

The European skill premium in international comparative perspective, 1200-1950.¹

First draft

Jan Luiten van Zanden
IISG/University of Utrecht

The aim of the research project ‘global history of prices and wages 1200-1950’ is to establish the characteristics of different regions of the world in terms of relative prices and wages from the Middle Ages to the present, in order to analyze and understand the long term economic performance of these regions. The underlying idea is that relative prices are in a way the DNA-prints of an economy, i.e. the basic pieces of information that reflect and in their turn define its structural features. In particular in the period before the mid 19th century, when other sources of information (such as historical national accounts) are relatively difficult to acquire 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.

In this, we are in particular interested in the relative performance of (western) Europe in comparison with other relatively advanced parts of the world in Asia – China, Japan and India. One of the big debates in recent writings on economic history focuses on the issue whether the exceptional performance of the European economy after about 1780 is a more or less accidental by-product of developments occurring during these decades (such as the rise of steam power), or the result of patterns of economic change which began many centuries before the 1780s – perhaps already during the Middle Ages. The first and highly preliminary results of the ‘global history of prices and wages’, presented in Buenos Aires in 2002, suggested that already during the Early Modern Period the structure of relative prices in North-western Europe was distinctive in a number of respects. Peter Lindert et.al. formulated the working hypothesis that ‘Northwest Europe led in the development of non-agricultural productivity concentrated in the capital-goods and knowledge-intensive sectors’. The paper showed that capital goods and knowledge intensive products were relatively cheap in this part of the world (and interest rates were relatively low), whereas foodstuffs/agricultural products (and land) were relatively expensive there.²

This paper investigates one aspect of this broader hypothesis, namely concerning the remuneration of human capital. It tries to elaborate the Lindert et.al idea that northwest Europe had a comparative advantage in knowledge intensive sectors by looking at the long-term development of the skill premium in Europe and parts of Asia. It takes a rather limited view at this ‘skill premium’ by focusing on the difference in daily wages between skilled craftsmen (carpenters and masons) and unskilled labourers in the construction industry, a skill premium about which we are relatively well informed. In another paper, using evidence from the 1960s and the 1990s, I hope to show however that in this construction-industry skill premium is a rather good proxy of differences of pay in the economy at large, and is explained by the same factors as more encompassing measures of pay differentials. Therefore this ‘building-wage-skill-

¹ I thank Peter Koudijs for helping me to collect the data for this paper, and Bas van Leeuwen for assisting me with a few econometric experiments.

² Lindert et al 2002.

premium' can in my view be used to test ideas about the relatively low European skill premium. An added advantage of this skill premium is that technological change in the construction industry was relatively slow – in particular until the second half of the 19th century – which means that the skills acquired by those craftsmen did not change much in time, and were also more or less identical in different regions of the world (although some variation did occur, of course). It can also be argued that carpenters and masons possessed quite strategic skills. Masons were the architects (and other the entrepreneurs) of almost all early modern buildings (famous architects such as for example Palladio were trained as masons).³ Similarly, carpenters were the engineers of a technology consisting mainly of wood, and shipwrights, millwrights, wheelwrights and other specialized carpenters were responsible for a large part of new inventions. The relative price of these skills was therefore quite important, not only for the construction industry (which was of course the most important supplier of capital goods) but for the economy as a whole. Finally, I hope to show that the analysis of the causes of the low skill premium in construction industry show light on the conditions for human capital formation as such.

The hypothesis to be tested is that in Europe the skill premium was already relatively low during the Early Modern Period (in fact, as I will show, since the late Middle Ages). More important is to understand and explain this phenomenon: why did the skill premium in European construction industry decline rapidly between 1350 and 1450, and why did it remain stable at a very low level during the next five and a half centuries since? I will use standard explanations of the skill premium, focusing on the one hand on interest rates and the efficiency of capital markets (the 'human capital approach'), and on the other hand on institutions for training and for wage setting (the 'institutional approach'), in a first attempt to explain the patterns found.

Skill premia in mid 20th century

Since the 1930s the ILO publishes, in its annual publication on International Labour Statistics, data of the yearly 'October census', an inquiry which is more or less the same in all countries involved, resulting in data of wage levels of different occupations in manufacturing.⁴ In 1950 the number of countries covered by this census is sufficiently large to make it possible to study the variation of the skill premium in construction on a global scale.⁵ Freeman and Oostendorp, who used the same October census to reconstruct wage differentials at about 1990, found a strong correlation between different measures of the degree of variation in the wages paid (or in wage rates) and GDP per capita. In Figure 1 the same relationship is shown, including trend lines for different regions. It is clear that at about 1950 there existed a relatively strong, negative relationship between GDP per capita and skill premium in construction industry. This relationship was not exactly the same for all regions, however; skill premia and the Americas (north and south did not make a difference here), for Asia and for Africa were higher than skill premia in Europe. Regressions with the data conform this picture (where skill premium is the dependent variable and GDP per capita the independent

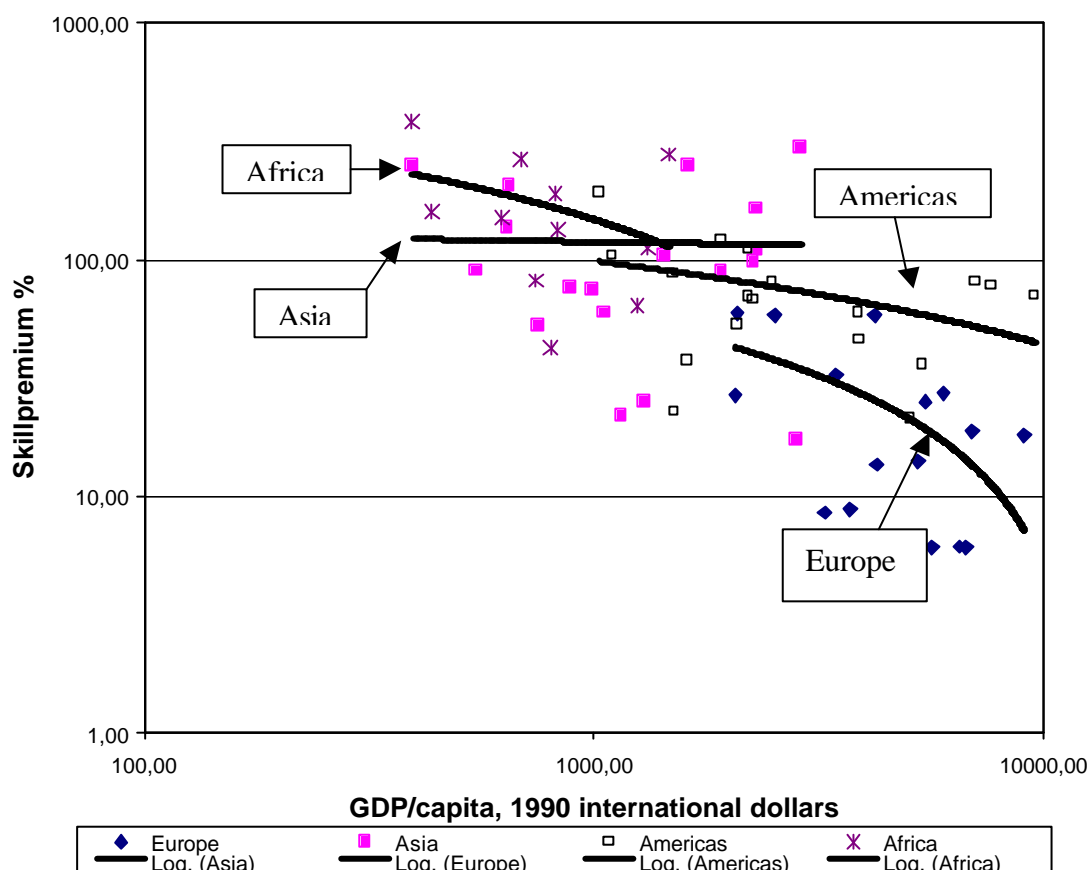
³ For the role of masons see Richard Goldthwaite 1990 pp. 125 ff.

⁴ Freeman and Oostendorp 2001 give an historical overview of the October census.

⁵ Sources: ILO, Yearbook of Labour Statistics, 1946-1954 (for a few countries wage data from years close to 1950 had to be used); GDP: Maddison 2001.

variable): dummies for Europe consistently had a negative sign (and were highly significant), whereas dummies for the other continents had a positive signs.⁶

Figure 1 The relationship between GDP per capita and the skillpremium of building craftsmen (c. 1950)



These data suggest that Europe was different, that the level of the skill premium was lower there than in the rest of the world – even much lower than in North-America.

It has been argued that the main cause behind the negative relationship between GDP per capita and skill premium is that the supply of human capital increases more rapidly than demand for it during the process of ‘modern economic growth’. This hypothesis can, however, not explain the European ‘divergence’; levels of human capital formation in the US and Canada, for example, were probably higher than in western Europe in the 1950s, and certainly not inferior.⁷ The variables that may help to explain this gap are of an institutional nature, and related to the level of corporatism of

⁶ A number of regressions were run, using different definitions of regions; the only region of which the dummy did not have a positive sign – apart from Europe – was Oceania, with only two observations (Australia and New Zealand); the Asian country that fitted well into the European pattern was, unsurprisingly, Israel (wages Jews).

⁷ The first data in the global dataset by Barro and Lee are for the 1960s and show that average years of schooling in the US and Canada were more than 8, a level only attained by Germany and Denmark, the other European countries fell clearly behind this; in 1950 the gap between both sides of the Atlantic must have been even bigger.

the western European economy. Unfortunately, these statistics are unavailable (on a global scale) for the 1950s.⁸

Summing up this brief introductory section: the data for the mid 20th century strongly suggest that skill premium in construction was lower in Europe than elsewhere, and that this is unrelated to the level of human capital formation as measured conventionally as the number of years of schooling of the labour force.

The long-term development of the ‘building wage skill premium’ in Europe

The work by Allen, Ozmucur and Pamuk and others on wages of construction workers in European cities resp. Istanbul in the very long run, makes it relatively easy to construct time series of the skill premium in this industry between c 1300 and 1914.⁹ Figure 1 compares the skill premium in western Europe (the average for London, Oxford, Amsterdam/Holland, Antwerp/Gent and Paris) with the available estimates for Japan and India.¹⁰ It shows that during the first half of 14th century the European skill premium was relatively high – between 100 and 150% of the wage of an unskilled labourer – but that it declined rapidly after 1350, and converged to about 50% at the middle of the 15th century, a level at which it remained strikingly constant during the next 450 years (during the first half of the 20th century it declined to a an even lower level, to about 25% in 1936). This fall in the skill premium happened in all cities for which wage data have been collected: in England,¹¹ in Florence, and in the Low Countries. The striking stability after 1450 is a phenomenon of western Europe, however.

The observations we have for other parts of Eurasia – for India, Japan, and Indonesia (the latter not shown in Figure1) – suggest that the skill premium was much higher there than in Europe. Unfortunately these data do not go back to the period before 1600, but for the latter half of the period they are very clear. In Japan the skill premium seems to have fluctuated between 150 and 250 percent; a typical observation is that in 1802/04 a day labourer in Kyoto earned 0.92 monme per day, while the wage of a carpenters in the countryside (in Kami-Kawarabayashi) was 2.6 monme and that for Osaka carpenters 4.3 monme per day.¹² A few 17th and 18th century observations for India and Indonesia suggest similar high levels.¹³ Indonesia and Russia fit into the same picture; for the latter we have the data published by Hellie pointing to a 100% (carpenter/unskilled labourer) to 167% (mason/unskilled labourer) for the 17th century.¹⁴

The significant exception appears to be China. The detailed wage data available for 1769 – the result of government regulation of public construction – show that in large parts of China (Hunan, Gansu, Jiangsu) the skill premium was only about 25%:

⁸ Regressions with data from the 1990s about the degree of corporatism or the degree of unionization of the non-agricultural labour force suggest strong negative links between these institutional variables and the skill premium, but in almost all cases the dummy for Europe remains negative and significant.

⁹ Sources: Allen 2001 (I used the underlying series published at <http://www.economics.ox.ac.uk/Members/robert.allen/WagesPrices.htm>) ; additional data for Istanbul from Ozmucur and Pamuk 2002 (published at <http://www.iisg.nl/hpw/istanbul.xls>) and for the Low Countries before 1500 from Van Bavel and Van Zanden 2004.

¹⁰ Sources: Saito 1978 and Saito 2003.

¹¹ This sharp decline has already been noted by Beveridge and by Postan; see Phelps Brown and Hopkins, 1981: 8.

¹² Saito 2003.

¹³ See also the paper by Van Leeuwen; India: Broadberry and Gupta 2003.

¹⁴ Hellie 1999: 413-74.

we find a median wage of .05 tael for a craftsman and .04 tael for an unskilled labourer. This is even lower than in western Europe. But in Zhili province, in particular in and near Beijing, both nominal wages and skill premia were much higher than elsewhere. Nominal wages in the capital were three times as high as in the other regions for which data are available, and the skill premium was as high as 80 to 100 %.¹⁵ For Beijing this high skill premium can be confirmed by other evidence for the 18th and 19th centuries.¹⁶ For other regions I could not yet compare these data with other sources; the government regulations of 1769 on which they are based were part of the process of setting prices, and it is not completely clear to what extent the quoted prices and wages reflected market values.

Another comparison that is relevant is that between different parts of Europe (see Figure 3). It is possible to distinguish three clusters of six cities each: Western Europe (Antwerp, Amsterdam, Oxford, London, Paris, and Strasbourg), Southern Europe (Florence, Milan, Naples, Valencia, Madrid and Istanbul) and Eastern Europe (Augsburg, Leipzig, Vienna, Danzig, Cracow and Warsaw). Not all time series are of equal length, however – for the 14th century the western European pattern is only based on data from England and from the Low Countries, for southern Europe in the 14th century we have only data for Florence. But from the 15th century onwards data become more abundant. The skill premium for each city was calculated and averages per region were estimated for the cities for which data are available. In both western Europe and in southern Europe the skill premium declines rapidly after 1350 – in the south (=Florence) the fall is even more spectacular than in the north-west. But from the mid 15th century onwards the skill premium in the south tends to go up, a pattern that can also be found in the east (Poland and Germany). Whereas the skill premium is between 50 to 60% in the north-west after 1450, it tends to increase to as much as 80 to 100% in eastern and southern Europe during the 19th century. In 1936/37, according to the ILO data, the same differences still existed: the average for 6 eastern European countries was 56% (range: 28 and 95%), of three southern European countries 45% (25 to 64%) and for four western European countries 22% (12 to 28%), so the differences that came into existence during the Early Modern Period continued into the 20th century.

¹⁵ My reworking of the 1769-document published by the project Staat, Handwerk und Gewerbe in Peking, 1700-1900 (at <http://www.uni-tuebingen.de/sinologie/project/shp/databases.html>) results in, in taels per day (Jiangsu data acquired from Christine Moll-Murata):

| | N = | Masters | labourers | Skill premium (%) |
|-------------------------|-----|---------|-----------|-------------------|
| Hunan | 10 | .050 | .039 | 29 |
| Jiangsu | 63 | .051 | .040 | 26 |
| Gansu | 50 | .057 | .047 | 21 |
| Zhili/ Shuntian | 24 | .141 | .077 | 84 |
| Zhili/Baoding-Tiajin | 34 | .112 | .071 | 59 |
| Zhili/other prefectures | 82 | .081 | .054 | 49 |
| | | | | |

¹⁶Moll-Murata 2003.

Figure 2 The skill premium of craftsmen in construction in Western Europe, India and Japan (1300-1913; as a percentage of the wage of an unskilled labourer)

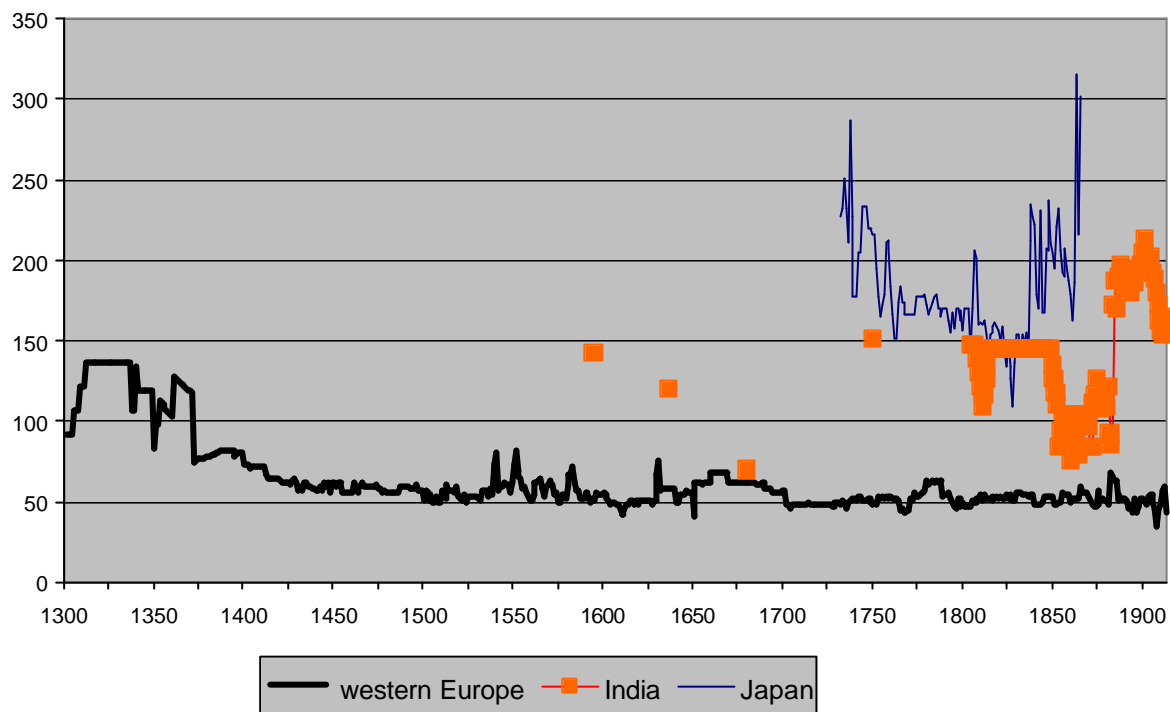
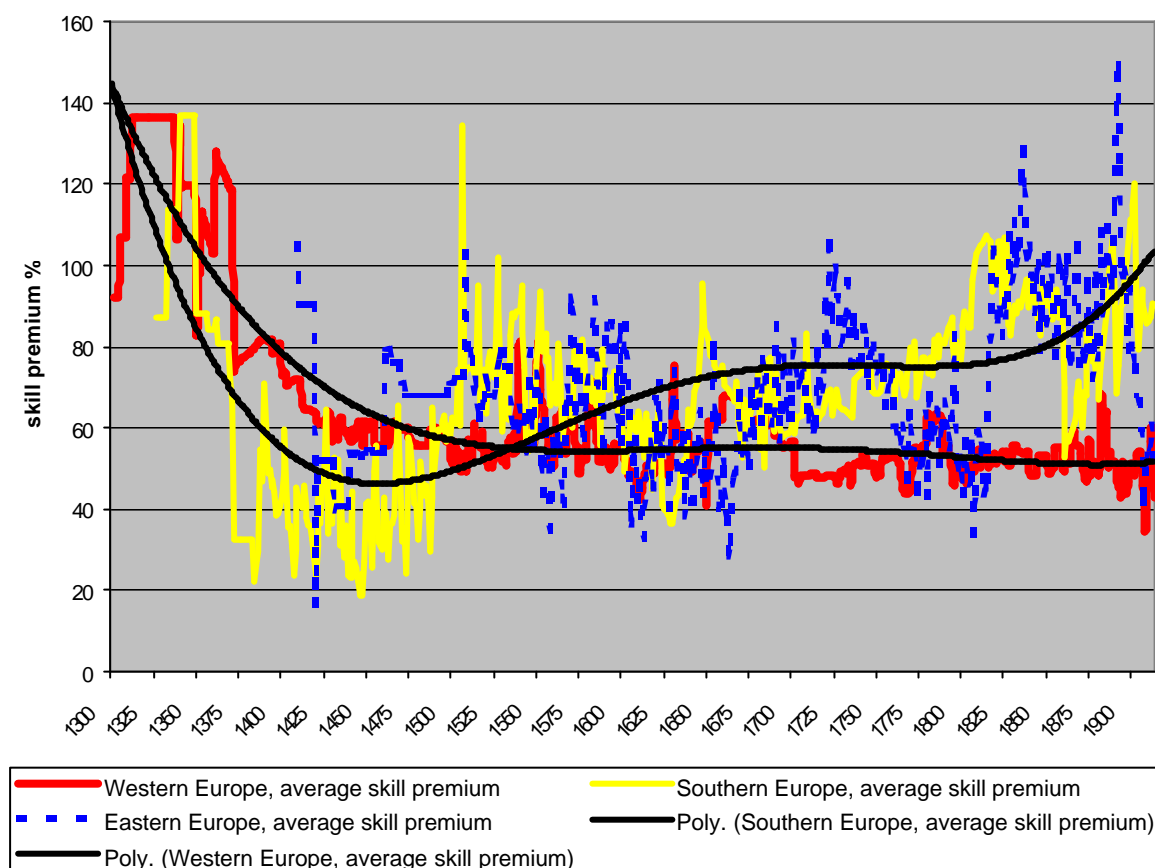


Figure 3 The skill premiums of craftsmen in construction in western, southern and eastern Europe, 1300-1914



These two figures raise a number of questions about the remuneration of human capital in early modern Europe. The first and perhaps most striking development is the sudden and spectacular decline in the skill premium in southern and western Europe in the century after the Black Death. The result was that during the Renaissance - between 1400 and 1550 - there was an exceptionally low level of remuneration for human capital. The stability of the skill premium in western Europe between c 1450 and 1914 is the second striking phenomenon; how is it possible that in those four-and-a-half centuries relative pay of craftsmen became 'frozen' at such a low level? The divergence of the south and the east in the centuries after 1650 is perhaps the third - related - remarkable development (although it may not be statistically significant, given the large margins of error involved); this occurred during a period in which in terms of real wages (according to Robert Allen) and of GDP per capita (my own estimates) the countries around the north sea began to diverge from those in east and south.¹⁷

In the rest of the paper I will explore a number of possible explanations for these long-term trends.

¹⁷ Allen 2001; Van Zanden work in progress.

Explaining European skill premia

According to the ‘human capital model’ the skill premium is the remuneration for investing in human capital, eg. not earning an income during the period in which the apprentice was undergoing training. Therefore, the skill premium is determined by (1) the number of years that are needed for acquiring the specific skills and the unearned wage income during these years (2) the interest rate linking future – higher - earnings to the present, and (3) the number of years that one can expect to enjoy the higher wage of a skilled labourer.¹⁸ Given the fact that becoming a carpenter or a mason meant acquiring the same skills before and after the Black Death and after, the simplest explanation for the post 1350 decline of the skill premium in construction would be that interest rates in Europe declined dramatically in this period. There is some evidence to support such an interpretation: all over Europe interest rates seem to have declined in the century or so after the Black Death. The evidence relates to actual interest rates on loans and on the public debt (collected by Sidney Homer), on the yield on investment in land (put together by Clark and Epstein), and can be derived from what we know about the seasonal fluctuations in grain prices, from which McCloskey and Nash and Poynder have derived estimates of Medieval interest rates.¹⁹ Evidence that interest rates in Europe were lower than elsewhere on the Eurasian continent is fragmentary, but the general tendency seems to be that from the late Middle Ages capital markets in Europe were more efficient and developed – broader and deeper - than elsewhere.²⁰ For Indonesia and other parts of South-East Asia this has given rise to some speculation about the causes of this ‘high interest rates/thin capital markets’ equilibrium trap, in which the region seems to be caught since at least the 17th century when the first data become available.²¹

The ‘standard’ explanation for falling interest rates after 1350 is that the Black Death caused an exogenous fall in population levels, which – given the fact that the capital stock and the cultivated land remained the same - resulted in a more favorable capital/labour and land/labour ratio, which induced the fall in interest rates (and led to increased levels of consumption, given the rise in wealth per capita). This then, it can be argued, induced households to increase their investments in human capital, leading to the strong decline in the skill premium in the same years (a possible link with GDP per capita growth during the same period will be discussed below).

The exact measure of the decline of interest rates in Europe is unknown; for England Clark suggests that they may have declined by perhaps as much as 50 to 60%, from 10 to 11% before 1350 to 4 to 5% in 1450-1500 (but the number of observations for the latter period is quite small).²² It is possible to roughly simulate what the decline

¹⁸ This may seem a very modern idea, and the approach therefore perhaps slightly anachronistic, but the basic idea can already be found in Adam Smith (as always), who wrote about the skilled labourer that ‘the work which he learns to perform, it 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: 203-4.

¹⁹ Homer and Sylla 1996: 99-100, 106-8; Clark 1988: 268-76; Epstein 2000: 18-25, 60-61; McCloskey and Nash 1984; Poynder 1999.

²⁰ See Pomeranz 2000: 178-9; Sylla and Homer 1996: 610-615; Adam Smith was also convinced of the fact that interest rates in Europe – in particular in Great Britain and Holland - were much lower than in China and the ‘Mahometan’ nations (‘twelve per cent accordingly is said to be the common interest of money in China’, whereas he considered 3 to 4.5 per cent to be normal in Great Britain); Smith 1776: 198.

²¹ Boomgaard 1996 (for South-East Asia and India); Van Zanden 2004 for Java in the 19th century;

²² Clark 1988; also Epstein 2000: 61.

in skill premium means in terms of ‘implied’ interest rate – i.e. the return to investment in human capital. The following assumptions are used in this simplified ‘model’:

- a 7 years apprenticeship period – the standard in English contracts – at ages 14 to 21;²³
- the unearned income of the apprentice is estimated at 20% of the annual wages of an unskilled labourer at age 14, increasing via 40% (15 years), 60% (16 years), 70% (17), 80% (18), 90% (19) to 100% at age 20;²⁴
- after finishing their apprenticeship they will earn the wages of skilled craftsmen for 45 years, at ages 21 to 65;

Three variants have been calculated: 1/ assuming that that an apprentice has a 100% chance of becoming a craftsman after finishing his seven years of training; 2/ assuming that this chance is 75%, and that there is a 25% chance that he will earn the income of an unskilled labourer only; 3/ in addition, it is assumed that the apprentice has to pay a premium of 50% of the annual wage of an unskilled labourer up-front. Figure 4 gives the relationships between skill premium and return on capital invested in training that can be derived from these assumptions. It shows that a decline of the skill premium from 135% (in 1325) to 60 % (in 1450) would be consistent with a decline of the return on human capital from 19% to 10% in the 100% version, from about 15,5% to 8% in the second version of the model, and from almost 14% to 7% in the third variant.²⁵ These returns on investment in human capital are still higher than the interest rates on the capital market found in other studies, most of which, however, are related to the more ‘formal’ parts of the capital market, in which land was (or could be) used as a collateral. Obviously, investment in human capital was much more risky than investment in land, but this risk premium was – if we are to believe these calculations – surprisingly small in early modern Europe. Significantly, McCloskey and Nash also found a more radical decline of interests rates on rural capital markets in their study of the seasonal variation in grain prices.²⁶ The evidence presented here and their study perhaps indicates that the spread of interest rates between ‘formal’ and ‘informal’ capital market was also declining during the 1350-1450 period.

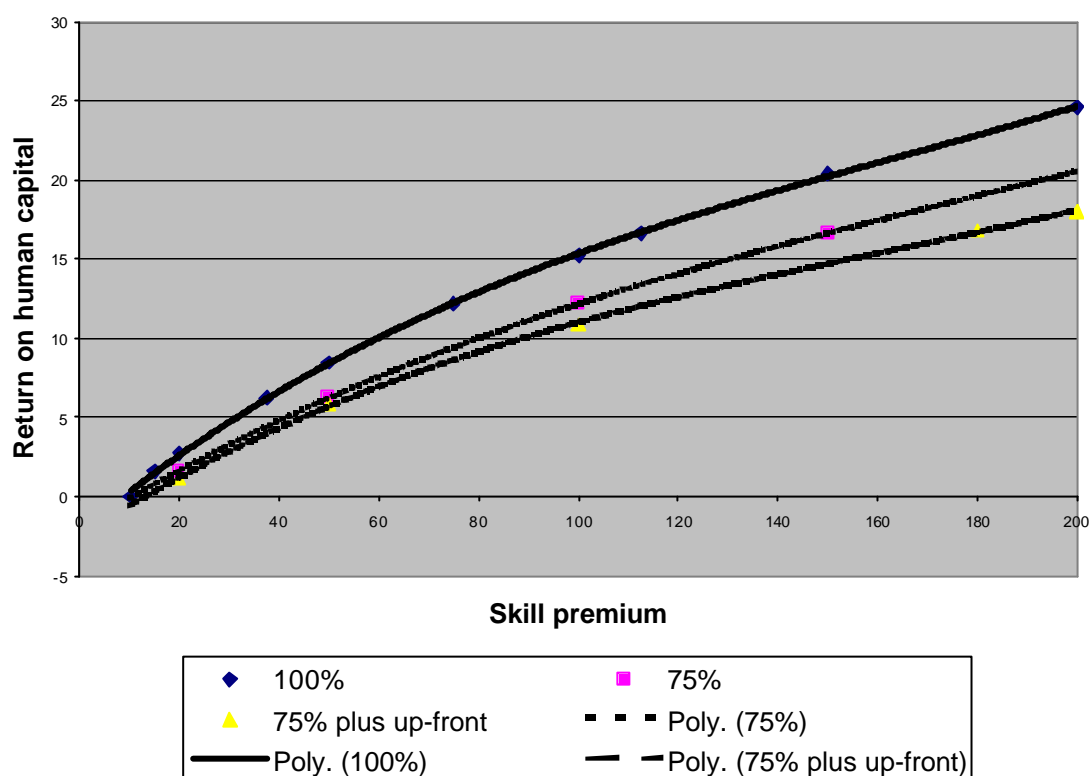
²³ See Humphries 2003: 75; also Epstein 1991: 142 also gives a seven years apprenticeship period for carpenters in 13th century Genoa, but shorter periods for masons (5 and 6 years).

²⁴ This very rough scaling is based on Dutch/Flemish data.

²⁵ The extremely low skill premium of 20-25% found in large parts of China would be consistent with interest rates of 1 to 3%.

²⁶ McCloskey and Nash, 1984.

Figure 4 Modelled relationship between skill premium and return on human capital; three variants.



What is also striking is that in western Europe both interest rates and the skill premium remained more or less constant (or showed an almost unnoticeable declining trend), and did certainly not rise again to the pre 1350-level, in spite of a strong growth of population numbers and a subsequent decline of the land/man ratio in the centuries after 1450. In fact, population growth after 1450 was particularly rapid in those countries – 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 which focuses only on the decline of population after 1350 is incomplete. Additionally it can be argued that the changes in relative prices between 1350 and 1450 induced changes in the institutional setting of capital markets, leading to increases in efficiency in those markets (i.e. the fall of transactions costs) which resulted in the long term increases in the supply of savings that made a stabilization of interest rates in the very long run possible – and indeed, led to even lower interest rates during the 18th and 19th centuries.²⁷ That the demographic downturn after 1348 was perhaps of secondary importance - and perhaps 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 case of Holland, where a strong expansion of the population between 1350 and 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.²⁸ It is beyond the scope of this paper to

²⁷ Epstein 2000 and Clark 1988 speculate about these changes but do not yet give adequate explanations.

²⁸ The fall in interest rates is documented by still unpublished research by Jaco Zuyderduyn (Ph D student Utrecht University).

analyze the causes of these changes in any detail, but my argument is that this long-term decline of interest rates and skill premium were fundamental for the long-term evolution of the European economy in the centuries after 1350 (in fact, the regime of low interest rates and low skill premia is still with us today, as much as the regime of high interest rates and high skill premia is still there in South-East Asia).

But how to explain long-term stability of the skill premium between 1450 and 1914? Why did not the Dutch Golden Age, the Industrial Revolution or any other major transformation of the economy of western Europe in these centuries lead to changes in the demand and supply of skilled labour resulting in changes in their relative prices? Part of the answer is that this did happen, but on other segments of the labour market. De Vries and Van der Woude (for sawyers), Van Zanden (for salaried employees) and Williamson (but contested by Feinstein) found evidence of increases in the skill premium in other parts of the labour market – in particular related to relatively highly skilled employees.²⁹ These reflected bottlenecks in the supply of highly skilled labour, the result of accelerations in economic growth and the transformation of economic structures. The skill premium used here – of construction labourers – was not affected by these changes, perhaps also because production techniques in building did not change much during these four and a half centuries.³⁰ Therefore it may perhaps be argued that this index is a stable measure of the efficiency of the supply of certain standardized skills, which are demanded by all societies.

Interest rates are only part of the story, however. The efficiency of institutions regulating the training of apprentices obviously also plays a role. The contract between an apprentice and his master is a highly complex one, involving different remunerations for services spread out over a lengthy time period.³¹ Workers may fear, when they pay for their training up-front, that they will not get the quantity and quality of training necessary for becoming a skilled worker or an independent craftsman. Masters may fear that –after the apprentice has been a net liability for his household during the first years of the contract- he will quit, before becoming a net source of income during the second half of his term.³² When the master himself controls access to the ranks of skilled craftsmen, trainees may also fear that he may renege on his promises.³³ These by definition ‘incomplete’ contracts may therefore result in underinvestment in human capital; efficient levels of human capital formation requires 1/ trust between both parties, and/or 2/ third-party involvement, i.e. institutions that guarantee the fair execution of the apprentice-contract.

In Europe guilds traditionally were the institutions that 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.³⁴ This meant that guilds almost everywhere operated as the ‘third’ party that saw to the fair treatment of apprentices. The exceptionally low skill premium of post 1450 Europe is therefore a testimony of the efficiency of the guilds (and, in England, of the additional institutions guarantees supplied by the national organization of the apprentice contract).

²⁹ De Vries and Van der Woude 1997: 632-4; Van Zanden 1995; Williamson 1985; Feinstein 1988.

³⁰ De Vries and Van der Woude 1997: 632-4 found some short-term changes in the skill premium of building craftsmen, but their results are not corroborated by the evidence used here – the changes they pointed at were also quite small relative to the long-term stability of the skill premium in this sector.

³¹ Humphries 2003.

³² See Epstein 1991: 102 ff; almost all contracts contained clauses forbidding the apprentice to quit before the contract period had ended.

³³ Humphries 2003: 81-2.

³⁴ Humphries 2003; Epstein 1991.

If the guilds had been less efficient, if they had functioned as cartels of skilled labour restricting the entry to the ranks of craftsmen, the skill premium would have been much higher (or, in other words, the gap between the return on human capital and the interest rate on the capital market would have been much higher). These conclusions are relevant for the ongoing debate about the relative efficiency of the guilds in early modern Europe. The traditional literature was very critical of the role of guilds, but more recent literature has suggested that their role was much more positive, in particular in the supply of training.³⁵

The structure of labour relations may also help to explain the near-constant level of the skill premium in Western Europe between 1450 and 1914. Knotter and De Vries and Van der Woude has characterized the pre-modern labour market as consisting of two segments.³⁶ The first segment – the ‘internal’ labour market – was relatively small in scale, and was characterized by stable labour relations and more or less fixed wages. The second segment – the ‘external’ market – had different characteristics: labourers, who were often seasonal migrants from the other parts of the Netherlands or Germany, were employed on a project basis, changed employment frequently, and their wages fluctuated much more than wages of the first segment. The second segment acted as a buffer for fluctuations in the demand and supply of labour. The near-stability of wage rates we find in sources about the construction industry is a feature of the first segment of the labour market. Here, employment was a long-term relationship, and the costs of renegotiating the wage on a regular basis (apparently) outran the benefits that both parties could reap from such frequent renegotiations.³⁷ Other mechanisms were used to support employees in times of famine, such as a bonus payment at the end of the year to compensate for dearth. The stability of nominal wages – Amsterdam shipwrights, for example, complained in 1869 that their wages had remained the same for more than 200 years! – was therefore embedded in long-term employment relationships. The very stable skill premium should be seen against this background; stable nominal wages of both skilled and unskilled labourers obviously resulted in a stable skill premium.

Of course, these institutions could not guarantee the long-term stability of the skill premium at the 50 to 60% level if interest rates would go up or guilds became less efficient in training apprentices. This may be the explanation for the divergence of Southern and Eastern Europe between c 1450 and 1900 (and in particular after 1650). The divergence of the skill premium in these regions compared to western Europe shows a (not particularly strong) relationship with population growth: it increases in the sixteenth century, followed by convergence during the 17th century crisis, and again followed by increases of skill premia in the south and the east in the 18th and 19th centuries. Whereas in western Europe this link between demography and skill premium seems to be cut after 1450, it continues to exist in the rest of Europe. So it can again be argued that the ‘real’ problem to be explained is why the skill premium in western Europe remained at the very low level attained in 1450.

An aspect that is related to this brief sketch of the structure of the labour market is the status of the unskilled labourers in different parts of the world. In Europe these unskilled construction workers were full time urban inhabitants who were active on this first segment of the labour market. In Japan, India and Indonesia one gets the impression that unskilled labourers are basically *agricultural* labourers – coolies is the term used in South Asia – who were also active in construction and other urban

³⁵ An overview of the debate stressing the role guilds played in training in Epstein 1998.

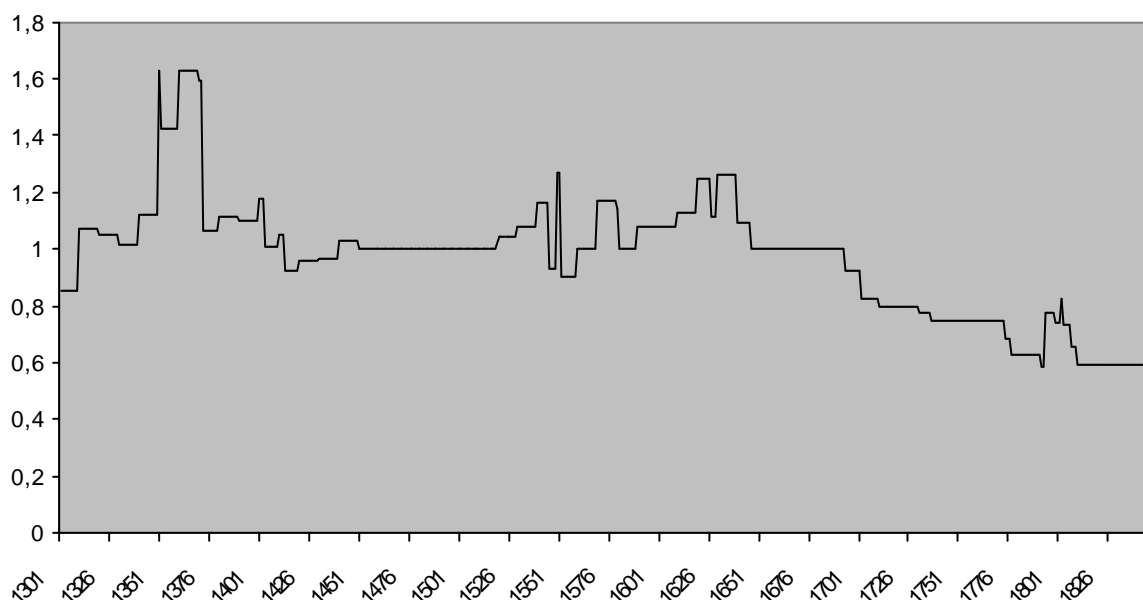
³⁶ Knotter 1984; see also De Vries and Van der Woude 1997: 636-47.

³⁷ The basic assumption underlying this, was that prices in the long run were stable.

activities. Saito in his study of the Japan labour market stresses the links between the urban market for unskilled labourers and the situation in agriculture; unskilled labourers in cities earn about the same wage as ‘male springtime farm workers’, which means that no big urban-rural wage gap existed.³⁸ We have already seen that in China wages in Beijing were much higher than in the south and west of the country, suggesting a big urban-rural wage gap. The situation in Indonesia and India was perhaps similar; the big we find between the wages for skilled and for unskilled labour may therefore result from the fact that the non-European measures of the skill premium also include the urban-rural differential.

In Western Europe these differentials were surprisingly small. During the 16th and 17th centuries agricultural wages in Holland were more or less on par with those of unskilled workers in the building industry.³⁹ In England we find the same picture between 1300 and 1700 – with some (in itself quite significant) fluctuations, nominal wages in agriculture were at the same level as the wages of unskilled labourers in construction (Figure 5). This changes after 1693, when a gap between wages emerges which increases from 8% in 1700 via 25% in 1740 to 40% in 1810. It appears therefore that western Europe was not only characterized by very low skill premium, but also by the fact that the wage gap between town and countryside was remarkably small.

Figure 5 The ratio between daily wages of an agricultural labourer and an unskilled labourer in construction, England 1300-1850



³⁸ Saito 1978: 88; Saito 2003 gives for the base period 1802-4 that the mean money wages for agricultural labourers in the countryside was 1.0 monme and for Kyoto day labourers 0.92 monme per person-day;

³⁹ Van Zanden 2002

Finally, an observation about the link between skill premium and the level of GDP. In section 2 we have seen that in the 20th century there existed a connection between GDP per capita and the skill premium – which was not very strong, but still quite important when countries with radically different levels of economic development were being compared. The same link exists in early modern Europe. I have constructed a dataset of 33 benchmark estimates of levels of GDP per capita in six European countries at various point in time between ca 1450 and 1820.⁴⁰ In another paper I describe a model to ‘explain’ the variation in GDP per capita. In all variants of the model the sign for the coefficient of the skill premium (in construction industry) is negative, meaning that a high levels of GDP per capita and a low skill premium are correlated (in more or less the same way as in the 20th century). The regional comparison leads to similar conclusions: skill premia are lowest in western Europe – in England and the Low Countries – the regions which expand most rapidly between c 1500 and c 1800. Moreover, the low skill premia seem to predate the expansion of these economies (with the possible exception of Flanders) by one or two centuries. The Dutch Golden Age began after about 1580, and the acceleration of the English economy occurred during the middle decades of the 17th century, that is, 130 or 200 years after skill premia (and interest rates) had fallen to their historic minimum.⁴¹ More complex tests of causal relationships between skill premia and estimated series of GDP per capita have not brought to light strong links between the two variables; attempts to test for Granger-causality, for example, generally led to the conclusion that the hypothesis that Granger-causality between GDP per capita and the skill premium in construction should be rejected.

Conclusion

The argument that has been developed in this paper is that the skill premium measured in this relatively simple way – as the difference between the wages of carpenters and masons on the one hand and those of unskilled labourers in construction on the other hand – is probably a good proxy of the quality of the institutional framework of an economy. This follows from the analysis of the main factors determining it:

- the level of interest rates, as paid by/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 standardized way; the skill premium offers an elegant alternative measure;
- the efficiency of institutions for the formation of human capital, in particular apprenticeship-contracts, the guilds in which they are embedded, and the degree of trust between apprentice and master that results from these institutions – again we deal with strategic variables for measuring the quality of the institutional framework

In other words, a low skill premium shows that households have access to relatively cheap capital (the result of their own savings or of borrowing on a capital market) and that institutions for the formation of human capital are working efficiently. The long-term effect will be that investment in human capital will be high and that its level will

⁴⁰ Work in progress; preliminary results are published on my website at <http://www.iisg.nl/research/jvz-simulating.pdf>

⁴¹ Ibidem, for these estimates of the growth of European economies.

be close to the socially optimal level (reflecting social costs and profits). This will obviously have long-term consequences for economic growth – one would expect growth to be strongest in economies with high levels of human capital formation and a low skill premium; the differential growth of the economies of early modern Europe, on which we have concentrated in this paper, seems to confirm this hypothesis. Therefore, the skill premium is not only a very good measure of the quality of the institutional framework on an economy, but also a good predictor of growth in the long-run. Consequently, the fact that the skill premium in Russia, India, Japan, Indonesia and in the capital city of China was, after about 1450, much higher than in western Europe, probably also means that capital markets and/or institutions for investing in human capital were much less efficient than in western Europe.

References (incomplete)

- Allen, R. C. (2001), 'The great divergence in European wages and prices', *Explorations in economic history*, 38, pp. 411-47.
- Bavel, J.P.B. van, and J.L. van Zanden (2004), 'The jump start of the Holland Economy during the late Medieval Crisis, c. 1350 – c. 1500', *Economic History Review*.
- Boomgaard, P. (1996), 'Geld, krediet, rente en Europeanen in Zuid- en Zuidoost-Azië in de zeventiende eeuw', in C.A. Davids et.al. (eds.) *Kapitaal, ondernemerschap en beleid*. Amsterdam: Neha, pp. 483-511.
- Stephen Broadberry and Bishnupriya Gupta (2003), 'The Early Modern Great Divergence: Wages, Prices and Economic Development in Europe and Asia, 1500-1800,' Research Paper, Department of Economics, University of Warwick, UK.
- Barro, Robert J. and Jong-Wha Lee (2000), 'International Measures of Schooling Years and Schooling Quality', at <http://www.worldbank.org/research/growth/ddbarle2.htm>.
- Clark, Gregory (1988), 'The cost of capital and medieval agricultural technique', *Explorations in economic history*, 25, pp. 265-94.
- Epstein, S.A. (1991), *Wage Labor and Guilds in Medieval Europe*. Chapel Hill: The University of North Carolina Press.
- Epstein, S.R. (1998), 'Craft Guilds, Apprenticeship, and Technological Change in Preindustrial Europe', *Journal of Economic History*, 58 (1998) 684-714.
- Epstein, S.R. (2000) *Freedom and growth: the rise of states and markets in Europe 1300-1750*. London: Routledge.
- Feinstein, C.H. (1988), 'The rise and fall of the Williamson curve' *Journal of Economic History*, 44, pp. 699-729.
- Freeman, Richard B., and Remco Oostendorp (2001), 'The Occupational Wages around the World Data File', *International Labour Review*, 140, no. 4, pp. 379-403.
- Goldthwaite, Richard A. (1990) *The Building of Renaissance Florence*. Baltimore: John Hopkins U.P.
- Hellie, R. (1999), *The economy and material culture of Russia 1600-1725*. Chicago: the University of Chicago Press.
- Homer, S. and R. Sylla (1996) *A History of Interest Rates*. New Brunswick: Rutgers U.P. 1996/3.
- Humphries, Jane (2003), 'English apprenticeship: a neglected factor in the first Industrial Revolution', in Paul A. David and Mark Thomas (eds.) *The Economic Future in Historical Perspective*. Oxford: Oxford U.P., pp.73-103.

- Knotter, A. (1984), 'De Amsterdamse bouwnijverheid in de 19e eeuw tot ca. 1870. Loonstarheid en trekarbeid op een dubbele arbeidsmarkt', *Tijdschrift voor sociale geschiedenis*, 10, pp. 123-154.
- Lindert, Peter, et.al. (2002), 'Preliminary Global Price Comparisons, 1500-1872.' Paper at session on World Living Standards since 13th century. XIIIth Economic History Congress, Buenos Aires.
- Maddison, A. (2001), *The world economy: a millennial perspective*. OECD, Paris.
- McCloskey, D. and J. Nash (1984), 'Corn at interest: the extent and cost of grain storage in medieval England', *American Economic Review*, 74, pp. 174-87.
- Moll-Murata, Christine (2003), 'Maintenance and Renovation of the Metropolitan City God Temple and the Peking City Wall during the Qing dynasty', unpublished paper University of Tuebingen.
- Ozmucur, S. and S. Pamuk (2002) Real Wages and the Standards of Living in the Ottoman Empire, 1469-1914, *The Journal of Economic History*.
- Phelps Brown, H., and S.V. Hopkins (1981), *A perspective of wages and prices*. London.
- Pomeranz, K. (2000), *The Great Divergence. China, Europe and the Making of the Modern World Economy*. Princeton U.P.
- Poynder, Nick (1999), 'Grain storage in theory and history', paper presented at Third Conference of European Historical Economics Society, Lisbon.
- Saito, Osamu (1978), 'The Labor Market in Tokugawa Japan: wage differentials and the real wage level', *Explorations in Economic History*, 15, pp. 84-101.
- Saito, Osamu (2003) "Wages, inequality and pre-modern growth in Japan, 1727-1894", Discussion Paper Series Hitotsubashi University Research Unit for Statistical Analysis in Social Sciences.
- Smith, Adam (1776/1976) *The Wealth of Nations*. Harmondsworth: Penguin
- Vries, J. de and Van der Woude, A. (1997), *The first modern economy: success, failure, and perseverance of the Dutch economy, 1500-1815*. Cambridge: C.U.P.
- Williamson, J.G. (1985), *Did British Capitalism breed inequality?* Boston: Allen & Unwin.
- Zanden, J.L. van (1995), 'Tracing the beginning of the Kuznets curve: Western Europe during the early modern period', *Economic History Review*, XLVIII, pp. 643-64.
- Zanden, J.L. van (2002), 'The 'revolt of the early modernists' and the 'first modern economy': an assessment', *Economic History Review* LV, pp. 619-41.
- Zanden, J.L. van (2004), 'On the efficiency of markets for agricultural products. Rice prices and capital markets in 19th century Java' to be published in *Journal of Economic History*.
- Zanden, J.L. van (forthcoming) 'The carpenter, the printer and the rise of the European knowledge economy 1350-1600'.