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# URBAN REAL WAGES AROUND THE EASTERN MEDITERRANEAN IN COMPARATIVE PERSPECTIVE, 1100–2000

Şevket Pamuk


## ABSTRACT

*This study examines the long-term trends in wages of skilled and unskilled construction workers in Constantinople-Istanbul, and to a lesser extent in other urban centers in the Near East and the Balkans from about 1100 until the present. It also compares long-term trends in eastern Mediterranean wages with those elsewhere in Europe. Two events had significant and long-lasting impacts on urban real wages around the eastern Mediterranean during the last millennium: the Black Death and modern economic growth. The available price and wage data also point to the existence of a gap in urban real wages between northwestern Europe and the eastern Mediterranean during the first half of the sixteenth century.*


## INTRODUCTION

During the last two decades economists and economic historians have paid a good deal of attention to the estimation of the per capita real product of

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different countries and the analysis of what happened over time to the gap between the leaders and followers. One of the most interesting questions in this respect concerns the emergence and evolution of the gap in levels of real income between today's developed and developing countries. We know that the gap is large today and can infer from the growth record of both groups of countries that it was smaller or did not exist at all prior to the onset of modern economic growth.

Recent research by Angus Maddison and others has confirmed the existence of a gap in 1820 (Maddison, 2001, 2003). There is little information, however, about the period before 1820. How large was this gap in 1750, and was there a gap in 1600 or in 1500? Were levels of income in Europe and Asia comparable before the Industrial Revolution? These inquiries inevitably give rise to questions about the prevailing trends in per capita incomes, productivity, and institutions during the early modern era not only in Western Europe but also in today's developing regions.

Unfortunately, with the exception perhaps of a handful of developed countries, estimates for per capita GDP for the period before 1820 are difficult to construct and not sufficiently reliable. Moreover, it has not been possible to construct detailed estimates for any of the developing countries for the period before 1820 or even 1870. An alternative approach for studying the gap in levels of per capita income or the standards of living has been to compare real wages of specific occupations, most often of skilled and unskilled construction workers in urban areas. Real wage data are of far better quality than per capita GDP estimates for the period before World War I for all of the developing countries and available for a wider sample. In fact, real wage series are virtually the only solid piece of information we have for the standards of living in the developing countries for the period before 1870 if not 1914. In short, real wages continue to be the most reliable source of information about the standards of living of at least part of the population. They also provide the most convenient vehicle for international comparisons of standards of living.

Although they cannot be claimed to be "national" in any sense, urban real wage series exist for many regions and large inter-regional differences within the same country are not apparent in these series. Nonetheless, real wage series are open to valid objections. Even if we accept the representative wage as an adequate proxy for the annual per capita earnings of labor, this does not mean that it should be a good proxy for income per capita. The latter depends on the further assumption that factor shares across countries are similar. In many parts of Europe and Asia during the early modern era and until World War I, incomes of households were often determined by



changes in employment levels, participation ratios of men, women, and children, and above all, by non-market incomes.

Despite these qualifications, the link between wages and the standards of living remains. A decline in real wages did result in a decline in the standards of living or welfare of the household because more labor had to be supplied to buy the same amount of goods, thereby leading either to a decline in other types of income, or in the case where the household responded to the decline in real wages by working harder or longer, a decline in leisure time. (Van Zanden, 1999; De Vries, 1993). Among urban workers, construction workers were a relatively homogeneous category of labor over time and space. Moreover, in contrast to the payments made to other employees, urban construction workers received a high proportion if not all of their pay in cash rather than in kind or in the form of shelter, food, and clothing. As a result, their wages allow for useful inter-country comparisons between pre-industrial societies.

Utilizing a large volume of archival documents and other sources, this study examines the long-term trends in the wages of skilled and unskilled construction workers in Constantinople-Istanbul, and to a lesser extent in other urban centers in the Near East and the Balkans, from about 1100 until the present. Data from three different sources are used for the study. For the period before 1450, a recently gathered set of wage and price data from Byzantine sources are employed. For the Ottoman period until World War I, we rely on the results of a recently published study which utilized detailed wage and price data collected from large numbers of account books and price lists located in the Ottoman archives in Istanbul (Ozmucur & Pamuk, 2002). Finally, for the period after World War I, real wages of manufacturing workers in Turkey available mostly from the official publications are linked to the real wage series for urban construction workers from the Ottoman era. We thus arrive at a reliable series for a large region of the Old World stretching back almost a millennium.

We will then compare long-term trends in eastern Mediterranean wages with long-term wage trends in other parts of Europe. The key issue in this comparison will be the origins and evolution of a wage gap between the eastern Mediterranean and other parts of Europe. For this purpose, we will make use of the recent literature on European wages in the late Middle Ages and the early modern era, most notably the study by Bob Allen which was published at the same time as our previous study on Ottoman prices and wages (Allen, 2001).

Several basic conclusions emerge from this study. First, two events had significant and long-lasting impacts on urban real wages around the eastern

Mediterranean during the last millennium: the Black Death and modern economic growth. The Black Death caused urban real wages to rise by as much as 100 percent and remain above their pre-Black Death levels until population growth during the sixteenth century reversed most if not all of those gains, not only in Western Europe and the western half of the Mediterranean but also around the eastern Mediterranean. Second, while local conditions always had a significant impact on real wages in specific countries, wage differentials between the eastern and western halves of the Mediterranean remained limited until the nineteenth century. Third, differences in real wages both between the eastern and western halves of the Mediterranean and also between individual countries have increased since the Industrial Revolution, during both the nineteenth and twentieth centuries.

We begin below with a discussion of the data and our methods of index construction for each of the three time periods. The paper concludes with an overview and interpretation of the results.

## BYZANTINE PERIOD, 1100–1453

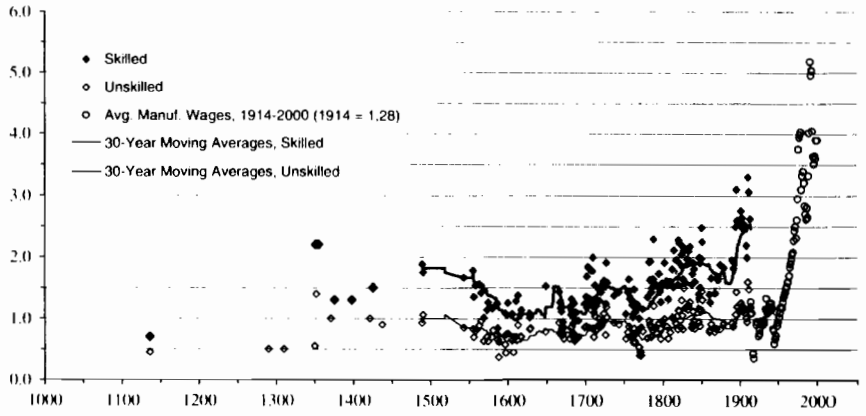
The Byzantine Empire with its capital city at Constantinople ruled over large parts of the eastern Mediterranean for most of the Middle Ages. While archival documents are not available from the Byzantine era, a group of Byzantine historians has recently published a sizable collection of observations of incomes, wages, and prices gathered from a variety of manuscripts. (Morrison & Cheynet, 2002; Cheynet, Malamut, & Morrison, 1991; Morrison, 1989). In this collection, observations are available as daily or annual wages or incomes of different types of workers, government officials, soldiers, ecclesiastics, and professionals in different locations across the empire. These observations cover the entire Byzantine period, but they become sufficiently detailed only for the period after 1100. For that later period, observations of nominal wages for skilled and unskilled urban construction workers do not exceed two dozen in number. More than half of the available observations on wages of construction workers are for the capital city, but observations are also available for Crete, Salonica, and other locations. Moreover, the absolute levels as well as changes over time and spatial changes in the levels of other income and wage observations in this data set can be utilized to obtain additional information about and to increase our confidence in the available observations of the wages of urban construction workers.



As for prices, the data set provides sufficiently large number of observations only for two standard commodities, namely wheat and olive oil. In addition, the limited number of observations for other cereals, especially barley, meat, other animal products and livestock can be used for obtaining additional information about prices and the aggregate price level at different points in time. In addition, long-term changes in slave prices were used to gain additional insights into trends in wages.

While we were able to deflate nominal wages in the Ottoman period by the price index of a detailed basket of consumer goods, for the Byzantine period nominal wages were deflated by an index consisting of the prices of wheat and olive oil. The Byzantine real wage indices for skilled and unskilled construction workers were then linked to the corresponding indices for the Ottoman period.

Our calculations based on the Byzantine wage and price observations indicate that prices and nominal wages began to rise during the eleventh century due to fiscally motivated debasements (Kaplanis, 2003). However, real wages remained roughly unchanged until mid-14th century as summarized in Graph 1. While the available data are not as detailed as one would like, there can be no doubt that the Black Death led to a large long-term increase in nominal and real wage levels around the eastern Mediterranean. Annual wages of skilled workers jumped from less than 20 gold hyperpyra to more than 50 hyperpyra while food prices showed only modest increase after mid-century. Wheat prices showed large fluctuations between good




*Graph 1.* Real Daily Wages of Construction Workers in Constantinople-Istanbul, 1100–2000 (unskilled in 1500 = 1.0).

and poor harvest years, but normal prices increased from about 1/6 or 1/5 hyperpyra per modios (12.8 kg or 17 l) to about 1/4 hyperpyra at the end of the century. Urban real wages at the end of the fourteenth century were above their pre-Black Death levels by as much as 100 percent and they remained well above their pre-Black Death levels until the end of the sixteenth century, 150 years into the Ottoman era. This large jump in the urban wage levels was paralleled by and confirmed further by the doubling of slave prices across the Byzantine territories during the second half of the fourteenth century (Morrison & Cheynet, 2002, pp. 847–850).

In order to facilitate comparisons with the Ottoman period for which more detailed price and wage data are available, we have converted the Byzantine and Ottoman wage and price observations for the fifteenth century into a common form, grams of silver per metric units. These observations, which are summarized in Table 1, reflect the continuity between the two eras despite the radical break in economic policy, monetary units, and metrology. Such continuity and comparability increase our confidence in the available observations on both sides of the year 1453. While the price and wage series expressed in common units are comparable before and after 1453, it is also clear that the prices were higher and real wages were lower during the Byzantine period. The most important explanation for this pattern was the deterioration of the Byzantine economy during its last century. As the territory under the control of the Byzantine state shrank, Constantinople

***Table 1.*** Comparisons between Byzantine and Ottoman Prices and Wages in Constantinople-Istanbul in Constantinople-Istanbul.

| Averages | Byzantine, 1400–1450 | Ottoman, 1460–1500 |
|---|---|---|
| Wheat prices in own units | 0.4 hyperpyra/modios | 12.8 akches/kile |
| Wheat prices in common units | 31.3 g silver/100 l | 23.5 g silver/100 l |
| Olive oil prices in own units | 2 1/3 hyperpyra/10 l | 4.8 akches/okka |
| Olive oil prices in common units | 3.10 g silver/l | 2.82 g silver/l |
| Daily wages in own units skilled construction workers | | 8.75 akches/day |
| Daily wages in common units skilled construction workers | 4.28 g silver/day | 5.95 g silver/day |
| Daily wages in own units unskilled construction workers | 75 hyperpyra/year | 4.77 akches/day |
| Daily wages in common units unskilled construction workers | 2.86 g silver/day | 3.24 g silver/day |

*Sources:* Morrison and Cheynet (2002) and Pamuk (2001). The gold:silver ratio was approximately 10 for this period. Annual wages are converted into daily wages at 180 days/year.



often had difficulties in securing its food and raw materials from the surrounding regions.

In the aftermath of the Black Death, urban real wages also registered large increase elsewhere around the eastern Mediterranean, well beyond Byzantine territories. Ashtor (1976) provides detailed evidence that urban real wages roughly doubled after the Black Death and stayed high during the fifteenth century in Egypt and Syria. Similar increase in urban real wages occurred in the Balkans as well (Morrison & Cheynet, 2002). It also appears on the basis of the Byzantine evidence that the skilled- and unskilled-wage differentials declined after the Black Death. However, more detailed data would be necessary to establish this latter trend with greater certainty (see Graph 1).

## OTTOMAN PERIOD, 1489–1914

For our price series in the Ottoman period, we utilized data on the prices of standard commodities (food and non-food items) collected from more than 6000 account books and price lists located in the Ottoman archives in Istanbul. The food indices included the prices of ten leading items of consumption, namely flour, rice, honey, cooking oil, mutton, chickpeas, lentils, onions, eggs, and olive oil for burning. Among these, flour, rice, cooking oil, mutton, olive oil and honey provided the most reliable long-term series and carried the highest weights in our food budget. In cases where the prices of one or more of these items were not available for a given year, missing values were estimated by an algorithm that applied regression techniques to the available values (Ozmucur & Pamuk, 2002; Pamuk, 2001).

Based on the available evidence regarding the budget of an average urban consumer, the weight of food items in the overall indices was fixed between 75 and 80 percent. The weight of each commodity in the overall index was then based on the shares of each in total expenditures of the respective institutions. To cite two prominent examples, in the absence of long series on bread prices, the weight of flour, mostly wheat flour, varies mostly between 32 and 40 percent of food expenditures and 24–32 percent of overall expenditures, depending on the fluctuations in prices. Similarly, the weight of meat (mutton) varies between 5 and 8 percent of the overall budget.

Prices of non-food items obtained from a variety of sources, most importantly the palace account books, were then added to the indices. These commodities are soap, wood, coal, and nails by weight (used in construction and repairs). Cloth was not included in our indices because we were unable

to ensure that the long-term price series obtained from the archival documents belonged to cloth of the same quality.

For the period 1860–1914, data from archival sources are limited. For this reason, the detailed quarterly wholesale prices of the Commodity Exchange of Istanbul covering about two-dozen commodities and a separate series for imported cotton textiles were used. Indices based on these prices were then linked to those for the earlier period with the help of detailed data for both retail prices of individual commodities and prices at the Commodity Exchange for 1860–1862 and 1913–1914.

Daily wage data were gathered from more than five thousand account books of the construction and repair sites in Istanbul and other cities. These account books contain daily wages for both unskilled and a variety of skilled construction workers. Wages for unskilled workers referred mostly to one type of worker, called irgad in the early period and rençber after about 1700. In contrast, daily wage rates could be found in for more than half a dozen categories of skilled construction workers in these account books. In order to utilize the additional information, an index was constructed for skilled wages that included the wages of carpenters, masons, stonecutters, ditchdiggers, plasterers, and others. Based on the relative frequency with which they appeared in the account books, the greatest weight in this index was given to the category of neccar, specialists who built wooden houses and the wooden parts of buildings. There also existed a separate category of carpenter (marangoz), which apparently referred more to makers of furniture. The share of neccar fluctuated between 50 and 60 percent in our skilled wage index.

Istanbul was chosen primarily because the data were most detailed for the capital city. However, price and wage data from the account books of the pious foundations is available for other cities of the empire as well. Price observations for a shorter list of commodities similarly obtained from the account books of pious foundations in the Ottoman archives in Istanbul were used to construct separate series for the cities of Edirne, Bursa, Konya, Trabzon, Damascus, and Jerusalem. In these Ottoman cities, the overall change in the price level from 1490 to 1860 and the medium term trends were quite similar to the price trends in Istanbul (Pamuk, 2001, Graph 3.1 and Appendix Tables 5.1 through 5.6). Price data gathered by Ljuben Berov suggest that the Balkans experienced similar increases in prices during the sixteenth and seventeenth centuries (Berov, 1976; a summary is available in Berov, 1974). The evidence, thus points to similar price trends for the region stretching from the Balkans through Anatolia to Syria. In Egypt, the local currency was the para or medin whose silver content and rate of debasement



differed from those of the akçe. Nonetheless, it is possible to construct price indices in grams of silver for Cairo on the bases of data supplied by Andre Raymond from the court records of that city (Pamuk, 2001, Appendix, Table 5.7; Raymond, 1973–1974, Vol. I, pp. 17–80). These indices indicate that prices in Cairo expressed in grams of silver moved together with those in Istanbul and other Ottoman cities in the akçe region until 1800. Observations on the daily wages of skilled and unskilled construction workers also available from the account books of the pious foundations and collected by Andre Raymond for Cairo show clearly that nominal wages in other Ottoman cities showed similar trends during these four centuries (Raymond, 1973–1974, Vol. II, pp. 383–386; Hanna, 1984, pp. 43–46). In other words, although we are unable to offer the same details for other cities around the eastern Mediterranean, we are confident that the long-term trends we established for the city of Istanbul also closely reflect the patterns in other urban areas.

Real wages of construction workers in Istanbul and other urban centers across the Ottoman Empire during the century after 1453 were higher than corresponding real wages in Constantinople and other Byzantine urban centers during the century before 1453, especially for skilled construction workers. This difference is in large part due to the difficulties of the Byzantine society and economy during its last century of existence. Constantinople often experienced problems in securing its food supply during this period. From their relatively high levels at the end of the fifteenth century, Ottoman urban real wages experienced a steady and large decline during the sixteenth century, by as much as 40 percent. This trend was due, at least in part, to the increases in population around the eastern Mediterranean during the sixteenth century.

With a long-term perspective, one may thus interpret the sixteenth century decline in real wages around the Mediterranean and in many parts of Europe as the second and reverse leg of a movement that began with the sharp increases after the Black Death during the second half of the fourteenth century. An inverse-V-shaped pattern in urban real wages was thus completed by the end of the sixteenth century and urban real wages in the eastern Mediterranean stood close to their levels before the Black Death (for Italy, see Malanima, 2004; see Fig. 4).

After remaining roughly unchanged until the middle of the eighteenth century, the Ottoman urban real wages increased by about 20–30 percent from the late eighteenth until the mid-nineteenth century and then by another 40 percent during the late nineteenth and early twentieth centuries. On the eve of World War I, real wages of unskilled construction workers were

about 10–20 percent above their levels in 1500. Because relative prices shifted in favor of goods consumed by higher-income consumers during these centuries and because the skill premium began to rise late in the nineteenth century, real wages of skilled workers in 1914 stood at more than 50 percent above their levels in 1500 (Ozmucur & Pamuk, 2002, pp. 303–304). In comparison to the first half of the fourteenth century, that is, the era before the Black Death, both unskilled and skilled urban wages stood in on the eve of World War I at least 100 percent higher.

Urban wages were undoubtedly a limited category in the Ottoman economy. Nonetheless, there can be no doubt that these very long-term trends in urban wages reflect changes in the productivity and income levels of the underlying economy, most importantly in the agricultural sector where more than three-fourths of the labor force were still employed on the eve of World War I. In the light of this new evidence, we now need to consider the possibility of a slow and modest rise in labor productivity around the Eastern Mediterranean in the era before the Industrial Revolution.

## URBAN REAL WAGES SINCE WORLD WAR I

With the spread of industrialization, wages of urban construction workers have declined in importance as a wage category. For the same reason, it has become increasingly difficult to obtain regular observations on this category from the published statistics of individual countries. In contrast, information on the wages of manufacturing workers is much more readily available. As a result, we decided to link our wage series for the construction workers until World War I with the more readily available series of national average wages for manufacturing workers for the period after 1914. Taking into account the relative levels of both construction and manufacturing wages in the period 1900–1930 and especially the sectoral wages provided in the Ottoman Industrial Census of 1913–1915, we decided to link the national average daily manufacturing wage to the Istanbul daily construction wages at 16 percent above the wage of an unskilled construction worker and at 41 percent below the wage of a skilled construction worker in 1913–1914. Wages of skilled construction workers at Istanbul were 118 percent higher than those of unskilled construction workers during 1913–1914. For our national average manufacturing wage series, we utilized the Ottoman Industrial Census of 1913–1915, the nominal manufacturing wage series prepared by Tuncer Bulutay until the early 1990s which revises and utilizes various official series and the average manufacturing wage indices prepared by the State Institute of Statistics for the most recent period.[1] For the deflator, we used the consumer price indices for Istanbul prepared by the Istanbul Chamber of Commerce, for Ankara prepared by the Under secretariat for the Treasury and Foreign Trade until 1960 and the urban areas consumer price index prepared by the State Institute of Statistics for the period since 1960 (Pamuk, 2001, pp. 19, 53).



After remaining below their pre-World War I levels until after World War II, real manufacturing wages in Turkey increased by 300 percent from 1950 until the end of the century. Urban real wages, thus exhibited the largest increases during the last millennium in the half century since 1950 (Graph 1). This pattern applies to all countries and regions around the eastern Mediterranean from the Balkans to Syria and Egypt. For most countries around the eastern Mediterranean, real wages did not show significant increases during the period 1914–1950. The notable exception was that part of Mandate Palestine, which ended up as the state of Israel where real wages more than doubled from 1914 to 1950. In the period since 1950, the largest increases in urban real wages around the eastern Mediterranean occurred in Greece and Israel (3–5-fold), while real wage increases were most limited in Egypt, Syria, and in former Yugoslavia (less than 2-fold or 200 percent increase). Real wage increases in Turkey fall between these two groups of countries. Even in the slow-growing countries, in Egypt, Syria, and the former Yugoslavia, however, real wage increases since 1950 were greater than those in any other century or any other two-century period during the last millennium.[2]

## A COMPARATIVE PERSPECTIVE, 1300–2000

In this section, we will examine long-term trends of urban real wages around the eastern Mediterranean within a Mediterranean and European comparative perspective. For this purpose, we will again adopt a three-period approach.

For the late medieval period before and after the Black Death, all available evidence points to a similar pattern in urban real wages on both sides of the Mediterranean, east and west. The Black Death led to a large long-term increase in nominal and real wage levels. Urban real wages at the end of the fourteenth century were above their pre-Black Death levels by as much as 100 percent in the eastern and western halves of the Mediterranean in Italy, France, and Spain, as well the Balkans, the Byzantine Empire, Syria, and Egypt.[3] They declined somewhat but remained well above their pre-Black

Death levels through the fifteenth century. During the fifteenth century, nominal and real wages of Constantinople and Cairo construction workers were close to but appear to be lower than those in Italy (Ashtor, 1969, pp. 511–524). Real wages of urban construction workers in England exhibited a similar pattern during the fourteenth and fifteenth centuries. However, due to the limitations of the data, it is not easy to compare the levels of Eastern Mediterranean and English real wage levels for this early period. (Clark, 2005.)

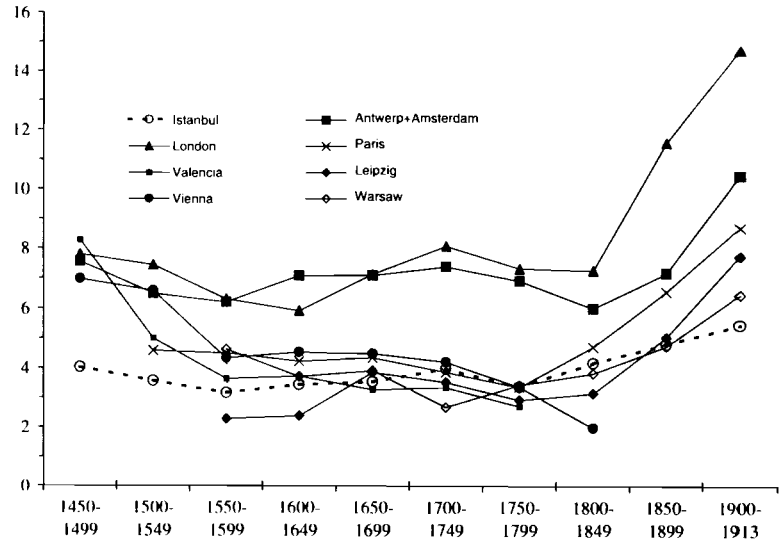
For a comparison of the urban real wages around the eastern Mediterranean with those in other parts of Europe from the sixteenth century until World War I, we make use of the recent study of prices and wages in European cities by Bob Allen. Allen utilized a large body of data most of which were compiled during the early part of this century by studies commissioned by the International Scientific Committee on Price History founded in 1929. In order to facilitate comparisons, he converted all price and wage series into grams of silver and chose as a base to the index of average consumer prices prevailing in Strasbourg during 1700–1749 (Allen, 2001).

Allen has argued that even though wages in a single city may be accepted as a barometer of wages in the whole economy, international comparisons need to be made between the cities at similar levels in the urban hierarchy. Since his study uses data from cities at the top of their respective urban hierarchies such as London, Antwerp, Amsterdam, Milan, Vienna, Leipzig, and Warsaw, it would make sense to insert Istanbul, another city at the top of the urban hierarchy of its region, into this framework. It is not very difficult to do so since prices and wages are already expressed in grams of silver in the present study. However, it was still necessary to express Istanbul prices in terms of the Allen base of Strasbourg 1700–1749 = 1.0. For this purpose, Ottoman commodity prices for the interval 1700–1749 were applied to Allen's consumer basket with fixed weights. A second and equally useful method of linking Istanbul's price level to those of other European cities in the Allen set was to employ the detailed annual commodity price series gathered by Earl Hamilton for Valencia and Madrid for 1500–1800 and compare them with the Istanbul prices for the same commodities (Hamilton, 1934, 1947, Appendices). Since Valencia and Madrid prices were already calibrated into the Allen set, it was then possible to determine the Istanbul price level vis-à-vis European cities for each interval. The price series for flour, mutton, olive oil, cooking oil, onions, chickpeas, pepper, sugar, and wood were used in these calculations. The two procedures produced results that were quite similar.



Our indices show that daily wages in Istanbul and other eastern Mediterranean cities expressed in grams of silver were comparable to many other locations in northern and southern Europe in the early part of the sixteenth century. However, since Istanbul prices were higher than those in other cities in Allen's sample, real wages in Istanbul varied between 60 and 90 percent of real wages in other cities during that period (Graph 2). It is interesting that while real wages continued to decline after 1600 in southern and many other parts of Europe, they remained little changed in Istanbul during the seventeenth and until late in the eighteenth century leading to greater convergence with other parts of Europe except the northwest. A wage gap of one-third to one-half between Istanbul and the leading cities in northwestern Europe continued until the Industrial Revolution.

In Table 2, we offer another comparison of the real wages in eastern Mediterranean with those in northwestern and southwestern Europe before the Industrial Revolution. For this purpose we present and make use of more detailed price data as well as wage indices for western Netherlands, London, Valencia, and Madrid collected by Jan Luiten Van Zanden, Bob Allen, and Earl Hamilton respectively in addition to our own for Istanbul.[4] Table 2 shows that nominal wages of skilled and unskilled construction




*Graph 2.* Real Wages of Unskilled Construction Workers in European Cities, 1450–1913 (Wages in Grams of Silver/CPI).

***Table 2.*** Real Wage Comparisons between Istanbul and Other European Urban Centers, 1500–1750.

| | 1500–1550 | | | | 1700–1750 | | | |
|---|---|---|---|---|---|---|---|---|
| | Istanbul | Western Netherlands | London | Valencia | Istanbul | Western Netherland | London | Madrid |
| Wages, nominal, in grams silver | | | | | | | | |
| Unskilled | 3.37 | 3.45 | 3.20 | 4.20 | 3.30 | 8.60 | 10.50 | 5.70 |
| Skilled | 5.94 | 5.66 | 5.00 | 6.50 | 5.17 | 13.36 | 14.70 | 11.60 |
| Prices, in grams silver per kilogram | | | | | | | | |
| Bread | 0.38 | 0.28 | | | 0.36 | 0.87 | | |
| Wheat | 0.42 | 0.33 | 0.19 | 0.54 | 0.41 | 0.62 | 0.59 | 0.47 |
| Mutton | 1.10 | 1.23 | 0.76 | 2.10 | 1.30 | 4.07 | 3.12 | 3.66 |
| Butter | 4.22 | 1.79 | 1.85 | 3.74 | 3.89 | 5.35 | 5.63 | 4.21 |
| Olive Oil | 2.67 | | | 1.95 | 2.51 | | | 2.73 |
| Chick Peas | 0.59 | 0.55 | 0.27 | | 0.80 | 1.57 | 0.58 | 1.56 |
| Rice | 0.87 | | | 0.72 | 0.94 | | 4.62 | 2.49 |
| Honey | 2.67 | | 0.47 | 1.79 | 1.70 | | | 2.96 |
| Sugar | 15.95 | 4.38 | | 7.95 | 12.37 | 7.42 | 8.10 | 6.08 |
| Black Pepper | 17.93 | 15.86 | | 33.52 | | | | |
| Soap | 2.67 | 1.09 | 3.50 | 1.64 | 3.00 | 2.28 | 7.00 | 3.04 |
| Coal | | | 0.06 | | 0.22 | | 0.17 | 0.20 |
| Price indices (Istanbul 1500–1550 = 1.0) | | | | | | | | |
| | 1.00 | 0.68 | 0.63 | 0.92 | 0.90 | 1.58 | 1.63 | 1.30 |
| Real wages Istanbul (Unskilled, 1500–1550 = 100) | | | | | | | | |
| Unskilled | 100 | 151 | 151 | 135 | 109 | 162 | 191 | 130 |
| Skilled | 176 | 247 | 236 | 209 | 170 | 251 | 268 | 265 |

*Sources:* Pamuk (2001), Allen (2001), van Zanden at http://www.iisg.nl/hwp, De Vries and Van der Woude (1997), and Hamilton (1934, 1947).



workers measured in grams of silver were quite comparable in these four regions during the first half of the sixteenth century. However, our direct comparison of the prices of more than half a dozen commodities which are available for both regions indicate that, in grams of silver terms, Istanbul and Madrid prices were higher by about 50 percent than those in western Netherlands and London during the same period. By the first half of the eighteenth century, prices and nominal wages in western Netherlands and London measured in grams of silver had risen by about two and a half times, with the nominal wages lagging somewhat behind prices. Prices and nominal wages in Spain rose to a lesser extent during the same period. In Istanbul, on the other hand, prices and nominal wages during the first half of the eighteenth century, measured in grams of silver, were not very different from those of two centuries earlier. In other words, detailed price and wage data presented in Table 2 indicate that real wages in Istanbul were below those in western Netherlands and England by one-third to one-half during the first half of the sixteenth century and this gap remained roughly unchanged until the era of the Industrial Revolution. This more direct and more detailed comparison between Istanbul and the western Netherlands, London, Madrid, and Valencia price and wage series is thus consistent with the real wage trends outlined earlier in Graph 2. Both Graph 2 and Table 2 suggest strongly that we need to look at the period before the sixteenth century for the origins of the wage gap between the eastern Mediterranean and northwestern Europe.

It has been frequently argued that in the absence of detailed price series, it would still be useful to deflate nominal wages by wheat or grain prices and arrive at "wheat or grain wages" as a reasonable approximation of the purchasing power of wages, especially in view of the large share of cereals in the average consumer basket during the late medieval and early modern periods. As Jan Luiten Van Zanden has warned recently, however, wheat or grain wages may at times provide a misleading picture because of the wide variations in grain prices (Van Zanden, 1999). In Table 3 we present nominal wages, grain prices and wages for the two leading urban centers in the eastern Mediterranean, Istanbul, and Cairo, and compare them with grain wages in other European urban centers in the early modern era. The barley prices presented in this table for Poland are unusually low which gives us a distorted picture of the standards of living in this part of the European periphery. For this reason, it may be useful to investigate in greater detail cereal prices in Poland in the future. It is also remarkable that the range of cereal prices around Europe was just as wide around 1800 as it had been around 1600. This pattern is consistent with arguments that commodity

***Table 3.*** "Grain Wages" of Unskilled Construction Workers, 1400–1800.

| | 1400–1420 | 1500–1520 | 1600–1620 | 1680–1700 | 1780 1800 |
|---|---|---|---|---|---|
| Daily wages in grams silver | | | | | |
| South. England | 2.6 | 2.9 | 3.7 | 5.7 | 9.2 |
| Holland | | 3.0 | 6.5 | 7.7 | 8.7 |
| Florence-Milan | 4.7 | 2.6 | 5.4 | 3.9 | 3.2 |
| Warsaw-Kracow | | 1.0 | 2.8 | 1.8 | 2.9 |
| Istanbul | 2.8 | 3.3 | 4.1 | 4.3 | 4.4 |
| Cairo | 2.7 | 2.6 | 2.5 | 2.0 | 1.7 |
| Wheat or rye prices in grams silver/100l | | | | | |
| South. England | 26.5 | 22.2 | 61.5 | 70.6 | 113.2 |
| Holland | 21.0 | 21.5 | 57.2 | 46.5 | 87.5 |
| Florence-Milan | 22.0 | 39.1 | 103.6 | 46.8 | 81.1 |
| Warsaw-Kracow | 4.0 | 2.3 | 9.0 | 8.0 | 10.3 |
| Istanbul | 24.0 | 35.6 | 50.0 | 37.4 | 42.0 |
| Cairo | 30.0 | 28.0 | 38.0 | 26.0 | 19.0 |
| Daily wages in liters of wheat or rye | | | | | |
| South. England | 10.0 | 13.2 | 6.0 | 8.1 | 8.1 |
| Holland | | 14.0 | 11.4 | 16.6 | 9.9 |
| Florence-Milan | 21.5 | 6.6 | 5.3 | 9.3 | 6.0 |
| Warsaw-Kracow | | 45.1 | 34.8 | 23.2 | 20.6 |
| Istanbul | 11.6 | 9.3 | 8.2 | 11.5 | 10.5 |
| Cairo | 9.0 | 9.3 | 6.6 | 7.7 | 9.0 |

*Sources:* Europe: Van Zanden (1999), Allen-Unger (2004); Istanbul: Pamuk (2001), Morrison and Cheynet (2002); Cairo: based on Ashtor (1969), Raymond (1973-1974).

price convergence around Europe remained limited until the institutional changes and the transportation revolution of the nineteenth century.

It is also worth noting that because wheat prices did not deviate significantly from wheat prices elsewhere in southern and western Europe, levels of wheat wages in Istanbul and Cairo are in line with what we already know about the purchasing power of wages and the standards of living around the eastern Mediterranean. It thus appears that real wage levels in Cairo were comparable to those elsewhere around the eastern Mediterranean before the Industrial Revolution. However, nominal and real wages in Cairo appear to lag behind those elsewhere in the region during the nineteenth century.

Real wage differences between the eastern Mediterranean and western Europe continued to widen during the nineteenth century and until 1950.[5]



Real wage differentiation within the eastern Mediterranean has accelerated since 1950. Greece and Israel have experienced increases in real wages that brought their wage levels closer to those in western Europe. At the other end of the spectrum, wage increases in Yugoslavia, Syria, and Egypt continued to lag behind those in western Europe, widening the wage gap between these two groups of countries even further. On the other hand, urban wage increases in Turkey since 1950 have been roughly comparable to those in western Europe.

## CONCLUSION

One of the more important questions regarding the world economy in the early modern era concerns the emergence and evolution of the gap in levels of real income between today's developed and developing countries. With the exception perhaps of a handful of countries, however, estimates for per capita GDP for the period before 1820 are difficult to construct and not sufficiently reliable. An alternative approach for studying the differences in levels of per capita income or the standards of living has been to compare real wages of skilled and unskilled construction workers in urban areas. One needs to be cautious about using daily wages of urban construction workers as indicators of the standards of living for an entire country. Nonetheless, in the absence of reliable information about production and income, real wage series still serve as the best indicator available for long-term trends in standards of living.

Utilizing a large volume of archival documents, this study established for the first time the long-term trends in wages of skilled and unskilled construction workers in Constantinople-Istanbul and other urban centers around the Eastern Mediterranean from the twelfth century until World War I. These price and wage series were then inserted into a larger framework of price and wage trends in European cities during the same period.

Several basic conclusions emerge from this study. First, two events had significant and long lasting impacts on urban real wages around the Eastern Mediterranean during the last millennium: the Black Death and modern economic growth. The Black Death caused urban real wages to rise by as much as 100 percent and remain above their pre-Black Death levels until population growth during the sixteenth century reversed most, if not all, of those gains not only in Western Europe and the western half of the Mediterranean but also around the eastern Mediterranean.

Our real wage series point to the existence of a modest, but statistically significant upward trend in urban wages around the eastern Mediterranean dating back to the seventeenth century. It is thus possible that there occurred a slow rise in productivity across the region in the era before the Industrial Revolution. Increases in urban real wages continued at a higher pace after the Industrial Revolution, during the century before World War I. However, the largest real wage increases to occur around the eastern Mediterranean during the last millennium took place in the half-century since 1950. We may thus conclude that the most significant impact of modern economic growth on the standards of living in this region occurred during the last half century. With the arrival of more rapid economic growth after 1950, significant real wage differences began to emerge within the region as well, between economies with higher and lower rates of economic growth.

This study has also provided new insights into the origins and evolution of the wage gap between this region and elsewhere in Europe. The available price and wage data point to the existence of a gap in urban real wages between northwestern Europe and the eastern Mediterranean during the first half of the sixteenth century that persisted until the Industrial Revolution. The available evidence thus suggests strongly that we need to look at the period before the sixteenth century for the origins of the wage gap between the eastern Mediterranean and northwestern Europe. On the other hand, a significant wage gap between the eastern Mediterranean and other regions of Europe cannot be observed before the Industrial Revolution. While local conditions always had significant impacts on real wages in specific countries, wage differentials between the eastern and western halves of the Mediterranean remained limited until the nineteenth century. In contrast, differences in real wages between the eastern and western halves of the Mediterranean have increased substantially since the Industrial Revolution, during both the nineteenth and twentieth centuries.

## NOTES

1. Further details on manufacturing wage series can be obtained from Pamuk (2001, pp. 77–78).
2. Maddison (2003); compare with Berov (1979).
3. Ashtor (1969, pp. 517–524). For Italy, trends in urban real wages in the aftermath of the Black Death can be followed in detail from Malanima (2004).
4. The van Zanden indices are available from http://www.iisg.nl/hwp.



5. For further evidence on real wage trends in the eastern and western halves of the Mediterranean from the Industrial Revolution until 1950, see Williamson (2000).

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## REFERENCES

Allen, R. C. (2001). The great divergence in European wages and prices from the middle ages to the first world war. *Explorations in Economic History, 38*, 411–447.

Ashtor, E. (1969). *Histoire des Prix et des Salaries dans l'Orient Medieval*. Paris: SEVPEN.

Ashtor, E. (1976). *A social and economic history of the near east in the middle ages*. Berkeley: University of California Press.

Berov, L. (1974). Changes in price conditions in trade between Turkey and Europe in the 16th-19th century. *Etudes Balkaniques, 3*, 168–178.

Berov, L. (1976). *Prices in the Balkans during the 16th-19th centuries and the European revolution of prices*. Sofia: Publishing House of the Bulgarian Academy of Sciences (in Bulgarian).

Berov, L. (1979). Wages in the Balkans during the period of manufacturing capitalism and the Industrial revolution. *Bulgarian Historical Review, 1*, 91–115.

Cheynet, J.-C., Malamut, E. & Morrison, C. (1991). Prix et Salaries a Byzance (Xe-XVe Siecle). *Hommes et Richesses dans l'Empire Byzantin* (Vol. II, pp. 339–374). Paris.

Clark, G. (2005). The condition of the working-class in England, 1200–2004. *Journal of Political Economy, 113*.

De Vries, J. (1993). Between purchasing power and the world of goods: Understanding the household economy in early modern Europe. In: J. Brewer & R. Porter (Eds), *Consumption and the world of goods* (pp. 85–132). London & New York: Routledge.

De Vries, J., & Van der Woude, A. (1997). *The first modern economy: Success, failure, and perseverance of the Dutch economy, 1500–1815*. Cambridge: Cambridge University Press.

Hamilton, E. J. (1934). *American treasure and the price revolution in Spain, 1501–1650*. Cambridge, MA: Harvard University Press.

Hamilton, E. J. (1947). *War and prices in Spain, 1650–1800*. Cambridge: Harvard University Press.

Hanna, N. (1984), Construction work in Ottoman Cairo, 1517–1798. *Supplement aux Annales Islamologiques*, Cahiers No. 4. Cairo.

Kaplanis, C. (2003). The debasement of the 'dollar of the middle ages. *The Journal of Economic History, 63*, 768–801.

Maddison, A. (2001). *The world economy: A millennial perspective*. Paris: OECD Development Centre.

Maddison, A. (2003). *The world economy: Historical statistics*. Paris: OECD Development Centre.

Malanima, P. (2004). Labor, productivity, wages in Italy, 1270–1913. Paper presented to the conference, Towards a global history of prices and wages, Utrecht, August.

Morrison, C. (1989). Prix et Salaries a Byzance (Ve-VIIe Siecle). In *Hommes et Richesses dans l'Empire Byzantin* (Vol. I, pp. 239–260). Paris.

Morrison, C., & Cheynet, J.-C. (2002). Prices and wages in the Byzantine world. In: A. E. Laiou (Ed.), *The economic history of Byzantium: From the seventh through the fifteenth century* (pp. 815–878). Washington, DC: Dumbarton Oaks.

Özmucur, S., & Pamuk, S. (2002). Real wages and standards of living in the Ottoman empire, 1489–1914. *The Journal of Economic History*, *62*, 292–321.

Pamuk, S. (2001). *500 Years of prices and wages in Istanbul and other cities*. Ankara: State Institute of Statistics (in Turkish and English).

Raymond, A.(1973–1974). Artisans et Commerçants au Caire au XVIIIe Siecle (Vol. 2). Damascus: Institut Francais de Damas.

Van Zanden, J. L. (1999). Wages and standards of living in Europe, 1500–1800. *European Review of Economic History*, *2*, 175–195.

Williamson, J. G. (2000). Real wages and relative factor prices around the Mediterranean, 1500–1940. In: S. Pamuk & J. G. Williamson (Eds), *The Mediterranean response to globalization before 1950* (pp. 45–75). London: Routledge.

# JAPANESE UNSKILLED WAGES IN INTERNATIONAL PERSPECTIVE, 1741–1913

Jean-Pascal Bassino and Debin Ma

## ABSTRACT

*Constructing consumption baskets for the benchmark periods 1745–1754 and 1882–1886, and price indices, we calculate real wages for Japanese unskilled daily laborers in 1741–1913. Matching caloric content and protein contents in our Japanese consumption baskets with those for Europe, we compare Japanese and European urban real wages. Real wages in Kyoto and later Tokyo are about a third London wages but comparable to wages in major Southern and Central European cities for 1700–1900. In Japan, wages are substantially higher in the Meiji period than in the Tokugawa period. These findings have implications for the debate on conditions in Europe and Asia on the eve of the Industrial Revolution.*

## 1. INTRODUCTION

How rich or poor was Japan before she embarked on the path of modern economic growth following the Meiji Restoration (1868)? Intellectual interest in this question, often in curious synchronism with the tempo of the

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