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Women's wages for physical labor, 1550-1759

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Constructing equality? Women's wages for physical labor, 1550-1759

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Constructing equality? Women's wages for physical labor, 1550-1759

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Abstract

This paper combines new archival data on women's wages from southern Sweden with published series from Stockholm in order to create a series of early modern female construction workers' wages between the middle of the sixteenth and middle of the eighteenth centuries. This paper finds that women had relatively high relative wages in the later part of the sixteenth century, with an increasing wage gap into the eighteenth century, and that the changes in women's relative remuneration are connected to changes in demand factors.

This paper challenges assumptions about women's participation in manual labor, in many cases finding a lack of differentiation between female and male unskilled workers as well as an unskilled labor force comprised of from forty to sixty percent women and high work intensity for female construction workers.

Keywords: Gender wage gap; wages; women; Scandinavia; Sweden; early modern period.

Introduction

Investigations of historical wages and the development of living standards in the early modern period have been increasingly popular, especially since Robert Allen's 2001 paper on the development of real wages throughout Europe. However, these wage studies have almost universally referred to men's wages as the drivers of economic development and determinants of living standards; comparatively there has been less investigation into women's earnings or into the ways in which they participated in paid work. But with strong evidence that the household and family-level division of paid market labor changed significantly over the early modern period (de Vries 2008), it is essential to understand women's contributions more clearly if we want to understand living standards more completely.

It has long been taken for granted that early modern women did not participate in paid work in the same ways as men; they have been assumed to have been constrained to unpaid and domestic labor or to cottage industry, with their participation in casual work, especially physical labor, largely overlooked. Recent research has increasingly indicated that unskilled women often participated in paid market work in similar ways to unskilled men, patching together a full-year's work schedule from short-term jobs as they became available, working for different employers and across different sectors (Humphries and Sarasua 2012), but there is still little known about women's earning and labor patterns in the early modern period.

This study fills some of these gaps by developing a series of women's wages from the building sector in Sweden, combining this new data from the south with an already-published series of female builders' wages from Stockholm, to create a series of Swedish women's real and relative wages from the middle of the sixteenth century through the middle of the eighteenth. Together with men's wages from the same sources, this provides new insight into the relationship of men's and women's wage trends. The scope and detail of the data combine to provide both a macro view of wage development in for women and men in unskilled construction in Sweden, as well as a micro level perspective on individual and gender-based work patterns.

This study addresses the following research questions:

1. How did the wages of unskilled female and male builders develop in early modern Sweden?
2. Did women's wages in the early modern Swedish construction industry gain relative to men's, decrease relative to men's, or were they at a consistent ratio?
3. What are the mechanisms which drive relative wage developments? Is there evidence for productivity-biased payments, or for women receiving a customary percentage of men's wage rates?
4. How did women's participation in paid manual labor compare to men's? To what extent did their employment differ?

Preliminary findings challenge long-held beliefs about women in physical labor; in the end of the sixteenth century female construction workers in Sweden were able to earn wages close to, or on par with, their unskilled male coworkers, though women's relative wages declined in

the seventeenth century, and women were of course typically relegated to the least skilled construction jobs. Women's relative remuneration appears to be largely demand-driven, with higher relative wages in periods with more construction work; there is less evidence for systematically discriminatory or custom-based wages; during peak building periods the labor force was especially feminized, with women constituting between 30 to 60 percent of the unskilled labor force during these periods.

Previous research

Women's work in the past has been systematically less studied than men's. Some of this is because of the relative ease of finding data – women are often not as clear in the historical record, and their work has often been less formal, making them harder to collect or identify (Humphries and Sarasua 2012). However difficulty does not mean that there is no data, and the focus on women has been increasing.

Humphries and Weisdorf (2015) present a comprehensive, long term series of women's wages for both day and annual labor from the middle of the thirteenth century through the nineteenth. Built on an impressive array of primary and secondary sources and covering a wide range of types of work, this is the first long-term investigation of women's wages in early modern and late medieval Britain. They conclude that the 'Golden Age of the Peasantry' following the Black Death – typically associated with increased bargaining power and wages for unskilled laborers – likely had little benefit for women, and that women who were engaged in casual work were likely increasingly dependent on their husbands for financial support as the gender pay gap widened through the period of industrialization; however, those women who could commit to full time labor with an annual contract, typically young single women without family commitments, had more ability to support themselves through the early modern period.

The majority of gender wage gap studies in a pre-industrial context examine the gender wage gap in the long nineteenth century; this literature tends to have a British focus, and to rely on agricultural data collected from farm accounts. These studies haven't typically produced long-term national series of data, but instead look closely at a particular farm or set of farms in order to gain a fuller picture of the working environment and division of labor between the sexes. Burnette (2004) expands on this genre to examine a larger set of farms throughout England from 1740 to 1850, also finding a decreasing female relative wage alongside a decreasing demand for female farm labor over this period; she attributes the decrease in demand for female farm labor to women's increasing ability to find alternative employment in cottage industry, driving up the competitive wage to the point where the wage farmers would have needed to pay to hire women would have been higher than the value of women's productivity.

Several other studies have found a widening gender wage gap through the late medieval and early modern periods. Van Zanden (2011) investigates the development of women's unskilled wages relative to men's at Winchester College in England, finding that initial wage parity in

the early sixteenth century rapidly declined, with women earning less than half of men's wages by the middle of the seventeenth century. The decline in women's relative wages is also found in wage assessments – the maximum wage rates allowed for certain types of workers – for reapers and haymakers across England in the early modern era; here the decline in parity occurs later, and is not as drastic, as the actual wages from Winchester College. The wage gap in the Netherlands follows similar patterns, with a very small wage differences before the Black Death and no wage gap in observations in the first part of the sixteenth century followed by a loss of wage parity going into the eighteenth century, though this increase in inequality was more modest and occurred later than in England (van Zanden 2011). Though I have been unable to locate John Langdon's 2010 conference paper discussing the wages of female builders in the medieval period, van Zanden (2011) reports results from this paper which also follow the trend of a widening gender wage gap into the early modern period; Langdon finds a much higher wage ratio, nearing two thirds, in the 1290s than in the early 14th century, when wage ratios have decreased to only about three quarters. At times, the wage ratio could approach levels as high as 80 to 100%.

Though there is increasing empirical evidence about women's wages and the development of gendered wage gaps, there are still difficulties in explaining what factors are driving differences in payment rates. The primary debate centers on whether wage differences were due to discrimination or whether they have been based on fair market forces, driven by the differences in women's and men's productivity. The historiography surrounding the Black Death also brings women's response to supply and demand shocks into focus; theoretically, women would be more incentivized to join the labor force when labor was in low supply, and subsequently would be able to demand higher wages.

Much of the long-term decline in women's relative wages has been connected to the labor shortage following the Black Death, a 'golden age' for the peasantry and unskilled in general; the low supply of unskilled labor in combination with continued and inflexible demand for agricultural workers allowed unskilled laborers, and theoretically women in particular, to demand higher wages; the subsequent decline in relative wages is connected to population recovery in the following centuries (van Zanden 2011). However, Humphries and Weisdorf (2015) find no such effect of higher women's relative wages following the Black Death.

Bardsley (1999) criticizes the historiography that claims that women were paid on par with men following the Black Death; she examines women's relative harvest wages before and after the Black Death in England, and finds a highly segregated wage structure, wherein the best paid women could earn only as much as the lowest paid men, but average wages were far from equal even when women and men were employed on the same tasks. She also presents evidence that women's wages may have been overestimated in some previous literature, especially when women were performing as part of a work group, in which a lump payment was made to a group leader and distributed internally. Further, many of the lowest male wages were possibly paid to boys, older men, or less physically fit men, meaning that the pay gap between fit adult women and fit adult men would have been even larger than it appears. Her overall conclusion is that gender, along with age and perceived physical ability, was an intrinsic component of how wages were determined throughout England's late medieval and

early modern period; she stresses the likelihood that selective comparisons and the lack of strong or systematic data has led to an overestimation of women's early modern wage parity.

Burnette (2008) counters that women were not paid lower wages than men simply on the basis of sex, and argues that when differences in productivity are taken into account women were paid on par with men for manual work – wage differences are because women are not as strong as men, and so are not as productive in strength-based tasks. While men and women often completed different work, this sorting was market-motivated and led to greater economic efficiency, rather than being based on discrimination or gender roles; while there was some assumption of typical 'male' or 'female' tasks, workers and employers were almost always willing to override gendered work categories in the interest of economic efficiency.

Burnette (2004) connects the decline of women's relative wages in the eighteenth to nineteenth century Britain to changes in farming practices and technology: as the labor-grain price ratio shifted from low grain and high labor prices to high grain and low labor costs, farmers preferred to pay the higher male wages, which allowed a higher reliance on the heavier scythe and led to more efficient grain collection than with the sickle, which was more easily used by women. Similarly, van Zanden (2011) connects the decline of wage parity to the development of large, capital intensive farms and enclosure systems; as farms grew in size and family farms disappeared, the demand for farm labor fell across the board, but fell especially for women and children.

Apart from wages, women's participation in paid work is also not well understood. Humphries and Sarasua (2012) propose that women participated in the paid labor market far more than what has historically been assumed, and that women were often occupied year round with paid work though it might be comprised of several jobs across different sectors; men's work was much the same. The absence of women from the official record of work is largely born of our own and our predecessors' ideologies. They also argue that demand-side factors were typically a stronger influence on women's decision to work in the early modern period than supply-side factors such as marriage or fertility, as de Moor and van Zanden (2010) and van Zanden (2011) would suggest through a mechanism such as the European Marriage Pattern; van Zanden connects this decline in women's relative earning power to the decline in women's marriage ages that was occurring in the eighteenth century. This is in turn theoretically connected to Becker's theory of lower marriage ages being associated with greater specialization within marriage, and falls in line with de Vries' (1994) theories of the Industrious Revolution and changing patterns of within-family specialization and the rise of the bread-winner model.

Data

The primary data for this study are collected from payment records from institutional and manorial archives in the south of modern day Sweden, primarily from the cities of Malmo and Kalmar, though also from some manorial sources and smaller towns around the southernmost province, Scania, where Malmo is located. All of the data in this current work represent day

laborers working in the construction industry. Johan Söderberg has generously granted access to some of his archival notes used for the construction of the 1991 series; some of this unpublished material is used to extend the series of women's wages in Stockholm earlier in time.

In most instances the data is coded using the HISCO and HISCLASS systems (Leeuwen et al 2000; Leeuwen and Maas, 2011). The exceptions are Kalmar, where the data is presented in the original source already divided into skilled and unskilled labor, and the already-published data from Stockholm. These systems allow for systematic categorizations of work tasks and the differentiation of skilled (in the case of these data, medium skilled) and unskilled workers.

In primary data women are less frequently represented than men. Unskilled men are paid for over 63,000 days of work 1550-1759; in the same period women are paid for 7324.

A female worker can be identified either through a gendered occupational title, a female relationship indicator, or by her name. In some sources, such as Kalmar, virtually every individual is named, which not only makes identifying the gender of the worker straightforward but means that we can be confident that we are not misidentifying female workers as male.

Women are not systematically separated from men through their titles or recorded occupations. In Malmö, women are sometimes identified as a digger's wife (*grävarens hustru*), but other times they are called simply a digger (*grävare*), the same title given to men. In Kalmar all unskilled workers are subsumed under the title '*hantlangare*', or unskilled worker.

Wages for unskilled men and unskilled women from Stockholm are taken from Jansson, Andersson Palm, and Söderberg 1991.

Methodology

Annual daily wages are calculated as the unweighted mean of daily payments. Each individual payment is given equal weight; a person who is recorded as receiving a payment five times in one year is counted toward the average five times. This is to give the strongest weight to the most typical wage, and because there are many times when it is impossible to determine the identity of the individual. Heavy outliers are removed.

Real wages are computed by deflating the nominal annual series by a cost of living series. In this case, the price basket is modeled after Robert Allen's (2001) consumption baskets, modified for a Swedish consumer. Day wages are multiplied by 250 days to represent an annual income. Cost-of-living baskets represent the total costs of supporting a family of 3.25 adult male equivalents, to proxy a family of one man, one woman, and two children for an entire year following Allen and Weisdorf (2011). The y-axis indicates how many times over an adult's wage can meet the financial needs of the family unit. A value of 1 indicates that an adult's wage could just support the family unit – a value under 1 indicates that the single wage

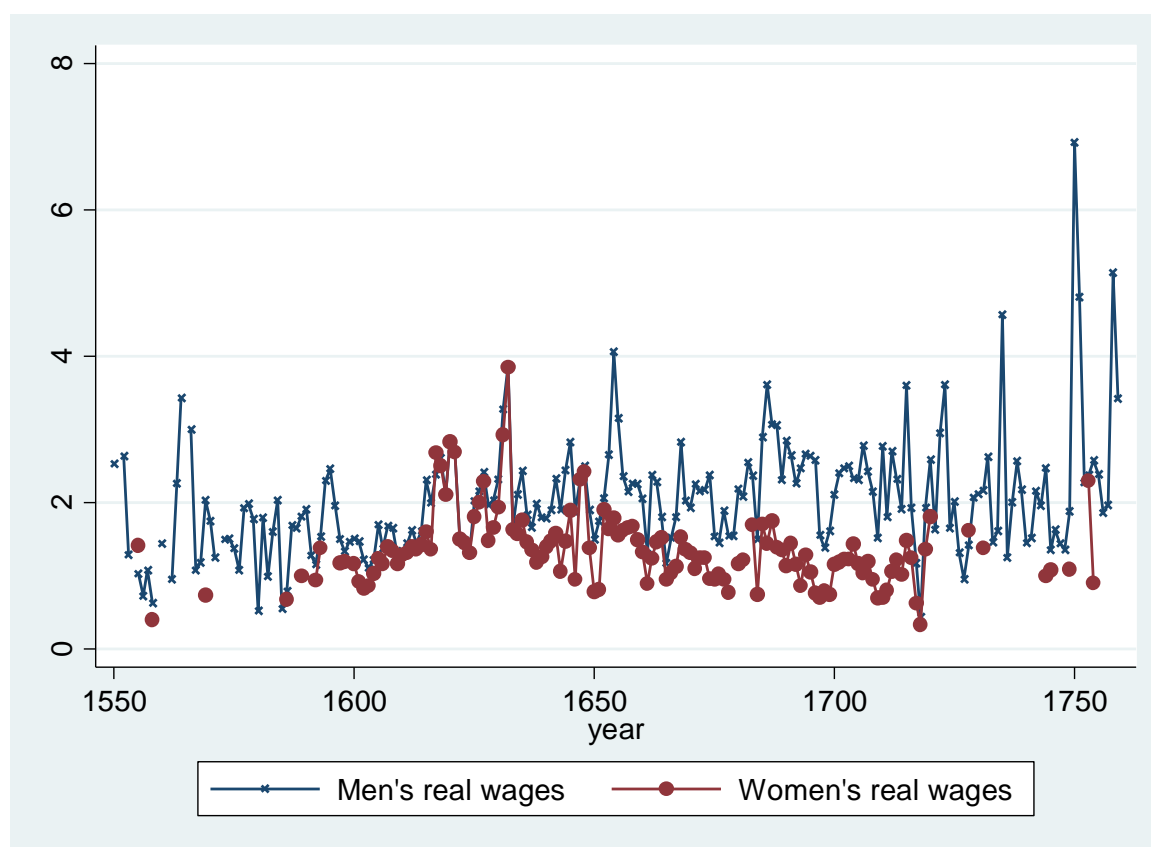
would not have been enough to support the family, while a value of 2 indicates that there is enough income to support the family unit two times over. This analysis uses so-called subsistence baskets – that is, a basket of goods that comprises cheaper and less luxurious alternatives – in order to give a lower-bound look at the possible range of living standards.¹

Women's relative wages are computed by dividing women's daily unskilled wages by men's daily unskilled wages. A value of 1 indicates that men and women had the same daily wage and a level of 0.8 indicates that women earned eighty percent what men did. To avoid regional price effects relative wages are computed locally and then an unweighted average is taken across all regions.

Women's and men's nominal and real wages in Scandinavia

Figure 1 shows a trend of fairly stagnant real wages for men; a mild increase in living standards during the sixteenth and into the seventeenth century is followed predominantly by stagnation for men through the rest of the period. After a slight increase in wages for women going into the seventeenth century, women suffer a wage decline through the rest of the

Figure 1: Unskilled men's and women's real wages in Sweden 1550-1759– in subsistence baskets



¹Consumption baskets are developed separately for Sweden in Gary (2017)

period. Income levels are typically between 1 and 2 subsistence baskets for both women and men, though sometimes dip below; according to Allen's methodology this indicates that while unskilled Swedish workers could make ends meet when work was available, they were not living luxurious lives. This is especially true as the subsistence basket measurements given here are for the most basic level of survival, without allowance for extras.

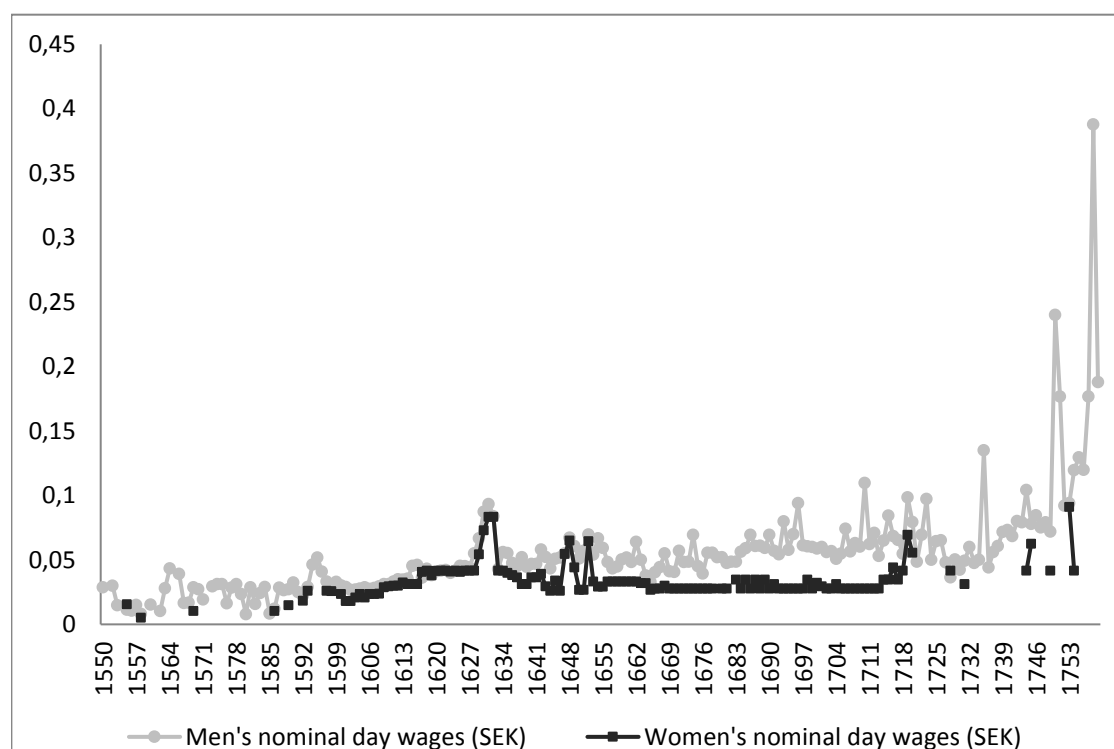
It is important to notice the parallel movement of women's and men's real wages through the first part of the seventeenth century, followed by decided wage divergence. There is some catchup of women's wages in the eighteenth century, but the data is scarcer here, so the trend is not as conclusive.

Nominal wages (figure 2) show that women's real wage decline is due largely to the halting of women's nominal wage growth during the majority of the seventeenth century and into the eighteenth, while men's nominal wages continued to keep pace with prices.

The development of men's wages is largely in line with the trends outlined in Allen (2001), which show a divide in growth between the developing Northwest and the poor and stagnant 'rest' of Europe and outlines the Little Divergence; Sweden compares with growth trends in the stagnant periphery, which were left behind by wealthier economies in England and the Netherlands.

The stagnation and decline of Swedish real wages can be partially attributed to the general instability and turbulence of the seventeenth century, during which time Sweden's position as one of the great European powers led to almost constant warfare, most of it overseas, taking substantial tolls on Sweden's economic and demographic development.

Figure 2: Men's and women's nominal wages in SEK



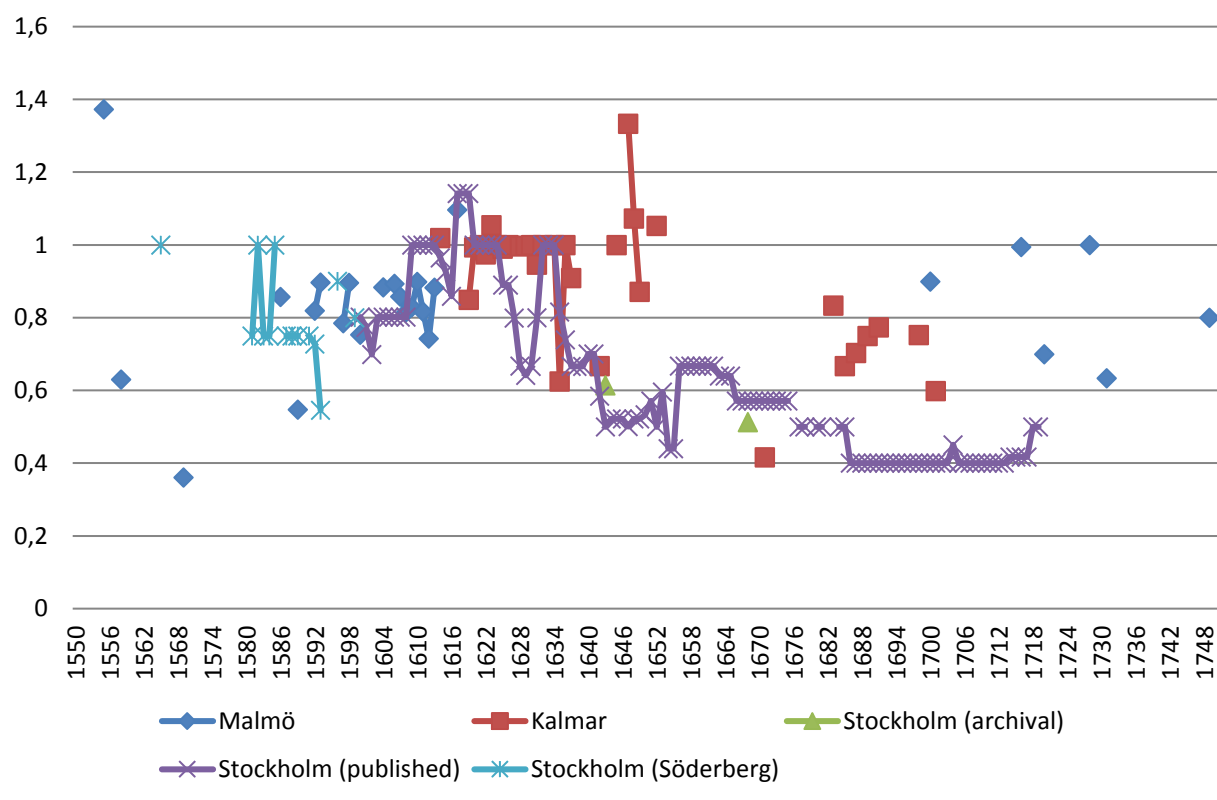
Women's relative wages in Sweden

Figure 3 shows the women's relative wages as a percentage of men's in Sweden, disaggregated by region. The dominant trend is an increase in women's relative earnings into the beginning of the seventeenth century, followed by a steady decline through the seventeenth century; this is followed by a slight indication of a recovery at the beginning of the eighteenth century, but this is tentative at best.

It is especially interesting that several data points from Kalmar and Stockholm indicate that unskilled were at times able to out-earn unskilled men. Some of the high levels of women's relative wages can be directly connected to events that would both increase the demand for building labor and likely decrease the supply of able men. Kalmar was previously a border town between Sweden and Denmark; the Kalmar War was fought between these two countries from 1611-1613, and the high wage ratio of 1.2 in 1614 is likely in response to the need to rebuild coupled with a fall in the supply of men.

Peaks in women's relative earnings in the late 1640s coincide with the years directly following a fire that devastated Kalmar in 1647; the town was rebuilt at a slightly removed location, and building labor would certainly have been in high demand, helping to explain the wage ratio of 1.33 in that year.

Figure 3: Women's relative wages as a percent of men's wages, disaggregated by source



Source: see text

The high levels of women's wages could also be connected to gender-specialization in the unskilled (or low-skilled) construction workforce. When Kalmar was rebuilt following the fire, burgers were given tax credits for building in stone, instead of wood. Throughout the archival records carpenters typically work alone, without assistants. Masons on the other hand often had many people working under them. In particular, they have more specialized unskilled workers, called *kalkslarare*, or the feminine *kalkslagerskor*, who frequently appeared with the same mason regularly. This position was often held by women, especially in Kalmar. Given this pattern of professional relationships, and increase in the demand for skilled male mason labor would also drive up the demand for semi-specialized unskilled female labor.

Even given the unusual circumstances that help explain some instances of very high relative wages, the decrease in women's relative payment through the seventeenth century is dramatic, especially as it occurs over the course of only a generation or so. The following sections concerning women's participation in the labor force aims to reveal some of the mechanisms that led to this dramatic swing in women's relative compensation.

Women as a part of the labor force

Demand-pull on women's work

Women played an important role as paid manual laborers; this was especially the case in periods when construction labor was in high demand. The importance of women in the building industry is particularly evident in Kalmar: one of the unique features of this data is that virtually every individual is named, which means that identification of each worker is essentially universal. This allows for a examination of women's presence in construction field on an individual level. Kalmar was not a large town; it had only about 2000 inhabitants around 1700 and the surrounding countryside was sparsely populated (Andersson Palm 2000), but this was fairly normal for a Swedish town in the period. Unfortunately the population statistics are not detailed enough for a clear examination of the population development of the town; because of this, little is known about the supply side of labor in Kalmar or how it might have changed in different periods.

Table 1 shows the number of payments made to women as a percentage of payments to all unskilled workers in Kalmar and as a percentage of the total sample, presented with the number of all unskilled workers and number of workers in total. Clearly the 1620s and 1630s were the biggest years for construction in Kalmar, while construction work recorded in the available sources generally declined in the 1640s; this is likely due to the extensive repair work necessary after the church and other parts of the city were destroyed during the Kalmar war 1611–1613. Women are a substantial part of the labor force throughout the period; they are regularly about half of the unskilled labor pool, and even when skilled (male) labor is included they are still a strong proportion of all builders. There is no doubt that female building labor was an integral feature of construction work in Kalmar.

Table 1: Women's work days as a percentage of all workdays in Kalmar, 1614-1706. Workdays rounded to nearest full day.

	As % of unskilled workdays	unskilled workdays (n)	As % of total workdays	Total workdays (n)
1614- 1620	68.6	2502	39.0	4406
1621- 1625	31.8	4039	18.6	6903
1626- 1630	60.8	2907	52.7	3354
1631- 1635	69.4	762	54.1	977
1636- 1640	54.5	130	11.5	607
1641- 1645	40.3	144	38.4	151
1646- 1650	18.9	354	4.2	1601
1651- 1655	13.2	46	6.2	97
1656- 1660	0	69	0	73
1661- 1665	0	13	0	20
1666- 1670	0	27	0	130
1671- 1675	17.4	383	15.2	438
1676- 1680	100	13	52.0	25
1681- 1685	27.8	18	15.4	33
1686- 1690	20.0	175	16.3	215
1691- 1695	5.7	35	4.1	49
1696- 1700	4.1	122	4.0	126
1701- 1705	0	135	0	135
1706- 1710	0	13	0	51



>60% women



Top quartile (n) of workdays



30-59 % women

The data here represents only one source from Kalmar, as others do not survive, but there are indications that this source is a strong representation of the building sector in Kalmar. After the fire in 1648, Kalmar was rebuilt at a new location with tax relief offered to burgers who rebuilt their homes in stone. As mentioned above, female construction workers frequently assisted masons, and so we can assume that female unskilled labor for private projects was in high demand in these years along with building labor in general. Because this employment would have been in the private sector, paid by individual townspeople, it does not appear in the records of the public sources used in this study. This demand from the private sector was enough to drive reallocation of the labor supply from the public market – at least, there are significantly fewer payments to construction workers in the public record during the period when private construction would have been at its highest. The few wages that do remain continue at a high level, especially for women. This indicates that the Kalmar market is small enough that the patterns in the records analyzed here are a reasonable proxy for the construction market, and reflect workers' reactions to supply and demand forces. This high labor demand, combined with a limited labor supply, may also help explain women's relatively high wages in this decade, despite this decade having fewer recorded wages overall.

The high proportion of women working during years in which the labor demand was greatest further indicates that women responded to demand factors when entering the labor market. We can investigate women's incentives further by examining the relationship between women's wages and labor demand.

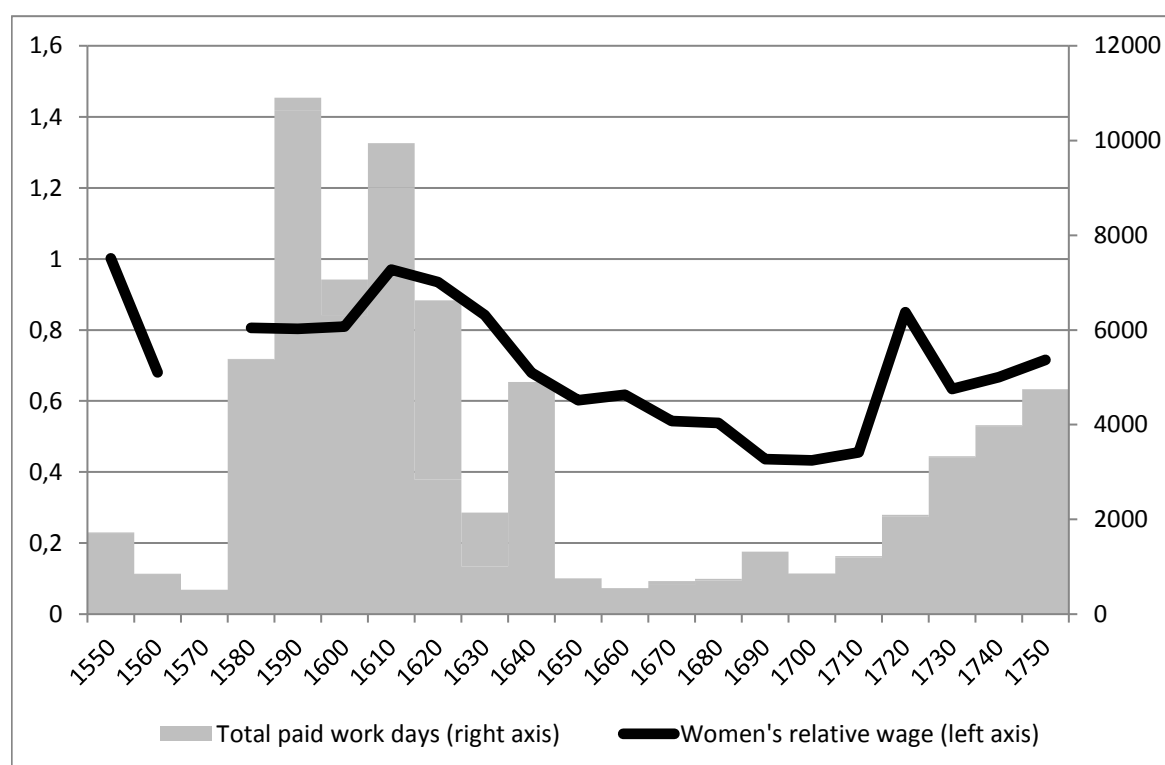
Figure 4 shows the development of total labor demand, measured as the number of individual wage payments made in each decade, along with women's relative wages. It is important to note that this comparison is somewhat flawed; the data of women's relative wages contain information from Stockholm, while the labor demand data do not. However, from figure 2 above we can see that the overall shape of women's wage development is fairly consistent even without the inclusion of Stockholm; the series would have more gaps and a slightly higher level, but the shape would be stable.

As figure 4 shows, the association between building demand and women's relative wages is high; the correlations confirm this association; total individual days worked and women's relative wages have a correlation coefficient of 0.31, which indicates that either employers raise women's wages, though not men's, in times of high labor needs, or that women are able to enact some degree of collective bargaining when employed in larger groups. Together this is strong evidence that demand factors have a strong influence on Swedish women's connection to the building industry, in accordance with Humphries and Sarasua's (2012) suggestion about the motivations of preindustrial working women in general.

A closer look at the difference in individual working patterns between men and women in Kalmar, with its more-complete records, gives a better idea of how women's work compared to men's. Notably we find one individual, a woman called Anna Dikerska, is an abnormally tenacious worker. Weekly payment records record unskilled men and women together; this list is organized in order of days worked in the week, with those who worked the most days topping the list. This position is almost unwaveringly held by Anna Dikerska. Because she is clearly unusual as an unskilled laborer, summary statistics are presented with and without her better understand what is typical of women performing this labor.

Table 2 below shows the average number of days an individual worked in a year, the average number of times an individual appears recorded as receiving payment (on a weekly basis), and the average number of years over which an individual worked, although these years need not be consecutive. Skilled men worked the most, which is to be expected, as they invested considerable amounts of resources to learn their trades and pursue a livelihood. What is less expected is that women, while fewer in number than unskilled men, appear to work more than their male counterparts in an industry that relies on physical strength and necessitates absence from the home. Median values are higher for unskilled women in all categories than for unskilled men; women are on average working more days in a year, and are returning to the workplace more often and over a longer period of time than unskilled men. While the raw mean might not be higher in all categories – unskilled men work during an average of 1.39 years, while women work during an average of 1.36 – in combination with median and max

Figure 4: Total building demand in number of days worked (right axis) and women's relative wages in Sweden (left axis) by decade



Source: see text

values the data shows a clear tendency toward a higher work intensity from women than from unskilled men. This possibly indicates that unskilled men had more options than women for earning an income on a casual basis, while women were more restricted in their work opportunities, but it is clear that women were a regular presence in the construction industry.

Average annual workdays						
	mean	s.d.	min	median	max	n
unskilled men	8.87	14.05	0.5	5	143	377
women	15.7	15.7	1	7	141	243
women w/o A.D.	11.35	15.73	1	6	114	242
skilled men	31.82	36.92	0.5	14	144	99
appearances (individual recorded payments, on the weekly level)						
	mean	s.d.	min	median	max	n
unskilled men	3.5	5.86	1	1	74	377
women	5.28	15.98	1	3	226	243
women w/o A.D.	4.36	7.31	1	3	69	242
skilled men	13.79	27.40	1	4	186	99
Number of years over which individuals worked (need not be consecutive)						
	mean	s.d.	min	median	max	n
unskilled men	1.39	0.95	1	1	9	377
women	1.36	1.29	1	1	14	243
women w/o A.D.	1.31	1.0	1	1	10	242
skilled men	1.65	2.0	1	1	18	99

Qualitative evidence from Southern Sweden

Evidence from Malmo also supports the idea that women tended to play a fairly regular role in construction work; while probably less common than in Kalmar, women's paid work seems to have been fairly normal and to have gone without comment. One piece of evidence for this is the frequency with which women are not given a gendered occupational title, but are only identifiable by their name; this at least implies that women's work was not seen as different enough to record them as doing separate work from men. Additionally, whether or not women were given a gendered title seems to have been somewhat arbitrary; Karine, wife of Niels the digger (possibly Niels Graffuer), appears in the data at least four times, and possibly a fifth, between 1589 and 1593. However, she is never named in the same way twice; she is named as Nils' Karine (Karine Nilssis), and as Niels' woman Karine (Niels kvinna Karine), and her occupation also changes from entry to entry. Twice she is listed as just a digger (grävare),

while twice she appears as a digger's wife (grävares kvinna). In 1592, another Karine, Karine Wogns, is paid 12 skillings for 1.5 days work on what was most likely the foundation work for Malmo castle's east tower. She appears directly after Wogn Jensön, her husband, who receives 8 skillings for one day's work, the same per-day rate as Karine. For both Karines, neither their occupational titles nor their wage necessarily identify them as female. It seems very likely that there are more women who similarly disappear into the data because it is impossible from the data to see that they are women. This is consistent with Humphries and Sarasua's (2012) theories that women performed more paid labor than what is apparent in much of the data we have, as well as their assertions that women participated in casual labor in similar ways to men.

As mentioned before, one of the strengths of the data from Kalmar is that virtually every individual is named, which can give some strong indications of women's occupational roles that are not available in other sources. Women are typically included under the heading 'hantlangare', as mason assistants and unskilled workers, along with men. While female builders are often listed at the end of daily lists of workers in the Malmo data, men and women are thoroughly mixed in Kalmar, with individuals who worked the most days listed first; either Anna Dikerska or Anna Kalkslagerska top almost every list of unskilled workers throughout the entire period.

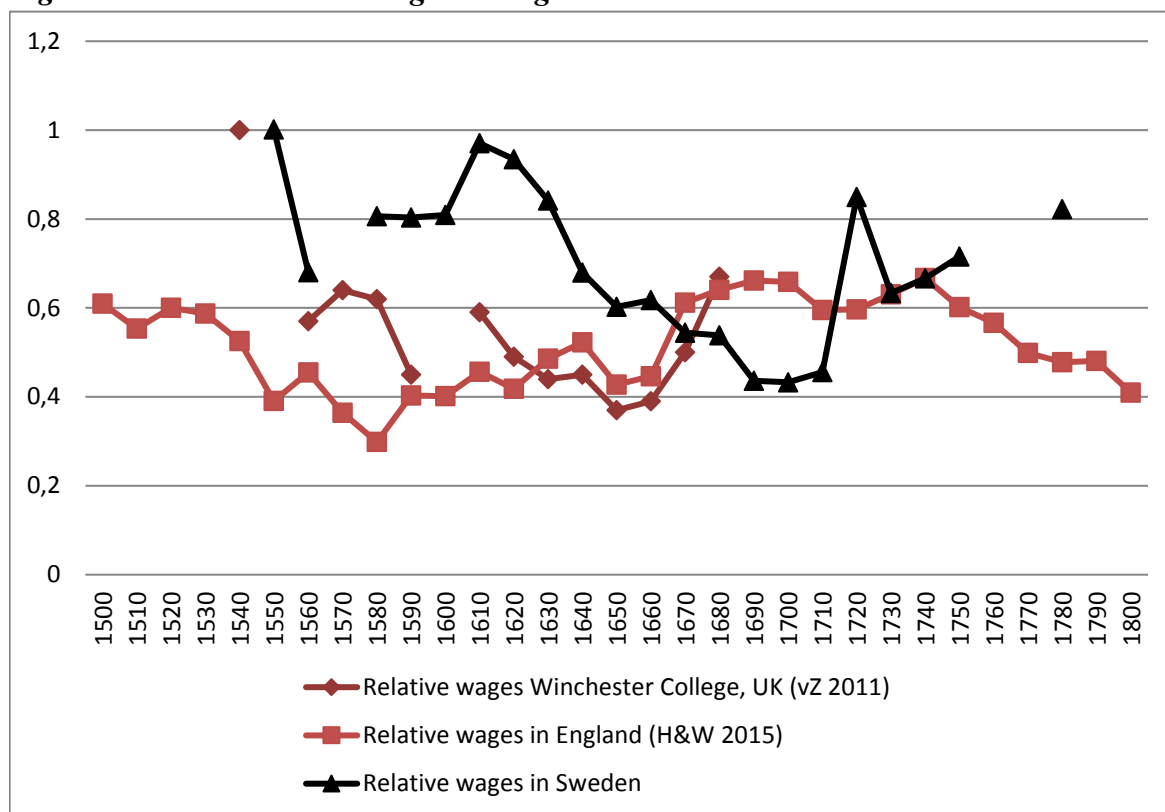
Anna Kalkslagerska and Anna Dikerska are also notable because of their names; both women's surnames are occupational titles, rather than the more typical patronyms that most women and many men carried. Many master men adopted the names of their professions, of course; there are many men called 'Murmästare' (mason) and 'Timberman' (carpenter), along with a few named 'Dödgravare' (gravedigger), but it is in general less typical for women to have occupational names. The women's titles are less prestigious than the men's; 'Kalkslagerska' is a mortar mixer or plasterer, and 'Dikerska' is a digger, but the suffix 'ska' unambiguously indicate that these titles are female, and so were not inherited from a father or husband; instead these names must refer to these women's identification as professional construction workers.

Swedish women in an international perspective

As mentioned above, there is a substantial lack of data on women's historical wages, which makes an international comparison difficult. Here, Swedish women's construction wages are compared with women's casual wages in England (Humphries and Weisdorf 2015) and the wages of women working at Winchester College in England (van Zanden 2011).

It is important to note that the wages from both English sources represent different types of work than those that come from Sweden; while the Swedish women are essentially all construction workers, the women in Humphries and Weisdorf's series are performing a large number of unskilled tasks, and women at Winchester College performed more domestic and agricultural manual labor, such as cleaning and winnowing. It is also important to put these series into context; Sweden was a largely rural and agricultural society until the end of the

Figure 5: women's relative wages in England and Sweden



Source: Winchester College: van Zanden 2011. England: Humphries and Weisdorf 2015. Sweden: see text.

eighteenth century, while England was an early industrializer, with mechanization changing many industries already at the end of the eighteenth century. These important differences make a comparison difficult, but it is still worthwhile to see where Sweden fits compared to others.

The development of men's and women's relative payments in Sweden is contrary to the development of English wage ratios. Humphries and Weisdorf (2015) find a declining level of relative casual wages from the middle of the sixteenth century; while there was some recovery through the seventeenth century, the decline appeared again in the middle of the eighteenth century, as the introduction of mechanized spinning drastically undercut spinners' opportunities for income and changed the overall casual labor market for women.

At the beginning of the sixteenth century these women's wages were on par with the unskilled men also hired by the college, but a substantial wage gap quickly developed, as men's wages grew but women's remained low; by the middle of the seventeenth century women were earning less than half of what men could earn. Like in Humphries and Weisdorf's aggregate series, there was substantial wage recovery for women in the later seventeenth century, bringing them almost to seventy percent of men's wages, but still not enough to bring wages back to parity.

This pattern of a steep fall and decline, followed by a tentative recovery, is also the dominant trend in the Swedish wages, but the pattern begins much earlier in the English data, already at the middle of the sixteenth century; the Scandinavian trend is about fifty years behind the English development. Additionally, these developments are likely connected to different trends. Humphries and Weisdorf connect the decline in women's relative unskilled wages in the eighteenth century to the increase in competition women faced from mechanization, while the high relative wage levels in Sweden are more likely connected to periods of high labor demand connected to destructive warfare; mechanization entered the scene relatively late in Sweden, and so is less likely to have had a strong impact during this period.

Discussion and conclusion

This study has shown that not only did women work extensively in the early modern Swedish construction industry, but that they were able to command high wages when labor demand was high, and entered construction work in response to demand factors. The combination of the potential for women to earn wages on par with their male peers in construction, a physical industry, argues against women being less productive workers than men, or at least against a payment structure based on such a relationship, as in Burnette (2008). At the same time, high earning periods alongside periods of decline argue against pure discrimination, as in Bardsley (1999), though it does indicate some reversion to a discriminatory state after the building crises were over, in which women were not the preferred workers. When physical labor was needed women were not excluded or underpaid, especially when recorded in the payrolls directly with men – women's relative wages are often lower when they were worked without men, indicating women yielded a certain amount of bargaining power in periods of high work demand, though it was unsustainable. Together this indicates a limited agency due to demographic pressures and labor needs, as theorized to have happened after the Black Death (van Zanden 2011). Women's response to demand factors also enriches a literature which tends to focus on the supply side of women's labor in the pre-industrial Europe (see Humphries and Weisdorf 2015; van Zanden 2011), and urges us to continue investigating historical labor markets in deeper detail.

The wage gap in Swedish construction in the early modern period appears to be primarily motivated by demand factors; as Humphries and Sarasua (2012) note, this aspect has not been investigated as much as supply factors in investigating women's participation in paid work in the past. In the case of Sweden we see that when there is a high demand for construction work employers make less distinction between male and female workers, both in terms of how they are recorded and the rates at which they are paid. It is when levels of construction work are lower and people are employed less regularly that wages begin to show some differentiation.

Women were responsive to demand factors, and this period of higher wages coincided with both higher periods of labor demand and higher levels of female employment. This pattern shifted after the beginning of the seventeenth century, when women's nominal wages fell

substantially while men's generally continued to increase; larger building projects became less frequent, and when they did occur they employed fewer women.

Theory would predict that when we observe women performing strength-intensive jobs that we would expect these women to earn more than other women, because the women working in strength-intensive jobs must be able to earn more in these occupations than they would in occupations that did not require strength in order to make the occupational change. However, theory still predicts that women in physical occupations will earn less than men in the same professions (Burnette 2008). This is not always the case in the data here, especially in the data from Kalmar where men and women working as unskilled workers are listed together and paid the same day rate; the heterogeneity in wages largely appears when there is lower demand for labor and tasks are less regularly paid. However, a similar sorting-based mechanism could explain why women tend to work more than unskilled men; if only those women who are most able are regularly obtaining employment in construction work, it is possible they are particularly efficient and choose to remain in this industry, while men are find other employment. Alternatively, it could be a function of a lack of employment opportunities for women compared to men.

The decline of women's relative wages is concomitant with a decline in building demand, as well as with a decline in the relative proportion of women working in construction. This makes it unlikely that women's relative employment is due to any sort of substitution between unskilled men and women; instead, they seem to act as compliments. Similarly, the rapid shifts in relative pay levels within the same sources, or at least the same geographical regions, also undercut a story based on customary gendered pay gaps; even if the differences in gendered pay rates are due to discrimination, the patterns of discrimination are not systematic or entrenched across time.

Regardless of what is causing the changes in relative payments it is clear that women are separated into the lowest class of workers; the fact that they are at times paid more or less the same as the other unskilled men doesn't change the fact that women were not able to become more than minimally skilled; they were still severely limited in their working options.

Women were certainly not strangers to paid physical labor; evidence from Kalmar shows that they were frequently between thirty and sixty percent of the unskilled labor force on construction projects, and records from Malmo indicate that women are 'invisible' in the data in many instances, and were likely working alongside men for equal or similar pay more frequently than we are able to observe.

Primary data sources

Lunds Landsarkiv (Regional Archives in Lund)

Urban archives:

Landskrona rådhusrätt och magistrat (*Landskrona city court and magistrate*)

Lunds domkyrkas arkiv (*Lund Cathedral archive*)

Lunds stadsarkiv: Rådhusrättens och magistratens arkiv (*Lund city archive: City Hall Court and magistrate archive*)

Ystad stadsarkiv: Rådhusrättens och magistratens arkiv (*Ystad city archive: City Hall Court and magistrate archive*)

Manorial archives:

Jordberga godsarkiv (*Jordberga estate archive*)

Karsholms godsarkiv (*Karsholm estate archive*)

Knutstorps godsarkiv (*Knutstorp estate archive*)

Maltesholms godsarkiv (*Maltesholm estate archive*)

Rosendals godsarkiv (*Rosendal estate archive*)

Rydsgårds godsarkiv (*Rydsgård estate archive*)

Trolle Ljungby godsarkiv (*Trolle Ljungby estate archive*)

Vittskövle godsarkiv (*Vittskövle estate archive*)

Malmö Stadsarkiv (Malmo City Archives)

Urban archives:

Borgerskapet i Malmö 1517 – 1862 (*Burghers in Malmo 1517-1862*)

Malmö Hospital 1528 – 1923 (*Malmo Hospital 1528-1923*)

S:t Petri kyrkoarkiv (*Saint Petri church archive*)

Landsarkivet i Vadstena (Regional Archives in Vadstena)

Kalmar rådhusrätt och magistrat 1600-1850 (*Kalmar city court and magistrate 1600-1850*)

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Appendix table 1: Archival sources					
Archive name	Wage payments (N)	Women (N)	Workdays (N) (rounded to nearest workday)	Date range	Type of archive
Malmö borgerskapet	13,063	336	33,895	1587-1759	Town
Kristianstad	69	0	1,157	1659-1727	Town
Lunds rådhusrätt	55	0	208	1674-1757	Town
Halmstad	44	0	224	1594-1702	Town
Ystad rådhuset	28	0		1636-1737	Town
Vadstena rådhusrätt och magistrat	25	3	335	1613-1729	Town
Landskrona rådhusrätt	18	0	52	1699-1758	Town
Kalmar	2,417	1,333	4,551	1614-1709	Urban church
Malmö Petrikyrkan	627	1	4,137	1550-1681	Urban church
Malmö hospital	514	14	1,787	1550-1676	Urban hospital
Allmänna barnhuset	239	2	4,385	1642-1643	Urban orphanage
Lunds domkyrka	182	0	928	1683-1759	Urban church (cathedral)
Domkapitlet i Växjö	56	7	281	1659-1703	Urban church (cathedral)
Vittskövle	274	3	4,603	1695-1759	Manor
Trolle Ljungby	203	1	1,241	1721-1758	Manor
Jordberga	31	0	128	1756-1759	Manor
Maltesholm	9	0	64	1738-1756	Manor
Karsholm	1	0	19	1707	Manor
Total	17,855	1,700	57,995	1550-1759	