The Maddison Project

A Tale of Two Transitions: The European Growth Experience, 1270-1900

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A Tale of Two Transitions: The European Growth Experience, 1270-1900

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Abstract: On the basis of new annual estimates of GDP per capita, we demonstrate that there were two transitions in the process towards 'modern economic growth'. The first was the Black Death, which prompted the divergence between the countries bordering the North Sea and the rest of Europe. The second was the shift to 'modern economic growth' in the 1820s, some time after start of the Industrial Revolution. In between those two transitions, the North Sea area showed consistent but (by later standards) relatively slow economic growth, instead of the 'efflorescences' that are typical for other pre-industrial societies.

Keywords: Black Death, Economic Growth, Little Divergence, Industrial Revolution.

JEL codes: N13, N33, O11.

1. Introduction

Economic historians have since the rise of 'New Economic History' worked on a grand project to reconstruct the long-term evolution of the various parts of the world economy in the past millennium. Simon Kuznets in the 1950s and 1960s (building on work by, amongst others, Colin Clark) created the first international comparative studies to chart the development of GDP and its components in the long run (Clark 1940, Kuznets 1966). This work was continued by many economic historians, of which Angus Maddison became the central 'hub' of this research, who published various syntheses of the work in historical national accounting that was undertaken globally (Maddison 2001). This work is now carried out by the Maddison Project – a collaboratory of the specialists in the field, coordinated by scholars from the University of Groningen (Maddison's home base).

The Maddison project has resulted in a systematic comparison of estimates of GDP per capita, often going back to the (European) Middle Ages, which allows us to shed new light on the transition to modern economic growth. For England the work by Broadberry et al (2015) has produced annual estimates of GDP and its components from the 1270s up to the 1870s, as well as one point estimate for the year of the Domesday Book (1086). Likewise, van Leeuwen and van Zanden (2012) have collected comparable data for Holland between 1347 and 1807. Similar projects have been carried out for Italy by Malanima (2011), for Spain by Alvarez-Nogal and Prados de la Escosura (2013), for France by Ridolfi (2016), and for Sweden by Krantz (2017) and Schon and Krantz (2015). What is new about this research is that it has produced annual series of estimates of GDP per capita from the 14th century onwards, making it possible to analyse the underlying trends much more systematically than the 'older' research that usually resulted in a number of benchmark estimates. We can now really observe when breaks in growth occurred and what long-term trends in performance were.

The picture that emerges from the comparison of economic performance in Europe over the very long run is the so-called "Little Divergence". The growth in real GDP per capita between 1300 and 1820 was largely restricted to the countries bordering the North Sea: Flanders, Holland and England. In 1750, just before the start of the Industrial Revolution, the level of GDP per capita of Holland and England had increased to 2355 and 1666 (international) dollars of 1990 respectively, compared to 876 and 919 dollar in 1347 (just before the arrival of the Black Death), and 1454 and 1134 in 1500. Contrary to what happened in the North Sea region, there was no economic growth in Southern and Central Europe before the 19th century (Bolt and van Zanden 2014, Fouquet and Broadberry 2015). A second picture that emerges from the comparison of annual GDP per capita relates to growth within the North Sea region. The centre of economic activity shifted from Flanders (Middle Ages) to Holland (after the Black Death up to the 17th century) to England (second half of the 17th century).

The aim of this paper is to try to explain these patterns of economic growth. We specifically focus on two phenomena. The first is the role of the Black Death. Only in the North Sea region (Flanders, Holland and England) did this demographic shock have the 'expected' Malthusian consequences, resulting in a big jump in per capita GDP. Moreover, the sharp increase of real income during the 1340s was not followed by a decline in the period afterwards – after this big shock there was no return to its pre-1347 level, not even when population levels recovered from the catastrophe. Elsewhere, in particular in Spain and France, the Black Death

had a very different impact on GDP per capita, confirming earlier suggestions by Pamuk (2006) that the Little Divergence may have originated in the responses to the sudden shock of the Black Death. In this paper we argue that the Black Death had this different effect in the North Sea region due to the presence of favourable institutions – a hypothesis suggested by Bavel and van Zanden (2004) and de Moor and van Zanden (2010).

The second, related phenomena we address in this paper concerns the dynamics of growth in the North Sea region. Economic historians have collected long time series for territorial, political units, such as Flanders, Holland and England. Economic growth was, however, not linked to the more or less arbitrary borders of these units. We argue that the North Sea region should be seen as one economic entity, highly integrated by movements of goods, people and capital, and showing one consistent growth path between the 1340s and the beginning of the 19th century. The economic core of this region – the centre where the high valued added activities in manufacturing and international services are concentrated – does however change over time. During the Middle Ages Flanders dominates the region: it is the centre of the Western European textile industry (making use of imported wool from England) and of related international services, and the rest of the North Sea area is increasingly integrated into this 'Flanders-centred' economy. During the 16th century the core first switches to Brabant – Antwerp specifically – and then moves on to Holland and Zeeland, due to complex economic and political changes. The Dutch Golden Age is however followed after about 1650 by the ascendance of London as the new centre of the North Sea economy. Eventually, in the 18th century, the most dynamic region moves even more Northwest, to the Midlands, Liverpool and Scotland. What we see happening in the 'national' time series is the growth and eventual stagnation of these regions (stagnation in Flanders after 1580 and in Holland after 1670), creating the impression that the region is characterized by successive waves of growth. Similarly, English GDP per capita, after the big jump in the 1340s, stagnates until the middle of the 17th century, before taking off (this stagnation was, however, already quite an achievement, given the recovery of population levels in the 16th century). It has been argued that economic development in this period was characterized by cyclical waves – Goldstone (2002) has coined the term 'efflorescence' for the phenomenon – much like China during the Sung/Tang dynasties or the Middle East in the period 700-1000. We disagree, and argue that this is the result of focusing too much on the relatively small territorial units of Western Europe in this period. Once we take the North Sea area as the relevant unit of analysis (comparable to territorial entities such as China and the Middle East) the significant fact is that the region as a whole showed persistent and almost constant growth between the 1340s and the early 19th century. By looking at the region as a whole, we demonstrate that pre-modern economic growth was a constant feature of this region since the middle of the 14th century, until, in the early 19th century, the Industrial Revolution transformed pre-modern economic growth into modern economic growth.

The third phenomenon that is only briefly dealt with in this paper – mainly to distinguish this new phase clearly from the previous period of pre-modern growth - is the acceleration of economic growth in the early 1820s. The British economy starts to grow at a much higher rate in the early 1820s, but it is striking that the rest of the North Sea area, as well as other parts of Europe, followed Britain so quickly. Although growth was more dramatic in the regions close to England, large parts of the continent saw a rather abrupt ending of the long stagnation that

had been characteristic of the 1400-1800 period. Modern economic growth, with GDP per capita increasing at a much higher rate than before the 1820s, set in.

Overall our study argues that when explaining the transition from a Malthusian economy to modern economic growth, we should focus on two transitions. The first transition took place after the Black Death and initiated a process of slow but persistent economic growth during four to five centuries. It was concentrated in the North Sea area and resulted in the Little Divergence. The rest of Europe, which had sometimes grown spectacularly during the High Middle Ages (northern Italy is obviously the best example), did not participate in this process of post-1348 growth. The second turning point occurred during the early 19th century, and must on the one hand be seen as the continuation and culmination of the early growth that began much earlier. The United Kingdom was clearly the centre of the new economic growth that arrived at the scene, but it spread very rapidly to the North Sea area as a whole, and even outside it, to large parts of Germany, France, Scandinavia, Switzerland, and beyond. On the continent growth after 1820 was 'catching up growth' based on the new technologies developed during the British Industrial Revolution, made possible not only by the spread of, for example, the spinning jenny and the steam engine, but also the migration of British and Scottish engineers to the emerging industrial districts.

We are going to develop these ideas in two related ways. First, we will analyse the long time series of GDP per capita growth in the period since the 13th century. What are the long-term trends? When does sustained economic growth begin? How did the economy react to the shock of the Black Death? These are the questions we address in the next section. We do this for the various country series, but we also constructed a 'North Sea area GDP per capita series'- i.e. a combination of the English and the Holland series – to show that growth was continuous from 1348 onwards. In section 3, we discuss these findings and try to understand why divergences and convergences occurred, and in particular what explains the two transitions that occur.

2. The long-term growth paths of the European economy, 1270-1820

2.1 The European Little Divergence

A substantial body of evidence – starting with the real wage estimates by Allen (2001), and including the new generation of GDP estimates already introduced – points to the fact that there was a divergence in levels of economic performance within Europe between 1500 and 1800. North-Western Europe – basically the Low Countries and England – showed more or less stable real wages (after the increase in real wages in the 14th century following the Black Death), whereas real wages in Central and Southern Europe declined sharply in the long run. As Figure 1 shows, in terms of GDP per capita, there is a similar divergence between the North Sea area and the rest of the continent. In Spain, France and (Northern) Italy real incomes stagnated or even declined somewhat, whereas Holland and England showed a lot of progress. They were substantially richer in 1750 than in 1500. This 'Little Divergence' is mirrored in patterns of urbanisation (rising in the North Sea area, stabilizing in the rest of Europe), in the development of political institutions (parliaments decline almost everywhere, except for England and the Netherlands) (Van Zanden et al 2012), and in indices linked to human capital formation (such

as per capita book production and consumption) (Buringh and van Zanden 2006, Baten and Van Zanden 2008).

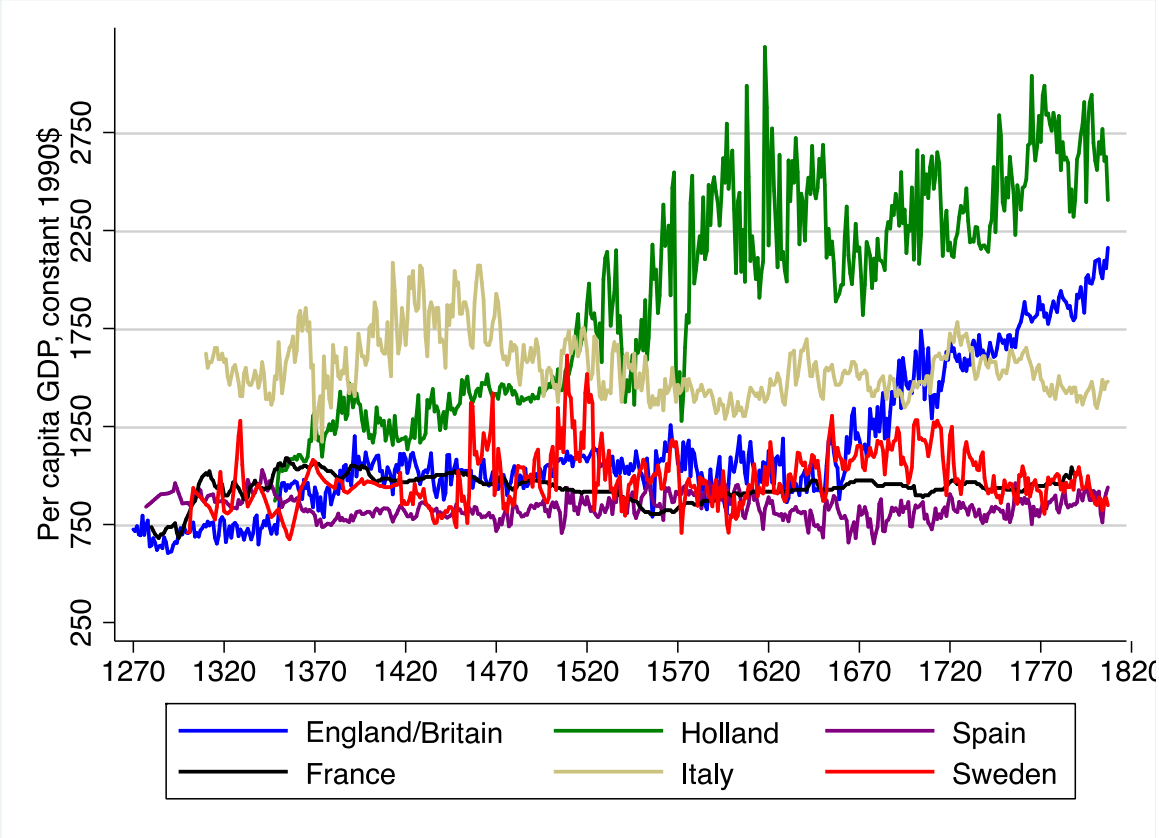

Figure 1. Per capita GDP in Western Europe, 1270-1807.

Sources: Broadberry et al (2015(, Van Zanden and Van Leeuwen (2012), Malanima (2011), Alvarez-Nogal and Prados de la Escosura (2013), Ridolfi (2016), Krantz (2017), Schon and Krantz (2015).

What is so special about the origins of the Little Divergence is that after the exogenous shock of the Black Death real incomes in Britain and the Low Countries did not return to pre-plague level, but remained much higher than before (ca. 20 to 40%), and, especially in the case of Holland, began to show a consistent rate of growth, which resulted in a doubling of GDP per capita in next 250 years (not taking into account the effect of the Black Death). As Figure 1 shows, the English growth experience was somewhat different. Between 1400 and 1600 real incomes fluctuated around a plateau of about 1000 dollars (against 700-800 dollars before 1347), and only in the second half of the 17th century growth really took off. We know less about growth in Belgium, but the few point estimates that have been made by Buyst (2011) suggest that it followed a third pattern: its level was fairly high at the start of the 16th century, there was some per capita income growth until the 1560s-1570s, but the late 16th and 17th centuries saw a decline of GDP per capita (see also Figure 2 below). In other parts of Europe (e.g. Spain), the collapse of population did not have similar positive effects on real incomes, which, as we will argue below, tells us something about the quality of institutions in the North Sea region.

To illustrate that economic growth in Holland and England after the Black Death was significantly different from the rest of Europe, we test for trends in the new generation of time

series of GDP per capita introduced in Figure 1. More specifically, we have estimated the simple regression model given in Equation (1),

$$\ln y_t = \alpha + ßt + \varepsilon_t \,, \qquad (1)$$

where the log of the levels of per capita GDP, $\ln y_t$, is regressed on the trend, t. Table 1 reports the results for England/Britain and Holland, and Table 2 shows the results for Spain, France, Italy and Sweden. We have performed the regression analyses for the entire period (Columns (1) and (3)), as well as for the period after the Black Death (Columns (2) and (4)) to make sure our results are not driven by this sudden 'break'.

	(1) England/Britain 1270-1822	(2) England/Britain 1353-1822	(3) Holland 1348-1807	(4) Holland 1353-1807
t	0.00167***	0.00156***	0.00204***	0.00202***
	(3.46e-05)	(4.70e-05)	(3.31e-05)	(3.19e-05)
Constant	4.431***	4.613***	4.301***	4.343***
	(0.0520)	(0.0729)	(0.0517)	(0.0498)
Observations	551	468	460	455
R-squared	0.782	0.672	0.828	0.823

Table 1. Economic growth in England/Britain and Holland, 1270 - 1822

Notes: Robust standard errors in parentheses; *, **, *** denote significance at the 10%, 5%, 1% level respectively.

The results in Columns (1) – (4) in Table 1 show that economic growth was positive in England/Britain and Holland between 1270/1347 and the 1820s. According to the coefficients on the trends, the British and Dutch economies grew 0.16% and 0.20% per year respectively. The results in Table 2 reveal that the process of economic growth in the North Sea region was very different from that in Spain, France, Italy and Sweden. The coefficients on the trend are generally much smaller, and in the case of France and Italy even negative. Spain and Sweden had very small positive trends after the Black Death (and Spain a negative trend when the period is extended back to 1277), but the R^2 shows that there is hardly any fit. Sweden with its significant growth trend, but very low rate of growth, can perhaps be seen as a borderline case between the North Sea area and northern and eastern Europe; its economy was to some extent pulled into the dynamics of the North Sea area, but before 1800 growth was too slow to start catching up with the core parts of that region.

	(5) Spain 1277-1820	(6) Spain 1353-1820	(7) France 1280-1789	(8) France 1353-1789

t	-3.66e-05*	9.34e-05***	1.72e-05	-0.000168***
	(1.93e-05)	(2.33e-05)	(3.05e-05)	(2.08e-05)
Constant	6.794***	6.579***	6.816***	7.118***
	(0.0296)	(0.0370)	(0.0494)	(0.0327)
Observations	544	468	511	438
R-squared	0.007	0.033	0.001	0.131

	(9) Italy 1310-1820	(10) Italy 1353-1820	(7) Sweden 1280-1789	(8) Sweden 1353-1789
t	-0.000217***	-0.000306***	0.000203***	0.000114**
	(2.59e-05)	(3.08e-05)	(3.66e-05)	(4.60e-05)
Constant	7.684***	7.833***	6.563***	6.710***
	(0.0425)	(0.0491)	(0.0577)	(0.0732)
Observations	511	468	521	468
R-squared	0.111	0.175	0.050	0.013

Table 2. Economic growth in Spain, France, Italy and Sweden, 1277 – 1820

Notes: Robust standard errors in parentheses; *, **, *** denote significance at the 10%, 5%, 1% level respectively.

2.2 Economic growth within the North Sea region

The per capita GDP series and the regression results clearly demonstrate that the Black Death led to positive income growth in Holland and England/Britain. However, as Figure 1 indicates, a related phenomenon concerns the dynamics within the North Sea region itself. The late 16th and early 17th centuries saw a decline of GDP per capita in Belgium due to the loss of industrial and tertiary activities to the Northern Netherlands. The decline of per capita GDP in Belgium and the rise of the Netherlands were part of the same process, in which the urban core of the North Sea region moved from Antwerp to Amsterdam. The next shift in the urban system, from Amsterdam to London, started after about 1670, and had similar consequences – i.e. England started to grow, whereas Holland stagnated at a fairly high level.

Therefore each country knew its separate growth cycles, characterized by period of rapid growth followed by (and/or preceded by) long periods of stagnation. Flanders boomed in the late Middle Ages, but declined after about 1560; Holland had its most spectacular growth spurt during its Golden Age (1585-1670), but slowed down in the 18th century; and, finally, English real incomes rose rapidly after 1670. And the case of Sweden can be interpreted as demonstrating what happened to a region that (partly) belonged to the North Sea area but did not at any moment become the industrial and commercial core of the region.

To formally test for the presence of these growth cycles within the North Sea region, we have estimated the simple linear model given in Equation (1), but now for the different sub-periods as identified above. We follow Crafts and Mills (2017) in choosing the break dates visually, taken the description of growth outcomes given by Broadberry et al (2015) and van

Leeuwen and van Zanden (2012). For England, the break dates are 1347, 1352, 1663, 1707 and 1822.[1] For Holland these are 1347, 1352, 1572 and 1648. The regression results are summarised in Tables 3 and 4.

	(1) England 1270-1348	(2) England 1353-1663	(3) England/Britain 1664-1707	(4) Britain 1708-1822
t	0.00110***	0.000160***	0.00787***	0.00319***
	(0.000335)	(5.68e-05)	(0.000856)	(0.000143)
Constant	5.135***	6.683***	-6.060***	1.860***
	(0.441)	(0.0848)	(1.443)	(0.254)
Observations	78	311	44	115
R-squared	0.136	0.031	0.692	0.880

Table 3. Economic growth in England and Britain, 1270 - 1822

Notes: Robust standard errors in parentheses; *, **, *** denote significance at the 10%, 5%, 1% level respectively.

	(5) Holland 1353-1572	(6) Holland 1573-1648	(7) Holland 1649-1807
t	0.00236***	0.00215***	0.00170***
	(0.000136)	(0.000691)	(0.000144)
Constant	3.822***	4.285***	4.838***
	(0.195)	(1.119)	(0.251)
Observations	220	76	159
R-squared	0.695	0.125	0.496

Table 4. Economic growth in Holland, 1348 - 1807

Notes: Robust standard errors in parentheses; *, **, *** denote significance at the 10%, 5%, 1% level respectively.

Columns (1) and (2) in Table 3 illustrate that the growth rate was positive but very small in England in sub-periods 1270-1347 and 1353-1663. The coefficient on the trend in Column (3) increases in magnitude: the English/British economy grew at a rate of 0.79% annually between 1664 and 1707. During this first early modern growth spurt, London by and large took over the role of Amsterdam as the central hub in word trade. Between 1707 and 1822, the annual growth rate became smaller (0.32%), although the coefficient on the trend shows that it was still much higher than in the pre-1663 period (see Column (4)). The sudden acceleration after 1663 and the deceleration at the beginning of the 18th century illustrate what the effect was of the change of the centre of gravity of the North Sea economy from Amsterdam to London in these years. Overall, the regression results in Table 3 correspond with the trends as set out in

[1] Our analysis focuses on the period 1270 – 1820, but to keep our analysis consistent with the contributions of Broadberry et al (2015) and Crafts and Mills (2017) we have decided to include 1821 and 1822 when studying the pattern of growth in England/Britain.

Figure 1. The Black Death caused a sudden increase in per capita income levels. This higher level was more or less stable until the 1660s (and it did not go down as was the case in France and Italy), after which growth accelerated and eventually led up to the Industrial Revolution of the 18th century.

Table 4 reports the results for Holland. Column (1) shows that there was continuous growth of ca. 0.24% annually between 1353 and 1572, when Holland developed from a marginal region into the core of the North Sea area (Van Bavel and Van Zanden 2004). Regarding the second sub-period (Column (2)), the coefficient on the trend does not seem to increase in magnitude, but the R-squared is considerably lower, indicating that economic growth became much more volatile. During the Golden Age Holland was a relatively small economy with extreme fluctuations in output and income due its open character and sensitivity to exogenous shocks affecting its large trade and transport sector (van Leeuwen and van Zanden 2012). Nonetheless, the results in Columns (1) and (2) support our hypothesis of uninterrupted growth in income levels from the Black Death until the end of the Golden Age. Finally, the results in Column (7) show that the Dutch economy slowed down after 1648, when it lost its central role in the world economy, but continued to grow.

Comparing the growth rates in Columns (1), (2), (5) and (6) suggests that the Dutch economy outperformed England before the 1660s. When turning to the regression results in Columns (3), (4) and (7), quite the opposite is true: economic growth after 1660s was faster in England/Britain than in Holland. Summing up, both countries demonstrate continuous growth between the Black Death and the early 19th century, but the rate of growth is also affected by its role within the North Sea economy. Growth accelerates when it is (becoming) the core of that region, and slows down when the region is more marginal or becoming more marginal.

Figure 2 adds the tentative series of GDP per capita of Flanders created by Buyst (2011). Because this is not an annual series, we cannot test for trends in a similar way, but the series reinforces the picture of alternating growth phases as Flanders is declining relative to Holland in the period of the latter's Golden Age, but returning to stability after 1700.

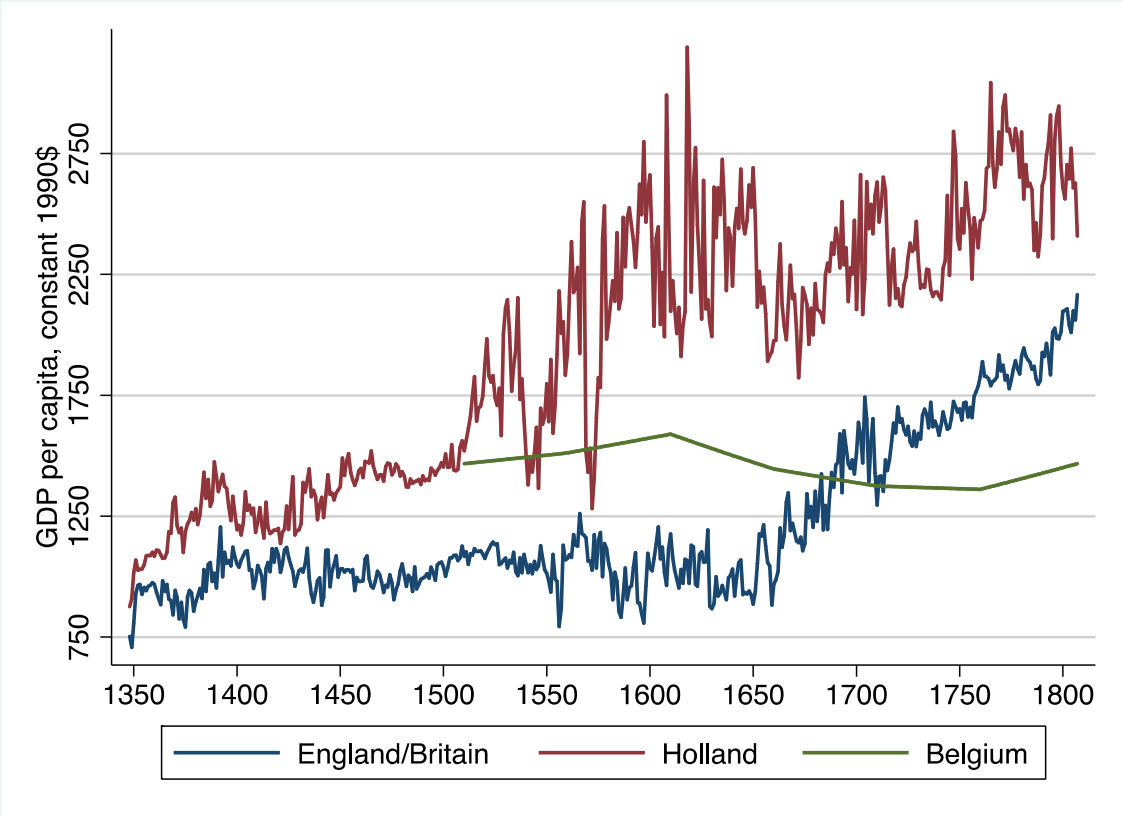

Figure 2. Growth within the North Sea region, 1348-1807.
Notes and Sources: Broadberry et al (2015), Van Zanden and Van Leeuwen (2012), Buyst (2011).

Scholars have concluded from this that growth was sporadic, intermitted and non-consistent - that growth spurts were always followed by stagnation and/or decline. Perhaps Goldstone's (2002) concept of periodic 'efflorescences' best captures this idea. But what seems a reasonable picture of growth before 1800 if one looks at individual regions within the wider North Sea region, is perhaps plain wrong when looked at the region as a whole. Figure 3 attempts to do this by merging the two (England and Holland) into one index of real GDP per capita of the North Sea region as a whole. What then appears is a remarkable stable path of economic growth, in which stagnation in one part of the region (in England between 1350 and 1660, or Holland after 1650) is compensated for by growth in the rest of the region (in Flanders and Holland when England stagnates, and in England when Holland's growth decelerates). But the region as a whole grows at a stable rate of 0.16% per year, almost without real interruption, between 1347 and 1820 (after which growth accelerates in England).

The finding of continuous growth in the North Sea region is moreover supported by the regression results in Table 5, where we once more have regressed the log of per capita GDP on the trend. In addition to this, we have also performed Quandt-Andrew unknown breakpoint tests to check for the presence of structural breaks in the combined per capita GDP series (Quandt 1960, Andrews 1993). The breakpoint test did not identify any significant breaks. Both results

therefore seem to confirm that there was a stable path of growth in the North Sea region between 1348 and 1807.[2]

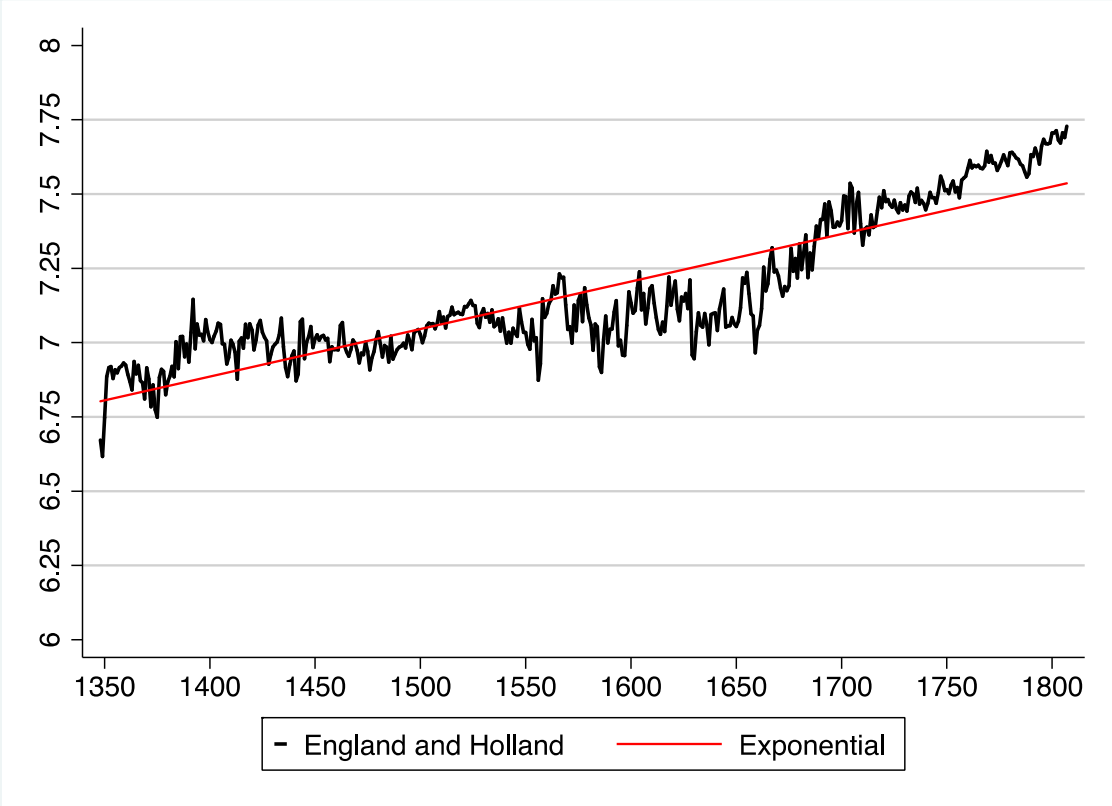

Figure 3. Economic growth in the North Sea area, 1348-1807.
Notes: Population weighted average of the Dutch and English/British per capita GDP series.

	(1) North Sea 1348-1807	(2) North Sea 1353-1807
t	0.00160***	0.00159***
	(3.72e-05)	(3.74e-05)
Constant	4.647***	4.656***
	(0.0577)	(0.0580)
Observations	460	455
R-squared	0.795	0.790

Table 5. Economic growth in the North Sea area, 1348 - 1807
Notes: Robust standard errors in parentheses; *, **, *** denote significance at the 10%, 5%, 1% level respectively.

3. Three Key Developments

[2] The largest test statistic found was 2.18 for the year 1672, but this was still below the critical value of 3.66 (5% level).

How can we explain these patterns? In this section we focus on three key developments. The first is the impact of the Black Death. As we will argue, the Black Death increased per capita GDP in the countries bordering the North Sea region due to their favourable set of institutions, notably the well functioning of labour and capital markets (Bavel and van Zanden 2004). The second development is the shift to pre-modern economic growth following the Black Death. We argue that between 1348 and 1820 Holland and England were able to generate a process of almost continuous economic growth due to investments in human capital formation, which, in turn, were the outcome of the favourable conditions underlying the European Marriage Pattern (de Moor and van Zanden 2010). Finally, we very briefly shed some light on the acceleration of growth in the period after 1820. During this period, the Industrial Revolution rapidly spread from Britain to the rest of the continent.

3.1 The Malthusian Economy

We start, however, with a brief look at the 'Malthusian' economy in the period before 1347 (Figure 4). This series of GDP per capita reconstructed by Broadberry et al (2015) shows no growth before 1348. The trend is slightly negative, mainly due to serious crises in the 1280s and the 1310s, and population growth seems to matter a lot. The population increases from 4.2 million in 1250 to 4.8 million in 1290, when GDP per capita registers a declining trend; after the crisis of the 1280s, the population starts to fall (to about 4.6 million in 1340), which results in a stabilization of real income, albeit with huge fluctuations, such as the 'Great Famine' of the 1320s. In short, this economy shows distinct Malthusian features, with a decline of real GDP during the (last stage of the) great Medieval boom (1080-1280) during which the population increased rapidly, and stability after the 1280s because population growth came to a halt. The level of GDP per capita is, however, clearly above subsistence levels, especially at the start of this century. During the 1250s the English GDP per head of 800-850 dollars is between at least twice and almost thrice subsistence level (of 300-350 dollars), and quite high by international standards – only the more wealthy ancient economies reached similar levels, if we are to believe recent estimates of pre-1000 GDP (Bolt and Van Zanden 2014). The earliest estimates for Holland (in 1347) also point to similar high GDP (almost 900 dollar) (van Leeuwen and van Zanden 2012).

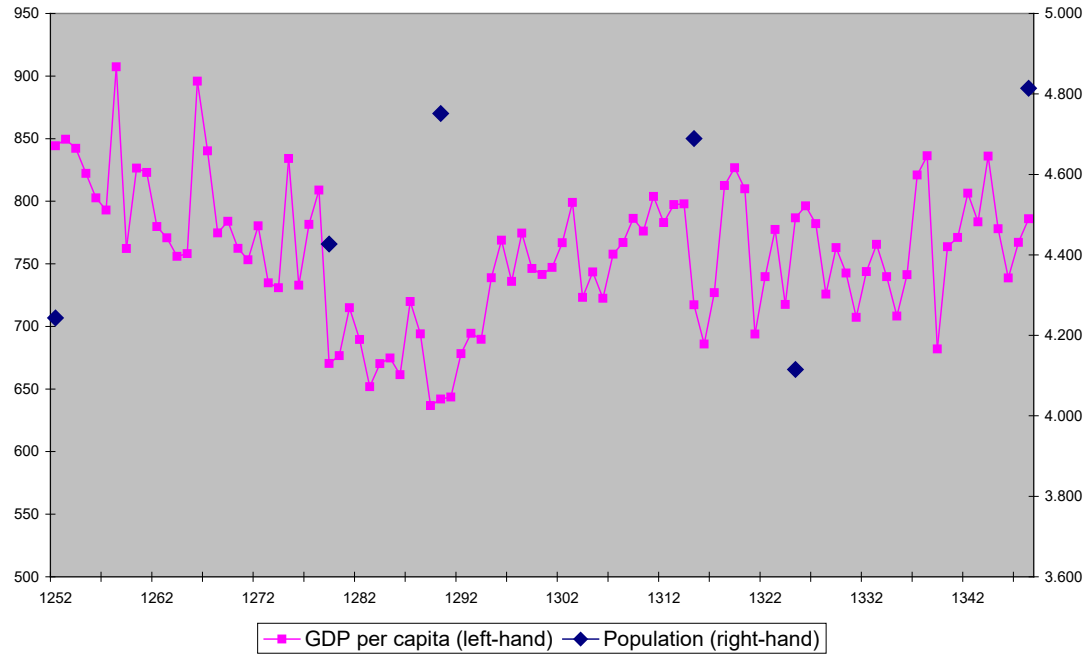

Figure 4. English per capita GDP and population growth, 1252-1347
Sources: Broadberry et al (2015).

3.2 The effect of the Black Death

However, as Figure 5 shows, the shock of the Black Death changed everything. The average level of per capita GDP in Holland and England was significantly higher after the Black Death than in the period before. In England, it had increased from an average of 714 dollar before the arrival of the Black Death to 993 dollar in the period 1348-1500. Something similar happened in Holland. We only have one point-estimate for 1347, but this suggests that it had increased from 876 dollar before the Black Death to 1301 dollar thereafter. In Spain, on the contrary, per capita GDP hardly responded to the decline in population: it fell from 900 dollar between 1270-1347 to 816 dollar between 1347-1500. The Black Death increased real incomes in Italy, but there it gradually fell back to its pre-plague level over the course of the 15th century.

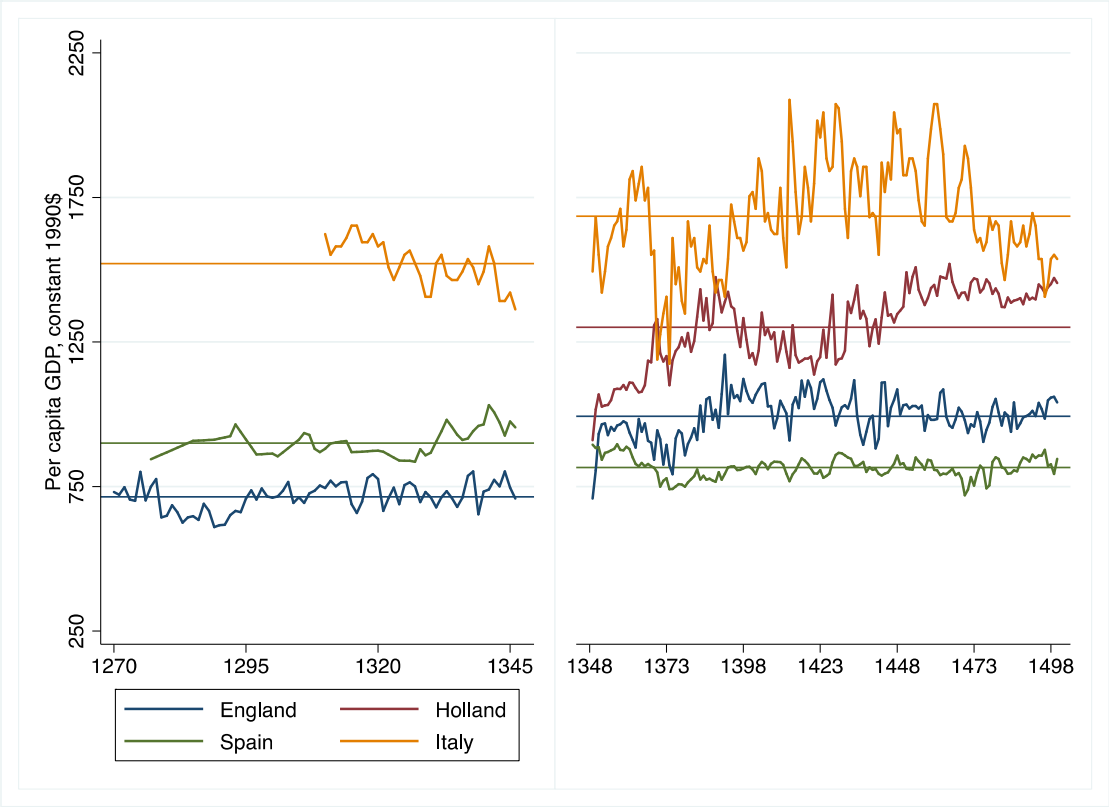

Figure 5. Per capita GDP in Europe before and after the Black Death, 1270-1500
Notes: Horizontal lines represent the average level of per capita GDP before and after the Black Death.

Why did the North Sea area respond so strongly to the population decline due to the Black Death, resulting in an immediate and sizable increase in GDP per capita? In a way, this is not a big mystery: the population of Europe declined by about one-third to one-half, which led to major changes in relative prices. Wages went up, capital and land became relatively cheap, which, standard economic theory predicts, impacted on the relative mix of inputs used. Labour productivity increased due to the larger availability of land and capital, and GDP per capita grew proportionally. This is arguably how a fully developed market economy would respond to such a crisis. That the North Sea area reacted in this way, therefore, meant that it behaved as a market economy. In other words, factor markets (markets for labour, land and capital) and product markets were apparently developed to such an extent that the Black Death had such an impact on GDP (see van Bavel and van Zanden 2014). This does not imply that these were perfect market economies. The English king, for example, tried to freeze wages at their pre 1348 level, and initially tried to use the power of the state to stop the rise in wage costs. But he soon found out that it was almost impossible to constrain the market (which, predictably, found ways to circumvent the legislation); the 1381 peasant revolt put a final end to this attempt to keep wages at an artificially low level.

The point that the North Sea region in the Late Middle Ages was already characterized by highly developed factor markets has already been made in the literature. A large part of the population – perhaps as much as 40 to 50% - was dependent on wage labour, both in the countryside and in the cities (Dyer 1989). Perhaps the rural labour market was even more developed than those in the cities (Van Bavel 2006). And both men and women were earning a wage income, and the gender wage gap was relatively low (women may have earned about 80%

of the wages of men), stimulating the labour market participation of women (Van Zanden 2011, Humphries and Weisdorf 2015, de Pleijt and van Zanden 2017). Capital markets were also well developed, in particular in the Low Countries, with (after 1348 in particular) low interest rates (5-6% annually), and large-scale participation again by both men and women (Van Zanden et al 2010). Finally, on land markets the leasing of land became increasingly popular, further adding to the commercialization of agriculture. Summing up, the fact that the economies of the North Sea area responded to the shock of the Black Death in this way appears to be rooted in an institutional structure with 'thick' markets, which were used intensively.

The real issue is arguably why the other European countries did not respond in a similar way. The simple answer is, because they were no comparable market economies. Alvarez-Nogal and Prados de la Escosura (2013) have addressed this issue for the case of Spain and conclude that the decline of GDP per capita after 1348 was due to the 'frontier' character of the Spanish economy. The marketing system that had developed before 1347 could not be maintained anymore by the sharply reduced population, as a result of which markets contracted, commercialization declined and GDP per capita decreased. For Sweden, Krantz (2017) suggested a similar explanation of the absence of a Black Death bonus.

However, the marginalization of markets in a region with low population densities cannot be the explanation for the response of the Italian economy. According to the estimates by Malanima (2011) GDP per capita of Northern Italy (which is actually Tuscany in this period, as the data are from this region) initially increased by about 20%-30% in the two decades following 1348, then returned to the pre 1348 level for the rest of the 15th century. During the first half of the 15th century there is a rise in the level of GDP per capita again (to about 20-30% above the pre 1347 level), but after this brief Renaissance efflorescence GDP per capita definitely starts to fall after about 1470. So there is a small but unstable Black Death bonus, which disappears after 1470 (when also population growth picks up again). And Malanima (2011) estimates that part of the explanation of the absence of a stronger increase in real GDP per capita is the decline of the labour input per capita, which declines to 120 days of work per year in the first half of the 15th century. A higher leisure preference may be part of the story of the divergence between Northwest and South, but this only helps to explain part of the difference. Larry Epstein (1991, 2001) has argued that institutional constraints related to the different relationship between city and countryside helps to explain the relative stagnation of the 15th century Tuscan economy. He argued that Florence was exploiting the Contado via taxation and other institutions that limited market participation in the countryside. Recent research seems to corroborate this view: the income gap between town and countryside was extremely high in Tuscany, and labour and land markets were relatively underdeveloped (Felice and Van Zanden 2017). In the countryside the system of mezzadria, which spread rapidly in the 15th century, reflected those constraints, but it is equally striking that the rural labour market was extremely thin, and that women were not very active on the (wage) labour market (De Pleijt and Van Zanden 2017).

Summing up, the different responses to the Black Death were the consequence of different institutional settings and economic systems. Other studies that compared the impact of the Black Death on Late Medieval Egypt and England (Borsch 2005), or Central Europe and Western Europe/England (Brenner 1989) arrived at similar conclusions. The economic reaction of the North Sea area, where the well-developed market economy made possible a transition to

a much higher level of GDP per capita, was probably exceptional. The deep roots of this peculiar development are probably not found in its specific political institutions, as these differed not radically between the North Sea area and the rest of Western Europe. The whole of Western Europe knew 'feudal' socio-political relations, in which the power of kings, princes and dukes was constraint by independent cities (strong in Northern Italy but also in the Low Countries) and by the integrative power of the Church (strong in all parts of the Latin West). The civil society of guilds, brotherhoods and other religious and non-religious institutions was not fundamentally different in the North from the South. An institutional 'Little Divergence' between the North Sea region and the rest of Western Europe would only emerge in the 16th or even 17th century, when Parliaments acquired a much stronger position in the North Western parts of Europe than in the rest of Europe where absolutism arose (van Zanden et al 2012). Although political institutions may have enhanced the phases of growth after the 16th century, they do not seem to have made the difference in the centuries following the Black Death (de Pleijt and van Zanden 2016).

3.3 Sustained growth

Even more important than the 'modern' response to the shock of the Black Death was the fact that it set in motion a process of sustained economic growth in the North sea area which persisted until the beginning of the 19th century (and even beyond that date, as the 1820s did not see the end of, but an acceleration of growth). It is, as far as we know, the first time in world history that a region went through such an enduring process of sustained growth. Actual, year by year growth rates were of course much affected by external shocks – wars such as the Dutch revolt of the 1570s, harvest fluctuations, etc. – and by shifts between economic regions such as the succession of the center of gravity of the North sea area from Flanders via Holland to England. But as we have shown before, the underlying trend was consistently upward, and on average GDP per capita grew by 0.16% per year during almost five centuries.

What explains this strong performance? Processes of structural change clearly played a large role (Broadberry et al 2013). The region as a whole managed to capture increasingly large share of international services and manufacturing output with high levels of value added. At about 1300 only Flanders was highly urbanized – thanks to the combination of a highly specialized woollen textile industry exporting to large parts of Europe and international services mainly supplied by the commercial hub of Bruges. The ups and downs within the North Sea area in terms of GDP per capita are mainly linked to the spatial changes in the concentration of these high value added activities - from Flanders to Antwerp to Amsterdam to London respectively. At the same time, the relative size of these activities is growing, as the international markets for which they are catering is expanding, until, in the 17th and 18th century, large parts of the world economy are linked to the central hubs in Amsterdam and London. The fact that other regions of Europe see their GDP per capita decline – in particular this is happening in Northern Italy, but Poland is another case in point (Malinowski and Van Zanden 2017) – is linked to the concentration of these activities in North Western Europe, at the expense of Tuscany and Venice.

We think, however, that there is more going on – the concentration of secondary and tertiary activities is not the entire story. Human capital formation is now generally considered as an

important – if not the most crucial – source of economic growth (cf. Galor and Moav 2002, Galor 2011). Human capital is strongly related to the capability to generate technological change and to adapt new and old techniques to new conditions. Recently this relationship has received empirical support from studies focussing on pre-industrial economic growth in Europe (Baten and van Zanden 2008, de Pleijt and van Zanden 2016)

This endogenous source of productivity growth has been quite important for the economic growth of the North Sea area. For England, Hoeppner Moran (1985) and Orme (2006) document the expansion of (grammar) schools after the Black Death. Between the late 14th century and the start of the Reformation, the number of grammar schools had increased from ca. 110 to 230. Graff (1987) moreover shows that male literacy was as high as 40% in London during the 1460s, of which craftsmen formed a significant group of literate people. The growth in secondary (grammar) school foundations continued after English the Reformation, which, eventually, led to the "educational revolution" of the late 16th and early 17th centuries (Stone 1964). The extraordinary growth in schooling was not just confined to England: something quite similar happened in Holland. In a recent paper, Akcomak et al (2016) link the exceptional growth in literacy achievements in the Netherlands between 1400 and 1600 to the Brethren of the Common Life – a religious community founded by Geert Groote in the city of Deventer in 1374. This community stimulated the accumulation of human capital though religious texts, schools and the production of books. As a consequence, by 1600 literacy rates in Dutch cities were twice as high as in Germany.

Thanks to the remarkable investment in schooling in England and Holland after the Black Death, levels of human capital were much higher in the North Sea area than anywhere else in Europe. Baten and van Zanden (2008) have collected evidence on the evolution of per capita book consumption/production for 9 countries in Europe between 1300 and 1800 (see also Buringh and van Zanden 2009). During the Middle Ages, Flanders and Italy, the two core areas of Europe, had the highest levels of book consumption per capita. However, the Netherlands (as well as Germany, France and Switzerland) approximated Flanders and Italian levels by the early 16th century. Between 1500 and 1800, England (and Sweden) rapidly caught up with the Netherlands in terms of book consumption, whilst Flanders fell behind. Similar conclusions can be drawn from the data on age heaping – another frequently used measure for levels of human capital in pre-industrial societies (see A'Hearn et al 2009) – showing remarkable high levels of numeracy in the UK and the Netherlands already in the late Medieval period.

Recently, even more detailed accounts on the increases in human capital in England and Holland have become available. Figure 6 reports the recent estimates of average years of schooling in England in the period between 1300 and 1800 and Holland between 1500 and 1800 (Van Leeuwen and van Zanden 2012, de Pleijt 2018). In England educational attainment was a mere 0.03 years on average in the period before the Black Death. Thereafter, however, school foundations were laid all over the country, and, as a consequence, literacy spread amongst the population between 1300 and 1500. By the end of the Middle Ages, educational attainment had increased to 0.3 years. These trends continued after 1500, and even accelerated during the 16th century. The level of human capital in England in the 1550s was, however, still lower than that in Holland. On average Dutch citizens had 1 year of education; which was almost double the level of English attainment. The gap however narrows between the 1550s and early 18th century – both countries saw increases in educational attainment, but this growth was faster in England

than in Holland. By the 1700s, the average years of schooling in England and Holland had increased to 1.2 and 1.5 years respectively. After 1700, attainment levels seemed to have diverged, with the Dutch series showing consistent growth, whereas the English series deteriorates. As we will explain in greater detail below, the stagnation in levels of schooling in England can probably be attributed to the 'Malthusian Intermezzo'.

Figure 6. Average years of schooling in England and Holland, ca. 1300 – 1820.
Notes and sources: Data for Holland from van Leeuwen and van Zanden (2012); data for England from de Pleijt (2018).

In sum, the process of sustained growth between the Black Death and early 19th century was driven by an almost continuous growth of human capital in this long period, which was a special feature of the North Sea area.

But what then accounts for these increases in human capital formation? What sets apart the North Sea region from the rest of Europe are its institutions regulating marriage-, property-, and labour-markets. De Moor and van Zanden (2010) have argued that the North-Western part of Europe, notably England and the Low Countries, differed from the rest of the continent due to the favourable characteristics of the European Marriage Pattern (EMP). The countries bordering the North Sea enjoyed a relatively high degree of female agency, which was the outcome of two core institutions: consensus based marriage and neo-locality of the household. This resulted in a relatively high age of marriage for women, a high percentage of singles and a low share of complex households. For instance, in Lincolnshire, the average age at marriage had increased from 21.4 years before the arrival of the Black Death to 24.6 in the first half of the 15th century (Hallam 1985).

This favourable demographic regime enhanced the formation of human capital.[3] Decisions about human capital formation are (were in this period) taken at the micro level of the household, by the parents basically. The state and other institutions hardly played a role. So if the accumulation of human capital in this part of Europe was remarkable, the structure of household and marriage is the most likely candidate for the explanation of this divergence.

This is not to deny that other factors may have played a role as well. The process of structural transformation and the growth of cities that accompanied it, probably created the right incentives for sustained increases in human capital. England, for instance, became a producer of finished cloth in the 15th century, and international trade and urbanisation increased the demand for formal schooling over the 16th and 17th century. Although literacy is disputed as an important factor for growth during the classic period of the Industrial Revolution (see Sanderson 1995, Mitch 1993), formal schooling - and in particular the learning of grammar - was important for trade and urbanisation. In the early modern period it was the only common vehicle of matured thought, and therefore the common medium for foreign intercourse (Orme 2006).

Similarly, the Reformation may have played a role as well. The evidence on grammar schooling from Boucekkine et al (2007) (originally collected by the Schools Inquiry Commissioners in the 1860s) neatly demonstrates the 'explosion' of grammar school foundations following the dissolution of the monasteries and chantries. Likewise, as illustrated above, the accumulation of human capital in Holland between 1400 and 1600 may have benefited from the movement of the Brethren of Common Life (Akcomak et al 2016). The Scandinavian countries, and in particular Sweden, also witnessed a strong growth of human capital in the centuries after the Reformation, the result of the policies adopted by state and (state) church, in combination with the spread of the EMP to these regions. In the 18th century the consumption of books was, for example, booming in Sweden, and more generally it became the 'poor sophisticate' that formed the basis for its highly successful development path in the 19th century (Sandberg 1979).

Probably linked to this was the institutional divergence within Europe – the rise of absolutism in the South and the East, and the stabilization of certain forms of parliamentary control (or even rule) in the North-West – which further enhanced the economic divergence. But again, the long-term increase of parliamentary power can also not be isolated from the urban and commercial character of the two societies involved and from the high levels of human capital their citizens possessed.

Yet, it is not all roses. Early modern growth did not smoothly transition into modern economic growth; in the 18th century the British economy went through a 'Malthusian intermezzo', as can in particular be seen from the development of educational attainment in that period (Figure 6) and the slowing down of per capita GDP growth after 1707 (Figure 1). The 18th century saw a stagnation of educational attainment of men, and a very slow growth of that of women – a pattern remarkably different from the rapid growth in human capital between 1500 and 1700 (and the 'explosion' of educational attainment after about 1850). At the same time, GDP per capita growth slowed down after the growth spurt of the 1650-1707 period

[3] Baten and de Pleijt (2017) empirically demonstrate the link between female autonomy (measured by average age at marriage) and human capital formation (proxied by numeracy) in Europe between 1500 and 1800, lending ample support to the hypothesis of de Moor and van Zanden (2010).

(which had coincided with the transition of the centre of gravity of the North sea economy to London), and only picked up again after 1820.

This growth deceleration has been attributed to various factors, such as the 'crowding out' of private investment due to heavy public borrowing during the French wars (but these happened after 1789, decades after the slowing down of economic growth in the mid 18th century). An alternative interpretation of this 'Malthusian intermezzo' is that it was caused by changes in the demographic regime. Population growth accelerated in the 18th century, due to, amongst others, the decline of average age of marriage of women (the, according to Wrigley and Schofield (1981), most powerful variable controlling population growth). More specifically, the average age at marriage in England in the first half of the 18th century was 25.4. This was higher than Poland (22.3 years), but significantly lower than the average age at marriage in Denmark (29.2) (Dennison and Ogilvie 2014).

This, in its turn, may have been caused by the gradual undermining of the position of women at the labour market: whereas in the 15th century unskilled women earned on average 70-80% of wages of unskilled men – giving them a relatively powerful position within the household – this had fallen to 30-40% in the 18th century, undermining their say in decision making at the micro level (Van Zanden 2011, Humphries and Weisdorf 2015, de Pleijt and van Zanden 2017).

At the same time, economic development also changed course – after the expansion of international services focused on London in the 1650-1750 period came the period of classic industrialization after 1750, concentrated in the north (Lancashire, Yorkshire) and in the lowlands of Scotland. Services required formally educated labourers, and the growth of educational attainment between 1500 and 1700 was clearly geared towards this sector. But the new industries that emerged in the 18th century did not demand this kind and level of human capital. Indeed, the recent literature suggests that early industrialisation may have been skill demanding and skill saving at the same time (O'Rourke et al 2015, de Pleijt and Weisdorf 2017). Mokyr (2005) even argues that the case for the role of human capital as driver of industrialisation appears to focus on more work specific human capital rather than on the average level of education present in the workforce (see also Mokyr and Voth 2009, Meisenzahl and Mokyr 2012).

3.4 The acceleration at about 1820

One of the most striking results of these long-term comparisons is that almost all series of GDP per capita show an acceleration of growth in the 19th century. However, as Figure 7 reveals, there were clearly 'leaders' and 'followers' in this process. The leader was Britain, which, at that time, was undergoing the Industrial Revolution. Crafts and Mills (2017) have empirically shown that the British economy starts to grow consistently after 1822. This is again confirmed by our analysis: The results in Table 6 indicate that annual growth in Britain was ca. 1.25% on average between 1822 and 1900. From there, the Industrial Revolution rapidly spread to neighbouring countries – Belgium, Northern France, the Netherlands, and possibly also parts of Western Germany. For The Netherlands van Leeuwen and van Zanden (2012) have found a similar break in the early 19th century, and the results Table 6 show that the Dutch economy grew ca. 0.77% annually between 1822 and 1900.

Thereafter the Industrial Revolution gradually spread to other parts of Europe (e.g. Spain and Sweden), although not all countries participated in this process (e.g. Italy). On the one hand, the breaks in the series for Spain and Sweden are perhaps more radical than for Britain and the Netherlands, as it signifies the change from no growth (before 1850) to modern economic growth (0.87% and 1.02% annually between 1822 and 1900 respectively). On the other hand, it should be mentioned that the initial level of GDP per capita in these countries was much lower than in the countries bordering the North Sea region (see Figure 7). On the other side of the spectrum, we have countries such as Italy that did not participate in this process.

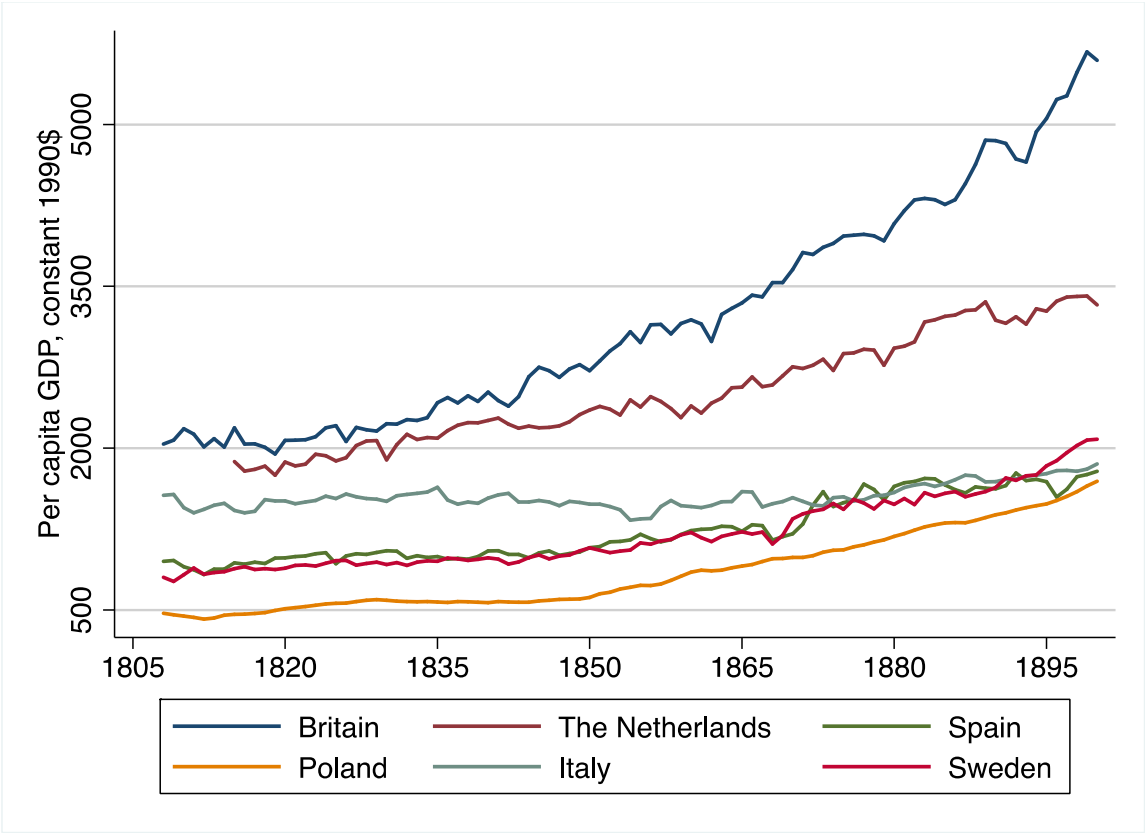

Figure 7. Per capita GDP in Europe, ca. 1807 – 1900.

	(1) Britain	(2) Netherlands	(3) Spain	(4) Italy	(5) Sweden	(6) Poland
t	0.0125***	0.00768***	0.00872***	0.00185***	0.0102***	0.0155***
	(0.000176)	(0.000145)	(0.000335)	(0.000261)	(0.000352)	(0.000415)
Constant	-15.25***	-6.447***	-9.088***	3.910***	-11.94***	-22.13***
	(0.327)	(0.269)	(0.624)	(0.484)	(0.655)	(0.778)
Obs.	80	80	80	80	80	80
R-squared	0.988	0.966	0.894	0.373	0.937	0.955

Table 6. Economic growth in Europe, 1822 – 1900.

Notes: Robust standard errors in parentheses; *, **, *** denote significance at the 10%, 5%, 1% level respectively.

The explanation for the break in the 1820s is that the technological changes which had started in the 18th century now – finally! – had this impact on the economy as a whole. Before 1820 technological change was concentrated in a few branches of industry (cotton, metal

working) but this changed after 1820, with the introduction of general purpose technologies such as steam engines in large parts of the economy, including the development of the railways and steamships, which revolutionized the transport sector and had an enormous impact on the economy as a whole. General Purpose Technologies such as steam (or electricity for the Second Industrial Revolution, or IT for the Third), initially have the tendency to be 'everywhere but in the productivity statistics' (to copy the famous quote by Solow) (Crafts 2004). An alternative explanation is that the structural changes which are required to really profit from the new GPT mean that initially the costs of their spread are substantial, which lowers the net effect they have on economic growth. But after a certain 'learning process', the productivity advantages become larger, and the new GPT spreads more quickly.

An alternative (or perhaps additional) explanation of the acceleration of the 1820s is that investments until the 1820s were 'crowded out' by government borrowing on the capital market. The big deficits of the late 18th and early 19th century were caused by the wars with France, which also pushed up the prices of foodstuffs. Napoleon not entirely unsuccessfully tried to cut Great Britain off of the trade with the rest of Europe, from which it imported large amounts of agricultural commodities. The results were negative terms of trade effects, and very high costs of living, which depressed real wages and limited purchasing power. After 1815 prices of agricultural commodities fell dramatically (initially the effect of renewed free trade were limited by the effects of an exogenous shock, the harvest failures of 1816 and 1817 due to the eruption of the Tambora volcano in Indonesia). This resulted in a sharp increase in real wages and purchasing power, and must have stimulated economic growth.

The growth acceleration of the British economy can be explained in this way; the underlying growth trend was probably already moving up, but it required a positive shock – the much more favourable economic conditions of the 1820s – to move the economy to a different growth path. It is less clear why large parts of Western Europe saw the start of modern economic growth in the same century. There is no evidence that the underlying trend was changing in the final decades of the 18th century or the beginning of the 19th century. It is probably clear that the 1820s saw an acceleration in the spread of the new technologies of the Industrial Revolution to the Continent. The re-establishment of peaceful economic relations with the UK (after the years of economic blockade and non cooperation during the French-British wars) probably played a role in this. Moreover, the Continental economies suffered from the same (or similar) problems in the supply of (cheap) foodstuffs (especially between 1790 and 1815) and of depressed real wages, and received the same 'bonus' when agricultural prices declined to 'normal' levels after 1816/17. In a way, the sudden change of growth path in Europe after the Napoleonic Wars resembles the post-1945 recovery of the European economy, which also put the continent on a new growth path, after the stagnation during the interwar years.

Acemoglu et al (2011) have suggested an institutional dimension of post 1815 growth. The French Revolution had swept away many of the extractive institutions that are associated with 'feudal' Europe, such as the power of the church (to raise tithes for example) and the nobility (to cream off rural surpluses). The more intense German regions were exposed to these revolutionary changes (the earlier they were occupied by French forces and integrated in the French empire), the more successful these regions were in the 19th century. The institutional reforms initiated by the French therefore may also have played a role in explaining the break in the immediate after war period.

The 1820 turning point has, for large parts of Western Europe, also a human capital dimension. We already demonstrated how human capital increased in England and The Netherlands between 1400 and 1800, partly in response to structural change (the growth of services) but also driven by supply side forces (increased focus on literacy and other skills among parents, linked to the EMP). In other parts of Western Europe schooling levels also tended to increase, due to the Reformation, to policies by the state and the church to further literacy, and to economic changes that also stimulated human capital formation. The continuing explosive growth of the demand for books has been seen as an index of such changes (Baten and van Zanden 2008). During the 17th and 18th centuries the high levels of human capital formation that were realized in parts of Germany (Prussia), Scandinavia (Sweden) and France (the north) did not lead to economic growth. But this changed after 1820. When the new technologies of the Industrial Revolution became more widely available, these regions were the first to import and copy the new production methods and kick-start modern economic growth (Sandberg 1979; Becker et al 2011).

4. Conclusion

Recent work in the reconstruction of annual series of GDP growth in the period before 1800 allows us, for the first time, to analyse patterns of growth and stagnation in the European economy in the centuries between 1300 and 1800, and to test for trends and break point in this long period of pre-modern economic development. We have shown that there were two important turning points in the process to modern economic growth. The first was the 'exogenous' shock of the Black Death, which had a differential impact on European economies. In the North Sea area it set in motion slow but consistent growth. However, although growth was continuous in the North Sea region between 1348 and 1807, each territorial unit knew its own growth pattern as the centre of economic activity shifted from Flanders to Holland in the late 16th century; and subsequently from Holland to England around 1650. We have suggested that this pattern corresponded with patterns of international trade and shipping: when a country became the central hub in international commerce, growth accelerated, and vice versa, when it lost its central position GDP growth slowed down. By looking at the North Sea area as a whole – a unit of comparison comparable to, for instance, the Middle East or China - we make the point that growth between 1300 and 1800 was not characterized by a series of 'efflorescences', but by a consistent international growth path that resulted in comparatively high levels of GDP per capita in the 17th and 18th centuries. This long period of expansion 'ended' with the second turning point which is evident from the new time series: the shift to modern growth in the 19th century in the 1820s. This was related to the development of the Industrial Revolution in 18th century Britain, and the spread of the new technologies to the Continent that began after the Napoleonic Wars. The acceleration of growth, in the North Sea area, and the start of growth, in the rest of Europe (with the possible exception of Italy), was a truly 'western European' phenomenon, covering almost the entire continent, and in that way really different from the 'slow but consistent' growth that was a feature of the North Sea area between 1348 and 1820. Moreover, the rate of economic growth was much higher after 1820 than before it.

We have also suggested explanations for these patterns of growth. The first question that arose is why the Black Death led to an increase of per capita GDP in the North Sea region and not elsewhere on the continent. What was so specific about the countries bordering the North Sea was that they had highly developed factor markets and a favourable demographic regime, the European Marriage Pattern. In their economic structures they came closer to the 'ideal type' of a market economy than the rest of Europe. This meant that the increased scarcity of labour after 1347 translated itself in increased real wages and higher output per capita. This set of initial institutions also created the basis for slow but consistent economic growth, amongst others via their effects on human capital accumulation. The pre modern economic growth that occurred in the North Sea area is consistent with the ideas of Unified Growth Theory stressing the importance of demographic factors and human capital formation (Galor 2011). This seems to be less the case for the second turning point, the Industrial Revolution, which was probably not linked to a general increase in human capital and to demographic changes that favoured quality over quantity of offspring. The actual Industrial Revolution may have occurred in a context of deskilling, of declining or stagnating levels of educational attainment, with only very specific skills playing a crucial role (Mokyr 2005).

It was two transitions that brought the economy of North-Western Europe from a Malthusian 'equilibrium' to the process of rapid economic growth that would become 'normal' during the 19th and 20th century. The differences between these two transitions were perhaps greater than their similarities. The first one was a response to an immense external shock, the second one was much more the result of endogenous changes. Human capital was arguably more important in the first one than in the second one. The first one occurred in a relatively small part of Western Europe – the North Sea area – whereas strikingly, the second one was (in due course) an almost pan-European phenomenon. It is therefore not easy to generalize about their causes, but what they had in common is that they occurred in market economies with relatively stable institutional environments, and that they made possible a structural acceleration of economic growth that would, in due course, shape global inequality as we know it now.

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