Two Worlds of Female Labour:
Gender Wage Inequality in Western Europe, 1300-1800

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Abstract

It is generally acknowledged that the degree to which women participate in labour markets and how they are remunerated are important determinants of female autonomy that may also affect their demographic behaviour. Such links have been discussed in the literature about the "European Marriage Pattern" (EMP). In order to bring about the conditions for female autonomy of the EMP (in which women have a large say in the decision when and with whom they marry), women should have had access to the labour market and have earned a decent wage. This is clearly affected by the gender wage gap and the possibility that women earn their own living and have the option to remain single. But so far no attempt has been made to compare the wages of women across Europe over the long run. In this paper we therefore provide evidence on the wages of unskilled women for seven European countries between 1300 and 1800. Our evidence shows that there were two worlds of female labour. In the South of Europe women earned about 50% of the wage of unskilled male labourers. In the Northern and Western parts of Europe this gap was much smaller during late Medieval Period, but it increased dramatically between about 1500 and 1800.

JEL Codes: N13, N33, J16.

Keywords: Living standards, labour market, gender inequality, pre-industrial development

1. Introduction

There has been a lot of work on long-term trends in real wages of men in the world economy. The new wave of interest started with the classic paper by Robert Allen (2001) studying the skilled and unskilled wages of urban builders in nine countries from the Middle Ages up to the First World War. The pattern that emerges from this for Western Europe is the so-called "Little Divergence" or "reversal of fortunes" (Allen 2003, Allen 2009, de Pleijt and van Zanden 2016). This is the process in which the North Sea region, notably the United Kingdom and the Low Countries, developed into the most prosperous and dynamic part of the continent. In all European countries real wages went up after the Black Death (1347-48). On the continent real wages went back to pre-plague levels in the long run, thereby confirming Malthusian expectations. In the North Sea region, however, real wages remained relatively high. This pattern is also clear from the more recent evidence on per capita GDP (e.g. Broadberry et al 2015, van Leeuwen and van Zanden 2012, Bolt and van Zanden 2014, Fouquet and Broadberry 2015): there was almost continuous growth in the Low Countries and England, whereas levels of per capita GDP stagnated in the rest of Europe.

One of the possible explanations for this divergent path of economic growth in the North Sea region is the "European Marriage Pattern" (henceforth EMP) – i.e. in this particular region of the world women married relatively late, there was a small spousal age gap, and a high share of single women (Hajnal 1965). Following the ideas developed by de Moor and van Zanden (2010) this favourable demographic regime emerged in the North Sea region in the late Medieval period as a result of the preaching of the Catholic Church promoting consensus based marriage, the rise of well-functioning labour markets in which women were participating, and favourable institutions of property transfers between parents and their offspring that promoted wage labour by women. In turn, this interplay of demographic and economic changes in the North Sea area is argued to have limited fertility, thereby increasing real wages (Voth and Voightlander 2013) and human capital formation (Baten et al 2017), eventually causing the shift to modern economic growth.

The link between fertility, human capital formation and economic growth has moreover been stressed by Unified Growth Theory (henceforth UGT) (Galor and Weil 1996, Galor and Weil 2000, Galor and Moav 2002, Galor 2011). UGT postulates a preference switch at the household level from large numbers of "low quality" children to small numbers of "high quality" children (cf. Becker 1981). The decrease in fertility rates and the increase in the level of human capital triggers the transition from "Malthusian stagnation" to "modern economic growth".

However, the link between the EMP (and the strong position of women therein) and pre-industrial economic development is not generally accepted. Dennison and Ogilvie (2014), for instance, find that the EMP did not increase real wages in early modern Europe. Scandinavia and Germany had even higher ages at marriage than England and Holland, but the former two countries were not early-industrialisers. Carmichael et al (2016) have argued that Dennison and Ogilvie did not conceptualise the link between the EMP and economic growth correctly. The focus of Dennison and Ogilvie was on marriage ages, the share of singles and the share of nuclear families. These indicators, however, respond to economic pressures (Wrigley and Schofield 1981, Clark 2007, Le Bris and Tallec 2018) – a high age at marriage is not a characteristic of the EMP but only a potential result if economic conditions are bad. Following Carmichael et al (2016), the focus should be on the relative position of women in the labour market, which is an important dimension of their autonomy. To illustrate this point, in the parish of Colyton (Devon, England), Sharpe (2002) found an increase in the age at marriage over the 17th century. This increase was linked to the lace industry creating opportunities for female employment and reduced male employment opportunities in agriculture (which in turn was the outcome of the switch from arable to dairy farming). As Sharpe shows, economically self-sufficient women lace-workers had the option to remain single, which was a remarkably assertion of independence.

Overall the theories put forward by de this literature induced scholars to pay closer attention to family formation and especially to the relative position and economic status of women as drivers of the transition to modern economic growth (see for instance Lagerlof 2003, Iyigun and Walsh 2007, Soares and Falcao 2008, Doepke and Tertilt 2009 and Diebolt and Perrin 2013).[1] As we have argued above, the participation of women in the labour market is an important dimension of their relative autonomy. Research has pointed out that women were quite active in the labour market in Western and Central Europe (Earle 1989, Ogilvie 2004), but for the EMP hypothesis the comparison with Southern Europe is probably most interesting. One striking aspect of the EMP is that a relatively high share of households were headed by women, sometimes as singles, in other cases as the main breadwinner. Therefore in this paper we would like to find out to what extent this was made possible by the earnings of women in the labour market. The gender wage gap obviously plays a large role in this. So far several have tried to document women's wages in different times and places (e.g. Van Nederveen Meerkerk 2010, Van Zanden 2011, Burnette 2008; see section 2 for an overview), but Humphries and Weisdorf (2015) were the first to attempt to match Clark's (2007)

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[1] See Bennett and Froide (1999) for an overview of the status of single women across Europe; and see Moring and Wall (2017) for the status of widows in the European society.

evidence on the long-run evolution of male wages with comparable series for women workers in England. More specifically, Humphries and Weisdorf presented two wage series for unskilled English workers between 1260 and 1850, one based on daily wages and one on the daily remuneration implied in annual contracts. Their findings show that women working on annual contracts did not share in the post-plague "golden age"; only women working for day wages saw their income increase after this "shock". From this Humphries and Weisdorf have concluded that women did not share the post-plague "golden age" and that there is insufficient support for a "girl-powered" economic breakthrough.

In this paper we study these issues from a broader European perspective, supplementing the work by Humphries and Weisdorf (2015) with evidence on women's wages for a set of European countries over the long run. Following Allen (2001), the series on wages of unskilled female workers has been derived from key publications of sources of wages and prices. This gives us evidence for Flanders (Antwerp: Verlinden 1959, 1965), Spain (Aragon and Navarre: Hamilton 1936 and Palacios 1994), Germany (Augsburg and Wurzburg: Elsas 1936/1940), Sweden (Stockholm: Jansson et al 1991), and Austria (Weyer: Pribram 1938). To get more insight into the evolution of the English gender wage gap, we also used a dataset about the wages set by the Justices of the Peace (see Roberts 1979 and Van Zanden 2011). Moreover, we scanned the current literature on this topic and were able to add much new data to these classic sources, but we did not systematically collect (additional) data for Portugal (Palma and Reis 2018), Austria (Adelsberger 2018), Denmark (Radu 2018), Sweden (Gary 2017) and France (on-going research by Faustine Perrin) as other scholars are currently working on (female) wages in these countries.

A potential problem for comparing the wages of women across time and space are compositional effects. For instance, the data does not always concern the wage for the exact same kind of job. As we discuss in greater detail below, the series for The Low Countries is largely based on weeding, binding and hay making for the St. Elisabeth Gasthuis in Antwerp and it is possible that haymaking was better paid than for instance weeding. In order to keep our female wage series comparable between countries we therefore focus on unskilled occupations and on daily wages only.[2] In addition, for all observations of female wages we have collected the comparable wage of male workers (i.e. unskilled work derived from the same source concerning the same location) to get a precise estimate of the gender wage gap at the lower end of the income distribution, unaffected by differences in skills and profession. By comparing like with like we also deal with the

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[2] A qualitative assessment of the ability of Medieval female causal workers to survive independently is given in Humphries and Weisdorf (2015, pp. 420).

problem noticed by Stephenson (2018) that some of the unskilled men at London building sites were actually semi-skilled. Finally, to address this potential issue empirically, we have also performed regression analysis using the evidence from the Justices of the Peace. The regressions demonstrate that the wage gap did not differ substantially among reapers and haymakers and that it was not very different across the English counties. Although tentatively, the regression results seem to indicate that it is possible to make these comparisons.

Having derived the evidence for unskilled female wages for a set of European countries allows us first of all to study the trends in the gender wage gap across countries and over time. The pattern that emerges from this is that the gender wage ratio was relatively high in Southern Europe: In Italy, Spain and probably also in Southern France, the ratio was ca. 50% in the centuries after the Black Death. In the North Sea Region in the same period (in England and Flanders, but also in 16th century Sweden) the daily wages of unskilled women were much higher, as much as 80-90% - and sometimes 100% - of those of men. Interestingly, when men and women worked in teams and did the same job, they often got paid the same wage (or only a slightly lower wage) (Penn 1987). This suggests that women were more marginal in the labour market in Southern Europe than in the Northern and Western parts of Europe.

A second important result is the rise of the gender wage gap in North-Western Europe over the course of the early modern period. Whereas the wages of women had been relatively high after the Black Death until the early 16th century, the gender wage gap increased rapidly afterwards, and in England and Sweden in the 18th century, for example, women earned less than half the wage of men – less than in Italy and Spain (or Germany). We hypothesise that slack labour markets help to explain the decreases in the relative wages of women. Periods of economic growth saw a decreasing wage gap (Antwerp in the 16th century; Sweden in the early 17th century; England between 1650-1750), whereas in periods of declining real wages for men (for example England in the 16th century) often also witnessed an increase in the gender wage gap. The implication of this finding is that women seem to have suffered more than men in times of economic hardship. In that sense they were truly marginal – a point also made by Langdon (2010) and Mate (1999) – and arguably became increasingly marginal.

Thirdly, we estimate if single women were able to generate enough income to maintain a single household. In doing so, we have calculated how many days of work were needed for women to earn the barebones basket (i.e. minimum subsistence package for one person) (Allen 2001, Allen and Weisdorf 2011). The picture that emerges from this is that there was a "golden age of labour" in

Western Europe. In the countries bordering the North Sea ca. 75 days of work were required for the barebones basket before the Black Death, whereas this had declined to ca. 25 to 40 days of work in the first half of the 15th century. After 1500, when the population level climbed back to pre-plague levels, there was a tendency to increase again. These numbers suggest however that it was possible for a woman with access to the labour market to earn an income that allowed her to remain single.

We also address the debate about the possible drivers of the gender wage gap. Is the lower remuneration for (unskilled) work the result of social norms – of discrimination at the work place – or is it related to the supposedly lower productivity of women and caused by market forces which value productivity differences? Burnette (1997) has made a strong case for the second interpretation, suggesting that women had less strength, worked less hours and were less skilled, but others have argued that that social norms and social capital played a large role in determining the relative pay of women (de Groot 2001; see the discussion in Ogilvie 2003 and 2004). Given the nature of our data, we can only briefly touch upon this discussion, however.[3]

2. Data on Female Wages

Historians have documented women's work and women's wages to determine their relative position in the labour market and their (relative) earnings. The studies are numerous, and include, amongst others, Berg (1993), Berg and Hudson (1992), Brik (2017), Burnette (1997, 2004, 2008), Clark (1919), de Groot (2001), Field (2013), Field and Erickson (2009), Horrell and Humphries (1995), Humphries and Schneider (2018), Kussmaul (1981), Nederveen Meerkerk (2007, 2010), Ogilvie (2003), Pinchbeck (1981), Schmidt and Nederveen Meerkerk (2012), Sarasua (2018), Sharpe (2000), Simonton (1998), Snell (1981), Valenze (1995), van Zanden (2011), and Whittle (2005). The finding of this strand of the literature is that women's wages usually constituted between one-third and two-thirds of men in the early modern period. However, it is difficult to find general patterns in this vast literature because of the absence of a clear methodology to compare relative wages of women in time and space.

Medievalists have moreover debated whether working women enjoyed a "golden age" in the later middle ages. Goldberg (1986, 1992) and Barron (1989) have suggested that labour scarcity after the Black Death allowed women to find employment in jobs which had earlier been reserved for men. Bennett (1988, 1996) and Mate (1998) however argued that the sexual division of labour

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[3] Please also note that the drivers of the wage gap may differ over time and between places.

prevented them from this: women continued to work in low-skilled and low-paid occupations. Focussing on the demesne accounts of Ebury manor and the records of prosecutions for breaches of the Statutes of Labourers in Yorkshire East Riding, Bardsley (1999) showed that after the Black Death women working on farms did not earn daily wages which were equal to those paid to men. Hatcher (2001) however pointed out that, when looking at the evidence of piece-rate payments for agricultural tasks, male and female workers received the same pay for the same amount of work (see also Bardsley 2001, Rigby 2000 and Langdon 2011).[4]

Humphries and Weisdorf (2015) combined the existing data on the earnings of women with primary source material to estimate long-run wage series for unskilled English women workers. On the basis of the new evidence, they have concluded that women did not share in the post-plague "golden age". However, so far no attempt has been made to compare the English wage series with earnings of women in other European countries over the long run. The classic paper by Allen (2001) documents the evolution in real earnings of men in nine leading European cities from the Middle Ages up to the First Wold War. Allen's focus here was on the building industry – an important sector in pre-industrial Europe. It was also the one of which the earnings of its workers were relatively well documented in the records and subsequently summarised in the various volumes of "histories of prices and wages". However, usually about 90 – 95% of the data in these sources refers to the earnings of men. In this section we show that there is female wage data available, but, as we will explain below, for this we sometimes need to move beyond the construction industry. In other cases we also need to broaden the geographical scope of the analysis. For instance, the studies of wages and prices in Northern Italy and Spain used by Allen did not contain data of the wages of women, probably because they did not show up in the sources used. As we will show in this section, we did an extra effort to collect wage data for Italy and Spain. In addition, it may be argued that the absence or presence of female wages in the historical sources is perhaps an important phenomenon in itself. It may actually tell us whether or not women had access to "modern" labour markets, which was a pre-condition for the development of the female autonomy of the EMP (de Moor and van Zanden 2010).

The strategy was to create a dataset which would supplement the earlier work of Humphries and Weisdorf (2015) for England and which would be comparable to the Allen (2001) dataset for Western Europe between 1300 and 1800. The original aim was to collect comparable wage data for women for Italy, Spain, France, Germany, Austria, the Low Countries, Denmark and Sweden. We

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[4] For the status of women and the extent to which labour scarcity could override patriarchal social norms in Medieval England see Bennett (2010).

dropped France because of on-going research by Faustine Perrin; Denmark because of on-going research by Cristina Rahu; and, finally, 16th century Sweden because of on-going research by Kathryn Gary (2017). For the other countries we collected data on female wages which could be compared with those of men.

The data for the remaining countries are available in different formats. The most detailed data consist of tables with the wages found in the sources and the number of observations per wage for a given year. For example, the data published by Elsas (1936) on the "Taglöhne für Frauenarbeid" in Wurzburg indicate that in 1429, the first year, 86 women earned a daily wage of 7 den. and that 178 women earned 8 den. In 1430 the distribution was 43 earning 7 den; 1 earning 8 den.; 11 earning 9 den and, finally, 4 earning 10 den. The presentation of the entire wage distribution makes it possible to estimate the mean, the mode and the median. Most economic historians have focused on the mode – the "normal wage" – as the proxy of the wage level, but other measures are obviously relevant as well. However, only the source publications by Verlinden (1959, 1965) on Flanders and Elsas (1936/1940) on Germany give this degree of detail.

The second format consists of economic historical studies that present tables of the wage level of the men and women involved, without specifying if this was the only wage that was mentioned in the source, and/or if this concerns the mean or the mode. These studies, however, still make it possible to estimate the female wage gap by comparing the wages of women and men published, but we lack the detailed information about the entire wage distribution that is available for Germany and Antwerp, where we can compare the female wage gap based on the average, the median and the modal wage. Nevertheless, since we expect that men – even unskilled men – are overrepresented in the upper wage classes, it may well be that the gender wage gap based on average wages paid to unskilled workers is higher than the gender wage gap based on modal wage. For Germany and Antwerp we will test this hypothesis by estimating the gender wage gap based on the mean and the mode for Antwerp, Wurzburg and Augsburg over the long run.

The next issue concerns the kind of work women did, and how comparable this was to the work performed by men. The literature on male wages focuses almost entirely on unskilled and skilled workers in the building industry, but for a number of countries such data for women are not available, perhaps because men more or less monopolized construction work. In Sweden, England, The Low Countries and Northern Spain we do however find women active in construction. The data for the other countries are based on agricultural work, and we compared female wages with male wages in agriculture. Often they worked together during the harvest, "producing" data for various

jobs in harvesting of grains (as in Augsburg) or grapes (in Napoli), but in other cases it concerned unskilled agricultural labour in general (as in Piedmont and Flanders). But in all cases, we made sure that like was compared with like.

The more general issue here is how comparable the wage work carried out by men is to that done by women. To ensure a high degree of comparability we focus in all cases on the wages of unskilled workers, but that does not necessarily mean that the kind of work they do is exactly the same. We now turn to a review of the evidence by country (where we also address this issue).

To start with, for Sweden Jansson et al (1991) focus on women as helpers in the building industry, and we compare with male helpers in the same industry ("hantlangare"); at other points they are both referred to as "male and female helpers", indicating the similarity of the work they did. That the work is quite similar is confirmed by the fact that during certain periods the wage gap was zero.

For Spain in the late Medieval period there are sufficient data for women's wages (also for Barcelona: see Fynn-Paul 2017). The Spanish data for the Late Middle Ages also relate to construction workers. Hamilton (1936) published wages in Aragon and Navarre between 1284 and 1450, amongst others of "laborer, female (mujer)" and "laborer, male (peon or bracero)", which were all active in the building industry. Similar wages of male and female construction workers in Zaragoza between 1276 and 1492 are available in Palacios (1994). However, for the period after 1500 (and for the south of Spain) such data are much more scarce, and do not concern construction workers anymore. Ernesto López Losa collected the unpublished wage data from the Hamilton archives, which contain observations of daily wages of laundresses and unskilled male labourers for Sevilla between 1687 and 1708. There are also wages for Madrid available between 1680 and 1800, but they concern annual wages, which we do not use in this paper.[5]

For Italy there are two series available. The longest series (1571-1787), from Doria's (1968) study of the village Montaldeo in the Apennines in Piedmont, concerns "salario giornaliero lavori campagna: donna" and the same description for "uomo", and relate to general agricultural work. Doria gives data for almost each month. We selected the summer wages (paid in April to September), but the winter wages show identical patterns. There are similar data of female and male wages of harvest workers near Napoli between 1734 and 1806 (Romano 1965). In this case the men are harvesters (of the grapes), whereas the women transported the baskets of grapes. The work is

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[5] Personal communications with Ernesto López Losa (29-6-2016) about unpublished wage data in Hamilton archive and by Enrique Llopis Angelan (3-10-2016) about annual wages in Madrid.

not fully identical, but both occupations can be classified as unskilled, are from the same source, and for the same place.

For Flanders we concentrate on agricultural labourers employed by the Antwerp "St. Elisabeths Gasthuis", who are "weeding, harvesting of hop, binding and haymaking", compared with the male workers who are "agricultural workers and gardeners, not specified". The female wages are rather diverse – weeding is probably not paid as well as haymaking – but the authors of the source publication decided to add all female day wages together. However, for Antwerp we can study the average and mode here, which makes these data more valuable.

For Germany there is a classic source – i.e. Elsas (1936/1940)'s compilation of wages and prices from which we were able to collect daily wages of women and men doing harvest labour in Augsburg between 1432 and 1755. It nicely illustrates the complexity of comparing the various groups of labourers. Elsas tells us about the "'recher" (someone who rakes the grain harvest) that they are usually women ("meist eine Arbeit für Frauen", pp. 713), but also suggests that sometimes this kind of work is also done by men. The comparable, more heavy harvest work for which there are systematic data, of the "schnitter" (mower), is the domain of men, but occasionally women do this kind of work as well (Elsas 1936). Whenever they do the same work, they earn the same wage, implying the absence of a female wage gap. But usually men mow and women rake (and bind?), and we have therefore calculated the gender wage gap as the difference between the wages for raking and mowing. The data for Wurzburg are less problematic, as it is possible to clearly distinguish the "Arbeiterinnen" (female labourers) in agriculture (between 1429 and 1759) from the other "male" jobs. In this case the comparable male job is the "Erdarbeiter" (digger). For both Augsburg and Wurzburg Elsas (1936) gives data for the entire wage distribution which allows us to calculate the mean and the mode.

The wages for Austria are based on the series of daily wages in Weyer in 1626-1790 published by Pribram (1938), both referred to as "Tagwerk" (day work). The source also has a few wages of women working in construction industry (for making mortar), which are on average 10-20% higher than those in agriculture, but the number of observations of that group is too small to make use of them.

As noted above, for England we make use of the estimates of the casual (daily) wages of women and men published by Humphries and Weisdorf (2015). This is not entirely unproblematic as their data has been derived from heterogeneous sources and covers all kinds of (unskilled) male and female wage work, with the exception of harvest work and excluding the (higher) wages for

London, which have been taken out of the comparison (see Table 1, pp. 411). It is therefore not possible to determine which part of the change in the female wage gap is due to changes in the composition of the labour force, and which part is caused by "real" changes in the gender wage gap for certain. Moreover, their estimates are available not on an annual basis but only per decade, which means that we cannot test our hypotheses about the changes in the gender wage gap in the same way as we can for annual data. Because of the limitations of using the Humphries and Weisdorf data, we also used a dataset, put together by Van Zanden (2011) of the wage settings by the Justices of the Peace. These contain, for a large set of counties in the period 1550-1760, the wages settings for men and women for two kind of harvest work, haymaking and reaping, and therefore make it possible to find out how the gender wage gap for the same kind of work developed over time. This is the only source that does not relate to actual wages paid, but most wage settings have wages for both men and women for the same job, which make this source rather unique.

It should be mentioned here that all wage data provided in this paper refers to daily wages. We do not make use of the data on the annual wages of servants and other employees for a variety of reasons. To begin with, the data seem relatively scant. The various volumes of the "histories of prices and wages" give only a handful of observations for Flanders (Antwerp: "servants", 1664 – 1797, but with many gaps), Spain (Old Castile: "servants", 1501 – 1550; New Castile: "servants", 1601 – 1650), Austria (Vienna: "nurses", 1523 – 1779, also with many gaps), and Germany (Leipzig: "maids", 1573 – 1799), and they lack comparable series for male servants. Only in the case of Austria there is evidence on wages of male nurses, but this seems to include the wage of the wife ("Mannsvater und sein Weib"). In addition, their interpretation is rather difficult. As Humphries and Weisdorf (2015) pointed out, most farm and household servants lived in and room and board was an essential part of the employment bargain. On top of that, servants contracts often came with additional payments in-kind. For instance, the servants employed at St. Johannis-Hospital in Leipzig were provided with shoes and clothing (Elsas 1940) Therefore, in order to present a series for unskilled workers on daily remuneration implied in annual contracts one has to make certain assumptions about the value of these payments in-kind to estimates the gender wage gap (as Humphries and Weisdorf 2015 have shown), and the estimates of the wage gap seem very sensitive to the assumptions made.

However, we also think that focusing on daily wages is a good strategy to understand the relative position of women, and in particular the option she may have to remain single and set up

her own household. Married women, widowers and women who remained single (a sizable group in regions characterized by the European Marriage Pattern) did usually not have access to the market for servants (Ogilvie 2004). The question whether single women could earn their own living, which we address in the second half of the paper, can only be addressed by studying daily wages (obviously, if they became servants, their master would take care of their subsistence).

Table 1 gives an overview of the countries included in our sample and summarises the various sources that we have used. Our sample of countries – England, The Low Countries, Sweden, Germany, Austria, Spain, and Italy – is reasonably well spread over Western Europe, but we lack data on Eastern Europe. The well-known Polish price histories contain only a handful of data on female servants in Warsaw between 1735 and 1770, but this we cannot use (see discussion above). For France we found a few studies, but we have not attempted to construct one French series because of on-going work by Faustine Perrin.

*** Table 1 around here ***

3. The Evolution of the Gender Wage Gap

The dataset that results from the data collection described in the previous section has been analysed to find out what happened to the gender wage gap in the seven European countries. More specifically, we regressed the wage ratio on decennial dummies to test for changes in the wage ratio over time. We did not add control variables because we already compare similar unskilled labourers over time.

Tables 2 and 3 summarises the regression results for Italy and Spain. In all regressions the reference category (denoted "REF" in the tables) is the average wage ratio in the first time-period for which we had sufficient information. If it is equal to 1.00, women received the same wage as men; if it is 0.80, the difference is 20%. In Table 2, Column (1) reports the results for Piedmont; Column (2) for Napoli; and, finally, in Column (3) we have combined both series. Likewise, in Table 3, Column (1) shows the results for Aragon; Column (2) for Navarre; Column (3) for Sevilla; and Column (4) combines the wage data. Overall the regression results for Italy and Spain show a fairly stable wage gap over time. In Piedmont, the wage ratio is only found to be significantly different from 50% (our reference category, which is the average wage gap in time period 1590-1600) between 1620 and 1630 when it had decreased with 7 percentage points to 43%. In Napoli,

for which we have data for the 18th century, the gender wage gap does not deviate from 50% at all (when the estimated coefficient for a decade is zero, it means that the value of the wage ratio is identical to that of the reference period). The results in Table 3 show that there was more variation in Spanish wage gap, although 50% seems to have been the norm here as well. The series for Navarre in Column (2) suggests that the wage ratio slightly increased in the years following the Black Death (from 0.44 in 1340 to 0.58 in 1350-1360), but that this was not sustained in the years that followed: After the 1360s the wage ratio went back to ca. 50%, a level that was also normal in the early 15th century (see Columns (2) and (4)).

*** Table 2 around here ***

*** Table 3 around here ***

Therefore, in the Mediterranean countries – Italy and Spain – women usually received 50% of the male wage. This ratio is clearly the norm in Italy during the entire period and in late Medieval Spain (for which we have a number of datasets); the Seville data for 17th and 18th century also point into this direction. We collected additional data to test this 50 percent hypothesis. In his exhaustive study of prices and wages in Florence in the 14th century, Charles de la Ronciere was unable to find data of women's wages, but he estimated that women active in spinning may have earned about 50% of the wages of unskilled male labourers (De La Ronciere, 1982, pp. 439).[6] The absence of women from most studies on wages, prices and labour markets in Medieval and Early Modern Italy is due to the fact that they were not participating on a large scale in the labour market (for a detailed discussion see Piccinni 2006). One of the exceptional sources that do tell us about female labour participation on the countryside of Tuscany is the biographical memoir of the monk Angiuliere, which supplies data on wages of men and women in Possibonsi in 1373-74 (Balestracci, 1977). The author concludes that women earned at best half the wage of men. The same author also published detailed data concerning the wages paid to men and women in the building industry of Siena (in 1340-1341) (Balestracci 1975-76). The normal wage for women was 2 soldi per day (34 out of 40 wage payments were at this level), whereas the normal wage for men was 4 soldi (22 out of 70 wage payments were at this level). Interestingly, there was considerable spread of wage payments for unskilled men (ranging from 1/6 to 5/9 soldi/denari), whereas almost all women were

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[6] We thank Marta Montebovi for collecting relevant Italian literature for us.

paid the same (moreover, (male) "masters" earned between 5 and 10 soldi). In agricultural work, women also earned about 50% of the wage of men (for example in cutting wood or in carrying manure). Male nightwatchmen on average earned 2 soldi, female night workers 1 soldo (Balestracci 1975-76).

Moving to southern France we find a similar pattern. Table 4, reporting daily wages in the vineyards of Marseille between ca. 1300 and 1480, shows that the 50% norm may have been a Mediterranean phenomenon. The data, originally collected by Georges Duby (1962), show a similar wage gap. And the Mediterranean zone may have extended until Toulouse, as 50% was the norm there as well, both in agriculture and in building industry (Perroy 1988: data relating to the late 14th and 15th centuries). In Northern France, on the other hand, women earned, as in the Low Countries and England, sometimes 90% of the wage of men (again in the 14th century) (Delmaire 2015). It therefore seems justified to conclude this is a Mediterranean pattern as also the gender wage gap in Marseille and Toulouse is exactly the same.

*** Table 4 around here ***

A second pattern relates to North-Western Europe, where we find a much lower gender wage gap in the late Medieval period (and 16th century), but a large rise of it during the early modern period. Table 5 examines what happened to the gender wage gaps in Antwerp (Columns (1) and (2)) and Sweden (Column (3)). Both start at levels (80% or more) which are unheard of by Mediterranean standards. In Stockholm female wages are in the 1610s even at par with those of men, and this happens occasionally also in Flanders (see Verlinden 1965 pp. 377 and 544 for examples from Ghent and Geraardsbergen). And both series show an increase in the gender wage gap to about 50% in the 18th century. For Antwerp it is possible to distinguish the mean and the modal wages paid to both men and women. As expected, the gender wage gap based on the mode is often smaller than that based on the mean (for the reference period this is 7% and 18% respectively), indicating that the upper tail of the distribution of unskilled male wages is higher than that of unskilled female wages (the best paid men earn more than the best paid women). However, this difference disappears over time, and after 1750 the wage gap is 50% on both counts. The evolution of the Antwerp economy is also reflected in the gender wage gap; the crisis period of the 1490s results in a high wage gap, whereas the booming economy of the middle decades of the 16th century leads to a narrowing of the gap (see Van der Wee 1963 for a detailed reconstruction of the

Antwerp growth cycle). The depression after the start of the Dutch Revolt (when many Antwerp merchants migrated to the north) again leads to a widening of the gap in the 1590s and after. Similarly, Gary (2017) found for the development of the Swedish gender wage ratio that it was clearly linked to periods of labour scarcity (resulting in near parity).

*** Table 5 around here ***

The English data show this pattern in its most extreme version. Ideally we would like to regress the wage gap on decennial dummies to test for changes in the wage ratio over time, but the data by Humphries and Weisdorf (2015) is not available on an annual basis. In Column (7) of Table 6 we therefore regressed the decennial wage gap on dummies for half-centuries to get more insight into the evolution of the English gender wage ratio. In addition to this, Columns (1) – (6) use the dataset about the wages set by the Justices of the Peace (van Zanden 2011). The latter gives information on agricultural wages for "reapers" and "haymakers" for a large set of counties between 1550 and 1760. In Column (1) we regress the wage ratio on dummies for half-centuries, a dummy indicating if food was included, a dummy for "reaper" (where "haymaking" is the reference category) and regional fixed effects. The wage data for Sussex included wages for different categories of workers – i.e. it reports on wages for "first-class" and "second-class" labourers. To make sure our results are not driven by this, we excluded them from the analysis in Column (2). For some of the counties the Justices of the Peace had information only for one period in time. To make sure our dataset captures enough variation over time, we omit them in Column (3). Column (4) is our baseline result where we exclude both the classified workers and the counties for which we had no time-varying information. Columns (5) and (6) control for county fixed effects. Column (5) repeats the analysis of Column (3) and Column (6) does so for Column (4).

The results in Column (7) of Table 6 neatly demonstrate that the gender wage gap was very small, about 25% in the centuries before the Black Death. In the century after the first epidemic of the Black Death the wages of women stay at this level. Perhaps this is due to the limited number of observations, but an alternative explanation would be that women profited even more than men from the sudden scarcity on labour market. Penn (1987, pp. 8) makes this point: "Indeed, during a period of severe labour shortage such as that which followed the Black Death it would seem that the less well paid labourers, including women, were in a far better bargaining position when it came to both the type of work which they were required to do, and the wages which they received." He

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gives many examples of women earning the same wage as men in the years following the Black Death (see also Langdon 2011).[7] In the 16th century, however, the gender wage gap increased dramatically, to more than 50% in the second half of that century. The regression results for the evolution of the wage gap from the Justices of the Peace in Columns (1) – (6) shows a similar pattern: the initial level was quite low, but there is a sharp increase in the wage gap over time. The wage gap was 12 to 15 percentage points higher in 1700-1760 than in 1550-1600. A link to population growth and increased surpluses of labour in this period may be suggested. The economic boom that began in the 17th century, and resulted in a strong increase in GDP per capita combined with a decline in the population (Broadberry et al 2015), led to a decrease of the gender wage gap from 60 – 70% to 30 – 40% in the first half of the 18th century. The acceleration of population growth (and the deceleration of per capita GDP growth) in the second half of the 18th century – what has been called the "Malthusian intermezzo" (Van Zanden 2011) – resulted in a sharp increase in the gender wage gap, which continued into the first half of the 19th century. All in all, the gender wage gap, which had been only 20% in the late Middle Ages, rose to 60% in the first half of the 19th century – an amazing decline of relative wages of women that requires explanation.

The regressions explaining the wage ratio derived from the Justices of the Peace also allows us to test for compositional effects. Although not always found to be statistically significant, there is a small difference in the gender pay gap between unskilled occupations: on average, the wage gap was 5 percentage points smaller for "reapers" than for "haymakers" (via the coefficients in Columns (4) and (6)). Third, with respect to potential regional differences in the gender gap, the wage ratio seems to have been slightly higher in the West of England (compared to counties in the East: see Columns (1) – (4)), but this disappears once we control for county fixed effects and when we omit the classified workers in Sussex (see Column (6)). In sum, we conclude that compositional effects are not a major issue for the comparison of wage ratios between regions and unskilled occupations.

One of the interesting results of this analysis is that the gap between the wages paid out to women and men outside the harvest season (the Humphries and Weisdorf data) and the harvest wages as set by the Justices of the Peace was quite large. According to these estimates in the period 1550-1600 the actual wages paid out to women were about 40% of that of men (according to Humphries and Weisdorf), whereas the wage settings for the same period give a ratio of about 75%. This is a big gap, which remains about this size for the rest of the period for which we have those

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[7] However, please note that food was given in addition to the wage. Hence, if men ate more than women, the ratio of total wages would be slightly less than 100%.

data. It points to two issues: perhaps women earn more in times of acute labour shortages as during the harvest (explaining the smaller wage gap), and perhaps the wage assessments by the Justices of the Peace are slow to accommodate to the changing relative market wages of women. It should also be mentioned that the wage settings concerned maximum wages which labourers were allowed to earn (the policy was initiated directly after the Black Death when labour shortages were acute).

*** Table 6 around here ***

Similar patterns, driven by the relative scarcity of labour, are found in Sweden and the Low Countries (see Table 5). In Sweden in the early 17th century women in construction earn a wage close to that of men, but during the 17th century the gender wage gap widens suddenly and in the 18th century the average wages of women are only 40% of those of men. In Antwerp the period of lowest gender wage gap is the 16th and early 17th century, and coincides with the Golden Age of the city, when labour was in high demand. As indicated already, this was probably a more general pattern, as additional wage data for 16th and 17th century Flanders (i.e. Gerardsbergen and Gent) also point to a very small gender wage gap (Verlinden 1965). In Holland the data that we do have point to a very small gender wage gap during the late Medieval period, continuing into the 17th century; but here as well, the gender wage gap began to rise in the 18th century (Van Zanden 2011; Van Nederveen Meerkerk 2010), as it did in Antwerp (where it became 50% after 1750).

In between the North Sea area and the Mediterranean, in Germany and Austria, we find a pattern which is in many respects intermediate (see Table 7). The starting levels of the gender wage ratio in the 15th century are in between what is normal in the south and in the north-west at that time, and as in the north-west, there is a tendency towards a decline in the wage ratio, in particular in the 17th century, but it is much more modest than in the North Sea area. At the end of the period, both in Augsburg and in Wurzburg, decline of the female wage ratio turns into a rise. The differences between the mean and the mode are in both cases small, which points to the fact that in these two cases the distribution of female and male unskilled wages are similar. In the very long run, the gender wage ratio in Germany and Austria is more or less stable at 60 to 65%, confirming its intermediate position between the 50% stability of the south and the long slide down from 70% and more to 40% from the north-west. A similar pattern of relative stability at a level of about two-third was found by Adelsberger (2018) for Vienna. We tentatively conclude that, following Ogilvie's analysis of the labour market and social-economic conditions in Central Europe in

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general, stressing the importance of guild pressure, community norms, and the inefficiently of information flows, there may have been a third, "intermediate" pattern of wage formation for women in this part of Europe (Ogilvie 2003).

*** Table 7 around here ***

Summing up, we find two "extreme" patterns in the Mediterranean and North Western Europe, and an "intermediate" pattern in Germany and Austria. These very different patterns, we speculate, are related to different levels of participation in labour markets.[8] The available data point out that female wage labour is much more usual in the North-West of Europe than in the Mediterranean. Whereas wage data in Italy and Spain (after 1450) are relatively scarce, the sources for North-Western Europe do contain evidence of substantial labour force participation of women. In the Mediterranean women only participate in certain segments – spinning for example – and their wages are apparently more affected by custom (50% of the wage of unskilled men) than by relative scarcity. Penn (1987, pp. 8) made a similar point comparing the favourable position of English women after the Black Death with "the sort of discrimination against hired female labour which one sees, for example, in the wages paid to women employed during the grape harvests in Toulouse." We hypothesize that in women participate on a larger scale in labour markets in North-West, but still are "marginal" in the sense that their wages increase rapidly in periods of scarcity, and go down dramatically when there is a growing labour surplus (see also Earle 1989 for the very high participation ratios for women in London, and Barron 1989 for the Medieval period). These differences between the North-West and South of Europe nicely correspond with the hypothesis of de Moor and van Zanden (2010) about the emergence of the EMP in the North Sea region. They have argued that one of the preconditions for its emergence in the North-West was the high labour market participation of women in the century after the Black Death and the relatively high wages they earned.

Whereas the economic position of women in the North Sea region in the late Medieval period was relatively strong, our analysis also shows that there was deterioration afterwards: there

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[8] These differences have of course also been noted by social historians writing about the labour force participation of women; Patricia Thane (1996), for example, states, in her review of Olwen Hufton's (1995) book on Women in Western Europe between 1500 and 1800: "I wish she had discussed further the implications of the differences which emerge throughout the book between north-western Europe and the Mediterranean south. In the latter codes of honour kept women's lives more constrained within the home, family structures were larger and more dominant". Contemporary literature documents that in particular Italian women have a low level of labour force participation, which is often ascribed to the pressures of family and the weakness of the Mediterranean welfare state; see discussions in Martinovic (2013) and Moreno (2016).

was a gradual increase in the gender wage gap from ca. 10% - 20% in the early 16th century to 50% – 60% in the 18th century. Following Ogilvie's (2003) analysis, free market forces were more important in North-Western Europe than in Central Europe, but the price women in the former part of Europe paid for their relative free access to labour markets was a strong decline of their relative wages. A possible explanation for this is the marginal position of women in the early modern period. Women's relative wage tended to decline in times of economic hardship, whereas it increased during phases of pre-industrial growth. This may imply that women were drawn into the labour market when it was tight, whereas they had hard times finding employment in times of excess labour supply.

4. The Real Earnings of Women in The Long Run

What were women able to buy with the wages they earned? Can we compare the purchasing power of those wages over time and between places? In this section we address the question what the purchasing power was of the wage that women received. We specifically ask the question if a women could earn sufficient income to maintain a household consisting of herself only – can she, in other words, remain single on the basis of the wage earned? If she can earn her own living, it tells us something about her autonomy; her relative bargaining position within and outside the household.

To find out, we use the adapted Allen (2001) approach, which tries to reconstruct the purchasing power of male wages in comparison with the budget needed for a family of four people (man, woman and two children). There are two versions of this basket: the barebones basket, which contains the basic essential to survive, and the respectability basket, which is closer to the actual budget in early modern Europe. Our calculations concern the barebones basket (and a necessary minimum consumption of 1950 Kcal per day, as in the original Allen paper), which can be seen as some kind of absolute poverty line (Allen et al 2011). In addition, in order to find out how independent women could potentially be on the basis of their wage, we do not estimate a welfare ratio, but we estimate the number of days of work necessary for earning this income using equation (1). This follows the methodology of Allen and Weisdorf (2011) and is preferable because it does not make unjustified assumptions about the number of days worked. As Hatcher (2011), Stephenson (2018) and Humphries and Weisdorf (2018) have pointed out, it is unrealistic to assume that a male

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day labourer worked 250 days per year in the Medieval and early modern period, and it is possibly even more unrealistic for women.

days per year = annual costs of barebones basket / day wage   (1)

In other words, how many days does a women have to work in order to earn a barebones living for herself only? For Italy and Spain we assume that the 50% female wage gap that we found applies to the period as a whole (but the values that are interpolated are in brackets). It should also be mentioned here that the estimates for England are based on the barebones basket for Oxford instead of London because it concerns rural wages. In addition, since the series of unskilled female workers by Humphries and Weisdorf (2015) do not include harvest wages, we also provide estimates using the information derived from the Justices of the Peace. This allows us also to make comparisons with the other European countries/cities as they are based on harvest and/or construction work (see also discussion in previous section).

*** Table 8 around here ***

Table 8 presents the estimates for the number of working days a woman had to be active on the labour market to earn a barebones basket for herself (for a family of three – one parent and two children - this would be double this amount). In Antwerp this number fluctuated between 30-40 days per year. In England, this was true only for the 15th century. The period between 1550 and 1650 was quite bad – and saw it increase to more than 100 days. However, the picture seems less negative if we look at the evidence derived from the Justices of the Peace which considers harvest wages. In Sweden real wages of women tended to decline in the long run, from about 42 days to about 66 days. A similar tendency can be observed in Southern Europe, where in the 15th century real wages were only slightly lower than those in the North-West, but they did decline a lot in the long run. In 18th century Italy women had to work ca. 115 – 165 days to earn a subsistence basket.

The 15th century was, all over Europe, probably the best period when about 30 – 50 days of work was necessary to earn a very basic living. 30 to 50 days – about seven weeks of six days; probably as long as the harvest season would last – is not a lot, and this low number suggests that this was indeed a Golden Age for working women with access to the casual labour market. Given this low number, the use of harvest wages is clearly relevant for these comparisons. If our estimates

are correct, in the later Middle Ages women could earn a living only on the basis of their work during harvest time.

In England, in the century before the Black Death of 1348 about 77 days of work were required to earn a barebones basket. This dramatically changes after 1348, when real wages – of men and women – increased sharply, and about 57 - 37 days of work was necessary to earn a very basic living (and the picture is probably a clear lower bound as it is based on non-harvest wages). The period 1540-1650 saw a sharp increase in the number of days required: at the beginning of the 17th century, more than 100 days were required for a single barebones basket. The period 1650-1750 saw a strong decline in the number of working days. During this period, population growth stagnated and economic growth accelerated (Broadberry et al 2015). During the second half of the 18th century women again had to work more days to earn the subsistence basket.

To illustrate the contrast between the North-West and the South of Europe, we add Spain to the picture, where we, for the period after 1500, make use of the assumption that female wages remain stable at 50% of those of men. In the Late Middle Ages the real earnings of women are equally high there as in England, and the decline during the 16th century is much more moderate – a surprising reversed "Little Divergence" (remember that the original Little Divergence meant that real wages in North-Western Europe developed more favourably and did not decline to a similar extent as those in the south and east). The "reverse" Little Divergence between 1550 and 1650 due to the sharp increase of the gender wage gap in England in this period is perhaps the most striking result of this analysis. However, the Antwerp data that show no sharp decline of real wages during the 16th century, are more consistent with the Little Divergence hypothesis.

5. Discussion and conclusion

What did we learn about labour markets, gender relations and economic development from this overview of female wages and their purchasing power in Western Europe before 1800? Firstly, there were possibly large regional differences in women's participation in labour markets between the South and the North-West. In the Mediterranean – in Italy during the entire period and in Spain since the 15th century – women were marginal on the market for wage labour. Moreover, their relative wages were more or less fixed at 50% of those of unskilled men, and this ratio was apparently unaffected by supply and demand. The wage data from southern France for the late Medieval period show exactly the same gender wage gap. This striking pattern can be interpreted as

a sign of discrimination of women, as a 50% female wage was below the supposed relative strength of women which is usually assumed to be about two-third of that of men (Bishop and Cureton 1987, Chen et al 2012). Of course, the productivity of women's labour was highly dependent on the degree to which they were allowed to actually work, acquire skills (even 'unskilled' work of course requires skills, for example the endurance to do physical work during 12 or more hours per day) and train their body in such a way that they gained strength. In that respect, labour force participation is clearly a virtuous – or in its absence, a vicious – circle, in which pure physical strength arguably plays a secondary role. We however think that this Mediterranean pattern fitted into a different system of family formation as sketched in the recent literature on the European Marriage Pattern.

North-Western Europe was really different: there is, throughout the period, a lot of evidence about the participation of women in labour markets, and their relative pay showed long term trends consistent with their relative scarcity or perhaps more accurately, the relative scarcity of unskilled labour in general. In the Late Middle Ages, and in some regions also in the 16th and early 17th century, the gender wage gap was relatively small, perhaps as low as 20% (England in the Late Middle Ages), and we find even cases of wage parity (in Black Death England, in Sweden the early 17th century, in Flanders/Antwerp in the 16th century and in Holland in the 17th century). Some authors have concluded that as women received the same wage if they did the same work, discrimination was absent from late Medieval labour markets (Penn 1987, Langdon 2010). Most striking is that the gender wage gap fluctuates with the ebb and flow of the labour market: women profit disproportionally from a tight labour market, and their wages decline disproportionally when there is a surplus. In that sense they are truly marginal: they are probably drawn into the labour market when demand grows more rapidly than supply, and vice versa, kicked out when men find it difficult to get a job. England is clearly the most extreme case of a switch from a very low to an extremely high gender wage gap, which may be related to changes in the agricultural sector, such as the enclosures and the rise of large-scale farming, which appears to have lowered the demand for female wage labour (van Zanden 2011). The early mechanization of spinning, in which many women specialized, may also have depressed this demand (Valenze 1995).

The German and Austrian case is again different: the wage gap is smaller than in the Mediterranean (about one-third to 40 percent), shows strong fluctuations (in particular in Germany), but remains more or less the same in the very long run (does not show the sharp decline that is usual in the North Sea area).

Our results are also important for the debate about the determinants of the gender wage gap, for the question whether customs and social norms or productivity and market forces determined the remuneration of women. The unchanging relative pay levels of women in the Mediterranean are consistent with the idea that in this kind of society customs ruled, and that economic productivity and supply and demand had only a limited impact on relative pay levels. It is striking that the rule that women earned 50% of the wages of men was according to the sources we could consult so uniformly applied in Italy, Spain and southern France, and appears not to have changed during the long period that we study. The North-western pattern obviously shows the opposite, the power of market forces, but this has to be nuanced a bit: the relative physical strength of women (often used as an explanation why markets value their labour less than that of men) was probably more or less constant over time, and therefore does not explain why their relative pay varies from 40 to 80% of that of men. Markets seem to rule in North Western Europe (much more than in the South), but because social norms determine the place women occupy in the queue of those trying to get a job – because they are considered marginal and only occupy relatively marginal positions in the economy – their relative pay shows the sharp swings documented in this paper. Being in the back of the queue, their relative wages fluctuated even more than those of unskilled male labourers. In the South customs determined market outcomes, in the North-West customs determined the position of women on the labour market and therefore, indirectly, via the relative scarcity of labour, their relative pay.

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	Coverage	City/Region	Type of work
England	1260 – 1850	Rural England	Rural labour, no harvest work; averages per decade
	1550 – 1760	Rural England	Harvest work
Belgium	1427 – 1797	Antwerp	Agricultural work; wage distributions
Spain	1284 – 1449	Navarra	Construction; average/normal wages
	1276 – 1492	Aragon	Construction; average/normal wages
	1687 – 1739	Sevilla	Daily wages laundresses/unskilled labourers
Germany	1432 – 1755	Augsburg	Harvest work; wage distributions
	1429 – 1759	Wurzburg	Agricultural work; wage distributions
Italy	1571 – 1787	Piedmont	Agricultural work; normal wages
	1734 – 1806	Napoli	Harvest work (grapes); normal wages
Sweden	1600 – 1720	Stockholm	Construction; normal wages
Austria	1626 – 1790	Weyer	Unspecified daily wages

Table 1. Overview of data and sources used.

	(1) Italy: Piedmont		(2) Italy: Napoli		(3) Italy: All obs.
1590-1600	REF: 0.50***	1730-1740	REF: 0.50***	1590-1600	REF: 0.50***
1600-1610	-0.10	1740-1750	0.00	1600-1610	-0.10
1610-1620	-0.08	1750-1760	0.00	1610-1620	-0.08
1620-1630	-0.07***	1760-1770	0.00	1620-1630	-0.07***
1630-1640	0.00	1770-1780	0.00	1630-1640	0.00
1650-1660	0.02	1780-1790	0.00	1650-1660	0.02
1660-1670	0.00	1790-1800	0.00	1660-1670	0.00
1670-1680	0.00	1800-1810	0.00	1670-1680	0.00
1680-1690	0.00			1680-1690	0.00
1690-1700	0.00			1690-1700	0.00
1700-1710	0.00			1700-1710	0.00
1710-1720	0.00			1710-1720	0.00
1720-1730	0.00			1720-1730	0.00
1730-1740	0.00			1730-1740	0.00
1740-1750	0.00			1740-1750	0.00
1750-1760	0.00			1750-1760	0.00
1760-1770	-0.01			1760-1770	0.00
1780-1790	-0.07			1770-1780	0.00
				1780-1790	-0.01**
				1790-1800	0.00
				1800-1810	0.00
Observations	115	Observations	73	Observations	152
R-squared	0.84	R-squared	0.01	R-squared	0.78

Table 2. The evolution of the gender wage ratio in Italy.

Notes: Standard errors are robust to control for heteroscedasticity. *** indicates significance at the 1% level; ** at the 5% level; and * at the 10% level.

	(1) Spain: Aragon	(2) Spain: Navarre	(3) Spain: Sevilla	(4) Spain: All obs.
1270-1280	REF:			REF:
	0.51***			0.51***
1290-1300	0.01			0.01
1300-1310	0.03			0.03
1310-1320	0.20***			0.20***
1340-1350		REF:		-0.07***
		0.44***		
1350-1360		0.15**		0.08
1360-1370		0.07***		0.01
1370-1380		0.03		-0.04
1380-1390		0.01		-0.06*
1390-1400		0.07*		0.00
1400-1410		0.02		-0.05*
1410-1420		0.19***		0.12***
1420-1430		0.06**		0.00
1430-1440		0.09***		0.03
1440-1450		0.08***		0.01
1680-1690			REF:	-0.01
			0.50***	
1690-1700			0.02	0.01
1700-1710			0.05	0.05
Observations	14	49	15	78
R-squared	0.34	0.42	0.04	0.34

Table 3. The evolution of the gender wage ratio in Spain.

Notes: Standard errors are robust to control for heteroscedasticity. *** indicates significance at the 1% level; ** at the 5% level; and * at the 10% level.

	1306	1331-36	1349-63	1409-30	1480
Man	10-15 denari	15-18 denari	4-6 soldi	5-6 soldi	6-7 soldi
Woman	5-6 denari	7-8 denari	2 soldi and 8 denari	2 soldi and 8 denari	3 soldi and 4 denari
Gender wage ratio	50-60%	53-56%	46-55%	47-56%	44-53%

Table 4. Daily wages in the vineyards of Marseille from 1306 to 1480.
Source: Duby 1962, pp. 562. *Notes*: 12 denari is equal to 1 soldo.

	(1) Antwerp: Mode	(2) Antwerp: Mean		(3) Stockholm
1420-1430	REF: 0.93***	1420-1430	REF: 0.82***	1600-1610	REF: 0.81***
1440-1450	0.00	1440-1450	0.11	1610-1620	0.21***
1450-1460	-0.43***	1450-1460	-0.32***	1620-1630	0.08
1490-1500	-0.53***	1490-1500	-0.42***	1630-1640	-0.01
1500-1510	-0.10	1500-1510	0.001	1640-1650	-0.25***
1520-1530	-0.33***	1520-1530	-0.25**	1660-1670	-0.19***
1530-1540	-0.15	1530-1540	-0.15	1670-1680	-0.26***
1540-1550	-0.18***	1540-1550	0.00	1680-1690	-0.35***
1560-1570	-0.06	1560-1570	0.04	1690-1700	-0.41***
1590-1600	-0.32***	1590-1600	-0.22**	1700-1710	-0.40***
1600-1610	-0.25***	1600-1610	-0.13	1710-1720	-0.38***
1660-1670	-0.40***	1660-1670	-0.29***		
1750-1760	-0.43***	1750-1760	-0.32***		
1760-1770	-0.43***	1760-1770	-0.32***		
1770-1780	-0.43***	1770-1780	-0.32***		
1780-1790	-0.43***	1780-1790	-0.32***		
1790-1800	-0.43***	1790-1800	-0.32***		
1800-1810	-0.43***	1800-1810	-0.32***		
Observations	93	Observations	94	Observations	119
R-squared	0.49	R-squared	0.50	R-squared	0.87

Table 5. The evolution of the gender wage ratio in the Low Countries and Sweden

Notes: Standard errors are robust to control for heteroscedasticity. *** indicates significance at the 1% level; ** at the 5% level; and * at the 10% level.

Table 6. The evolution of the gender wage ratio in England.

	(1) Region FE	(2) Region FE	(3) Region FE	(4) Region FE	(5) County FE	(6) County FE
1550-1600	REF	REF	REF	REF	REF	REF
1600-1650	-0.0894*** (-3.014)	-0.0453 (-1.347)	-0.0897** (-2.449)	-0.0322 (-0.804)	-0.0644* (-1.764)	-0.0579 (-1.522)
1650-1700	-0.0999*** (-3.515)	-0.0979*** (-2.986)	-0.0862** (-2.445)	-0.0917** (-2.344)	-0.0856*** (-2.872)	-0.0925*** (-2.984)
1700-1760	-0.184*** (-6.001)	-0.173*** (-4.875)	-0.153*** (-4.792)	-0.150*** (-3.885)	-0.0930*** (-2.990)	-0.115*** (-3.216)
Food included	-0.0308 (-1.610)	-0.0358* (-1.832)	-0.0313 (-1.342)	-0.037 (-1.490)	-0.0503** (-2.396)	-0.0575** (-2.446)
Reaper	0.000574 (0.0259)	0.0206 (0.957)	0.0222 (0.777)	0.0495* (1.808)	0.0472* (1.759)	0.0477* (1.724)
Hertfordshire					0.132** (2.054)	0.104 (1.402)
Kent					-0.0678 (-1.188)	-0.0947 (-1.379)
Lincolnshire					0.0674 (1.271)	0.0435 (0.666)
Northampshire					0.0577 (1.003)	0.035 (0.507)
Oxfordshire					-0.0852 (-1.469)	-0.103 (-1.527)
Rutland					0.0367 (0.646)	0.00557 (0.0794)
Staffordshire					REF	-0.0301 (-0.388)
Sussex					-0.0641 (-1.234)	REF
Warwickshire					-0.0324 (-0.546)	-0.0475 (-0.678)
Wiltshire					0.114* (1.824)	0.0861 (-1.147)
East	REF	REF	REF	REF		
Middle	-0.00812 (-0.303)	0.00289 (0.114)	-0.0473 (-1.293)	-0.0246 (-0.714)		
South	-0.0211 (-0.767)	0.0427 (1.343)	-0.0494 (-1.526)	0.0235 (0.616)		
West	-0.0421* (-1.663)	-0.0394 (-1.640)	-0.0727** (-2.149)	-0.0533 (-1.625)		
Constant	0.774*** (26.28)	0.744*** (22.89)	0.779*** (21.29)	0.736*** (19.00)	0.700*** (10.62)	0.731*** (9.733)
Observations	142	118	111	87	111	87
R-squared	0.16	0.28	0.16	0.29	0.43	0.48

(7) Humphries & Weisdorf

	(7) Humphries & Weisdorf
1270-1300	REF: 0.742***
1300-1350	0.0268 (0.487)
1350-1400	0.0114 (0.197)
1400-1450	-0.036 (-0.841)
1450-1500	-0.0884** (-2.060)
1500-1550	-0.170*** (-4.122)
1550-1600	-0.347*** (-8.240)
1600-1650	-0.278*** (-6.567)
1650-1700	-0.196*** (-3.359)
1700-1750	-0.140*** (-3.049)
1750-1800	-0.222*** (-5.221)
1800-1810	-0.332*** (-9.043)
Observations	54
R-squared	0.81

Notes: Standard errors are robust to control for heteroscedasticity. *** indicates significance at the 1% level; ** at the 5% level; and * at the 10% level.

Table 7. The evolution of the gender ratio in Central Europe.

Period	(1) Augsburg: Mode	(2) Augsburg: Mean	Period	(3) Wurzburg: Mode	(4) Wurzburg: Mean	Period	(5) Weyer
1430-1440	REF: 0.56***	REF: 0.56***	1420-1430	REF: 0.67***	REF: 0.64***	1620-1630	REF: 0.62***
1440-1450	0.04	-0.05***	1450-1460	-0.22***	-0.16*	1630-1640	0.04
1450-1460	0.60***	0.24***	1460-1470	0.00	0.03	1640-1650	-0.05
1470-1480	0.06	0.03	1470-1480	-0.17	-0.14	1650-1660	-0.10
1480-1490	0.15**	0.10**	1490-1500	-0.07	-0.03***	1660-1670	-0.13
1490-1500	-0.08	-0.09***	1500-1510	0.01	0.04	1670-1680	-0.13
1500-1510	-0.08	-0.06**	1510-1520	-0.01	0.02	1680-1690	-0.10
1510-1520	-0.01	-0.01	1520-1530	0.08***	0.09***	1690-1700	-0.06
1520-1530	-0.03	-0.01	1590-1600	0.00	0.03***	1700-1710	-0.12
1530-1540	-0.15***	-0.13***	1610-1620	0.04	0.02	1710-1720	-0.12
1540-1550	-0.03	-0.02	1620-1630	-0.03	-0.04	1720-1730	-0.07
1550-1560	-0.06	0.03	1630-1640	-0.42***	-0.35***	1730-1740	-0.03
1560-1570	0.05	0.09***	1640-1650	-0.06	-0.05**	1740-1750	0.01
1570-1580	-0.06	-0.02	1650-1660	-0.10***	-0.05***	1750-1760	-0.09
1580-1590	-0.10*	-0.10***	1660-1670	-0.07***	-0.05	1760-1770	0.10
1590-1600	-0.13***	-0.13***	1680-1690	0.33	0.18	1770-1780	0.011
1600-1610	-0.05	-0.01	1690-1700	0.24**	0.36		
1610-1620	-0.04	-0.02	1710-1720	0.17	0.20		
1620-1630	-0.14	-0.14**	1750-1760	0.17	0.23*		
1630-1640	-0.09	-0.08					
1640-1650	-0.07	-0.08**					
1650-1660	-0.06	-0.11***					
1660-1670	-0.06	-0.06*					
1670-1680	-0.11**	-0.11***					
1680-1690	-0.11**	-0.11***					
1690-1700	-0.10*	-0.11***					
1700-1710	-0.08	-0.11***					
1710-1720	-0.10*	-0.11***					
1720-1730	0.10**	0.09***					
1730-1740	0.06	0.05*					
1740-1750	0.10**	0.08***					
1750-1760	0.04	0.06***					
Observations	147	146	Observations	38	37	Observations	122
R-squared	0.50	0.50	R-squared	0.81	0.83	R-squared	0.40

Notes: Standard errors are robust to control for heteroscedasticity. *** indicates significance at the 1% level; ** at the 5% level; and * at the 10% level.

	Low countries	England	England	Sweden	Germany	Austria	Italy	Spain
	Antwerp	Humphries and Weisdorf (2015)	Justices of the Peace	Stockholm	Augsburg and Wurzburg	Weyer	Piedmont and Napoli	Aragon, Navarre, Sevilla
1301-1350		77.3					[99.0]	
1351-1400		57.4					[57.6]	
1401-1450	26.4	39.8			19.1		[46.8]	39.4
1451-1500	52.5	37.2			39.0		[54.7]	42.8
1501-1550	34.5	50.8			50.7		[84.4]	[55.4]
1551-1600	38.2	98.6	52.0		61.8		93.3	[75.3]
1601-1650	31.9	111.0	75.8	44.2	72.2	46.7	69.4	[74.9]
1651-1700	42.2	76.1	63.8	60.0	34.8	54.2	64.3	65.9
1701-1750		50.7	54.5	66.0	42.2	51.2	115.1	62.7
1751-1800	44.9	65.5			50.3	65.0	167.9	[92.9]

Table 8. The number of working days required for a single household at barebones subsistence level, 1300-1800.

Notes: The numbers in brackets assume a wage ratio of 50%. *Sources*: See text.

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