the income of an unskilled labourer; the third variant additionally assumes that the apprentice has to pay a premium of 50% of the annual wage of an unskilled labourer up front. Figure 14 shows the relationships between skill premium and return on capital invested in training derived from these assumptions. It shows, for example, that a decline in skill premium from 135% (in 1325) to 60% (in 1450) would be consistent with a decline in the return on human capital from 19% to 10% in the first variant, from about 15.5% to 8% in the second variant, and from almost 14% to 7% in the third. Also added to Figure 4 are the very rough estimates of interest rates and skill premiums for several countries for the early modern period (explained in detail in Chapter 1).

Given the fact that carpenters or masons acquired the same skills before and after the Black Death, the most straightforward explanation
for the post 1350 decline in the skill premium for construction is that interest rates in Europe declined greatly in this period. This induced households to increase their investment in human capital, which led to the change observed in the skill premium. The fall in the skill premium occurred in various parts of the continent, which is consistent with the fact that throughout Europe interest rates seem to have halved in the century or so after the Black Death (see Chapter 1).

The returns on investment in human capital estimated in this way are somewhat higher than the interest rates on capital; the latter are related to the segments of the capital market in which land was (or could be) used as collateral. Obviously, investment in human capital was riskier than investment in land, but this risk premium was – if we are to believe these calculations – surprisingly low in early modern Europe. Significantly, McCloskey and Nash (1984) also found a more radical decline in interest rates on rural capital markets in their study of the seasonal variation in grain prices. The evidence presented here and in their study perhaps indicates that the spread of interest rates between ‘formal’ and ‘informal’ capital markets was also declining in the century after 1350.

What is also striking is that in Western Europe both interest rates and the skill premium remained roughly constant after 1450, and certainly did not rise again to the pre-1350 level, in spite of a strong growth in population and a subsequent decline in the land/man ratio in the centuries after 1450. In fact, population growth after 1450 was particularly rapid in the Netherlands and England, where the skill premium remained frozen at the 50–60% level. This means that the explanation for the fall in interest rates and the associated skill premium that focuses on the decline in population after 1348 as the determining factor must be incomplete. The evidence suggests that at the same time changes in the institutional setting of capital markets and/or in the savings behaviour of households occurred resulting in a long-term increase in the supply of savings and a stabilization of interest rates in the very long run. In Chapter 4 a possible explanation has already been suggested: it was the rise in the European Marriage Pattern that caused these qualitative changes in institutional setting and savings behaviour. Further proof of this is that in the North Sea area in the centuries after 1450, interest rates and skill premiums did not increase again but continued to be low and perhaps even declined slightly during the eighteenth and nineteenth centuries, distinguishing this region from
the more ‘peripheral’ parts of the continent.\textsuperscript{10} That the demographic downturn after 1348 was perhaps of secondary importance – and only helped to attain a new equilibrium in the capital market characterized by low transactions costs, high savings, and low interest rates – can also be argued on the basis of the Netherlands, where a long-term expansion in the (urban) population from 1350 to 1500 coincided with a decline of the skill premium (from about 100\% in the 1340s to 40 to 50\% in the early 1500s) and a similar fall in interest rates (Van Bavel and Van Zanden, 2004; Zuijderdijn, 2007).

The question remains, of course, why the Dutch Golden Age, or the Industrial Revolution did not lead to a strong increase in this particular skill premium? Part of the answer is that the skill premiums may indeed have gone up, but it was in other segments of the labour market. De Vries and Van der Woude (1997, pp. 632–4), Van Zanden (1995), and Williamson (1985) found evidence of increases in the skill premium in other sectors of the labour market, especially with respect to highly skilled employees. These reflected bottlenecks in the supply of skilled labour, the result of accelerations in economic growth, and the transformation of economic structures.

Should we conclude then that the stability in the skill premium of carpenters and masons was exceptional? To test the hypothesis that the low skill premium for construction workers reflected the much broader phenomenon of a relatively flexible supply of skilled labour, I also collected wage data on another group of highly skilled craftsmen, the compositors and printers working in the printing industry following the invention of movable type in the 1450s. These printers can be seen as the ICT workers of the late medieval and early modern period, operating and developing the new techniques of mass production of information. Book production grew dramatically in Europe from the 1470s onwards, and the demand for their skills must have been increasing very rapidly. But this did not lead to ‘excessive’ wage levels. The very detailed wage data available for the large Plantijn firm in Antwerp for the period 1560–1800 show that in this booming centre of the printing industry, wages for these highly skilled and literate workers were at best at the same level as those of skilled construction workers, and often

\textsuperscript{10} Epstein (2000, pp. 60–63); and Clark (2007, pp. 167–175) speculate about these changes but do not give adequate explanations.
substantially lower (Figure 15).\textsuperscript{11} Because many printers were recruited from abroad, especially from Germany, this must have been indicative of wage trends elsewhere.\textsuperscript{12} This again points to the relative flexibility of the supply of skilled labourers in early modern Europe and suggests that the low skill premium in the construction industry may be indicative of the efficiency of the training system in general.

Can interest rate differentials also explain the gap in wage inequality between Europe and the rest of Eurasia? Evidence that interest rates in Europe were lower than elsewhere on the Eurasian continent is fragmentary, but as we saw in Chapter 1, the general tendency from the late Middle Ages onwards was that capital markets in Europe were more efficient than elsewhere, with the possible exception of eighteenth and nineteenth-century Japan. Figure 14 shows that, assuming the costs of training young apprentices were similar everywhere, the large differences in skill premiums between the rest of Eurasia and post-1348 Western Europe can be explained by this gap in interest rates. With

\textsuperscript{11} See also the classic study of the management and the labour relations at this printing firm, Voet (1972, p. 431), who concluded that the wage of the Plantin workmen ‘approached and often even exceeded those of master craftsmen’.

\textsuperscript{12} Printers and carpenters were paid a daily or weekly wage, compositors a piece wage, which explains the differences in behaviour of these series.
the notable exception of China, where interest rates were high but the skill premium was lower than in the rest of East and South Asia, the efficiency of capital market institutions seems to explain the price of human capital. The case of Japan, where both the interest rate and the skill premium probably declined in the eighteenth and nineteenth century, also fits well in such an interpretation.

The Efficiency of Training Institutions

Interest rates are only part of the explanation, however. The efficiency of institutions regulating the training of apprentices also plays a role. We can distinguish two different ways to organize such training: in large parts of the world the family or the clan played a central role, and skills were transferred from fathers to sons or other members of the (extended) family. In fact, in parts of Asia, being a craftsman was largely hereditary. In the countryside surrounding Pune (in southern India), for example, the village craftsmen or ‘balutedars worked as hereditary village servants’, who, in return for a share in the harvest, ‘rendered service to the cultivators throughout the year’ (Divekar, 1989, pp. 44–45). In Song and Yuan (and Ming) China the state defined craftsmen as a separate social class, which was taxed separately, often in the form of regulated labour services (of a couple of years or months in Beijing, working for the imperial household). This tax burden was hereditary, and based on the assumption that the father would be succeeded by another family member after his death. This system changed under the Qing: they abolished the hereditary corvée duties for artisans, who from 1661 onwards were included as ordinary households in the land tax registers. This ‘meant that their occupation was no longer hereditary by legal obligation’ (Moll-Murata, 2005, p. 14). The long tradition of forced labour by craftsmen under the Song, Yuan, and Ming, however, and the strong claims the state had on the work of these craftsmen, makes it more difficult to interpret the low skill premium found in parts of China during the Qing, however.

In contrast to these relatively closed systems in which the family played a central role, Western Europe had a formal system of apprenticeship – organized by guilds or similar institutions – and in principle open to all. Guilds or guild-like institutions existed in other parts of Eurasia as well, especially in the Middle East, but also in Qing China after the state ceased to regulate the supply of skilled labour in the late
seventeenth century. But it was only in the nineteenth century that those guilds began to play a role comparable to some European guilds; in the eighteenth century most guilds were set up by merchants from a certain province trading in a distant city (see Moll Murata, 2006). Similarly, guild-like structures appeared in Tokugawa Japan, but their effects on the training of apprentices were probably rather limited (Nagata, 2006). Still, it is striking that in the three regions that (probably) had the lowest skill premium, institutions such as guilds existed (or appeared) which regulated the training of apprentices.

This suggests that having a guild system in place may have had advantages. The contract between an apprentice and his master was complex, involving various remunerations for services over a long time period (Humphries, 2003; Epstein, 2001). Apprentices may have feared that paying for training up front would not ensure the quantity and quality of training necessary to become a skilled worker or an independent craftsman. Masters may have feared that after an apprentice had been a net liability for his household in the first years of the contract, he would leave before becoming a net source of income in the second half of his term. Since the master controlled access to the ranks of skilled craftsmen, apprentices may have also feared he would renege on his promises (Humphries, 2003, pp. 81–2). By definition, these ‘incomplete’ contracts may therefore have resulted in underinvestment in human capital. Efficient levels of human capital formation required a certain amount of reciprocity and trust between both parties and/or third-party involvement, i.e. institutions to guarantee fair execution of the apprentice contract.

In Europe guilds traditionally regulated the training of apprentices; in England the state also began to regulate apprenticeship (from 1563 onwards), but this was entirely based on the rules already applied by the craft guilds (Humphries, 2003). This meant that guilds operated as a third party monitoring the apprenticeship contracts. The exceptionally low skill premium of post-1450 Europe is therefore a testimony to the efficiency of the guilds (and, in England, of the additional institutional guarantees provided by the national organization for the apprentice contract). If the guilds had been less efficient, if they had functioned as cartels of skilled labour effectively restricting entry to the ranks of skilled craftsmen, apprentices may have feared he would renege on his promises (Humphries, 2003, pp. 81–2). By definition, these ‘incomplete’ contracts may therefore have resulted in underinvestment in human capital. Efficient levels of human capital formation required a certain amount of reciprocity and trust between both parties and/or third-party involvement, i.e. institutions to guarantee fair execution of the apprentice contract.

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13 See Epstein (1991, pp. 102 ff.): almost all contracts contained clauses forbidding the apprentice to leave before the contract expired.
craftsmen, the skill premium would have been much higher (or, for Figure 14, the gap between the return on human capital and the interest rate on the capital market would have been much higher). There were many regional variations in the power of guilds, however; their influence in England, for example, seems to have declined during the eighteenth century, perhaps also because the state took over part of their role, but they remained quite important in the Low Countries. But on a global scale it appears that guilds and low skill premiums coincided, a conclusion relevant for the ongoing debate about the relative efficiency of the guilds in early modern Europe. Although in the past the literature was very critical of the role of guilds, more recent research suggests that their role was much more positive, especially in the organization of training (Epstein, 1998; Epstein and Prak, 2008). This global comparison of the skill premium suggests that there may be some truth in a reassessment of the guild system.

The Link to Agricultural Labour Markets

The existence of guilds could not guarantee the long-term stability of the skill premium at the 50 to 60% level that was typical of fifteenth-century Europe, however. The example of Italy, where guilds were relatively powerful (Mocarelli, 2006), demonstrates this clearly (see Figure 12). More generally, in Southern and Eastern Europe, where guilds often did regulate labour markets, the skill premium appears to have been more flexible than in the northwestern part of the subcontinent. Long-term trends in the skill premium in the South and East point to an association with population growth: the skill premium increased in the sixteenth century, followed by convergence to the Western European average in the seventeenth-century ‘crisis’, which was again followed by an increase of skill premiums in the South and East in the eighteenth and nineteenth centuries (Figure 12).

The two different patterns can best be observed in the two regions for which we have the longest time series: England and northern Italy (Florence before 1618, Milan afterwards). As Figure 16 shows, in England the relationship between population and skill premium fundamentally changed in the fifteenth century; whereas the decrease in population and the decline in skill premium operated approximately in tandem before 1450, a clear ‘de-linking’ occurred thereafter. In (northern) Italy no such de-linking occurred (Figure 17): the situation in 1600 shows almost the
exact same pattern as in 1350. The Florentine skill premium returned to more than 100%, and the Italian population also increased to the pre-Black Death level of about 12.5 million. After 1620 a stagnation in population growth (which stabilized at slightly more than 13 million) was accompanied by a small decline in the skill premium (to about 80%); the real de-linking seems to have occurred in the eighteenth century, when rapid population growth no longer led to a further increase in the skill premium (of Milanese workers).

Why was the Italian skill premium so sensitive to population growth? Part of the explanation may be that the wages of unskilled labourers were linked to agricultural labour productivity, which tended to correlate with the size of the population. Such a link between rural and urban labour markets for unskilled labourers is a well-known theme in the literature on pre-industrial labour markets. In Japan, India, and Indonesia, unskilled labourers were basically *agricultural* labourers – ‘coolies’ was the term used in southeast Asia – who engaged in construction and other urban activities on a part-time basis. In the Japanese labour market the links between the urban market for unskilled labourers and the situation in agriculture were also strong: unskilled labourers in cities earned about the same wage as ‘male springtime farm workers’; the urban-rural wage gap was relatively small, at least for unskilled labourers (Saito, 1978, p. 88; Saito, 2005b).

The same link between the wages of agricultural workers and unskilled workers in the construction industry can be found in Western Europe. In the sixteenth and seventeenth centuries agricultural wages in Holland were roughly on a par with those of unskilled workers in the building industry (Van Zanden, 2002a). Similarly, from 1300 to 1700, nominal wages in English agriculture were at the same level as the wages of unskilled labourers in construction (Clark, 2005).

The connection between population growth and the skill premium can to some extent be explained in this way: wages of unskilled workers reflected labour productivity in agriculture, which in the long run was linked to population growth. The rapid demographic expansion in the sixteenth century triggered a strong decline in rural real wages, but the urban sector could to some extent protect itself against these trends. In the North Sea region real wages in agriculture did not decline as much as in Southern and Eastern Europe because of growth in agricultural productivity. Moreover, labour markets were better integrated, and wages in agriculture paralleled the wages of craftsmen in the construction industry. The de-linking of population growth and the skill
Sources: see Table 6

Figure 16. Skill premium (nine-year moving average) and estimates of English population (in millions), 1300–1800

Sources: see Table 6 and Malanima (1998)

Figure 17. Skill premium (nine-years moving average) in Florence/Milan and estimates of the population of Italy (in millions), 1326–1800
premium, therefore, points to fundamental changes in the economies of northwestern Europe, and shows that labour markets there were better integrated and less segmented than in the Southern and Eastern parts of the subcontinent. Thus, the skill premium also appears to reflect the extent of segmentation of the labour market: in a very fragmented system, where craftsmen are able to monopolize local labour markets and the wage gap between countryside and town is large, there is generally a high skill premium, but in highly integrated labour markets wage inequality will tend to be relatively low.

This can be illustrated by an extreme example of a labour market with a low level of integration, eighteenth and nineteenth-century Ireland. Like much of the Celtic fringe, Ireland had not fully participated in the big boom of the high Middle Ages; it did not undergo the thorough restructuring in the institutional framework of its economy and society that occurred elsewhere (and to the extent such institutions were introduced, they were largely restricted to the English minority that dominated the towns). In the eighteenth century we find an extremely high skill premium there, ranging from 100% in Dublin to 200% in the countryside; by all standards Ireland is a clear outlier, with a much lower level of human capital formation than the rest of Western Europe, which is confirmed by Mokyr’s work on age heaping that shows similar low levels of numeracy and literacy (Mokyr, 1985). One of the factors behind the enormous spread in wage levels was the wage gap between town and countryside, another feature of a poorly integrated economy: in eighteenth-century Dublin, for example, craftsmen earned a wage that was often double the wage of similar workers in rural Kilkenny, and the urban-rural wage gap for unskilled and semi-skilled labourers was even larger (all Irish wage data are from Kennedy and Dowling (1997)). What is even more striking is that the skill premium went up between 1700 and 1850, whereas for the same period in Scotland it declined significantly, to converge to the English level. In Dublin it increased from 100% from 1700 to 1760 to 140% from 1836 to 1850; in rural Armagh it increased from 155% in the 1740s to 200% in the 1840s. These are levels comparable to those in east and southeast Asia

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14 Mokyr (1985); there are many other signs that the market economy was not functioning well: interest rates in the countryside were very high, property rights to land unclear, markets were performing poorly generally.
but very unlike the rest of Western Europe. The analysis presented here suggests that this pronounced increase in the skill premium, which was unique to eighteenth and early nineteenth-century Ireland, was linked to a stagnant, or perhaps even declining, labour productivity in agriculture, induced by strong population growth.

Effects on Economic Growth

New growth theory postulates that human capital formation is one of the determinants of long-term economic growth. If this is correct, the varying conditions for human capital formation, reflected in the differences in the skill premium analyzed in this chapter, should have affected long-term economic growth. I have already referred to the paper by Davin Chor (2005), who demonstrates that such a link existed in early modern Europe: cities with efficient institutions resulting in low skill premiums had higher levels of real wages, a clear indicator of their relative success. Thus, the skill premium helps explain the ‘little divergence’ that occurred in Europe from 1400 to 1800.

Do these differences in the price of human capital also help explain the ‘Great Divergence’ of the nineteenth century? We can test this in two ways. Figure 18 shows the relationship between the average skill premium (in the capital city) in the period 1750–1820 and the growth of GDP per capita in the nineteenth century (the period 1820–1913) according to Maddison’s (2001) estimates. Because the 1820 estimates of levels of GDP have been subject to much debate – the revisionists claiming that the gap between Europe and China was much smaller than estimated by Maddison – I also compared the absolute level of GDP per capita in 1913 to the skill premium in the period 1750–1820 (Figure 19).

In both cases we find a clear relationship between growth/level of GDP and the skill premium, confirming the hypothesis that a low skill premium leads to rapid economic growth, or that the efficient institutions reflected in a low skill premium enhance economic development. The link to the 1913 level of GDP per capita is closer than it

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15 See also Cullen, Smout and Gibson (1988, p. 113), who find skill premiums as high as 300% in rural Ireland in this period, and Mokyr (1985, pp. 226–7).
16 Similarly, the fact that the skill premium in late Tokugawa Japan fell may also be related to the almost stationary population, but this is speculative.
Figure 18. The average skill premium of construction workers between 1750 and 1820 and GDP per capita growth in 1820–1913 is to growth in the nineteenth century. There are a number of outliers in Figure 18: China, the Netherlands, and Ireland, which reversed its development path following the famine of the 1840s, ‘explaining’ why its performance cannot be predicted on the efficiency of its institutions in 1800. Japan also has a slightly higher rate of growth than might be expected on the basis of its skill premium in 1800, but I used the high 1804 estimate of the skill premium by Saito here, which is perhaps not representative of the national average. China is the underperformer in the nineteenth century by these standards. It is the only country with a declining GDP per capita, according to Maddison, in combination with a relatively low skill premium; it continues to be an enigma. I used the estimates for Beijing (of a 100% skill premium) rather than the countrywide estimates, because for other countries we also used data related to their capital cities. Using the much lower countrywide estimates presented in Table 7 would make the underperformance of China even more dramatic. Growth in the Netherlands was relatively
slow because it started from a high level.\textsuperscript{17} The Dutch anomaly disappears in Figure 19; China remains the most significant outlier in the latter figure.\textsuperscript{18}

\textbf{Conclusion}

This chapter develops the argument that the skill premium measured in this relatively straightforward way – as the difference between the wages of carpenters and masons and those of unskilled labourers in construction – can be considered a good proxy of the quality of the institutional framework of an economy. That it exemplifies institutional efficiency follows from the analysis of the main factors determining level and development:

\footnotesize{\textsuperscript{17} Cf. Van Zanden and Van Riel (2004) for an interpretation of its slow performance in the nineteenth century.}  
\footnotesize{\textsuperscript{18} Fukao et al. (2007); Chinese GDP per capita in 1913 is perhaps underestimated.}
Table 7. Nominal wages of construction workers in ‘1769’ according to the *Wuliao jiazhi zeli* (in tael per day)

<table>
<thead>
<tr>
<th></th>
<th>Unskilled</th>
<th>Skilled</th>
<th>Skill premium</th>
<th>N = (millions in 1787)</th>
<th>Population (millions in 1787)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manchuria and Mongolia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heilongjiang</td>
<td>.100</td>
<td>.191</td>
<td>91</td>
<td>2/6</td>
<td></td>
</tr>
<tr>
<td>Jilin</td>
<td>.095</td>
<td>.160</td>
<td>68</td>
<td>6</td>
<td>1.0**</td>
</tr>
<tr>
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<td>.057</td>
<td>.100</td>
<td>75</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Xinjiang</td>
<td>.097</td>
<td>.110</td>
<td>13</td>
<td>3</td>
<td>?</td>
</tr>
<tr>
<td><strong>The North</strong></td>
<td></td>
<td></td>
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<tr>
<td>Rehe*</td>
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<td>.120</td>
<td>82</td>
<td>7</td>
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<tr>
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<td>.141</td>
<td>83</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Tianjin/Baoding*</td>
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<td>.112</td>
<td>58</td>
<td>34</td>
<td>23.0***</td>
</tr>
<tr>
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<td>.081</td>
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<td>.054</td>
<td>23</td>
<td>48</td>
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<td>.050</td>
<td>14</td>
<td>74</td>
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<tr>
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<td>.061</td>
<td>36</td>
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<td>.039</td>
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<td>.050</td>
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<td>12.0****</td>
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<tr>
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<td>.050</td>
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<td></td>
</tr>
<tr>
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<td>.081</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Average (weighted by population)</td>
<td>.044</td>
<td>.060</td>
<td>36</td>
<td>214</td>
<td></td>
</tr>
</tbody>
</table>

* *part of the province of Zhili (there is a separate regulation for Rehe)*  
** Manchuria as a whole  
*** Zhili as a whole  
**** including Taiwan  
Source: Allen et al. (2005); population: Wang (1973).
• *The level of interest rates*, as paid by or used as a shadow price by (urban) households: it is generally accepted that interest rates are good indices of the quality of the institutional framework of an economy, but they are difficult to measure in a standard way. We found a strong correlation between the skill premium and the interest rate, both across time (in Western Europe from 1300 to 1914) and across regions (comparing Western Europe with, for example, Korea, India, and Indonesia) that is consistent with standard human capital theory. The south of China appears to be exceptional in this respect, because interest rates were fairly high there, but the skill premium of construction workers was perhaps even lower than in Western Europe; Japan, where both interest rates and the skill premium probably declined in the (late) eighteenth and nineteenth centuries, does seem to fit the general patterns, however.

• *The efficiency of institutions for the formation of human capital*, and the absence or presence of formal or informal barriers to entry in these professions: a high skill premium indicates that the efficiency of these institutions was not very high and/or that strong barriers to entry existed. The data suggest that skill premiums in Western Europe were not inflated by conservative guilds; on the contrary, it appears that in regions with guilds, the skill premium was lower on average than elsewhere (it is perhaps no coincidence that in China and Japan, too, guilds became increasingly important in the eighteenth and nineteenth centuries).

• *The degree of integration of rural and urban labour markets* (and within the urban sector, of the markets for skilled and unskilled workers): fragmented labour markets tended to result in large skill premiums, and well integrated, efficient markets in low levels in the skill premium.

Thus, a low skill premium reflects the fact that households have access to relatively efficient labour and capital markets, and that institutions for the formation of human capital are working well. A low skill premium also seems to point to relatively high levels of investment in human capital, which according to endogenous growth theory, will result in long-term economic growth. One of the links is possibly that the skill premium of carpenters and masons, because they are the designers and makers of capital goods, affects the relative price of these capital goods. In addition, this link also suggests that a low skill premium will
contribute to economic performance. The differential growth in the economies of early modern Europe appears to confirm this hypothesis: growth after 1450 was especially strong in the North Sea region, where the skill premium was permanently low. But even more striking are the strong correlations between international differences in the skill premium in 1800 and growth in the nineteenth century. Therefore, the skill premium is not only a measure of the quality of the institutional framework of an economy, but also appears to be a predictor of growth in the long run.
CHAPTER SIX

THE PHILOSOPHERS AND THE REVOLUTION OF
THE PRINTING PRESS

Introduction

The price of the skills of common workmen – prescriptive knowledge in Mokyr’s terminology – was relatively low in Western Europe in the centuries before the Industrial Revolution. But would it also be possible to measure the price of the knowledge of ‘philosophers and men of speculation’, of Mokyr’s propositional knowledge? And what do we know about the long-term development of literacy, which forms a crucial link between the two elements of the knowledge economy? Economists who model the emergence of the Industrial Revolution have identified the growth and productivity of the sector producing ‘theoretical’ knowledge as one of the key elements in generating a cumulative process of knowledge creation and human capital formation (Cervelatti and Sunde, 2005). Is it possible to test these ideas and measure the cost and production of this kind of knowledge in a way similar to the one we used for pricing the skills of common workmen?

Chapters 2 and 3 identified key moments in the history of the system of knowledge production in Western Europe: the growth of the monastic movement and the establishment of universities in the high Middle Ages were crucial steps in the developing ‘knowledge economy’. In combination with other developments, such as the growing importance of the written word in place of memory as the most reliable sources of information, this sparked a very significant expansion in the demand and supply of propositional knowledge, as can be seen from the growth of book production and consumption during the high Middle Ages.

Here we take up the story of the growth and accumulation of knowledge and try to measure the output and cost of propositional knowledge, focusing on book production. Books and journals, which only started to appear in the seventeenth century, were the most important carriers of knowledge in the period before the Industrial Revolution – besides the scholars who wrote them. As in the previous chapter, where data on the skill premium from different parts of Europe were analyzed in
a global perspective, we will again try to find out how exceptional the levels of book production in Western Europe were: how they compared with book output in Japan, China, and other parts of Eurasia. Moreover, the demand for books is clearly related to another measure of human capital formation, literacy. Estimates of the level of book consumption per capita, therefore, make it possible to chart the long-term evolution of literacy in the centuries before 1800. Through this connection it is also possible to analyze the causes behind the increase in book production and consumption: how important was income growth, urbanization, and Protestantism in explaining the strong growth of book output from 1450 to 1800? And is there a link between book production – as a measure of human capital – and economic performance? Can we use the estimates of book production in various parts of Eurasia to explain the ‘Great Divergence’?

The Economic Consequences of Mr. Gutenberg

Book production was revolutionized in the centuries before 1800, especially following Gutenberg’s invention of moveable type in the 1440s and 1450s in Mainz. Historians working on ‘the coming of the book’ explain that this innovation was related to broader trends in society and economy in post-Black Death Europe; the rise in income (in particular of real wages) led to a diversification of demand and a growing market for books. At the same time, stimulated by the favourable climate for investment in human capital, literacy was increasing, certainly in the more urbanized parts of Europe. This is also demonstrated by the rise of new religious movements, such as the Modern Devotion in the Low Countries, which stressed individual reading of devotional literature and in particular the Bible. Before the 1450s, the supply of books was somewhat inelastic because the price of hand copying was high. As we have seen in Chapter 3, however, there is clear evidence that following a decline in the 1350s–1370s, manuscript production in the fifteenth century increasingly surpassed previous output levels. New ways of copying books were introduced – such as the pecia system used in universities – to reduce costs and increase output. At the same time, the use of paper as a medium for writing was growing rapidly, and economies of scale and learning effects gave rise to a decline in the real price of paper in these years (see Febvre and Martin, 1976, pp. 29–77). Books continued nonetheless to be high-priced items, often worth more than the annual income of a craftsman.
The invention of the printing press should be seen against this background of the dynamic late-medieval economy in which incomes were high and levels of literacy were rising. There is a great deal of evidence that the substantial increases in real wages after the Black Death led to systematic attempts to save on wage costs via new labour technology: in port cities man or horse-driven cranes spread from the Low Countries to the rest of Western Europe, new ship designs were developed to make better use of wind energy (and the dependence on manpower of Mediterranean galleys was clearly declining) (Unger, 2006) and windmills spread to various parts of Western Europe, especially to those low-lying areas where water power was unavailable (Van Bavel and Van Zanden, 2004). Also, the ‘military revolution’ which began to revolutionize European warfare (at about 1400 we see the systematic use of cannons and the introduction of handguns in warfare) can be seen as a response to the changing relative prices of the period: capital goods (cannons, guns, harnesses, and a great deal of other equipment) were increasingly substituting for manpower in those years (see Hoffman, 2004).

Gutenberg’s invention was another logical response to these developments: a rapidly growing demand for books (and other printed matter), a well developed capital market with low interest rates, and high wages in combination with an abundant supply of skilled labour (and a low skill premium). The middle decades of the fifteenth century saw many experiments with new technologies to solve the bottlenecks in book production that had emerged, some perhaps inspired by ideas from China and the Middle East, others probably indigenous. Woodblock printing had become the dominant technology in China, although it continued to compete with hand copying and there was a very small niche for moveable type printing, which had been developed in the eleventh century (Moll-Murata, 2008). In Western Europe, too, woodblock printing was experimented with at some scale. What made the Western European development different is the radical breakthrough of the new ‘high tech’ way of printing. Given the factor costs of Western Europe in the fifteenth century, it was rational to develop a capital intensive and skill intensive technology – moveable type printing – which was labour saving and characterized by large economies of scale, i.e. large savings on costs per book with relatively large print runs. This choice for a high-tech solution set in motion a chain of events – learning effects, economies of scale – that resulted in sharply declining book prices and a broadening of the market, which led to strong growth
in book production and indirectly contributed much to the gradual growth of literacy.

In China factor costs were different: labour was much cheaper and capital more expensive (Chapter 1, and Allen et al., 2005). This made the advantages of moveable type much less; after its invention in the tenth or eleventh century, it was almost exclusively applied to government-funded projects, such as an encyclopaedia, for which costs were irrelevant (Febvre and Matin, 1976, p. 75; Moll-Murata, 2008). Moreover, the fact that as many as 5000 characters were required to produce a Chinese text, whereas 26 characters sufficed for European books, had a major impact on the necessary initial investment in fonts. Thus, in China several techniques for the reproduction of information – hand-copying, woodblock-printing, and moveable type – continued to coexist after the invention of different forms of printing under the Sung (960–1279) (Moll-Murata, 2008). In Western Europe the advantages of moveable type were so significant (given the size of the market and the relative factor costs) that it soon replaced all other techniques for the mass production of the written word.

One of the ways to analyse the long-term impact of the development and adoption of movable type printing is by looking at the price of books. A series of estimates of the long-term development in the (average) price of books is not easy to reconstruct, primarily because books are very heterogeneous items. Printing started with high quality work for relatively large books in small series; the (probably) 200 copies of the Gutenberg Bible were sold for as much as 20 Rhenish guilders, the equivalent of the annual wage of a labourer.\(^1\) Slowly the industry learned to print smaller books, in (much) bigger runs at lower prices. In the second half of the eighteenth century, for example, the cheapest Bibles printed in the Netherlands were priced as low as one guilder and fifty cents, the equivalent of the daily wage of a carpenter. Bibles comparable to Gutenberg’s were much more expensive, but still cheaper than in 1455 (about 17.50 guilders, or less than 12 daily wages), whereas all other prices (and wages) had gone up substantially in the meantime. For the seventeenth and eighteenth centuries a database of book prices, randomly chosen from a 1788 catalogue of books published in the Netherlands from 1600 to 1785, could be set up (the

\(^1\) A detailed analysis of the economics of the early printing industry on which I rely here is Cuijpers (1998, pp. 20–108).
main source was Abkoude, 1788). The average prices of the 782 books included in the database was 1.60 guilders, the median 1.20 guilders, which clearly suggests how cheap books were in the Netherlands in this period. The seventeenth and eighteenth-century estimates of book prices could be linked to a set of book prices of the period from 1465 to 1500 taken from a number of studies on the early rise of printing and book marketing. Both sets were linked via the prices of a comparable, ‘high quality’ Bible: the Metelin Bible (from Strasbourg), priced at 12 Rhenish guilders in 1466, was considered comparable to a 17.50 guilders (luxurious, large size, with plates) Bible printed in the 1780s. The results are presented as the dots in figure 20.²

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² Sources of Figure 20: the 1460–1500 prices are taken from: Cuijpers (1998, pp. 33–39); 1628: Van Selm (1987, pp. 344–49); seventeenth and eighteenth century: Abkoude (1788)

Figure 20. Actual observations of (average) prices of Dutch books, and the simulated price, 1450–1800 (indices 1460/74 = 100)
Moreover, I also tried to simulate the long-term development in book prices using 1) prices of the most important inputs: paper and labour (wages of a carpenter) in Holland and 2) assumptions about the size of scale economies and learning effects on costs (and therefore on prices), effects which were substantial. The best fit was achieved from assuming that the elasticity of scale was .25 (a 10 percent increase in output in a given year resulted in a 2.5 percent decrease of the price of books) and the elasticity of cumulative output (a proxy of learning effects) was also .25 (an increase in cumulative output of 10 percent also resulted in a decline in the prices of books by 2.5 percent).

The simulated book price is also presented in Figure 20. It shows that over the long term, book prices were characterized by a dramatic fall in the 1470s that has been documented by other sources as well (see Cuijpers, 1998, p. 37). This was followed by stagnation from 1480 to 1550, and by a slow increase in book prices from 1550 to 1650, driven by an increase in the price of paper and a rise in wages. After 1650 book prices tended to decline slightly.

When the simulated book price is compared to developments in the cost of living index, we can estimate the real price of books (the CPI is from Van Zanden, 2005a). Figure 21 shows how dramatic the decline in book prices was during the 1470s; simulated prices declined by two-thirds, which is probably an underestimate of the real decline in real book prices, in view of the even steeper decline shown in Figure 20. This decline continued throughout the period, until the real prices of books was slightly more than 10 percent of the real price of books in 1800.

The actual impact of the invention of moveable type on book prices was even more pronounced, because in the 1460s printed books were 50 to 80 percent cheaper than their hand-copied equivalents (Cuijpers, 1998, p. 36). This means that within the span of one generation – from 1455 to 1485 – book prices may have declined (in real terms) by 85 to 90 percent, a revolution in the price of communication comparable to current developments in ICT technology.

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3 Cuijpers (1998, pp. 33ff.) for a detailed analysis; he shows, for example, that the average number of characters per page increased from 9000 to 17,000 from 1473 to 1540, which meant major savings on the most expensive input, paper.

4 Simulated book price was based on the following costs: prices of paper (60 percent) and wages of craftsmen (40 percent) from Van Zanden (2005a) and the economies of scale and learning effects discussed in the text.

5 See also Clark (2007, p. 252) for an almost identical decline in book prices in England.
The major forces shaping the dramatic rise of the printing press are well known from the literature. The most important were:

- Economies of scale and learning effects inherent to the technology of moveable type printing; both were very significant as the simulated price curve shows. Increasing the print run and the number of characters per page lowered the average costs of books dramatically;
- Technology was to a large extent embodied in printers who were very mobile – within one generation German printers had settled in the most distant corners of Europe, and their remuneration was kept at relatively low levels due to the increased competition among different publishers and different cities. The flexibility of the supply of human capital, noted in the previous chapter, is evident here as well;
- The potential market for books was huge, witness the very rapid spread to printing within a few decades: in 1480 more than 100 cities housed one or more printing shops, which increased to at least 236 in 1500 (Febvre and Martin, 1976, pp. 184–5);
• Finally, economies of scale in paper production (and probably in
the making of other inputs as well) also significantly contributed to
the declining costs of printing; as much as 50 percent of total costs
consisted of paper, and relative prices of paper also went down a
great deal (Van Zanden, 2005a).

The rise in total book production was as dramatic as the fall in book
prices. In 1480 about 800 (new) editions were published. In 1500 the
2000 mark was approached, and in 1600 the 5000-book threshold was
reached, after which growth slowed somewhat (Figure 22). Initially,
Germany was the most important centre of the industry; but production
spread rapidly to northern Italy (which produced more incunabula than
Germany from 1455 to 1500), as well as France and the Low Countries;
England, Spain, and Switzerland followed closely behind. Figure 22
shows the dynamics of the industry, measured by the number of edi-
tions published in a number of European countries and Europe as a
whole. It shows that short-run fluctuations in book production were
affected by various factors: the depression in Dutch book production
in the middle decades of the sixteenth century, for example, was the
result of the very fast expansion of the Antwerp printing industry during
this period, which resulted in a concentration of the industry in that
city. Politics sometimes had a major impact on book production: the
English Civil War of the 1640s, for example, led to a huge expansion of
book production, as did the French Revolution of 1789. It is also clear
that different long-term patterns can be discerned: Italy and Germany
show an immediate spurt in book production, which slows down after
half a century. The growth of book production in the Netherlands and
England was consistently high over a much longer period, which led
book production in these much smaller countries to reach a similar
level in the middle of the seventeenth century. Finally, Sweden appears
to have been a slow starter, but its performance during the eighteenth
century was spectacular.

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6 In Chapter 3 it was already explained how the dataset of book production for the
period 800–1800 has been constructed; the difference with the numbers presented
there, is that we concentrate on numbers of editions (instead of printed volumes)
here, whereas in Chapter 3 the total numbers of hand-copies and printed books were
analysed; because average print runs were increasing from about 700 to at least 1000
between 1500 and 1800, the growth of actual output was even somewhat higher than
suggested here.
Figure 22. New editions of printed books in different countries of Western Europe, 1454–1800
The revolution in printing had a number of other consequences that should be mentioned briefly. Several new roles emerged in society and the economy: 1) the intellectual, who lived from his pen, i.e. from the proceeds of his books (Erasmus is often mentioned as the first example) and 2) the publisher/printer, who often played a key role in bringing academics together, in commissioning new books, and developing new projects. These new roles in the network of academia stimulated exchange and contributed to the vitality of the academic community. Later developments – the invention of the newspaper and the journal – further contributed to the power of the republic of letters (cf. Burke, 2000). Finally, Eisenstein (1979), in her well-known analysis of the long-term consequences of the printing press, saw it as one of the prime movers – if not the prime mover – behind the Reformation of the sixteenth century and the scientific revolution of the seventeenth century. The heterodox ideas of Luther and Calvin, or Copernicus and Galileo might not have survived in a world without the printing press; both movements used the press intensively, much to their advantage. In a similar way Peter Burke (2000), in his analysis of the ‘social history of knowledge’ during the early modern period, stressed the revolutionary changes in the production and dissemination of knowledge that began with Gutenberg and resulted in what Mokyr calls the ‘paradigmatic document’ of the (industrial) Enlightenment, Diderot’s Encyclopédie (cf. Mokyr, 2002, p. 42).

With this we return to the theme of this chapter: the link between the Industrial Revolution and previous developments in the production and dissemination of useful knowledge. I have argued that the printing press caused a revolution in the cost, production, and exchange of propositional knowledge. Its real cost was cut by perhaps as much as 85 to 90 percent; most of the decline occurred in the second half of the fifteenth century, in the three or four decades after Gutenberg. At the same time, book production expanded enormously. Of course, not all books published after 1455 contained such useful knowledge: the portion devoted to pure enjoyment increased slowly in the long run, and even in a relatively modern and urbane country like the Netherlands, the output of the printing industry continued to be dominated by works of a religious nature (but it can be argued that religious knowledge is an integral part of propositional knowledge). In short, the access costs for information became much lower, a development which was not unique to the industrial Enlightenment of the eighteenth century, as Mokyr
(2002, pp. 67–9) seems to imply, but was a typical feature of Western Europe since the 1450s. This followed the invention of printing and the dynamic development of the printing industry, which responded rapidly to the opportunities offered by the new technologies and the growing market. Supporting this positive reaction were patterns of flexible supply and mobility of human capital, strong competition between cities and regions to attract the new industry, and an elastic supply of venture capital – all features of a relatively flexible economy characterized by efficient institutions.

Book Production Outside Europe

So far we have seen that several processes led to very rapid growth in book production in Western Europe: first, there was the flourishing monastic movement, second, the growth of urban demand and related institutions (such as the universities) in the twelfth to fifteenth centuries, and third, the invention of the printing press (which can be seen as a response to the growth in demand after 1350), leading to a dramatic decline in book prices that further stimulated the growth of the market. Were these changes – and the corresponding levels of book production and consumption – unique to Europe, or do we find a similar expansion of the printing industry elsewhere?

During the Middle Ages the levels of literacy and book production in the Middle East may easily have equalled and possibly surpassed that in Western Europe, but that region did not make the transition to mass production of books through the printing press – nor did India, another highly developed and literate society. Resistance to the printing press in Islamic countries was perhaps the result of ‘distrust in the common man…. to prevent his gaining access to printed materials’ (Huff, 1993, p. 232). The sultan of the Ottoman Empire, for example, banned the possession of printed materials after he discovered what the invention of the printing press meant for Western Europe (Pedersen, 1984, p. 133). The fact that the new technology could so easily be suppressed probably also suggests that the market for books was limited in the Ottoman Empire. In the early sixteenth century, Italian printers tried to gain access to the Ottoman market by printing specialized books for it, but these ventures were not very successful from a commercial point of view, which again suggests a limited demand for books (Pedersen, 1984, p. 134).
The two candidates for having a level of book production similar to Western Europe are China and Japan, both of which developed a commercial printing industry in the centuries before 1800. Recently, literature on the Chinese printing industry has been growing rapidly, which allows detailed comparisons with Western Europe. What emerges from this literature is that during the late Ming and the Qing, book production in China expanded rapidly; especially in the sixteenth century printed books largely replaced manuscripts. The growth of the commercial printing industry in the Yangtze Delta played an important role in this transformation (Chow, 2004, p. 22; McDermott, 2005). The best recent evidence on the volume of output in the Chinese book industry is for the second half of the Ming (1522–1644), which was probably the most dynamic period. The two main centres of production, Jianyang (in Fujian) and Nanjing (in Jiangsu) produced about 1,000 and 700 editions, respectively (Chia, 2003, p. 128). The estimates for the other cities and provinces are much lower; according to Zhang’s estimates, not more than 1600 titles were published in the rest of China, of which about half was also concentrated in the Yangtze Delta. Combining these figures yields a total of about 3,300 new titles for China as a whole in the 1522–1644 period, or 27 titles annually.\(^7\) Other recent estimates by Lucille Chia for the whole of China from 1505–1644 indicate a level that is almost double this estimate, i.e. 47 titles annually.\(^8\) As with our European estimates, these figures are based on books still available in libraries, and therefore underestimate real output. But even if we multiply these figures by a factor of 10, they are low compared to the estimates for Western Europe (which had a similar population size). The average annual book production in Western Europe from 1522 to 1644 can be estimated at about 3,750 titles, or about 40 times higher than the highest estimates for China in the same period.

For Qing China there has been much less recent work; the only estimate available is that a total of about 126,000 new editions were published from 1644 to 1911, which means that the average annual output

\(^7\) During the Wanli period (1573–1610), when book production in Nanjing and Jianyang peaked, the annual average may have been double this figure, 50 to 60 per year (based on Chia, 2003, p. 128); Chow (2004, p. 22) gives much lower estimates: 19.1 books on average per year for the 1573–1644 period.

\(^8\) Chia (2003) gives a total of 7,325 editions for the Ming (707 before 1505, and therefore 6,618 from 1505 to 1644; the latter would imply an average of 47 annually, almost double the figure that could be derived from the estimates by Zhang); this shows how large the extent of errors are, but the gap with Europe remains formidable no matter which estimates are used.
was 474. Again, this was much lower than output in Europe, where close to 6,000 titles in 1644 alone were published; Chinese book output was even lower than the output of a small country like the Netherlands during much of the seventeenth and eighteenth centuries. This is even more striking, as the printing industry in China was probably fairly efficient, producing books with relatively low prices (although perhaps not as low as in Europe); it may indicate that the demand for books was much more limited than in Western Europe.10

For Japan we have found a number of estimates of book production. Japanese printing really took off after 1590, when two printing presses were brought into the country. Peter Kornicki (2001, p. 175) concluded that ‘the net result of the printing boom of the period from 1597 to the middle of the seventeenth century was the appearance of at least 500 newly-printed titles, a total which is greater than that of all books printed during the previous two centuries’; this would mean an annual average of ‘at least’ one, which is not impressive at all. Other data from his study make it possible to estimate that between the 1720s and 1815 about 22,000 new titles were published in Japan as a whole, or on average about 300 per year.11 This is consistent with the estimates by Hayami and Kitô (2004, p. 241) of output in ‘the three cities of Edo, Osaka, and Kyoto’: about 400 new titles from 1727–1731 and almost 600 from 1750–1754. Again, these estimates are low compared to Europe: France, which had a slightly smaller population, produced more than 1,500 books annually from 1727 to 1731 and 2,350 per year from 1750 to 1754. Assuming that the above three cities produced at least 50 percent of the total Japanese output, Japanese levels of book production were still considerably below those of France and most

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9 Tsien (1985, p. 190, note f); in view of the significant growth in book publishing in the nineteenth century (see Reed, 2004), the average for the period before 1800 must have been even lower than 474.

10 For a discussion of Chinese book prices compared to those in Western Europe, see Rawski (1979, p. 119); Chow (2004, p. 40ff.); the different technologies used by European and Chinese printers – moveable type and woodblock printing – points in the same direction: moveable type printing is characterized by large economies of scale, and is therefore efficient when the market is large; the scale economies of woodblock printing were limited, and therefore this technology suited the more limited Chinese (and Japanese) market better. This also suggests that the low number of new titles produced in China was not compensated for by larger print runs; in fact, print runs in China were probably smaller than in Western Europe.

11 Based on Kornicki (2001, p. 198), which supplies estimates for Osaka and Edo between 1720s and 1815 of 3636 and 8000 new titles respectively, and the number of publishers given on p. 205.
other European countries, but higher than in China or as a matter of fact anywhere else in the world. It is, of course, significant that the only major centres of large-scale book production outside Western Europe were in China and Japan, a region that was characterized by relatively high levels of human capital formation and favourable institutions for economic development (as we saw in Chapter 1).

Bridging the Gap: The Rise of Literacy

The most fundamental change bridging the gap between propositional knowledge and prescriptive knowledge – between common workmen and *savants* – was probably the rise of literacy. The world of the philosophers was the world of the written word – of books, correspondence, and (increasingly) articles in journals. To gain access to this world, to learn from its methods and understand its results, and to provide information to the academics, craftsmen had to be literate. Mokyr, in his account of the industrial Enlightenment, stresses the importance of direct personal contacts between the two groups, but seems less convinced about the importance of literacy, arguing that ‘increases of literacy were relatively modest during the Industrial Revolution’ (Mokyr, 2002, p. 67). Personal contacts and especially the fruitful exchange of practical and academic ideas between engineers and other craftsmen and ‘men of speculation’ was probably conditional on a certain level of development of these common workmen, and literacy was likely a vital ingredient. Moreover, the fact that literacy did not increase much during the Industrial Revolution simply indicates that even before 1750 Great Britain had advanced to a level of literacy that made it possible to undertake a dramatic transformation of the economy. In this respect the crucial changes occurred before the 1750s.12

What do we know about the development of literacy in the period before 1800? A recent survey by Jaime Reis (2005) concluded that literacy increased greatly in Western Europe – especially in England, the Low Countries, northern France, and the western part of Germany – where levels of literacy rose from (sometimes) close to zero for women

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12 In his recent analysis of the factors causing early modern economic growth, Robert Allen concludes that the effects of rising literacy were quite small (Allen, 2003, p. 433); this conclusion is based on fairly weak data on literacy, in particular for the Low Countries in the sixteenth and seventeenth centuries.
or about 10 percent for men in 1500 to ‘somewhat above’ 40 percent for women and 60 to 80 percent for men. In two of these countries, the Netherlands (represented by Amsterdam) and England, it is possible to follow this process over time (see Figure 23, which also gives two estimates of literacy available for France). The Amsterdam data are fairly representative of the Netherlands as a whole, as more than half the brides and grooms who signed their marriage contract – the source for this reconstruction – were born outside the city: those immigrants came from all provinces of the Netherlands (and from neighbouring countries). Moreover, their levels of literacy were almost identical to the citizens of Amsterdam (Hart, 1976, pp. 130–2; Kuijpers, 1997, p. 511). This also points to a special feature of the Dutch case, namely, that literacy in the countryside was, more often than not, higher than in the cities (Kuijpers, 1997, p. 509). The Amsterdam data may therefore even underestimate national levels of literacy. Underestimation may also be

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13 Kuijpers gives the following estimates for 1585: literacy of grooms born in Amsterdam: 54.4%, all grooms: 55%; of brides born in Amsterdam: 32.4%, of all brides: 31.7%, which shows that differences between the city inhabitants and the immigrants were very small.
a problem in the English data, because London and other cities seem to be underrepresented; in the English case it is usually assumed that literacy in the capital was higher than in the countryside (Stephens, 1990, pp. 555–8).

The data show that literacy in both countries went up very significantly in those three centuries. The initial level in the Netherlands was much higher than in England, and the gap remained that way. As discussed in Chapter 3, there is evidence suggesting that as early as the sixteenth century a large part of the population of the Low Countries – perhaps as much as 30 to 40 percent of men and 20 to 30 percent of women – was literate. This percentage rises to three-quarters at the end of the eighteenth century (85 percent for men and 64 percent for women). In England rates of literacy continued to be at least 20 percent lower.

The estimates of book production and consumption can also be used to infer the long-term development of literacy in the centuries before 1800. Let us start simply by observing what is implied in the highest levels of consumption in the eighteenth century. From 1751 to 1800, when the Dutch population was about 2 million, about 52 million books were produced in the Netherlands, an estimated 7.7 million of those were exported, which leaves a per capita consumption of 436 per thousand inhabitants per year, or less than one-half book per capita per annum. The rate of literacy of the Dutch population can be estimated at 73 percent (84 percent for men, 61 percent for women), and further assuming that 40 percent of the population consisted of children who did not buy books at all, this means that an average literate Dutchman (or woman) bought one book per year.

Can we use this starting point to speculate about the development of literacy in Western Europe from 1450 to 1800? The factor that has to be taken into account is that book prices were much lower in the Netherlands than elsewhere, which was the result of the relatively large market that reached down into the lower middle classes. To correct for this, we can compare these estimates with a set of estimates on the level of literacy by Allen (2003). If it is assumed that the price elasticity in the demand for books was minus 1.4, and that book prices outside

\[ \frac{b}{p} = \alpha \times \beta \times p^{-1.4}, \]

where \( b/p \) is book consumption per capita (from Table 4), \( \alpha \) is a constant derived for the Netherlands in the eighteenth century (where we have independent estimates of the level of literacy), and \( \beta \) is the estimated
the Netherlands were 50 percent higher than in the Netherlands (the exception is the UK, where 35 percent is perhaps a more correct estimate), we get a set of estimates for levels of literacy in 1750/80 that are roughly comparable to Allen’s (see Table 8). The long-term trends also identified by Allen – a rise in literacy from about 10 percent in 1500 to one-third three centuries later – is well reflected in these estimates, and the differences among countries in 1500 are generally consistent with the Allen estimates. The comparison suggests that Allen may have overestimated literacy in Spain and Poland, and probably underestimated it in the Low Countries and Italy. In fact, the estimates arrived at here for the sixteenth century are probably still too low for the Low Countries. The overall pattern shows a strong increase in the North Sea area (including Sweden), stagnation in the southern periphery

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<td>Western Europe</td>
<td>–</td>
<td>9</td>
<td>16</td>
<td>25</td>
</tr>
</tbody>
</table>

Table 8. Estimates of the development of the rate of literacy compared with Allen’s, 1451/1500–1701/1800

Source: Estimates of literacy based on book consumption as discussed in the text, and Allen, 2003

rate of literacy, and \( p \) is the real price of books estimated in this chapter; the elasticity of demand is from Ringstad and Løyland (2006), which has a discussion of the different estimates for the price elasticity of demand; the value of \( -1.4 \) was suggested by several studies cited, and produces estimates of the development of literacy consistent with the Allen (2003) estimates of literacy.
(Spain), and slow increases in Italy and Poland. The other conclusion that can be derived from this is that the 30-fold increase in European per capita production from 1450/1500 to 1700/1800 can be decomposed into two elements: a tenfold increase caused by falling book prices and a threefold increase in literacy.

If we use the same procedure to estimate the development of literacy before 1500, in combination with assumptions on the development of the price of books, this results in the following estimates for Europe as a whole: literacy is increasing slowly from 1.3 percent in the eleventh century, to 3.4 percent in the twelfth century, to 5.7 percent in the thirteenth, and 6.8 percent in the fourteenth century. The regional patterns found here are identical to the ones analyzed previously, when we focused on book production per capita. The increase in literacy after 1350 is most striking in the Low Countries, Switzerland, and Italy (where it probably began earlier), but there also appears to be a sustained growth of literacy in the late medieval period in the British Isles, France, and Germany.

Falling book prices dominated the growth of book production, but the pattern of increased divergence within Western Europe cannot be explained by this, because book prices declined everywhere. In the working paper version of this chapter we have attempted to explain this Little Divergence within Europe, but due to the limitations of the dataset and problems of endogeneity of the independent variables (is income growth leading to higher levels of literacy, or is literacy leading

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15 This approach probably provides better estimates for large countries than for small ones, such as Belgium or Ireland (or the Netherlands in the sixteenth century), which were partially dependent on imports of books whose magnitude is difficult to estimate.

16 We assumed that real book prices declined in Europe because of the strong growth of output, improvements in the methods of hand copying, and the emergence of institutions focused on mass production of manuscripts (certain monasteries, houses of the brethren of the common life, etc.); average book prices in Europe in 1454–1500 were estimated at 600 (the index is based on Dutch book prices during the eighteenth century set at 100, see figure 20). It was assumed that average prices of manuscripts were double that level in the fifteenth century, and that they declined by about one-third from the twelfth century to the fifteenth (so the series of indices is: before 1200: 1750; thirteenth century: 1600; fourteenth century: 1400; fifteenth century: 1200). Other estimates – for example a smaller decline from 1200 to 1400 – do not significantly affect the patterns found; the estimates of book prices for the period before 1400 can be derived from Bozzolo and Ornato (1980).
to income growth?), the results are difficult to interpret (Buringh and Van Zanden, 2006). One variable that correlated very strongly with literacy and book consumption was Protestantism, which in itself was able to explain almost all of the difference in literacy between northwestern Europe (England, the Netherlands, Sweden) and the rest of the sub-continent. The question remains to what extent the growth of book production and consumption was driven by cultural or by economic factors. The ‘Little Divergence’ is clearly present in the estimates of book consumption, but Catholic Belgium more or less falls out of the region of high demand for books, whereas in economically ‘backward’ but Protestant Sweden book production expands very strongly. On the other hand, Switzerland, another (partially) Protestant nation, is a leading publisher only during the 16th century, but falls back dramatically during the next two centuries. This also leaves open the question of if the Reformation was an external factor – an exogenous shock – or should be considered endogenous, the result of for example growing literacy at the grass roots level during the Late Medieval Period, creating favourable conditions for the message of Luther and Calvin (Derville, 1984).

**Literacy, Skill Formation, and Economic Growth**

How can we explain these trends? In our analysis of the development of the skill premium in the previous chapter, we argued that from the late Middle Ages onwards conditions for investment in human capital were very favourable in northwestern Europe, especially in England and the Low Countries. This apparently also applies to another form of human capital formation, i.e. investment in young children by sending them to primary schools (or by hiring private instructors). It is no coincidence that the decline in the skill premiums in the late medieval period occurred at the same time as did strong increases in literacy and a rapidly growing ‘mass market’ for books. During the fifteenth century, the Low Countries were the core region of these developments, followed by England. Both were stimulated by a favourable ‘investment climate’ in human capital (i.e. low interest rates and efficient institutions). High levels of literacy must also have contributed to the efficiency of the training system of apprentices, and the growth of a class of craftsmen with specialized skills may also have enhanced investment in primary education. The significant increase in literacy and skills in the North Sea region is even more striking because (city)governments only played a
small role in it. Investment in human capital therefore reflected private costs and benefits, and the efficiency of institutions to bring supply and demand together.

In the (late) seventeenth and eighteenth century government policy also began to play a role. The rise of literacy in the northern ‘periphery’ of Western Europe – in Sweden, Scotland, Prussia, Denmark and Norway – was in part the result of enlightened government policy inducing citizens to learn to read and write, often in combination with the supplying of schools and teachers, although in some areas this was delegated to local churches or villages. Adam Smith already defended such government policies, and attributed the high level of literacy found in eighteenth century Scotland to it, but recent research tends to stress that other factors played a role as well (Mitch, 2004, p. 352). A similar success story can be identified in Sweden, or perhaps Scandinavia in general, in the eighteenth century, where the state played an even larger role in stimulating education. Germany, and in particular Prussia, is another example of public policies favouring literacy, going back to the sixteenth century when protestant city government promulgated ordinances to foster education (Reis, 2005, p. 206). In the cases of Scotland and Sweden, the rise of literacy was accompanied by a decline in the skill premium, which suggests that besides government policy changes in household behaviour and more favourable circumstances for human capital formation also played a role (Chapter 5).

The links between skill premium and literacy were many and complex. In both the Netherlands and England it was obligatory to be able to read and write before entering an apprenticeship. The reason was that a guild master had to be literate and numerate. That is why the regents of the Amsterdam orphanage, for example, wanted all their children to go to primary school – otherwise they would not be able to enter an apprenticeship (Kuijpers, 1994). So the supply of apprentices was ‘limited’ by the extent of basic schooling that children received – but as this extended down the social pyramid, the supply of apprentices became more elastic, which helped keep the skill premium low.

The rise of literacy may also have been enhanced by the revolution of the printing press: the availability of cheap books and other reading material – from government decrees to newspapers – and more generally, the rise of the written or printed word as the primary and official medium of exchange among people, and between the state and its inhabitants, all meant that incentives for learning to read and
write, and to invest in teaching one’s offspring to do so, were becoming stronger (see Houston, 1988).

The older literature about the link between education and economic growth suggests that there existed a threshold for the level of literacy beyond which the beneficial affects of human capital formation became large enough to trigger a process of sustained economic growth. On the basis of a cross-sectional analysis of the world’s nations in the 1950s, Anderson and Bowman (1976, p. 5) conclude that this threshold was about 40 percent: ‘a male literacy rate of about 40 percent is required (but that alone will not suffice) to support sustained economic growth’. It is striking to note that literacy in both the Dutch Republic before the 1580s, at the onset of its Golden Age, and England at the start of the eighteenth century, on the brink of its Industrial Revolution, was breaking through this threshold.

The hypothesis that book production and consumption – and therefore literacy – had a positive impact on economic growth has been tested more formally by Baten and Van Zanden (2008). We concluded that book consumption in a given period had a positive impact on real wages in the next period; the divergent patterns in book consumption per capita – growing very rapidly in the North Sea area, and much less so in the rest of Western Europe (with the exception of Sweden) therefore helps to explain the ‘Little Divergence’ of 1400–1800. But does it also contribute to an explanation of the ‘Great Divergence’ after 1800? In other words, can we predict nineteenth-century growth using eighteenth-century book production estimates? To test this idea, the dataset was broadened to include several countries for which data are available for the second half of the eighteenth century, some of them European (Ireland, Switzerland, Poland, and Russia), others non-European (United States, China, Indonesia, Japan, and India). The hypothesis is tested in two ways. Figure 24 shows the relationship between book production in the second half of the eighteenth century and the growth of GDP per capita during the nineteenth century (the period of 1820–1913) according to the estimates by Maddison (2001). Again, we also tested for a relation with the level of GDP per capita in 1913, because the 1820 estimates of levels of GDP are relatively weak and subject to much debate (Figure 25).

Both relationships were very strong. Per capita book production in Asia was close to zero for India and Indonesia, and about three per one million inhabitants in China. In Japan titles per capita were more than twice as high, almost seven per million inhabitants, comparable
Figure 24. Book production per capita in 1750–1800 and growth of GDP per capita between 1820 and 1913

\[ y = 0.0013 \ln(x) + 0.0048 \]
\[ R^2 = 0.5563 \]

Sources: for the European countries see the text (details in Buringh and Van Zanden, 2008); USA and Ireland: English Short Title Catalogue; Russia: Marker (1982); Indonesia: Isa (1972); Japan: Hayami and Kitô (1999, p. 241); China: Tsien Tsuen-Hsiun (1985, p. 190); India: Darnton (2002); GDP: Maddison (2001)

Figure 25. Book production per capita in 1750–1800 and GDP per capita in 1913

\[ y = 966.25x^{0.0048} \]
\[ R^2 = 0.7798 \]

Sources: see Figure 24
to the Russian level, but still much lower than in Western Europe. The variation within Europe was also large – the highest levels were attained by the Netherlands (538), Sweden (219), and Great Britain (198); the US was not far behind, with 141 titles per million inhabitants per year. But this great variation within Europe did not significantly affect the results. Only China is an outlier in figures 24 and 25, as it was an outlier in the relationship between the skill premium and economic growth analysed in the previous chapter. Both figures show a close relationship between our measure of human capital formation during the eighteenth century and economic performance during the period of the Industrial Revolution. Countries with a low level of human capital formation were unable to participate in the industrialization process that transformed the world economy, whereas countries that had a better starting point did manage to catch up with Great Britain. It is interesting to note that Japan had already invested significantly in education in the eighteenth century, which is evident from the existence of a mass market for books. The high level of education in pre-Meiji Japan is also confirmed by other evidence (Hayami and Kitô, 2004; also Van Leeuwen, 2007 for the large differences between Japan on the one hand and Indonesia and India on the other hand). This seems to have been just sufficient to be a successful ‘early’ modernizer, whereas other Asian countries failed to industrialize during the nineteenth century.

**Conclusion**

‘Why and how the Industrial Enlightenment/Revolution happened is the central question that holds the key to the modern economic history of the West’ (Mokyr, 2002, p. 43). In the third part of this book, I have followed up his argument that fundamental changes in Europe’s knowledge economy were driving this divide in the long term evolution of the world economy. I have attempted to contribute to answering this central question by: 1) developing quantitative measures for price, production, and access costs to different forms of ‘useful knowledge’, 2) showing that these measures provide a consistent picture of differences between Western Europe and other parts of Eurasia in the early modern period, and 3) tracking the development of these processes over time. In the late Middle Ages, the North Sea area already stands out as a region with favourable conditions for investment in human capital, both in craftsmen’s skills and in overall literacy (and probably general education). These must be seen against the background of falling and
relatively low interest rates and efficient institutions for training and education. At the same time, during the fifteenth century, a revolution in the way propositional knowledge was reproduced resulted in a very sharp decline in book prices, which in turn gave strong positive feedback to the production and reproduction of ‘academic’ knowledge: book output increased enormously in the decades and centuries after 1455. Finally, the gap between common workmen and ‘men of speculation’ was bridged by the marked rise in literacy in the same region; this process probably began in the Low Countries (and northern France, and perhaps parts of Germany and Italy as well) during the one-and-a-half centuries after the Black Death, and spread to England in the sixteenth and seventeenth centuries. At the end of the period, almost all skilled craftsmen in the North Sea region were probably literate; they were definitely able to read and write in the Low Countries, and increasingly so in Great Britain, Germany, and France.

In all these respects, this region increasingly differed from the rest of Europe: Italy, for example, was left behind both in the supply of skilled craftsmen and in literacy (which may have declined in other regions bordering the Mediterranean). Comparisons with other parts of Eurasia are more difficult, but they seem to point in the same direction. In large areas of Eurasia, the skill premium was much higher than in Western Europe; only in south China and (probably) in Japan do we find a skill premium comparable to Western Europe. Similarly, book production was only significant in China and Japan, but grew more slowly and was smaller on a per capita basis there than in Europe. What is known about levels of literacy seems to confirm this picture: the estimates for nineteenth-century Japan and Ming China compare well with the estimates for (for example) eighteenth-century France (and perhaps Europe as a whole), but they are still lower than those in the Low Countries and England. It is not clear whether parts of China – such as the Yangtze Delta – had levels of literacy significantly higher than the rest of the country. The estimates of book consumption suggest, however, that the reading public in Europe was growing much more rapidly than in China, signifying that trends in the two parts of Eurasia were different. Yet, it is important to note that in eighteenth and nineteenth-century Japan and China – the only regions that were close to Western Europe in the efficiency of their institutions (see Chapter 1) – we find levels of human capital formation that are much higher than in other parts of Eurasia. In Western Europe, China, and Japan, relatively efficient
institutions produced relatively high levels of human capital formation. But in Western Europe these efficient institutions had their origins in the late Middle Ages, as was again manifest in our analysis of the skill premium, which had already declined from 1350 to 1450, whereas similar signs of institutional maturity and high levels of human capital formation only appeared in China and Japan in the late eighteenth and nineteenth centuries. In other words, in both respects Western Europe had a head start of 300 to 400 years on its closest rivals.

Finally, there were strong links between these measures of human capital formation and knowledge accumulation and economic growth. Papers by Davin Chor (2005) and Baten and Van Zanden (2008) found, respectively, that skill premiums were negatively related to real wages, and book consumption was positively linked to income growth. Moreover, both measures were able to predict the Great Divergence fairly accurately. Trends in human capital formation and knowledge accumulation that are closely linked to the efficiency of the underlying institutional framework can thus explain why Western Europe – and in particular the North Sea area – took an early lead in the early modern period, while other parts of the world economy were much less dynamic.
PART FOUR

TOWARDS THE DUAL REVOLUTION: STATE FORMATION AND MODERN ECONOMIC GROWTH
CHAPTER SEVEN

STATE FORMATION AND CITIZENSHIP: THE DUTCH REPUBLIC BETWEEN MEDIEVAL COMMUNES AND MODERN NATION STATES

With Maarten Prak

Introduction

The relationship between the state and its inhabitants is one of the fundamental themes of political economy and New Institutional Economics. It is often assumed that interests of the state – to maximize its level of income – and those of the citizens – to have their property rights protected – normally diverge. Douglass North (1981), for example, defines the central issues of early modern economic development that (on the one hand) economic growth requires secure property rights, whereas (on the other hand) the central issue of pre-modern politics was how to bind the predatory actions of the state. Although the state is supposed to be the agent of the citizens, there are often no institutions that bind the actions of the state in such a way that citizens can be sure their property rights will be respected.

One of the fundamental characteristics of the early modern period was that, within the limited space of Europe, different types of states competed fiercely, in war and the preparation for war (Tilly, 1990). It is obvious that the way in which states constructed their relationship with their citizens must have been crucial for their long-term success in this struggle for survival. States that found efficient solutions for the dilemma sketched by North must in principle have done better than states unable to solve this fundamental agency problem. Other factors – economies of scale, and the solutions for coordination problems that arose whenever larger political entities were created (Epstein, 2000) – obviously played a role as well. The power of a state controlling twice the resources (e.g. armies) than its smaller neighbour is probably (ceteris paribus) more than two times as large as that of its neighbour.1

1 A detailed discussion of this concept and its use in military history in Latzko
These military economies of scale, which according to Latzko (2005) emerged in the two centuries before 1700 as a result of the introduction of modern firearms, are also fundamental for understanding the process of concentration and consolidation that occurred in Europe between 1000 and 1800. However, as Tilly (1990) has demonstrated, this process was not straightforward; attempts to create European empires failed, demonstrating the limits of economies of scale in state formation. According to Tilly, the ‘capital-intensive’ city-states in the zone stretching from Northern Italy to the Low Countries obstructed the ambitions of monarchs such as Charles V and Philip II to create a pan-European empire. During the sixteenth and seventeenth centuries these small states, which, as we will argue, had solved the agency problem in a particularly efficient way through a special relationship with their inhabitants, were able to resist the offensive of the large territorial states, in spite of their small size. They thus helped to preserve the competitive state system of Europe, a system that has often been identified as one of the explanations for the ‘rise of the West’ during this period. That Europe did not become one single integrated empire, but continued to be a competitive system of relatively small states – some of which already developed into nation states during this period – finds its explanation to a large extent in the role played by these ‘capital-intensive’ city-states.

In this chapter we analyse what were the specific features of one case, the Dutch Republic, arguably the best example of a small state to play a disproportionately large role in the European state system in this period. It helped to counterbalance the hegemonic ambitions of the Habsburgs between 1568 and 1648 and attempted to play the same role during the late seventeenth and early eighteenth centuries when Louis XIV had similar military-strategic aims. But to many later observers the Dutch Republic has appeared to be quite inefficient at first sight: it was a rather bizarre constellation of urban and provincial privileges, held together by an atypical, decentralized state. Yet, this relatively small state turned out very successful; in spite of its size it was one of the major European powers during much of the seventeenth century. Moreover, we will demonstrate that the specific features of this state

(2005); the classical formula for this was already given by Lanchester in 1916: ‘the fighting strength of a military force is proportional to the square of its numerical strength multiplied by the fighting value of its individual units’ (Latzko, 2005, p. 18).
were rooted in a number of institutions already developed during the High Middle Ages, of which the concept of citizenship was perhaps the most important. This chapter therefore takes the story of the specific Western European characteristics of the process of state formation from the origin of the communes during the High Middle Ages to the final decades of the eighteenth century, when some of these concepts and ideas, reformulated by Enlightenment thinkers, played a large role in the ‘Atlantic Revolution’ which began in 1776. We will argue that the Dutch Republic was an important link between these two ‘democratic’ movements – the Medieval and the ‘Atlantic’. Moreover, we will also briefly discuss that it is perhaps no coincidence that the other ‘democratic’ revolution of the early modern period occurred on the opposite shores of the North Sea, in England, between the 1640s and 1688.

An important reason for studying the relationship between state and citizens is that in Chapter 1 we saw that Europe had a strong comparative advantage in ‘vertical’ institutions guaranteeing property rights and enhancing trust. In terms of ‘horizontal’ institutions Tokugawa Japan and Qing China may have performed at the same or perhaps even a superior level than large parts of Western Europe, as is clear from the comparison of degrees of market integration in the different parts of Eurasia presented there. In order to understand the genesis of industrialization and modern economic growth in Western Europe, we therefore have to focus on the ways in which the state and its citizens interacted.

An Economic Interpretation of Citizenship

It is the function of the state to supply public goods. New Institutional Economics argues that the state should guarantee the system of property rights (defence against outside aggressors, a legal system), supply public goods that help lower transactions costs (a system of weights and measures, rules to regulate markets), and solve market failures (in the supply of education, infrastructure, health services, etc.). In return, citizens pay taxes to finance these public goods (Furubotn and Richter, 2000, p. 414).

Financing the state in the more distant past was to a large extent based on the levying of tribute, i.e. the state used its military and political power to coerce its inhabitants to contribute in terms of money and/or labour. In return, the inhabitants received protection, which
was sometimes hard to distinguish from the sort of protection offered by the Mafia to its ‘clients’ (Tilly, 1985; Volkov, 2002). Under certain circumstances this state ‘protection’ was to be preferred to a situation in which the peasants (the mass of the population in tributary societies) were ‘unprotected’, and therefore the potential victims of every lord who would ‘offer’ his services. Such an exchange between peasants and lords played a role in the emergence of feudalism in the ninth and tenth centuries. Historically, states have evolved from these coercive structures into systems dominated by exchange in which the actions of participants are bound by contractual rules – the ‘parliamentary democracy’ that is considered to be the most efficient system by North and others working in his vein (North, 1981; North and Weingast, 1989). Here we would like to focus on one key element in this transformation, the role of citizenship.

The basic problem of the state can be formulated as an agency-problem. The state is supposed to be the agent of its inhabitants, acting on their behalf and in their interest. Yet the state is subject to its own dynamics and the power of the state can and has often been used against its inhabitants. It may therefore be in the interest of those inhabitants not to pay taxes and thus not to contribute to the strengthening of the state, if they cannot be sure that the state will not turn against them. But a strong state may also be in the interest of those governed: it can protect the property rights of its citizens (for example, against outside aggressors), defend their interests abroad, and supply other collective goods vital for economic development. A weak state may therefore be sub-optimal, but a strong state may be a potential danger for those who support it (and certainly for those who do not support it). This is the classic agency-problem of the state.

A second problem is related to the potentially opportunistic behaviour of individual inhabitants. Even if there is agreement that it is in the interest of all to finance a strong state, and pay the taxes this requires, it will still be in the interest of the individual inhabitant to evade taxes as much as possible – the classic free-rider problem. Given the fact that his share in total taxation is very small, the effect of free riding by a single citizen on the total income of the state will be close to zero. Whereas it may be in the interest of all to pay all taxes, at the individual level it will be optimal to pay none at all. The success of the state in levying taxes will therefore depend to a large extent on either its ability to suppress free riding by force, or on the willingness of taxpayers to contribute to ‘the common weal’.
A solution to these coordination and commitment problems – the agency problem and the free rider problem – is implied by the concept of citizenship, which was developed during the Middle Ages as the cornerstone of the political process of the city, although the roots of the concept can be found in Ancient Greece, especially in Athens. Citizenship, to quote Charles Tilly (1995, p. 8), can be defined as the ‘continuing series of transactions between persons and agents of a given state in which each has enforceable rights and obligations’. It is a bundle of rights and duties characteristic of theburgers of a polity. The citizen had to participate in the political life of the community and in all other activities aimed at building and defending the city. This included paying a fair share in the taxation levied by the city, performing certain roles in public life and contributing to the community’s defence. Guarding the town walls and policing the public domain were often allocated to groups of citizens, organized in guilds, wards or civic militias. The most fundamental right was to participate in the political process in ways regulated by the city constitution, to contribute to the governing of the town, or to the election of its officials who would act on behalf of the citizenry. In return, the community had to protect the rights of the citizens and foster their interests. This also meant that taxes had to be levied on a fair basis, had to be transparent, and that citizens who were coerced to pay had to be treated with respect. Finally, citizens – and elected officials – were bound by oath to obey these rules. In this solemn way the first communes tried to establish credible commitment among their members, and the cities that grew out of these tenth and eleventh century experiments continued this practice.2

This brief sketch already suggests how the institution of citizenship might help solve the two coordination and commitment problems we identified. Firstly, it gave citizen the right, in fact the duty, to participate in the political process and monitor its outcomes, and thereby created a certain level of trust between authorities and citizens. Secondly, by stressing the moral obligation to contribute their share of the costs of maintaining the state, it guaranteed that taxes would be paid more or less fairly, or that citizens assumed that their fellow-citizens would pay their fair share of taxation. If all citizens obey these rules – and in

medieval cities they were bound by oath to do so – the two coordination and commitment problems will be solved. As a result, citizens supposedly have a keen interest in maintaining those norms as cornerstones of socio-political behaviour; it will create a political community based on trust, participation and commitment, in which the chances that the state will turn against its citizens are minimized. This will also mean that the degree to which the state has to rely on force to induce its citizens to pay taxes can be lowered substantially. The mix between coercion and cooperation will, in such a case, be quite different from states that have not developed a similar relationship with their inhabitants.

The result would be a city(state) that could levy much more taxes on a per capita basis than ‘feudal’ territorial states that operated on the basis of coercion. Its ability to survive was related to the superiority of its financial system. To begin with, tax morale would be higher in a system based on citizenship, since there were positive incentives – one’s good standing as a citizen – not to evade taxes. Secondly, new systems of taxation, on wealth and income, that might be considered fairer than for example excises and other indirect taxes, could be introduced that were individualized (i.e. each household or individual pays a sum related to his or her income or wealth) and based on information supplied by the citizens themselves (such as their own assessments of their wealth or income). Thirdly, a modern, funded debt could be created since the actions of the state were bound by these rules. This debt might then become negotiable, and in this way contribute to the development of a capital market. Because the commitment problem had been solved, the interest rate on this public debt could be modest.

In sum, citizenship helped create the conditions for a cooperative relationship between state and inhabitants, presumably more efficient than a relationship based on coercion. In other words, by creating the conditions for trust and cooperation, citizenship arrangements lowered the transaction costs of the exchange between state and inhabitants. This led – as we will argue – to an increased supply of public goods at relatively low costs to the economy.

Contemporary economists are currently also ‘discovering’ the important of citizenship and tax morale, and how this interacts with the way in which citizens are being treated by their state; see Frey (2002).

This point has been made in the explanation of the low interest rates at which the estates of Holland could borrow money in the sixteenth century (Tracy, 1985).
This cooperative model of rule suffered from a number of shortcomings, however, that were to become more evident as time went on. Game theory has demonstrated that frequent, repeated contacts between participants within a context of continuity – in which participants assume that they have to live together ‘forever’ – increases the incentive to conform to cooperative rules (Axelrod, 1984, pp. 59, 69 and 83). The rules of citizenship could therefore arise in a situation of frequent interaction between rulers and their citizens, and among citizens themselves, that is within relatively small spaces such as towns. But this also meant that such rules tended to be undermined by the very success of these towns, by their growth and the social differentiation of their populations. Formal rights of citizenship were usually restricted to a minority of the urban population: to the owners of property and of arms. In practice the merchants often dominated the medieval commune. When cities grew in size, those with access to power tended to restrict access to citizenship, while government by the whole civic body was transformed into rule by a small oligarchy. Short-term gains from rent seeking may have induced this kind of behaviour, which however at the same time tended to undermine the institutional fabric of the city and thus the foundations of its economic success. But there were counter-tendencies as well. The rules of citizenship might develop into a ‘democratic’ ideology that could inspire opposition-movements, such as the ‘popolo’ in thirteenth century Italian cities, or the growing influence of craft guilds in Flemish cities in the same period, resulting in guild government there after the Battle of the Spurs in 1302 (Black, 1984, pp. 66–7). Such a ‘democratic revolution’, in which new constitutions for urban government were formulated, re-established the citizens into the heart of government in these cities.

The second problem of early modern urban citizenship was that by its very nature it created a club to which some belonged, and at the same time defined the rest of the world as non-members, outsiders to the inner circle of power and privileges. Urban citizenship was restricted to a specific city, and excluded the countryside. This limitation is spelled out by David Hume, who, although he probably had Roman citizenship in mind, clearly pointed out this limitation of this special relationship between state and citizens:

It may easily be observed, that though free governments have been commonly the most happy for those who partake of their freedom; yet are they the most ruinous and oppressive to their provinces... When a monarch extends his dominions by conquest, he soon learns to consider his old
and his new subjects as on the same footing…. He does not, therefore, make any distinction between them in his general laws; and, at the same time, is careful to prevent all particular acts of oppression on the one as well as the other. But a free state necessarily makes a great distinction, and must always do so, till men learn to love their neighbours as well as themselves. The conquerors, in such a government, are all legislators, and will be sure to contrive matters by restrictions on trade, and by taxes, so as to draw some private, as well as public advantage from their conquests. (Hume, 1748)

As a result the countryside controlled by the city was often looked upon as a ‘colony’, to be exploited for the benefit of the city and its citizens. Likewise, rural folk did not have access to the state, and their interests were often ignored. Dominance of the surrounding countryside could result in exploitation and suppression of economic development there, such as the growth of proto-industry.⁵

Finally, this system of government, based as it was on an exclusive relationship between the burghers of a town and their state, made it very difficult to form more complex and larger political units that encompassed more than one city-state. Attempts to form city leagues (in Germany and Italy) in the late Middle Ages and sixteenth century never produced stable political entities, because it proved impossible to overcome the problems inherent in this kind of cooperation; sooner or later these urban leagues disintegrated as a result of free rider problems (see Brady, 1985).

As the quote from Hume shows well, the ‘feudal’ territorial state did have a mechanism to incorporate new territory, and the more successful feudal states – France, Castile, not to mention England – were able to increase their scale faster and in a much more durable ways than the city-states of the urbanized core region of Europe, the area between the Low Countries and northern Italy, that suffered from diseconomies of scale. The power of a state is, evidently, not only a function of the efficiency of its ability to mobilise resources, but also dependent on its size, i.e. the amount of resources available within its boundaries. The city-states of Europe may have been more efficient on a per capita basis, but nonetheless were in the long run doomed to compete unsuccessfully with the territorial states that grew out of ‘feudal’ (land-based) socio-political structures, especially when the latter started copying

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⁵ This appears to have happened in Tuscany in the late Middle Ages, and perhaps similar developments occurred in Flanders, where the cities too were in control of a large part of the countryside; cf. S.R. Epstein (1991).
institutional innovations developed by urban governments (Tilly, 1990). This not only meant that inside the new territorial states the specific ‘democratic’ urban political structures were increasingly suppressed – subordinated to the growing hierarchy and bureaucracy of the territorial states – but also that the cities which were still outside the realms of the territorial states had to fight many a battle to survive independently. Most succumbed sooner or later.

A Paradox: Taxation, Economic Growth and the Size of States

These observations help to explain two paradoxes about the relationship between state formation, taxation and economic development. The first paradox is explored in a recent paper by De Long and Shleifer, who analysed a database with information on size of cities and types of state in early modern Europe. They were able to demonstrate that in ‘absolutist’ states, urban growth – which they use as a proxy for economic development – was arrested, whereas in regions with city-states urban growth continued: ‘each century in which a western European nation….was ruled by a strong “absolutist” prince saw its urban population fall by roughly 180,000 people, and its number of cities with more than 30,000 fall roughly one and a half, relative to what the experience of that region in that era would have been in the absence of absolutist rule’ (De Long and Shleifer, 1993; De Long, 2000). This is strong evidence, of course, that absolutist rule was not conducive to economic development.

The explanation offered by De Long (2000) for this pattern is that absolutist regimes maximise tax revenue, and non-absolutist regimes are unable to do this because of the constraints of representation. He expects that the rate of taxation will be higher in absolutist states than under a regime in which merchants are able to influence the political process. He does not, however, present evidence to support this hypothesis. In fact, reviewing the available evidence suggests that the opposite may be true. Hoffman and Norberg (1994, p. 299), after reviewing the evidence, conclude that ‘in the absolutist states, Spain and France, taxation was relatively light’, whereas ‘in the states with strong representative institutions, the Netherlands and eighteenth century England,…taxation was extraordinarily heavy’. Similar conclusions can be drawn from comparative work on taxation regimes in fifteenth- and sixteenth-century Europe: in the city-states tax pressure
was much heavier than in the large territorial states. Yet, at the same
time these city-states were the centres of international trade and eco-
nomic growth, whereas the absolutist regimes were unable to generate
growth in a comparable way, if we are to believe the evidence analysed
by de Long and Shleifer.

De Long’s implicit assumption is that all taxes are bad for economic
development. In fact, much of the academic literature tends to assume
that the state only takes, and gives nothing in return. The concept of
citizenship makes it relatively easy to explain the ‘De Long paradox’.
However, in city states citizens were prepared to pay relatively high taxes
in return for the public goods they desired, because they were more
or less able to monitor the political process. What’s more, these public
goods – from protection of property rights to education and health
services – probably contributed to economic development (cf. Putnam,
2000, ch. 19). The high taxes they paid seem to have been transformed
into growth-enhancing (public) investments. This would explain why
economic development in early modern Europe was concentrated in
those parts of the continent where taxes were highest.

A similarly paradoxical development occurred during the nineteenth
and twentieth centuries. After the ‘democratic revolution’ of the final
quarter of the eighteenth century citizenship became redefined on
a national scale. In essence the concept remained the same: citizens
demanded the right to participate in the political process, some measure
of democracy and transparency, and in return were prepared to defend
the nation state (e.g. through conscription) and to pay their fair share
in taxation (Levi, 1997). In the long run this did however not result in
a lowering of taxation levels (as would be expected by De Long). On
the contrary, the introduction and spread of parliamentary democracy
resulted in a lowering of the transaction costs of the complex exchange
between state and inhabitants, which produced a remarkable increase
in the supply of public goods on the one hand and a sharp rise of the
share of total income going to the state on the other. At the same time,
economic growth accelerated, assisted by increased investments in more
and better public goods, such as education and medical services.\(^6\) It
can, perhaps, be argued that the fundamental changes in the relation-

\(^6\) The literature about this is enormous; we only mention a recent contribution Peter
Lindert (2003) stressing that democracy increases investment in human capital and
therefore stimulates long-run growth, a link that may also be relevant for the early
modern period.
ship between state and its citizenry occurring after 1775 were possibly as important as the technological changes of the Industrial Revolution occurring in the same period.

Case-Study: The Dutch Republic

In between two periods of vibrant citizenship – between the medieval communes of 1050–1350 and the nation states of the nineteenth and twentieth centuries – there appears to have been a long period in which citizenship was at low ebb and did not have a significant place in the political process in large parts of western Europe. The Dutch Republic – together with Italian and German city-states and the Swiss Eidgenossenschaft – to some extent bridged the gap between these two phases. In the late middle ages and early modern period the growing strength of territorial states profiting from economies of scale that were beyond the reach of most city states, were increasingly able to incorporate and/or suppress this ‘particularistic’ socio-political structure. To some extent these new states profited from the experiments with new sources of taxation and new political philosophies developed in the medieval and renaissance city-states, Italy in particular. The great wars that were fought on the territories of Italy (sixteenth century), the Low Countries (1572–1648) and Germany (1618–1648) – that is, in the urban belt of Europe where city-states were dominant – did much to harm the economic vitality of this central, urban corridor. Some parts of this urban belt were able to resist the onslaught of the territorial states successfully; one such part, fortuitously located in an inaccessible, marshy part of the delta of the rivers Rhine, Meuse and Scheldt, was the Netherlands. The Dutch Republic as an independent state originated in the conflict between two different structures of governance. It emerged when a handful of cities in Holland and Zeeland began to defend their privileges – i.e. the relatively efficient set of institutions that had been created as a result of the explicit contract between the city and its citizens – against a territorial, absolutist state, Habsburg Spain. The latter state, which tried to destroy local and regional privileges and

7 Hyde (1973, pp. 178 ff.) maintains that, after the flowering of civil life in the century before 1348, there followed a period in which the communes were in crisis, or actually ’dying’ (p. 187) but this picture of a strong decline of civic ideals may have been specific for late medieval Italy.
impose absolutist rule, was able to mobilise far greater resources than the (initially weak) coalition of cities. And yet the cities managed to win their independence (Parker, 1976; Tracy, 2008). In the process they formed a very complex state, which demonstrates both the strengths and the weaknesses of the urban model of citizenship. It was a complex, multi-layered coalition of (in theory) independent cities and rural regions, which proved durable (it lasted for more than 200 years) and was able to withstand strong external and internal (centrifugal) forces. But it had trouble incorporating new territory, and those new lands that were conquered (the Generaliteitslanden) were not treated on a par with the established regions (Christ, 1984) – exactly as Hume’s analysis predicted.

Perhaps there is a certain logic in the appearance of this complex state, based on a multi-layered coalition of quasi independent city-states. The territorial states were still growing in size and consolidating their territories and power; they were building administrations and introducing new systems of taxation, and were trying to create a sense of national identity that foreshadows the growing political unity of the eighteenth century. Individual city-states had great difficulty keeping up with their territorial neighbours. A stable coalition of city-states was – until the nation states would develop a concept of national citizenship – a possible strategy for survival. The essential issue of the political economy of the Dutch Republic is therefore how this polity was able to combine the advantages of small scale – i.e. an efficient contract between citizens and city-state – with the economies of large scale – i.e. the organization of a political entity of about 2 million people covering an area much larger than that of a single city-state. This boils down to two interrelated sets of questions:

• In what way was the contract of citizenship – which was based on the model of the (small) city-state – extended to the larger polity of the Republic? Did all citizens become citizens of the new nation, or did they remain first and foremost members of the urban political community? To what extent did the fragmentation of sovereignty create a space for the political participation of citizens, and how could the benefits of citizenship be harnessed into an efficient state organisation?
• How could this durable coalition between (in theory) independent cities function? How were the inherent free-rider problems resolved? How could the potentially negative impact of fragmented sovereignty on both the economy and the state itself be restricted?
In Holland the problems of cooperation within a durable coalition of more or less autonomous entities had been solved effectively. Already in the fifteenth and sixteenth centuries it had developed the institutions that balanced the particularistic tendencies of the cities against the unifying forces of central government. For the Dutch Republic, a league of seven provinces, it proved much more difficult to suppress the free rider problem. The coalition between the various provinces was less stable, in particular when outside pressures to close ranks disappeared, as happened after 1713, when the Dutch Republic became an increasingly marginal player in international politics (Aalbers, 1980). Free riding did much to undermine the long-run success of the Dutch state after 1713, eventually resulting in its demise in 1795. At the same time it was unable to overcome another limitation of the ‘civic’ model, as it proved impossible to incorporate new areas into a hierarchy like the feudal state. Because of their incapacity to expand territorially, city-states and leagues of city-states like the Dutch Republic were incapable of surviving in the highly competitive European state system.

Two elements of the explanation of the success of the Dutch Republic need to be highlighted here: its broad tax basis, i.e. the ‘willingness’ of its citizens to contribute to the public good, and the public goods that these citizens received in return, such as protection against invasion and protection of its commerce by the fleet.

*The Advantages of Citizenship: a Broad Tax Basis*

No doubt, the success of Dutch public finance in the seventeenth century was, first of all, the success of Holland. Figure 26 shows the spectacular rise of per capita taxation during the first stage of the existence of the

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8 A related discussion is about the question whether the Dutch Republic, as a result of its particular, decentralized, structure, failed to implement the economic policies that might have stopped economic decline after about 1670; unlike its great rivals France and the United Kingdom it did not develop a consistent set of mercantilistic policies to protect its economic interests against growing competition from abroad (see the recent discussion by Ormrod, 2003); the issue is however what the possibilities for protectionism were, given the structure of this small and open economy; all sectors – agriculture, fisheries, industry and commerce – were highly dependent on imports and exports; although in the eighteenth century a quite lively debate emerged about the advantages of protecting certain key industries, not much happened because the dominant elite favored free-trade and the gains of protection were relatively unclear given the structure of the economy (see De Vries and Van der Woude, 1997, p. 698 for an analysis and in fact an endorsement of this strategy).
Republic compared with the development of taxation in England and France. Perhaps per capita income in Holland was as much as 50% higher than in those other countries, but a large part of this gap is captured by the use of wages as denominator of the comparison.

In a recent analysis of the ‘financial revolution’ that helped financing the Revolt, Wantje Fritschy (2004) demonstrated that this success was related to two features. The first was the early centralization of taxation within the county of Holland, which established institutions of financial and political cooperation between the cities of Holland. Attempts to decentralize taxation – to allow each city to introduce its own taxes in order to pay for its share in the financing of the Revolt – were suppressed very early during the Revolt, and common taxes, on basic consumption goods, but also on different kinds of property and ‘capital’, were introduced and extended very rapidly. The introduction of a long series
of new taxes on consumption goods was the second important feature of the ‘financial revolution’ after 1572. The so-called ‘common means’, which were now introduced in towns and countryside alike – the tax ‘revolution’ of the 1540s had been limited to the cities – supplied by far the largest share of new income to the state. They also formed the basis for the gradual extension of the credit of the States of Holland. Total income of the States increased from less than 1 million guilders in the 1570s to about 10 million in the early 1620s and almost 18 million in the years before the Treaty of Munster (1648). Between 50 and 70 percent of these sums were ‘common means’; excises on bread, peat, meat and beer were by far the most significant, but few consumption goods escaped taxation as textiles, herrings, wine, candles, salt were also taxed (Fritschy, 2004). The results of this financial revolution are immediately obvious from Figure 26. Per capita tax pressure in Holland, expressed in the number of daily wages of an unskilled labourer, was much higher than in France and Britain. The rapid increase of tax revenue in Holland during the first phase of the Dutch Revolt (1570s–1610s) stands out especially in this comparison.

Does the sharp increase in taxation after 1572 also show that the burghers of Holland had a high tax morale, that they were willing, as ‘good citizens’, to pay their fair share of the tax burden? As much of these were levied as excises, people were left with little choice in the first place. Excises also helped to cover up the impact of taxation. In Holland, the burden of taxation also pressed relatively more on the urban than on the rural population. Thus the countryside, excluded from citizenship, also came off lightly in terms of taxation. Urbanites certainly did not boycott the many new taxes in ways similar to their resistance against the Spanish tax collectors before 1572. Although some tax riots did occur, they were remarkably rare. A survey of public disturbances in Holland uncovered a mere 24 tax riots between 1600 and 1795; of these 22 were of a purely local character (Dekker, 1982, p. 29). It is, obviously, very difficult to measure tax morale – even with contemporary data economists need advanced techniques to arrive at the conclusion that most citizens also nowadays are much more willing to pay their share in taxation than the ‘theory of deterrence’ predicts (Frey, 2002). Taxation in Holland seems to have been organized well and yields were high, which perhaps indicates that tax morale was good. But there is a prima facie argument against too optimistic an interpretation of tax morale in the seventeenth century: the taxation
system, with its emphasis on excises, was quite regressive, in particular until the 1670s.

Its skewed character is a common reproach against early modern tax systems, the British in particular. Tax systems before 1800 were dominated by taxes on basic consumption goods, which raised the cost of living of the labouring poor, whereas all kinds of property remained largely untaxed. Such a regressive tax system fits the general picture of a predatory state, which was not based on a ‘social contract’ between king and ruling elite of the one hand and the inhabitants on the other. O’Brien, for example, demonstrates that the share of indirect taxation in the income of the English state was often more than sixty per cent (O’Brien, 1988, p. 9). During the first stage of the Revolt this was also the usual share of the ‘common means’ in the total income of Holland. The similarity with the structure of taxation of the English state therefore does not support the view that the ruling elite of Holland was more willing to pay for the services of the state than elsewhere.

After about 1670 this began to change, however. The basic problem was that the possibilities for increasing indirect taxation had been all but exhausted. Therefore, taxation slowly shifted to taxes on luxury consumption goods and capital (including forced reductions of the interest paid on the public debt). After about 1670 this tendency resulted in an increasing share of progressive taxes. Whereas the taxes paid by the poorest 70% of the population increased by ‘only’ 20% between 1650 and 1750, taxes paid by the rich more than tripled (Vries and Van der Woude, 1997, p. 112). The second stage of the ‘tax revolution’ which is evident from Figure 26 – roughly a doubling of the fiscal revenue per capita between about 1670 and 1770 – was largely the result of the introduction and increase of taxes paid by the rich.

A progressive tax introduced already during the first phase of the Revolt was the tax on wealth, which had been used as an emergency tax in most cities of Holland, but was introduced for the whole province from 1599 onwards. It contributed modestly to the growth of tax income in the years of the Revolt – adding on average no more than about 1.2 million guilders – and was reformed, discontinued and reintroduced again often, mainly because of the high costs of collection (Fritschy, 2004). After 1672 the tax on wealth was followed by a number of attempts to introduce taxes on income, which, from 1715 onwards, also applied progressive taxation (Oldewelt, 1950). Other provinces – Zeeland, Utrecht, Overijssel – followed the Holland example at some later point in time (Dimksen, 1966).
The 1715 income tax was still very mildly progressive, ranging from 1% for incomes just above the 600 guilders threshold, to 2% for incomes higher than 2,000 guilders. A similar experiment in 1742 had a higher degree of progression – from 1% for 600 guilders via 1.6% for 2000 guilders to 2.5% for 10,000 guilders and more (Oldewelt, 1950). These rates show that the elites of Holland were willing to tax themselves, because without doubt they were among the ones who paid the highest rates. However, these experiments were unsuccessful in the long run, mainly because of the high costs of collection and of maintaining tax registers. Income taxes continued to be emergency taxes for difficult financial and political situations, not a durable basis for continued taxation.

Other provinces had more difficulty with the idea of progressive taxation. In Overijssel, a land province characterized by a very different socio-political structure (its countryside was dominated by large, noble landowners who owned much of the land) also introduced an income tax in 1750, but with a regressive rate of taxation: the poor, with incomes less than 200 guilders, paid about 3% of their income, the rich with 3000 guilders and more about 1.8% (Van Zanden, 2001b). Progressive income taxation seems to have been an urban idea, strongly disliked by the nobility of Overijssel.

After 1795 progressive income taxation was one of the priorities of the revolutionaries who, supported by the French, took over the Dutch state and introduced national citizenship. In neighbouring countries – France and Britain – the same years also saw a number of important experiments with progressive income taxation to finance large-scale warfare (Gross, 1993). This spread of progressive income taxation, in a way a new round in raising the stakes of taxation when earlier forms had been exhausted, may be interpreted as proof of a changing relationship between the nation state and citizens, which had been pioneered by Holland.

A perhaps even more convincing case for the special relationship between state and citizens in the Dutch Republic can be made on the basis of the development of the public debt. Initially the degree of trust in the continuity and viability of the polity that emerged during the Revolt was limited, and very high interest rates had to be paid to attract capital from the urban elite. Many of the early loans had an element of coercion, as they were ‘distributed’ among the urban collectors of the commons means (Fritschy, 2004). It took forty years – until 1611 – before the interest rate on renten had returned to its pre-1572 level, and
only after about 1648, when the Republic was at last secure, did interest rates on the public debt decline to a level below 5%, giving the Dutch Republic a clear advantage over neighbouring states (Ibidem, Table 3). In spite of relatively high interest rates on the public debt before the 1620s, the fact that Holland could borrow money on a large scale was nonetheless very important: the common means excises supplied large but relatively static amounts of money; other taxes, on ‘capital’ in general and on specific parts of the capital stock (land and houses), were more elastic sources of money in emergencies, but nothing could compare with the increasingly elastic supply of money on the rapidly expanding capital market. And the more Holland borrowed, the more it became a monopsonist who could set the interest rate.

Interest rates on public debt are used as proxies of the degree of trust people have in the government. North and Weingast (1989), and also Epstein (2000, pp. 18–25) have based their assessment of the efficiency of different governance structures on the level of the interest rate states had to pay on their public debt. Epstein in particular has shown that city states in the late Middle Ages and Early Modern Period could profit from much lower interest rates on their public debt than large territorial states, a gap that can be explained by the specific governance structures of these types of states. As we argued earlier in this chapter, the city-states had found an efficient solution for the agency problem of the state, whereas the territorial states had not been able to solve this dilemma. Epstein argues that the gap between city-states and territorial states declined during the early modern period, and both converged in the eighteenth century.

Data from the Dutch capital market in the eighteenth century tell, however, a somewhat different story. Amsterdam was the dominant international capital market at the time, supplying loans to all major states in Europe, and to many small ones as well. Typically, the interest on the public debt of Holland itself was 2.5% (and obligaties at 2.5% were traded at about par until 1780). Yields on the British public debt fell substantially between the 1690s, when they were 7 to 14%, via 5% in the 1710s to less than 3% from the 1730s onwards (Riley, 1980, p. 121). Annuity rates on Austrian debts varied between 3.5 and 5% in the 1760s and 1770s, when interest rates in Amsterdam were at their lowest (Riley, 1980, p. 129). In the same years the Danish crown raised loans for 4 to 5%, the Swedish and the Russian crowns for 5%, while Spain paid 6%, and the estimated interest rate on the French loans (which
were mainly life annuities) was between 6 and 6.5% (Riley, 1980, pp. 111, 139, 165). Therefore, at the end of the early modern period, during the 1760s and 1770s, a still considerable spread existed between the interest rates on loans to ‘republics’ and to those of ‘monarchies’. It is consistent with this pattern that the United States were also able to acquire an image of creditworthiness very rapidly, as a result of which interest rates on public loans fell from more than 10% to about 4% in the early 1790s (Riley, 1980, p. 191).

Hoffman and Norberg also noticed a comparable ‘risk premium’ of about 2 percentage points between the king of France, who suffered from the consequences of an established tradition of ‘suspending’ payments of interest on the public debt, and the English crown during the eighteenth century: ‘this was a sizeable premium, and the French king paid even more for his riskier loans’, they concluded (Hoffman and Norberg, 1994, p. 308). The evidence from the Dutch capital market thus suggests a still considerable difference of about 50% between the interest rates on the public debt of the two state systems.

The reasons for this gap were obvious to Dutch investors: they distrusted monarchs whose actions were not bound by representative institutions. The Leiden millionaire Pieter de la Court van der Voort, for example, recommended buying English stock, as it was guaranteed by Parliament. He was, however, extremely suspicious of the other monarchies. High interest rates would only fool the ignorant, he claimed, but served as a warning for those in the know, as they were only offered by swindlers. One should be especially careful with those who invoked the bible to prove their reliability, or when dealing with monarchs: ‘Those who trust the signed promises of sovereigns find themselves easily betrayed’, De la Court told his wife and heirs (Prak, 1985, p. 137).

It seems that until the end of the seventeenth century the interest rates charged to ‘republics’ was substantially lower than what ‘monarchies’ had to pay. Insofar as that gap narrowed during the eighteenth century, and that happened only to a limited extent, this might be explained by developments on the capital market itself, rather than a greater efficiency of the monarchies, learning to play the game of international finance without necessarily becoming more efficient in their internal organization. The data on the development of interest rates on the public debt therefore do not offer conclusive evidence that the monarchies’ agency problems were resolved. On the European capital
markets ‘republics’ and the monarchy that had adopted a ‘republican’ constitution after 1688, i.e. England, still held significant advantages over the other monarchies.

Public Goods: What Did the State Do?

Because it was born during the Revolt against Spain – or rather, a Civil War between those who remained loyal to the Spanish crown and those who opposed Philip II – defence against the enemy was without doubt the first and foremost public good that was supplied by the Dutch state. Much like other early modern states, war expenditure dominated the budget of the Dutch Republic: it accounted for 90% of expenditure in 1641 (’t Hart, 1993, p. 62). In the course of the seventeenth century expenditure on the public debt became almost as important, but the public debt was initially mainly an instrument to smoothen expenditure on warfare.

Expenditures on war are by their nature ‘destructive’ and perhaps therefore often considered to be ‘irrational’ items of expenditure. But from the perspective of the Dutch Republic – a rather small state trying to survive in a Hobbesian struggle for survival of the ‘fittest’ – war and defence were the public goods that were demanded by the citizens themselves. A primary aim of Dutch foreign policy was to pacify the crucial sea route with the Baltic, the source of a large part of the grains consumed within the Dutch Republic. Already in the sixteenth century Holland had aimed at imposing a kind of Pax Hollandica there; because of the strategic importance of the Sound, the closure of this waterway by the Danish King was a casus belli. This part of Holland’s foreign policy had during the sixteenth century led to tensions within the Habsburg Empire, as Charles V had at times other strategic considerations for supporting the Danish King. But after the Peace of Spiers (1544) the dominance of Dutch interests in this field was accepted by all parties involved, and the Sound (and more generally the route to the Baltic) became a relatively safe waterway for Dutch trade. The protection costs of this route were now being paid for by Holland (and the other provinces), and skippers and merchants could focus on how to transport and trade their commodities as efficiently as possible. This made it possible to develop very efficient ships – the famous flûtes or flyboats – characterized by the absence of means of defence (cannons in particular) and a very high ratio between carrying capacity and the manpower required to sail it. These efficient ships, developed in the ‘niche’ of the
well protected Baltic route, were very important in the following phase of commercial expansion, in which the Dutch conquered many other routes (Unger, 1978; Van Tielhof and Van Zanden, 2008).

For Holland in the sixteenth century, the protection of its merchant ships on the Baltic route was a key public good, not only for the commercial interests that were involved, but also because the food supply of the province was depending on it. The Dutch Republic that was created after 1572 had very similar aims. The Union of Utrecht of 1579 was first and foremost a military alliance, uniting the rebel provinces against Habsburg Spain. War, and the preparation for war, was to remain the most important task by far of the States General of the Republic. First and foremost it fought against what it considered to be foreign invasion of its territory by Spanish forces and more incidentally after 1648, the armies of other countries, such as France or the bishop of Munster. After 1580, when Portugal became part of the Spanish crown and the Low Countries were cut off from the supply of colonial products from Lisbon, the war was fought on an almost global scale. The best example of this is the Dutch East India Company (VOC), set up in 1602 to develop the direct trade with the Indies and at the same time to do as much harm to the Spanish Empire as was possible. The West Indies Company set up in 1621 had a similar double goal: to make a profit and to harm the enemy. But also in ‘normal’ operations by the fleet and the army, strategic commercial interests loomed very large; perhaps the most famous battle in the Eighty Years war, the battle at Nieuwpoort in 1600, had as its aim the rooting out of the pirates of Dunkirk.

The state that emerged in the course of the long conflict with Spain can therefore be described as mercantilistic to the extent that it used its power to secure the interests of the commercial elite. The explicit aim of much of the warfare that was going on was to serve the interests of the commercial elite, which were considered to be identical to the interests of the state itself. The wars fought with Britain – the first one (in 1652–54) begun after the issuing of the Navigation Acts by Cromwell in 1651 – were most clearly ‘mercantilistic’ wars about the mastery of the sea and the commercial empires that were controlled via sea routes.9

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9 There is a tradition of seeing the Dutch Republic as a non-mercantilistic state, because it did not protect its industry and was not concerned with its balance of payments or the outflow of bullion, but this is based, in my opinion, on too narrow an interpretation of the concept (cf. Ormrod, 2003).
The ‘central’ state, i.e. the States General, almost exclusively concentrated on warfare and the servicing of the public debt, and the funding of a very modest bureaucracy underpinning this. The supply of other public goods was decentralized, and carried out by the cities or by private institutions within them. The public expenditures of a typical town, Zwolle, in the eighteenth century, shows how it provided a wide range of services to its inhabitants. These included defence and security, maintenance of infrastructure, health care and education, as well as information about time (it maintained public clocks). Expenditure on education was minimal, however, which points to a problem with the town’s accounts: many public services were not undertaken directly by the council, but outsourced to other institutions, with their own income streams. In all fields of social welfare, private institutions (privately funded schools, poor relief, care for widows and orphans etc.) played a large role; the city government only stepped in if and when private initiative failed. Citizenship however also meant the obligation to support such private institutions as were considered necessary for the welfare of the city. Members of the town council also served on the boards of charities (McCants, 1997); Dutch citizens proudly had their portraits painted in their much respected role as governor or governess of such institutions, portraits that were displayed in public places to underline the public-mindedness of the elite.

Citizenship and the Pre-history of the English Revolution of 1640–1688

Why did England, which had such a different starting point from the Low Countries, converge to a similar ‘political economy’ in which the executive was constrained in its actions by a strong Parliament, in which citizenship became increasingly important, and in which the state became an instrument in the hands of an urban elite to further its commercial and imperialistic objectives? Why did England not take the course that was the logical continuation of its trajectory of being a centralized state dominated by a landed elite, in which – as in the rest of Europe – the power of the King acquired ‘absolutist’ proportions? What explains, put differently, that the resistance against the rise of absolutism became so strong and effective in England?

We have interpreted the Dutch Revolt as arising from resistance against the growing absolutism of the large territorial states – in this
particular case Habsburg Spain – which sought to overrule the ‘privileges’ of the city-states that formed the core of the Dutch political system. There was also a strong religious element in the conflict, but this was related to politics. Cities resisted Philip II because he did not allow them to carry out a policy of religious tolerance, a rational policy from the perspective of a regional trading community that had to do business with Lutherans from Germany and Scandinavia or Anglicans from England. The other way around, the religious conflict also had an important governance dimension: who was to rule the church and to define the norms of religious and moral behaviour: a centralized hierarchy located in Rome, or churches which, as the Calvinists and Mennonites, governed by the members themselves, following the model of the universitas developed during the twelfth century? The Reformation had a truly ‘democratic’ dimension, and the various branches of Protestantism had strong grass roots support among the (lower) middle classes (and the poor) – among craftsmen, fishermen, labourers.10

It is obvious that there are clear parallels with the political and religious struggles occurring in England in the seventeenth century, where we see a similar mix of contentious issues: concerning the governance of the Anglican Church, the toleration of minority religions, the role of the Parliament and the rising tide of Absolutism, the latter in the form of the newly defined ambitions of the Stuart kings, who modelled themselves after Continental examples. There too, the ‘left wing’ of the opposition had its social roots in the lower middle class of craftsmen and journeymen. There as well, a medieval institution – Parliament – was the central instrument of organization against the royal offensive, much as the Estates in Holland during the Dutch Revolt. And there as well, the merchants were divided against each other, the wealthy and privileged London merchants often supporting the royal cause, as Amsterdam had done during the Dutch Revolt because it profited more than any other city in the northern Netherlands from the economic expansion under the Habsburgs, whereas the lesser merchants, who did

10 The irony of history is that Protestantism – at least its more radical versions – wanted to govern the church following the model of the universitas – the independent corporate body – that had been developed during the High Middle Ages which was amongst other causes a result of the Papal Revolution of that period (see Chapter 2); the Catholic Church was unable to cope with such a change, however, resisted it strongly and in its opposition to this change strengthened the hierarchical elements of its governance structure.
not profit from royal patronage, often strongly supported Parliament (Brenner, 1993).

It is perhaps not a surprise that this clash between ‘top down’ and ‘bottom up’ institutions occurred in the Low Countries, with its very strong traditions of civic liberties and urban privileges. In England the position of the cities was traditionally much less strong, but this changed to some extent during the sixteenth and early seventeenth centuries. Whereas on the Continent civic liberties were increasingly being suppressed, England witnessed the growth and consolidation of a strong ‘corporate system’ between circa 1540 and 1640 (Withington, 2005). The number of incorporated towns increased from a mere 38 in 1500 to 181 in 1640. This reflected the growth of market towns in the period, but more importantly, a renewed conceptualization of the relationship between those towns and the commonweal in terms of civic duties and privileges. As in the Low Countries, the craft and apprenticeship system played a large role at the grassroots level. Withington (2005, pp. 29–30) demonstrates how in particular the apprenticeship system was growing perhaps even more rapidly than the cities themselves. What strongly expanded in the 1540–1640 period was a class of ‘citizens, freemen and burgesses’ who were capable of running the affairs of their town, who defined their rights and duties in terms very similar to our analysis of Dutch citizenship, and who were increasingly interested in the management of the English commonweal.

The link between these trends at the local level and ‘high politics’ was Parliament, to which increasing numbers of representatives of incorporated towns (boroughs) were send; their number increased from 74 in 1584 to 128 in 1641, when 52% of the MPs were representative of the corporate system. Moreover, ‘borough representatives were most likely to be parliamentarian or split between parliament and king’ (Withington, 2005, p. 41). The resistance against the king was therefore largely the result of the strong position the corporate system had in the 1641 Parliament (which initiated the changes leading to the Civil War).11

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11 Withington (2005, p. 44) adds ‘This is not meant to imply that...city commonwealths somehow ‘caused’ the civil war. It is to argue that freemen, burgesses, and citizens were very much present and participatory in the political culture that spawned England’s troubles.’
Withington’s book helps to solve the paradox that the Civil War and the Glorious Revolution (which in a way concluded the ‘revolutionary’ seventeenth century) occurred in England, where initially the socio-political infrastructure for such a major conflict was weak. Commercial impulses (the growth of market towns) and the rise of a middle class of merchants and craftsmen help explain why a corporate system came into place in the sixteenth and early seventeenth century.

Stone has in a seminal paper on ‘Literacy and Education in England’ suggested that there also might be a link between the rise of literacy in the period 1530–1640 and the revolutionary conflicts of the 17th century: ‘Moreover there seems to be a direct connection between the evolution of mass literacy and the emancipation of the lower classes from intellectual dependence upon their superiors. It was the first stage of the growth of literacy which provided a market for the pamphleteering literature of the mid-seventeenth century, and which, by subjecting a mass audience to the Bible and the Psalter, created the intense religious zeal without which there would have been no revolution at all, in the sense of a radical challenge to old institutions and values. If our figures are correct, they suggest that the three great modernizing revolutions of the West, English, French and Russian, have taken place at a time when the rate of male literacy has been between one third and two third, not less, not more’ (Stone, 1969, pp. 137–138). Another example he could have added is the Dutch Revolt, which also happened when literacy was growing rapidly from about one third to fifty percent of the male population (Figure 23). Stone’s point, that the English Revolution – and by implication, the changes in the institutions brought about by the political upheaval of the 1640–1688 period – was driven by the growing literacy of the population, is an important one. Recent (theoretical) literature makes the same point about the positive feedbacks between human capital formation and institutional changes (Glaeser et al., 2004).

The growth of literacy, the development of market towns and of the ‘corporate system’ created the basis, we want to suggest, for the convergence of England’s political economy towards the Dutch model. Significantly, during the conflict, a new model of citizenship emerged in England, which was no longer based on the relationship between a burgher and his local government, but, much more than in the Dutch Republic, the nation state became the ‘other party’ in the contract. This anticipated developments that would, in the rest of Western Europe,
only take root in the period after 1789, when all over Europe citizenship would be redefined on this national scale (Prak, 1997).

Conclusion

In their seminal paper on ‘The Rise of Europe: Atlantic Trade, Institutional Change and Economic Growth’ Acemoglu, Johnson and Robinson (2002, 2005) argued that the ‘Little Divergence’ was based on the rapid commercial expansion of Great Britain and the Netherlands, and that commercial growth also induced major institutional changes among the Atlantic nations, by strong new merchant groups who supported institutions that constrained the opportunistic behaviour of monarchs. The mechanisms underlying these changes, and the interaction between institutions and socio-economic change, have been analysed in more detail in this chapter. The central argument of this chapter is that citizenship played a key role in these changes. Citizenship is a set of rules guiding the behaviour of citizens and ‘their’ state, which in theory solves the two coordination and commitment problems of the state; the problem that a strong state can turn against its citizens and the problem of free riding by individual citizens. The rules of citizenship can result in a relatively efficient exchange between the state, as supplier of collective goods, and its citizens, as consumers of these goods and tax payers. This model, pioneered by the city-states of Ancient Greece, re-emerged in Western Europe during the Middle Ages with the rise of the communes (after c. 1050), and was, in Continental Europe and the US, redefined on a national scale again from the 1770s and 1780s onwards, to become a core institution in nineteenth-century nation states.

The concept as it was used in the early modern Netherlands enhanced the efficiency of the exchange between state and inhabitants; we therefore disagree with the assessment by Greif of the Dutch Republic that it was ‘ill-suited to mobilizing resources to wage effective wars elsewhere’ (Greif, 2005, p. 773). Had this been the case, the Dutch Republic would have never survived the war with the much bigger Spanish empire, nor would it have been able to last so long amidst fierce international competition. On the contrary, on a per capita basis the Dutch Republic, and in particular Holland, was able to mobilize many resources than the territorial states surrounding it, as Figure 26 demonstrates. But it was relatively small, indeed, and a state rooted in citizenship had a number
of disadvantages. It was based on the definition of a group of privileged citizens – only during the nineteenth and twentieth century was this extended to the whole population of the nation state. Those who did not belong to this group were partially excluded from the privileges enjoyed by the citizens. Given this particularistic definition of its socio-political structure, it proved difficult to integrate other groups – or regions – into the same polity. As a result it could not profit from the same economies of scale as the territorial states of early modern Europe. Therefore, the city-states that had developed this model were forced on the defensive by the growing power of large territorial states.

The Dutch Republic was to some extent the ‘accidental’ result of this contest between two different governance structures, between territorial states and city-states. It was a multi-layered coalition between (in theory) independent cities who were part of sovereign provinces, initially held together by the common war against the Spanish forces. We have analysed which free rider problems arose as a result of this complex structure of coalitions. Within Holland these problems could be effectively suppressed by relatively strong institutions at the level of the province and a long tradition of cooperation between the cities themselves and between the cities and the central authorities in The Hague. The collaboration between the provinces was much more problematic, however, and free rider problems in the long run undermined the vitality of the Dutch Republic. The revolutionaries of the 1790s introduced a strong centralized state to overcome these problems (Van Zanden and Van Riel, 2004, pp. 32–51).

The ‘output’ of this polity – like that of earlier city states in Medieval Europe – was highly geared towards the needs and interests of the merchant elite of citizens that dominated the state. The fiscal-military state that emerged after the Dutch Revolt was a powerful tool in the hands of this elite to enhance it interests, e.g. by protecting its fleets and safeguarding major trading routes. The dynamic expansion of the economy of Northern Netherlands in this period was therefore also linked to the creation of this mercantilistic state. Copying the Dutch example was one of the main driving forces behind the Civil War that erupted on the other side of the North Sea. The English civil war saw the emergence of an even more powerful fiscal-military state that would within a few decades surpass the Dutch in military and commercial success (O’Brien, 2001). Moreover, in the seventeenth century England was able to develop a concept of citizenship that gradually superseded the limitations of the particularistic ‘urban’ model; it was to a large
extent based on its rapid commercial expansion during the sixteenth and seventeenth centuries. From the mid seventeenth century onwards England became an equally mercantilistic power, converging in this respect to the Dutch model.

The approach developed here also helps clarify a number of specific issues. It offers an explanation for the paradox that inhabitants of states with ‘representative governments’ were on the one hand paying more taxes (Hoffman and Norberg, 1994), whereas they at the same time seem to have been more successful economically (according to De Long and Shleifer, 1993). It also helps explain that during the nineteenth and twentieth centuries democratization – based on a nation-wide redefinition of citizenship, which have their origins in the Dutch Republic and in particular the English Civil War – resulted in a strong increase in government spending and taxation. It shows that citizenship was and is a set of rules that dramatically lowered the transaction costs of the highly complex exchange between a state and its inhabitants.
CHAPTER EIGHT

THE EMERGENCE OF MODERN ECONOMIC GROWTH IN THE NORTH SEA REGION

Introduction

Exactly when ‘modern economic growth’ began in Western Europe is still an unresolved issue. Usually this development is thought to be closely related to the Industrial Revolution in the second half of the eighteenth century, but research on the long-term development of the English economy suggests that real income levels were increasing, albeit slowly, as early as the first half of the eighteenth century. Research by Crafts and Harley in the 1970s and 1980s was unable to detect any acceleration in growth rates during the eighteenth century itself, when income per capita increased on average by about .3% per year. While output growth was probably somewhat faster after 1780, population growth accelerated at the same time, leaving per capita growth at about the same level as it had been during the first half of the eighteenth century (Crafts, 1985, p. 45; Crafts and Harley, 1992). Moreover, the starting point of much of this research is the well known ‘political arithmetic’ by Gregory King, which shows an economic development with a high level of structural transformation (46% of GDP is earned outside agriculture), indicating that even before the 1690s growth may have been substantial. So when did it begin – and why? Or are we, perhaps, looking in the wrong place and should we investigate the Dutch Republic instead; was it indeed the ‘first modern economy’, as De Vries and Van der Woude (1997) have argued, producing a wave of modern economic growth from the 1580s to the 1670s?

This question is also relevant for placing the Western European experience in a global perspective. Pomeranz (2000), for example, has claimed that the post-1750 economic growth in England was the result of a number of fortuitous factors and developments, linked to the fact that England had access to cheap coal and a large overseas empire. From

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1 Here we use Simon Kuznets’ (1966) definition of modern economic growth as the ‘sustained increase in income per capita’.
the latter it could draw foodstuffs and the raw materials to break through Malthusian constraints. This hypothesis too is linked to the genesis of the process of modern economic growth; Pomeranz’s claim rests on the idea that growth began after 1750, which may not be correct.

The first focus of this chapter will be to reconstruct the development of GDP per capita in the long term, on the basis of several benchmark estimates mainly derived from work by other authors. This will be combined with a simulation procedure to estimate the annual development of GDP per capita, based on a Cobb Douglas production function. Next, the results presented in the first part of this chapter will be related to what we learned from previous chapters about the development of institutions and human capital in the different parts of Western Europe from 1500 to 1800.

**The Debate: Economic Growth or Stagnation before the Nineteenth Century**

The debate about the pace of economic growth in the early modern period emerged in the 1990s. It began with several papers by Graeme Snooks (1990; 1994; 1995) about the long-term evolution of the English economy, in which he argued that GDP per capita had increased almost eightfold from the writing of the Domesday Book in 1086 to 1800. In fact, in his view, growth before the Industrial Revolution had been almost as rapid as after 1780. A series of papers dealing with the same issue for several other European countries followed the publication of Snooks’ thesis. These papers were brought together by Angus Maddison and Herman van der Wee at the Xth World Economic History Congress in Milan in 1994. Their conclusions were generally much more conservative: growth from 1500 to 1800 was substantially slower than after 1800 (Blomme and Van der Wee, 1994; Malanima, 1994; Yun, 1994; Van Zanden, 1993). Apart from one or two growth spurts (e.g. during Dutch Golden Age), this survey found that per capita growth had been slow (in Belgium) or non-existent (in Italy and Spain). In an attempt to synthesize these results, I concluded that on average GDP per capita in Western Europe may at best have increased by about 20% to 30% from 1500 to 1820; because labour input per capita probably increased substantially, labour productivity may have remained unchanged (Van Zanden, 2001a).

These somewhat pessimistic conclusions contrast with the picture that can be derived from the recent synthesis of a thousand years of
economic growth in the world economy by Angus Maddison (2001). In *The World Economy, A Millennial Perspective* he presented estimates of economic growth in Europe from 1000 to 1820 (and beyond). According to Maddison, GDP per capita in Western Europe tripled from 1000 to 1820, the result of a near doubling of income levels from 1000 to 1500, followed by another 56% increase in the three centuries before the Industrial Revolution. Giovanni Federico (2002), in a detailed review of Maddison’s (2001) book, pointed out a number of problems in these estimates. They result, Federico argued, in medieval levels of GDP per capita that are unrealistically low (only just above subsistence levels). Growth rates from 1500 to 1800, moreover, seem to be inconsistent with independent estimates of the growth in agricultural labour productivity.

This chapter presents an update on the research carried out recently, focusing mainly on the countries bordering the North Sea: England and Holland. We also briefly discuss new research on several other countries: Sweden, Spain, and Italy, after which we test the results of these national studies by experimenting with a Cobb Douglas production function. We try to establish whether the available estimates for the development of population, real wages, and real rents can be made consistent with the benchmark estimates of the development of GDP per capita in the centuries before 1800. Thus, assuming a Cobb Douglas world (with constant returns to scale and an elasticity in substitution of 1), are the estimates of GDP per capita consistent with what we know about the development of factor prices, population levels, and labour input per capita? This means experimenting with the different variables that enter into the production function, with the share of GDP that is invested (which determines the long-term growth of the capital stock), with the number of days worked per year, with the absence or presence of technological progress, and others. This should produce new insights into the long-term development of the European economy in the period before the Industrial Revolution, and also will help to distinguish my own estimates (see Van Zanden, 2001a) from those published by Maddison (2001; 2003).

**England 1086–1688**

Modern research on economic growth before and during the Industrial Revolution began with the seminal study by Deane and Cole (1962), who produced estimates of the economic growth of Great Britain in
the eighteenth century. Their work was extended and refined by Crafts (1985) and Harley (1993), which resulted in a set of estimates on the development of GDP starting in 1688 that have been widely accepted (Crafts and Harley, 1992). Snooks (1990; 1994; 1995), more recently pioneered estimating national income before 1688 in his work on the 1086 Domesday Book. He ingeniously filled out the data on ‘demesne income’ from this venerable source with estimates of income outside the demesne sector, such as income generated by towns. The results are fairly conservative figures. It is assumed, for example, that the consumption of farmers was at subsistence level. Snooks then combined his estimates of total income and income per head in 1086 with Craft’s revision of Deane and Cole’s estimates for 1688 and onwards, including several (unspecified) estimates for the intervening period. The result is a set of estimates of economic growth from 1086 to 1688 that are astonishingly high; the average annual growth rate of GDP per capita is as high as 0.29%, which, over a period of 600 years, leads to a quadrupling of real income per head. In some of the component periods (especially in the first half of the sixteenth century), he even finds annual growth rates of 1.5% and more. These results mean that growth from 1086 to 1688 would not have been much lower than in the eighteenth century, when it was 0.31% per capita per year (from 1688 to 1760). The pace of growth in the first half of the sixteenth century would only just be matched in the period from 1830 to 1870.

Snooks’ optimistic results met with much criticism. Many researchers found fault with his 1086 level, which seems substantially underestimated, and with the fact that he does not clearly explain how he apportioned the overall growth from 1086 to 1688 to the various centuries. Nor is it clear how he solved the problem of price fluctuations from 1086 to 1688. His estimates have been revised and improved by several authors, most notably Nicholas Mayhew (1995) and Bruce Campbell (2000, pp. 406–10). The latter carefully compared Snooks’ figures with his own much more detailed estimates for the output of arable farming (about which more below), and showed that in view of what we know about the subsistence needs of the population, Snooks’ estimates are untenable, as he systematically underestimates ‘the cost of peasant subsistence’ and fails ‘to allow for the production of a disposable surplus for the unfree’. For 1086, Campbell agrees with the much higher estimates produced by Mayhew (1995), who corrected for some of the problems in Snooks’ work.

In another recent study, Campbell (2007) produced detailed estimates of national income in the 1290s, which can be compared with Gregory
King’s very similar estimates, as corrected by Lindert and Williamson (1982) (Table 9). These estimates show a per household increase of real income of 110% from 1290 to 1688; because the average size of households also declined, per capita income grew by about 150%. This can be compared with the relatively small increase in income per head from 1086 to 1300 (or the 1290s), which Campbell estimates at 10%. Because population growth was strong before the 1290s, total GDP must have increased by 130–150% from 1086 to 1300 (Campbell, 2000, p. 409).

<table>
<thead>
<tr>
<th>Share of households</th>
<th>Share of households</th>
<th>Share of income</th>
<th>Share of income</th>
<th>Real increase income per household 1290–1688</th>
</tr>
</thead>
<tbody>
<tr>
<td>1290s</td>
<td>1688</td>
<td>1290s</td>
<td>1688</td>
<td></td>
</tr>
<tr>
<td>Landowners, aristocracy, gentry, high clergy</td>
<td>2.3</td>
<td>2.9</td>
<td>15.8</td>
<td>22.0</td>
</tr>
<tr>
<td>Tenants, smallholders</td>
<td>41.8</td>
<td>16.4</td>
<td>43.6</td>
<td>22.4</td>
</tr>
<tr>
<td>Cottagers, (rural) labourers, vagrants</td>
<td>36.2</td>
<td>37.9</td>
<td>19.4</td>
<td>9.1</td>
</tr>
<tr>
<td>Non-agrarian sector (commerce, professionals, craftsmen etc.)</td>
<td>19.8</td>
<td>42.8</td>
<td>21.2</td>
<td>46.4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Total population (millions)</td>
<td>4.32</td>
<td>4.9*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total GDP (current prices, million pounds)</td>
<td></td>
<td>3.67</td>
<td>54.44**</td>
<td></td>
</tr>
</tbody>
</table>

* according to Lindert and Williamson (1982); more recent estimates are generally slightly higher, up to 5.06 million.

** Lindert and Williamson (1982); Maddison (2004) gives 54.04 million

Sources: Campbell (2007) and Lindert and Williamson (1982)²

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² Assumptions: price level increased by a factor of 5 from the 1290s to 1688 (according to Campbell); it is also assumed that one-third of labourers in 1688 are non-agricultural, the rest are agricultural.
The comparison shows a distinct polarization of the rural income distribution: the ‘middle classes’ of tenants and smallholders that still dominated the agricultural sector in the 1290s, were greatly reduced in relative and absolute terms, whereas the landowners’ share of income increased substantially, from less than 16% to 22% of GDP, or from about 20% of value added in agriculture to about 50%. Moreover, the real income of agricultural labourers (and cottagers) declined, in spite of the more than doubling of GDP per capita. Finally, the share of non-agricultural activities in GDP more than doubled in these 400 years; employment in the non-agrarian sector increased from less than 20% in the 1290s to 43% in 1688, and the share of income increased in a similar way. These figures may still underestimate the growth of the secondary and tertiary activities, however; because proto-industrial activities emerged in the countryside, the portion of non-agricultural sources of income for tenants, smallholders, cottagers, and rural labourers must have also increased. Crafts estimated that the share of agriculture in GDP in 1700 was as low as 37% (declining to 26% in 1800 (Crafts, 1985, pp. 16–7)), whereas in the 1290s this must have been more than 70%.

Perhaps the comparison between the estimates for the 1290s and the detailed reconstruction of the social tables of 1688 is somewhat biased, however. The estimates produced by Mayhew and Campbell are still fairly rough, and have not been compared with other data on the socio-economic composition of the population. The main contribution by Lindert and Williamson (1982) was to correct the estimates by Gregory King, which resulted in a strong increase in estimated total income by 25.1%. This is an example of what may be called the ‘first law of historical national accounting’: the more we know about pre-modern societies, and the more detailed our estimates of historical national accounts are, the higher income per capita appears to have been. In other words, major revisions of historical national accounts almost always lead to a strong upward correction in the level of per capita income, as we see from the revisions of Snooks by Mayhew and Campbell, or the work by Lindert and Williamson revising Gregory King.3 The comparison of a ‘first generation’ estimate for the 1290s

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3 This is in fact still true: even most recent revisions of national accounts result in upward adjustments of levels of GDP, which may be as high as 10% or more; in these cases the reason for this is also that more detailed information and improved estimation methods almost always lead to upward adjustments.
with a very detailed and corrected ‘second generation’ estimate for 1688 may therefore lead to an overestimate of the growth rate between these two dates. But that it was a period of dramatic change in the English economy, accompanied by a substantial increase in income per head, is quite clear from Table 9. In Appendix 1 it is explained how growth from 1290 to 1688 was apportioned among the various centuries, a subject to which we will later return.

European Growth from 1000 to 1800

In 2001 I published a compilation of estimates of GDP per capita for six European countries – Great Britain, the Netherlands, Italy, Spain, Belgium, and Poland – taken from case studies by various authors. This survey concluded that there was no growth in most of the countries, and that it was fairly slow in the others in the three centuries before 1800. Moreover, whatever growth did occur was limited to specific regions and eras; that is, growth was limited in time as well as space (Van Zanden, 2001a). The new research carried out since 2001 tends to confirm this conclusion:

- Olle Krantz developed a detailed reconstruction of Swedish national income in 1571, concluding that “despite the margins of uncertainty, it could be inferred that GDP per capita was about the same in the sixteenth century as around 1800. Thus, Sweden, like other peripheral countries was characterised by stagnation during the period between the sixteenth and the nineteenth centuries.” (Krantz, 2004).
- Paolo Malanima (2003) produced more detailed estimates for Italian GDP in the very long run (from 1300 to 1861), which confirm the trend of a gradually declining income level between the high Middle Ages and the early nineteenth century.

Another argument is that the 1688 revisions are so good that the resulting estimates may lead to the conclusion that there was no growth during the 1700–1830 period; this is the result of a study by Lawrence Officer on the same issue available via eh.net; see http://www.eh.net/hmit/ukgdp/ukgdpstudy.pdf.

Also, income per household increased much less than income per capita, because household size was falling from 4.4 in the 1290s to 3.5 in 1688; but Lindert and Williamson (1982) may have somewhat underestimated the English population in 1688, which may also lead to slightly lower per capita GDP for 1688.
Albert Carreras (2003) reviewed estimates of Spanish GDP in the early modern period, adding to the estimates previously published by Yun (1995) his own estimates for the beginning of the sixteenth century, and confirming the picture of long-term stagnation in the Spanish economy.\(^5\)

Finally, I published detailed estimates of the structure and level of GDP in Holland for the years 1510–14 (Van Zanden, 2002b), which can also be compared to estimates for the early nineteenth century. Not unexpectedly, Holland turns out to be exceptional: during these three hundred years: GDP per capita increased by about 50%, almost all of which was concentrated in the period from the 1570s to the 1650s; in fact, from 1650 to 1807–08, levels of real income slowly declined again; see also De Vries (1984b), Van Zanden (1987; 1992).

Table 10 shows the results for the seven countries for which point estimates based on a detailed reconstruction of GDP are now available. The relative levels of GDP per capita in 1820 taken from Maddison (2001) are used to render comparable these attempts to quantify economic growth before 1800.

The results of this comparison can be briefly summarized. The ‘Little Divergence’ already discussed in Chapter 4 is clearly evident in these estimates. Long-term stagnation is revealed on the periphery; i.e. in Italy, Spain, and Poland. From 1500 to 1750 GDP per capita in these countries first dropped before a limited recovery set in (at least in Spain and Poland). Only in Spain may GDP per capita have been somewhat higher in 1820 than in 1570, but even more recent estimates by Nogal and Prados de la Escosura (2007) are more pessimistic. Compared to the stagnation of Southern and Eastern Europe, the countries bordering on the North Sea show gradual (Belgium) or even rapid (England) growth during the early modern period. These estimates reveal a doubling of GDP per capita in England from 1600 to 1820; the estimates for Holland imply a much more modest rise of only about 50% for the same period, and the increase in Belgium was probably even smaller.

The margins of error in these estimates increase for earlier periods. The ranking for the sixteenth century – Italy being the richest country,
followed by the Low Countries – is plausible. Only English income levels are lower than expected, at least from an international perspective. The minimum level of GDP per capita is found in Poland in the eighteenth century and in England in 1300, and was probably about 30% of the base year (Great Britain in 1820).

The general picture that emerges from these data can be viewed in two ways. It is clear that over the long term population growth was more than compensated for by the increase in production, whereby in Europe production per capita from 1500 to 1820 increased by less than 10%. At the same time, population in these six countries increased by 91% from 1500 to 1800. The Malthusian pessimists, who saw a growing tension between population and resources, were mistaken if these data are correct: the growth in population was clearly matched by a somewhat larger increase in output. But likewise, the hopes of the optimists are only met in patches: economic growth, in the sense of growth in per capita production, is exceptional, certainly before 1700. Even in dynamic Holland there was only one ‘growth spurt’ in a period of 300 years. And then, growth in Holland was partly achieved at the expense of Flanders, whose economy declined at the same time, when the centre of economic gravity in the Low Countries shifted from Antwerp to Amsterdam. On balance, growth is very modest indeed.
in these six countries, taken together; the weighted average GDP per capita increased by less than 10% over 300 years, and this growth was mainly due to the inclusion of the most dynamic parts of Western Europe (England and Holland) in our sample.

Moreover, differences in the level of economic activity within Europe were small. The gap between the richest regions (Flanders and northern Italy) and the poorest (Poland) in 1570 was at most 30% of the level of the richest. Differences increased sharply during the seventeenth century as a result of the rise of Holland and the decline of Poland and Spain, but this was partially compensated for by the rise of England and the decline of northern Italy and Flanders with respect to the European average. In the second half of the eighteenth century, international disparities seem to be slightly less, due to the increase in GDP in Poland and Spain, and to stagnation in Holland. In 1820 the spread around the mean was even smaller than in 1700 or 1750, although at that time England was increasingly ahead of the continental countries.

Growth from 1500 to 1800 was relatively slow, except for the countries bordering the North Sea, but this may not have been true for the five centuries before 1500. It is plausible that English GDP per capita increased by as much as 50% during the ‘crisis’ of the late Middle Ages (see Table 10), after a more modest increase of 10% per capita from 1086 to 1300. In Chapter 2 we saw that Western Europe went through a spectacular boom from 950 to 1300; the question raised here is what this meant for GDP per capita in this period.

There are various ways to address this issue. One is to determine how typical medieval England was, assuming that the 1086 estimates for England are more or less correct; for example, are there reasons to assume that English GDP per capita in 1086 was systematically higher or lower than on the continent? There is no doubt that, compared to Southern Europe (Italy, Spain), England in 1086 was a relatively backward country, although the difference was not so large if compared to Western Europe as a whole. Moreover, large parts of the continent, such as Flanders and northern Italy, developed more rapidly during the high Middle Ages than England, which specialized in supplying agricultural commodities, wool in particular, during the great boom of 1000–1300, whereas Flanders and northern Italy concentrated on industrial and tertiary activities that had a higher value added component. The result was probably that growth was more rapid in the
latter regions. Campbell’s estimate for England of a per capita increase between 1086 and 1290, may therefore be too conservative for Western Europe as a whole.

Another way to approach the same problem is to estimate a (subsistence) minimum below which income cannot fall. A reference point is Maddison’s estimate of British GDP per capita in 1820: 2121 (1990 international) dollars, the benchmark of Table 10. Translated in 1990 international dollars, English GDP per capita in 1500 was 910 dollars and around 550 dollars in 1086. In a recent study of income and inequality in Byzantium around 1000, Branko Milanovic (2006) estimated that the absolute minimum level of GDP was probably about 400 (international 1990) dollars. This result seems plausible; English GDP per capita in 1086 would have been about 40% above the subsistence minimum, which is consistent with Campbell’s (2000) estimate that the value added of arable output would be about 55–60% of GDP. The level of GDP per capita in Western Europe as a whole would probably be somewhat higher than in England, between 550 and 600 dollars. In the same study Milanovic also estimates the GDP per capita of Byzantium. He arrives at a figure of between 640 and 680 dollars, which sets the upper limit of the European income level, because at the turn of the millennium Byzantium was still probably among the richest parts of Europe. Around 1500 the average for Western Europe was about 1100 dollars (derived from Table 10), which implies that it may have doubled in the preceding five centuries; the increase in England was more modest, from 550 to 910 dollars. Summing up, and taking into account that the two estimates used here – by Campbell for England in 1086 and by Milanovic for Byzantium in 1000 – are very tentative, we can perhaps conclude that the five centuries before 1500 experienced much more per capita growth than the three centuries after 1500 (see also Chapter 9). For Western Europe as a whole, the late Middle Ages (between 1000 and 1500) therefore appear to have been much more dynamic than the early modern period, when growth almost came to a standstill.

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6 Total agricultural output including the output of the livestock sector would of course be a much higher share of GDP, perhaps as high as 70–80%.
How plausible are the results presented here? Are they consistent with other evidence on the long-term development of the European economy in these years? What was driving growth in the two more dynamic areas, the Netherlands and England? And finally, when did modern economic growth begin in the North Sea region? To try to answer these questions, we carried out several experiments using a Cobb Douglas production function to simulate the relationships between real wages, real rents (when data are available), population, labour input, and land input.

The production function used has three inputs, land, labour, and capital, which are all assumed to be homogenous and unchanging in quality (an assumption to which I will return). We started with Holland, an economy for which detailed estimates of the structure of GDP in 1510–14 and 1807–08 are available, making it possible to estimate the share of each factor in GDP in 1510–14 (land .07, labour .60, and capital .33; taken from Van Zanden, 2002b); all simulations will be expressed in prices for that base period. Other ingredients of the model are:

- factor prices: estimates of real wages for an unskilled labourer per day (from Allen 2001) and of nominal and real rents (per hectare) (the latter deflated with a CPI from Van Zanden, 2005a).
- factor inputs: an annual series of the cultivated land, and the population and labour force (apart from the changes in the number of days worked per year, the ratio between labour force and population was assumed to be constant at 40%).
- the capital stock in the base period 1510–14 was estimated by assuming an average rate of profit/interest on capital stock of 12%, which, in combination with a share of 33% of GDP accruing to capital, resulted in an estimate of the capital stock for the base year; it was furthermore assumed that depreciation reduced the capital stock by 2.5% per year; additions to the capital stock were the results of investment expressed as a percentage of GDP (so the capital stock in year t+1 was 97.5% of the capital stock in year t plus gross investment during year t).

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7 The work in progress relates to a project aimed at reconstructing the national accounts of Holland in the period 1500–1800, see http://www.iisg.nl/nationalaccounts/
The variables that can be used to manipulate the outcomes of the simulation are:

- the share of GDP that was invested annually (the starting point here is a level of 5%);^8
- technological progress, which was Hicks neutral, i.e. affected all factor contributions equally; the starting point is a situation without technological progress;
- the number of working days per labourer; for Holland this variable was set at 200 before 1560, increasing gradually, under the impact of the Reformation and declining real wages, to 250 in 1660 (following Noordegraaf, 1985, pp. 58–61; and De Vries and Van der Woude, 1997, pp. 616–7).

The model isolates two causes of long-term growth in real wages: capital accumulation and productivity growth. As the simulations will show, the re-investment share has generally only a limited effect on the long-term development of the economy, which is restricted by the share of capital in GDP: a doubling of capital stock per capita will merely lead to a 33% increase in GDP per capita. By definition, productivity growth translates directly into a proportional increase in GDP and in real wages, and is therefore a more direct way to bring about long-term growth. The simulation can therefore help to determine when European countries began to experience sustained productivity growth: was this only during the Industrial Revolution in the second half of the eighteenth century, or were there periods of productivity growth before 1750? Was, for example, the Dutch Golden Age characterized by ‘modern’ productivity growth as De Vries and Van der Woude (1997) have maintained, or was growth simply the result of a higher level of capital formation?

The third instrument variable, the changing the relationship between labour input and population, enables us to bridge the gap that might arise between the development of real wages and the point estimates of GDP per capita (as will be explained below). It is also an attempt to test the hypothesis formulated by Jan de Vries (1994) that an ‘industrious

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^8 It was of course also possible to vary the rate of depreciation, which was now set at 2.5%; experimenting with this share had an effect similar to experimenting with different investment shares.
revolution’ preceded the Industrial Revolution of the eighteenth century. He hypothesized that labour input per capita greatly increased because men, women, and children worked more days and hours per year than they had done in the late Middle Ages.

We used the following procedure: the real wage as simulated by the model was compared to the real wage as estimated by Allen (2001), or rather the long-term pattern of the latter wage series as estimated by a second-degree polynomial. The instrumental variables were manipulated so that the development of the simulated real wage is almost identical to this estimated second-degree polynomial, it is in practice impossible to follow the ups and downs of the real wage curve itself, because the enormous fluctuations are driven by many erratic supply and demand changes. Figure 27 shows the results.

The Allen series show that real wages declined from 1500 to the mid 1570s, thereafter there was a significant increase in real wages, continuing until about 1710; during the second half of the eighteenth century real wages again declined. This pattern is simulated using different combinations of investment share and rate of technological progress. The model easily ‘predicts’ the decline in real wages during the first three-quarters of the sixteenth century, when the investment share in GDP is held constant at 5%; the small per capita decline of capital stock and cultivated land explain the fall in real wages. After the 1570s population growth accelerates, but real wages start to increase as well; this clearly points to a break in economic development in these years, which has been analyzed by De Vries and Van der Woude (1997) as the Dutch ‘take off’. It is this combination of rapid growth in population and increasing real wages that, given the slow growth of the cultivated land, can only be explained by a massive increase in the accumulation of physical capital and/or the growth of total factor productivity. The different combinations of investment ratio and rate of productivity growth that produce results consistent with the growth of population and of real wages are: 12% and 0%, 10% and .1%, 7% and .25%, and 5% and .35%. Because it is likely that both the investment ratio and the rate of technological progress rose simultaneously during these years,

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9 Moreover, the labour force probably increased much more than the population because it was a period of large-scale immigration from the southern Netherlands and other areas (see Gelderblom, 2000).
a combination in the middle of this range, i.e. an investment ratio of 7% and an increase in productivity of .25%, was selected to run the simulation. Moreover, this hardly affects the growth path of GDP per capita, because wage income is a fixed share of GDP, and labour supply is exogenously given; the real wage curve therefore directly determines the growth of GDP (see Figure 27).

The next turning point, again well-known from the literature, occurred in the 1660s and 1670s, when the increase in real wages began to level off, whereas at the same time rapid population growth ended, and the population of Holland even began to fall. This could be simulated by assuming that technological progress came to an end (in 1670), and that the investment ratio began to decrease from 7% in 1670 to 4% in 1750, after which it remained constant.

The next step allowed us to derive estimates for the development of GDP (total and per capita) from the simulation. Figure 28 presents the
results by comparing the simulated estimates of the development of GDP per capita in Holland to the point estimates of the Van Zanden (2001a) dataset. According to this ‘first round’ simulation, GDP per capita increased by ‘only’ about 30% from 1510 to 1805, less than the 50% which was the result of comparing the benchmark estimates. The long-term development of GDP per capita shows the same pattern. But the simulation ‘predicts’ a decline of GDP per capita during the sixteenth century (compared with the stagnation of the point estimates), followed by a significant increase during the Golden Age (1580–1670), which is however less steep than the point estimates suggest.

The difference between the point estimates and the simulation can be bridged by manipulating another instrumental variable, the number of days worked annually. This instrumental variable tries to capture both quantitative and qualitative changes in the labour force. The quantitative dimension is a real increase in the number of hours worked per capita – via lengthening the working week – through, for example, the abolition of holidays following the Reformation, or an increased contribution from children and women’s labour, following De Vries (1994). The fact that simulated GDP per capita seems to grow less than would be expected on the basis of the development of the real wage in this period can be interpreted as confirmation of the hypothesis.
Qualitative changes must, however, also be taken into account. The average quality of the labour force must have increased in the early modern period; the share of services in the labour force, for example, went up from 22% in 1510–14 to 42% in 1807–08, and a large part of this increase consisted of well-paid, highly skilled work by professionals, merchants and government employees. The relative pay of these professionals probably also rose (Van Zanden, 1995). In industry the share of skilled workers may have increased, whereas branches that used mainly unskilled workers (fisheries, peat digging, and agriculture) saw their relative size decline. These changes in the composition of the labour force are one of the reasons why indices of real wages based on wages of construction labourers are not completely reliable guides to the long-term development of wage income. Ideally, it would be desirable to have a weighted average of wages for all sections of the labour force. Assuming that the average quality of the labour force increased by about 20–30% – which is probably still an underestimate – brings the two curves (of simulated GDP per capita and the point estimates of GDP per capita) very close together.

Another limitation of the model is that it assumes a closed economy, which Holland clearly was not. At the beginning of the sixteenth century a large part of the food supply consisted of imported grain, and this greatly increased in the next 150 years. The imports from the Baltic are a good index of these changes: they went up from 10,000 lasts of about 2 tons each, representing about 25% of the total grain supply during the first decade of the sixteenth century, to more than 50,000 lasts from 1610 to 1650, or more than 70% of supply – but part of it was re-exported (Van Tielhof, 2002). In return for these land-intensive imports, Holland exported large quantities of labour-intensive and capital-intensive products and services. It has been suggested that the economic development of Western Europe in the early modern period was facilitated by the fact that Holland and later Great Britain had access to the ‘ghost acreages’ of overseas colonies (see the discussion in Pomeranz 2000, but see Vries 2001 for a critical review of this idea), although in this case the foodstuffs were mainly imported from the Baltic. The simulation presented here provides an idea of the quantitative importance of these ‘ghost acreages’ by looking at the gap between the actual development of real rents, which was affected by such international trade flows, and the simulated rent following from the Cobb Douglas model, assuming a closed economy. Unsurprisingly, the simulated rent increased much more than real rents (see Figure 29); in a closed economy real rents
would have increased by almost 250% from 1500 to 1700, but they actually went up by only about 50%. Population decline and agricultural productivity growth during the eighteenth century did much to reduce the gap between the two series, however; around 1800 the Netherlands as a whole had become almost self-sufficient again, but Holland was still a net importer of grains.

To determine how much this may have affected growth, a second simulation was carried out with a re-estimated series for land input, in which the ‘ghost acreages’ were actually estimated on the basis of the difference between the real rent and the simulated rent from the first simulation; in other words, a new land input series was estimated in such a way that the real development of rents between 1500 and 1800 coincided the rent level simulated by the model. This resulted in a second round simulation of GDP and real wages on the basis of the new, larger land input. The second round simulations in Figures 27 and 28 show that at their peak the impact of the ‘ghost acreages’ was about 10% of GDP per capita.

Summing up, the model can replicate the long-term development of the economy of Holland, identifying clearly the well-known turning points in the 1590s and 1660s, when it is assumed that from 1580 to 1670 there was an approximately constant rate of productivity growth.

Figure 29. Real rents in Holland between 1510/14 and 1800: actually realized (open economy) and simulated (closed economy) (indices 1510/14 = 100)

Source: see the text
(of .25% per year), and that investment from 1580 to 1670 was higher than before and after that period. To obtain an increase in GDP per capita that matches the benchmark estimates of GDP discussed in the previous section, and Allen’s real wage series, it is necessary to assume a significant increase in labour input per capita, a greater increase than the 25% assumed here (from 200 to 250 working days per year). Changes in the quality of the labour force and an even larger increase in working days probably explain the discrepancy. The model does have some problems incorporating the openness of the Dutch economy; real rents are not simulated correctly, but this part of the experiment provides insight into the importance of ghost acreages for economic growth; it was concluded that their effect was at most 10% of GDP.

**England 1500–1800**

The same procedure was applied to the English data. Obviously, the contribution of various inputs to GDP was not the same as in the Dutch case, and was estimated at 20% for land, 30% for capital, and 50% for labour.\(^{10}\) The real wage series of unskilled labourers by Allen was again taken as a starting point. Estimates of population were supplied by Wrigley et al. (1997), cultivated land was assumed to grow by 10% per century (Campbell and Overton, 1996), the capital stock in 1500 was simply estimated on the basis of a share of 30% in GDP going to capital, and an average profit rate of 12%.

Figure 30 shows the extent the simulation fits the estimated series of real wages resulting from the following manipulation of instrumental variables: in the sixteenth century the investment ratio was set at 4.5%, and there was no technological progress. This resulted in a slow decline of real wages, as the per capita capital stock and in particular the per capita supply of land decreased. During the 1590s the real wage began to develop more favourably: its decline came to an end, but population growth continued, a combination that is inconsistent with the previous

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\(^{10}\) The share of land is from Clark (2002); rough estimates based on the structure of national income by King, as reconstructed by Lindert and Williamson (1982); assuming 250 days per year, a participation ratio of 40% and a wage rate for an unskilled labourer of 14 d., the wage sum is exactly 50% of the total national income as estimated by Lindert and Williamson (1982).
values of the instrument variables. As in Holland, different combinations of an increased investment ratio and productivity growth were able to generate the pattern that emerged around 1600–1610. In the simulation presented here, we experimented with the variables that could be derived from growth accounting studies for the second half of the eighteenth century, which show: 1) capital stock per capita remained roughly constant, and 2) growth in total factor productivity was about .25% to .30% per year (see Crafts, 2004 for an overview). Surprisingly, assuming the same variables – an investment ratio of 6.5% from the 1590s onwards and a consistent increase in total factor productivity of .25% from 1615 onwards – provides an almost prefect simulation of the growth path of real wages in the seventeenth and eighteenth centuries. Keeping these two variables constant for the rest of the period produces the turning point in the early 1600s, an increase in the simulated real wage from 1610 to the 1750s of about 50%, and the stabilization of real wages during in the second half of the eighteenth century, when population growth accelerated again. After 1750, the Allen series becomes more pessimistic; a decline in investment ratio or technological progress must be assumed in order to get the same result. Feinstein’s more comprehensive series shows stabilization from 1750 to 1800, similar to the simulation results presented here (Feinstein, 1998).

Figure 30. England: real wages, simulated and estimated, 1500–1800
(indices 1500 = 100)
The two variables – the increase in investment ratio around 1600 and the growth in total factor productivity of 0.25% per year from 1615 onwards – allow for a simulation of the development in real wages (Figure 30). In order to obtain a growth of GDP per capita consistent with the available point estimates, it is necessary to assume a very sharp increase in labour input per capita. Figure 31 presents the result of this part of the simulation, assuming a linear increase of working days per year from 200 in 1500 to 350 in 1800. It should again be pointed out that this increase has a qualitative and a quantitative component. England seems to be the heartland of Jan de Vries’ industrious revolution, where the labour force grew much more rapidly than total population as a result of a sharp increase in (among other things) the labour input of women and children. As a result, in the early nineteenth century the ratio between labour force and population in Great Britain was much higher than elsewhere (about 45% versus 41% in the Netherlands and 35% in the United States). This is also confirmed by the finding that children’s and women’s labour played a much bigger role in British industrialization than in most other European countries (Humphries and Horrell, 1995). Of course, at the same time, the structure of the labour force changed dramatically, with the share of agriculture declining from more than 70% in 1500, via 55% in 1700, to 35% in 1800 (Allen, 2000), which must have had similar effects on the quality of the labour force as those discussed for Holland.

These simulations clearly show that if real wages are a reliable guide to macro-economic performance, the transition towards modern economic growth in the English economy did not occur in the eighteenth century, but at some point between the 1590s and the 1620s, when it moved from what was basically a trajectory without technological progress to

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11 This assumption also has consequences for the modeling of real wages; the development of the instrumental variables discussed in the previous paragraph (an increase in the investment ratio from 4.5% to 6.5% after 1590 and a continuous rate of productivity growth after 1615 of .25%) are from the same simulation in which the increase in the number of working days from 200 to 350 is assumed. If this assumption is rejected in favour of an increase from 200 to 250 in the instrumental variables needed to obtain the right growth for real wages, we see a 6% investment share and a .2% annual increase in productivity (from the 1590s onwards).

12 The very growth in female and child labour during the seventeenth and eighteenth centuries probably also helps to explain why the level of literacy stagnated during much of the eighteenth century and in England was at a lower level than expected on the basis of its GDP per capita (see Crafts, 1985, pp. 61–64).
one with a higher level of investment and a roughly constant rate of productivity growth. The fact that this occurred in the same years as the ‘take off’ of the Dutch economy is striking. The major difference is that English productivity growth was sustained into the eighteenth century and beyond, whereas it stopped in the Netherlands after 1670, only to start again after 1820. What is perhaps equally striking is that productivity growth did not accelerate during the eighteenth century, which is consistent with the findings by Crafts (1985, p. 81). The Industrial Revolution of the second half of the eighteenth century appears to be a continuation of trends that had begun in the first half of the seventeenth century.

Added to Figure 31 is another simulation of GDP growth in the period of 1500–1800, which emerged from another effort at understanding growth, now using a regression model with real wages and the extent of structural economic transformation as independent variables (described in Van Zanden, 2005b). The results of this alternative model also pointed to a relatively early start of modern economic growth in England – somewhere between 1610 and 1630. As is also clear from the long-term perspective presented above, there can be no doubt that the English economy grew at an exceptional rate, precisely in the centuries leading up to 1800, while its growth in the two centuries after 1800

![Figure 31. English GDP per capita: point estimates and simulated values, 1500–1800 (indices 1500 = 100)](source: see the text)
was not so unique (see also Wrigley, 2000). It may be ironic that the
country that provides the model for the classic Industrial Revolution –
the decisive break between a stagnating agrarian society and a dynamic
industrial economy – was in fact characterized by such dynamism in
the centuries preceding this revolution. From this research it would
appear that the Industrial Revolution in the second half of the eighteenth
century was no accident, as Crafts would have us believe (Crafts, 1977),
but a logical continuation of the exceptionally dynamic development
of the English economy in previous centuries.

Did England also profit from access to ‘ghost-acreages’? Figure 32
compares the series of real rents as simulated by the Cobb Douglas
production function with the estimates presented by Clark (2002). In
the very long run, the two series show a similar rate of increase. During
the 1550–1650 period, rents in the real world increased more than the
model predicts, but the difference disappeared between 1650 and 1750,
when, in spite of agricultural protectionism (the first Corn Laws date
from 1689) real rents increased less than expected. England was an
exporter of agricultural commodities until the middle of the eighteenth
century, but these exports were a much smaller fraction of supply
or demand than in Holland (Ormrod, 2003, p. 207ff.). This changed

![Graph of English land rent: actually realized (open economy) and simulated (closed economy), 1550/59–1790/99 (in constant prices, 1550/59 = 100)](source: see the text)
during the second half of the eighteenth century, when Holland became a large net importer of grains (from the Baltic), colonial products such as sugar and tea from the colonies, and, after 1780, of cotton from the Americas. These developments are accurately reflected in the ratio between simulated and real rents, because the latter increases much less than the former after the middle of the eighteenth century, and this comparison therefore adds credence to the approach developed here.

From the mid-eighteenth century, when agricultural trade was probably in equilibrium, to 1800, the ratio between simulated rents and real rents increased by almost 40%, which is an index of how much England profited from ‘ghost acreages’ (or being able to import land-intensive products). The share of agriculture in GDP was only 26% in 1800 (Crafts, 1985, p. 17), and the share of land cannot have been more than half that amount (10–13%), so the extra GDP that resulted from alleviating the land constraint in this way must have been less than 4.5%. Of course, as in the case of Holland, this is an upper bound estimate, a consequence of the assumption that as a result of international trade these countries acquired extra land as a ‘free lunch’, because we simply added ‘ghost acreages’ to the inputs in the production function (or in fact run a simulation with an enlarged land input, which brings the simulated rent down to the level of the real rent). In reality, there are no free lunches, and the services of this extra land were bought by selling capital- and labour-intensive products to land-abundant countries and colonies. Producing the commodities that were exchanged for the foodstuffs and the raw materials that were imported from the ‘ghost acreages’ directly and indirectly claimed some land (if only to feed the labourers making those products), as a result of which the net gains from these imports were smaller than suggested by the estimates presented so far.

Conclusion: Early Modern Growth and the Emergence of Modern Economic Growth

So far, this chapter has presented a synthesis of recent research on the long-term development of several European economies in the centuries

13 Moreover, as Vries (2001) has rightly pointed out, most of these agricultural imports did not come from colonies overseas, but from Ireland, the Netherlands, Prussia, and Russia, and were therefore not the result of privileged access to certain raw materials and foodstuffs, but of (more or less) ‘free’ commercial exchange.
before the Industrial Revolution, and attempted to determine if these estimates are consistent with the (more detailed) evidence we have on the evolution of real wages, population, labour input, land input, and real rents, given the assumptions of the Cobb Douglas production function. Our overall conclusion is that these estimates are indeed consistent with this evidence, although in a few cases we had to assume substantial increases in the quality and per capita quantity of the labour input to reconcile the real wages series and the GDP estimates.\footnote{This would have been more difficult, if not impossible, with the estimates published by Maddison (2001), which generally show much higher rates of economic growth. For Europe as a whole, for example, Maddison estimates a 56\% increase in per capita GDP from 1500 to 1820, which is not consistent with the decline of real wages that occurred in the same period (my much more modest estimates of 10–25\% growth are at the limit of what might be consistent with the real wage data). The same applies to his assumption that in the same period income levels in the Netherlands increased by 140\% (against my 50\% estimate); especially the near doubling of per capita GDP from 1500 to 1600 is difficult to reconcile with the decline in real wages (and the near constancy in real rents) in this century.}

In Appendix 1 we describe more experiments with the Cobb Douglas production function, leading to very rough estimates of the development of GDP per capita in Italy from 1300 to 1800 (consistent with the Malanima estimates), of English GDP per capita from 1300 to 1500, and of European GDP per capita in the 1300–1800 period. The results of these experiments with the Cobb Douglas production function are summarized in Figure 33 and Table 11.\footnote{I added guesstimates for Europe as a whole for the 1300–1500 period, based on an average of the wages in Italy and England (see Appendix 1).} The contrasting long-term trajectories of Italy and England are clear from this comparison. Before 1550 Italy had a (much) higher income level than the rest of Europe, and even around 1600 it was still considerably richer than England. The latter country experienced its transition to sustained economic growth during the first half of the seventeenth century, when the rest of Europe, with the exception of the Netherlands, stagnated.

It was possible to identify a number of periods during which there was a sustained increase in total factor productivity. This happened in Italy and England in the century or so after the Black Death, in England again after the 1610s (unchanging in tempo between 1615 and 1800), and in Holland from the 1590s to the 1670s.\footnote{It is likely that a similar process of productivity growth occurred in Holland from 1350 to 1450, see Van Bavel and Van Zanden (2004).} In the rest of Europe there was no increase in GDP per capita from 1500 to 1800; in fact,
Table 11. Estimates of the growth of GDP and GDP per capita in Europe, 1300–1800 (in average annual growth rates)

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>1300–1350</td>
<td>0.07</td>
<td>0.09</td>
<td>-0.25</td>
<td>0.37</td>
<td>-0.04</td>
<td>0.27</td>
</tr>
<tr>
<td>1350–1450</td>
<td>0.06</td>
<td>0.26</td>
<td>-0.20</td>
<td>0.34</td>
<td>-0.14</td>
<td>0.18</td>
</tr>
<tr>
<td>1450–1600</td>
<td>0.01</td>
<td>-0.25</td>
<td>0.29</td>
<td>-0.11</td>
<td>0.14</td>
<td>-0.06</td>
</tr>
<tr>
<td>1600–1700</td>
<td>0.00</td>
<td>-0.01</td>
<td>0.71</td>
<td>0.49</td>
<td>0.09</td>
<td>0.00</td>
</tr>
<tr>
<td>1700–1800</td>
<td>0.23</td>
<td>-0.09</td>
<td>0.91</td>
<td>0.41</td>
<td>0.28</td>
<td>-0.10</td>
</tr>
</tbody>
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Source: see text

Figure 33. Simulated GDP per capita: Europe, Italy and England, 1300–1800 (England in 1800 = 100)

Income levels could only be maintained because of increases in labour input per capita.

The simulation experiment also threw light on the importance of ‘ghost acreages’ for economic growth in the core countries around the North Sea. For England, a net exporter of agricultural commodities before 1750, this was not an important source of growth. Only after 1750 did imports of agricultural goods (foodstuffs and cotton) help to alleviate the land constraint, but the overall effect on GDP was limited to
less than a handful of percentage points. For Holland the story is clearly
different, and international trade – access to foodstuffs and building
materials from the Baltic in particular – was essential for its develop-
ment. A rough simulation of this effect leads to the initial conclusion
that in the case of Holland the ‘ghost acreages’ may have increased
the level of GDP by perhaps as much as 10% at the economic peak of
the region in the second half of the seventeenth century. In reality this
contribution was more limited, because in the way we have modelled
it here, these extra imports are considered to be a ‘free lunch’, whereas
the Dutch (and the British) had to pay for these imports by exporting
services and colonial and industrial commodities. Thus, ‘ghost acreages’
did not play an important role in economic development.

What again stands out in these comparisons is the sharp contrast
between the North Sea region (Holland and England) and the rest of
Europe. The consistently strong performance of England is perhaps the
most striking result, but equally the stagnation of the rest of Europe
requires explanation. In view of the absence of productivity growth,
why were most Europeans unable to improve their institutions, tech-
nologies, and the quality of inputs in a systematic way between 1500
and 1800? Why did the incentives created by a market economy (as it
emerged during the Middle Ages) fail to produce a systematic search
for more efficient solutions, or why did this search accomplish so little?
Or is such a pattern normal, much like the ‘high level equilibrium trap’
that can be observed in other highly developed pre-industrial societies
such as China, India, or the Ottoman Empire during the early modern
period? This ‘normal’ pattern has been called Smithian growth (see
Bin Wong, 1997). It was characterized by an increase in population
and income, the latter driven by the expansion of markets and related
processes of specialization and urbanization, but without the qualita-
tive leaps of sustained productivity growth that can be found in parts
of Europe after the Black Death and in the North Sea region during
the seventeenth and eighteenth centuries. In other words, Smithian
growth, usual in developed (urbanized, market-oriented) economies
of the pre-1800 period, which had probably also occurred in India and
China as much as it had in Western Europe, appears to be a move-
ment along the production curve. Movements of the curve, sustained
increases in total factor productivity, seem to have been much more
exceptional. We detect just such a change from 1350 to 1450, which
was probably the result of the exogenous shock of population decline
that led to major changes in relative prices, which in turn promoted development of new (labour-intensive) technology such as the printing press, but that such an outcome was not predetermined is discussed in Chapter 9, where we compare Western Europe with other parts of the world. More remarkably, this also happened in the seventeenth and eighteenth centuries in the North Sea region, in a period of rapid population growth.

The first major question is why was most of Europe stagnant – in terms of total factor productivity and GDP per capita – during the three and a half centuries after 1450? Part of the answer is related to the fact that real wages were declining in the long run, and that therefore real incentives to develop labour-saving technological devices were absent. But then why did real wages decline in much of Europe, whereas they stabilized in the North Sea region? In Part II we pointed to the different developments at the micro-level: the emergence of the European Marriage Pattern in northwestern Europe was part of a process of developing new strategies for dealing with the newly emerged market environment. Such new strategies included higher levels of human capital formation, which in themselves may help to explain part of the divergence: perhaps the increasingly literate labourers in the North Sea region were simply more productive than the predominantly illiterate workers in the rest of Europe, and therefore earned a higher real wage. But it was also a more complete orientation towards, and dependence on the market which distinguished the North Sea region from the rest of Western Europe: a region characterized by a huge labour market encompassing 30–60% of the population, high levels of market dependence by farmers, and well-developed capital markets. In other parts of Europe markets penetrated less deeply and remained thin; the market system here were clearly less efficient than in the countries bordering the North Sea (see Chapters 1 and 5). This, again, may have been a cumulative process: markets became more reliable when they were used more intensely, and thin markets were almost by definition prone to the formation of local monopolies, to manipulation by states and other distortions. The stagnation of the rest of Europe may therefore also be

17 This is a topic that has been sadly neglected in this book, but see De Vries (1974) for the seminal work on market orientation of agriculture in the Netherlands; recent research suggests, however that this turn towards the market occurred earlier than De Vries suggested (Van Bavel and Van Zanden, 2004).
linked to the more superficial involvement of households in the market environment, which did not therefore give incentives to develop new, labour-saving technologies.

Declining real wages in the rest of Western Europe also had negative effects on the level and structure of demand, in particular on the demand for industrial goods and services, sectors in which the most rapid productivity advances were realized. Declining living standards meant that an increasing share of the budget was spent on agricultural commodities, on basic foodstuffs, where supply was constrained by the increasing scarcity of land and which did not have the potential for rapid advances in labour productivity. The changes in relative prices – agricultural prices showed a strong upward trend, whereas the prices of industrial (and colonial) products tended to decline in relative terms (Van Zanden, 1999) – further contributed to these trends. The growing attraction of colonial and industrial commodities, mainly because of their declining relative prices, was to a large extent cancelled out by the fact that for households to survive they had to spend a large part of their budget on food. This also constrained structural transformation, i.e. the growth of employment in non-agricultural activities. The rest of Europe was therefore locked into an agricultural sector where productivity growth was slow and the growth that did occur was mainly due to the increased application of labour per unit of land. In the literature on Indonesian and Chinese economic development such a process has been called ‘involution’ (Geertz, 1963; Huang, 1990). We find traces of this in large parts of Western Europe, from northern Italy, where a one-sided maize/polenta-based rural economy emerged in the Po Valley, to Ireland, where the potato played a similar role. During the middle decades of the nineteenth century the shocks of industrialization, which often led to loss of employment in proto-industrial activities, in combination with harvest failures would create an economic crisis in these regions that was not so dissimilar from what happened in parts of China and India in the same period, as a result of the same external shocks of industrialization. In parts of Western Europe declining real wages led to a development path similar to that found in other parts of Eurasia (see also Allen et al., 2005 for a comparison of wage levels between Asia and Europe). In Europe, the long-term solution for these ‘overpopulated’ regions was often out-migration to the Americas, a process that really accelerated after the crisis of the 1840s (Williamson and O’Rourke, 1999); in China and India only relatively small minorities could opt for this.
Another factor behind the post-1450 stagnation is more speculative: was there an institutional ‘backlash’ after the dynamic Middle Ages? The growth of large, centralized states such as Spain and France did suppress the ‘privileges’ of the cities that had developed there during the Middle Ages. There are several indications that these large states were detrimental to economic growth. In Chapter 7 we discussed how De Long and Shleifer (1993) showed that the absolutist states did indeed put a brake on economic growth, as measured by urban development. We also demonstrated that these states had less efficient capital markets and as a result paid substantially higher interest rates on their public debt. Similarly, it was in the Protestant regions of Europe that human capital formation (as measured by book production) continued to expand rapidly in the early modern period; by implication, Catholicism had a negative effect (Chapter 3). The policies of both Lutheran and Catholic states concerning marriage and household formation did not enhance the more democratic European Marriage Pattern that flourished in the late medieval period (Chapter 4).

Institutions that had contributed a great deal to the dynamism of the high Middle Ages became much less ‘progressive’ in the early modern period. Cities developed into city-states, which sometimes (e.g. in Tuscany and Flanders) controlled their contado in such a way that they suppressed economic change. The dynamic interaction between city and countryside that had been characteristic of the early stages of urbanization turned into a one-sided relationship based on the domination of the countryside by the city, where the urban elite tried to exploit this asset as much as possible, thereby stifling processes of economic change that might be at the expense of urban interests (Epstein, 1991; Van Bavel, 2003). Finally, it can be argued that guilds, which had been such an asset in the initial development of the market economy during the Middle Ages – creating stable and flexible institutions for exchange – were in some cases becoming a liability, especially when they were part of larger societal structures aimed more at redistribution than growth (see Ogilvie, 2007). In short, the institutional development path in the early modern period, with its turn towards absolutism and patriarchy, contrasted dramatically with the democratic legacy of the Middle Ages and brought large parts of Western Europe much closer to the kind of institutions that were typical for the rest of Eurasia.

Only the countries around the North Sea escaped this fate, but thanks mainly to their own ‘mutinies’, both at the level of the state (Chapter 7) and at the level of the household (Chapter 4). Around the turn of the
sixteenth and seventeenth centuries, a process of continuous growth in GDP per capita and total factor productivity began, which, in England, almost unnoticeably ‘overflowed’ into the Industrial Revolution in the eighteenth century. We argue that modern economic growth – a sustained increase in GDP per capita made possible by technological change and accompanied by structural transformation of the economy – began in the seventeenth century in the North Sea region, most clearly in England, where it continued during the eighteenth century, but came to a halt in the Netherlands. It is no coincidence that in Holland this growth spurt coincided with the emergence of a mercantile state, which strongly protected the rights of its merchants within and beyond its borders, and generally used its power to enhance the interests of the commercial elite. A similar transformation of the state occurred in seventeenth-century England – with the Civil War as the most radical period of change, and ended in the Glorious Revolution which concluded the ‘marriage’ between commerce and state (O’Brien 2001).

As De Vries and Van der Woude (1997) demonstrated for the Dutch economy, and Wrigley (1967) pointed out for seventeenth-century England, structural transformation of the economy – the growing importance of non-agricultural activities – was key to growth in this period. The emergence of export industries from the late Middle Ages onwards, based on the efficient set of institutions in the region and on its abundant supply of cheap capital and skills, played an important role in the centuries before the emergence of the fiscal-military state. What this state contributed was a determination to use all its powers to increase its share in international trade and transport – in the case of the Netherlands, initially as part of the struggle with the Spanish forces (the explicit aim of the East India Company set up in 1602 was to do as much harm as possible to the Spanish/Portuguese trading empire). In the case of England, paradoxically it was competition with the Dutch that to some extent drove the process (as the Navigation Acts demonstrate). This combination of efficient institutions, an abundant supply of skilled (and unskilled) labour, cheap capital, and a mercantile state, led to a boom in overseas trade and shipping, which promoted the growth of cities, further stimulated export industries, and generally enhanced the process of structural transformation that drove economic growth. The value added per worker in these industries was much higher than in agriculture; moreover, the increased demand from the rapidly growing cities also stimulated productivity growth in the latter sector, further contributing to economic growth (De Vries, 1974; Grantham, 1999).
The important point here is that the Industrial Revolution of the second half of the eighteenth century is not the beginning of modern economic growth, but a second stage in a process that had begun much earlier. This point becomes clear from even a superficial look at the development of GDP per capita in England, which began to grow during the first half of the seventeenth century, and has continued to grow ever since. It is reaffirmed when we look more closely at the underlying dynamics of the process. Bob Allen (2004) has suggested a new way to interpret the Industrial Revolution. The mechanism driving the process is substitution: England in the eighteenth century had become a high wage economy, at least by international standards, which prompted the search for new technologies to save on labour (see also Broadberry and Gupta, 2005). This process was feasible because energy and capital goods were relatively cheap, which was due, in addition to other factors, to easy access to coal, a low skill premium, and low interest rates. Thus, new technologies in textiles, mining, the iron industry, and general purpose technologies such as the steam engine were developed that increased labour productivity and used large amounts of energy and capital. So the Industrial Revolution occurred in a society that was already a ‘high wage economy’, and the new technologies that emerged there made it possible to sustain this development path.18

The Industrial Revolution therefore was, to some extent, a continuation of trends begun already in the first half of the seventeenth century. In terms of the rate of economic growth, the period after 1760 or 1780 does not appear to have been a radical break with the previous, 1630–1760 growth record. What was perhaps different was the underlying cause of growth: the growth of industrial productivity played a central role in the post 1760 period, and we simply do not yet know enough about growth before 1760 to analyse its sectoral determinants

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18 The argument that the Industrial Revolution was different because it set in motion a process of cumulative and continuous technological and economic growth, whereas seventeenth and eighteenth century growth would have petered out if there had not been an Industrial Revolution, is only partially correct. The argument of course also applies to the Industrial Revolution itself, because it consisted of a set of interrelated technologies – of which the steam engine was probably the most important – whose the long-term effects were not unlimited in the sense that growth would have diminished sharply in the long run, had it not been succeeded by the technologies of the ‘Second Industrial Revolution’ usually ascribed to the 1880s.
and composition. The distinction between Smithian growth, which is driven by specialization processes, and Schumpeterian growth, which is based on technological innovation, may be relevant here, and perhaps future research will demonstrate that a switch towards Schumpeterian growth occurred in the second half of the eighteenth century. Both processes led to a strong increase in total factor productivity, however – the simulations show that the growth of GDP per capita in England and in Holland cannot be explained without assuming some kind of TFP-growth.

In one respect the Industrial Revolution was different, however. The new techniques became so efficient that after a time lag, during which only British producers had the right factor costs and endowments to profit from them, they could also be applied with substantial profit outside the British Isles. After about 1800 the new technology began to spread outside the borders of Britain, to Belgium, Switzerland, the United States, France, Germany, and the Netherlands. Whereas the Dutch Golden Age of the seventeenth century provided only limited impulses to other parts of Western Europe, and the new labour-saving techniques developed there had only a minor impact on production elsewhere – it was, for example, not always easy to copy the windmill because it was embedded in the specific ecological conditions of the Netherlands –, the steam engine, once its fuel efficiency had increased beyond a specific threshold, began its victorious march across the globe. What made the Industrial Revolution different is that it spread so rapidly to the most distant corners of Western Europe – and beyond. It was, perhaps, the post-1815 spread of the growth process to the rest of Western Europe, that also helps to explain the acceleration of growth occurring in England itself during the 1820s and 1830s.

Thus, the Industrial Revolution was not the beginning of modern economic growth, but an, albeit radical and fundamental, transformation of the growth process that had started in the North Sea region in the first half of the seventeenth century. It was, as Allen (2004) pointed out, the continuation of a growth trajectory characterized by high nominal and real wages and an elastic supply of human and physical capital at

19 New research into the long term growth record of the economies of Holland and England in the centuries before 1850, which has recently begun by a group of researchers (Stephen Broadberry, Bas van Leeuwen, Bruce Campbell, Mark Overton and myself) will hopefully shed more light on this issue.
low prices, which made the choice for new labour-saving and capital and energy-using techniques logical. In the process, ghost acreages only played a very limited role. It is clear that this contradicts Pomeranz’s analysis of the causes of the Industrial Revolution, and is much closer to the older view that interprets the rise of the ‘first industrial nation’ as the result of long-term transformations going back to the (late) Middle Ages.
PART FIVE

TWO GREAT DIVERGENCES
CHAPTER NINE

THE ARAB WORLD, CHINA, AND JAPAN

This book began with the start of the second millennium A.D., when Europe was a relatively backward part of the world economy. It clearly lagged behind other centres of civilization such as the Middle East, where a new wave of economic dynamism was unleashed by Islam and its rapid conquest of the region, and China, where under the Sung, the empire was experiencing an unprecedented economic boom. Eight hundred years later, there is no doubt that Western Europe had become the most dynamic part of the world economy. But was it also more prosperous than China or Japan, or did the ‘Great Divergence’ only occur after 1800? And exactly when did the European economy surpass those of the rest of Eurasia?

The approach developed in this book so far has been to study the interrelationships among institutions, human capital formation, and economic development, using insights from new institutional economics. In Chapter 1 we analyzed various measures of the efficiency of institutions, which enabled us to identify specific patterns within Eurasia: Western Europe had a relatively efficient set of institutions from the late Middle Ages onwards, but institutions in South and Southeast Asia were much less efficient (there were, for example, higher interest rates and lower levels of market integration). However, in several respects Japan and (southern) China seemed to catch up with Western Europe during the seventeenth and eighteenth centuries – in terms of market integration, their performance may even have surpassed Western Europe. The same picture emerged from studying two measures of human capital formation. In Chapter 5 the analysis of global patterns in the skill premium demonstrated that this measure of the efficiency of the supply of human capital, from the late Middle Ages onwards, was fairly low in large parts of Western Europe. On the other hand, it was very high in South and Southeast Asia, but in southern China it was as low as in Western Europe (but not in northern China), and it was probably declining in Japan. Book production, analyzed in Chapter 6, showed a similar pattern: it was very high and growing rapidly in Western Europe (in particular in the North Sea region). Similarly,
there was a dynamic development of the book industry in late Ming and Qing China and in Tokugawa Japan, but probably at lower levels of per capita book consumption than in the more developed parts of Western Europe; there was almost no book production and consumption in South and Southeast Asia. Summing up this evidence, Western Europe, and in particular the North Sea region, had a clear head start over the two other dynamic, market oriented regions of the world economy, southern China and Japan, although they were able to develop institutions that were also relatively efficient. But in certain respects, such as the extent of household participation in labour and capital markets, Japan and southern China continued to lag behind the North Sea region, which, as a result of the emergence of the European Marriage Pattern in the late Middle Ages, became much more market-oriented than any other part of the world economy. At the same time, it should be stressed that Japan and China, with institutional and socio-political arrangements very different from those of Western Europe, were able to develop institutions that encouraged considerable levels of market exchange and human capital formation. We will return to this point in the conclusion of this chapter.

First we focus on the consequences of these different sets of institutions for long-term economic growth. Can we compare the economic performance of Western Europe with that of the other two regions that were clearly ahead of “the West” at the close of the first millennium: China and the Middle East? When did Western Europe overtake these two regions – if it did, of course, since some recent literature suggests that the difference may have been limited.

Long-Term Economic Growth Outside Western Europe: The Arab World

We have a few indicators of the long-term development in the Arab world that may help address its relative performance compared to Western Europe. The boundaries of the Arab world shifted over time. With the spread of Islam in the eighth and ninth centuries, the Islamic economic system stretched from Cordoba in Spain to Samarkand in Turkmenistan, forming to some extent one giant trading zone dominated by an Islamic ruling class, although with substantial Christian, Persian, and Jewish minorities. To what extent was this flourishing Middle Eastern economy the result of the pan-Islamic trading zone and
newly introduced Islamic institutions, or of older traditions of urbanization and development, is still subject to debate. Continuity with pre-Islamic (and often pre-Christian) institutions was strong in large parts of this zone; the eastern basin of the Mediterranean probably offers the best case of continuity with classical Antiquity – with Hellenistic and Roman economic and socio-political structures – or even older institutions and traditions, such as were found in Egypt and Mesopotamia. This part of the former Roman Empire never experienced a collapse of political institutions and economic exchange like that which occurred in the West after the fifth century B.C.

Byzantium is obviously the best example of this continuity. In Chapter 8 we saw that according to Milanovic’s (2006) estimates, GDP per capita in Byzantium was probably about 20% higher than in Western Europe at the turn of the millennium. This can be compared with the estimates Sevket Pamuk made of the GDP per capita for the Ottoman Empire from 1500 to 1820 (Figure 34).1 In 1500 the difference with Western Europe was already pronounced: on average, GDP per capita in the Ottoman Empire was about 60% of Western Europe’s. The gap continued to widen from 1500 to 1800, but it was less steep because the Ottoman Empire became as stagnant as large parts of Western Europe (Figure 34). In 1820 the gap had grown by about 5 points, to 45%, a divergence that was only caused by the expansion of the economies around the North Sea. Although it is not possible to exactly compare the two estimates – as the Milanovic estimate for Byzantium refers to a much smaller part of the Middle East – the comparison does suggest that in terms of GDP per capita the West overtook the Middle East at some point between 1000 and 1500.

It may, however, be possible to identify this point with some greater degree of precision. In a recent study Borsch (2005) has shown that Western Europe (i.e. England) and the Middle East (i.e. Egypt) reacted very differently to the crisis that occurred as a result of the Black Death of 1347/48. The Western European reaction is well known: as we saw in Chapters 3 and 8, real wages and income per capita greatly increased in the century after 1350, a process that was accompanied by falling interest rates, the movement from a capital-scarce to a capital-abundant economy, increased consumption of luxury goods, and labour-saving

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1 These estimates, the result of recent, yet unpublished research, were kindly made available by Şevket Pamuk.
technological change. This combination of changes, typical of adaptation to a situation of labour scarcity in a market economy, all helped prepare the way for the next phase of economic growth that began after 1600.

Borsch showed that in Egypt the opposite happened: real wages and GDP per capita went down substantially in the centuries after the Black Death. This was partially the result of the increased difficulties of maintaining the complex irrigation infrastructure with a much reduced population. The decay of the irrigation system set in motion a cumulative process of disintegration, with strong negative consequences for agricultural output and productivity. But the full nature of the decline is more complex: the changing labour/land ratio in England strengthened the position of the peasants and led to the disappearance of the manorial system and its replacement by “free” markets for land and labour. In Egypt exactly the opposite occurred. There, the power of the landlords was increased, backed by the strong, centralized state of Mamluk Egypt (Borsch, 2005, p. 48). Of course, English landlords attempted to do the same, and were also supported by a relatively strong state, but the
bargaining position of rural communities in England was much stronger than in Egypt. In England, similar ordinances were suppressed or annulled by large-scale uprisings such as the Peasant Rebellion of 1388. It is perhaps ironic that peasant mutinies in a way “saved” the market economy and prevented a “second serfdom” that not only occurred in Egypt, but in other parts of the world economy as well. Moreover, Borsch argues, English peasants had an exit option – migration to the cities – not available to Egyptian peasants (Borsch, 2005, p. 49). As a result, Egypt’s landholding structure and its wider political economy, “determined a dramatically different outcome from the one depicted in most historical studies [on Western Europe].” Egypt’s rents increased, its grain prices rose, wages dropped precipitously, per capita incomes fell, and the landholding system stayed intact. The outcome in Egypt stands out in dramatic relief compared to that in England (Borsch, 2005, p. 113). Again, the point can be made that the more balanced distribution of power between landlords and peasants, combined with the greater possibilities for “exit”, determined the positive outcome in England.

How exceptional levels of income and in particular real wages had become in Western Europe in the period after the Black Death can also be seen from an inventory of available real wages estimates drawn up by Walter Scheidel (2008). He uses a large number of sources, ranging from Mesopotamia in the twentieth century B.C. to Constantinople in the 12th/13th century A.D., including a number of estimates related to Athens and Rome during their ‘golden ages’, the fourth century B.C. and the first century A.D. respectively. Figure 35 compares his estimates with the English wheat wages from Clark’s (2005) research. The figure demonstrates the exceptional level of real wages in England in the late medieval period; England was not very different from the rest of Western Europe, however; including other countries would lead to a similar picture (Allen, 2001; Van Zanden, 1999). It is perhaps significant

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2 Robert Brenner (1989) suggested a similar explanation for the rise of “second serfdom” in Eastern and Central Europe, i.e. that the absence of “long traditions of solidarity and struggle for rights” among the peasantry made it possible for lords to consolidate their power in periods of labour scarcity and use it to coerce the peasants into serfdom; Brenner (1989, p. 44); see also Kochanowicz (1989). In Byzantium the fall in population levels after the Black Death also led to increased coercion of the peasantry through the growth of corvée labour and of large estates (Laiou, 2007b).

3 Cf. Scheidel (2008); if he reported a certain margin of minimum and maximum estimates, I took the average of the two; I did not include his estimates for China.
that Athens and Rome during their efflorescence also realized relatively high levels of real wages, as did the economy of the Arab world during its boom period between 800 and 1200. This comparison also suggests that, consistent with Borsch’s ideas, it is only after 1350 that European real wages become much higher than those elsewhere, although the early thirteenth century was also relatively prosperous.

Borsch’s study points to some of the factors that may have contributed to the divergent developments of the Middle East and the Latin West and help to explain the gap that appears to emerge. It is too early to say this is the full account – even before the Black Death the northern shores of the Mediterranean (in particular Northern Italy) seem to have been much more dynamic than the once vibrant Arab world. Moreover, a factor that explains the relative decline of the Egyptian irrigation economy does not necessarily have to explain the relative stagnation in other parts of the region.\(^4\)

\(^4\) For a discussion on the deeper institutional factors that may have been involved, see Chapter 2, and Bosker, Buringh and Van Zanden (2008).
Literature on Chinese economic development from 1000 to 1800 is divided on the issue of its relative and absolute performance through the ages. The classic interpretation, which has perhaps been most forcefully argued by Mark Elvin (1973), is that the Chinese economy went through a “Medieval economic revolution” under the Sung (from 960 to 1279), and then moved into a “high-level equilibrium trap”. The turning point was in the fourteenth century, after which per capita GDP stagnated. Angus Maddison (1998), for example, also assumes (partially basing himself on Perkins 1969) that GDP per capita remained constant from 1280 to 1700. More or less consistent with such an interpretation are the recent estimates of the development of GDP per capita from the twelfth to the eighteenth centuries by Liu (2005), who estimated that income per head in fact significantly declined from the Sung (1120) to the Ming (1550), to recover again in the late Ming (1600), after which stabilization followed. According to his estimates, income per head during the Qing (about 1775) was slightly lower than during the Sung.\footnote{Liu’s (2006) estimates are somewhat problematic, because the margins of error are very large, and because he only estimates that part of income generated via market exchange (his estimates are based on estimates of money supply, price level, and population, starting from the Fisher equation). The decline he reconstructs for early Ming may therefore also point to the fact that market exchange has been substituted by non-market exchange, for which there is a good deal of evidence.}

This orthodox interpretation has recently been criticized by scholars working mainly on the Yangtze Delta: for example, Bozhong Li stresses the ongoing process of economic expansion that occurred then. Li is very critical of the paradigm of a Sung revolution followed by Ming-Qing stagnation, and argues that his research on the development of the agricultural sector in Jiangnan points to continuous “changes in farm technology and land exploitation”, revealing “a long process of gradual improvement and dissemination from the Sung to the Qing” (Li, 2003, p. 175). Other revisionist scholars have not expressed such strong views on the long-term development of income and output per capita before the Qing, but they probably agree with Li that there was no long-term decline, or even a stability in income per capita, but rather (modest) growth (especially) in the Yangtze Delta. In particular, Ken Pomeranz (2000) has made the important point that we tend to compare China as a whole with the most advanced parts of Western Europe – i.e. England –
which biases the comparison. The comparison that should be made is to use data for China and Europe as a whole (Europe as a whole did not expand a great deal in the 1500–1800 period), or alternatively, data for the Yangtze Delta and the North Sea region (or England).

Experts disagree on the development of GDP per capita in China between the Sung and the Qing, but also on the level of Qing real income vis-à-vis Western Europe. In particular, Pomeranz (2000) maintained that income levels in China in 1750 may have been on a par with Europe, and that the Yangtze Delta region may well have been as prosperous as the most developed parts of Western Europe (England and the Netherlands). Maddison (2003, pp. 249–51) rejects those views, however. He derives his 1820 benchmark estimates of GDP per capita in China on the basis of PPP comparisons from the 1990s, combined with time series of GDP per capita for the 1820–1990 period. One of the problems with Maddison’s method is the poor quality of historical national accounting in China; for the period before 1912 no serious studies are available, and the evidence for growth between 1912 and 1949, and indeed after 1949 is shaky (Maddison, 1998). The discontinuities in the time series that are available – caused by the Second World War and the Communist takeover in 1949 – and the inadequate statistics for the period after 1949 are all causes for doubting the accuracy of the time series used to link 1990 benchmark estimates with the early nineteenth century.6

One of the comparisons that can be made is with another country, for which more reliable GDP estimates are available. In a detailed study of income levels and PPPs comparing Java and the Netherlands in the first half of the nineteenth century, I concluded that the Maddison (2001) estimates of the income gap between these two regions in 1820 were about right: Dutch GDP per capita was about three times Javanese GDP per capita (Van Zanden, 2003). Maddison estimates, however, that Chinese per capita GDP in 1820 was lower than the Indonesian level, which is unlikely. From the perspective of Java (and the rest of Southeast Asia), China clearly had a more developed economy, from which it imported entrepreneurship, skilled labour, technology, and capital, as well as manufactured goods. Therefore, Chinese GDP per capita would be expected to be considerably higher than that of Java,

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6 See the important new work by Debin Ma (2008) and Fukao, Ma and Yuan (2007) which will make it possible to acquire firm benchmark estimates for pre-war China.
and certainly higher than the low level (35% of British GDP per capita in 1820) suggested by Maddison.

Appendix 2 suggests a number of ways in which estimates of the relative GDP per capita for China and the lower Yangtze Delta can be derived. The results suggest:

- On the basis of Bozhong Li’s somewhat optimistic assessment of economic performance for the region, it can be concluded that income per capita probably did not increase in the lower Yangtze Delta from 1620 to 1750, but kept pace with population;
- A striking aspect of this economy was that labour productivity in agriculture was (marginally) higher than in industry and services, which may help to explain the development path of China in this period, in particular the slow rate of structural transformation, because it implies that incentives to move labour from agriculture to industry and services were weak. In Western Europe, the Netherlands after 1800 offers a similar case of relatively high productivity in agriculture, resulting in a slow process of structural transformation (Van Zanden and Van Riel, 2004, p. 188 ff.);
- China’s GDP per capita was probably not very different from that of Western Europe as a whole, but significantly lower than in the North Sea region; according to a detailed study by Allen et al. (2005), the same pattern can be found in real wages: in eighteenth century Japan and China they were roughly on a par with real wages in Italy, Germany, and Spain, but real wages in England, Holland and Flanders were much higher than elsewhere;

Are these results consistent with what we know about the long-term development of the two parts of the Eurasian continent? Assume for a moment that the relative level of China in 1750 was indeed 50 to 55% of the English level of 1800 (the standard used in Chapter 8) and remained roughly constant from 1000 to 1800. This compares well with estimates of European GDP per capita discussed in the previous chapter, which may have increased from 38% of the standard (England in 1800) in 1000 to 54% in 1500 and 56% in 1700. After a growth spurt in the Middle Ages, Europe would have been more or less on a par with China during much of the early modern period, in fact from the fifteenth century until the acceleration of European growth in the 1820s and 1830s. Such a scenario is roughly consistent with the Pomeranz’ (2000) interpretation of the Great Divergence.
The next question: did Jiangnan play the same role in the Chinese economy as England and the Netherlands did in Europe? One way to analyze this is to look at the structure of wages and prices. A striking feature of the European economy was the regional structure of nominal (and real) wages. As Van Zanden (1999) and Allen (2001) have shown, in Europe a clear regional pattern in nominal wages emerged in the early modern period: nominal silver wages in the Low Countries and England increased much more than elsewhere, leading not only to a 'Little Divergence' in real wages, but also, and much more pronouncedly, in nominal wages. In the second half of the eighteenth century silver wages for unskilled labourers in London, southern England (Oxford), and Amsterdam were as high as 8.3 to 11.5 grammes per day, whereas in the rest of Europe levels of 3 to 5 grammes per day were usual (ranging from 2.9 in Cracow to 5.3 in Madrid) (Van Zanden, 1999). Entrepreneurs in England and Holland could only pay these wages because labour productivity was much higher around the shores of the North Sea than elsewhere; had that not been the case, they would have lost their competitive position vis-à-vis entrepreneurs in the rest of Europe, and their market share in international trade would have contracted. In reality, it was the high-wage countries that expanded relative to the rest of Western Europe. Therefore, it is possible to conclude that regional patterns in nominal (silver) wages found in Western Europe to a large extent reflect the geography of labour productivity.

If the Yangtze Delta played a similar role in Chinese economic development, a similar lead in nominal wage levels should be expected. The sources collected by a team of five scholars, which were partially presented in Chapter 5 where the skill premium in eighteenth-century China was discussed, do not point in that direction. The best survey of wage levels in the construction industry, the *Wuliao jiazhi zeli* of 1769, shows large regional differences, wages in the south being generally lower than in the north (in Zhili, Manchuria, and Inner Mongolia) (see Map 1). The lowest wages were to be found in the south – in Fujian and Taiwan, and in Henan, where the regulations in a few districts set the lowest wages of .020 tael for unskilled and .030 tael for skilled labourers. In the South average wages for unskilled workers were about .040 for unskilled labourers and somewhat more (.050 to .060) for craftsmen (see Allen et al., 2005). The provinces in the Yangtze Delta, Jiangsu and Zhejiang, which were supposed to have been the most productive parts of the Empire, do not stand out for their wage levels; wages there were representative of the Southern part of the Empire as a whole. By
contrast, nominal wages in the north, in Zhili, Manchuria and Inner Mongolia, were much higher than in the rest of the country.7

The pattern found in China is therefore exactly the opposite of the regional structure for wages in Western Europe, where wages were low in the periphery and high in the core. In Western Europe a high-wage economy developed in the core region of economic development, which seems not to have been the case for China, although, as Pomeranz, Bin Wong, and Bozhong Li have argued, to some extent similar processes of regional and international specialization, proto-industrialization, and agricultural intensification did drive the development process. The differences in regional structure point to the fact that in Europe these processes generated economies of sufficient scale and/or agglomeration to generate the regionally differentiated wage profiles, but this did not happen in China. Instead, it appears as if the availability of land per capita still had a strong influence on nominal and real wages; in the North and West, where the availability of land per capita was relatively high – up to 21 mu per capita in Manchuria, wages were relatively high, whereas the lowest wages were found in Fujian, which also had the greatest population pressure (1.2 mu per capita, according to Wang, 1973). The two provinces in the delta of the Yangtze are in between, but closer to the observations on Fujian (per capita availability of land was about 2 to 2.5 mu there). But there is probably a political dimension to the wage gap between the North and the South as well: conditions in Manchuria, the home country of the ruling dynasty of the Manchus, were maintained at a relatively favourable level, and migration to this area was restricted. The region was a typical ‘periphery’ of southern China, producing large surpluses in the form of bean cake and grains for the south (Yong, 2007).

The striking feature in the structure of Western European wages was that in addition to nominal wages being high in the core region around the North Sea, real wages too were high in the core as well, in spite of the fact that food was relatively expensive in this urbanized region. For China it is not yet possible to estimate differences in the cost of living at the regional level; therefore, we will restrict the analysis to the

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7 This is also confirmed by the wage regression of Allen et al. (2005): the dummies for the North (Manchuria, Beijing) are positive and significant, and wages elsewhere were similar to those of the Yangtze Delta (which was taken as the standard).
Map 1. Nominal wages of craftsmen in construction in China in 1769

Source: Wuliao 1769
comparison of real wages in terms of kilogrammes of rice and wheat that can be bought in different parts of the Empire.

Several studies have documented the close integration of rice markets in the eighteenth century, especially in the Yangtze River valley. The main focus of the rice trade was from the upper parts of the valley to the delta; Chuan and Kraus (1975), for example, estimated that rice prices in the first half of the eighteenth century increased about .030 to .037% per mile (of the price in Suzhou). Shiue (1999) reworked the data collected by Chuan and Kraus and showed that on average rice prices in 1723–35 in the delta were 1.43 taels per shi in Zhejiang (and 1.23 in Jiangsu), declining to .94 in Hunan, .85 in Sichuan, and .73 in Guizhou. Following the coast southwards a similar pattern emerges: rice prices declined from 1.43 tael per shi in Zhejiang to 1.18 in Fujian, 1.08 in Guangdong to .98 in Guangxi. Unfortunately, we do not have the same kind of price data for the years around 1769, and will have to assume that this regional structure in rice prices was similar from 1723–35 (or 1738/40) to 1769. In the long run, only the relative position of the South seems to have changed, as in the nineteenth century Guangdong became a region that heavily imported rice, as a result, in 1909 prices in the South were somewhat higher than in the Yangtze Delta. In the North, wheat and millet were the most important foodstuffs; rice had to be imported from the South and was relatively expensive. For Zhili and Liaoning (Manchuria) we have series of wheat and millet prices showing that in the capital city wheat was about as expensive as rice in the Yangtze Delta (Li 1992; see also Allen et al., 2005). Millet was cheaper, and its relative price varied from 94% of the price of wheat in Zhili to 68% in Fengtian (Liaoning/Manchuria). No price data for Inner Mongolia, Shandong, and Henan could be found (see the discussion of price data in Allen et al., 2005).

The pattern that emerges from Table 12 is not very different from what emerged from the nominal wage data. In fact, the tendency for real wages to be relatively low in the most developed parts of the Empire is even stronger, because prices are the highest in the lower Yangtze (and

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The series of rice prices in Suzhou published by Wang (1992) begins in 1638; it was probably the largest rice market of the Empire, and therefore a good guide to long-term trends. We have taken the average for the years 1767/72 as a basis for calculating real (rice) wages. We also assumed that the structure of nominal rice prices in 1767/71 was the same as in the period 1723–35 (as reconstructed by Shiue, 1999); for Guandong this meant, for example, that we assumed the price of rice was 88% of the price in Suzhou.
in Beijing). In real terms, wages in the North and in the West (Sichuan and Yunnan) are significantly higher than along the southeastern coast – Fujian again emerges as the region with the lowest wage levels. The gap between the North and the Southeast is probably somewhat smaller if the slightly higher nutritional value of rice – compared to wheat – is taken into account, but this would only lead to a small correction.

A comparison with similar estimates for Europe shows that in all parts of China real wages measured in this way were relatively low. European levels of real wages generally varied from about 6 to about 10 litres (rye or wheat) per day; in a few regions, such as in Poland, where rye prices were very low, and in the North Sea region, where nominal wages were relatively high, much higher levels of wheat/rye wages were usual during the early modern period. In the closing decades of the eighteenth century, when grain prices were high, comparable “rye” or “wheat” wages were 8.7 litres in Stockholm, 8.5 litres in Danzig, 5.9 litres in Augsburg, 9.9 litres in Holland and Paris, 8.1 litres in Oxford, and 6.0 litres in Milan (Van Zanden, 1999, p. 185), values which are all higher than for the various regions of China.

Japan: Another Road to Industrialization

How efficient were institutions in Japan? At various places in this book evidence was presented which suggested that Tokugawa Japan was developing institutions that were in many respects almost as efficient as those found in the more advanced parts of Western Europe. Perhaps the most fascinating evidence in support of this conclusion can be found in the data on the development of rice markets in different parts of the country. In Chapter 1 I already presented the outline of the research carried out to establish the relative level of efficiency of rice markets in eighteenth and nineteenth century Japan; here the details are discussed, before we move on to the explanation of the remarkable development of Japanese institutions.

Iwahashi (1981) has analysed the development of rice prices in 14 market towns in from the early eighteenth century to the middle of the nineteenth century; Miyamoto (1988) and Bassino (2008) have used these data to show the high degree of correlation between them, even if they were at considerable distance from each other. Figure 36 pictures the development of these prices over the 1710–1860 period, and illustrates the high degree to which they move in the same direc-
tion. Prices in the far north are generally the lowest; those in Dewa are consistently at the bottom of the price range, whereas the highest prices are found in market town such as Nagoya which are situated between the two largest cities, Osaka and Edo (Tokyo). The explanation for this is that the Tokugawa taxation system demanded that land taxes were partially paid in kind; the rice had to be transported to Osaka, where it was delivered to the tax authorities – part of it was directly shipped to Edo and Kyoto to feed the royal households there. As a result, Osaka became the central hub of the rice trade; information about prices there was also instrumental in price formation in other

<table>
<thead>
<tr>
<th>Region</th>
<th>Unskilled</th>
<th>Price of rice/wheat (tael per shi)</th>
<th>Real wages in litres of rice or wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manchuria</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liaoning</td>
<td>.057</td>
<td>1.55</td>
<td>3.79</td>
</tr>
<tr>
<td><strong>North</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zhili</td>
<td>.062</td>
<td>1.74</td>
<td>3.67</td>
</tr>
<tr>
<td>Gansu</td>
<td>.047</td>
<td>1.35*</td>
<td>3.59</td>
</tr>
<tr>
<td>Shanxi</td>
<td>.054</td>
<td>1.55**</td>
<td>3.59</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>.044</td>
<td>1.45**</td>
<td>3.10</td>
</tr>
<tr>
<td>Shandong</td>
<td>.045</td>
<td></td>
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<tr>
<td><strong>Middle</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Henan</td>
<td>.037</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jiangsu**</td>
<td>.040</td>
<td>1.80</td>
<td>2.29</td>
</tr>
<tr>
<td>Zhejiang**</td>
<td>.040</td>
<td>2.09</td>
<td>1.97</td>
</tr>
<tr>
<td>Hunan</td>
<td>.039</td>
<td>1.38</td>
<td>2.92</td>
</tr>
<tr>
<td>Sichuan</td>
<td>.048</td>
<td>1.24</td>
<td>3.97</td>
</tr>
<tr>
<td>Yunnan</td>
<td>.048</td>
<td>1.62</td>
<td>3.04</td>
</tr>
<tr>
<td><strong>South</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fujian</td>
<td>.030</td>
<td>1.73</td>
<td>1.79</td>
</tr>
<tr>
<td>Guangdong</td>
<td>.040</td>
<td>1.58</td>
<td>2.61</td>
</tr>
<tr>
<td><strong>Average (weighted by population)</strong></td>
<td>.044</td>
<td>2.86</td>
<td></td>
</tr>
</tbody>
</table>

* on the basis of millet prices  
** on the basis of the price difference between Gansu and Zhili, assuming that prices fall with distance from Beijing  
Sources: Allen et al., (2005) (Wuliao), and the price data discussed in the text
market towns. It should be added that in particular in the eighteenth century the prices collected by Iwahashi (1981) are often ‘official’ prices set by han government authorities, which were used to convert their rice and cash entries as well as payments. Iwahashi suggests that if averaged out for a reasonably long period, those government-set prices were not very different from market price levels, but it is very likely that year-to-year fluctuations were dampened down. In the course of the nineteenth century the system became liberalized, and Osaka lost some of its central market power as a result; as Figure 36 already suggests, the degree of covariation between rice prices appears to have decreased in this period.

Figure 37 confirms this; in fact, the relationship between distance and covariation of rice prices between 1710 and 1759 is almost flat at a very high level. This suggests perhaps that government officials had a large impact on these prices, and that they followed Osaka prices very closely and were well informed about them. During the second period, 1760–1809, price fluctuations were less violent than during the first fifty years for which we have these data, which may also help to explain the decline in covariation. The relationship between distance and correlation during the third period is very similar to the one observed during 1760–1809, but prices fluctuation do increase quite a lot during these years. To illustrate these changes: the coefficient of variation of prices in the Osaka market first fell from .43 in 1710–1759 to .18 in 1760–1809, and then increased again to .28 in 1810–1859 (developments in other markets were very similar).

As demonstrated in Chapter 1, the level of market integration of Japanese rice markets was very high – much higher than in India (or Indonesia) in the same period, and comparable to the most developed parts of Western Europe and China. The variability of rice prices was relatively high however; in the early eighteenth and the first half of the nineteenth century price fluctuations were sometimes quite extreme,

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9 Linked to this, as early as the seventeenth century the merchant houses in Osaka developed a capital market (related to supplying credit for their commercial transactions) that had a high level of sophistication and relatively low interest rates (12–15%). In the same environment a futures market for rice developed which has been identified as the first futures market in the world, although this may be not completely accurate; Amsterdam developed a futures market before Osaka (Gelderblom and Jonker, 2004).

10 Osamu Saito was so kind to point this out to me; email correspondence 18–7–2008.
and higher than in Western Europe. Part of the explanation may be the absence of foreign trade, which was very much restricted by the Tokugawa state, and which would have helped to stabilize rice markets in times of harvest failures or alternatively, large food surpluses. This may help to explain the fact that a well developed market system did not stop large famines occurring (Hayami, 2001, pp. 46–49; Tsuya and Kurosu, 2005). Whereas in the North Sea region the correlation between grain prices and death rates became very weak or zero (Galloway, 1988; Noordegraaf and Van Zanden, 1995), such a link continued to be quite strong in Japan (Tsuya and Kurosu, 2005).

Famines may have played a role in stabilizing the population development of Tokugawa Japan. Its population grew rapidly during the seventeenth century (when it increased from 18.5 million to 27

Figure 36. Rice prices (in silver) in 14 Japanese market places, 1710–1859
milion), but this growth came to a halt during the eighteenth century, only to resume slowly during the first half of the nineteenth century. By contrast, there is evidence that GDP per capita was growing in the eighteenth and early nineteenth, although the exact timing of the growth is still unclear (Miyamoto, 2004). Saito (2005a, pp. 86–7) discusses the available evidence and concludes that real income per capita may have increased by about 30% from 1700 to 1870; at the same time, real wages went up by about 18%, which is again exceptional for a pre-industrial economy. As Saito (2005a, pp. 81–2) demonstrates, real wage growth was largely the product of the eighteenth century, and he suggests that real income per capita moved in tandem with real wages: growth in the Kinai region (the core of the Tokugawa economy) was most rapid in the eighteenth century, but slowed at the end of that period. Japan may have been one of the few economies in the world, which was generating long-term per capita income growth in the century before 1800.

Is there a demographic dimension to the Japanese story as well? The incidence of famines may have played a role in stabilizing the population

![Graph showing the relationship between distance and covariation of rice prices, Japan 1710–1859](source: Iwahashi (1981))
after about 1700, but other demographic developments were perhaps equally important. In Western Europe the rise of the European Marriage Pattern played a key role in the further development of the market economy and in human capital formation. The Japanese family system was different from that of China or other parts of Asia; Arthur Wolf and Susan Hanley (1985) have claimed that the differences between China and Japan are as fundamental as those between Eastern and Western Europe. In large parts of Japan, in the more commercialized south-west in particular, the average age of marriage was much higher than in China, and was increasing substantially during the eighteenth and nineteenth century to get to levels (22–25 years for women) that were not unusual in Europe (Saito, 2005, pp. 169–171). It was not a marriage based on consensus, however; the age gap between men and women was high by European standards (4–8 years), and marriage remained quasi-universal (only 2% of women did not marry) (Hayami, 2001, p. 107). It was also patri-local, and the living together of three generations was quite normal; in a sample of 8989 households analyzed by Saito, 91% had at least one member – a grandfather/mother or a grandchild, which one would not find in the small nuclear families of Western Europe (Saito, 2005c, p. 168). Why the age of marriage of men and women went up, is still not completely clear, however. A link with economic modernization has been suggested, because it occurred in particular in those parts of Japan that underwent rapid commercial change, but, as in the European case, other institutional factors such as different systems of property transfer between generations also may have played a role (Hayami, 2001, pp. 161–177; Murayama, 2001). In the Western parts of Japan, where the position of women was traditionally relatively strong, ‘modern’ systems of family formation emerged with high average ages of marriage; perhaps it is no coincidence that this is also the region where the growth of education was most rapid (cf. the map in Rubinger, 2007, p. 183). This suggests that also in Japan there was a link between changes in the demographic regime and the increased level of human capital formation that can be found there.

Summing up, Tokugawa Japan saw the rapid development of a market economy – an ‘economic society’ is the term used in the Japanese literature (Hayami, 2004) – within the stable environment of the Tokugawa state. This, possibly in combination with demographic changes, led to a rapid growth of investment in human capital, as is for example clear from the booming demand for books. In the eighteenth century, Japan
may have been the only region outside Western Europe that increased its income per capita consistently and invested strongly in human capital, especially towards the end of the eighteenth century, when school attendance began to grow rapidly. Japan emerged from this period much better equipped to deal with the challenges of a globalizing world dominated by industrialized countries. As was demonstrated in Chapters 5 and 6, where we used proxies of eighteenth-century human capital formation (skill premium and book production) to predict growth during the nineteenth century ‘Great Divergence’, Japan demonstrated the predictive qualities of the approach developed here. Its rapid growth during the nineteenth century was consistent with the global patterns found. It is China that is the real outlier, because it seemed almost as ready as Japan to profit from the new opportunities of the nineteenth century, but was unable to do so.

Conclusion

Summing up this brief review of some of the evidence about the long term growth paths of other relatively developed parts of Eurasia, a number of conclusions can be formulated. Firstly, there were different roads towards more or less efficient institutions that made possible high levels of market exchange. The European road emerged in a period of weak (or even absent) states, and was characterized by strong ‘bottom up’ institutions, which made possible the combination of a fragmented state systems and rapid commercial development. The ‘alternative’ road was one in which a strong state – an empire such as the Qing, Tokugawa Japan, and perhaps as the Roman Empire, and the Abbasid and Ottoman Empires – withdrew from direct intervention in product and factor markets, and created sufficient space for ‘free entreprise’ to emerge and to prosper. This second road had certain advantages: those empires knew a great deal of uniformity in terms of institutions regulating exchange, which was sometimes – paradoxically – enhanced by state intervention into markets for essential foodstuffs (rice, wheat) to guarantee the proper functioning of those markets and in particular to ensure the food supply of the capital city. Other advantages of this road towards efficient markets was that these empires often knew one language, which also reduced transaction costs, and that of tariff barriers were absent within its borders. Large empires could offer stability, but only as long as they lasted, of course; the decline of the urban system
of the Arab world between 1100 and 1400 was intimately linked to the disintegration of the empire on which it was dependent, as we have argued elsewhere (Bosker, Buringh and Van Zanden, 2008).

Perhaps more important is that these empires did not create the kind of trust and secure property rights that made possible the emergence of truly efficient capital markets, and of labour markets on which a very large share of the population was active (as we saw in Chapter 1). The comparison between Western Europe on the one hand, and the Arab World and China on the other hand, suggests that the Latin West, after having been a marginal part of the world economy before 1000, was able to catch up quickly during the High Middle Ages. In the fourteenth and fifteenth centuries levels of income per capita there may already have been on a par, and perhaps even higher than in other parts of Eurasia. This was also due to the fact that the European market economy reacted in a flexible way to the challenge of population decline following the Black Death of 1347/48, whereas in other parts of Eurasia this demographic catastrophe may have lead to a collapse of the economy. The second growth spurt of the European economy – between 1370 and 1470 – was induced by the change in factor prices; high labour costs in combination with rapidly declining interest rates and sharply declining skill premiums set Western Europe on a new growth trajectory of capital using and labour saving technologies (such as the printing press).

The comparisons presented here also leave many questions unanswered. Japan appears to have been a special case of the ‘second road’ to modernity. One reason is perhaps because we find changes at the micro-level that made possible sustained growth in human capital formation and increased levels of participation in labour and capital markets, developments which may have been rather similar to the emergence of the European Marriage Pattern analysed in Chapter 4. Much more comparative research into these developments is necessary before firmer conclusions can be drawn, however. It also leads to new questions about regional variation in demographic patterns in China; did the most advanced parts of China also develop new patterns of demographic behaviour? It would also be good to know more about the reaction of Japan and China (and other parts of East Asia, such as Korea) to the fall in population following the Black Death, as this may tell us more about the character of these economies in this period. Shortages of data have limited the answering of these questions.
until recently, in particular concerning Sung, Yuan and Ming China (and pre Tokugawa Japan), but new research is underway which will provide new data and new insights into the long term development of these economies. Clearly this will change our perspective on these issues in the future.
CONCLUSION

‘A MILLION MUTINIES’

Why did the Industrial Revolution take place in England in the eighteenth century? What explains the genesis of an industrial society in northwestern Europe in this period? This is the key question addressed in this book. The focus was on the long prologue necessary to reach the critical ‘take off’. To do this, we had to go back to the high Middle Ages, to identify the institutional basis for the dynamic development of the European economy in the centuries that led to the industrialization of the eighteenth century. From 1780, when the growth of industrial output accelerated, back to 975, when the ‘Peace of God’ movement began, is a long and complex story. The crucial steps identified are:

A. The Industrial Revolution did not just suddenly appear, but was the result of a process of growth and structural transformation that had begun in the first decades of the seventeenth century, a process that also took place in other parts of the North Sea region, in particular the Netherlands.

B. The driving force behind this first phase of modern economic growth was the world market that emerged in the sixteenth century. Both the Netherlands and England expanded rapidly because they managed to capture increasingly large shares of international services (trade, transport, and finance) and enlarged their share of key export industries.¹

C. They managed to do this because they had efficient institutions, resulting in low interest rates, a large supply of skilled and unskilled labour, and high levels of human capital formation. Both countries also experienced the emergence of a ‘fiscal-military’ state, modelled after the medieval city state. They used the power of the state to enhance the interests of the commercial elite. The new states arose from conflicts between absolutist monarchs and their elites, during the Dutch Revolt and the English Civil War.

¹ Cf. Acemoglu, Johnson and Robinson (2002, 2005); I see not contradictions with their findings, but stress the pre-1500 roots of the rise of the Atlantic economy on which they concentrate; see also Bosker, Buringh and Van Zanden (2008).
D. The Industrial Revolution was the product of specific interactions between incentives, economic structures, knowledge accumulation and human capital formation. Incentives, such as the desire to save on scarce, expensive labour, were supplied by changes in economic structure; the accumulation of useful knowledge in Western Europe in the centuries before 1800 was closely linked to the growth of human capital that began during the Middle Ages and accelerated in the late Middle Ages due to improved institutions (which led to lower interest rates), new technologies (printing), Protestantism (which was as much effect as cause of the new developments), and the growing demand for skilled labour in the rapidly growing cities (in particular in the North Sea region). It is possible to establish a close link between levels of human capital formation (as measured by the skill premium and/or book production) and economic performance – in fact, this made it possible to successfully ‘predict’ the performance of countries during the ‘Great Divergence’ of the nineteenth century.

E. To explain why it was only in the North Sea region that these new institutions emerged – or in fact, only there that the institutional revolution of the Middle Ages was brought to its logical conclusion – we analyzed the transformation in underlying demographic structures in this region, i.e. the emergence of the European Marriage Pattern (EMP) in the late medieval period. This was seen as an adaptation of demographic patterns to the new market environment (or rather, a process of co-evolution of demographic structures and markets). The EMP in turn led to an increased participation in the labour market, greater involvement in capital markets, and higher levels of human capital formation for both men and women, which became a particular feature of this part of Western Europe.

F. The EMP and the breakthrough to a market economy that occurred in the North Sea region in the late Middle Ages built on the institutions that had emerged during the high Middle Ages. In the rest of Western Europe the dynamic institutional and economic development that had taken place from 950–1300, was not continued in the early modern period; the economies of Southern and Central Europe were by and large stagnant from 1500 to 1800, or fell victim to processes of decline, as happened to Italy. This was in sharp contrast to the brilliant, pan-European process of economic growth occurring in the high Middle Ages. We have also suggested that this ‘Little Divergence’ within Europe, e.g. the stagnation of Southern
and Central Europe, was linked to institutional failures, such as the rise of absolutism, which suppressed the more ‘balanced’ institutions that had emerged in the Middle Ages, and the return of serfdom in parts of Central Europe.

G. Our analysis of institutions and institutional change was supported by various quantitative measures of the efficiency of institutions; it was argued that interest rates, the skill premium, levels of market participation, and of market integration can all be used to understand the degree of efficiency of institutions regulating market exchange and the protection of property rights. Based on global datasets that included these criteria, or an inventory of studies of these measures, we were able to establish that from the late Middle Ages onwards institutions in Western Europe – and in particular in the North Sea region – were relatively efficient, and that in particular ‘vertical’ institutions were more efficient than in other parts of Eurasia. Only late Ming and Qing China and Tokugawa Japan had institutions, especially horizontal institutions that were able to compete with those of Western Europe. In the final analysis, the process of modern economic growth that began in seventeenth and eighteenth-century England was based on these efficient institutions that had emerged in late medieval Europe.

H. The key characteristic of those efficient ‘vertical’ institutions of Western Europe is that they protected the powerless against the those in power; this ‘balance of power’ was the result of 1) the ‘right’ legal ideas (coming from the Papal revolution and its consequences) about the ‘rule of law’; 2) the importance attached to the written word as a superior source of ‘truth’; and 3) the solution of collective action problems by a ‘bottom up’ process of institution building, in which corporations (universtates) played a key role. As a result, power became constitutionalized, defined and restricted by the written word, and negotiable, potentially the subject of negotiations between the parties involved, and therefore also partiable. This was a fundamentally different conception of power than we find in most non-European societies in this period (and in Antiquity), where power was in principle unified, top-down, and monolithic.

I. The crucial importance of these ‘bottom up’ institutions distinguishes the Western European development path from that of East Asia, where the emergence of a market economy under the Ming and the Tokugawa was the result of a top down process of laissez faire policies. This might help to explain why in Western Europe with
its very different political economy, vertical institutions were more efficient, resulting in very low interest rates, whereas horizontal institutions in the East may have been superior to those in the West. The importance of this conclusion is stressed by the fact that recent research suggests that vertical institutions are much more important for explaining long term economic performance than horizontal institutions (Acemoglu and Johnson, 2005; Bosker, Buringh and Van Zanden, 2008).

Another way to summarize the contents of this book is to look at its different layers. First, we attempted to sketch the genesis and long-term trajectory of institutions that for the most part arose during the high Middle Ages in Western Europe. Examples of these are the rule of law, the corporate body (such as the guild), the European Marriage Pattern, and the notion of citizenship. Next, we analyzed the relative efficiency of these institutions – how they reduced transaction costs and enhanced market exchange – by looking at relative prices reflecting institutional performance, such as interest rates, the skill premium, book prices, and at the depth and breadth of factor markets, the share of the population that participated in labour and capital markets. We then tried to establish how the relatively efficient institutions affected the process of human capital formation and knowledge accumulation that occurred in Western Europe by measuring these processes, using indicators such as book production and consumption, the growth of literacy, and, again, the skill premium. The final step in the argument was to link human capital formation to economic performance, showing that countries and regions with high levels of human capital formation also experienced relatively rapid economic growth. Such an association emerged when we looked at regional patterns within Europe, contrasting the North Sea region with the rest of the continent, and when we compared Western Europe with the rest of Eurasia, to account for the ‘Great Divergence’ of the nineteenth century.

The specific European development path analysed here, began in the centuries after 950 as a result of the two processes – top down and bottom up – analysed in Chapter 2. It was in a situation of weak or non-existent states, that a wave of institutional gadgets occurred that laid the foundation for the institutions that still govern European society and economy. What is perhaps new in this approach is that the Catholic Church played an important role in the process. The Church also helped to lay the foundation for the second stage in the long tale
of ‘a million mutinies’ when it began to preach that marriage should be based on consensus between the spouses. Together with the development of the labour markets and specific institutions for intergenerational transfers, which were relatively favourable for women in the ‘Germanic’ northwestern parts of Western Europe, this led to the emergence of the European Marriage Pattern, a distinctive institution in the North Sea region from the fourteenth and fifteenth centuries onwards. As was pointed out above, the essence of the European Marriage Pattern was that it was relatively democratic, that a balance of power of sorts existed between men and women, and between parents and children. Moreover, it was a household and family system geared to the market economy, highly dependent on wage labour in the various stages of the life cycle, closely interrelated with capital markets as, for example, children no longer lived with their parents. More than other systems of household formation, it invested in human capital, especially during the many years before marriage. We have argued that the second stage in the emergence of a knowledge economy was driven by these adaptations to the market economy at the micro level.

Part of the medieval institutional legacy also included new concepts (or rather, renewed and reinterpreted concepts) in the relationship between the (city-)state and its citizens, which were relatively efficient, and helped lower transaction costs in the crucial exchange between citizens and (city-)state. The concept of citizenship also formed the basis for a reinterpretation of the relationship between the nation state and its inhabitants, which began in England in the middle decades of the seventeenth century, and would form the basis for the ‘Atlantic Revolution’ of the post-1776 period. Also in this sense, the democratic traditions established in the Middle Ages continued to play an important role in the further development of new parliamentary institutions in Western Europe.

Thus at four levels – the micro level of the household, the meso level of communes, guilds, and universities, the macro level of the state, and the meta level of the law – relatively democratic institutions originating in the high Middle Ages were at least partially the result of bottom-up processes of institution building. The big wave of institutional design of the 10th–13th centuries occurred in a political vacuum resulting from the disintegration of the Carolingian empire, and more generally, the weakness of earlier, Greek-Roman traditions. Institution building in Europe was driven by the collective actions of citizens who established communes, students and scholars who set up universities, merchants
and craftsmen who designed guilds, and peasants (and lords) who created commons. There is an unbroken democratic tradition from the beginning of the communal movement in the eleventh century, via the reign of the Popolo in thirteenth-century Italy, the guild movement emerging in the Low Countries after 1302, the Dutch Revolt of the final third of the sixteenth century, to the English and Glorious Revolutions of the seventeenth century and the French Revolution of 1789. It is significant that even the latter revolution initially used a medieval institution – the States General – to organize its specific form of collective action, as all major revolutions had done before 1789.

Why were such democratic institutions relatively efficient? The main answer suggested here is that these special vertical institutions made it possible to protect the property rights of those without power. Another factor is that democratic procedures – both in corporate bodies such as guilds or communes and in states based on citizenship – offer transparent ways to change the ‘rules of the game’. Economists and economic historians often focus on how to develop efficient institutions, but perhaps one of the key problems is how to develop efficient ways of changing suboptimal rules of the game. Economic development implies that institutions have to be adapted to changing circumstances. At the same time, institutions often favour certain social groups which may work to the disadvantage of others; every change in the rules of the game will have its winners and its losers. A society needs meta-rules to change institutions, and these meta-rules should be transparent and acceptable to all. Democratic procedures solve this problem: they can in principle be accepted by all, and can offer a balance between stability of the meta-rules and flexibility of the rules themselves that may often be optimal – or at least less sub-optimal than other systems. In this context it is useful to refer to Churchill’s famous quote that ‘Democracy is the worst form of government, except for all those other forms that have been tried from time to time.’

The argument that it was the ‘bottom-up’ institutions that created the favourable institutions for long-term economic expansion is strengthened by the temporal and regional patterns of development. The high Middle Ages were arguably the most dynamic and innovative period before 1800, when almost all parts of Western Europe went through a process of radical economic change. From having been a relatively backward part of the world economy in the tenth century, beginning in the thirteenth century it became the most dynamic region, while other
core areas – the Middle East in particular, and perhaps also China – showed signs of stagnation. Large parts of Western Europe, however, were also unable to sustain this economic dynamism. In particular the South (Italy and Spain) and the middle (Germany), which had been very dynamic during the Middle Ages, found it difficult to maintain the pace. These regions were clearly on the decline in the early modern period in relative and perhaps even in absolute terms. Whereas growth was a pan-European process in the centuries from 900 to 1300, after 1500 it became restricted to the North Sea region. And it was this region that maintained, stabilized, and further developed the democratic heritage of the medieval period. In Southern and Central Europe there was a struggle to defend this heritage after 1500. We have analyzed the return of patriarchy, which was particularly strong in those regions, from Lutheran Germany to Catholic Spain. The growth of strong territorial states and the development of absolutism suppressed aspects of the democratic heritage, which was especially true for the independence of cities in France and Spain. From a pan-European perspective, the early modern period can almost be described as a phase of stagnation between the dynamic, democratic Middle Ages and Hobsbawm’s ‘dual revolution’ of 1789–1848, when newly defined democratic and economic institutions emerged to usher in another long period of strong economic growth. What linked the two phases of European expansion were the developments in the North Sea region from 1400 to 1800, where institutional change continued – at both the micro level of the household and, in a later stage, the macro level of the state – and growth continued.

Of course, seeing the early modern period only in terms of stagnation in the greater part of Europe would be an exaggeration. Perhaps the term ‘Smithian economic growth’ – a process of growth driven by urbanization, population growth, and specialization – is more to the point. Such an interpretation implies that advances in technology were relatively slow and that strong incentives for labour-saving technological change were absent in large parts of Europe because real wages were declining. We see ongoing processes of proto-industrialization, of ‘Boserupian’ growth in agriculture, leading to higher yields but probably not to higher labour productivity, of productivity advances due to economies of scale and learning effects in certain key industries, such as paper making, printing, iron making, shipbuilding, but much of this progress was concentrated in the North Sea region, and outside this area it was not sufficient to generate genuine per capita income growth.
The long-term trajectory of economic change in large areas of Western Europe, characterized by sudden expansion in the Middle Ages and followed by a long period of stability, if not stagnation ‘at a high level’, was not very different from the path of economic development followed by China or the Middle East in the same period, although the peak in their performance may well have predated that of Western Europe. It was the North Sea region that continued to expand during the early modern period, and this made the difference between Western Europe and the rest of Eurasia; the ‘Little Divergence’ giving rise to the ‘Great Divergence’.

The analysis of various indicators of institutional efficiency and human capital formation showed that Japan and China were different from the rest of Eurasia. From late Ming China and Tokugawa Japan, there is a great deal of evidence of a flourishing book trade and a growing demand for books, although per capita it was no match for Western Europe; of a growing sophistication in market exchange and high levels of market integration; of a relatively low skill premium in China and perhaps also in Japan; and of improvements in capital markets leading to much reduced interest rates. It is reassuring to find in these cases the same kind of correlation between the efficiency of institutions and levels of human capital formation. During the nineteenth century, Japan developed much as our theory would predict: its efficient institutions and high levels of human capital enabled it to deal with the challenge of being ‘opened up’ by the West, and rapidly copied Western technology and some vital institutions. China, which had a slightly less favourable starting point, was much less successful, and very much the outlier in this respect: its development was much slower than might have been expected. Perhaps the crucial difference was that in Japan the reformers, after the Meiji Revolution of the 1860s, used the state to introduce key reforms, whereas the Chinese state did not play a similar role during the nineteenth century. The important point to make here is that although I have stressed the specific development of Western Europe since the Middle Ages as an explanation for its long-term success, the examples of Japan and China demonstrate that there were different roads to a ‘modern’ economy of efficient institutions and high levels of human capital formation. In Western Europe bottom-up processes and insti-

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2 The story is probably much more complex, as the story of the silk industry demonstrates, see Ma (2004).
tutions played a major role. In Japan and China ‘modern’ institutions came into existence when the state withdrew from direct intervention in the economy and decided to leave things to the market, as happened in late Ming and Qing China and in Tokugawa Japan.

One of the other issues we distinguished in the introduction was the link between human capital formation and economic growth, and in particular the role human capital formation played in generating the transition to modern economic growth. Some theorists predicted that increased human capital formation was linked to the genesis of a different demographic regime, which would result in a change from quantity to quality of offspring. In Chapter 4 we indeed identified such a fundamental change in demographic regime: the emergence of the European Marriage Pattern in late medieval Western Europe. Again, its foundations were established during the high Middle Ages. Moreover, we saw that increased book consumption had a significant effect on the emergence of national states (Baten and Van Zanden, 2008). For the same period Davin Chor (2005) has likewise shown that a low skill premium led to relatively high real wages, again indicating that high levels of human capital formation enhanced economic growth. Another factor mentioned in the new growth literature as a cause of sustained human capital formation was technological change in the production of ‘scientific’ knowledge. The invention of the printing press, with its long-term consequences for the growth of a mass market for books (because of its significant reduction of production costs), has been identified as a major technological breakthrough which greatly enhanced the productivity of scientific labour. It also led to increased investments in this sector of the economy, cumulating in the scientific revolution of the seventeenth century, the basis for the Industrial Enlightenment of the eighteenth century (Eisenstein, 1979). These processes set in motion the cumulative growth of human capital formation and economic expansion in the North Sea region.

One of the final issues addressed by this book is the causality between more efficient institutions and increased human capital formation, which in its turn enhanced economic growth. Such a view was recently criticized by Glaeser et al. (2004), who, in a critical review of Acemoglu, Johnson and Robinson (2001), made the point that human capital may cause both growth and subsequent institutional improvement, meaning that the more efficient institutions of northwestern Europe can perhaps also be seen as the result of previous human capital formation, and not the other way around. That there is a link between human capital formation
and institutional development may seem obvious. We already saw that it was probably no coincidence that the two successful revolutions of the early modern period occurred in the Low Countries and in England. These are good examples of the link suggested by Glaeser et al.: that a high level of human capital formation and a strong civil society are required for revolutions to be successful against an established regime and to develop more democratic institutions. The Dutch Revolt and the English Revolution are telling examples of the complex search for more efficient institutions in Western Europe (especially in the North Sea region), a search that was relatively successful because the institutional frameworks facilitated a great deal of input ‘from below’.

Our findings led us to reconsider the beginnings of the Industrial Revolution. As argued by Allen, the ‘wave of gadgets’ that is the central feature of the process, needs to be interpreted against the background of the specific factor costs and relative prices in eighteenth-century England. Real and nominal wages were relatively high there, whereas the cost of capital goods and energy were low, caused by low interest rates, an abundant supply of relatively skilled labour, and easy access to coal. Additionally, we were able to demonstrate that the growth of total factor productivity – perhaps the most distinguishing feature of modern economic growth – had already begun in the first half of seventeenth century, a century and a half before the ‘official’ start of the Industrial Revolution. The industrialization that occurred during the (late) eighteenth century was the transformation of an economy that had already undergone consistent productivity growth for more than 150 years – a productivity growth that was ultimately based on the ‘million mutinies’ of women and men, craftsmen and merchants, peasants and labourers, which generated the kind of institutions that would set Western Europe on the road to the Industrial Revolution.
APPENDIX ONE

FURTHER EXPERIMENTS WITH THE COBB DOUGLAS PRODUCTION FUNCTION: ITALY AND WESTERN EUROPE

The same experiment with a Cobb Douglas production function was carried out for Italy, and for Western Europe as a whole. For Italy we have the point estimates of GDP and population by Malanima (1998, 2003). Because his estimates relate to northern Italy, we are dealing with a relatively urban society here, in which land played a smaller role than in England. Italy was also more or less self-sufficient in foodstuffs, which means that we probably do not have the problems encountered in the case of Holland. I assumed shares in GDP of 15% for land, 60% for labour, and 25% for capital, but also experimented with a model with radically different shares (25%, 40% and 35% respectively) to find out how sensitive the estimates are to this assumption. Cultivated land remained basically unchanged between 1300 and 1800, the labour input increased with population (and I experimented with a decline of working days from 250 to 200 between 1350 and 1450 followed by an increase from 200 to 250 between 1500 and 1600), and the capital stock in 1300 was determined by its share in GDP of 25% (or 35%) and an interest rate of 20%. For the first decades of the 14th century the Allen (2001) wage series (which begin in 1326) was supplemented by the wage series published by Malanima (2004).

Figure 38 presents the result of the simulation: real wages rise in the second half of the fourteenth and first half of the fifteenth century by about 60% on average (less than in England), and begin to fall after c. 1450, a decline that is almost continuous but slow until about 1750, and accelerates in the second half of the 18th century (according to Malanima (2004) the Allen estimates overestimate the decline after 1750 however). This pattern can be matched by the model assuming 1) that the investment rate was 4.5% initially and 2) that between 1348 and 1400 there was continuous growth of total factor productivity of 0.40% annually, the rate of which fell constantly to zero between 1400 and 1450, and 3) that after 1450 the investment share also declines to a mere 1% of GDP, at which very low level it remains until the end of the eighteenth century (and, if the simulation was to follow the sharp
decline of real wages after 1750, investment would have to fall to less than that, but in the results presented here investment remains at 1%). The alternative experiment (with a much lower share of labour in GDP) started with the same assumptions, but needed a more modest rate of technological progress after 1340 (of .20% between 1349 and 1420) and a slightly higher level of gross investment after 1450 (of 2% annually); the second experiment may therefore be somewhat more realistic.

Figure 39 pictures the resulting estimates of GDP per capita (of the two experiments). In the very long run both sets of estimates seem to concur, but the model in both cases predicted a strong increase in the sixty to eighty years after the Black Death, which is missing from the Malanima estimates. Between 1450 and 1550 the Malanima estimates and the results of the Cobb Douglas simulation converge again, and for the rest of the Early Modern period the two approaches give more or less similar results (but note that if the simulation had followed the decline of real wages after 1750 according to the Allen estimate more closely, the fall in GDP per capita would have been larger than Malanima (2003) estimated). Differences with England in the same period are striking:
there the increase in real wages is higher (but the population decline is also larger: almost 60% in England versus less than 30% in Italy), and real wages remained on a relatively high level until the first quarter of the 16th century, whereas in Italy they declined strongly after 1450. This is also reflected in different trajectories of GDP per capita: in England the growth between 1350 and 1450 resulted in more or less permanently higher income levels, whereas in Italy the gains were not consolidated after 1450. Apparently, during the century or so after the Black Death (northern) Italy was a very dynamic economy, with a consistent rate of productivity growth for 70 to 100 years, but this dynamism completely disappeared after c. 1450. By contrast, England remained very dynamic in the long run, and per capita growth was ‘only’ interrupted by the population explosion of the 16th century. After about 1600 the same dynamism (in terms of the growth of total factor productivity) returned in England (and the Netherlands), whereas no such thing happened in Italy (and in other European countries).

The three countries this appendix has concentrated on so far, are all rather exceptional: Italy because of its strong long-term decline, Holland and England because of their dynamic development. In between these two extremes were the other European countries, of which the GDP per capita may not have changed very much between 1500 and 1800. In principle the experiment can be carried out for all countries for which we have long-term series of real wages and population estimates, but in order to make a long story short, I experimented with Europe.

Figure 39. Italy: GDP per capita, estimated and simulated, 1300–1800
(1310/19 = 100)
Allen (2001) has estimates for the development of real wages in (capital cities of) Italy, Spain, France, Austria, Germany, Poland, the Low Countries and Great Britain, which can be weighted with their respective populations to get a series for real wages in Europe. The following standard assumptions are used in this version: share of labour 60%, of capital and land both 20%; cultivated land increases by 5% per century; capital stock is estimated on the basis of an interest rate in 1500 of 12%; working days per annum increases from 200 in 1500 to 300 in 1800.

The results are presented in Figure 40; this simulation assumes a very low investment ratio (of only 2%), and no technological change. The general pattern of the simulation is rather similar to that of the estimated wage series: rapid decline during the sixteenth century, stabilization between 1600 and 1750, followed by another decline after about 1750. The long term development of European wages seems to follow a path that can be simulated by a Cobb Douglas production function assuming no technological change and a very low level of new capital formation; the different phases of population growth (in the sixteenth century and after 1750) then produce the pattern estimated by Allen. It is also clear that the divergent development of real wages in England and Holland – where wages began to rise again during the seventeenth century as a result of productivity growth – has a very limited impact on the European average. The reason for this was that their combined population was quite small, although as a share of European population it grew from slightly less than 6% in 1500 to 9% in 1800.

Estimates of the development of European GDP per capita that can be derived from this experiment all give a rather bleak picture: assuming a 50% increase in working days per annum over the whole 1500–1800 period gives an in the long run almost flat curve (Figure 40), with some decline during the sixteenth century and a small recovery in the next 150 years. In order to get a little per capita growth (consistent with the estimates of Table 10), one has to assume an even larger increase in labour input per head of the population, which is unlikely to have occurred however.
Figure 40: Europe: real wages, estimated and simulated, 1500–1800 (indices 1500 = 100)

Sources: see the text
One way to approach this problem is to try to fit China (or parts of China) in a model used for estimating GDP per capita in pre-industrial Europe, which took data on the structure of the labour force and the level of real wages to estimate the level and development of GDP per capita from 1500 to 1800 (see Van Zanden, 2005b). Allen (2001) made estimates of real wages for farm workers in 1750, indicating that Chinese wages were 82% of the English level. A more detailed study by a team of scholars came to more pessimistic conclusions; they estimated it may have been about half the English level (Allen et al., 2005). To be on the safe side, we will use the higher of these two estimates, realizing that we are probably overestimating GDP per capita in China. Additionally, we need estimates of the structure of GDP and/or the labour force. For the beginning of the nineteenth century, Rozman (1973) estimated that agriculture contributed 70% of GDP, which can be taken as a rough estimate for China as a whole. More detailed estimates can be derived for the Yangtze Delta, the most developed and prosperous part of the Empire. Jack Goldstone (2002) used the detailed estimates of Li Bozhong (1998) for the size and structure of the rural economy in Jiangnan (part of the Yangtze Delta) to derive a set of estimates for income levels of the agricultural and proto-industrial population there in 1620 and 1750. What is missing are estimates of the income levels of the non-agricultural population in the countryside (estimates by Li at 10% of the rural population) and of the urban population (in 1620 15% and in 1750 20% of the total population of the region). If it is assumed that this non-agricultural population had an income level two to three times the level of the farmers – which is perhaps reasonable – it is also possible to derive estimates of the structure of GDP and the labour force in Jiangnan. The differences between the estimates for 1620 and 1750 are small; in both cases agriculture contributed about 55% to 65% of GDP (depending on the assumption for the relative income level of the non-agricultural population). The share of agriculture in the labour input for the total labour force was even smaller, i.e. 51% (1750) or
54% (1620). These estimates point to the fact that labour productivity in agriculture was (marginally) higher than in industry and services.\textsuperscript{1}

Entering these estimates in the model developed for Europe yields the following results (all indices England in 1800 = 100): Chinese GDP per capita in 1750/1800 was 53% of the base level, assuming a real wage of 82% of the English level, and 70% of the labour force in agriculture. This is similar to Europe in 1750 (which was 56) and 35% lower than England in 1750 (which had a level of 80). Jiangnan in 1750 (real wage was 82% of the English level, and 51% of the labour force in agriculture) had a level of 68%, which was higher than Europe as a whole, and only 15% lower than the contemporary English level (an estimated wage of only 50% of the English level would bring this down to about 60%, which is only marginally higher than Western Europe). This result falls between Pomeranz and Maddison for these gaps.

The problem with making more direct comparisons between China and Europe using the established method of estimating income levels and PPPs is the scarcity of price information on China. One way to circumvent this is to use rice as a standard for comparison. The Jiangnan estimates derived from the work of Bozhong Li and Jack Goldstone imply that per capita GDP in this region was the equivalent of 650 to 790 kg of rice in 1750, and slightly more, 680 and 800 kg in 1620. It is important to note that the optimistic work by Li therefore does not seem to imply that there was per capita economic growth in the Yangtze Delta from the late Ming to the Qing, as his estimates appear to show a stability of income levels from 1620 to 1750 (again, depending on the estimate of the relative level of income for the non-agricultural population; if that increased substantially between 1620 and 1750, the conclusions would have to be altered). Per capita GDP in Java from 1815 to 1835 was on average the equivalent of 490 kg of rice, which gives an indication of the large gap between “underdeveloped” Java and the “developed” Yangtze Delta. Measuring this in terms of a basket of consumer goods would probably widen the gap, because China exported industrial products and services, and Java exported rice. Since

\textsuperscript{1} This is the direct consequence of the estimates by Bozhong Li and Jack Goldstone, where one day of female labour is taken as the equivalent of one-half day of male labour; the relatively high productivity of agriculture both in 1620 and 1750 may cast light on the development path of China in this period, in particular the slow rate of structural transformation, because it implies that incentives to move labour from agriculture to industry and services were weak.
Javanese GDP per capita according to Van Zanden (2003) was about half the level of Europe in 1820, the estimated gap between Europe and Jiangnan would be quite small – or perhaps non-existent. This again suggests that the Maddison estimates for Chinese GDP per capita in 1820 (being lower than those for Indonesia) may be too low.
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