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Gary, Kathryn

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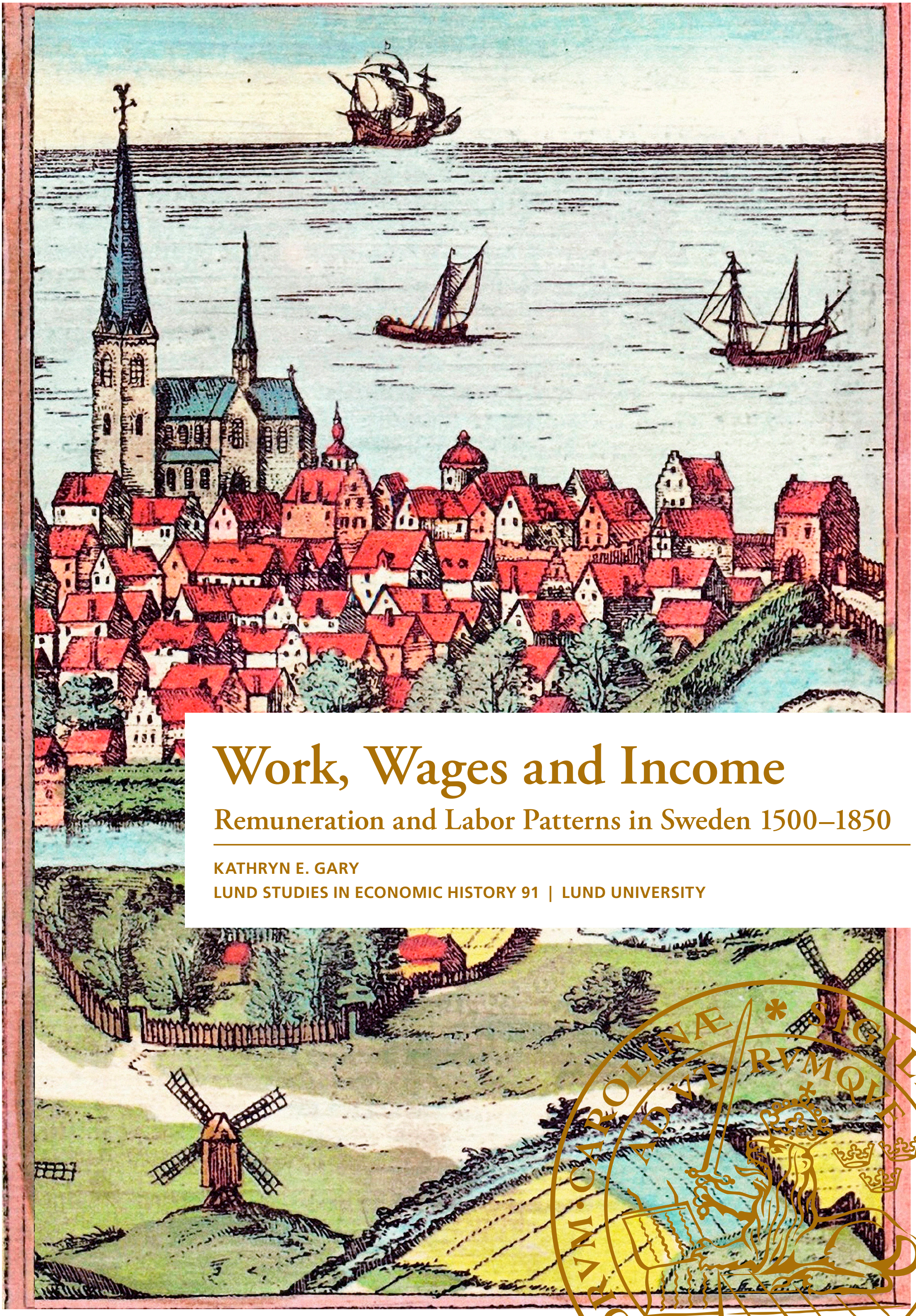

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KATHRYN E. GARY

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Kathryn E. Gary

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Abstract

Since the earliest economic historical studies wage series have been used to sketch economic development both at the macro and the household level. This dissertation takes advantage of new data from women and men, working in both the countryside and in towns, as well as employed both by the day and on long-term contracts, in order to make an in-depth quantitative look at the relationships between different kinds of work and how they were compensated within an extended labor market. The use of Swedish data situates these studies in a rural and pre-industrialized economy – a context broadly representative of much of Central and Eastern Europe. The time period, 1500-1850, covers the centuries between the end of the middle ages and the emergence of a truly modern economy. It is during this critical period that the differences between the economies of modern day Europe, as well as the rest of the world, began to take shape.

The central questions are *what does a wage represent?* and *how does a wage turn into income?* The results both expand our understanding of Sweden and Scandinavia's historical labor markets and challenge assumptions in economic history. At the same time, it contributes substantial new sets of data for different kinds of workers from earl modern Southern Sweden.

Together, these papers explore and quantify a complex and changing labor market, while still keeping the earners and those who depend on these earnings in sight. The results show a labor market in which women were integrated into manual labor and could earn wages equal to men's, and women and men probably worked only as much as they needed to in order to meet their annual needs. However, this became more difficult for all groups into the eighteenth and nineteenth century as urban growth and increasing landlessness made making a living progressively more difficult. Several of these results continue to push against standards economic historical approaches, including our understandings of women's labor and working patterns of laborers in the distant past.

Through this, this dissertations demonstrate how much we have taken for granted about the early modern people and workers and how much we still have to learn. Thankfully, the extensive new data sets, drawn from over 50,000 primary archival wage observations, promise many future studies as extensions of this initial work.

Key words: wages, casual wages, women's wages, labor market, early modern, Sweden

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To Anna Dikerska, whoever you were

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Lund, 6 November 2018

List of papers

I. Gary, Kathryn E. (2018).On the construction of nominal and real wage series: Southern Sweden 1500-1850. *Unpublished manuscript*.

II. Gary, Kathryn E. (2018). Constructing equality? Swedish women's wages for physical labor, 1555-1760. *Unpublished manuscript*.

III. Gary, Kathryn E. (2018). The distinct seasonality of early modern casual labor and the short durations of individual working years: Sweden 1500-1800. *Unpublished manuscript*.

IV. Gary, Kathryn E. and Mats Olsson (2018). Men at work: Real Wages from annual and causal labor in southern Sweden 1500-1850. *Unpublished manuscript*.

V. Gary, Kathryn E., and Cristina Victoria Radu (2018). The impact of border changes and protectionism on real wages in early modern Scania. *Unpublished manuscript*.

Work, Wages and Income: An introduction

Motivation and aim

Since the earliest economic historical studies wage series have been used to sketch economic development. They have served at a macro level as proxies for national development, as well as a tool to look into individual and household level experiences. Wages and well-being are some of the oldest and most frequently revisited topics in economic history and related disciplines. Wage studies have been common since the beginning of the twentieth century, and in-depth investigations into early modern work patterns in both rural and urban contexts are a staple of historical research. But even with this abundance of research, it has been difficult to quantitatively match these studies together. Wage studies have relied on less-typical work, and connecting labor markets together in a way that can describe growth and development has been extremely difficult.

The question of how individuals and households made a living in the early modern period is central to many of the most important narratives in economic history and is axillary to many more. And yet recent research has made it abundantly clear how little we properly understand, despite decades of wage studies. From 2001, but even more in the past few years, several studies have shifted both how we use wages as measurement tools as well as the macro-scale narratives which we draw from wage studies (c.f. Allen 2001, Allen and Weisdorf 2011; Humphries and Weisdorf 2016). If even after so many decades of studies, the perspectives drawn from real wages can change so quickly with simple (and very important) methodological innovations, it is clear that wage studies and methodological improvements are still important and living tools for anyone hoping to better understand the past.

As wages have been used in an increasingly comparative context it has been more important than ever to understand how we translate raw wage payments into real wage series, and how we translate wage series onto people's lives in the past.

Comparability and consistency, or at least transparency, are essential. In parallel, as recent studies using different types of wages (Humphries and Weisdorf 2015, 2016) have indicated very different patterns of development that what has been interpreted from traditional approaches, it is clear that a larger body of data must be included in wage studies in order to give a more robust representation of historical labor and income. It is additionally clear that attention to and improvement of our methodological approaches can go a long way toward a better understanding of life in the past.

The focus of wage research has also been unequally distributed. Because of the importance in European and global economic development, the strong focus on economic history, and the compounding effects of generations of empirical research, England has been at the center of real wage studies and advancements in methods. But England was special; it was commercialized early, the first industrializer and home to major urban centers.

The aim of this dissertation is to investigate work and labor markets in early modern Europe. This is carried out through a set of studies which examine differences in remuneration from several kinds of labor and types of payment, using the lens of what is today southern Sweden to better understand developments within Europe as a whole. Through this work I also make inferences about labor allocation and survival strategies at the household level.

This dissertation takes advantage of new data from women and men, working in both the countryside and in towns, as well as employed both by the day and on long-term contracts, in order to make an in-depth quantitative look at the relationships between different kinds of work and how they were compensated within an extended labor market. The use of Swedish data situates these studies in a rural and pre-industrialized economy – a context more broadly representative of much of Central and Eastern Europe than the growth-leader, England. The time period, 1500-1850, covers the centuries between the end of the middle ages and the emergence of a truly modern economy. It is during this critical period that the differences between the economies of modern day Europe, as well as the rest of the world, began to take shape.

The essential questions asked are *what does a wage represent?* and *how does a wage turn into income?* Specifically, this dissertation investigates the following overarching research questions, using archival data from the south of modern-day Sweden:

- How did wages develop for different groups in the long run?
- What were the differences between women's and men's wages?
- What caused women's wages and work patterns to change?
- How much did people work?
- Did income develop differently between different types of workers?
- How did geopolitical changes impact the lives of everyday workers?
- How do the answers to these questions inform the approaches we use to study historical work, wages, and income?

Contributions

This dissertation makes contributions to our understanding of working conditions in the past, to the body of historical wage data on early modern Europe, to our understanding of different kinds of wages for unskilled workers, and to methodological approaches to day wage calculations. Importantly these data also include information on women's work and wages, which is often underrepresented in historical sources.

Contributions to data

Most clearly this dissertation develops several new wage series based on primary archival data from southern Sweden between 1500 and 1850. This data is sorted into two databases, one for day wages and one for annually-paid wages. Both data sets are extensive; the daily paid database contains nearly 28,000 observations in total, and the annually-paid database almost 24,000 observations, and both include wage data for skilled men and women which is only lightly touched upon in this dissertation.

The data are the basis for wage series for unskilled men and unskilled women, working in day-labor as construction workers and as annually hired workers, in both towns and in the countryside. These are, to my knowledge, only the second set of long-term series developed for workers in annual position in early modern Europe – the others are for British workers from 1260-1850, also for women and for men, by Jane Humphries and Jacob Weisdorf. These new data series are important because they allow for an extension of the new methodological approach developed by Humphries and Weisdorf (2015, 2016) to both a new context, and to a context which is not British. British wage data has often been at the forefront of real wage methodological development, with good reason: many of these papers have questioned what led England to industrialize and experience modern economic growth first. It makes sense to focus on what could have led to such important changes and developments.

But a function of England's exceptionalism is that it is, definitionally, not 'typical' of early modern Europe. Just as it is important to understand the forerunners of economic growth, so is it important to understand the laggers, the regulars, those left behind. These were, after all, the great majority of the European population. This is an important contribution of these data; they allow a similar investigation to Humphries and Weisdorf's papers, but in an environment that is more representative of the more typical and peripheral parts of Europe. This takes cutting edge methodology and a new approach to data and allows a comparison between the development leader and a representative of more typical Europe. This is especially important because both women and men can be part of this comparison.

Day laborers, too, are an important contribution. The data in this dissertation expand the coverage of builders' day wages to a new region, and are the first Danish long term wage series to extend earlier than the eighteenth century. Even when Malmö becomes Swedish in the seventeenth century the wages are still from a more peripheral region than Stockholm, which provides some more nuanced perspective of regional development. The fact that Malmö's development is so different than Stockholm's- as shown below when the new data is introduced, as well as in Gary and Radu (2018), is a clear indication that these regional wage series continue to give an important perspective of wage development.

The database of day labors is remarkable for a few reasons; one is its female population. There are over 1600 unskilled women working in construction, and they are often earning high wages compared to their male counterparts. While this is not a particularly large component of a 28,000 observation database, it is still a significant number of observations on women's casual work, especially in a physical environment, and is an important insight into how women worked.

The other important aspect is that the large majority of the data all come from the same source, and are a complete collection of the data over the majority of the 350 year period. This is not often the case; because of the labor involved in collecting data many wage series are based on samples. Many series are also built on multiple kinds of sources, which can lead to some heterogeneity. Because of the extensiveness and the consistency of the backbone of this database it is able to stand as a more representative component of the casual labor market, which makes it possible to draw extensions from the data such as patterns of labor seasonality (Gary 2018c) which have previously been essentially black boxes. This paper is the first to investigate labor seasonality and the early modern working year using direct wage payment data so far back in time or over so long a period, and is the first to demonstrate changing labor seasonality patterns directly.

Along with new series of wage data this dissertation also compiles two new price series each for Malmö, Stockholm, and Kalmar. These prices series are congruent with the methodology developed by Allen (2001), and represent the cost to support a single man at either a bare bones (subsistence) or a more comfortable (respectability) level for one year. These are useful tools to enable more direct comparison with a growing body of real wages. These price series are also contributions in that they introduce fish, in this case herring, into the price series, which acknowledges the importance of fish to a Scandinavian diet.

Contributions to literature and debates

In addition to new data, this dissertation contributes substantially by producing new information which informs discussions and debates both in a Swedish as well as a broader European context.

Sweden

The data in this dissertation are an important extension of long-term wage data within Sweden, and so allow important extensions of research within Sweden. The results show that development within Sweden could be significantly different based on region. This is especially important because so much of the macro-level statistics for Sweden in the distant past are based almost entirely on data from Stockholm. While Stockholm was the capital and the largest city, it was still relatively small and not very representative of the kingdom as a whole. These investigations into Malmö, a smaller city, and the rural Scanian countryside, are completely new perspectives on wages and development in early modern Sweden.

The data are in agreement with new regional GDP series for Sweden (Enflo and Missiaia 2018), but this series is forced to rely on a benchmark indicator in 1571 and then continues again from 1750, which means that a large period of development and change – including the period when Scania shifted from a Danish position to a Swedish – is necessarily passed over. While the overlapping parts of the regional GDP for Scania and the wage series developed here show similar developments, the wage series which are part of this dissertation make it clear that there was significant change and development within this missing period, which would be improperly represented if the missing values were filled with a linear interpolation. While it is of course hardly surprising that regions develop differently, having concrete data which can be used to trace these developments is an important contribution for understanding the actual divergences and how they interacted with each other as well as macro-level development.

The data in this dissertation are, to my knowledge, also the first series of rural wages based on actual wage data to stretch into the early modern period. Wage data from Jörberg (1972) have relied on market scale rates which are not 'true' wages, but rather a negotiated agreement about what work was worth which was not typically directly paid, but was part of tenancy agreements. The new data presented here allow for a direct comparison with these market scales, which is the first chance to directly assess how well the market scales lined up with true wage rates.

Europe

While the data and the context of this dissertation are rooted in early modern Sweden, the aim has been to address European debates and advancements about wages and well-being for different kinds of workers in the early modern period. There is an especial focus on our methodologies; what makes sense when we measure wages?

The dataset which underlies this dissertation is unique because it represents so many types of work from the same labor market, over such a long period. This gives the opportunity for comparisons which have in the case of England taken many different scholars' many years of data collection, and which have not been possible yet with other historical data sources. As mentioned above, this is also an important chance to look at a more typical and peripheral economy, which is important for our overall understanding of early modern economic development.

The results show a substantial disconnect between the synthetically calculated wages which are earned by day-earners and the somewhat more stable wages that are associated with annual work, which is similar to findings by Humphries and Weisdorf (2015, 2016). At the same time, it also indicates that the methodology for calculating annually-earned wages in these two papers might flatten out both differences between the types of wages earned this way, as well as the development of these wages over time, which is a problem which has not yet been addressed or examined.

Women are a strong component of the datasets in this thesis; while still minority workers, women do appear in both casual construction work as well as annual service work. Because of women's consistent underrepresentation in sources as well as in large-scale quantitative work (though the later has been changing), new data that allow a long-term picture of women's work is always important. These data are especially interesting because it shows women in manual labor working in the cities, as opposed to for example agricultural work, which give a different perspective than much of the work done on women in the past. The findings from these data give more insight into why and under what conditions women worked; here, women seem to be responding to demand forces, working in physical labor during periods when building work was especially needed.

One of the biggest contributions in this dissertation is the insight it provides into the length of the working year for casual workers. The length of the casual working year is a substantial question which has been a fundamental problem in the European real wage literature, and is of course a vital component to estimating what an actual annual income would have been. Previous studies have supplied piecemeal direct evidence on the length of the working year, but most causal workers worked only short periods at each job, so it is hard to work directly from evidence like this. More recent papers (Allen and Weisdorf 2011, Humphries and Weisdorf 2015, 2016) are able to estimate an implicit work year using the relationships between different types of wages and prices; these methods are also used to refine the estimates in this dissertation. But because the data in this thesis cover a relatively extensive part of an urban labor market, it is possible to use the wage payment data themselves to estimate the typical length of the working year, and how it changed over the centuries.

Coverage and context

Early modern Sweden and Denmark[1]

Scania and Malmö were originally Danish, but were ceded to Sweden in 1658. Because of Malmö's proximity to Copenhagen, lying just across the Oresund Sound, the region was heavily influenced by the Danish economy before the territorial

[1]This section draws on work presented in Gary 2014

change; afterward it fell more in line with Swedish development (see Gary and Radu 2018).

At the beginning of the fifteenth century Denmark was dominant in the Baltic region and in Scandinavia, with a strong navy that allowed Denmark to control and tax access to the Baltic. Denmark was an important exporter, especially of grain and cattle, both of which were especially important to the Scanian economy. This trade was strongly connected with the Netherlands, which had an extensive and established global trade network (Petersen 2001). Malmö was an important part of this European trade network, especially in the late middle ages when Malmö's herring market was a European trade destination (figure 1).

Denmark's military control of both sides of the Sound, especially at narrow points both between Helsingor and Helsingborg, and between Copenhagen and Malmö, additionally gave Denmark the uncontested ability to collect duties. The sound tax

Figure 1: Illustration of Malmö, looking toward the Oresund, from Braun and Hogenberg's Civitates Orbis Terrarum*, (Cities of the World) circa 1600. In this etching Malmö is called by the old name used for the town by the Hanseatic League and German traders, 'Elbogen'.The name means 'Elbow' and refers to the shape of Malmö's coastline. Saint Petri's Church, standing tall at the back of the town, is an important source of archival data. Malmö Castle is surrounded by a moat and wall at the left of the image. The importance of agriculture to Malmö's economy is evident in the fields close outside the town walls. From the same vantage point a modern observer would be able to see the outskirts of Copenhagen across the water.*

was an important source of revenue for the Danish state during this period (Myrdal 2011).

In the seventeenth century Denmark lost Scania and neighboring county Blekinge to Sweden. With this loss Denmark also surrendered its absolute dominion over the Baltic with the loss of the cities of Malmö and Helsingborg, located in Scania. As Denmark declined, Sweden's military strength grew, though economically Sweden was still fairly stagnant (Söderberg, Jonsson and Persson 1991). The Danish 'golden era' of trade lasted from 1560 to 1620, though continued at a diminished level through the beginning of the 1640s (Petersen 2001). Sweden claimed Scania and neighboring territories in 1658, and the seventeenth century was known as Sweden's 'Great Power Era', until defeat following the Great Northern War in 1721 ended its period of military domination (Myrdal 2011).

The transition of Scania from a Danish to a Swedish possession seems to have been a relative non-event for the majority of the occupants of the region. A strong indicator of this is the indoctrination of the Swedish language which appears to have been minimally intrusive: as David Kirby puts it, "In all likelihood, the natives of [Scania] gradually came to regard Swedish as the official language corresponding to their own dialect, in much the same way as they had earlier regarded Danish." (Kirby 1990: 283). Rights and privileges of the noble classes were also largely preserved which allowed significant continuity for the upper classes (Gary and Olsson 2017).

Scania was hit particularly hard by the Danish and Swedish wars. As a result population was relatively stagnant in the plains areas, and Scania's population was fairly constant in the sixteenth and seventeenth centuries at about 140,000, even as Sweden's population overall increased (Myrdal 2011: 104). The continuing warfare also led to a general increase of fortifications in Scania and surrounding regions. Kristian IV of Denmark devoted considerable effort to fortifying defenses against the Swedish, including the construction of Kristianopel in Blekinge, founded in 1609 and Kristianstad in in Scania in 1610 (Cermeño and Enflo 2018). The military construction work is clear in the archival records used in this study, especially in work done renovating Malmo castle at the end of the sixteenth century (see Gary 2018b).

Scania has always been dominated by agricultural production both for domestic consumption and for export. While Scania exported grain in the sixteenth century, indicating some degree of expansion, famine in 1649-1650 stopped all exports from Sweden and ushered in a period of grain imports. Famines in the 1690s continued the period of decline. Scania and the other regions that were acquired by Sweden after 1658 were not fully integrated into other Swedish legal regulations - for example, Scania was able to continue its international cattle trade even when it was banned in the rest of Sweden (Myrdal 2011: 107).

In Sweden, Stockholm was the most important commercial city, but did not become the administrative center of Sweden until the seventeenth century, after which it gained increasing prominence. Sweden was in a state of financial crisis through the eighteenth century and so Stockholm was never an opulent city. Stockholm was not as directly impacted by battle as Scania was, which likely did not increase the demand for fortification and military building as warfare did in Scania. However, Stockholm's position as a growing European capital and naval port did mean that there was considerable demand for construction and shipbuilding (Oakley 1992; Söderberg 2010). The seventeenth century especially was one of construction and physical growth. This was typical among European capitals and major cities, including also Copenhagen. Much of this construction and administrative expansion was in response to political turbulence and continual military conflict and Sweden's militarization during its period of military strength during the seventeenth century (Söderberg 2010).

Territorial losses and military defeat after the Great Northern War in the early eighteenth century marked the end of Sweden's position as a European military power, though Sweden attempted several times throughout the eighteenth century to regain its former position. The loss of territory decreased Sweden's capacity for income, leaving the kingdom in an increasing state of indebtedness; the Crown was bankrupt, short on revenue, short on ways to create revenue, and short on ideas of how to solve their problems. Added to the lack of funds was significant financial instability; the government lacked any long-term, of even any short term, planning and recent political decisions had put it at odds with the international community (Karonen 2008).

The eighteenth century was not the best for Sweden as a whole, as Stockholm and much of Sweden continued to stagnate, but there were some improvements by the end of the century. At this point Sweden and Scandinavia were emerging as leaders in Europe's developing knowledge economy. Sweden had a remarkably high literacy rate, was the first country to hold regular censuses in the middle of the eighteenth century, and was the first country to introduce banknotes in the same century (Edvinsson and Söderberg 2010). By 1686 Sweden had already introduced pioneering laws that were aimed at increasing literacy (Baten and van Zanden 2008), and a trend of rapidly increasing book production through the early modern period, as Swedish per capita book consumption jumped from 1.1 per 1000 in 1500-49, well below the majority of Europe, to 214.1 per 1000 in 1750-99, second only to consumption in the Netherlands (de Pleijt and van Zanden 2016).

Despite the increase in human capital it was not until the nineteenth century that Sweden began to recover economically and to enter into sustained economic growth. The shift occurred first in Stockholm with wage and GDP growth from the early decades of the 1800s (Söderberg 2010, Söderberg , Jonsson and Persson 1991).

Labor organization in early modern Sweden and Denmark

This dissertation deals with several different types of labor; casual labor and labor for those on annual contracts, both urban and rural, and for women and men. While many conclusions depend on comparing wages from these different earned types, the wages tend to refer to different kinds of work and institutional traditions. The following sections outline different forms of work and how they fit into a broader society.

Rural employment

Lifecycle employment – rural annual contracts

Early modern Sweden, like much of Western Europe, was characterized by a cultural norm of lifecycle employment; that is, different kinds of work and employment were associated with specific life stages. Lifecycle employment refers to a pattern of young people working in service during their late teenage years and into their mid-to-late twenties. If they are able to save enough to afford marriage and establishing their own households they stop working as servants and take over a farm or household of their own. Young adults worked for several years, usually moving between farms, until they built up enough savings to afford to establish their own households. The lifecycle servant system relied on a rural European society and a system in which there was a substantial as well as a fairly stable need for manual farm labor. Peasant children worked at home on their parents' farms, and as teens typically moved out and worked as domestic and farm servants for other peasant farms. In Scania children tended to leave home between ages 15 and 20 (Kussmaul 1981, Dribe 2000, Uppenberg 2017). The age of marriage was relatively late, often not until the late twenties, and many never married at all because of the expenses associated with household establishment. Those who married and established their own households were typically able to reach the same economic and status level as their parents (Dribe 2000), though many who were not able to marry ended their lives in poverty (Uppenberg 2017).

In Sweden, young unmarried persons were required by civil statute to enter into annual domestic service if they had no independent means of support; those not in service were called to a magistrate to prove that they had a legitimate reason for not being in service (Lindström et al 2017). This obviously had huge influence over work patterns and strongly reinforced a life-cycle pattern of service. This, in turn, means that neither women nor men were particularly free to make the calculation of whether they preferred to work in casual labor or annual service – this differentiation was predominantly dependent on marital status.

These servants would have been the typical annually-employed, low-skilled workers, especially in the countryside. Servants would work both inside and outside, as domestic and farm hands. On larger farms or estates the labor was more likely to have been divided and specialized, with a stronger gender segregation – this is clear in the data used in this dissertation, as well as consistent with patterns found in other work (e.g. Lindström et al 2017). Unfortunately the vast majority of households where servants would have been employed were farms from which no records remain – the rural data on annual employment in this dissertation rely on data from manorial estates, which both employed more people and kept more thorough records than more typical households.

Servants lived in with their employers, as more or less a member of the family, and were expected to eat the same food and live in the same spaces as the nuclear family (Kussmaul 1981). This seems to have been respected as the norm, as there are instances of servants taking their employers to court when they did not feel they were receiving acceptable treatment, often in the form of poor diet and board (Uppenberg 2017).

This lifecycle pattern was common among almost all of the social classes in rural areas, though the children of the landless were more likely to leave home at earlier ages and so are likely more represented in the young servant class (Dribe 2000). It is also possible that children of wealthier families would have access to more desirable positions, such as manor houses and larger estates (see Kussmaul 1981); however, this may have been less likely in a Swedish context, as freeholder peasants, typically the wealthier group, may have been more keen to preserve their independence from the manorial system.

Servants were highly mobile, but only within a limited range. Most servants stayed at a position for only one year, and the vast majority of stayers did not remain for a third. Kussmaul (1981) finds that, in England, although hiring fairs typically took place on the county level, which would imply that in theory servants could be hired across counties or even further, if the servant lived at the nexus of two counties, in practice servants took up a new position near to their previous position, which was in turn near to their place of origin. Dribe (2000) confirms these patterns in nineteenth century Scania; almost sixty percent of servants stayed at a place of employment for one year, with an additional twenty four percent remaining fixed for two years. This is slightly less mobility than what Kussmaul identifies in England. In the four Scanian parishes studied by Dribe, seventy-eight percent found a new position within fifteen kilometers of their previous appointment, and only three percent relocated to a town from the countryside (Dribe 2000, pp 138). This is important; even though the society as a whole was highly mobile, there was not much urban growth or influx of young people into the cities.

There could be quite a degree of homogeneity of wages and perquisites between different employers, so servants would probably not have gained an extraordinary degree of material improvement by changing situations. But as Kussmaul (1981) highlights, changing employers could be a way to find a more desirable position, to expand one's skillset, and to expand one's social network and marriage network. Kussmaul also emphasizes that frequent changes could be a strategy for young women, especially, to ensure that their servant-master relationships did not become too close and that they were less open to sexual predation. Too, moving frequently was a way to end relationships with employers or employees which had not been satisfactory, for whatever reason. Regardless of the underlying reasoning, frequent and regular mobility was intrinsic to the servant institution and early modern peasant economy.[2]

Manorial labor organization

Along with servants in annual employ, a system of corvée, or semi-coercive labor taken as part of the rental contract, covered the majority of the agricultural labor needs in Scania until the later part of the eighteenth century. This means that even in the countryside there is very little casual paid labor in agriculture. This is counter to other European economies where wages for casual agricultural labor are a frequent focus of wage studies (see for example Burnette 2004).

Scania, the region under study in this dissertation, was a relatively manor-rich region. At the end of the medieval period about half of Scanian farms were under the manorial system (Olsson 2006). There were three classes of peasant farmers, and each group had at times different rules and regulations. Peasants could be tenants of the nobility, of the Crown, or could be freeholders. Noble estates were the most likely to implement a corvée system, and so to not have many paid days of casual labor. Scanian Noble estates were considerably larger than those throughout most of the rest of Sweden, due largely to a tendency of consolidation throughout the early modern period (Gary and Olsson 2017).

Due to Scania's history as a Danish province the county maintained several aspects of Danish noble privileges, which translated to restrictions on the peasantry. The extensive corvée system was part of this. In the sixteenth century noble Scanian estate holders gained the right to evict tenants who would have previously expected to enjoy lifetime tenancy (Olsson 2006, Gary and Olsson 2017), and were also able to restrict the mobility and freedom of location of peasants who lived on their estates during portions of the seventeenth and eighteenth centuries (Olsson 2006). Tenants on Crown land, however, had stronger tenancy protection throughout the period, with de facto property inheritance rights from the seventeenth century. This meant

[2]Though there were of course exceptions: Lindström et al (2017) discuss a woman who had been with the same master for twenty years and intended to continue to work in his service (pp. 225).

that many farmers who lived on noble land might have somewhat precarious guarantees and protections.

Scanian estates extensive corvée system was to a large extent unregulated. This labor was what produced the output on the manorial demesne, or the manor's own land, which would then be sold on the market. In the later medieval period and into the sixteenth century the Scanian manors were primarily dependent on rents paid by their peasant tenants for income, but from the mid-seventeenth century they relied more or less equally on rental incomes and income from the demesne, the lands cultivated for sale directly by the manor. The importance of the demesne for manorial income continued to grow as agricultural output itself increased, and from the mid-eighteenth through mid-nineteenth century manors became almost wholly dependent on the income generated from the demesne. This meant that tenant labor on the demesne also became increasingly important. This increased the work load on those tenants, and left Scanian peasants who were subject to corvée systems with some of the highest labor dues in Europe (Olsson 2006). Figure 2, taken from Olsson 2006, shows this drastic increase in labor requirements.

The raising of corvée dues meant that tenants needed to hire additional labor of their own in order to meet their labor dues. Estates, too, increased their labor force, hiring larger numbers of day labors as well as married farm hands, called *statare*. The increasing importance of *statare* in the nineteenth century in some way allowed for a continuity of employment possibility for those groups who would have been

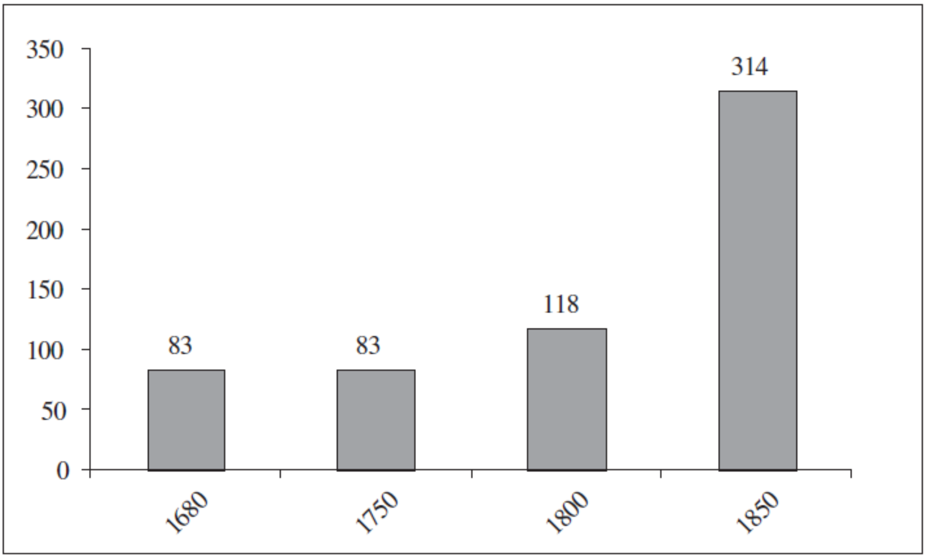

Figure 2: Corvée on Scanian manors 1680-1850. Average number of workdays per tenant and year. From Olsson 2006

peasant tenants before the largescale evictions. However, the increasing dependence on day laborers was a new development, and a departure from previous centuries when the corvée system had met Swedish agricultural labor needs without the need for additional seasonal labor.

Urban employment

Domestic service

Like the countryside, the most common employment for young people in the cities was typically as domestic servants in other people's homes, though means of support could be varied and from multiple sources. As in the countryside labor was typically divided by marital status, especially for women (Ågren 2014b). Unfortunately, like domestic servants in the countryside, the vast majority of records for this type of worker do not survive.

City employees

The early modern period was an important period of state formation in Sweden. This process led to an increasingly bureaucratic state, and the role of towns as employers consequently grew. This is readily apparent in the data itself; new jobs appear in the registers over time and more people are hired by the cities per position. This increase was necessary not only as municipalities themselves grew but as the role of formalized taxation became increasingly important as a mechanism for funding the state apparatus (Ågren 2014a). This increased employment led to a large number of low level officials tasked with carrying out the more mundane tasks of the city and taking care of the town; it is these types of workers that make up the urban annually employed sample in this dissertation.

While in the late mediaeval and into the early modern period performing the duties of a civil servant was the purview of only the nobility, the state formation process necessitated an expansion of positions beyond what members of the nobility could fill. Many of these jobs were also not as glamorous or as well-remunerated as more traditionally noble-held positions and so they held little appeal for people of higher standing. More middle class workers filled these roles, especially during seventeenth and eighteenth century expansions. In theory, someone entering into civil service would have needed to have some access to ready capital in order to facilitate the cash-based nature of the job and the frequent need of the state to draw on its offices for loans. These positions could be a path to increasing personal wealth, but could also lead to personal debt and destitution (Ågren 2014a).

Ågren (2014a) pays particular attention to customs officials, who were a large component of this growing low-level bureaucracy. Unlike in England, for example, where state employed tax collectors were fairly specialized and had some degree of theoretical knowledge, Ågren claims that the Swedish counterparts were only basically educated, very unspecialized, and roundly disparaged by the citizenry. The job was neither well-paying nor particularly prestigious. In the same article, Ågren emphasizes the importance of wives' financial contributions to households in which the male head was employed as a low-level civil servant; without significant income from wives and other members of the family such employees would not be able to support their households.

Urban casual labor

Casual labor in the cities could take many forms. In this dissertation all casual labor is in construction work. This was of course not the most common occupation, but it is the one which has survived most consistently in archival sources throughout Europe. This has made casual construction work the de facto norm for estimating wage development throughout early modern Europe.

Hawking and selling textiles was a common occupation for women, especially married women who had to supplement low male incomes. Ågren (2014a) discusses one wife of a toll-collector who earns a considerable portion of her husband's income making bread in other families' homes, somewhat bridging the gap between the domestic servant marital divide. Other women produced and sold cloth within the city. The importance of women engaging in small-scale service continued throughout the early modern period, and was still an important (and regulated) source of female income well into the nineteenth century (Bladh 1992). Other small-scale tasks, such as running errands, making deliveries, or providing childcare could be other ways of making ends meet (Ågren 2014b). Most of this labor flies below the radar, and is not easily retraced.

Studying women's employment

Women's work and income have been often overlooked and discounted. This is true both in reference to historical sources and how they record women's or household labor, and for professional historians, economists, and economic historians, who have taken it for granted that women did not work in certain fields in the past, or that women were constrained to work in the home. A recurring criticism of conventional real wages studies is their focus on men's income while ostensibly measuring household-level well-being; this has been a criticism of the Allen-style baskets in particular, since this measurement explicitly attempts to measure well-being at the household level, including the consumption needs of women and children (e.g. Humphries 2013).

Recent work has shifted this position considerably; it is increasingly acknowledged that women worked in similar patterns as well as tasks to men (e.g. Lindström et al 2017, Humphries and Sarasúa 2012). This is of course reasonable on an intuitive level; in a rural and agricultural society there would not be a large degree of flexibility in what work needed to be completed or when. But women's work still tends to be hidden, often subsumed with male work or domestic or unpaid. Men's work, too, was often similar in nature, but some of the differences have led to its stronger preservation in written records.

One of the major difficulties in measuring or reconstructing women's work has been how many missing variables there are with regards to women, such as labor force participation or market work attachment outside the home outside of a small number of specified and in-depth studies. This is largely the case for men as well, but the literature has been willing to make more assumptions about men's work in order to develop more streamlined methodology than it has about women's. Without firm evidence investigators have been reluctant to include women in macro-series which currently only represent men.

However, the inclusion of women is quite apparently vital for understanding total household well-being. Household labor market attachment and who worked inside and outside the home changed substantially over the centuries. These changes developed both temporally, as styles of agricultural and economic production changed (Pinchbeck 1930), as well as cyclically, as social preferences and domestic ideals changed (de Vries 2008).

This exclusion of women (and children, though they are not discussed in this dissertation) was especially problematic when studies are very long-term, since the ways in which households organized themselves in relationship to the labor market changed substantially over time. De Vries (2008) for example founds his argument on the changing patterns of household consumption, industrious behavior, and changing labor regimes on the changes between women working primarily in the domestic sphere and primarily outside the home for money. These shifts occur over centuries, and the 'norm' has changed several times – clearly not only are women important, but women's contributions are not constant and cannot easily be assumed without further empirical investigation.

Unfortunately this dissertation is not able to make the leap to develop a stronger and more inclusive estimation of household level income and living standards. However it does make a significant contribution to the long-term and quantitative investigation of women's wages and earnings.

The importance of women's economic participation and of their contribution to family well-being is well established by historians of women's work and labor. This literature has not developed in as linear or methodological way as real wage studies, for example; there are important and novel contributions which continue in many forms. The literature about women's work and labor force participation tends to be localized and in depth. Many texts are largely qualitative, or combine smaller and localized quantitative investigations with large amounts of qualitative information. Because of this, this section will cover some of the most noteworthy studies of women and work, with particular attention to women working in physical labor and in early modern and rural contexts. Though the work in this vein has been extensive, it has still been slow to bring women into the mainstream.

Ivy Pinchbeck already in 1930 wrote an exhaustive study on the impact of industrialization of women's work, wages and income, and household attachment. One of the earliest and most impactful changes was due to changes in agricultural technology and organization, especially the shift to enclosures from the older common field system. This is an impact that we are more likely to see in early modern Sweden as well. Pinchbeck describes the preindustrial (and pre-enclosure) system as one in which women's labor was crucial not only for the family's comfort and home life, but for their financial well-being. Women's use of the agricultural commons and kitchen gardens to raise dairy cows and grow extra vegetables provided both dietary and nutritional variety and steady income to the household. When the commons were eliminated women and poor households lost access to this vital land, which changed the nature of household market-orientation. With women less able to provide for their families in more traditional and non-market ways, their paid market labor became more important. However it was also difficult to access market work from the regions which would have been so predominantly agriculturally oriented.

More recently Burnette (2008) investigates women working during England's industrial revolution. This text is in many ways a culmination and expansion of much of her earlier work, building on extensive archival investigations of wages and employment throughout the major labor markets both changing and emerging during England's industrial revolution; she uses this expertise to explore what biological, cultural, and institutional factors influences women's relative earnings and access to paid labor. The major focus is the driver of the gendered wage gap: why did women earn less, and what kept it this way? The primary conclusion is that women do earn less, but at least in traditional and unskilled occupations this is largely reflective of women's lower efficiency: the average woman does not have as much upper body strength as the average man and so could not be as efficient in occupations or tasks which depended primarily on physical strength.

This led to occupational segregation in occupations like farming, where different tasks required different degrees of strength. The tasks that women worked were typically paid less than men, though Burnette claims that they were still typically paid fairly in relation to their productivity. According to Burnette, this segregation actually lowered the gendered wage gap, because it allowed women to be relatively more efficient than they might have been in more strength-dependent tasks.

The situation was less straightforward in skilled occupations and in unskilled work which did not require strength. Within skilled trades generations of guild, and later union, leadership worked to protect their trades and wages against competition from female workers, and they often still were able to protect against this kind of competition because women often did not have the same human capital opportunities as men. In less skilled trade which did not require strength union leaders tended to lose out to more capitalist-oriented owners who were eager to profit off of the lower wages they were able to pay women. The trades which most completely were able to remain sex-segregated were those which were customer-facing; for many services consumers' own discrimination removed financial incentives to hire women, since customers were not interested in paying for their work.

Ågren's (2017) recent edited volume is an impressive new insight into the multiplicity of work and the complex divisions of labor within early modern cities. Work patterns were incredibly diverse and multifaceted, both between and within households. The focus is on Sweden, and a large proportion of the data come from Stockholm, but the broad coverage over the entire country and different kinds of working and living environments mean that the conclusions are broadly applicable. This research makes it clear both how indistinct work categories were, but also how the entire household was mobilized in order to bring in enough income or supplies to support the family.

Quantitative investigations have often focused on women's labor force participation, and the disparity between official census records and the actual participation rates shown by employment registers. Horrell and Humphries (1995) and Humphries and Sarasúa (2012) trace women's labor force participation using alternative sources to demonstrate the complexity and extent of women's work during the industrial revolution and before and individuals' contribution to household income. Together these papers, and others, make the case that women have been overlooked and undervalued as economic participants and income earners in the past.

There have also been strong theoretical assumptions about what determines or places constraints on women's work. Traditional models tend to emphasize the supply side of female labor, and this has carried over into more recent literature as well. These approaches focus on women's marriage and role as mothers as impediments to waged work, especially work that takes place outside the home. Humphries and Sarasúa (2012) argue, as do I in the second paper in this dissertation, that women were strongly influenced by demand factors when they made decisions about entering the labor force and reacted to labor market conditions when deciding to work or not.

Mainstream economic historians are beginning now to take more notice of women working in the pre-industrial period, but these typically are still understood as specific studies as opposed to 'general' real wage series; unfortunately the field seems to still be divided into 'economic history' and 'women's economic history'. There are many highly informative investigations and they have covered many labor contexts, including the Netherlands (van Nederveen Meerkerk 2010), Sweden (Stanfors, Leunig et al. 2014), and England (Burnette 2004, van Zanden 2011).

Humphries and Weisdorf (2015) develop perhaps the first long-term study of women's real wages which is constructed in a manner which is intended to be directly comparable to the real wage studies which have long been used for men. The series covers both casually and annually employed women in England in a variety of unskilled positions 1260-1850.

Development of real wage studies

Early real wage studies

Real wage studies have been one of the most used tools to estimate changes and trends in well-being, economic development, and living standards. The fundamental principle is simple: to measure the wellbeing of a group of workers, usually a group which represents a 'typical' worker, by calculating what they could buy with their wage. This is a simple indicator of well-being and living standards which is much more local or specific than GDP, for example, which can only be calculated on a national level. The ability to break down real wages on different levels and by different regions make real wages a very valuable tool for examining the differences between groups. This more precise measurement makes real wages particularly suited to a period such as the little divergence, during which international as well as intra-national inequality was increasing substantially.

However, there are several ways to estimate real wages. Perhaps the most substantial differences between methodologies during the earlier literatures is the denominator, or the way in which prices or cost of living is calculated. Perhaps because of this, along with data limitations regarding the types of wages which have been used, the denominator or consumer price index (CPI) has been the component which has been most debated and altered over the past century of wage studies. Debates about the CPI or deflator have centered both around the correct methodology to best estimate the CPI, as well as what exactly the CPI or price index should be measuring.

Worthy of note is that many of the methodological problems highlighted in early studies are the same with which modern scholars still struggle; it is an unfortunate fact of historical research that some data will never be complete or available to researchers. Phelps Brown and Hopkins, in their seminal 1956 paper on British builders' wages from 1264 to 1954, begin with a list of problems familiar to any modern researcher of historical wages: lack of information about the number of days builders worked in a year and about other sources of income; almost no data about the cost of rent; price data from primarily wholesale transactions, not the retail prices that these workers would actually be facing; and only piecemeal information about household consumption and diets. These problems and their implications on our interpretations will be discussed in more detail later, but for now it is important to realize that most of the differences between the different real wage studies are authors' attempts to combat the same set of problems, all rooted in the lack of historical data and information. Another common theme is the use of builders' wages as the numerator in real wages estimates: Builders' wages were probably initially used because of their comparative availability in the historical record, but the construction work they represent is also fairly comparable throughout Europe and throughout the early modern period, which makes it continually appealing for modern researchers who value international comparability. Later sections will also discuss what this has meant for how real wages and well-being have been estimated, but again, for now, we will discuss the development of these wage studies.

A full review of real wage studies is not possible; even Elizabeth Gilboy in 1936 comments on the vast number of studies already published. Instead this section will walk through the studies which have furthered methodological approaches or spurred significant debates. Because of a number of factors, including language, the strength of British economic history, and England's history as the first industrial nation, the overwhelming majority of these studies investigate British real wage development. This does not mean however that there have not been other studies on other parts of Europe and the world.

The historiography of historical real wage studies can be divided into three main periods. First, the early periods from the 1930s through the 1960s. This was the period when national accounts and macro-style data series were first being developed and used systematically, and real wage studies also became more systematic and scientific. During the second phase, from the 1950s and 60s into the 1990s, early historical real wage series from England were revised heavily, and series for many other countries were developed. However, the methodology and approach were largely unchanged. In the third period beginning in the late 1990s and early 2000s the most important developments were changes in methodology and efforts to expand the notion of real wages to include different types of jobs and workers than earlier series, with the hope of better representing the development of living standards and economic development.

Historical wage series were first developed in earnest using British data, as is the case with many parts of economic history. Elizabeth Gilboy is one of the first scholars to develop long-term historical wage series, and then real wage series incorporating a price index, covering eighteenth century England (Gilboy 1936). She used the wages of construction workers, including "bricklayers', masons', paviours', and plasterers'" wages to represent the wages of "common labor" (pp 138); using wages from the building sector is still standard for wage data used in modern real wage studies. However, most of more recent series separate unskilled workers from the groups of more skilled workers such as masons which are folded into Gilboy's series.

Giboy separately compiles wages for London and for Lancashire, highlighting the different developments in London and in the north of England, and also highlighting one of the benefits of real wage studies for regional analysis. The wages are only recorded as day rates, as is typical in the data. To deal with this Gilboy transforms the wages into an index, and divides the wage index by the price index with a base year of 1700.

Gilboy's price index is also not so far distant from what modern scholarship develops. Gilboy creates an arithmetic mean of thirty price series, with weights for each of five commodity groups: cereals; animal products; candles and coal; beverages and condiments; and clothing, based on detailed budget reports from the eighteenth century (pp. 135).Her prices come from a combination of wholesale and retail prices – she discusses the difficulty of finding retail prices in the historical record, a problem which still frustrates researchers today. Unlike some more modern deflators (cf Allen 2001, discussed below) Gilboy's 1936 index contains some very specific items, such as raisins, felt hats, and biscuits – this leads to a more detailed index which is more likely to reflect actual consumption, it also makes the index very specific to time and location, and so harder to use in a comparative context.

Phelps Brown and Hopkins (1956) expand British historical real wage coverage with a real wage series from 1264 to 1954 – though they take pains to clarify that it is not a 'proper' real wage series due to the lack of information on a typical work year for the wage earners in their data, among other issues.

Their price index incorporates six, instead of Gilboy's five, component group, though the groups are essentially the same, and the foodstuffs comprise of eighty percent of the index. As one might expect, the data are not available for every commodity for the entire time period. Both because of this and because the authors intentionally change the components of the index to reflect changing consumptions, tastes, and availability, the price index is not homogenous for the entire period. However, the relative quantities in each of the main categories in the index remain constant; while this provides continuity in calculation, it is also at times misleading;

as the authors point out, when wages fall, as they did in the sixteenth century, consumers would naturally buy less of high-priced commodities such as meat and would instead substitute toward cheaper food sources (pp. 303).

Consumption is based off of household budgets from contemporaries; the quantity and value of the price index is set at what one hundred pennies could buy in the period 1450-1475. When commodities are replaced, new commodities are incorporated at the volume that the cost of the departing commodities could purchase in the base period, in order to maintain as much continuity in the purchasing power as possible.

Twentieth century debates

During the 1970s through 1990s there was a lively and persistent debate over what happened to British workers' living standards during the early modern period, especially during industrialization and into the early decades of the nineteenth century during the Napoleonic Wars. This phase was dominated by close attention to data specifics and to data collection, as well as debate about the correct mobilization of existing methodology; however, there was little fundamental innovation in the basic methodology itself.

The debate went back and forth between groups self-styled as 'optimists' and 'pessimists'; each side, rather self-evidently, with a different view of how the working class fared during England's industrialization. Optimists, including Lindert and Williamson (1983), maintained that the wages of workers in the early nineteenth century grew faster than the cost of food, and so blue collar workers experienced a substantial increase in material well-being during this time. Pessimists, such as Feinstein (1998), instead held forth that wages and prices grew more-or-less in tandem, and so there was literal material gain while the upheaval and uncertainty due to changing markets likely pushed down overall well-being. This back-and-forth stimulated the creation and reevaluation of several real wage indices and price deflators, attempting to get most accurately at the 'true' costs to and income of the working classes.

These debates were characterized by detailed and technical discussion about the correct application of index bases years and weights, as well as the proper index style to use, as well as increased precision in the cost index contents and weights (see discussion in Flinn 1974). Many of the differences between authors' estimates of well-being could be attributed to differences in how prices were indexed. Choice of base years had a huge impact; Feinstein (1998), who wrote the final major article in this debate, on the side of the pessimists, partially attributes the rise of living standards during the first part of the nineteenth century reported by (optimistic) Lindert and Williamson (1983) to their use of 1851 as a quantity-weight base year for the entire preceding century (Feinstein 1998 pp. 641). At the same time there was an emphasis on precise data measurement; for example the proper textile commodity prices formed a minor sub-debate (Lindert and Williamson 1983, Feinstein 1998).

Flinn (1974) criticizes what emerge as a heterogeneity in approaches, calling the collection of base years as well as the differences in composition and weighting of price series "not particularly helpful" in directly comparing results or in reaching a consensus; the problem was especially significant when years of political, but not price- or wage-related significance were selected as cutoff dates, which Flinn felt gave undue weight to unrepresentative or misleading periods (pp. 396).

In the 1980s and 90s there was also a strong inclination toward a multidisciplinary (or at least multi-data driven) approach toward the standard of living debate. These papers will not be discussed here, but during this period wage historians increasingly turned toward anthropometric data such as heights as well as mortality data to confirm (or refute) the evidence of wage and price developments. Crafts' (1997) application of the Human Development Index to the historical standard of living debate is a good example of the integration of many different factors and variables into a cohesive measure of well-being – however, it, too, is sensitive to re-weighting of the sub-indices, to the point where alternative weights return different results.

This multidisciplinary perspective was motivated by an expansion of the well-being discussion to include information reflecting living standards and life experience such as urban health penalties and disease load, which might offset increases in well-being indicated by real wages alone. Increasing consumption of previously luxury goods such as coffee and sugar are also taken as important 'non-quantitative' indicators of increasing well-being.

This period was essentially brought to a close by the work of Allen (2001), who devised a system of real wage estimation with a more concretely-interpretable index number which was designed to be broadly comparative across time and space – this reflects the growing global and comparative perspective in the practice of British economic history. Allen developed a 'basket' of goods which broadly comprised the necessary costs of keeping a household running over the course of the year. This basket is much simpler than what had previously been calculated for British workers – for example, the cost of rent is assumed to be five percent of the cost of the rest of the basket, and is added as a simple inflation; in contrast Feinstein (1998) calculated the cost or rent in Britain by using tax assessments and poor relief records to estimate the aggregate cost of rent for all of Great Britain, which he divided by the number of occupied homes. Additionally, the basket contents intentionally are not altered over time – this subverts other previous problems with how to model changing consumption patterns. Instead, the basic consumption patterns represented in the price series are intended to represent a theoretic base-level of well-being, with the understanding that workers and consumers could and would substitute for higher quality and variety of products instead of simply consuming more of the basic essentials. While commodities reflect consumption patterns to some extent, and make substitutions for different products consumed in different parts of Europe, the theoretical base of the consumption baskets is based to a large extent on nutritional and caloric needs. These simplifications were important for Allen's primary purpose, which was to compare the development of many countries over a long time span – the data load of the more sophisticated indices is too high for many regions, and the changes in composition and complications that come with a pure index introduce too many variables to make a clear or direct comparison particularly useful.

In the first iteration of Allen's work the household is assumed to be a man, a woman and two children, which is assigned a level of consumption equal to the costs of 3 adult men; however later critiques have led to different weights being assigned to reflect a household's likely higher caloric needs (see for example Humphries 2013).

Men's day wages are multiplied by the number of working days that an early modern casual worker was assumed to have worked – this it taken as the annual income. Both values are calculated in the local currency, without conversion to silver prices, as in van Zanden (1999), or index values, as virtually all other previous methods. The income is divide by the cost of supporting a household, which gives a number representing how many 'consumption baskets' the income could purchase a family over the year. This resulting number is both intuitive and easily comparable, which has led to this methodology becoming the standard since its introduction. However, Allen's approach has not come without criticism or commentary. Much of this will be discussed in the next section.

Recent studies

Real wage studies have gone through two primary phases: first was a wave of primarily British studies meant to measure how certain groups fared during different periods of economic development. More recently the predominant focus of real wage studies has been to compare development between different countries, cities, and economies through important periods of development and divergence. Real wages used in this second manner have been a vital tool for measuring Europe's Little Divergence, when Northwestern Europe grew increasingly wealthy, 'diverging' from the rest of the stagnating continent.

Van Zanden (1999) undertook one of the first broadly comparative European real wage studies, which compared wages across Europe from 1500 through the nineteenth century. He used the price of local grain to deflate the daily wage rate, resulting in a measure of how many liters of grain an unskilled day laborer could buy in a day. This was an important step toward broad comparability and toward an index number with some tangible interpretation, but at the same time the interpretation was somewhat difficult. Deflating by grain prices gives an impression of inflated living standards to regions where grain is produced, and therefore cheap; these regions in some cases correlate with areas which are known by other means to have been among the poorest, such as Poland, in van Zanden's study, and Sweden when studied with a similar method (see Gary 2014).

However, Allen's (2001) study shifted the focus of real wage debate and study to this more broadly comparable. Because his price deflator is not meant to 'perfectly' represent consumption, it is methodologically simpler to take it as an indicator of baseline needs, and so interpret the resulting index as a bottom level for consumption-based well-being. This simplification both lowered the data load for real wage studies and created a comparative framework which spurred an outpouring of real wage studies from across Europe and, increasingly, from around the world. Most of these studies have followed the framework of Allen (2001), though many make some adjustments for local differences in diet or standard commodities, as did the initial study. However, this section continues to focus primarily on those studies which were the most methodologically innovative.

The most recent studies of real wages and waged work have for the most part taken a departure from the more classic approaches in an attempt to capture a larger part of the working population as well as reflecting living standards more accurately. These involve critiques of Allen (2001) and attempts to adjust his methodologies to better reflect actual caloric needs and work patterns, as well as attempts to include women and children; to take into account backward-bending labor supply curves and workers' preferences for leisure; and to incorporate workers other than casual day laborers, who would not have been the 'typical' early modern worker.

Perhaps the exception to the new direction of real wage studies is Clark (2005), who collected a large quantity of new data to update the builders' wage series – most studies after this use his nominal wage series, together with some version of Allen's (2001) price series for England, when examining British wages.

Other studies have sought to address long-standing problems inherent to the real-wage methodology, often caused by missing data and information. One of the primary and longstanding problems with real wage series as they have been computed is that they have relied on the day wages of (typically) construction works. This is because of the relative availability of day (or 'casual') wage data, and because it is also usually more straight-forward than wage payments for servants who received their compensation largely in the form of room and board. The majority of workers who were not self-employed likely worked for a small cash supplement on top of room and board, and imputing the value of the compensation in perquisites has been challenging.

To deal with the problem of valuing room and board, Humphries and Weisdorf (2015, 2016) add the cash value of the Allen-style price basket to the cash wage which annually-employed workers received to approximate the full value of compensation. They have applied this methodology to wages for both women (2015) and men (2016), with both studies showing a substantial difference in development for wages earned by the day and by the year – this further indicates that a closer look at the way we treat day wages and the assumptions about the working year should be taken. The shifting relationships between the amount of casual work days needed to make a respectable living or to meet the equivalent of an annual salary also show a dynamism in early modern work patterns which requires closer attention.

A huge piece of missing information has to do with the length of the working year, and the extent to which casually-employed workers would change their work patterns as a function of how high day wages were – essentially, was there a backward-bending supply curve, with laborers only working enough days to meet their basic subsistence needs, or did laborers tend to work a regular or fixed number of days every year?

Allen and Weisdorf (2011) invert the standard (Allen 2001) approach to measuring real wages, which multiplies the average daily wage in a given year by a set number of working days. This number of work days is largely an assumption based on somewhat better-known patterns form later periods. Instead of calculating real wages, Allen and Weisdorf calculate how many days an unskilled man would have needed to work in each year to meet his and his family's basic consumption needs; instead of dividing the wage by the basket, the basket is divided by the wage. They find that their 'implied' working year, derived from the days of work needed to get by, is reasonably in line with the independent estimates of the working year which are available – this does indicate that laborers worked more to meet consumption needs than to increase incomes in order to consume at higher levels.

However, Allen and Weisdorf (2011) continues to frame the working year as a supply-side decision, in which workers are able to decide themselves whether and how much to work – however working days must also depend on the availability of work and demand from employers. The final paper in this dissertation examines the seasonality of paid work days in the unskilled construction sector to estimate the actual demand for construction work over the period 1500 to 1800. Because the paper relies on actual data it is able to uncover more about the working year of causal laborers than other studies in the past, indicating that casual labor was very seasonal and not available in large enough quantities to meet the assumptions of Allen-style models, as well as showing that seasonality increased farther back in time; of these findings indicate that further adjustments may be necessary to properly model the differences in working patterns and work availability both regionally and temporally.

There are other important efforts which have been made to improve our use of data and methodology in real wage studies. Stephenson (2017) conducts another important study in this area, reexamining the archival material and organization of the data which underlie the British casual real wage series. She finds that the wage data that have been used to estimate British real wages during the industrial period actually include a substantial markup for contracting fees, which has not been realized or acknowledged in previous studies – this would indicate that the true wage level could be as much as twenty percent lower than what real wage historiography has relied on in the past.

Real wages in Scandinavia

There have been a few long-term real wage studies on Scandinavian data. However, these have tended to either be shorter term, beginning in the eighteenth century, or used an index which is not directly interpretable or comparable.

Sweden has perhaps the best real wage series of the Nordics, with a series of builder's real wages stretching back to 1730 published already in 1987 (Söderberg 1987) and subsequent improvement and expansions back to 1365, but with a more-or-less continuous series from 1500. These series are all based on data from Stockholm, predominantly compiled and made available by Johan Söderberg – these data are also used in this dissertation to estimate welfare ratios for Stockholm. Söderberg's study describes a Malthusian system without any sustained economic growth up through the beginning of the nineteenth century, a pattern in line with Allen's (2001) and others' description of the peripheral economies during Europe's little divergence. These wages are estimated using an indexed CPI.

Danish series of 'absolute' real wages have been published for the period 1731-1913 (Khaustova and Sharp 2015) and with an indexed deflator from the late medieval period (Abildgren 2017). The wage and price data which underlie these series are fairly heterogeneous, covering different types of work and different parts of Denmark during different periods. Khaustova and Sharp (2015) apply Allen's (2009) methodology to already-published data, and find that Danish laborers were poor, like much of the periphery, through the eighteenth century and maintaining a comfortable family living would have required several family members to work. Danish male workers rapidly caught up with leading economies in the nineteenth, and were among the wealthiest workers in Europe by 1870. This is not unlike the development of what is known about the wages of workers in Stockholm.

The series by Albidgren (2017) is rather unusual in the field of early modern wage studies in that it estimates real hourly wages, while most studies of this kind estimate daily or yearly wages, due to the considerable lack of data on the working day or the working year. Patterns in the preindustrial period are rather like those in Stockholm, with some minor real wage decline in the sixteenth century, some recovery in the seventeenth and decline again in the eighteenth, before much strong growth going into the later decades of the nineteenth century. According to Abildgren's comparison of hourly wages in Sweden from the late medieval period, which he has derived from other sources, the decline and recovery before the eighteenth century was much more pronounced in Denmark than in Sweden, with Denmark experiencing a real wage trough significantly below Sweden's around 1550. Abildgren also notes the dramatic decline of wages in both countries in the later part of the 1770s; certainly this is an important finding of this dissertation as well, with indications that a single earner would not have been sufficient to support a family, and that even single men would have struggled to support themselves comfortably with seasonal and unskilled work (see Gary 2018d, Gary and Olsson 2018).

Unfortunately Norwegian data does not reach so far back as her Scandinavian siblings, with real wages dating back only to 1726. This series is, like Denmark, comprised of heterogeneous sources and types of labor and deflated with a national CPI. Though on a shorter time scale, the patterns still reflect those in Sweden and Denmark, with declining wages through most of the eighteenth century and a sharp, and likely highly detrimental, drop in real wage levels right at the turn of the nineteenth century.

Existing real wages studies, while lacking a common base or comparable unit, show similar trends between Scandinavian countries; this is not surprising given the physical proximity and multiple political unions throughout the centuries. In a study of early modern integration around the North Sea region, van Bochove (2008) uses data on prices and wages from Allen (2001) augmented with other published sources including Söderberg's work on Stockholm to build welfare ratios in the style of Allen and this dissertation – his work indicates that while the patterns in wage development might have been similar, wage ratios in Copenhagen were at a higher level than in Stockholm for the period when both are available, after the beginning of the eighteenth century. Both Stockholm and Copenhagen performed substantially below the level of the European leaders, and unskilled male workers in Stockholm did not make enough to comfortably support a family throughout the entire period, ending in 1800.

Each of these nations only has one national real wage series into the early modern period. There is of course much more information for later periods; for Sweden there are several studies of wages on a regional basis: from 1732 for agricultural work, and from the later part of the nineteenth century for other industries.

The dominant literature on Sweden's regional development has been the significant convergence both in real wages and in GDP since the middle of the nineteenth century (Enflo and Rosés 2015; Collin 2016) and the relative high level of equality in Sweden, but recent research has indicated that Swedes faced much higher levels of regional inequality in the pre-industrial period than what later data have indicated, and that inequality grew substantially from the early modern period into the nineteenth century and industrialization (Bengtsson et al 2017; Enflo and Missiaia 2017, 2018). Regional GDP benchmarks from 1571 to 1850 indicate that Scania has been among the poorest regions in Sweden, with Malmöhus County consistently recording among the lowest GDP per capita index in the country, often in competition with Jönköping County for the bottom spot. Malmöhus and Scania performed their relative best between the late eighteenth and early nineteenth century, with slightly above-average performance in 1800.

These more recent studies with an emphasis on earlier periods indicate how different patterns in the early modern period were both from what we witness in the eighteenth and nineteenth centuries, but also between different regions of Sweden, and through this it becomes apparent how important studies of particular groups are, and the impact of reaching as far back in time as possible.

Modern debates and real wages

Real wage studies of course tell us something about the progression of wages and what workers could afford at certain times, and this has been a useful and important tool for understanding the back-and-forths of a population's well-being at a more concrete or relatable level than, say, GDP per capita.

But wages have also been used to formulate and test some of the major debates and theories in economic history, through their use alone, in comparison with other wage data, and in contrast to other statistics. Part of this is because wage data are often the most frequent survivors of history's cull of written information. Wages were and are ubiquitous, and are paid to top level employees as well as casual farm hands. Though not all were written down, many of course were, and some of those have been found and utilized by economic historical researchers.

Another factor is that wages simply existed before other measurements became common. GDP and other macroeconomic indicators are modern inventions. Production and consumption figures, while important to independent suppliers, did not catch the interest of governing bodies in the same way that they do today.

Because of both their usefulness and their relative frequency in archival sources, wage data is at the backbone of many of economic history's most important and perennial debates. However, wages are not straightforward. While they in some ways feel intuitive and simple to interpret, the ways in which wages are calculated, manipulated, and compared have massive impacts on what type of market functions they represent, both at the global and at the household level. So too can a focus on a particular type of data, either because of convention or difficulty in finding and using other data, present significantly different interpretations of both local and global developments.

It is difficult to overstate the importance of the differences in interpretation and results that different uses – or misuses – of wage data have led to, and how they have shaped and reshaped the meta-interpretations of early modern European economic development.

This section outlines some of the most vital theories and discussions which have a strong basis in wage data, with emphasis on how different manipulations of the data or use of different types of wages lead to radically different narratives. These discussions (and sometimes heated debates) illuminate why it is so important to continue to collect new kinds of wage data representing different types of workers and why new types of analysis are so essential to economic historians. It also emphasizes the difficulties which can be found in using data for a purpose other than for which it was collected; without serious criticism of the source material and the initial impetus for collection, such data can lead to misleading or exaggerated conclusions

Standardizing wage units and how it can change interpretations

Some debates use wages to explain developments; other to describe them. The Little and Great divergence typically fall into the second category. With an important exception, described below, wage levels are used to illustrate the shifting of economies away from each other but are not taken to have necessarily *caused* these divergences.

'The Little Divergence' describes the divergence in growth trajectories between England and the Netherlands, in the Northwestern part of Europe, from the rest of continental Europe in the early modern period. Most European economies had fairly similar levels of wages in the fifteenth century, and economic development was also fairly evenly spread, though slow. Following this homogeneity in the late medieval period, the Netherlands, and then England, diverged and underwent a substantial increase in both wages and GDP levels. These were the first instances of modern economic growth, and resulted in British workers receiving wage levels beyond any other European workers.[3] The rest of Europe, on the other hand, experienced declining wage levels, even in formerly wealthy regions, such as the Italian cities which had been central to Europe's access to the thriving Mediterranean (Allen 2001).

Wages have been one of the predominant measurement techniques used to describe the development of the little divergence, beginning with the first major description in Allen's (2001) study. Wages here are used as a rough proxy for economic development; regions with higher wages are strongly associated with higher GDP and stronger economies. The use of wage data has supported a level or resolution which is not typically feasible with indicators such as GDP which require a higher data load and can be more difficult to focus on specific cities or small regions. This has allowed for a more direct comparison between specific economic regions, as opposed to larger political entities. When making distant and intercontinental comparisons this is especially important; the huge differences in size and population make comparisons at the country level meaningless when the strong growth is concentrated in smaller regions. It is of course an imperfect stand-in.

When wages have been used as descriptors in the Little Divergence literature they have been based on the model described in Allen (2001); a day rate paid to unskilled workers, which is typically the most readily available type of wage data is multiplied by an assumed number of work days to estimate an annual income. This is applied universally across time and space. This issue is the focus of Gary (2018d), and so this section will not discuss the issue in depth, but it is one of the most important methodological considerations which has, until this point, been unaddressed (or unaddressable). Because workers likely had little control over when work was available, and the availability work was likely to be different in different regions, this universal inflator imposes certain pattern on the data which might not exist in reality. This is especially the case if there are consistent differences in the number of days worked between different markets, as the discussion in Gary (2018d) suggests.

There are several assumptions in the Allen (2001) model which are being questioned from many different sides. This derived wage is both assumed to also support a set number of individuals, or adult male equivalents, and to come to the family though only one source. None of the work in this dissertation directly addresses the assumed size of the family, but Humphries (2013) approaches this from several different angles. Gary (2018c) indirectly addresses the issue of a single household earner, though an investigation and analysis of women's comparative earnings in construction work.

[3]The data underlying this story has recently been called into question. This will be addressed below in the section headed 'Builders' Wages'

The pattern of wage divergence within Europe is of course only a part of economic divergence on a global level. Europe was emerging as the new global trade and economic center, with, of course, an emphasis on the European growth leaders in the North Sea region. Europe's pull away from other previously strong economies is known as the Great Divergence.

The question central to the Great Divergence debate is at what point economic development in Europe truly pulled ahead of economic development in the rest of the world, primarily in Asia, with the leading regions in China often compared against leading European regions. Pomeranz's (2000) major book *The Great Divergence* does not use wages as the central measurement of regional differences, but wages are used as evidentiary support. Wages are also central in critiques of the theory (for example Broadberry and Gupta 2006). Different interpretations of the relative wage levels between East Asia and Europe largely hinge on how the differences are measured, whether it be by wages compared against local living and food costs, which relate to living standards or wages converted into grams of silver, which acts more as a measure of the strength of wages on an international market.

These differences are at the front in discussions over the timing and the extent of Europe's and Asia's 'Great Divergence', and highlights the important question, 'how do we measure wages?', or, perhaps more accurately in this case, 'what do wages measure?'

When compared to caloric needs and basic subsistence, the purchasing power of wages in China, Japan, and India are not dissimilar level to much of Europe through much of the early modern period; Pomeranz (2000) for China and Parthasarathi (1998) for India both find consumption-based wage levels that are commensurate with those through much of peripheral, but not leading, European cities before 1800. However silver wages were much higher than those in Europe, which Broadberry and Gupta (2006) claim indicates a much less developed value-add in international trading; the relative affordability of foodstuffs combined with low silver wages instead indicates high productivity in agriculture in a way which could be compared with Poland. Broadberry and Gupta use this difference in the different type of wage gaps to challenge both Pomeranz's and Parthasarathi's later dating of divergence between Asian and European economies. While the dating and definition of divergence are difficult and elusive, it is abundantly clear that measuring wages is not straightforward, and the choice of comparison unit is essential to the economic factors that the wage is used to indicate.

Difficulties with wages collected for other purposes

What is more problematic is when wage data are misused, and when interpretations do not line up with what the data itself can reasonably represent. This presents problems when hypotheses go beyond what are appropriate or can be supported by the data which is used; it is of course much more difficult to adjust data to suit one's needs than it is to fix a model. Again, because of its prominence, Allen's (2009) high wage economy hypothesis presents an example of a lively discussion over what wage data represent and how they can be interpreted, as well as the pitfalls of relying on data which was collected for purposes other than what it is being used for. Both Humphries and Schneider (2016) and Stephenson (2017) present strong critiques against both the data which is used and how the data is utilized and interpreted.

One of the most revisited and chronically debated topics in economic history is the question of why England industrialized first. Allen's (2009) 'high wage economy' hypothesis addresses this question; his thesis centers on the role of England's supposedly high wages levels as a causal push toward industrialization. The argument proposes that England had high wages compared to both other countries and compared to the price of capital and coal. In its simplest terms, high and rising labor costs in combination with very low prices of coal incentivized investments into labor-saving technologies. This did not occur elsewhere both because wages were much lower and because the cost of the fuels needed to run the new and inefficient steam technologies in other regions was so high. This meant that investment into labor-saving technology made little economic sense elsewhere, leading to a divergence in capital investment and labor savings innovations to further reduce labor input costs.

Here wages play a central and causal role; if wages had been lower, Allen claims, capitalists would have had little incentive to invest in capital-intensive production techniques. Without these investments, there would have similarly been little incentive for or return to innovation. In this model of course Allen is interested in wages as the cost of labor, not as a signaler of well-being (see Allen 2015). The argument has been increasingly criticized in recent years, both in its interpretation of what wage data represent and in the type of data which has been used to frame the argument. This hypothesis and its critical responses has become one of the most lively and vivid debates in economic history, with several high-profile critiques followed by responses and defenses by Allen.

The main critiques are that the proposals Allen makes rest on inaccurate uses and interpretations of wage data (Humphries and Schneider 2016, Stephenson 2018). Much of the data which has been used to build and support this hypothesis was collected for other purposes, by other people, and often was done decades ago. This has in the eyes of some led to a lack of clarity about what exactly these wages represent in terms of actual remuneration to individuals.

Spinners' wages

A crucial mechanism of Allen's (2009) argument is that industries with particularly high wages were incentivized to invest in labor-saving technology; as a result, the industries which mechanized earliest and most completely should have been those with the highest wages, or at least should have had relatively high wages. The spinning and weaving industries were famously the first to mechanize. Spinning was largely (though not exclusively) dominated by women, and so it is 'women's wages relative to the cost of spinning machinery' (Allen 2009b, cited in Humphries and Schneider 2016) which should have been the driving factor behind investment in mechanization.

Allen uses estimates of spinners' wages collected by Muldrew (2012) and Feinstein (1998), both of which are indirect and secondary sources on wage rates. Muldrew (2012) relies on contemporary social commentators' accounts of the state of the industry, as related to them primarily by the capitalists who were engaging the spinning labor and selling the finished material. That is to say, these are not typically direct accounts of direct wage payments, and are 'likely to overestimate the level and growth of wages' due to the commenters' social position and social goals (Humphries and Schneider 2016 pp 3). Feinstein (1998) relies on previously compiled wage indices. But due to the complexity and difficulty of gathering and processing hand-spinning wage data, this had been virtually the only data on hand-spinning available in the mainstream economic history literature – Humphries and Schneider (2016) emphasize that the gender studies literature has paid more direct attention to hand-spinners over a longer period of time.

In such a case where reliable data is not readily available this kind of secondary view – reliant on secondary reports of wages, productivity, and work – can be immensely useful, but of course must always be viewed with the position and goals of the compiler in mind. In this case, it was to the benefit of the clothiers, especially, to report that employees were "well paid and employers … hard pressed" (Humphries and Schneider 2016 pp 12), which is not made apparent in Allen's initial presentation of his hypothesis nor in his 2015 response to Humphries (2013) critique, which focuses much more explicitly on the relative wages of female spinners.

Humphries and Schneider (2016) take a bottom-up approach to construct spinners' wages. The difficulties and complexities they describe in connecting different types of data, as well as converting piece rates to day wages, make it fairly apparent why collecting and analyzing similar wage data had not been fully undertaken before. They are also faced with a relative scarcity of records, in comparison to how common this type of work was. Wages paid for spinning or other textile work are tricky; wages were paid by piece, not by time, and different rates for different types of spinning work compound the difficulty. Spinning was typically conducted as part of a putting out system, where the work was carried out at home and workers primary interaction with the employers was to turn in completed spinning work and to pick up fresh raw materials; this means that there is no direct observation of productivity. Spinners were typically paid by the pound of fiber spun, so any expression in wages as they related to hourly work depends on some knowledge of productivity. Further, the same starting weight could be spun into different lengths of yarn based on the fineness to which the spinner spun, which was less likely to be recorded. Obviously spinning finer, longer yarn required more skill and a higher time commitment, which further complicates calculations.

This recount of the difficulties in calculating spinners' hourly or daily wages is to illustrate the labor associated with reconstructing these wages and the meticulousness and attention to detail needed in order to reconstruct them in a useful manner. Through this reconstruction Humphries and Schneider estimate wage levels far below what evidence collected from social commentators indicated; while Allen cites wage levels as high as 12 pence a day in 1770, falling to 5 per day by 1779, Humphries and Schneider indicate that 4 to 6 pence a day was far more typical throughout most of the seventeenth and eighteenth centuries. Furthermore, any possible wage spike does not line up with the timing of Allen's hypothesis; there is no great change in wage levels after 1700s, as would be necessary to motivate that investment in mechanization was a result of rising wage levels. The estimates that Humphries and Schneider make are, on the other hand, much more in line with what had been accepted in gender historians' work for many years (Humphries and Schneider 2016 pp 24). These wages were also incredibly low, and would have not given the earner a luxurious lifestyle. Neither does it seem that hand spinners had any large control over their conditions of work or influence on pay rates. Humphries and Schneider (2016) claim that these findings would of course erode most of the support for the high wage economy hypothesis as presented in Allen (2009, 2015) – with no high wages, and no consistent trend of wage growth, these things could of course not act as incentives for investment in new technology.

Humphries (2013, Humphries and Schneider 2016) uses this evidence of quite low wages for women to counter Allen's (2009, 2015) high wage economy hypothesis; it was the low wages of women and children along with the desire for more uniform and consistence textile production, she says, which were the big push for innovation and capital investment.

In a working paper, Allen (2018b) replies to Humphries and Schneider (2016) with an assertive claim that their data and analysis are not, in fact, able to make any true comment or critique against his High Wage Economy Hypothesis (Allen 2009). Allen is very critical of the data collected and employed by Humphries and Schneider. He is particularly critical of the somewhat erratic development of the series, which is comprised of several different types of earnings. He is also critical of the lack of data on the number of hours worked by women in spinning – however, this last critique somewhat moves to goalposts, as this kind of information has never been available or included in his own previous works. It is true that the length of the working day for different pre-industrial laborers is a long-standing and unanswered question, and that more information on this variable would be immensely valuable in better understanding wages and well-being. Hopefully with further research more information will be collected to lead us closer to a stronger understanding.

Builders' wages

Stephenson (2017) similarly critiques Allen's use of London builders' wages. As were the spinners' wages, the building wages that Allen (2001, 2009) bases his analysis and hypothesis on were collected for other purposes, several decades ago, including by Gilboy (1936) and other foundational (real) wage series discussed above. But, Stephenson contends, these wages are taken out of context both in initial collection and in Allen's subsequent studies. From at least the later part of the sixteenth century, wage rates represent the costs to the builder, rather than the wage paid to individual laborers. This cost includes a markup to contractors which does not make it to workers on the group, but is instead part of the profit margin of contractors and capitalists. Through her analysis of the context and work structure in which these wages were paid, she determines that the wages which unskilled builders directly received was as much as thirty percent lower than what major building projects' records would indicate, especially into the seventeenth century.

Allen (2018a) critiques her analysis on four points. First, he argues that the archival sources are not the most representative of London wages for the period, and that other wage sources are better choices. Second, he contends that Stephenson overestimates the overhead which contractors collected; this overestimation would artificially depress the wages that builders received, and the true levels would then be closer to his own estimates.

The first two critiques are data-based, and further research could lead to deeper confirmation or refutation. However, Allen's (2018a) second two rebuttals are interpretation-focused, and are more tenuous. He first suggests that an adjustment in line with what Stephenson (2017) suggests does not meaningfully change the interpretation of his story. However, a downward adjustment of London laborer's wages by 18 percent delays the Little Divergence (or Great Divergence, between Northwestern Europe and the rest of the world) by approximately one hundred years, with no divergence until the middle of the seventeenth century, which would in turn impact the validity of the mechanisms he proposes are at work. His final main critique proposes that similar downward wage adjustments would be appropriate in other (leading) economies, which would simply mean a full adjustment of all wage levels downward, without impacting their relative relationships. Even if not all building series should receive this treatment he does suggest Amsterdam as a candidate. Adjusting London and Amsterdam wages downward could substantially shift the timing of the Little Divergence.

Nevertheless this is, again, an instance where the reported or recorded wage rates are not entirely aligned with what actual workers received as pay; another reminder that it is vital to examine the sources and to understand the purposes for which they were recorded. If Stephenson's analysis applies to the British wages which underlie the real wage series at the foundation of the picture we've built of early modern Europe – but not to other key series, as she's indicated is likely to be the case – then our current view of comparative early modern Economic development needs to be reassessed, with a serious eye to the data upon which our claims are based. This, too, is the inevitable conclusion of a reading of Humphries and Schneider (2016); we need to give our data more training and preparation before we send them to the front to fight our battles.

Revised wage series

Other reevaluations of data series are conducted on more simple grounds – the data collected do not line up with the use because they are not from the region they are meant to represent. Allen's (2001) paper relied on a large amount of data, largely collected from other sources. After the publication of the data underlying the paper the main wage series have become somewhat canonical, and are frequently referenced and used in other investigations.

Because of the high profile of Allen's initial study and the data series which were utilized in the paper, several of these studies have been further scrutinized and other authors have revised some of the wage series which featured in the initial study. Two of the poorest series in the original 2001 study have been revised by other authors. Revised estimates for Strasbourg (Geloso 2018) indicate that the town was much better off than in Allen's estimates, largely because the original figures failed to take into account payments in kind. These wages also come from rural villages outside of the city, and so reflect a lower-waged paradigm than urban or town wages. This highlights how essential it is to ensure that comparisons are actually comparing similar types of wages – the whole impression of early modern French wage levels is significantly higher when wages from Strasbourg proper are used and adjusted for non-cash perquisites which would have been an important component of pay.

So too does comparing high wage and low wage regions as representatives of an entire country give a misleading result – Malanima (2013) argues that this has been the case for Northern Italian wages used in the Great Divergence literature. London wages are used as the comparison for England, but these are high in an English context; Malanima offers that when some corrections are made to better reflect comparability of markets and consumption, England overtook Italian wage levels much later than Allen's (2001) initial estimate. Italian wages were likely above those of England in the end of the medieval period, and English and Italian wage levels converged during the sixteenth and seventeenth centuries; England overtook Italy only around the turn of the eighteenth century, not at the beginning of the early modern period. Again; when used in a comparative perspective we must be much more careful about the validity of what it is that we are comparing.

The 'correctness' of many of the wage series estimated in the original Allen (2001) Great Divergence paper has, as is apparent from the preceding sections, been an important drover of academic debate since the paper's publication. This abundance of research has truly pushed the research frontier forward and improved our understanding of early modern work and remuneration.

New insights from different kinds of wages

All of the above wages have been based on wages paid by the day, or, in the case of spinners, by the piece. It is difficult to translate these wages into an 'accurate' measure of a year's earnings because so little is known about a typical work year and how it might have changed over time. As a result economic historians have been forced to rely either on pure indexes which make it difficult to calculate a 'concrete' result, or on an assumed number of work days which can give a more approximate relation to tangible wage levels. As discussed above, Humphries and Weisdorf (2015, 2016) make a first serious foray into presenting wages earned by annually employed workers in a long-term and unified series, for women and then for men.

The series for men, especially, challenges many of the largest narratives which have been developed to describe and explain early modern economic and labor development; this is of course because the bulk of these theories are built on the back of men's day wages.

Their new wage series suggest a new revisionist interpretation of early modern British growth. One of the great confounders in European early modern economic history has been the substantial divergences between real wages and GDP per capita. In the British case, these divergences have been the theoretical foundation for the so-called 'Golden Age of Labor' following the Black Death; in the thirteenth century GDP per capita was fairly flat, while real wages grew substantially. During this time unskilled workers are thought to have had a significant bargaining advantage due to the labor shortage caused by high death rates. The second relationship, termed 'Engles' Pause' describes an inverse situation in which GDP per capita increased significantly after 1650, while real wages stagnated. Here it is thought that capital gained the upper hand and profits grew at the expense of workers' income (Humphries and Weisdorf 2016 pp. 3).

The annually-contracted wage series by Humphries and Weisdorf departs substantially from the day-constructed wage series, but not nearly so much from the GDP series; in fact the annually-earned wages are a near-fit to GDP. This has strong implications for overarching theories based on day wages inflated by 250 days; annually incomes earned in the 'Golden Age' were not so high as casual wages inflated with a 250 day work year would suggest, and causal workers probably worked as few as 100 days per year. Wages in the post-1650 period grew continuously, indicating that economic growth began significantly earlier than what has been suggested in previous scholarship.

As Humphries and Weisdorf (2016) acknowledge, their findings are highly in line with many speculations or inferences put forth by other works, most notably Hatcher (2011), which is very skeptical of the proposition of such high wage levels following the Black Death and into the sixteenth century.

Work such as this is a clear indication that no matter how many studies we have on something so (supposedly) fundamental or basic as (real) wages, there is still so much which is unknown about the most basic experiences in the early modern period. These findings, with such a revisionist set of implications on the essential narrative of the early modern worker's experiences, are strong motivation for work such as this dissertation which continues to probe deeper into an early modern economy and work patterns.

Data and methodology

This dissertation is based predominantly on archival data of workers' wages from the south of modern-day Sweden. The data are compiled into two databases: one of casual laborers' wages, and one of annual employees' wages. Additional secondary data from Stockholm is sometimes used as well.

In order to study the actual purchasing power or wages, price series are constructed from secondary price data. This enables construction of real wage series for casual workers as well as for annual employees.

Yearly wage payments are estimated using fixed-effects regressions for each wage type, as well as separately for women, men, rural, and urban workers. Real wages are calculated for casual workers who work for 140 days and 250 days, as well as the real wage for a single day of work. Real wages are calculated for annual employers on a yearly basis, following the methodology of Humphries and Weisdorf (2015, 2016).

A full description of the data, the sources, and the processes necessary to calculate nominal and real wages is available in Gary (2018b). Nominal wage, real wage, and nominal price data are printed in the appendix to that paper.

The new data in Swedish perspective

How does the new data place Sweden, both Stockholm and the south, in comparison with both each other and other European economies? Real wages for male unskilled builders are used here to show development of wage trends between regions. Wage development follows general patterns discussed in previous literature, with an increase through the sixteenth century, decrease in the seventeenth, and recovery in the later part of the eighteenth or early nineteenth. However, what is clear here is that there are distinct differences between what is developing in Stockholm and wages in the south. Kalmar and Malmö have very similar patterns and are taken together with Malmö price levels in other analyses. Stockholm suffers a wage collapse during the sixteenth century far earlier and faster than the south, and later recovers and enters into modern economic growth both sooner and at higher wage levels than Malmö. Throughout most of the period however, Stockholm wage levels have a dominant trend toward stagnation, while the south has larger economic shifts. This stagnation has been well documented in past research; Söderberg et al's 1991 volume about the city through the eighteenth and nineteenth centuries even took this this poor economic performance as the inspiration for the title; calling the book *"A Stagnating Metropolis"*.

Earlier comparative studies on real wages in Sweden were only able to compare long-term trends between regions from 1732 onward, and sometimes later depending on data availability. These wages were for day labor in agriculture; other types of wages are not widely available before the nineteenth century. The different developments of Stockholm and the south (or other regions) could only be examined from the eighteenth century onward, during which patterns give the impression of a perpetually poorer south only falling further behind Stockholm levels. More recent regional work on Swedish GDP (Enflo and Missiaia 2018) makes it clear that an inversion occurred between 1571, when Malmöhus County's GDP was substantially above that in Stockholm, and 1751 when the south was relatively worse off, but there is a lack of intermittent data to flesh out the developments. It is clear from figure 3 that this gap omits substantial and important differences in regional wage development in early modern Scandinavia.

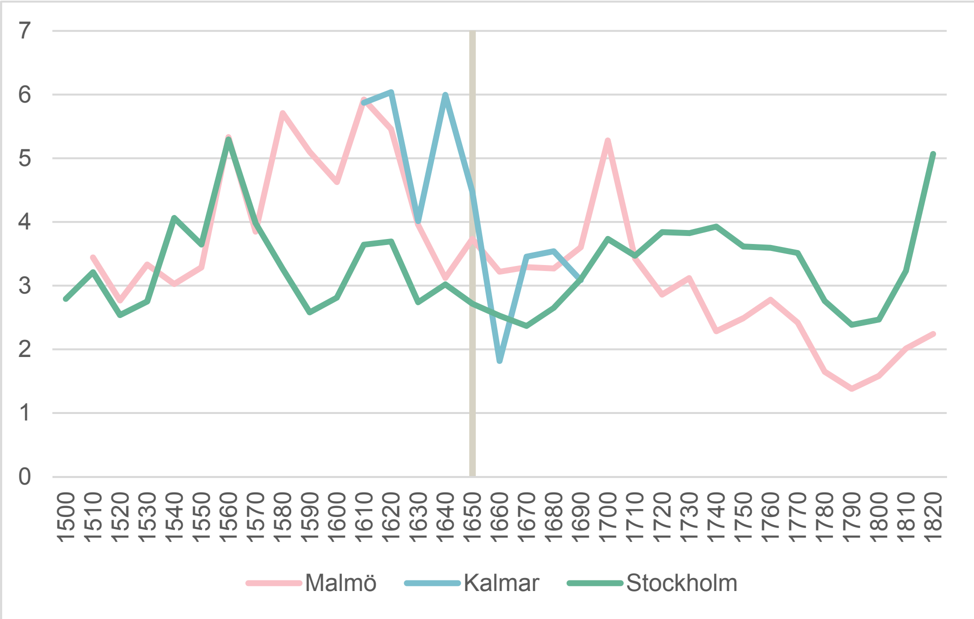

Figure3: daily real wages in Malmö, Kalmar, and Stockholm. Vertical bar represents the change of borders which made Scania part of Sweden

The different trajectories of Stockholm and Malmö wage levels can be connected to the different economies to which each city was tied during the early modern period. Malmö benefitted from several late sixteenth century economic trends, including Denmark's power years as an important exporter, the herring runs, and increased construction work. Later periods of wage increase, or at least a halt in decrease, can also be tied to combinations of these factors.

Malmö remained a Danish city until 1658; between 1560 and about 1620, with a brief resurgence into the 1640s, is considered the 'Golden Age' of Danish exports, both of grain and cattle, to economies throughout the Baltic. This period coincides with Malmö's highest wage levels. Wage collapse in the 1640s also parallels a more permanent trend of market stagnation in the Danish economy (Petersen 2001). It is not surprising that Malmö would play a strong part in Denmark's economic golden period; the region is still known as a 'bread basket' and a grain supplier. It was also heavily dominated by cattle production before it became a Swedish region in 1658 (Myrdal 2011). Malmö and Scania's position as a grain-producing region also led to lower food prices, effectively increasing real wages.

These years were a period of intense building projects, with by far the most paid labor undertaken throughout the entire study period; this would likely have had an upward pressure on wages in the building sector (see Gary 2018b). Wage data from rural modern-day Denmark (presented in Gary and Radu 2018) also spike in the first decade of the seventeenth century, indicating that the economic boost reached across the sound and was not limited to solely urban areas.

Herring cycles, or periods where herring schools migrated to relatively shallow waters and were easily fishable, were immensely important to the southern Swedish economy. An important herring period in in the second half of the sixteenth century, as well as the 1660s-80s and later eighteenth century probably influenced labor patterns in the city as well as wage levels.

Stockholm on the other hand did not begin its bureaucratic and administrative expansion in earnest until the 1620s, though it then grew considerably during the seventeenth century. However the end of Sweden's 'Great Power Era', which was effected by Sweden's 1721 defeat in the Great Nordic War, began a long period of stagnation in Stockholm. This was combined with a de-industrialization of the major textile production centers in the city which had been important in the sixteenth and seventeenth centuries, as well as a shift in the focus of trade from Stockholm and the Baltic toward the western coast and the Atlantic. Grain production also shifted away from the Stockholm region toward the southwest, with increased production while Stockholm's surrounding estates stagnated (Söderberg, Jonsson, and Persson 1991). Stockholm did manage to remake itself as an important European capital city, and with industrial development at the beginning of the nineteenth century recovered and experienced substantial economic growth (Schön 2010), though not before a critical low-wage point in the final years of the eighteenth century.

Sweden in the Little Divergence

This dissertation situates itself as a part of the vast body of literature which examines changes in living standards and differences between groups' living standards in early modern Europe, and so during the period when economic development throughout Europe was diverging as growth leaders pulled ahead of the rest of Europe.

The results from this study help further situate Sweden and Scandinavia's place in early modern European economic development. Figure 4 shows the real wage ratios calculated in this dissertation for Malmö and for Stockholm, together with wage rates from other European economies published in Allen's 2001 paper or on his website. Wage ratios are presented at the respectability levels assuming 250 days of work and a support burden of 3.5 adult male equivalents. While Gary (2018d) and Gary and Olsson (2018) suggest that this was a longer working year than what was likely to have been common in early modern Scania, these levels have been typically used in the international literature and allow for simpler comparison.

Scandinavia spent the majority of the early modern period as a part of the European periphery; wages are clearly below the Northwestern growth leaders, Amsterdam and London, from the mid-seventeenth century onward. This is fairly expected. What is less expected is the high wage levels found in Malmö in the late sixteenth through mid-seventeenth century; for a few decades they are on par with those in Amsterdam and above those in London, though wages in Malmö decline by the beginning of the seventeenth century. Wages in Stockholm also reached a comparable level to the leading economies for a brief period in the middle of the sixteenth century, but drop off much sooner and remain more or less stagnant until the late eighteenth century. Again, this relationship finds support in recent work on regional GDP in Sweden in the very long run, which has shown that Malmöhus County was relatively wealthy in the mid-sixteenth century, with a GDP approximately 30 percent higher than in Stockholm (Enflo and Missiaia 2018a, 2017). However, this wage spike in Malmö was only temporary, and during a period

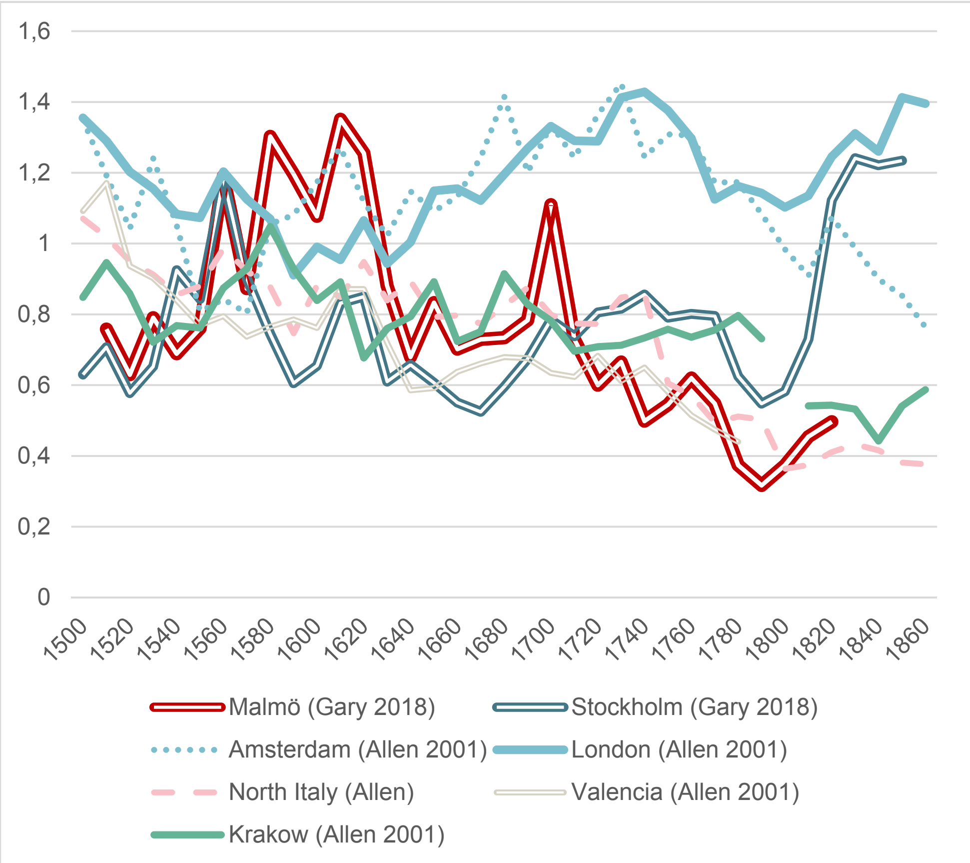

Figure 4: Europe's little divergence in real wages, 1500-1800. Respectability level baskets, 250 work days, 3.5 male equivalent support unit.

when wages in London were at a particularly low level. Swedish wages were not at a competitive level with those in London or Amsterdam in the long run.

Malmö's economic decline from the 1620s, during which wages in Malmö drop down to – and then below – real wage levels in Stockholm, conforms to a familiar story to Swedish economic historians – in large part because so much of Swedish economic history before the nineteenth century is based on data from Stockholm. In this period Malmö's wages are on a level with other members of peripheral Europe, including relatively nearby Krakow. Wage levels began to recover at the beginning of the nineteenth century, but were still far below those in Stockholm and European leaders. It is worth nothing that the wage series from Malmö ends in 1830 while Stockholm's continues to 1850, which may indicate a larger gap than what was actually in place; however since both cities' wages indicate a leveling-off in the 1830s it is possible that Malmö also did not experience wage growth to the same rapid extent as Stockholm in the following decades.

What sets Stockholm, and to a lesser extent Malmö, apart is the massive catchup in wages at the beginning of the eighteenth century. Stockholm rapidly made real wage gains, moving from among the lowest levels to among the highest, in only fifty years. This is not totally unexpected, given previous research on Sweden and Stockholm's rapid catchup when Sweden at last entered into its first period of modern industrialization in the nineteenth century. Söderberg (2010) also attributes this gain to falling grain prices, which greatly lower the cost of subsistence. Malmö shows a tendency toward catchup as well, though not as strong, and data are only available until 1820 for the city of Malmö itself. However, this huge catchup might also indicate that the ways in which real wages are calculated for the early modern period might become less appropriate for a nineteenth century economy, when the composition of foodstuffs consumed by a typical family as well as labor patterns are undergoing substantial changes.

Despite the clear regional differences in wage development between Malmö and Stockholm, as could be expected from their different contexts, both cities are clearly a part of the European periphery with low and stagnant wages during the seventeenth and eighteenth centuries, and only begin to catch up during the nineteenth century, after the period of this study. The papers in this dissertation further expand upon the wage data from Malmö and southern Sweden in order to investigate different kinds of wages and employment and how they relate within the broader economy.

Summaries of the papers

Paper 1: On the construction of nominal and real wage series: Southern Sweden 1500-1850

Wages are one of the best and most consistently available tools economists and historians have to investigate what labor markets and living standards looked like in the distant past. With a dense enough set of wages paid to people in different occupations, regions, and payment schemes; as well as to women and men, comparisons can be made both within and across markets. This can give considerable insight into the workings of labor markets overall and how these labor markets must relate to the survival of the households and individuals dependent on them.

To this end, this chapter describes the process behind the construction of several wage and price series, developed in order to analyze patterns of early modern work and compensation in what is today southern Sweden. Wages reflect two broad categories of work: casual work in construction, paid by the day, and work which is contracted and paid for an entire year. Casual work is often conducted on the spot market; there is little indication of long-term contracts. Long-term work would be contracted by the year; in many cases these positions would include room and board as part of compensation.

The predominant task of this work is to process and refine primary archival data on wage payments to produce a variety of wage series which can be used for further in-depth analysis. The wage data come from archival sources from across the south of modern day Sweden. A secondary task is to compile previously published sources on prices in order to create regional cost of living indices in order to deflate and interpret wage trends.

This is an ambitious task. There are nearly 28,500 observations of casual wage payments and over 23,000 observations of annual wage payments in the raw databases. The wage observations cover over three centuries. The types of work covered in the sources and the raw databases range from unskilled ditch diggers to mayors; organists to midwives; mason's assistants to dairy maids. They are employed by cities, manors, churches; some are anonymous workers or appear only for a few days while others are observed for decades. Because of the huge scope of skill and occupational diversity in the raw data, this paper limits its focus to only those in the lowest categories of skill; we take the dairy maids, diggers, and assistants and leave the mayors and artisans for another day.

Unskilled workers are the focus of this work for several reasons. The first and most important is that the lower skilled are the common people and the backbone of society. If we are interested in the basic function of early modern life we must take the basic people of the early modern world. The second reason is the sake of comparability. The vast majority of early modern wage studies focus on unskilled workers – indeed, the bulk of this work addresses men who worked for casual wages, predominantly in unskilled construction work. This focus provides a rich body of comparative studies and is a strong motivation for beginning with the parts of the data set which can be most in conversation with international scholarship.

Third is the fact that, largely because of existing work on unskilled workers, there is a stronger methodological foundation for understanding (or debating our understanding of) these types of wages. Methodological approaches to understanding unskilled workers' casual wages – and robust debates over the problems with or appropriateness of certain methods – have been a stalwart of economic-historical literature since the early parts of the twentieth century (see Phelps -Brown and Hopkins 1956). Recent work by Jane Humphries and Jacob Weisdorf (2015, 2017) has expanded methodological approaches; previous work assessed only day wages. Humphries and Weisdorf's approach has provided a more broadly applicable methodology for calculating wages paid by the year to live-in servants – a category of payment that, while much more typical than casual payment, had been difficult to calculate due to the large component of in-kind payments.

Due to the novelty of this method there are still very few studies that develop a long-term data series of annually-remunerated work. This study makes an important contribution by presenting both annually-paid and casually-paid wages together; it is among the first studies to do so. It furthermore presents wages for women and for men in urban and rural environments for both wage types. This array of wage types creates an unprecedented chance to examine the relationships between different types of unskilled work. Through these relationships we can uncover the changing positions of different labor groups and infer the impact these changes must have had on household units.

These archival wage data, for both annually and casually employed, come from the same set of sources. The locations are spread across what is today southern Sweden; most sources are in Scania, the southernmost province, but there are some sources from just outside of the region. The backbone of the data comes from the city of Malmö, then and now the largest city in the region. The city is located just across the Oresund straight from Copenhagen, and is today the third largest city in Sweden. Nearby Lund and the city of Kalmar are also more urban areas. Other data come from smaller municipalities, churches, and manors located throughout Scania. A few sources, including the data from Kalmar, are located outside of the province of Scania.

The data discussed and processed in this paper have a strong advantage over data which come only from builders in cities. This chapter also includes wages for builders in rural areas as well as wages for annual earners both in the towns and countryside. Because of this density of wage data it is possible to make comparisons which are not feasible in other regions. This means that the comparisons and contrasts between different sets of wage data with different assumptions can be used to lead to a stronger understanding of the waged economy and labor markets.

One of the first steps and among the more labor intensive tasks is the separation of workers into different skilled categories. The full database consists of approximately 28,500 observations of casual and 23,000 annual payments, with a wide range of work requiring a broad set of skills or specializations. Understanding the skill level or specialization involved in the work being done is important to interpreting what the wages being paid represent – is the person executing very basic tasks, such as moving materials or digging; or are they doing something which could be considered more semi-skilled, such as mixing mortar and assisting a mason? Are annual hires carrying out only basic work, or are they also acting in supervisory capacities?

Not all tasks, especially in the casual data, are clear in their degree of skill. This ambiguity is noted by Judy Stephenson (2016). Here, she observes the many gradations of skill that are encapsulated in the group of workers we typically call ‘unskilled’ and argues for closer attention on the individual tasks and skill level actually present. There are similar patterns clearly at work in the Swedish data as well; people who do unskilled work but act as supervisors; those who mix mortar or perform some other task which requires practice or some on-site training; ‘unskilled’ workers acting as supervisors. However, I have chosen in this work to continue to use the broad category of ‘unskilled’, and to address wage development from this perspective. This captures a low-skilled or non-specialized class – the class which has not been able to access advanced human capital development and which is more likely to rely on several types of ‘jack-of-all-trades’ type labor to bring in cash.

For workers in annual service the cash wage would be only one part of their total ‘pay’; these workers would typically live-in with their employers, meaning that a large component of compensation was their room and board. To approximate the total value of this compensation the cost of living is added to the cash wage. This is a little less straightforward with urban workers, employed by the city. There is less of a robust historiography on these types of workers, most likely because they are not as common as those who work in annual service in the countryside or in individual households. Because of this it is less clear how their compensation would have been structured, and so we must go forward with clues

Nominal wage payments are estimated by regression in order to control for regional, occupational, and seasonal heterogeneity. Nominal daily wage payments for unskilled casual work are estimated separately for women, the entire unskilled male sample, and for the sub-samples of men's urban and men's rural work. All estimates are made according to the base function (equation 1):

$$\begin{aligned}\ln(c\_wage_{it}) = {} & \alpha_{1i} + \sum \beta_1 year_i + \sum \gamma_1 HISCO_i \\ & + \sum \delta_1 location_i + \sum \theta_1 season_i + \vartheta soldier_i \\ & + \mu guard_i + \pi cart_i + \varepsilon_{1it}\end{aligned} \tag{1}$$

Where *i* refers to an individual wage observation, *t* refers to the year and ε_{it} is an error term. C_wage_{it} is the value of the dependent variable, casual wage. The wage is determined by a set of explanatory variables: year is a dummy for the year of payment; HISCO is a categorical control for the specific type of work being carried out, with a general unskilled worker as the reference; location is a categorical dummy for the location of payment, with Malmö city as reference; season is a dummy for the month of payment, where November, December, January and February are counted in one category and June is the reference category. Dummies indicating if the worker was a soldier, performing guard work, or working with a cart are also included to control for types of work which were structurally different from typical work. Soldiers were often employed in basic manual labor; guards often worked overnight but were not required to carry out great tasks, and those with carts and horses likely received higher wages which also compensated for the capital of horse and cart.[4]

Annual cash wages are estimated according to the form (equation 2):

$$\begin{aligned}\ln(a\_wage_{it}) = {} & \alpha_{2i} + \sum \beta_2 year_i + \sum \gamma_2 HISCO_i \\ & + \sum \delta_2 Location_i + \varepsilon_{2it}\end{aligned} \tag{2}$$

[4]The appendix shows the estimated wage vales per year as $\alpha_i + \beta_i year$.

Where again, i refers to an individual wage observation, this time for annual employment; t refers to the year and $\varepsilon_{it}$is an error term. A_wage_{it} is the value of the dependent variable, the cash payment of an annual wage. Terms here refer to the same controls as in equation 1; year is a dummy for the year of payment; HISCO is a categorical control for the specific type of work being done, and location is a categorical dummy for the location of payment, again with Malmö city as the reference category. The reference HISCO is a (city) custodian, the most common type of worker in the data.

In order to calculate real wages from nominal wages this chapter builds and uses six separate consumption basket style price series, two each for the cities Malmö, Kalmar, and Stockholm from 1500 to 1914. Baskets are constructed at both the 'subsistence' and 'respectability' levels, representing a meager survival and a more comfortable pattern of consumption, respectively. The price baskets are based on the quantities in Allen (2009). This allows the baskets and the real wages calculated from them to be comparable with most recent studies (see table 2).[5]

Wages earned by the year require adjustment to move from the cash wage to the nominal wage. Annually earned cash wages, calculated above, are only one component of the total annual remuneration. Compensation would also typically include room and board; most annual employees, especially unskilled workers in rural areas, lived in with their employers and received food as part of compensation. To approximate this the total nominal wage is calculated by adding the cash value of the cost of living to the cash wage calculated above.

The formula for calculating real wages based on casual work payments (equation 3) is fairly straightforward: the presumed total yearly income, calculated by multiplying the daily wage rate by the number of days worked in the year, divided by the cost of support for the earner, in the case the cost to support a single adult.

$$casual\ real\ wage = \frac{day\ wage * days\ worked}{cost\ of\ support} \tag{3}$$

[5]With some small adjustments the baskets can also be made comparable with basket price levels in earlier work which rely on Allen's 2001 price levels, including his initial study, as shown above under the section, 'Sweden in the Little Divergence'

Annually earned real wages are calculated by deflating the nominal wage, defined as the cash wage plus the cost of support, by the cost of support (equation 4). This makes no assumption about the number of working days, but does make the assumption that those working for the year received full room and board as part of their remuneration.

$$\text{annual real wage} = \frac{\text{cash wage} + \text{cost of support}}{\text{cost of support}} \tag{4}$$

The wage series which have overlaps with existing Swedish data are harmonious with these sources. Together, these new data lay a strong foundation for a deep and extensive investigation of work, wages, and income in early modern southern Sweden from a variety of perspectives.

Paper 2: Constructing equality? Swedish women's wages for physical labor 1550-1760

This study investigates the wages of Swedish women to determine the relationship of women's work and payment to the overall shifts in the Swedish economy. Were women's wages set by market forces, customary rates, discrimination, or some combination of these factors? How do these factors relate to the development of the overall Swedish economy? I take advantage of data from the Swedish construction sector – one of the few areas where we can observe a spot market in early modern Sweden. Here, men and women were employed together, working on the same tasks and projects. This allows for a direct comparison of work in a physical labor market.

Findings indicate that women were employed at higher rates during periods of higher labor demand. Women were employed more often when work was most intense, and women were typically paid on par with men when they were employed together. When work was less needed and projects were smaller women and men were more often employed separately; this is when women's relative wages became much lower. This indicates that women's wages and employment was substantially influenced by market forces, though reverted to a more discrimination-based system during less intense periods.

The archival data in this study come from the south, from Malmö and other manorial sources in the southern region Scania as well as the town Kalmar, on the southern part of the east coast. All of the data are from day laborers working in the construction industry. Published wages data from construction workers in Stockholm are added to produce a more robust coverage. these are published series from similar types of sources, also reflecting women's and men's day labor in construction; women are recorded from 1600-1719, and men from 1500 through 1719 (Jansson , Andersson-Palm, and Söderberg 1991).

Relative wages are calculated locally, between women and men working at the same location at the same time. This allows them to be calculated directly from the recorded currency, and also removes concerns of price effects between different regions in the main analysis.

Figure 1 shows the five year average of women's wages as a percentage of men's in Sweden, disaggregated by source and region. While it has many moving parts, it is important for two reasons. Because each region or data source has a similar movement we can infer that similar pressures exist beyond a local market; this is strong justification for examining the gender pay gap on a national scale. The trend throughout is an increase in women's relative earnings from the end of the sixteenth and into the seventeenth century, followed by a steady decline through the seventeenth century; this in turn is followed by a slight indication of a recovery at the beginning of the eighteenth century, but this is more tentative. The main departure in the trend is the sudden increase in women's relative wages in Kalmar in the late 1640s and into the 1650s; this is connected to a local fire which destroyed the city and is addressed directly below. What is clear is that over the course of about two working generations women's wages declined from relative parity across several different regions during a period of expansion and development, to relative wage levels as low as forty percent of men's, during a time when Sweden was economically stagnating.

The second important point is that there are several moments in each region – Kalmar, Stockholm, and Malmö – where women were able to out-earn unskilled men in a physically demanding industry. This is unexpected. Economic theory (and social expectations) would predict that men would earn more in strength-based occupations; men on average have higher upper body strength, which means that they will typically be more efficient in tasks which are highly strength dependent, as early modern construction would be. We could expect this to be reflected in higher wages (see Burnette 2008).

What can explain these trends? Until 1658 Malmö was a part of Denmark; it became Swedish after the Treaty of Roskilde. During the period of Sweden's military expansion in the late sixteenth and early seventeenth centuries both Sweden and Denmark were administering a project of state-building and reinforcement, first building up already-existing cities and fortifications and later, especially in the Swedish case, establishing new towns and settlements In Denmark a parallel

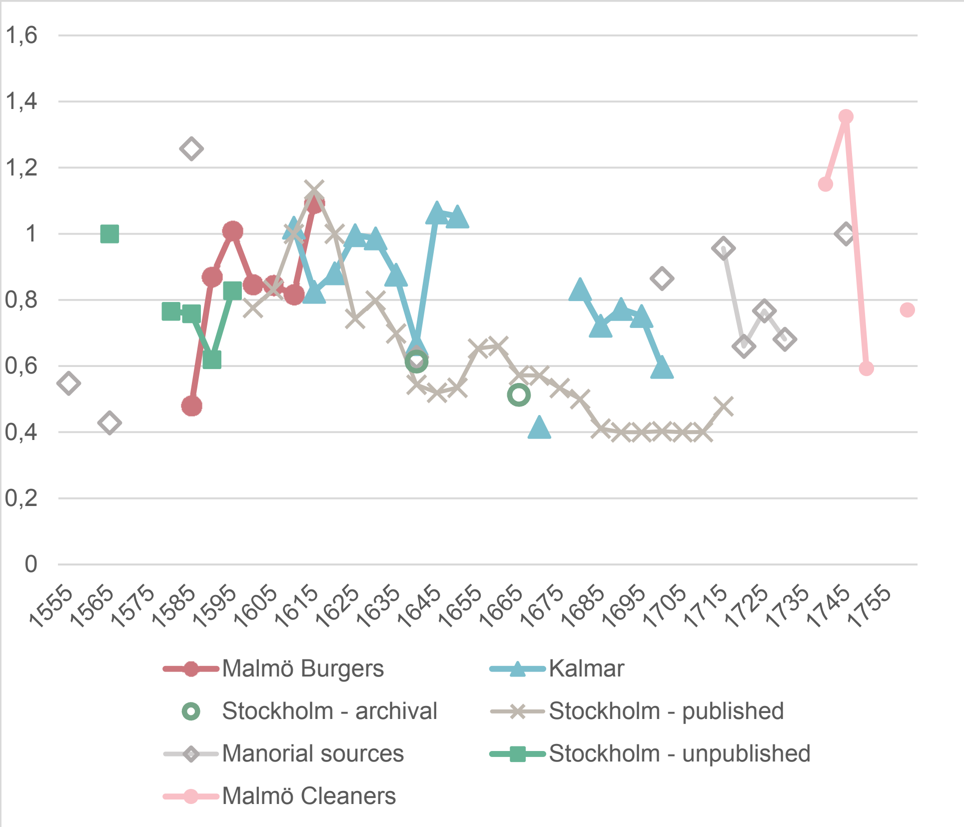

Figure 1: Women's relative wages in casual Swedish construction 1555-1760. Source: Stockholm published Jansson et al 1991. Stockholm unpublished: Johan Söderberg, personal communication. All rest: Author's calculations.

development was underway, of a centralization of the tax system despite the relative strength of Denmark's nobility over the crown. This was particularly strong at the turn of the seventeenth century, precisely the time women's relative wages were particularly high.

This pattern of high building labor demand raising women's wages is especially clear from local events in Kalmar. Kalmar was a border town between Sweden and Denmark before the acquisition of Scania. It was already an old and well-established town, and while small, was still an important part of Eastern Sweden. The Kalmar War was fought between Denmark and Sweden from 1611-1613; in 1614 the wage ratio was 1.2. This is likely connected to an urgent need to repair and rebuild after damage from the war, and a probably-lower supply of working men. Several years later in 1647 a fire burnt the town and it was rebuilt several kilometers away. This real wage spike is even stronger, as the rebuilding effort would have been intense.

Figure 2 shows building demand, as measured by paid workdays in the archival sources, charted against women's relative wages. There is a clear association between periods of greater work projects and higher women's relative wages – the correlation coefficient is approximately 0.6. Both women and men are employed to scrub and clean the city hall, and the relative wage shown here refers to the wages for this type of work only. The wages are quite high – a comparison against the yearly unskilled male wage actually yields a higher relative wage than a direct comparison between only cleaners. It is possible that this is connected to the large amount of work being carried out by and within the city hall itself. The building work is more local to Malmö. Still, the relationship between women's relative wages and labor demand holds.

This demand for more building labor, combined with a thin labor market, could pull in marginal workers in order to meet building demand needs. Marginal workers who have a high opportunity cost are likely to require a larger incentive to join the labor market. Women, especially married women, are likely to have high opportunity costs, with taking care of the household and meals along with pregnancy and child care. This need to pull in marginal labor can easily explain why women's wages rise relative to men's in high demand (or low supply) periods. It can even explain why wages might be equal – in big projects, it could be much simpler to higher workers at the same price, and to divide them where they are most useful and will be most efficient. It is harder, however, to explain why unskilled women might be out-earning unskilled men.

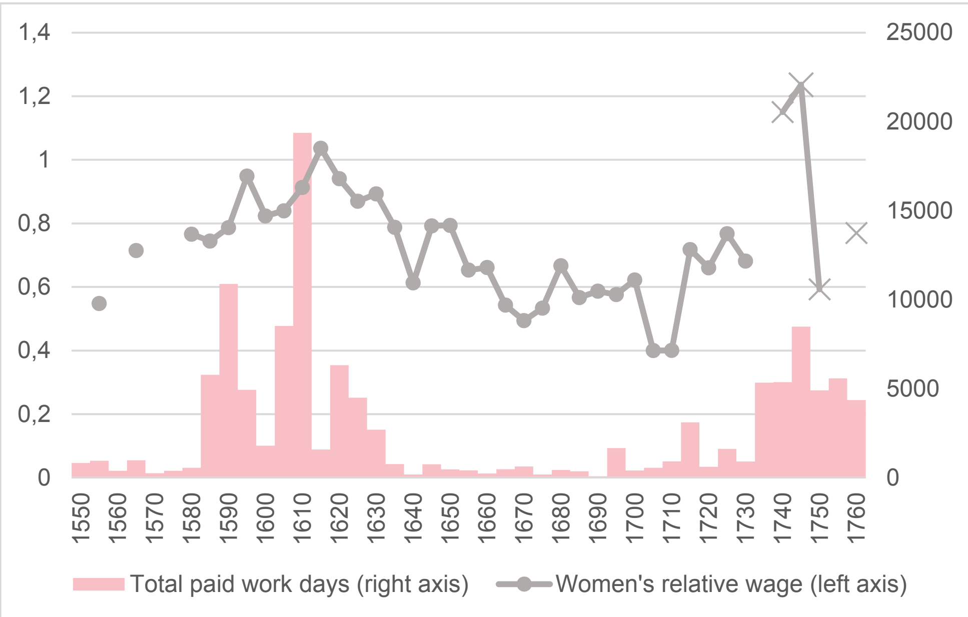

Figure 2: Demand for building labor and women's relative wages in Sweden, 1550-1760

Why, when women's wages had been so close to men's around the turn of the seventeenth century, did they fall so completely behind? A deeper look into the records of Kalmar, where recorded wage payments are most complete and most consistently contain names, might give some insight. Kalmar was not a large town; it had only about 1500 inhabitants around 1571, rising only to 2000 by the beginning of the eighteenth century. The surrounding countryside was also sparsely populated (Andersson-Palm 2000), which was fairly normal for a Swedish town in the period. This typicality together with the more thorough records makes the town a useful case study.

Table 1 shows the number of payments made to women along with the number of recorded payments in five year periods. This is presented for both the percentage of the unskilled labor force and the total labor force. Clearly the 1620s and 1630s were the biggest years for work hired by Kalmar Cathedral, the source here. There is also a large spike in skilled labor, largely carpenters, in the late 1640s following the fire. While the number of unskilled workers hired by the Cathedral didn't boom to the same extent, knowing that the entire town was being rebuilt clearly shows the strong demand for building labor in the private sector, for which records do not survive.

It is also clear that the periods of the highest relative women's wages, especially in Kalmar, coincide with the periods when building work was heaviest or when demand was highest, as indicated by historical sources. This further strengthens the conclusions from above, that women were more likely to be seen working when labor demand was highest. But it also suggests something further; women's wages were highest when demand was highest, but also when women were a larger proportion of the labor force. There are two sets of mechanisms which present themselves and which act in different directions, though it was likely a combination of the two along with other factors which determine the final wage rates. The first is that when there was a lot of work to be done it was simply easiest to pay everyone a fixed rate. Together with this, women might have been able to wield a form of collective action when there were so many of them working together and they were such a large component of the labor force. This means that women's massive participation in construction work is in some way a cause of higher relative wages; the work is dependent on them and will pay them well for it.

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

(dark red)	>60% women
(light pink)	30 – 59% women
(grey)	Top quartile (n) of paid workdays

There are still many steps needed to make women's work throughout early modern Europe as broadly comparable as men's. One first step is currently being undertaken by de Pleijt and van Zanden (2018) who compare women's relative wages throughout Europe. They draw a line through Europe, separating the South and the North, into two primary paradigms of women's labor: the South, where women's relative wages were low, but stable in the very long term; and the North, a stronger influence of market forces meant that women's relative wages could fluctuate substantially. In the middle they identify an 'intermediary' pattern, with institutional factors such as strong guild presence tempering women's participation as well as wage potential. As might be expected, Swedish women's periods of high relative wages put them firmly within de Pleijt and van Zanden's 'northern' paradigm. But the ability to earn wages on par with men during certain high-demand periods was a double-edged sword: de Pleijt and van Zanden make the observation, as does this study, that in places where women had more market based wage rates they could earn high wages when the market allowed it, but were extremely vulnerable to market changes. Women in these markets were marginal workers, and when the market shifted against them their wages dropped and their earning power was greatly diminished. In southern regions the relative wage rate was much more stable, typically at about fifty percent of men's wages. This did not allow for periods of increased female earning power, but neither did it lead to periods where women suffered complete wage collapse. Flat wage rates, while initially appearing to disadvantage women entirely, likely did provide some protection.

Paper 3: The distinct seasonality of early modern casual labor and the short durations of individual working years: Sweden 1500-1800

Real wage studies have built much of the foundation of our understanding of economic history. Through them we have sketched the development of modern economies and estimated the ebbs and flows of household wealth. However real wage studies have never been able to truly or accurately address the changes in the working year. Real wages have almost always been based on the wages of unskilled and casual laborers, often in construction but sometimes in agriculture. These people are typically paid by the day, and their annual incomes are not clear or obvious – the income is directly dependent on how many days they work.

Implicitly the literature has assumed that the number of days worked is a matter of labor's decision of how much labor to supply – and that they will work essentially as many days as they are able. This is true both in the standard contemporary methodology, as introduced by Allen (2001) and the theoretical interpretation of early modern economic and social development. Two of the most influential interpretative theories – the Industrious Revolution (de Vries 2008) and the Golden Age of the peasantry following the Black Death – assume that the unskilled working class work, on their own accord, well beyond their subsistence needs in order to increase their own standard of living. Typical real wage studies rely on a guestimate framework which assigns all workers in all regions and in all centuries a fixed number of workdays – typically 250 – but there is a lack of empirical evidence which can be used to support this.

As a result, the actual work year, both at the individual level and for a statistical 'typical' worker, has remained largely a black box. This paper makes use of nearly 28,000 observations representing over 151,000 paid workdays across over 300 years to investigate individual work patterns, work availability, and the changes in work seasonality over time. This sample is comprised of workers in the construction industry, and includes unskilled men and women as well as skilled building craftsmen – the industry which is often used to estimate comparative real wages through early modern Europe. Data come predominantly from Scania, the southernmost region in modern day Sweden, and especially from Malmö, the largest town in the region.

The Swedish case presents an appealing test environment, with its late industrialization and slow urbanization preserving many older systems of production and work longer through the early modern period than in the growth leaders such as England and the Netherlands. Only with the Swedish industrial revolution, in the later part of the nineteenth century, was there rapid development of population and urban centers (Bengtsson and Dribe 2005). Other regions in the European periphery were not unlike Malmö or southern Sweden during much of the early modern period, remaining predominantly rural and agricultural into the nineteenth century. The majority of Europe, especially in the central and eastern regions, was overwhelmingly rural, as was Sweden. This means that Sweden was dependent on the natural economy and constrained by low-technological paradigm quite late. The patterns which can be observed in the Swedish data as late as the eighteenth century can possibly provide insight into realities of rural European life in a more distant past.

Figure 1 below shows the monthly distribution of paid work days for unskilled men working in the casual construction industry in southern Sweden, including both Kalmar and Malmö towns as well as casual building work on rural manors, over the entire period of study. The unit of measurement is paid work days, not observations, because it is not uncommon for observations to record more than one workday or more than one worker at a time. The pattern is overwhelmingly seasonal, with peak labor periods in June, July, and August – almost twenty percent of paid days of labor are in July, with an average of about three percent in December through March. Not many would be employed for a full year, or even 250 days. An individual who was able to work only in months with the median or more paid work days would probably be working about 140 days in the year.

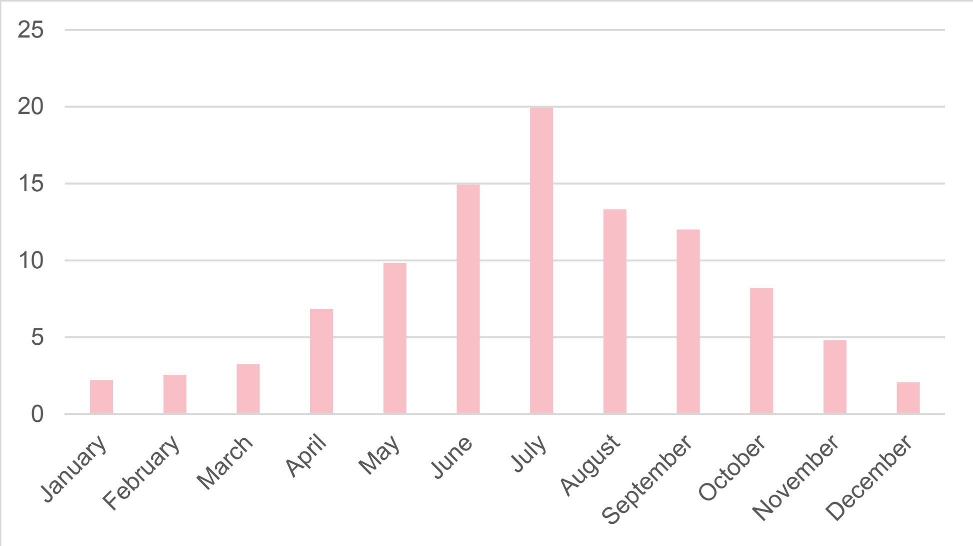

Figure 1: Distribution (percent) of workdays in construction by month when month of work is known, 1500-1799. All workers. Source: Author's calculations.

It is clear from figure 1 that the work year in construction was strongly seasonal, but was employment consistently seasonal for entire 300 years? Indirect estimates of labor seasonality have found a declining seasonal trend in more recent centuries. These studies have been primarily focused on the influence of agricultural seasonality, since agriculture was of course the dominant employer as well as the structure around which society was focused[6].

Here we can directly assess the changes in seasonal labor distribution. Figure 2 divides seasonal payment information into fifty year periods from 1500 through 1799 for skilled and unskilled workers and shows the distribution of work for every month throughout each period. The decline in seasonality for both skilled and unskilled male workers is suggestive – from peaks of 25 to 35 percent of construction labor carried out in the summer months in the first two periods, to under fifteen percent in the later periods. Also important is the shift to more work being done in the late winter and early spring, which is less apparent in the earliest periods.

While the predominant trends for skilled and unskilled men are the same, there are some differences that indicate somewhat different labor patterns. Skilled workers tend to have their labor peaks slightly before their unskilled coworkers, especially

[6]Kussmaul 1981; Dribe and van der Putte 2012; Engerman and Goldin 1997. Engerman and Goldin also investigate the complementarity of manufacturing employment seasonality in 19th century America, but find that the two were likely both influenced individually through sectoral shifts and the decreasing reliance on climate in both industries.

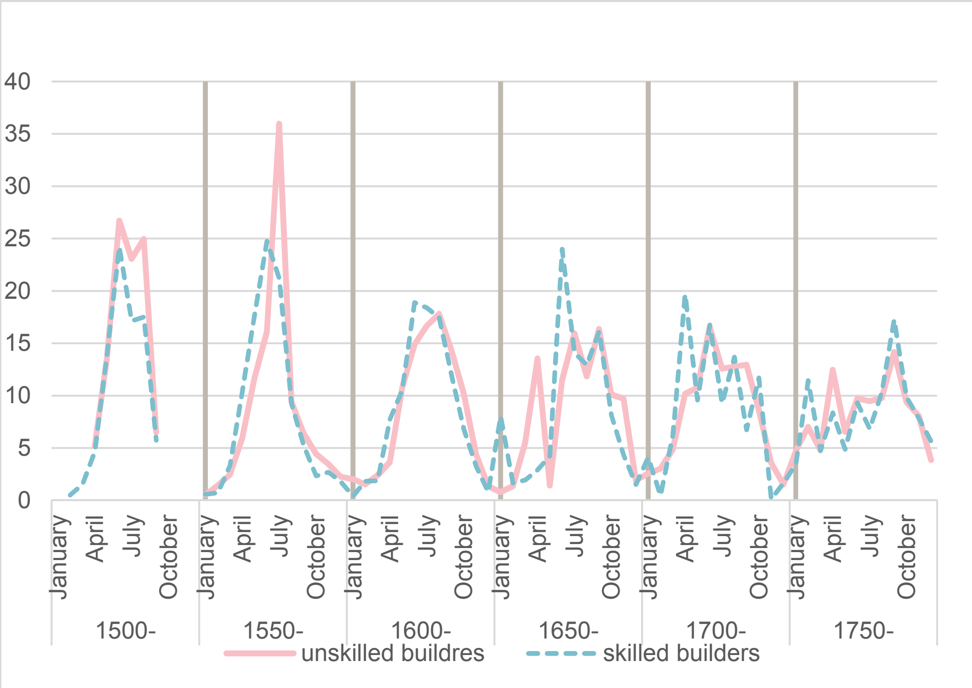

Figure 2: Distribution (percent) of unskilled and skilled workdays by month in fifty year periods. Source: Author's calculations. Unfortunately the data in the first half of the sixteenth century are the least likely to include a time specification beyond the year – about 35 percent of these observations cannot be included in the seasonality analysis because of this missing information. Missing seasonal information in other periods ranges between about three and 16 percent.

in later periods when skilled workers, in particular, are working earlier in the season. This could be connected to a changing in the structure of the labor market, or perhaps to a greater need (or ability) to prepare when building projects are smaller.

This indicates a changing dependence on seasonal conditions for labor, as indicated in previous studies. With a less seasonal work pattern, a larger number of individual workers would be able to work more days in the year – this is a mechanical function of a flatter distribution. When only those workers who are employed are examined, this can give the impression of increased industriousness; that is, it looks like people started working more. But this doesn't necessarily mean that there was more work being done, or remunerated, in the economy at large. A flatter distribution means instead that a smaller number of workers could work longer, but that fewer individuals could access work. This relationship is important to keep close to mind when assessing changes in industriousness in the very long term.

Was this seasonality universally applied? Which workers were able to continue their work into the winter months? Approximately 11,400 observations in the primary dataset include individuals' names; these represent nearly 2,900 individuals who can be identified in repeat observations and their working year isolated. Table 1 shows the distribution of individuals' workdays within a given year; they clearly tend to be very few. Sixty percent of all workers work ten days or fewer on a particular worksite; the mean number of workdays is 18, and the median 8. Skilled workers do work a bit more than unskilled workers with a mean of 28 and a median of 10, which is reasonable since they likely are leading projects. However this is still not a very large number of days.

Table 1: Median and mean number of men's workdays in Malmö, by number of paid workdays in the year

All years with more than (n) paid workdays		median	mean	s.d.	Obs (individual workers)
100 >= n	Unkilled	3	4.94	5.74	201
	Skilled	3.5	6.1	7.6	28
100 < n <= 400	Unkilled	6	8.95	11.8	211
	Skilled	7.5	11.8	19.2	33
400 < n <= 1000	Unkilled	11	18.7	22.2	270
	Skilled	13.5	27.6	30.1	40
1000 < n <= 2000	Unkilled	6	20.1	31.8	461
	Skilled	50	51.1	29.9	9
2000 < n <= 4000	Unkilled	11	24.8	36.4	62
	Skilled	18	30.5	28.8	36
4000 < n	Unkilled	12	24.8	34.2	234
	Skilled	9.5	9.2	4.5	4

So what does this say about a 'typical' work year? It is abundantly clear from the preceding sections that a typical work year in any one place was quite short, and unlikely to supply a full year's worth of work; workers who relied on the market for their primary support clearly would have gone between several different employers over the course of the work season, which makes it difficult to estimate the length of a 'typical' worker's full work year directly from the wage data. However it does seem clear that relying on alternative paid work in the offseason would not have been a reliable strategy because of the consistency of seasonality throughout alternative sources of paid work – agricultural work years peaked at the same time as the building labor assessed here. While there may have been substantial flexibility in places of work, there appears to be less flexibility in the timing of work.

Could people make ends meet with these annual labor patterns? Figure 3 below shows the number of days needed for unskilled men and unskilled women to meet the same level of income that someone employed on an annual contract would earn, as well as the number of days needed for unskilled men to earn their own basic needs (a 'respectability basket' of consumption go).There is a fairly clear trend toward more work days needed in order to meet an annual wage; the large increase in the late eighteenth and early nineteenth century is particularly apparent. These years featured particularly low wages and high prices, most likely related to high prices following the Napoleonic Wars and Sweden's continued (and not entirely successful) military engagement with Russia during this period. After the Finnish War ended in 1809 the relationship returned to levels closer to its previous trajectory. Throughout the majority of the period someone who was able to work

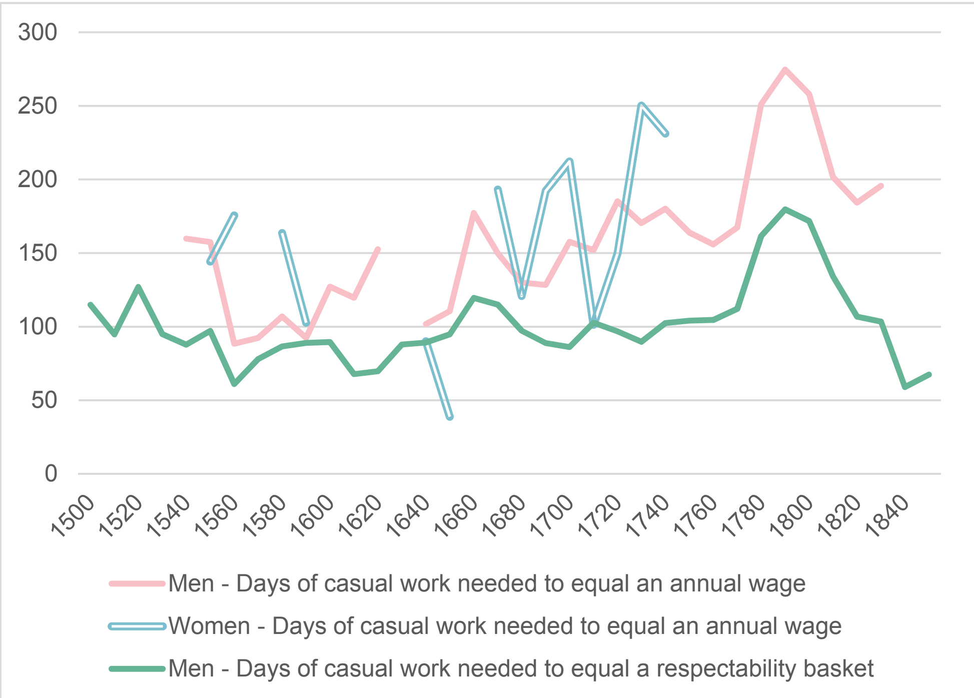

Figure 3: Days of casual work needed to equal an annual wage, and a respectability basket. Source: Gary 2018

140 days – a plausible median worker as suggested by figure 1 – would probably be able to support themselves at a reasonable level, but would not have had much left over for other members of a household. The evidence presented here suggests that our traditional assumptions of working patterns have overestimated real wage rates and household incomes.

Paper 4: Men at work: Real wages from annual and causal labor in southern Sweden 1500-1850. *With Mats Olsson*[7]

How did people in the past make a living, and what did they earn? Was one person's income enough to get by, or did the whole family have to chip in? How much did these things change over time, and why? The basic survival and wellbeing of common people have been some of economic history's central questions for nearly the last century. Countless real wage series of various types of laborers and over different lengths of time have investigated these questions. However, nearly all have relied on the same set of methodologies and data sources: using the wages of (male) day laborers to somehow impute changes in well-being on a national level, or at least for a class of workers.

In this paper, we use a brand new dataset to estimate and compare wages for casually and annually hired workers in early modern southern Sweden. This allows for a much more sophisticated and in-depth investigation of early modern living standards and well-being, but more importantly allows for an interrogation of some of economic history's most important questions, in a somewhat more 'typical' early modern economy than the leader, England. We follow methodology laid out by Humphries and Weisdorf in recent analyses of England (2015, 2017) and add the cost of living to the cash wage to estimate a wage-equivalent for annually employed workers who received room and board from their employers.

Wages have been used to formulate and test some of the major debates and theories in economic history, through their use alone, in comparison with other wage data, and in contrast to other statistics. Part of this is because wage data are often the most frequent survivors of history's cull of written information.

It is difficult to overstate the importance of the differences in interpretation and results that different uses – or misuses – of wage data have led to, and how they have shaped and reshaped the meta-interpretations of early modern European economic development. Wage studies have been the foundation for the most influential theories in the development of the modern economy; high real wages in the late medieval period are the cornerstone of Robert Allen's (2009) explanation

[7] Kathryn Gary took the lead on this study. Mats Olsson made substantial contributions through coding annual occupations, contributions of literature, and revisions.

of the Great Divergence and why England industrialized first – high wages and low costs of factor endowments such as coal led to employers and capitalists to invest in labor-saving capital and machinery, which in turn led to innovation and mechanization. Earlier, the increase in day wage rates after the Black Plague is connected to both transition to economic growth in the North Sea region as well as to women's increased engagement in paid labor and late age at marriage (de Moor and van Zanden 2010). Wages are also the foundation of the Industrious Revolution hypothesis (de Vries 1994, 2008), which posits that English workers increased their engagement in paid work after 1650. A growing gap between nominal wages and GDP per capita indicated an increase in the amount of work being done per person, which would generate higher GDP while wage rates themselves did not change. Many of these theories are grounded in the gaps between (British) real wages and GDP.

These theories are all based on men's day wages. But a different story can emerge when different kinds of wages are investigated; Humphries and Weisdorf (2017) demonstrates that incomes from annually employed men much more closely match developments of GDP and other macro-level indicators in England, while casually earned wages were famously out of synch. Reassessing historical trends with a focus on annually earned wages eliminates many of these divergences and calls for a reassessment of many economic historical theories.

This paper takes this step for the first region outside of England: southern Sweden. By examining casually earned wages together with annually earned wages, the sets of data together are able to offer more than the sum of their parts and provide significant insight into labor markets and living standards in an early modern society.

In figure 1 daily-earned wages are multiplied by 140 and 250 to represent two possible functions of the length of the working year. Annually earned wages are calculated as the cash payment together with the cash value of perquisites, measured here as the cost of food and other consumables for one year. Both annually earned wages and daily earned wages are divided by a single man's cost of consumables for a year (a 'respectability basket'), and show how they could support the earner directly. Despite some differences in development both wage types have a similar trend, with growth during the sixteenth century, peak wage levels in the beginning of the seventeenth, and decline through the rest of the period, especially from the 1770s and into the 1790s. Both wages have a slight decrease around the time of the Great Northern War in the early eighteenth century, while only casual wages indicate a decrease during the Second Northern War during the mid-seventeenth century, when Denmark lost Scania to Sweden. There is some recovery going into the nineteenth century, following a low point especially for casual wages in the last

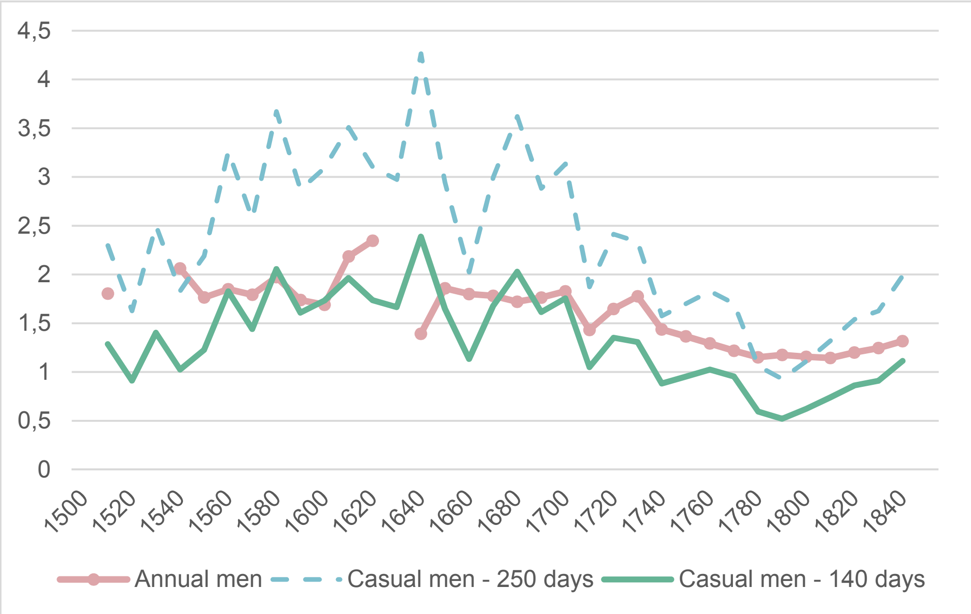

Figure 1: Casual vs annual real wages

years of the eighteenth century. However, annually earned and casually earned wages, with a 140 day working year, are remarkably in synch.

Figure 1 examines total and urban wages together, but there were substantial changes in the types of jobs available in the towns during the period of investigation. The eighteenth century saw a burgeoning bureaucracy. One of the dominant features is the increase in employment of lower-skilled workers, most notable in Malmö, the largest city in the sample. These growing positions included occupations such as customs officials (*tullskrivare*) and city police (*stadsprofoss*), both positions which required some skill or connection, but which Ågren (2014) describes as being rather lowly, often disliked by the people of the city, and not very well paid. While these positions might require some literacy skills, they were only a small step up from the bottom.

How did this impact urban wages? We can expect some level of 'de-skilling' of the least-skilled positions, typically city custodians such as *bysven* and *stadstjänare*, as roles become more specialized. And in fact this is apparent in the urban wage development. Figure 2 shows men's wage rates only in Malmö city, the largest town in the sample and the most important town in Scania, from 1650 until 1850. The yearly real wage for casual workers is shown at both 140 and 250 days of work, along with the wage for annually employed unskilled workers in Malmö. In addition, low-skilled men working on annual contracts are shown. These men's wages develop largely in line with unskilled annually employed men's, though are typically somewhat higher, as would be expected. There is convergence between them, especially in the early eighteenth century when wage levels are falling. At this point low-skilled workers even dip slightly below the unskilled workers, though this is not a particularly large difference.

Who was better off under these labor regimes? Figure 3 shows the number of working days needed for a casually working man to earn the amount of money needed to equal a subsistence basket, a respectability basket, and an annual worker's cash-income-equivalent. The underlying assumption is that men would be aiming to earn an income at approximately the same value as a respectability basket or an annual income, but the 'work day' values of the subsistence basket also give us a range of 'survivable' working years.

Throughout the majority of the study period it would take only 150 to 200 days for a casually employed man to earn as much as an annually working man; he need only work 100 to 150 days to earn a respectability basket's value – as little as 50 days were needed for a subsistence level support. Up until the mid-to-late eighteenth century a man relying on casual work would have been able to meet their annual needs with far fewer work days than what an annually employed man was expected to work. He could then spend the rest of the year working on domestic production or in leisure.

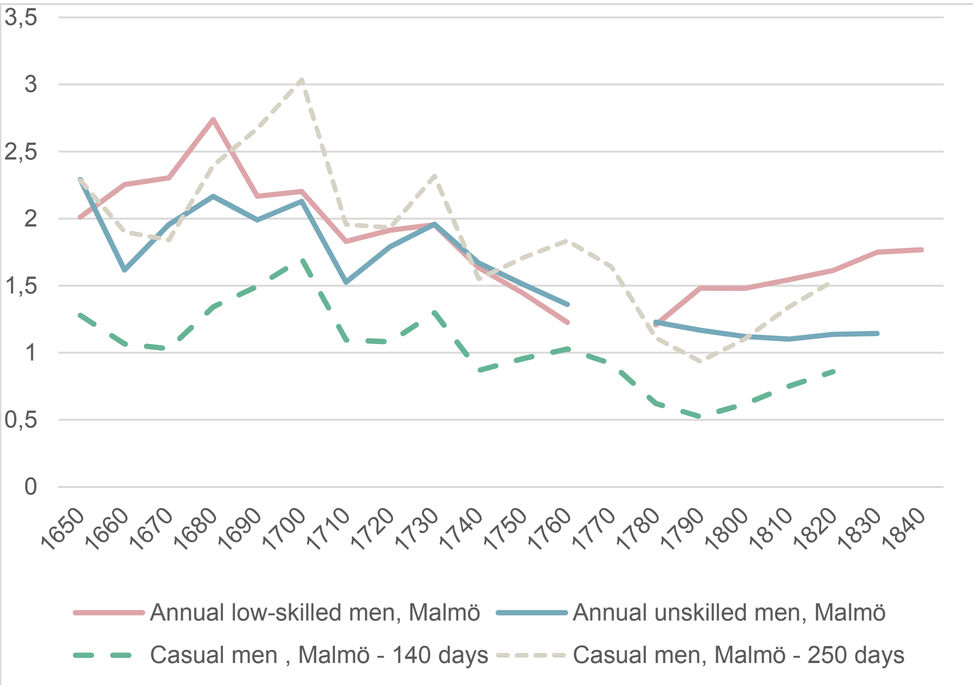

Figure 2: Comparison of wage rates in Malmö

The trend is fairly steady, with some fluctuations, until the late eighteenth century. Here nominal casual wages stagnate and prices rise, and real wage rates for casual workers in particular plummet. Söderberg (2010) connects this low point in real wages to an eighteenth century trend of rising grain prices, especially exacerbated at the end of the century by food shortages caused by the Napoleonic Wars. Here it became increasingly more work to earn the same cash equivalent as an annually employed man or respectability basket. At this point it would likely be more beneficial to be employed on an annual basis, especially if meals were guaranteed by the employer. Even if living standards for annually employed fell, they were still housed and supported by their employers. The risk here though is that households (and municipalities) would cut employment when food costs rose too high. And in fact this seems to be exactly what was happening, as estates increasingly shifted peasants off their land over the eighteenth century and shifted towards casually-hired labor, and the Swedish population became increasingly landless.

Especially during the last two decades of the 1700s, additional work from other family members was necessary. This pushes back against a male breadwinner model – most unskilled households relying on their men would go hungry. Women would have needed to be well engaged in the labor force, and children's work, at home our outside, would have likely also been required. It is also further evidence for an industrious revolution though the eighteenth century, though not in order to decorate their homes or indulge in new finery, as de Vries (2008) describes in some markets.

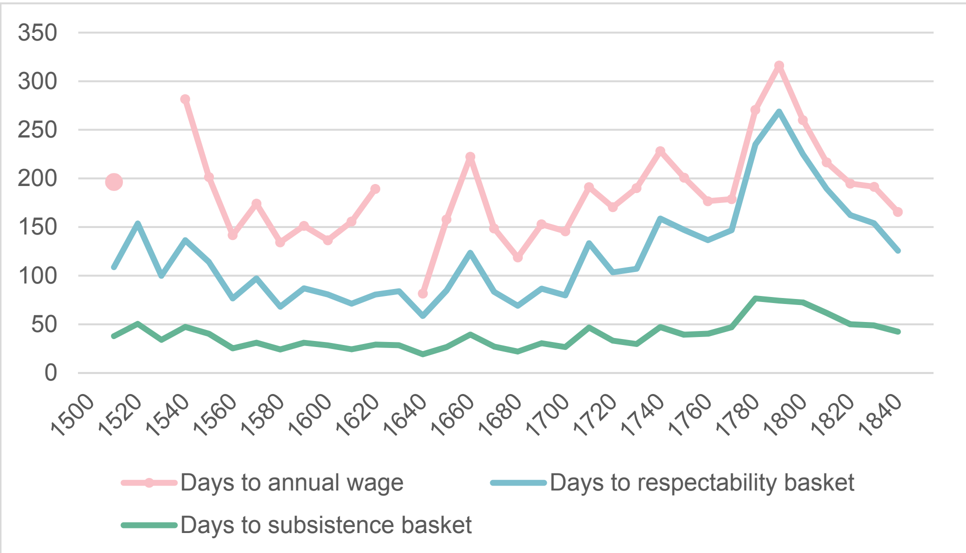

Figure 3: Days of casual work needed to equal an annual wage, a subsistence basket, and a respectability basket

Swedish working class families had to work more during the course of the eighteenth century in order to fight to maintain a decent consumption level.

Paper 5: The impact of border changes and protectionism wages in early modern Scania
With Cristina Victoria Radu[8]

One of the central questions surrounding both economic history and modern political economy is the impact of borders and protectionism on the movement and stability of prices and wages. Central to these conversations is the extent to which these macro-level policies impact regular workers whose livelihoods might be influenced, directly or indirectly, by changes in policy and institutions – how do the decisions of the elites trickle down to those with much less? An additional question of new economic geography asks 'how does location matter for economic growth and wellbeing?' – and how does second nature geography, in particular, impact well-being?

The Scanian case is useful addressing both of these questions in the case of early modern Scandinavia. The province of Scania (in Swedish *Skåne*) was reassigned from the kingdom of Denmark-Norway to Sweden in 1658, along with provinces Halland, Blekinge, and Bornholm, as a condition of the Treaty of Roskilde at the end of the Second Northern War. Apart from Bornholm, which was returned to Denmark, these three provinces today form the southernmost part of Sweden, with Scania as the most southern tip. Before this territorial change Denmark had controlled the territory on both sides of the Oresund Sound (Swedish *Öresund,* Danish *Øresund*) the straight which allowed access into the Baltic – now the sound separated Denmark from Sweden. The city of Malmö is located on the Scanian coast, across the water from Copenhagen but still within sight of the city, as shown in figure 1. The change in territory meant that Malmö was very quickly transformed from its kingdom's second largest city, in the capital region, to a peripheral town now several days' travel from its new nation's capital, Stockholm. This border

[8]Both authors contributed equally to the paper, with Cristina Radu taking a lead on analysis and Kathryn Gary taking a lead on the manuscript. Cristina Radu compiled data for rural Denmark and Kathryn Gary compiled data for Scania and Sweden.

Figure 1: Map of southern Scandinavia, with the main locations in this investigation. Scania is shaded dark grey and the other ceded territories medium grey.

change was accompanied by a series of protective legislation which prevented inhabitants of Scania from selling their products to Danish markets, which in turn had a direct route to the vital Dutch trade networks.

This study is especially well placed to shed some light on the effects of borders on prices and wages because of the similarity in language and culture between Sweden and Denmark. This allows our analysis to show how much institutional barriers to trade mattered. Our data is particularly well suited for this; we are able to take advantage of time series for a difference-in-differences based approach (e.g. Heinemeyer, Schulze, and Wolf 2008).

The empirical strategy assumes that workers in Scania and neighboring regions of Denmark were more-or-less the same and were developing under more-or-less similar conditions. If this assumption is met, we can further assume that real wages should have developed in parallel in lieu of any major upset.

Denmark-Norway and Sweden were largely similar in language and in culture throughout the early modern period, and many of the rights and customs of those living in the new Swedish territories were preserved while the nobility was guaranteed a continuation of their previous rights. Church services were conducted in Swedish instead of Danish, but the linguistic barrier was small, and the differences little more than a dialect or accent (Kirby 1990: 283). Swedish, Danish, and Norwegian remained de facto dialects of the same language, mutually intelligible but for regional accents. It is more likely that a Swede from the south of would have difficulty understanding a Northern Swede than a nearby Dane. This means that observed changes can be more directly linked to the change in institutional oversight and connection with important trade links, or to changes in second-level geography.

We know that the regions were not exactly the same –Denmark had been richer, and during the time of Scania's annexation Sweden was becoming more dominant. However, by using wage data from several different towns and regions we hope to capture the development of all the nearly-parallel paths developing in the extended southern Scandinavian region, and so isolate the impact of the border changes and change in second nature geography on Scania specifically.

We exploit several different types of data from rural and urban areas. Day wages for Malmö, Scania, and Kalmar come from primary archival sources from the south of Sweden, including city archives, churches, manorial estates, and hospitals. The majority of the data come from the city of Malmö and the town of Kalmar, but there are also data from other small towns as well as rural sources within Scania. The wages represent payments to both skilled and unskilled workers in construction, paid by the day. Between 1500 and 1850 there are over 21,300 observations of unskilled men, nearly 6,500 of skilled men, and nearly 1,700 of unskilled women. Skilled workers are predominantly carpenters and masons, while unskilled workers are assistants, mortar mixers, or diggers (see Gary 2018b). Secondary data from Stockholm on the day wages of unskilled construction workers come from Jansson et al (1991). These are presented as annual averages.

Wages for Denmark and Copenhagen are based on multiple sources and compiled by Radu (2018). The majority of the data from this period is from unskilled workers, though there are some skilled workers, typically craftsmen. The majority of these are from the construction and agricultural sectors, with around 11500 and 7500 observations respectively, but there are also around 2800 records of other occupations such a housekeepers, seamstresses, postman, or judges. While most of the data, around 20900 observations, are from rural areas, approximatively 850 records are from urban areas, mostly from Copenhagen

The test region is Scania, which changed hands from Denmark to Sweden and was directly impacted by new protectionist regulations. We test the change in Scanian real wages primarily against wages from Denmark, with the assumption that Scanian wages would have continued on the same trajectory without the border change. The second major comparison is Kalmar, situated just across the old Swedish-Danish border. This entire region suffered during the extended Danish and Swedish conflicts; this means that the economic impact of fighting on wages, either positive or negative, should have been present in both regions. However, Kalmar's previous trade routes and physical relationship to the capital, Stockholm, would not have been impacted. This makes Kalmar an extremely useful reference to isolate the impact of the border changes and increased protectionism in Scania, net of the impacts of fighting. In most models nearby Växjö is included alongside Kalamr.

Finally we include Copenhagen and Stockholm as comparisons. Copenhagen is an important test against Malmö town, since Malmö had been the second largest Danish city before its transfer. However, the data from Copenhagen are a bit scarce to rely on it as the primary analytical comparison. Stockholm represents the least impacted region, at least in terms of proximity to fighting, However these data are only available on an annual basis and so we are unable to compare on an individual level in this case. Because individual level observations are not available for the Swedish capital we cannot control for factors such as occupation and gender for the individual level observations and need to assume that these differences are not great enough to impact our findings.

The primary analysis is undertaken from 1600-1719. This time period covers the 58 years before the border change and ends at the close of the Great Northern War. The end of this war is selected as the end of the primary analysis because of the inflation and price disruptions which followed its conclusion (Edvinsson 2010, Gary 2018b).

Real wages (figure 2) are calculated for the day, by dividing the daily wage rate by a single day's fraction of the consumption basket. The vertical line to represent the 1658 border change is placed in 1660 because the border change was late in the previous decade. The drop in real wages for all regions – with the possible exception of Stockholm – is apparent following the border change. The question is whether this decline was greater for Scania, and whether we can connect this to the border change.

We apply a difference in difference estimation in order to compare the relative difference in wage changes before and after the border redrawing between Sweden and Denmark. We exploit that the border change is likely to have had a differential impact on people living in Scania, under the assumption that log wages would have

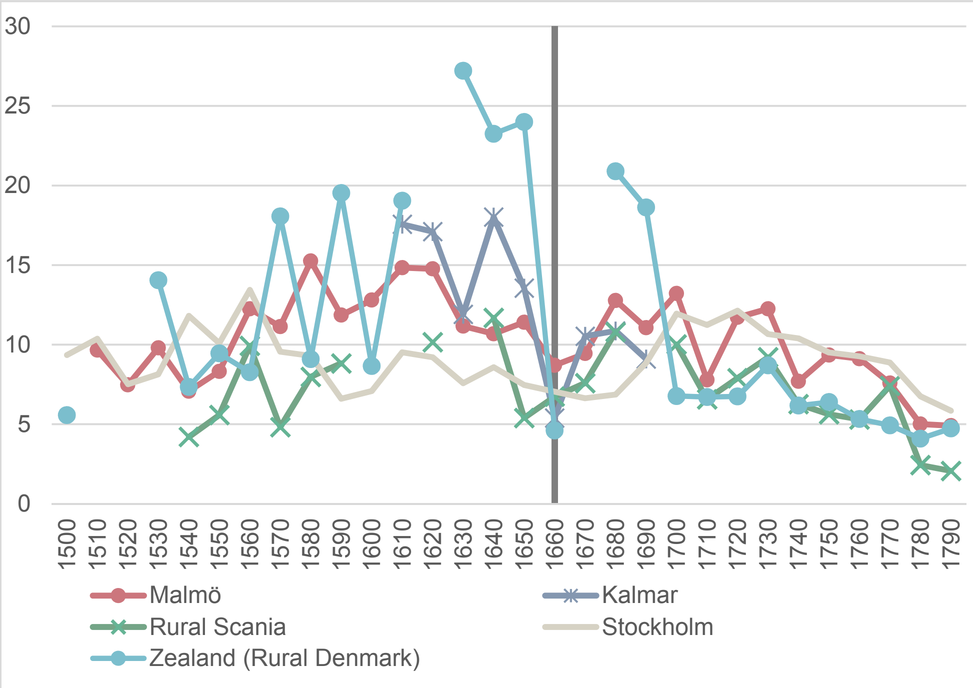

Figure 2: Real wages (for one day's work) in Malmö, Rural Scania, Rural Denmark, Kalmar, and Stockholm

been on parallel trends for those living in Stockholm, Scania, Kalmar, and Denmark in the absence of the border change. To this end, we estimate the following equation for the period 1600-1719:

$$lnw_{it} = Scania_{it}border_{1658}\beta + \alpha_t + X_{it}'\gamma + \varepsilon_{it},$$

In which lnw_{it} denotes log wages; i indicates individual and t indicates time; $Scania_{it}$ indicates whether the individual lives in Scania; $border_{1658}$ is a dummy variable which equals 1 for the period 1658-1800; β measures the effect of the border change on the standard of living of individuals living in Scania; α_t indicates the year fixed effects; X_{it}' is a vector of control variables for occupation and region.

We use fixed effects to control for year, occupational, and regional effects in order to account for differences across occupations and between regions with different types of data or workers. The year fixed effects capture any event that influenced wages across regions while the other fixed effects capture differences in wages between occupations and regions.

	Dependent variable = real wages 1600-1719							
	Scania compared to:							
	Denmark (Zealand, Funen and Jutland)			Kalmar and Växjö			Stockholm	
	1	2	3	4	5	6	7	8
Scania x change	-0.558***	-0.454**	-0.558***	-0.136**	-0.193***	-0.136**	-0.225***	-0.225***
	[-3.48]	[-2.07]	[-3.48]	[-2.25]	[-2.50]	[-2.25]	[-3.10]	[-3.10]
Observations	5,687	5,687	5,687	8,268	8,268	8,268	234	234
R-squared	0.666	0.674	0.666	0.482	0.508	0.482	0.682	0.682
Fixed effects for:								
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hisco FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Region FE	Yes	No	Yes	Yes	No	Yes	Yes	Yes
City FE	No	Yes	No	No	Yes	No	No	No
Sex FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Avg_Decadal_Wage<1658	No	No	Yes	No	No	Yes	No	Yes

Table 2. Main results for the border change. Base Model.

Scania compared to Denmark, Kalmar and Stockholm for the period: 1600-1719

Notes: The table shows the effect of the border change on real wages for men and women in Scania (measured as the natural logarithm of the daily real wage). Scania is compared to Denmark, more specifically with Zealand, Funen and Jutalnd (columns 1-3), Kalmar region (columns 4-6), and Stockholm (columns 7-8). The sample period is 1600-1719. The variable "Scania x change" represents a dummy variable which takes the value of 1 for observations from Scania in the period after the borders were changed (1658-1719); in the case of Stockholm, the difference in difference analysis was conducted on time series averages of real wages. Models include fixed effects for years, occupation, region, location as indicated by "Yes" or "No"; "Avg_Decadal_Wage<1658" is a variable that takes the value of the average wage by decades before annexation and 0 otherwise; coefficients are reported with the robust t-statistics in parentheses (*** p<0.01, **p<0.05, *p<0.1) and the standard errors are clustered at occupation level

Table 1 shows the results for our basic model. All the regressions show a negative and strongly significant impact of the annexation of Scania on real wages. Column 1 is the base model, where we include fixed effect to control for years, different jobs and different regions. The coefficient indicates that wages after 1658 were around forty percent lower than what we would expect without the intervention of the border change. Column 2 tests on a more local level and examines location fixed effects instead of region; again, results are statistically and economically significant. In column 3 we added a control variable which takes the value of the average wage by decades before annexation and 0 for the wage observations from after the change. This controls for wage trends before the annexation and gives more strength to our difference-in-difference model. The results here differ only slightly form those from the base model. Further sets of controls, including controls for wars, urban locations, and geographical factors, continue to show robust results. A pre-trend check also indicates that there were no significant differences in wage trends before the annexation – this lends validity to our identification strategy.

These findings lend support to the idea that locations matter beyond the relationship to physical features. Here, a prosperous region, though already in decline, was more adversely impacted by its change in second nature geography than surrounding regions which, though impacted, maintained more continuity in institutional and proximity to national capitals and established local networks.

Discussion, conclusions, and further work

This dissertation has drawn on a vast set of new archival wage data in order to address the question of what workers in different types of work received in remuneration in early modern Sweden and how this was impacted by the important chances and developments of the early modern period. Through these investigations the dissertation has also interrogated many of the assumption that we make as well as the ways in which we calculate and frame wages.

It becomes clear that many of our assumptions about the early modern period and what wages looked like mislead us when we employ them in trying to understand well-being and economic development. Further, using the experiences of one group to represent the development of the whole tends to give skewed results. This dissertation contributes considerable new wage and price data as well as extensive findings on the relationships between different types of wage earners in early modern Southern Sweden.

The initial data compilation in this chapter demonstrates the importance of regional-level data for understanding economic development and change. Even though Malmö and Scania are often included in historical assessments of Swedish development, it is clear that the Scanian experience is not well represented by that of Stockholm, upon which many of the national-level data series are based.

The first paper (Gary 2018b) lays the foundation for the dissertation by compiling and calculating new series of wages for different types of workers in early modern southern Sweden; these are examined briefly earlier in the present chapter.

Most real wage studies throughout early modern Europe feature casual wages paid to unskilled men; because of this, men's unskilled day wages are the most easily compared within early modern Europe. When compared this way, wages in Malmö were fairly high during the Danish period, especially during Denmark's decades as a dominant trade power in the late sixteenth and early seventeenth centuries. Wages before the eighteenth century were either on par with or substantially above those in Stockholm. While wage levels in Stockholm stagnated during the eighteenth century, wages in Malmö continued to fall, reaching extreme low levels by the end of the century before a recovery in the nineteenth.

This high wage level during Malmö's Danish period is a new contribution; previous understandings of Scandinavian and Sweden in this period have depended on data from Stockholm. The high wage levels, on par with those in European growth leaders, shifts somewhat our perception of the development of early modern Scandinavian well-being. Previous regional analysis, with the exception of Enflo and Missiaia (2017), have only been able to compare Scania, the county in which Malmö is located, to other regions from the middle of the eighteenth century. It is readily apparent with the new data here that there is a much more complex story further back in time. Through this it becomes clear that representing an entire country with the earnings of a certain group and place is not always appropriate.

Paper five (Gary and Radu 2018) strengthens this impression, and highlights the importance of high-level decisions on individual and local well-being; how are wages impacted by institutional structures far outside of the earners' control? The analysis indicates that a large part of the separate wage development was due to Scania's removal from Denmark and acquisition by Sweden following the Second Norther War. In 1658 Scania became Swedish and trade barriers were erected, along with Swedification programs to encourage residents to identify as new Swedes. Well-being as measured by men's casual wages was declining throughout Sweden and Denmark at this time, as both countries continued to fight and both lost their European power status. However, analysis shows that there is an even greater fall in wage levels in Scania associated with the boarder changes when compared to neighboring regions.

Paper two (Gary 2018c) draws on a specific set of data calculated in paper one: unskilled casual construction work. This is a typical source for calculating men's unskilled real wages, but this paper expands the inquiry to examine how women cooperate in this field. What kind of work that we think of is gendered is, in reality, flexible? And how permeable are these boundaries? It becomes clear that in many cases work is work, and what needs to be done simply must be done. This is fairly congruent with previous research from gender historians (i.e. Ågren 2014a), but has been harder to trace in a more quantitative fashion, especially over longer periods. Furthermore, these periods of work necessity permitted women to earn wages as high as men's. Whether this was because of some function of collective bargaining, facilitated by the larger proportion of women working in these periods, or simply a function of the need for casual construction workers is hard to say. But it does continue to indicate that women and women's work in the early modern period are more complex than what we assume both in our framing and in our methodological approaches. This paper contributes both data and strengthens theoretical approaches about women in early modern work. However, it is not able to make the leap to address household-level work patterns or income levels, beyond highlighting the flexibility of women's work. This is an important area of further research, since it is at the household level where living standards are truly determined, and is the measurement which most real wage studies hope to approach.

Paper four (Gary and Olsson 2018) is more explicitly interrogative; do these typical measurements really measure what we think we do? When day wages are compared to annually earned wages in service, a much more typical way to earn money, do we see similar patterns? Or contradictions? The methodology used here was only recently developed by Humphries and Weisdorf (2015, 2016) and has not yet been used outside of England. Even the analysis with data from a peripheral country is an important step to understanding more normal economic development. This paper focuses not only on the differences between men's wages in different types of work, but also explores the relationship between waged work and different markets – how much do different types of jobs represent normal wages as work and jobs change over the early modern period? Here it becomes clear that the picture is complicated as different categories of work dominate in different times and places.

Paper three (Gary 2018d) is explorative, but is also the most interrogative, asking 'what was a work year' and how it changed, and how well this lines up with our methodological assumptions. The results indicate that a work year was short at about only 140 days, though it was growing longer over time, and that this does not line up very well with our assumptions. It is also not enough work to support multiple people, furthering the growing understanding that supporting the household was a family affair. This pushes back against the standard real wage methodology, used almost unthinkingly, that assumes unskilled workers were regularly working 250 or more days in a year.

Many of these findings are not in the strictest sense 'new'; most expand on ideas which have been intuited by others, or described more generally by qualitative data.

But for many findings, this is the first time they have been consistently quantified. Interrogated, and presented together as components of a larger labor market. And even some of the findings that could be intuited are surprising: the short length of the working year, shown here numerically, is far below most estimates reached by less direct methods. Women's high earnings in construction have aroused considerable surprise, even if high relative wages and women working in physical tasks have been seen before. High wage levels in Danish Malmö could be assumed based on Denmark's' concomitant prosperity, but the actual height of these wage levels, together with other recent revisionist wage studies which shift levels from Allen's (2001) study, present an evolving image of what early modern wage divergence could have been. And while one could of course assume that restricting trade and free-flowing networks across a newly-drawn national boarder would have adverse effects on the prosperity of the citizens of the region, seeing the impact numerically has a very different feeling, and makes us once again question what we and our policymakers have decided to forget from our historical experiences. Together, this dissertation demonstrates the importance of continuing to question our methods and our sources on the most basic levels, as well as the possibility of finding data and information which enable us to address questions which we have thought were not possible.

There is of course considerable work still to be done. This dissertation almost entirely skips over skilled workers of both sexes, despite their presence in the underlying data sets. As indicated in papers 3, 4 and 5, the experiences of these workers could be very different, and including their development shifts what we conclude about overall development. Annually employed women, too, are left out, and are the subject of another ongoing work. The seasonality of early modern labor is likely different across Europe, and this should be addressed by developing and applying an adjustment index which accounts for regional variation. The day wage series also would benefit from extension further forward in time. But taken together this thesis is a step toward a better understanding of early modern work, wages, and income.

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Paper I

On the construction of nominal and real wage series: Southern Sweden 1500-1850

Kathryn E. Gary

Wages are one of the best and most consistently available tools economists and historians have to investigate what labor markets and living standards looked like in the distant past. With a dense enough set of wages paid to people in different occupations, regions, and payment schemes; as well as to women and men, comparisons can be made both within and across markets. This can give considerable insight into the workings of labor markets overall and how these labor markets must relate to the survival of the households and individuals dependent on them.

To this end, this chapter describes the process behind the construction of several wage and price series in order to analyze patterns of early modern work and compensation in what is today southern Sweden. Wages reflect two broad categories of work: casual work in construction, paid by the day, and work which is contracted and paid for an entire year. Casual work is often conducted on the spot market; there is little indication of long-term contracts. Long-term work would be contracted by the year; in many cases these positions would include room and board as part of compensation.

The predominant task of this work is to process and refine primary archival data on wage payments to produce a variety of wage series which can be used for further in-depth analysis. The wage data come from archival sources from across the south of modern day Sweden. A secondary task is to compile previously published sources on prices in order to create regional cost of living indices in order to deflate and interpret wage trends.

This is an ambitious task. There are approximately 28,500 observations of casual wage payments and over 23,000 observations of annual wage payments in the raw databases. The wage observations cover over three centuries. The types of work covered in the sources and the raw databases range from unskilled ditch diggers to mayors; organists to midwives; mason's assistants to dairy maids. They are employed by cities, manors, churches; some are anonymous workers or appear only for a few days while others are observed for decades. Because of the huge scope of skill and occupational diversity in the raw data, this paper limits its focus to only those in the lowest categories of skill; we take the dairy maids, diggers, and assistants and leave the mayors and artisans for another day.

Unskilled workers are the focus of this work for several reasons. The first and most important is that the lower skilled are the common people and the backbone of society. If we are interested in the basic function of early modern life we must take the basic people of the early modern world.

The second reason is the sake of comparability. While there is much to be gained from a close investigation of one region or market, there is even more to be gained if we are able to place these findings against similar investigations from other regions or contexts. The vast majority of early modern wage studies focus on unskilled workers – indeed, the bulk of this work addresses men who worked for casual wages, predominantly in unskilled construction work. This focus provides a rich body of comparative studies and is a strong motivation for beginning with the parts of the data set which can be most in conversation with international scholarship.

Third is the fact that, largely because of existing work on unskilled workers, there is a stronger methodological foundation for understanding (or debating our understanding of) these types of wages. Methodological approaches to understanding unskilled workers' casual wages – and robust debates over the problems with or appropriateness of certain methods – have been a stalwart of economic-historical literature since the early parts of the twentieth century (see Phelps -Brown and Hopkins 1956). Recent work by Jane Humphries and Jacob Weisdorf (2015, 2017) has expanded methodological approaches; previous work assessed only day wages. Humphries and Weisdorf's approach has provided a more broadly applicable methodology for calculating wages paid by the year to live-in servants – a category of payment that, while much more typical than casual payment, had been difficult to calculate due to the large component of in-kind payments.

Due to the novelty of this method there are still very few studies that develop a long-term data series of annually-remunerated work. This study makes an important contribution by presenting both annually-paid and casually-paid wages together; it is among the first studies to do so. It furthermore presents wages for women and for men in urban and rural environments for both wage types. This array of wage types creates an unprecedented chance to examine the relationships between different types of unskilled work. Through these relationships we can uncover the changing positions of different labor groups and infer the impact these changes must have had on household units.

This chapter presents the sources, assumptions, and computations of the nominal and real wages, which are used as the basis for analysis throughout the rest of this dissertation.

The first sections present descriptions of the data sources, the types of work they represent, and how they fit into early modern Sweden. The following sections describe the treatments necessary to transform the raw data into annual cash-wage estimates. The next section describes the calculation of prices series from secondary and published data. Finally, the wage and price series are brought together to estimate nominal and real wages for both casually-employed and annually-employed men and women in early modern southern Sweden. A short section compares the newly developed data to already-published data about early modern Swedish prices and wages.

The Sources and Data

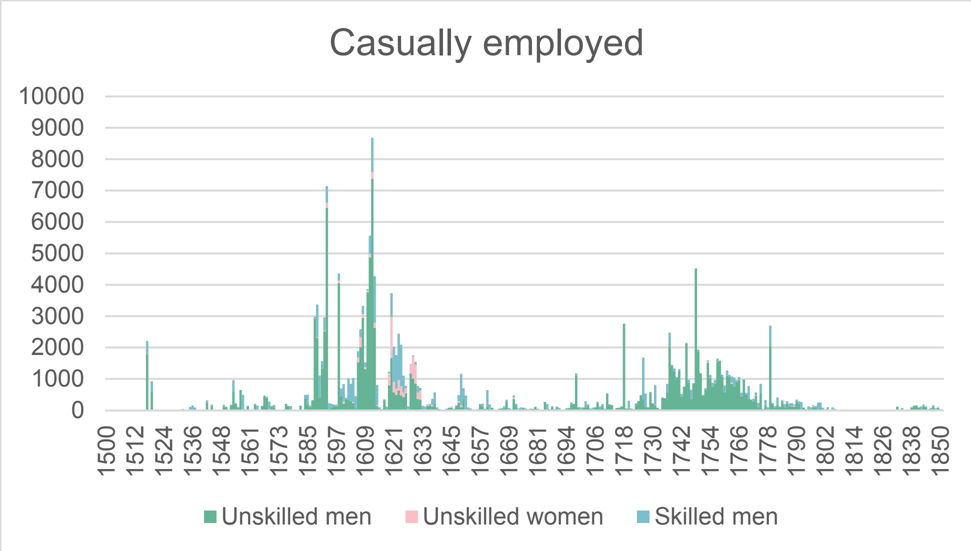
The different types of sources

The combination of different types of wages and different locations and types of work provides important scope to analysis and investigation, but it also presents some difficulties in ensuring that all the data is correctly understood and computed. It is important to understand the differences both in what the figures themselves represent as well as the differences in character between the different kinds of work the payments compensated.

The wages and work that were earned, completed, and recorded are different for casual labor and for workers hired on long-term contracts. In rural regions annually-paid work is predominantly work in service, completing household and farm work throughout the year. In the cities, annually-employed workers are observed working for the city itself, often as city custodians and guards. Interspersed with these are some workers for churches and cathedrals, who tend to follow similar patterns to the municipal employees.

The primary wage data has different units of observation for wages earned by the day and those earned on a long-term contract: for casual, or day, wages, the unit of observation is paid work days. If one entry records an individual working for five days, this is counted as five observations; similarly, an entry recording seven workers each working for one day is counted as seven observations. This is to ensure that all data points are treated equally and given equal weight. It is not possible to link every entry to an individual worker, so if repeat work days for the same individual were eliminated from one record, this person's work days would not be given the same amount of weight as other days worked by another individual which could not be connected.

Wages paid by the year on the other hand have a unit of observation of paid work year. This does create some disequilibrium in what is being compared; obviously a



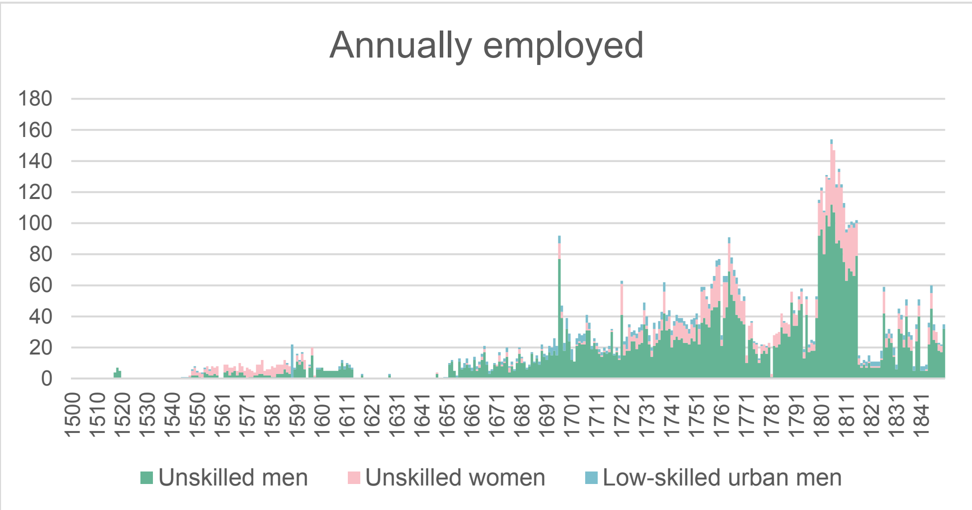


Figure 1: Distribution of observations of paid casual workdays, observations of employed annual employees. Source: see text. Author's calculations

full work year of casual work will comprise many more observations than a full year of annually contracted work, which will be only one observation.

In addition to the different units of observation the distributions are also distinct, despite both sets of data coming from the same basic sources. Figure 1 shows these differences. There is a massive spike in the amount of casually-paid workdays around the turn of the seventeenth century, peaking with over 7000 observations of paid work days to unskilled men in 1612, followed by a trough and then a lower peak in the middle of the eighteenth century. Before 1800 the casual wages observations are a complete extraction of all available observations from all consulted sources; in the nineteenth century it was necessary to take a random sample. This explains some of the low level of observations after 1800. The fluctuations in the early period are reflective of data availability. Annually employed observations on the other hand show a tendency to increase throughout the period, with some fluctuation. This reflects the expansion of urban bureaucracies and population throughout the period, and the sources' reliance on city records. Throughout both types of wages unskilled men are the bulk of all observations.

This differences in units between the two wage types also presents difficulties with directly comparing individual work patterns over the course of the year. People employed by the year work more or less the entire year – there would be holidays and some days off, but especially those working in agriculture or husbandry would have had chores nearly every day. When it comes to those who are paid by the day it is much harder to understand how this fits into an individual's overall strategy of support. All we know is what is observed, which could be all or only a part of a person's work for cash in a given year.

Payment records are also recorded slightly differently for those on annual contracts and those who are paid by the day, with day wages more likely to include the worker's name and annual occupations more likely to refer to a job title. Annual records include the occupation, the wage, and the length of the contract. The location of work, type of employer, and the year of employment are known from the record books themselves. It is not common for these records to include the names of the workers, especially when they are unskilled servants working on manorial estates. However, most occupational names are gendered, so sex can be fairly easily assumed. Records however do not include a description of tasks or responsibilities, or age or marital status.

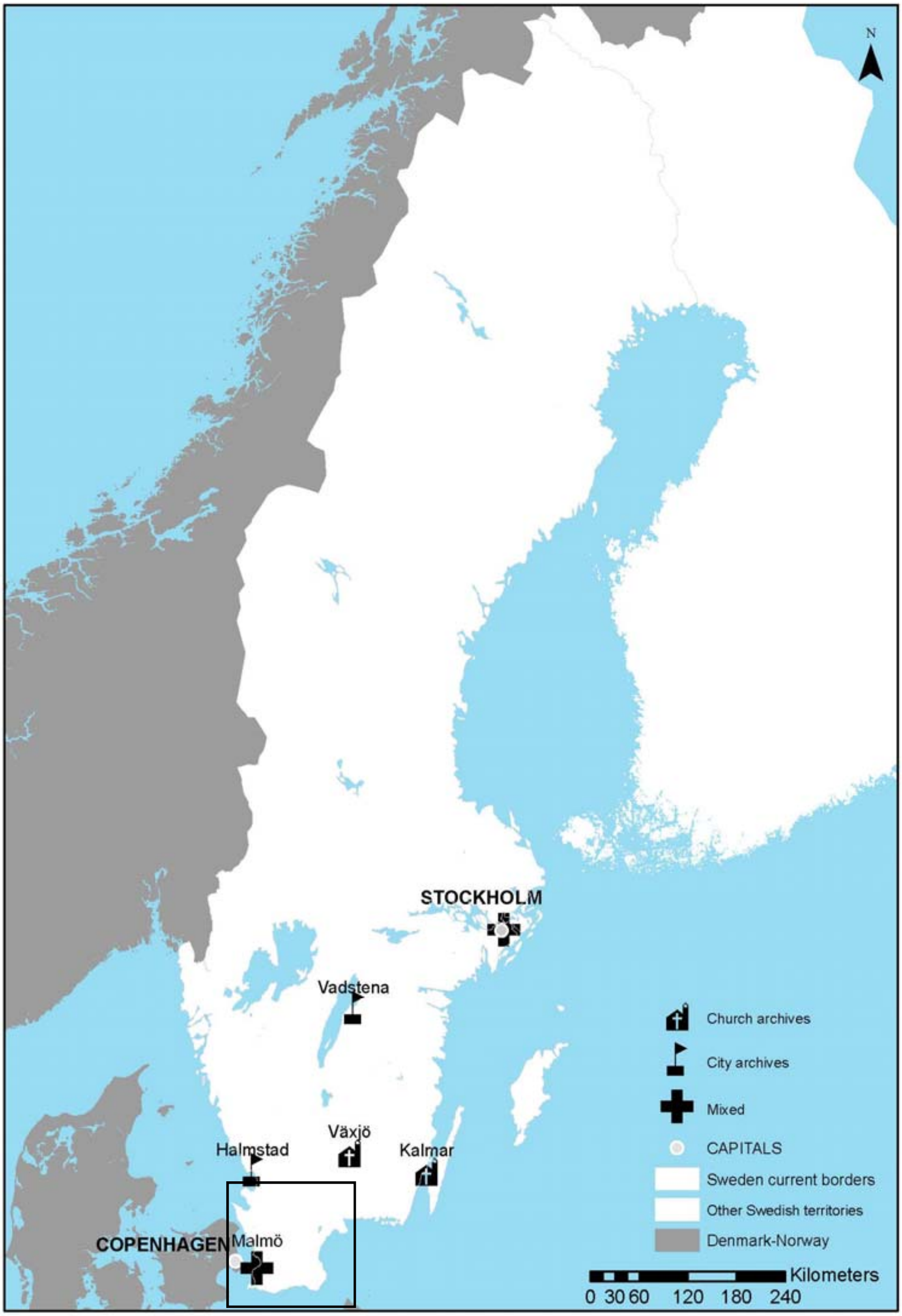


Figure 2a: Map of Sweden with non-Scanian archival locations indicated. Map: Alexandra L. Cermeño.

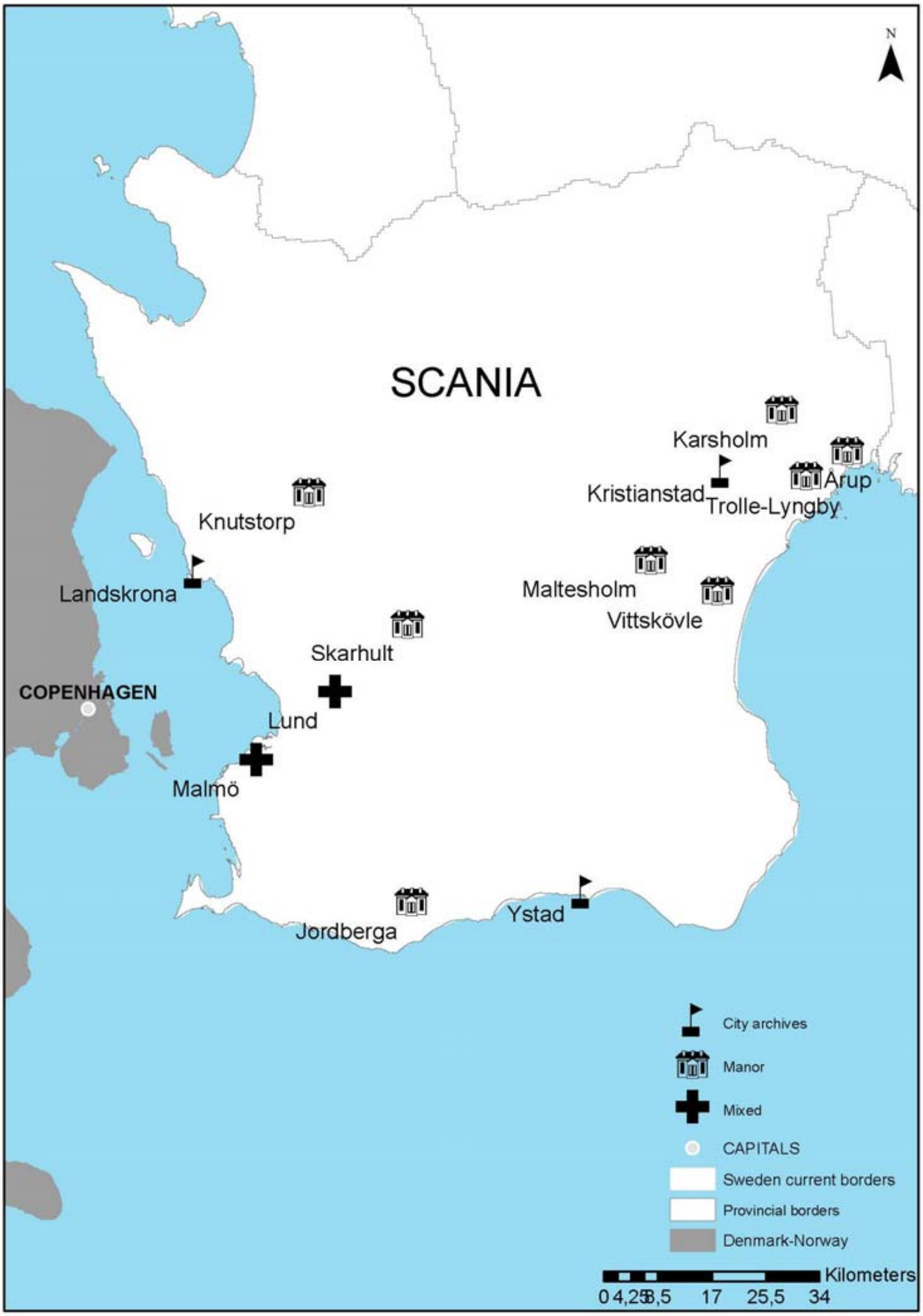


Figure 2b: Map of Scania with archival locations indicated. Map: Alexandra L. Cermeño.

Table 1: Wage observations by type and location

Archive	Casual men		Casual women	Annual men	Annual women	Annual men - urban	Archive type	Years
	unskilled	skilled	unskilled	unskilled	unskilled	Low-skilled		
Malmö borgerskap	16,066	3,509	324	1,013	1	400	Town	1517-1850
Kalmar cathedral	2,746	1,485	1,330	-	-	-	Church	1614-1709
Halmstad	35	26	-	-	-	-	Town	1594-1702
Jordberga	42	9	-	221	85	-	Manor	1756-1809
Karsholm	16	42	-	54	26	-	Manor	1681-1811
Knutstorp	41	21	12	414	83	-	Manor	1742-1849
Kristianstad	67	19	-	420	21	92	Town	1652-1770
Kristianstad Hospital	-	-	-	65	87	-	Hospital	1766-1830
Landkrona Rådhuset	160	58	-	-	-	-	Town	1699-1776
Lund Cathedral	241	65	-	153	-	5	Church	1676-1780
Lund Rådhuset	56	45	-			-	Town	1674-1757
Malmö Hospital	530	326	8	141	216	-	Hospital	1547-1689
Malmö Saint Petris Church	716	349	1	-	-	9	Church	1532-1681
Maltesholm	15	3	-	20	11	-	Manor	1738-1770
Rosendal	-	1	-	4	10	-	Manor	1672-1680
Skarhult	-	-	-	9	4	-	Manor	1679-1762
Trolle-Ljungby	206	10	1	700	357	-	Manor	1721-1807
Vadstena Rådhus	24	10	2	117	-	26	Town	1613-1740
Vittskövle	297	15	2	1,132	519	-	Manor	1647-1828
Växjö Cathedral	35	71	6	23	-	-	Church	1658-1704
Ystad	40	92	-	275	9	31	Town	1633-1850
Årup	7	-	-	7	2	-	Manor	1623-1778
Total	21,348	6,456	1,686	4,822	1,465	563		1517-1850

Daily wage records usually include the general occupation or job of the person employed, though sometimes it is not specified; in these cases context indicates that workers are typically an unskilled laborer. These records are more likely to include a description of the project on which they are working. These records are also more likely to list workers by name, though this is not always the case. Most records indicate the day rate the worker is paid, the number of days worked, and the total payment at the end of the pay period. In these records men and women are sometimes referred to by the same occupational title, so when names are not also listed it is not possible to identify the sex of the worker.

The particulars of each type of wage should make it clear that there are significant difficulties with both. They are addressed here as well as is possible with the current data and methodologies. The difficulties are further addressed by assessing the different types of wages together – it is more likely to reach a set of conclusions which more accurately reflect the workings of the early modern Swedish economy through using different types of data together.

Representativeness of the data sources

These archival wage data, for both annually and casually employed, come from the same set of sources. The locations are spread across what is today southern Sweden; most sources are in Scania, the southernmost province, but there are some sources from just outside of the region. The backbone of the data comes from the city of Malmö, then and now the largest city in the region. The city is located just across the Oresund straight from Copenhagen, and is today the third largest city in Sweden.Nearby Lund and the city of Kalmar are also more urban areas. Other data come from smaller municipalities, churches, and manors located throughout Scania. A few sources, including the data from Kalmar, are located outside of the province of Scania; these are indicated in figures 2a and 2b. Table 1 shows the names of the different sources, their contribution to the data sets, and the type of source they represent.

Skilled casual employees and unskilled annually employed women are included in the tabulation to give a broader view of the labor market in general and different types of sources, even though they are not directly assessed in the dissertation itself.

These are all institutional sources or large manorial estates; none of these data come from private households. The reliance on institutional sources is fairly standard; these are the kinds of sources which tend to survive the centuries in order to find their way into our archives. These source all have a high incentive to accurately and thoroughly record their costs and spending; these account books were used to audit cash flow and hold individuals accountable for all payments.

This typicality and internal reliability does not mean that these types of data are not problematic. It takes no stretch to understand that the type of work which is paid for, and subsequently recorded, might not be truly reflective of the labor market as a whole. Our concerns are twofold: *(i)* the *type* of work might be distorted, and *(ii)* the *wage level* might be systematically different when compared to other employers.

We cannot know exactly when or to what extent these patterns are distorted. Even if we do know that some must be – the over-representation of urban sources as well as construction labor relative to the demographics and sectoral spread of southern Sweden at the time are the most obvious examples – they are difficult to quantify. As with almost all similar historical data, there is simply too little known about the everyday of the period and about how people went about their lives. However, there are some assumptions and inferences we can make.

First, as stated, is the reliance on construction work to represent casual labor. As stated, this is standard in the literature; since Phelps-Brown and Hopkins (1956) first estimated a proto-real wage series, researchers have relied on day wages paid to construction workers to estimate changes in cost of living or other measures related to wages. These wage payments, in turn, come from large estates and institutional sources, places which had the incentive or necessity to keep account books and payment records. The ubiquity of construction workers' payments is a function of data availability.

The strong contribution of data from cities is also not a representative sample of work in early modern southern Sweden and early modern Europe as a whole. While the majority of casual work and a strong component of annually hired work come from towns, only about 10 percent of Swedes lived in urban areas as late as 1850, at which point Sweden was still over 70 percent agricultural (Schön 2010). However the data used here do have a stronger representation from rural sources than many similar studies, and the ability to break the data down by urban and rural contributions is an important step in understanding wage developments as a whole.

It is much harder to know how this source bias of occupation or job is also reflected in wage levels themselves. Work on the eighteenth century has indicated that wage levels for servants hired in farming households were fairly consistent across Scania (Dribe 2000), but extending patterns far back in time is not reliable. A 1683 survey of the wages paid to household servants by all city households undertaken by Malmö city indicates a strong degree of wage-setting, with consistent wage structures throughout most of the city (Malmö stadsarkiv, Borgerskapet i Malmö, GIIIa:1). These indicate a tendency toward wage equilibrium and the robustness of the data in this chapter.

The data discussed and processed in this paper have a strong advantage over data which come only from builders in cities. This chapter also includes wages for builders in rural areas as well as wages for annual earners both in the towns and countryside. Because of this density of wage data it is possible to make comparisons which are not feasible in other regions. This means that the comparisons and contrasts between different sets of wage data with different assumptions can be used to lead to a stronger understanding of the waged economy and labor markets.

Casual work – data patterns and types of work

The work represented in the casual labor database is in many ways fairly homogenous; the vast majority is construction work, and all paid on a casual basis. However, this does not mean that it was entirely without variability. Unfortunately while the existence of variability is apparent, the recording style also do not necessarily make it simple to understand exactly how to interpret that variability.

One of the first steps and among the more labor intensive tasks is the separation of workers into different skilled categories. The full database consists of approximately 28,500 observations of payments, with a wide range of work requiring a broad set of skills or specializations. Understanding the skill level or specialization involved in the work being done is important to interpreting what the wages being paid represent – is the person executing very basic tasks, such as moving materials or digging; or are they doing something which could be considered more semi-skilled, such as mixing mortar and assisting a mason?

Some of this is reasonably straightforward, especially for the most-skilled. But others are less clear, and we must often rely on the structure of the data itself to make inferences. Through this, and made clear largely because of a tendency toward wage stickiness and fixed rates, it becomes clear that there are often several slightly different tasks or jobs being listed together under the same heading or within the same category.

The majority of payments in the dataset are recorded by the week, with the date of record and the number of days worked in that week. The format is fairly typical and consistent between most sources and most periods when there is regular work. The data appear like this because the majority of it comes from periods of higher work intensity and larger building projects. During years when there is less regular work and paid labor is more sporadic it is much less common for the date or the number of days worked to be recorded as precisely.

During these regular periods the written format is quite standardized. At the top of the page is a heading, usually with the week of payment and the project being undertaken. This can be fairly broad, sometimes only describing the location or region in which work is being done. The topmost listed payments are to the most skilled or specialized people. Typically payment records then have headings under which groups of similar workers are listed. First come the masons, or *murare*, skilled workers who often have many assistants, and carpenters. The most common structure then has a heading '*hantlangare*', often translated as 'helper' but referring generally to an unskilled worker. Other instances might have a more general heading such as '*diverse arbete'*, or 'various work'. This means that the large majority of workers and an even higher proportion of unskilled workers do not have their work task specified beyond the general project on which they are employed.

Within large groups paid for what is lumped together generally as 'unskilled work' there are still differentiations and indications of separate tasks, though these are not labeled. But within these explicit categories are often sub-groups of workers who are not explicitly differentiated. This is especially true of management-type positions, which are often not defined but become clear through the structure of the lists and the differences in payment. Week after week it is common to find the same individuals listed first in their respective categories – skilled or unskilled – paid a slightly higher wage than their peers. It becomes clear that these people are either foremen or a lower-level manager. It is also common to have the more skilled workers explicitly titled, instead of falling under a broad category – in these instances it is more common to have a foreman explicitly mentioned, along with the masons, but then there is often a man who has no title connected who in included with the 'skilled' workers, before the broad category of *hantlangare*. Going strictly by the labeling in the data he should be considered unskilled, since the default is to treat un-labeled workers as unskilled (to ignore all of this category would be to eliminate too many data points and would skew the sample away from the most typical type of observation). However, contextual information – their inclusion with skilled workers and their higher wage levels – make it clear that a 'skilled' categorization is more appropriate.

This description should make at least two facts abundantly clear: *(i)* there is a substantial degree of discretion and decision-making that has gone into the categorization of the data, and *(ii)* there is a significant amount of heterogeneity even within work categories which on the surface appear the same. Both of these facts present some difficulty. It is always the goal of scientific research to be as replicable as possible. However, it is also the case that historical records were not created with the needs of future researchers in mind, and some interpretation is required in order to use them to their fullest extent.

Different tasks or skill levels are not always clearly specified or indicated. Even when a specific bill of payment is enumerated, it cannot be guaranteed that a particular project in that year and location will have recorded tasks or work categories in the same way as another project in another town and a different century. This means that there is some discretion needed when separating workers and work tasks into categories of 'skilled' and 'unskilled' work, especially when the categories become blurred. In several cases the same individual can be observed working on tasks that are clearly skilled in one month but are working on unskilled tasks in other months, creating further difficulty with classifications (see figure 3).

Many of the workers who are less-skilled are not described in detail. Forty percent of all unskilled observations are called by a title that is generally equivalent to 'man' or 'worker' (*man / män, karl, arbetskarl, dräng*). A further twenty percent have no title at all, meaning that over sixty percent of all unskilled observations provide very limited, if any, occupational information apart from the general project being undertaken. Approximately six percent more are called *hantlangare*, an unskilled worker or helper. About seven percent are called *grävare*, a digger; this is one of the only specific very-unskilled occupational titles which is used.

One of the few categories of more specific unskilled workers listed more than a handful of times is *kalkslagare*, a lime- or mortar-mixer, and interpreted broadly throughout as a mason's assistant. These workers are still considered unskilled, but seem to be slightly more specialized than the general workers. This is especially the case in Kalmar, a small city just across the Scanian border. This source has more consistently named workers, so it becomes simpler to track individuals throughout the records. Here, we find a large number of women working as *kalkslagare*, typically denoted by the feminized *kalkslagarska*. Some of these women appear consistently working with the same masons, even when there is less work being done overall, indicating this stronger degree of specialization or a preferential relationship.

This ambiguity of skill, and the prevalence of skill-dependent work into categories which researchers describe as 'unskilled', is observed by Judy Stephenson (2016). Here, she observes the many gradations of skill that are encapsulated in the group of workers we typically call 'unskilled' and argues for closer attention on the individual tasks and skill level actually present. There are similar patterns clearly at work in the Swedish data as well; people who do unskilled work but act as supervisors; those who mix mortar or perform some other task which requires practice or some on-site training; 'unskilled' workers acting as supervisors. However, I have chosen in this work to continue to use the broad category of 'unskilled', and to address wage development from this perspective. This captures a low-skilled or non-specialized class – the class which has not been able to access advanced human capital development and which is more likely to rely on several types of 'jack-of-all-trades' type labor to bring in cash.

Some types of work were excluded from the dataset in order to ensure that all wage observations reflected a more-or-less standardized group. One of the largest categories was agricultural work. There were a small number (approximately 160) observations of agricultural work by both women and men. Before the later part of the eighteenth century this was predominantly carried out at Malmö Hospital, a charity hospital, and predominantly consisted of tasks such as *'bundit de fattigas korn', or* 'bound the poor's grain'. Wages were extremely low. Because of the atypicality of the work in combination the very different wage levels these workers are not included. Likewise, children and prisoners are clearly not typical workers and are expected to receive systematically lower wages and to be carrying out different types of work than full adults who are not conscripted to work. These groups are also excluded from the final data set.

Casual work – modality and wage stickiness

Nominal wages from before the modern period are characterized by their stickiness – wage payments, at least in cash, did not change much from year to year. Short-term changes in real wages and living standards were instead driven predominantly by prices changes (see Phelps-Brown and Hopkins 1956).

This pattern of wage stickiness is present to a large extent in the databases which are constructed here. In Malmö the pay rate for a day's work could remain the same for decades. This is only a moderate case of stickiness, however; in England day rates could remain flat for much longer, at times up to a full century (see Phelps-Brown and Hopkins 1956, Clark 2005). The less-persistent wage stickiness and occasional nominal decreases in Scania and Malmö is connected to the financial instability and frequent revaluation of currencies. The response of nominal wages to re- or de- valuation is apparent in the more than doubling of nominal wage levels between 1755 and 1765, in the decades before the old monetary system was completely abandoned and a new system established in 1777. Responses to inflation are also apparent in the early sixteenth century; the introduction of copper coinage parallel to silver in 1624, followed by the continued devaluation of copper relative to silver and the repeated changes between copper and silver as the 'official' monetary unit push back against any long-term wage stickiness through much of the seventeenth century. Wages did tend to be fairly (though not entirely) constant within a given year, however, and were very clearly set within a given work project. This is explicitly clear on the largest projects, especially, when the wage of all workers would be written next to a list of names, and a bracket would be drawn to indicate that the wage rate was the same for all listed (see figure 4). In other instances, a 'ditto' mark is simply entered on subsequent lines, to show that the wage rate continues down the page. This wage-setting is especially strong for the unskilled workers, but extends as well to more skilled masters. However, with fewer masons or masters employed per project, it can be less distinct.

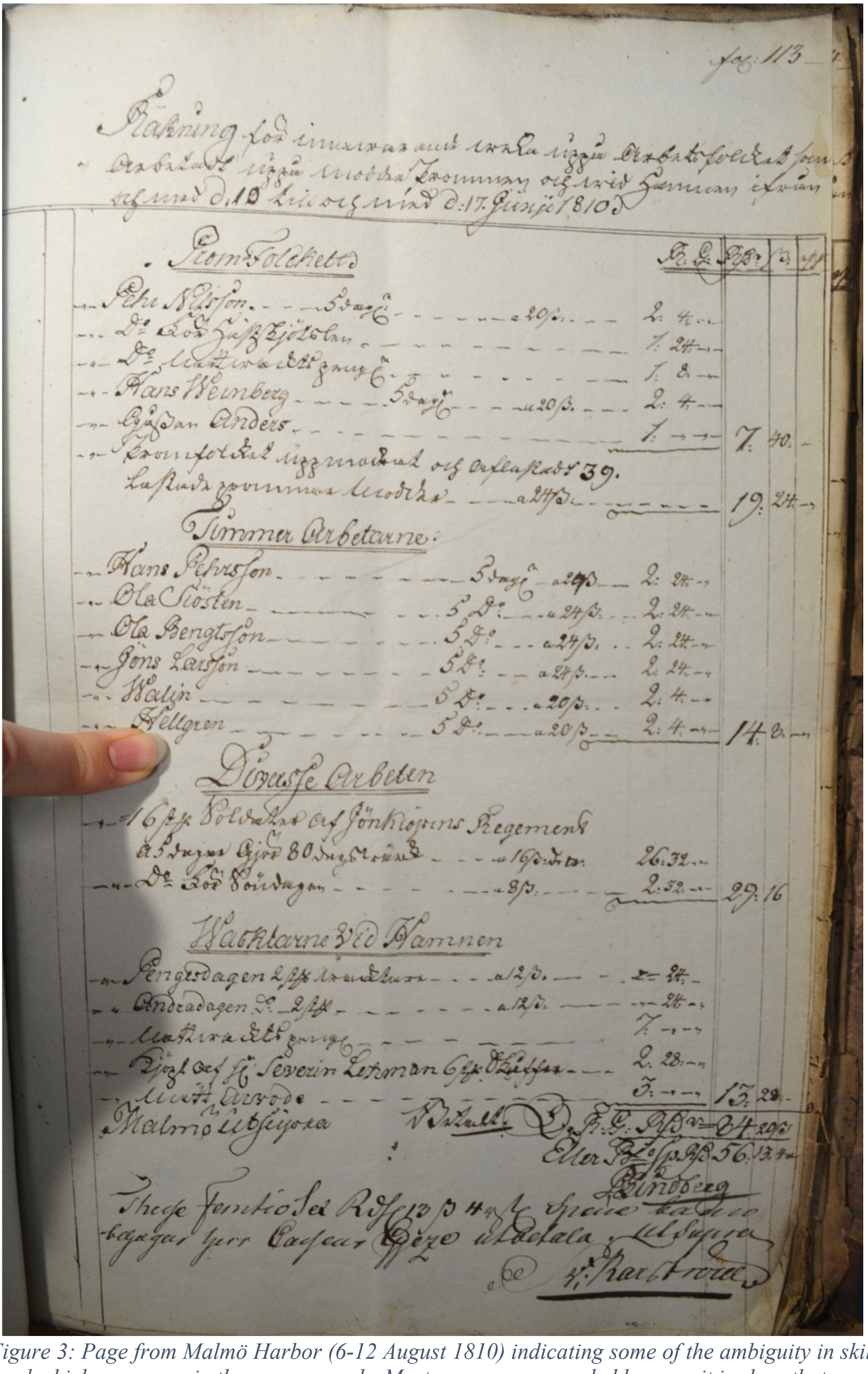


Figure 3: Page from Malmö Harbor (6-12 August 1810) indicating some of the ambiguity in skill level which can occur in the wage records. Most names are recorded here, so it is clear that some of the men who are 'Timmer Arbetarne' *(the carpenters) in August are the same who are later performing presumably unskilled* 'Diverse Arbeten' *(various work) in December (not shown here). Their December wages are lower than their August wages, but still higher than many other 'unskilled' workers.*

Figure 4: Page from Kalmar Cathedral record book from the week beginning on 20 May 1620. The right page shows all unskilled workers grouped together with a bracket, both women and men, with the notation ‘om dagen 1&’*, or, ‘per day, one mark’. One individual is singled out to receive 5* öre *per day instead. This is one example of the strong modal tendency of daily wage rates*

The tendency toward wage setting is very useful for establishing the data quality and understanding what it represents. Because a set wage is the norm, the instances when someone is paid a different rate are much more clear. In most of these instances the outlier is paid a higher rate; this is discussed in more detail below. Less often is someone paid a lower rate than the set level. This indicates that the calculated wage levels are not being influenced by wages paid to less-capable men, such as young boys or older men, as is a frequent concern when dealing with this type of source (see Burnette 2008).

Annual work – types of work and urban-rural differences

Annually paid work was organized and paid differently than casually paid work, and there are different approaches required in order to understand what the full remuneration of these workers actually was. Work on annual contracts was more regular than causal work, and the cash portion of the wages were also more consistent. Annual work is consistently different from casual work. Annual workers are employed in the cities and in the countryside, as are casual workers, but the type of work in which annual workers are employed differs between the town and country, unlike the casual work in this sample. The differences between town and country work is to a large extent a function of the types of sources which survive, though it is of course also dependent on the different needs of each environment.

Unskilled and annually paid work in rural environments is largely people working in annual service on manors. This type of work would comprise daily work on private farms and manorial holdings, both in agriculture and in the household; the most common titles contain the word for young woman or maid (*piga*) or the word for young man or servant (*dräng*). This type of work and employment is consistent with the 'lifecycle service' pattern which is considered typical of northwestern Europe (de Moor and van Zanden 2010). Within this paradigm young people would leave their parents' homes as teenagers and undertake paid work on other farms and save for marriage. Many of the lowest skilled workers in the rural sample are likely from this demographic, and likely were only employed for a year or so at a time (see Dribe 2000). No records from private farms or ordinary farmsteads survives; surviving data in this employment category come from manorial estates.

Urban sources contain wages paid to city employees. These jobs were different than those preserved in rural sources; unskilled workers were employed, for example, as city and tower guards or custodians, working in urban environments instead of agriculture. Some towns also employed sailors or military personnel.

For workers in the countryside the cash wage would be only one part of their total 'pay'; these workers would typically live-in with their employers, meaning that a large component of compensation was their room and board. To approximate the total value of this compensation the cost of living is added to the cash wage. This is a little less straightforward with urban workers, employed by the city. There is less of a robust historiography on these types of workers, most likely because they are not as common as those who work in annual service in the countryside or in individual households. Because of this it is less clear how their compensation would have been structured, and so we must go forward with clues from the data itself.

Some internal information indicates that room and board were in all likelihood a part of compensation. Some payment lists explicitly do provide for rent or clothing, or provide a stipend in place of actual provision. Some accounts indicate a rent allowance given as a part of a widow's pension, separate from the wage part of the pension which she received. From a more post-hoc perspective, some of the wages paid to these full-time workers were so incredibly low that the position could not possibly have compensated solely through the cash wages which are listed. This is especially true toward the end of the eighteenth century when cash payments barely register compared to the cost of supporting an individual; here it is simply impossible to conceive that people would be working for so low a wage without also receiving room and board. The cash would not nearly have covered one person's basic needs. Because of these pieces of evidence the annually contracted jobs in the cities are treated in the same way as those in the country, with the cost of living added to the cash component to estimate the value of total compensation.

Annual work – modality and stickiness

The cash wage payments tend to be fairly low, which emphasizes the importance of the value of room and board to those who worked these jobs. Wages were also fairly sticky, and did not rise for long periods of time. This is somewhat concealed in the aggregate measure of wage levels from all sources, and is even more hidden when nominal wages are calculated by adding the cash wage and the cost of living is included. Wages are especially sticky for the least skilled; in Kristianstad, a small town on the coast, a guard is paid at the same rate of 24 *daler* from 1652 to 1672, the entire time he is in the sample. The rate for a shepherd in the same town is 5 *daler* from 1652 through 1708, also the entire time he is in the sample. At Trolle Ljungby, the manor with the highest payroll in the sample, a gardener is paid 5 *daler* from the first recorded payment in 1737 through 1767, when the rate is raised to 8 *daler* per year. However this higher rate only lasts for a few years, and the pay is again reduce to 5 *daler* in 1774 and 1775, the last two years available in the sample. Unfortunately most annually employed work is recorded without the name of the employee, so it is not possible to track if the changes in wage rates are related to changes in personnel or experienced by one person. Several decades of flat wage rates are not uncommon, and are more the norm than the exception. Decreases in nominal wage rates are also not unusual. It is not clear if these decreased wages are related to changes in hiring, and so reflect a new person in the position; or if the pay cuts are more arbitrary. Some nominal decreases occur during periods of financial instability, when the actual value of cash may have been less certain. It is quite possible, and even likely, that employers would have adjusted the value of perquisite payments in order to compensate for uncertainty or nominal pay cuts, but this is harder to observe in the sources.

Constructing the data series

Occupational coding

Obviously a collection of so many wage payments across so long a period and from different kinds of employers leads to heterogeneity in the types of work recorded. In order to make a meaningful set of studies and comparisons to other economies throughout early modern Europe this dissertation limits itself to predominantly unskilled occupations and paid work. This, like currency conversion, is not as straightforward as one might hope. Again, there were different sets of difficulties for wages paid by the day and by the year.

One of the primary difficulties for casual workers was determining what task they were engaged in. Workers are sometimes described by an occupational title, but more often a worker's job or occupation is inferred from a description of the work, rather than an explicit title. For example, a 'man' who is 'doing some sort of work on the clock' at the cathedral is identified as a clock repairman, even though him being listed as a 'man' without description would otherwise lead him to be labelled as unspecified unskilled worker.

In order to separate skilled and unskilled work in as systematic and consistent a way as possible the HISCO system is used to code occupations, and then the HISCLASS system is used to separate these occupations into groups of various skill levels (van Leeuwen et al 2002, van Leeuwen and Maas 2011).

The HISCO and HISCLASS systems were used to categorize the occupation of the workers and to sort them into skill groups. HISCO assigns a code based on the work or task carried out, and HISCLASS sorts this code into a skill scheme. Not all occupations in the primary data were present in the established HISCO and HISCLASS system, and so many were assigned occupation and skill groups based on the researchers' experience, historical understanding, and context from the data itself. This was especially the case for the annually hired occupations, which required substantially more researcher discretion due to the novelty of the data sources and types. Day workers could usually be categorized into clear existing groups. *Svenska Akademiens ordbok* (The Swedish Academy's Dictionary) was used to search for occupations which were not listed in previous occupational coding registers and which were unknown.

A description of what type of work or task the workers was carrying out was given preference over a listed title or occupation. Many times a stated occupation was not given, or the task being done was clearly more specialized or skilled than what the occupational title indicated. In some cases contextual wage information could also be used to reclassify workers when wage and occupation or skill information was clearly not reflective of the actual work being done. This was important for annual occupations especially. The most significant example of this is '*stadstjänare'*, a common occupation for low and unskilled men in the cities. The position as defined by the HISCO and HISCLASS which were initially assigned to it represented it as a much more skilled and managerial position that what the contextual evidence indicates.

Timing and dates of work

The period of work for the majority of recorded work is clear. For annually employed, this is the year they were hired. For casually employed it is typically the day, week, or month during which they were hired which is denoted. However there were some instances which required further work or investigation.

For annually hired positions, a harvest year or a holiday-to-holiday year were sometimes listed as the contract period; typically this was Michaelmas to Michaelmas (29 September), though occasionally Easter was also recorded as the beginning or end of a contract period. This is in line with the typical hiring period for Swedish servants before the nineteenth century, when Michaelmas marked the beginning and end of the hire period (Carlsson 1962). This means workers were employed during two separate calendar years. In these instances the year of hire, during which the contract would have been set and price negotiated, is used as the year of employment.

There is more variety in the casual labor data. During periods and in locations where there is a large amount of work records are more regularly kept, especially over time. The year, month, and date of the week is typically noted at the top of a payment register. However records are occasionally less regular. Some record only the year of work, which prevents use of these data in more nuanced analyses.

Other difficulties arise when the date of work is recorded in reference to a holiday instead of to a fixed month and date. These could be references to a flexible holiday, such as Easter or Pentecost, or to a fixed holiday such as a saint's day. To attach a calendar date to these liturgical dates historical calendars were consulted[1]. For fixed saints' day dates which do not appear in the historical liturgical calendar, contemporary Danish name days were used. This occurred only a small number of times, and only in the sixteenth century when Scania was Danish.

Some work was reported by lengths of time which were not consistent with the observational units used in this dissertation; for example, casual wages might be reported by the week or annual wages by the half-year. For casual wages where the number of days is not given but a different discrete length of employment is indicated the work period is converted to days assuming a six day work-week. This is consistent with the strong majority of the observations in the data. Long-term contracts which report only one half-year employment are normalized to one year; shorter-term contracts, such as by the month, are not included unless repeat observations make it clear that the contract was de-facto a full year's employment. These occurrences were not common.

Currency standardization

All monetary units are converted to the Swedish Crown (SEK), a monetary unit which did not exist before 1876; historical monetary units are converted to the crown-equivalent in order to enable direct comparison. While the transition to the Crown was at parity with the previous currency regime, the *riksdaler*, the journey from 1500 to the nineteenth century was indirect and labyrinthine.

The temporal and spatial coverage of the data mean that wages in Scania were paid in Danish currency until 1658, after which the region became Swedish and wages were paid in Swedish money. Thankfully the transition from the Danish to the Swedish period is straightforward as the currencies operated at par during this period, with the same denominations and names for coins (Friis and Glasmann 1958, Aakjaer 1936). However, monetary standardization was less simple on either end of this divide.

The main units of payment in both Denmark and Sweden until the eighteenth century were the *daler*, *mark*, and *öre*, though there were also smaller sub-units. For the majority of the period under study a *daler* was worth four *mark* and 64 *öre* (16 *öre* per *mark*) (Edvinsson 2010). In Denmark one *daler* had been worth three *mark* up until 1544; the relationship transitioned to four *mark* per *daler* by 1572. Linear interpolation between three and four *mark* per *daler* is used as the conversion factor in these years.

[1]https://www.slaktingar.se/historisk-kalender

Currency standardization becomes more difficult in the Swedish period. One of the features of early modern Swedish wages is the variety of currency and coinage available for payment – in his chapter on early modern Swedish currencies Rodney Edvinsson describes it succinctly: “What characterizes most of the period [of 1534-1803] was the perplexing parallel use of several domestic currencies. Exchange rates fluctuated not only on foreign currencies … but also between these domestic currencies” (pp 133), with in practice up to six currencies based on three metallic standards during the seventeenth century (pp 151). In addition to the change in currency units, attempts to control the global price of copper led to the introduction of copper coins, which were intended to circulate at parity to silver, but shifted away from face value toward intrinsic value. This further complicated currency relationships and, as an extension, payments.

From the beginning of Scania’s Swedish period the currency relationships were the same as the Danish described above: one *daler* : 4 *mark* : 64 *öre*, but this was only the case with the *daler* as a unit of account. From the end of the sixteenth century the market value of silver *daler* coins varied substantially, from 4.5 to 9 *mark* (Edvinsson 2010). Because the wages reported here are, definitionally, units of account, the ‘street value’ of different purities of coins are not of immediate concern, though it is worth understanding that the considerable series of debasement and re-valuing might be visible in nominal wage patterns.

From 1624 copper coins were introduced alongside silver, meant to be circulate at the same value as their silver counterparts (and with the same names) but they quickly lost value relative to silver, falling gradually to a ratio of 1 silver *daler* : 3 copper *daler* by 1665. Each system continued with its own sub-units of *mark* and *öre,* still with the same relative relationships within each system.

When copper coins were introduced in 1624 copper became the official metallic standard, but In 1633 silver was again the official metal, signaling copper’s first official debasement vis-a-vie silver to half its previous value. As copper continued to fall and in 1643 it was debased again to the ratio of 2.5 copper *daler* to one silver *daler*, and the copper i was again the official currency unit. By 1665 copper had continued to fall, ending at the three-to-one copper-to-silver valuation, and the silver *daler* was once more the official currency unit, though with copper still circulating as part of a de facto bi-metallic standard. The metals traded again once more, still circulating at the same basic exchange rate as before, until the entire monetary system was overhauled in 1776 and the *riksdaler* was introduced. Though the currency was again overhauled in 1803, and once more in 1873 when the modern crown was introduced, there was more or less continuity between these later changes (Jörberg 1972).

This bi-metallic (and tri-metallic; gold coins were minted but less often used) standard and multi-currency system were able to persist because the silver and copper based currencies did not circulate at a fixed exchange rate, and so the cheaper money did not replace or force out the more expensive money – as might be expected if the different systems circulated at an exact conversion rate (Edvinsson 2010 pp 155). This is likely also complicated by the continued attempts to change the official metallic standard of the kingdom.

Figure 5, as published in Edvinsson's (2010) chapter, gives an indication of the development of the *daler* and its debasement and bifurcation in the early modern Swedish monetary system. Not all these terms or units appear in the records. On the contrary, the payments themselves are units of account, rather than the exact unit of payment (Lindström and Mispelaere 2015) – thankfully this also helps to avoid some of the difficulties associated with debasement and inflationary cycles. Asterisks have been added to indicate the primary currency regime followed throughout the conversion process.[2]

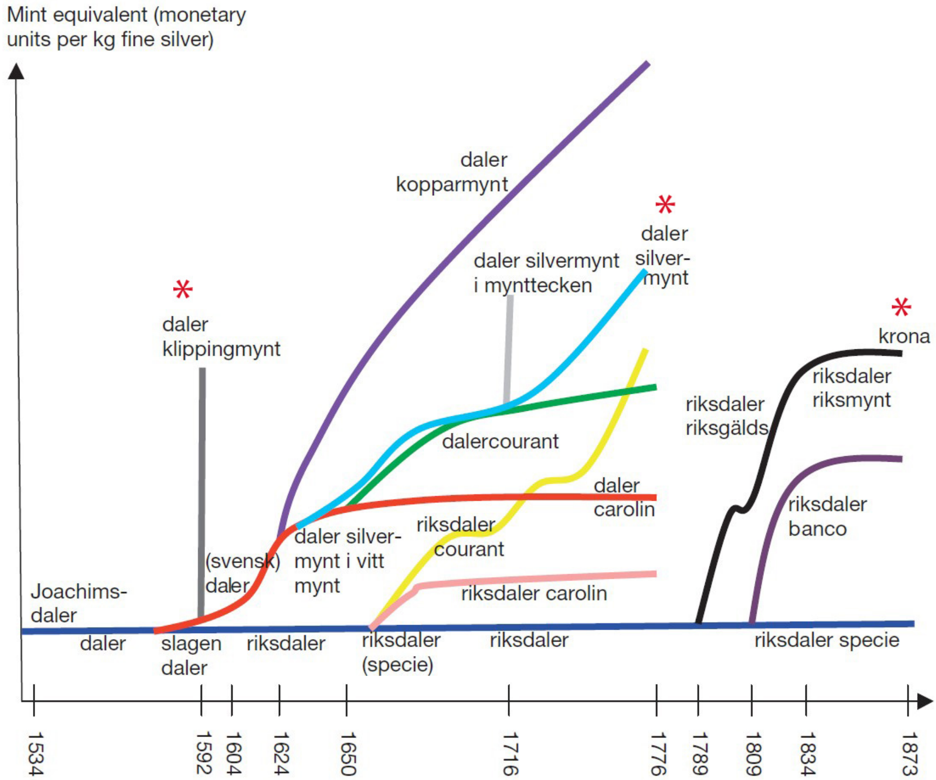


Figure 5: The bifurcation of the term 'daler' 1534-1873" as presented in Edvinsson 2010, pp 136. Asterisks added by the author.

[2]While the *daler klippingmynt* in the 1590s was technically a Swedish mint policy and not Danish, there is still evidence of the inflationary pressure in nominal wages from Malmö at the time.

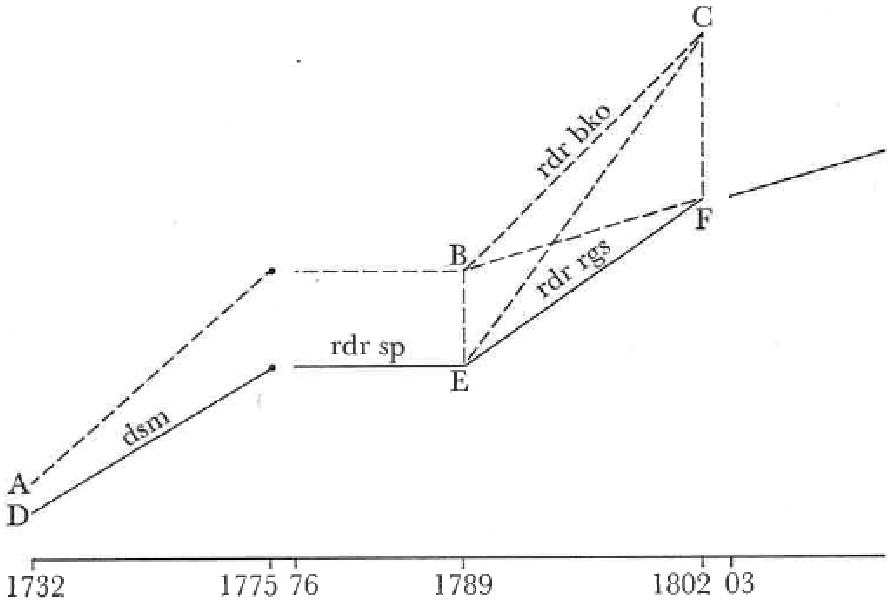


Figure 6: "Schematic representation of monetary conditions 1732-1803", as presented in Jörberg 1972, pp. 82

However, the same shorthand terms, such as '*daler'*, is often used, which could refer to several different units. More commonly the number of the unit and subunit of payment are recorded, without clarifying the currency or metal: for example one *daler* and four *marks* would be recorded as 1:4, or 1 & 4. This is perfectly clear where there is only one monetary option, but becomes less clear during periods of transition or multiple monetary standards. These ambiguities can be fairly simply cleared when the two currencies have a different number of sub-units – for example if currency one is comprised of 16 sub-units while currency two is comprised of 32 – and there are enough of the subunit accounted for in the payment to clear the benchmark. At other times it is necessary to compare with other sources from the same period in order to determine which currency and metallic standard is being used.

The entire system was overhauled in 1776, and in 1777 the *riksdaler* was the only legal form of currency and silver the only metal. The *riksdaler* was subdivided into 48 *skilling*, which in turn was divided into 12 *runstycken* and the *riksdaler* was introduced equivalent to six silver *daler* from 1776 (Edvinsson 2010).

This did not last. By 1789 there were again multiple currencies and multiple metallic standards; by the early nineteenth century there were three different sets of *riksdaler* and *skilling*, and Sweden had gone off and on the silver standard several times. This time there were fewer differences within the domestic market; by 1803 domestic units had set relationships and were made inconvertible. However the domestic exchange rates were somewhat more stable than in previous centuries; instead the differences prevailed between the domestic and international markets (Edvinsson 2010, Jörberg 1972).

As Edvinsson points out, the plurality of currencies and monetary units makes transformation to a standardized currency difficult, and means that decisions must be made about which conversion values to use. There are two fairly established tracks (Edvinsson 2010), but there are more options available depending on the goal of the conversion, as illustrated by Jörberg (1972).

The method used here, as well as by Jörberg in his data compilations, follows the bottom line in figure 6, along the line DEF. This line follows nominal prices back until 1776 and then converts at the relationship of six silver *daler* to one *riksdaler*, as described above. This approach preferences domestic circulation and relative prices within Sweden. To my mind this is the most direct representation of how monetary shifts related to those earning and spending in smaller denominations every day, as the data in this dissertation represent. This is also most compatible with previous work which has been done on Swedish wages (i.e. Söderberg 2010; Jansson, Andersson-Palm, Söderberg 1991). Other conversion schemes may be more appropriate for different uses of currency units, especially tracing the exchange value of Swedish currency on the international market or into silver. For a detailed discussion of applications and benefits of different conversion schemes see Jörberg 1972 pp. 81-83.

Calculating cash wages

Nominal wage payments are estimated by regression in order to control for regional, occupational, and seasonal heterogeneity.

Nominal daily wage payments for unskilled casual work are estimated separately for women, the entire unskilled male sample, and for the sub-samples of men's urban and men's rural work. All estimates are made according to the base function (equation 1):

$$\ln(c\_wage_{it}) = \alpha_{1i} + \sum \beta_1 year_i + \sum \gamma_1 HISCO_i + \sum \delta_1 location_i + \sum \theta_1 season_i + \vartheta soldier_i + \mu guard_i + \pi cart_i + \varepsilon_{1it} \quad (1)$$

Where i refers to an individual wage observation, t refers to the year and $\varepsilon_{it}$is an error term. C_wage_{it} is the value of the dependent variable, casual wage. The wage is determined by a set of explanatory variables: year is a dummy for the year of payment; HISCO is a categorical control for the specific type of work being carried out, with a general unskilled worker as the reference; location is a categorical dummy for the location of payment, with Malmö city as reference; season is a dummy for the month of payment, where November, December, January and February are counted in one category and June is the reference category. Dummies indicating if the worker was a soldier, performing guard work, or working with a cart are also included to control for types of work which were structurally different from typical work. Soldiers were often employed in basic manual labor; guards often worked overnight but were not required to carry out great tasks, and those with carts and horses likely received higher wages which also compensated for the capital of horse and cart.[3]

Rural workers are estimated with a slightly altered function and do not control for location. Location controls for rural wages were insignificant and did not contribute to the strength of the model; during several periods when the data was more scarce the controls created substantial distortions. The model for women is also slightly different; women are estimated with the reference location Kalmar because of the much more frequent appearance of women's wages in Kalmar.

Annually earned wages were estimated in a similar structure, with all unskilled men estimated together as well as the sub-samples of urban unskilled men and rural unskilled men. Low-skilled urban men are also estimated separately. Rural men, as well as women – who appear in almost exclusively rural locations as annually-paid employees – are estimated without a control for location, as in the casual estimations.

Annual cash wages are estimated according to the form (equation 2):

[3]The appendix shows the estimated wage vales per year as $\alpha_i + \beta_i year$.

$$\ln(a\_wage_{it}) = \alpha_{2i} + \sum \beta_2 year_i + \sum \gamma_2 HISCO_i + \sum \delta_2 Location_i + \varepsilon_{2it} \quad (2)$$

Where again, i refers to an individual wage observation, this time for annual employment; t refers to the year and $\varepsilon_{it}$is an error term. A_wage_{it} is the value of the dependent variable, the cash payment of an annual wage. Terms here refer to the same controls as in equation 1; year is a dummy for the year of payment; HISCO is a categorical control for the specific type of work being done, and location is a categorical dummy for the location of payment, again with Malmö city as the reference category. The reference HISCO is a (city) custodian, the most common type of worker in the data.

For annual workers an additional work category is estimated; low-skilled urban workers. This category is defined as those jobs which fall into HISCLASS category 5. This category is selected as a low-skilled HISCLASS category which is most similar to the types of work being done by un-skilled (according to HISCLASS) workers in the cities. This allows for a comparison of the compensation for similar work dependent on different levels of skill to compare most For low-skilled urban men the omitted HISCO is 58990, a city policeman, which is the most prevalent occupation.

The results from the regressions are included in the appendix. As a rule, the strong majority of year-coefficients are significant, though many HISCO occupational codes were not. However enough were significant and this was considered an important enough indicator that they were included in every model, regardless.

Constructing the price series

In order to calculate real wages from nominal wages this chapter builds and uses six separate consumption basket style price series, two each for the cities Malmö, Kalmar, and Stockholm from 1500 to 1914. The price baskets are based on the quantities in Allen (2009). This allows the baskets and the real wages calculated from them to be comparable with most recent studies (see table 2).[4]

The baskets are comprised of the amount of food and other consumables that would have been needed to sustain a single adult man over the course of a year. The price of all of these commodities is taken as the cost of survival for the year. It is worth noting that other authors (cf Allen 2001, 2009) often present the basket cost as the sum needed to support a family; only the cost for a single individual is presented here.

There are two levels of baskets, one representing consumption at a comfortable, or ‘respectable’ level, and another representing consumption at a subsistence, or ‘bare bones’ level. The respectable level represents a more ‘typical’ consumption pattern (Allen 2009), with a larger variety and high quality foodstuffs. The subsistence, or bare-bones, basket is composed of cheaper alternatives which would still provide daily caloric needs but use lower quality alternatives. Both types of baskets are developed for Malmö, Kalmar, and Stockholm, using local price levels. The only change made to Allen’s quantity levels is to replace half of the meat allowance with herring, to more accurately represent a Scandinavian diet which relied heavily on fish as a source of protein (see Morell 1989). This decreases the prices of the baskets from what their costs would be if the full protein allotment were meat due to herring’s lower price, and is probably an under-substitution toward the cheaper option.

Allen’s (2001, 2009) approach has become standard in the field and so using this methodology and basket composition allows for substantial comparability with other existing literature – since the goal of much of this research is to understand relative economic development and development of living standards, this alone is a strong incentive for following suit. However, the quantities laid out in this approach are also a reasonable approximation of studies which investigate Swedish consumption and household expenditures toward the end of the early modern period and into the early twentieth century. This is especially true when we remember that potatoes were not available on a large scale in Sweden until the first half of the nineteenth century (Berger 2018) and so individuals in the period of investigation in this dissertation would not have had access to potatoes as part of their consumption. Table 2 shows the components of the consumption baskets used in this dissertation as well as Allen’s 2009 weights, together with Myrdal ’s (1933) budget study of the components of Swedish consumption from the middle of the nineteenth century.

[4]With some small adjustments the baskets can also be made comparable with basket price levels in earlier work which rely on Allen’s 2001 price levels, including his initial study, as shown in Gary (2018a)

Table 2: Comparison of components of budget studies and consumption baskets

	Myrdal 1933	Allen 2009 Subsistence	Allen 2009 Respectability	Gary 2018 Subsistence	Gary 2018 Respectability
kg bread	-		234	-	234
kg grains	163.3	155		155	-
kg potatoes	200	-	-	-	-
kg peas	12	20	52 *l*	20	52 *l*
kg meat	21.5	5	26	2.5	13
kg salt fish	17	-		2.5	13
liters beer	-	-	182	-	182
kg cheese + butter	4	3	10.4	3	10.4
eggs (n)	20	-	52	-	52
liters milk	160	-		-	-
kg soap		1.3	2.6	1.3	2.6
m linen		3	5	3	5
kg candles		1.3	2.6	1.3	2.6
liters lamp oil		1.3	2.6	1.3	2.6
M BTU fuel		2.0	5.0	2.0	5.0
rent		5%	5%	5%	5%

It is an unfortunate and yet universal truth of quantitative historical research that there is always data which is impossible to locate or recover, or which was never recorded in the first place. This has certainly been the case with the construction of the price baskets, and several extrapolations, interpolations, substitutions, and adjustments have been necessary in order to create consistent time series which could be used to estimate living costs for Malmö, Kalmar, and Stockholm from 1500 through 1914. Other studies, including Allen (2001), have also been forced to make extensive substitutions and extrapolations in order to estimate a consistent and useful price series. When substitutions or extrapolations are necessary data is used from the nearest or most similar county where data is available. A detailed discussion of price data sources and series composition can be found in the appendix.

Calculating nominal wages

Within the data collected here, there is no indication that casual workers were paid with in-kind payments; their compensation appears to have been only cash. The nominal wage is thus only cash; the calculated wage is the wage paid for one day's work.

Wages earned by the year require adjustment to move from the cash wage to the nominal wage. Annually earned cash wages, calculated above, are only one component of the total annual remuneration. Compensation would also typically include room and board; most annual employees, especially unskilled workers in rural areas, lived in with their employers and received food as part of compensation. To approximate this the total nominal wage is calculated by adding the cash value of the cost of living to the cash wage calculated above.

This calculation is of course an approximation. While it is an approximation which has been used before in the case of rural farm workers (Humphries and Weisdorf 2015, 2017), it has not been used before for city employees or for skilled workers. There is the risk that this might overestimate the actual income of workers in cities, in cases where they do not receive full room and board as part of their compensation. However, it is not unreasonable to expect that city employees might receive housing as a part of their contract, especially if they are attached to an institution, like the city hall, which would likely have some residential capabilities. Many of these cash wages were also so low as to indicate that other perquisites could likely have been a part of compensation, in order to make the wage a livable or worthwhile income. There is evidence from Stockholm that indicates that city employees' wages were, in fact, well known to be extremely low, and in practice required family and spousal input to keep ends met (Ågren 2014, 2017). Because of the typically extremely low level of these wages, the approximated full nominal wage remains extremely low even when the cost of annual support is included. Because of this, it is unlikely that an overestimation misdirects the interpretation substantially.

Calculating real wages

Nominal wages can be converted to real wages when deflated by the cost of living index. The cost of living series represents the cost of living, in Swedish Crowns, of one adult individual for one year, with a caloric content of 2500 kilocalories per day

(Allen 2009). The resulting measurement of real wages is an index which measures how many annual 'baskets' of annual support could be purchased with an individual's income. A value of one indicates that a worker could just meet their annual needs; a value of two indicates that they could support two adults. Values under one mean that the individual's income would not be enough for comfortable support; workers would need to substitute lower-quality goods, find additional sources of income, or would face shortfalls of nutrition or other essentials.

There are several different pathways which can be taken to calculate real wages for casual earners. Recent methodological trends have preferenced the approach developed by Allen (2001) which calculates the amount of support an individual (male) earner could give a family or household. In these models the income of one earner is extended to a household of several. This requires some information (or assumptions) about household or family composition. Because of this, real wages are calculated here only as they relate to the earner him- or herself. However it takes no great mental calculation to extend how much a person's income could support additional individuals.

The formula for calculating real wages based on casual work payments (equation 3) is fairly straightforward: the presumed total yearly income, calculated by multiplying the daily wage rate by the number of days worked in the year, divided by the cost of support for the earner, in the case the cost to support a single adult.

$$casual\ real\ wage = \frac{day\ wage * days\ worked}{cost\ of\ support} \tag{3}$$

The calculation for real wages is thus the total annual income divided by the cost of supporting a single individual for one year. But the wage data for casual workers are only for a single day's work.

Allen's methodology has assumed a working year of 250 days – this has become a standard in the literature, but without a strong empirical support that it actually reflects historical patterns. Gary (2018d) indicates that a working year of about 140 days would be more typical of early modern Swedish workers. Real wages are presented in three forms: with calculations for 250 days of work, for 140 days of work, and the real wage for only one day's work. This allows for simpler comparison with international work, a figure which more closely approximates actual patterns, and a real wage which takes only the information given without imposing strong assumptions of working years. In the final presentation the year's cost of living basket is divided by 365 to represent the per-day cost of living.

Annually earned real wages are calculated by deflating the nominal wage, defined as the cash wage plus the cost of support, by the cost of support (equation 4). This makes no assumption about the number of working days, but does make the assumption that those working for the year received full room and board as part of their remuneration.

$$annual\ real\ wage = \frac{cash\ wage + cost\ of\ support}{cost\ of\ support} \tag{4}$$

These differences in how the wages are calculated mean that there are some important differences in the characteristics of the final real wage index number. Including the cost of support as an additive in the numerator for annual wages means that as the value of the cash portion of compensation approaches zero, the lower limit of the real wage approaches one; this defines those working for annual wages as always achieving basic subsistence. This is not necessarily wrong; the nature of annual employment, especially in service, does provide basic support. This is one of the strong incentives to this type of work. However, the lower limit of real wages calculated from casual earnings has no such floor; as the cash wage approaches zero, so does the real wage value.

The new data in Swedish comparison

The data developed in this dissertation are the first data from the south of Sweden to reach back to the sixteenth century. Other price and wage series have been developed from the sixteenth century for Stockholm (Söderberg 2010) and from the mid-eighteenth century on a regional basis throughout Sweden (Jörberg 1972).

Söderberg (2010) constructed a traditional price index for Stockholm with changing contents over time. The consumption-basket style index in this study has fixed commodity weights over time. Figure 7 shows Söderberg’s real wage index alongside real wages calculated using the respectability-level basket developed for this study. The same nominal wages (also Söderberg 2010) are used as the numerator. The series developed in this study can be read as the number of ‘baskets’ of daily subsistence a daily wage could purchase; Söderberg’s have no concrete interpretation. There are some discrepancies, including a substantial difference in the very early years and a slightly higher real wage level in the early part of the nineteenth century, both of which are slightly less exaggerated when Söderberg’s index is compared to the subsistence basket (not shown). These differences are

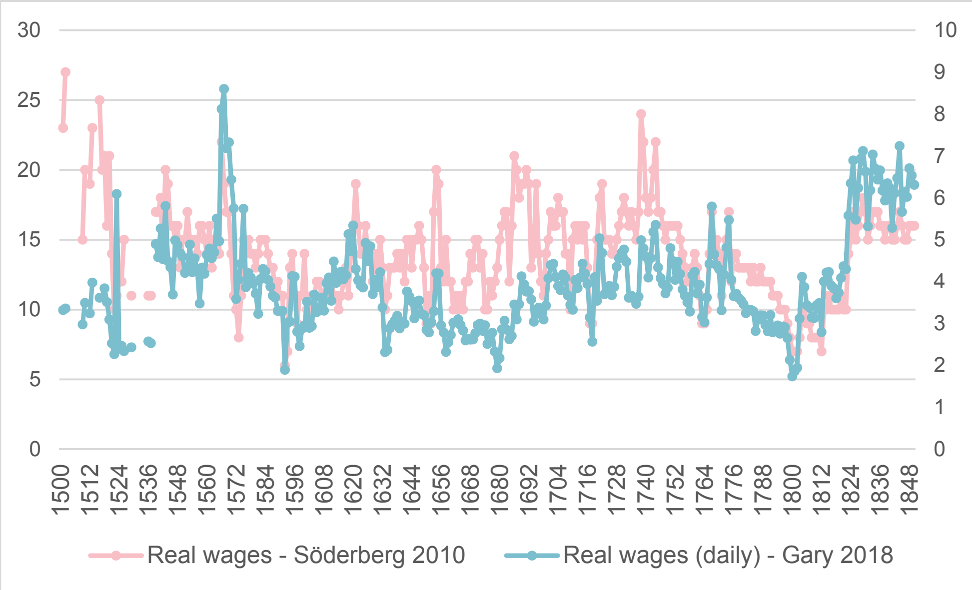


Figure 7: Real wages for unskilled male builders in Stockholm with two different deflators. Source: see text

likely due to the fixed contents of the respectability basket over time; the contents of Söderberg's index is changed over time. This does highlight the differences in interpretation which can accompany indices and data created for different purposes.

There is more comparative data available from the middle of the eighteenth century, compiled by Jörberg (1972). These wages are taken from market scale rates in agriculture. Market scales are not wages recorded from actual payments, but instead negotiated and agreed-upon price levels for labor that was performed as a part of labor contracts (Jörberg 1972). Comparisons show data from Jörberg 1972 from the same counties in which Stockholm and Malmö are located, Stockholm län and Malmöhus län respectively, as well as the national average for all 24 Swedish counties, though the composition changes based on data availability (figure 8). The series are shown in long scale so that the relative differences between the series are visible. The wage series are clearly harmonious, indicating unification between different kinds of unskilled labor, as well as a continued convergence between Malmö and Stockholm. During the crossover, Stockholm construction wages remain the highest, and Malmö construction the lowest, of all nominal wage series.

Figure 8: Men's day wages in Swedish crowns, various work and sources, 1700 - 1900. Log scale. Sources: see text.

Conclusions

This paper has presented the sources, methods, and assumptions used to create wage series for annually and casually employed men and women, in both the towns and countryside, in southern Sweden between 1500 and 1850. It has also presented the data and approaches used to derive price series which are used to create real wages.

These data lay the groundwork for investigations into the labor markets and relationships between different types of labor and remuneration on an unprecedented scale. It combines new methodological approaches for calculating the wages of annual workers with a breadth and depth of coverage which allow a unique level of investigation into a labor market.

Primary data sources

Lunds Landsarkiv (Lund Regional Archives)

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

Karsholm godsarkiv

Knutstorp godsarkiv

Maltesholm godsarkiv

Rosendal godsarkiv

Rydsgård godsarkiv

Skarhult Manor

Trolle Ljungby godsarkiv

Vittskövle godsarkiv

Malmö Stadsarkiv (Malmö City Archives)

Urban archives:

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

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

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

Malmö hamndirektionen *(Malmö harbor)*

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 1: Components and construction of the price baskets

The data used in the price series are grounded in Jorberg 1972. This comprehensive volume records prices and wages in Sweden on the county level from 1732 to 1914. Estimates are based on market scale records. The majority of the data from 1732 and later come from this source.

The foundation of the consumption baskets are rye in the bare bones basket and rye bread in the respectability basket. Rye prices from Malmöhus County, where Malmö city is located, come from Jörberg (1972)are combined with rye prices from Burlöv, a village just outside Malmö, from 1616 to 1670 (Tommer 1964) and rye prices based on the same market scale data as Jörberg (1972) from 1658 to 1742. There are virtually no differences between the series at the points of overlap, but when there are the average price is used. The series is projected backwards to 1502 using an index of Danish rye prices (Albidgren 2010), since Malmö was Danish during this period. Because there are no values available for 1500 and 1501 the same values are used as estimated for 1502. This applies to the entire Malmö price series: other missing data are projected backward using the Danish CPI, which also begins only in 1502. This does not make a difference in this study because the wage data also only exist from 1502. Conversions of grain are carried out assuming a grain barrel size of 165 liters (Jörberg 1972), and rye is assumed to have a density of 74.25 kilogram per hectoliter, based on measurements of the rye harvests in Sweden from 1898 to 1900 (Flatch 1909).

Unfortunately there is a lack of bread prices for early modern Sweden. This is not unique to the Swedish case: Allen (2001) also lacked substantial long-term series of bread prices throughout Europe. To address the lack of bread price data he regressed known bread prices on grain prices, mason's wages to proxy for the markup in cost from the baker's time, and a city fixed effect to capture taxes and rent, in order to create an equation to estimate bread prices. The price of bread is measured in grams of silver per kilogram of bread, and grain in grams of silver per liter. The coefficient on the grain price is 1.23 closely mirrors the requirement of one liter of grain to produce one kilogram of bread. The bread price is highest in Krakow, which has a coefficient of 0.245. This is also the city which is most likely to be similar to Malmö and Sweden: Poland was similarly situated on the European periphery and was a grain-producing region with consequently low grain prices, as was Scania in Sweden's south. Because of the lack of data, the relationship between bread and rye in Krakow is used to adjust Swedish rye prices to estimate bread prices.

Pea prices are a mixture of prices from Malmöhus County and the neighboring county of Halland (Jörberg 1972). These are extrapolated backward to 1500 using the price of peas from the Netherlands. This is reasonable because peas were dried and traded, and the North Sea region was by this time a fairly well-integrated trade region (see Olsson 2006). Price changes would be fairly consistent across the area for preserved commodities, especially. Conversions between weight and volume are carried out assuming a weight of 80.05 kilograms per barrel of dried peas (USDA).

Prices for beef for Malmö come from Jörberg, and before 1732 are extrapolated backward with prices from the Netherlands, as with peas.

Herring prices are estimated in the same way peas and beef. Herring were and are an important food item in Sweden; even today it is an important part of traditional holiday meals. Despite this importance, or perhaps because of it, herring prices have been published using a myriad of Swedish currencies, weights and measures, and different varieties of herring. Barrel sizes could vary considerably between regions, over time, and between commodities, even though they were often referred to using the same term (see Jörberg 1972). This has made standardizing all the prices into a consistent series which represents the same type of fish, in the same currency, and with the same barrel size an extremely unwieldly task, and I have been unable to come to any satisfactory result. A comparison between Dutch prices and the longest-available price series of Swedish herring prices from Stockholm shows that the price development was almost identical, both in development and in levels. In the interest of using a consistent series which would not introduce any deviations due to changes in the underlying measurements, Dutch prices were adjusted to price levels in Malmö and used to extend the available data backward.

Beer prices are not available for southern Sweden. Instead beer prices from 1539 to 1620 (Söderberg 2002) are adjusted to Malmö levels using the difference in the price of Barley. Then they are projected forward and backward using the price of beer in the Netherlands.

Tallow prices are taken from Jörberg from 1732, but there are no prices available for Malmöhus; instead prices from neighbors Blekinge and Halland are used. These are extrapolated back using meat prices, and joined with tallow prices from Stockholm between 1539 and 1620 (Söderberg 2002) which are adjusted to Malmö levels. The same procedure is used for tallow candles, instead starting with data for Kristinastad County from Jörberg (1972) due to a lack of data for Malmöhus. There is no data for soap prices at all; instead tallow is again used to represent soap prices – this is done in the same way as in Allen (2001), who also used tallow to proxy soap prices. The same proxy is used for lamp oil.

Butter prices are not available for Malmöhus County until 1838, and so prices from Kristianstad County are projected back based on the (very small) difference between the regions. Before 1732 butter prices are projected back using the Swedish CPI. Neither are Malmöhus cheese prices available; cheese prices from Kronberg County are used and then projected back with the butter series. Eggs are computed in the same way.

Cloth prices are an average of prices for linen and coarse cloth Kalmar County. These are extrapolated back with the Swedish CPI.

Malmöhus pinewood prices from 1803 through 1875 are extrapolated back using prices in Halland to 1789, and then further extrapolated using Stockholm County (Jörberg 1972). Stockholm County is used instead of a more geographically neighboring county to Malmöhus because Scania was already quite deforested, like Stockholm, from its extensive agricultural land use. The same series is used to extend the Malmöhus series forward to 1914. This is joined with firewood prices from Stockholm (Söderberg 2002) from 1539 to 1620 using the Swedish CPI. Units are converted from cords and kilograms to British Thermal Units (BTU), a measurement of heat, using Jörberg (1972) and data from World Forest Industries.

Rent prices are unavailable. This is a standard piece of missing data throughout historical price and wage investigations. This series follows Allen (2013) by adding an additional five percent of the total basket price to account for the cost of rent.

Prices in both Stockholm and Kalmar are calculated in a similar way, though the counties where both of these towns are located have more consistent data than Malmöhus recorded in Jörberg (1972), and so there is less need for substitution. Additionally, there are more published data series from Stockholm for periods before Jörberg's coverage.

Rye prices come from Jörberg (1972) from 1732 to 1914. Earlier prices are extrapolated backwards to 1540 using a rye price index from Stockholm provided by Lennart Schön. The calculated values from this projection are checked against converted values from Jansson, Andersson Palm, and Söderberg (1991) and Söderberg (2002) covering 1539-1620, and the index is clearly based on these data – thus the index is preferred as it has better coverage than the individual series spliced together. The series is extrapolated back to 1500 using the Swedish CPI.

Bread prices are calculated in the same way as Malmö, by imposing the grain to bread price relationship from Krakow onto the Swedish data. Peas and herring are computed in the same way as Malmö, by adjusting Dutch prices to Stockholm levels using data from Jörberg (1972).

Beef is compiled using Jörberg (1972) from 1732 to 1914, combined with data from Söderberg (2002) from 1539 to 1620. These are connected and extrapolated backward using indexed prices from the Netherlands, as in Malmö. Tallow prices are similarly based on a combination of Jörberg and Söderberg, and then connected and extended using the indexed meat prices.

Beer prices are based on beer prices from Söderberg and extended with Dutch beer prices.

Butter prices come from Jörberg (1972) and Söderberg (2002) and are connected and extrapolated using the Swedish GDP. The same adjustment as in Malmö is used to extend cheese prices backward based on indexed butter prices.

Cloth prices are the same as used in Malmö, due to a general lack of data on cloth and the assumption that manufactured goods would not have the same variation in prices as food products.

Firewood is estimated using data from Jörberg (1972) and Söderberg (2002) and projected using the Swedish CPI. Conversion from volume to BTU is the same as for Malmö. Rent is again a five percent increase on the basket price.

The Kalmar basket computation is almost the same process as Stockholm. As with Stockholm, the data in Jörberg (1972) is much more complete for Kalmar than it is for Malmö, though some substitutions did have to be made: pea prices are based on Jönköping County from 1732 through 1814, and are based on county Kronberg County from 1815 to 1914. Eggs are based on Kronberg County. Cheese is based on county 6 from 1734 through 1769, and are then based on county 7. Back projections are carried out using indexed prices from Stockholm. Bread and beer prices are adjusted based on the differences in grain prices. Cloth is again the same as Malmö.

Appendix Table 1: Casual workers' nominal and real wages

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1517	0.0055	0.0056			2.709	2.728			1.856	1.869			1.039	1.046		
1518	0.0034	0.0035			1.855	1.896			1.270	1.299			0.711	0.727		
1519	0.0100	0.0101			5.725	5.772			3.921	3.954			2.196	2.214		
1520	0.0050	0.0052			2.685	2.779			1.839	1.903			1.030	1.066		
1532	0.0087	0.0086			3.733	3.687			2.557	2.525			1.432	1.414		
1542	0.0085	0.0084			3.465	3.428			2.373	2.348			1.329	1.315		
1543																
1544	0.0082	0.0080			2.526	2.476			1.730	1.696			0.969	0.950		
1545	0.0052	0.0051			1.605	1.586			1.099	1.086			0.616	0.608		
1546	0.0103	0.0102			3.127	3.090			2.142	2.116			1.200	1.185		
1547	0.0141	0.0139			4.416	4.362			3.025	2.988			1.694	1.673		
1548																
1549	0.0131	0.0168	0.0039		3.898	4.970	1.170		2.670	3.404	0.801		1.495	1.906	0.449	
1550	0.0320	0.0207	0.0124		8.919	5.760	3.466		6.109	3.945	2.374		3.421	2.209	1.329	
1551																
1552	0.0161	0.0161	0.0056		4.523	4.536	1.586		3.098	3.107	1.086		1.735	1.740	0.608	
1553	0.0118	0.0119	0.0020		3.074	3.103	0.520		2.106	2.125	0.356		1.179	1.190	0.199	
1554																
1555	0.0097	0.0095		0.0154	2.495	2.466		3.991	1.709	1.689		2.733	0.957	0.946		1.531
1556	0.0127	0.0131	0.0040		2.698	2.799	0.859		1.848	1.917	0.588		1.035	1.074	0.329	
1557	0.0148	0.0145	0.0065		3.265	3.179	1.420		2.237	2.177	0.973		1.252	1.219	0.545	

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1558	0.0150		0.0050	0.0119	3.627		1.208	2.874	2.484		0.828	1.968	1.391		0.463	1.102
1559																
1560	0.0132	0.0131			3.733	3.689			2.557	2.527			1.432	1.415		
1561																
1562	0.0103	0.0102			2.689	2.656			1.842	1.819			1.032	1.019		
1563	0.0247	0.0245			5.961	5.920			4.083	4.055			2.286	2.271		
1564	0.0748	0.0605	0.0262		16.156	13.068	5.660		11.066	8.950	3.877		6.197	5.012	2.171	
1565																
1566	0.0382	0.0378			7.792	7.705			5.337	5.277			2.989	2.955		
1567	0.0085	0.0084			1.644	1.632			1.126	1.118			0.631	0.626		
1568	0.0365		0.0118		7.480		2.426		5.123		1.662		2.869		0.931	
1569	0.0301	0.0330	0.0089	0.0238	6.063	6.642	1.796	4.786	4.153	4.550	1.230	3.278	2.326	2.548	0.689	1.836
1570	0.0261	0.0263	0.0078		4.234	4.258	1.268		2.900	2.916	0.868		1.624	1.633	0.486	
1571	0.0223	0.0192	0.0104		3.585	3.086	1.673		2.455	2.114	1.146		1.375	1.184	0.642	
1572	0.0257	0.0254			3.650	3.605			2.500	2.469			1.400	1.383		
1573	0.0302	0.0299			4.284	4.241			2.934	2.905			1.643	1.627		
1574	0.0274	0.0271			3.370	3.342			2.309	2.289			1.293	1.282		
1575	0.0308	0.0305			4.006	3.956			2.744	2.710			1.536	1.517		
1576	0.0315	0.0305	0.0076		4.902	4.737	1.182		3.357	3.244	0.810		1.880	1.817	0.453	
1577	0.0275	0.0268	0.0120		6.071	5.921	2.641		4.158	4.056	1.809		2.328	2.271	1.013	
1578	0.0293	0.0291			6.428	6.378			4.403	4.368			2.466	2.446		

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1579	0.0145	0.0144			3.398	3.356			2.328	2.299			1.303	1.287		
1580	0.0175		0.0060		3.503		1.198		2.400		0.820		1.344		0.459	
1581	0.0301	0.0297			5.788	5.716			3.964	3.915			2.220	2.193		
1582	0.0297	0.0269	0.0118		5.828	5.283	2.316		3.992	3.619	1.586		2.235	2.026	0.888	
1583	0.0295	0.0284	0.0103		6.341	6.105	2.217		4.343	4.181	1.518		2.432	2.341	0.850	
1584	0.0549	0.0361	0.0174		13.361	8.775	4.226		9.151	6.011	2.894		5.125	3.366	1.621	
1585	0.0170		0.0060		3.837		1.355		2.628		0.928		1.472		0.520	
1586	0.0256	0.0305	0.0072	0.0238	5.569	6.612	1.572	5.169	3.814	4.529	1.077	3.540	2.136	2.536	0.603	1.982
1587	0.0262	0.0313	0.0064		5.205	6.218	1.268		3.565	4.259	0.869		1.996	2.385	0.486	
1588	0.0252	0.0258	0.0077		5.263	5.388	1.598		3.605	3.691	1.094		2.019	2.067	0.613	
1589	0.0262	0.0261	0.0186	0.0151	5.223	5.202	3.697	3.012	3.578	3.563	2.532	2.063	2.003	1.995	1.418	1.155
1590	0.0288	0.0294			5.417	5.530			3.710	3.788			2.078	2.121		
1591	0.0243	0.0247	0.0069		4.103	4.173	1.164		2.810	2.858	0.797		1.574	1.601	0.446	
1592	0.0207	0.0209	0.0070	0.0176	3.571	3.600	1.208	3.035	2.446	2.466	0.827	2.079	1.370	1.381	0.463	1.164
1593	0.0274	0.0275	0.0142	0.0257	5.120	5.146	2.659	4.799	3.507	3.525	1.821	3.287	1.964	1.974	1.020	1.841
1594	0.0508	0.0368	0.0325		8.509	6.159	5.433		5.828	4.219	3.722		3.264	2.362	2.084	
1595	0.0467	0.0458			7.422	7.276			5.084	4.984			2.847	2.791		
1596	0.0395	0.0403			6.651	6.773			4.555	4.639			2.551	2.598		
1597	0.0347	0.0334	0.0148	0.0260	5.434	5.239	2.319	4.080	3.722	3.588	1.588	2.795	2.084	2.009	0.889	1.565
1598	0.0249	0.0250	0.0151	0.0264	3.919	3.936	2.375	4.148	2.684	2.696	1.626	2.841	1.503	1.510	0.911	1.591
1599	0.0290	0.0294			4.479	4.555			3.068	3.120			1.718	1.747		

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1600	0.0309	0.0290		0.0262	5.177	4.853		4.387	3.546	3.324		3.005	1.986	1.862		1.683
1601	0.0327	0.0330		0.0014	5.032	5.072		0.214	3.446	3.474		0.147	1.930	1.945		0.082
1602	0.0274	0.0278			3.868	3.921			2.650	2.686			1.484	1.504		
1603	0.0275	0.0277			3.717	3.748			2.546	2.567			1.426	1.437		
1604	0.0281	0.0288	0.0213	0.0261	4.099	4.196	3.106	3.815	2.807	2.874	2.127	2.613	1.572	1.610	1.191	1.463
1605	0.0302	0.0307			5.226	5.328			3.579	3.649			2.004	2.044		
1606	0.0266	0.0268		0.0262	4.802	4.838		4.736	3.289	3.313		3.244	1.842	1.855		1.816
1607	0.0285	0.0287		0.0264	5.290	5.326		4.902	3.623	3.648		3.357	2.029	2.043		1.880
1608	0.0319	0.0322		0.0270	5.558	5.604		4.702	3.807	3.838		3.220	2.132	2.149		1.803
1609	0.0249	0.0251		0.0260	3.373	3.400		3.520	2.311	2.329		2.411	1.294	1.304		1.350
1610	0.0357	0.0360		0.0274	5.370	5.413		4.115	3.678	3.707		2.819	2.060	2.076		1.578
1611	0.0353	0.0355		0.0288	5.500	5.545		4.487	3.767	3.798		3.074	2.110	2.127		1.721
1612	0.0273	0.0276		0.0288	4.652	4.688		4.900	3.186	3.211		3.356	1.784	1.798		1.879
1613	0.0343	0.0346		0.0340	4.779	4.813		4.728	3.274	3.296		3.238	1.833	1.846		1.813
1614	0.0313	0.0321		0.0203	4.686	4.808		3.036	3.209	3.293		2.080	1.797	1.844		1.165
1615	0.0431	0.0424			6.920	6.811			4.740	4.665			2.654	2.612		
1616	0.0393	0.0389			5.594	5.542			3.832	3.796			2.146	2.126		
1617	0.0345	0.0366		0.0368	6.362	6.754		6.792	4.357	4.626		4.652	2.440	2.591		2.605
1618	0.0435	0.0433			7.756	7.714			5.312	5.284			2.975	2.959		
1619	0.0304	0.0306		0.0225	5.082	5.118		3.761	3.481	3.506		2.576	1.949	1.963		1.443
1620	0.0364	0.0367		0.0275	6.796	6.849		5.130	4.655	4.691		3.514	2.607	2.627		1.968

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1621	0.0370	0.0373		0.0280	6.486	6.543		4.903	4.443	4.481		3.358	2.488	2.510		1.880
1622	0.0371	0.0374		0.0279	4.056	4.093		3.058	2.778	2.803		2.094	1.556	1.570		1.173
1623	0.0340	0.0344		0.0268	3.844	3.881		3.025	2.633	2.658		2.072	1.474	1.489		1.160
1624	0.0367	0.0369		0.0279	4.038	4.068		3.069	2.766	2.786		2.102	1.549	1.560		1.177
1625	0.0371	0.0372	0.0241	0.0265	4.866	4.878	3.165	3.483	3.333	3.341	2.168	2.386	1.867	1.871	1.214	1.336
1626	0.0416	0.0420		0.0313	5.625	5.674		4.233	3.853	3.886		2.899	2.158	2.176		1.624
1627	0.0375	0.0380			5.456	5.530			3.737	3.788			2.093	2.121		
1628	0.0406	0.0409		0.0278	4.173	4.211		2.864	2.858	2.884		1.961	1.601	1.615		1.098
1629	0.0490	0.0494		0.0372	4.461	4.498		3.389	3.056	3.081		2.322	1.711	1.725		1.300
1630	0.0464	0.0469		0.0359	3.893	3.932		3.010	2.666	2.693		2.062	1.493	1.508		1.154
1631	0.0483	0.0483		0.0357	4.627	4.624		3.423	3.169	3.167		2.345	1.775	1.773		1.313
1632	0.0475	0.0478		0.0357	5.303	5.335		3.984	3.632	3.654		2.729	2.034	2.046		1.528
1633	0.0378	0.0372			3.907	3.851			2.676	2.637			1.498	1.477		
1634	0.0642	0.0638		0.0412	5.750	5.713		3.686	3.938	3.913		2.525	2.205	2.191		1.414
1635	0.0723	0.0738		0.0412	7.190	7.338		4.092	4.925	5.026		2.803	2.758	2.815		1.570
1636	0.0457	0.0443		0.0419	4.207	4.079		3.863	2.881	2.794		2.646	1.614	1.564		1.482
1637	0.0544	0.0565		0.0411	4.896	5.078		3.692	3.354	3.478		2.529	1.878	1.948		1.416
1638	0.0582	0.0578			5.446	5.405			3.730	3.702			2.089	2.073		
1639	0.0427	0.0418			4.102	4.014			2.809	2.749			1.573	1.540		
1640	0.0419	0.0405			3.791	3.663			2.597	2.509			1.454	1.405		
1641	0.0557	0.0571			5.241	5.372			3.590	3.679			2.010	2.061		

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1642	0.0698	0.0717		0.0412	6.603	6.785		3.894	4.522	4.647		2.667	2.533	2.602		1.494
1643	0.0557	0.0571			5.062	5.189			3.467	3.554			1.942	1.990		
1644	0.0493	0.0571	0.0229		4.320	5.001	2.008		2.959	3.425	1.375		1.657	1.918	0.770	
1645	0.0586	0.0552	0.0455	0.0415	5.161	4.855	4.001	3.657	3.535	3.326	2.741	2.505	1.980	1.862	1.535	1.403
1646	0.0612	0.0519	0.0425		5.433	4.604	3.775		3.721	3.154	2.585		2.084	1.766	1.448	
1647	0.0650	0.0575	0.0619	0.0823	5.877	5.192	5.593	7.440	4.026	3.556	3.831	5.096	2.254	1.991	2.145	2.854
1648	0.0985	0.1004	0.0273	0.1049	7.945	8.097	2.198	8.464	5.442	5.546	1.506	5.797	3.047	3.106	0.843	3.247
1649	0.0835	0.0849		0.0598	6.045	6.143		4.329	4.140	4.208		2.965	2.318	2.356		1.661
1650	0.0547	0.0541			3.768	3.724			2.581	2.551			1.445	1.429		
1651	0.0795	0.0805			5.765	5.834			3.949	3.996			2.211	2.238		
1652	0.1131	0.1152		0.1029	8.120	8.273		7.387	5.561	5.666		5.060	3.114	3.173		2.833
1653	0.0504	0.0493			4.525	4.418			3.099	3.026			1.736	1.695		
1654																
1655	0.0730		0.0480		7.650		5.028		5.239		3.444		2.934		1.929	
1656	0.0515	0.0499			5.117	4.958			3.505	3.396			1.963	1.902		
1657	0.0431	0.0717	0.0166		4.265	7.101	1.641		2.921	4.864	1.124		1.636	2.724	0.629	
1658	0.0330	0.0335			3.047	3.092			2.087	2.118			1.169	1.186		
1659	0.0589	0.0593			5.020	5.053			3.438	3.461			1.926	1.938		
1660	0.0386	0.0394			3.177	3.239			2.176	2.218			1.219	1.242		
1661	0.0467	0.0462			3.191	3.153			2.186	2.160			1.224	1.209		
1662	0.0448	0.0450			3.559	3.579			2.438	2.451			1.365	1.373		

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1663																
1664	0.0611		0.0226		5.664		2.092		3.879		1.433		2.172		0.802	
1665	0.0316	0.0241	0.0160		2.491	1.895	1.261		1.706	1.298	0.864		0.955	0.727	0.484	
1666	0.0516	0.0459	0.0209		4.171	3.708	1.687		2.857	2.540	1.155		1.600	1.422	0.647	
1667	0.0490	0.0455	0.0177		4.330	4.016	1.563		2.966	2.751	1.071		1.661	1.541	0.600	
1668	0.0204	0.0207			1.931	1.965			1.323	1.346			0.741	0.754		
1669	0.0474	0.0481			4.689	4.760			3.212	3.260			1.799	1.826		
1670	0.0452	0.0452			4.299	4.301			2.945	2.946			1.649	1.650		
1671	0.0691	0.0697		0.0278	5.854	5.906		2.357	4.010	4.045		1.614	2.245	2.265		0.904
1672	0.0484	0.0473			4.380	4.286			3.000	2.935			1.680	1.644		
1673	0.0477	0.0470			4.210	4.149			2.884	2.842			1.615	1.591		
1674	0.0531	0.0526			3.841	3.806			2.631	2.607			1.473	1.460		
1675	0.0578	0.0555	0.0239	0.0275	4.326	4.155	1.791	2.055	2.963	2.846	1.227	1.407	1.659	1.594	0.687	0.788
1676	0.0456	0.0429	0.0384	0.0274	3.682	3.466	3.097	2.215	2.522	2.374	2.122	1.517	1.412	1.329	1.188	0.850
1677																
1678																
1679	0.0381	0.0380			2.639	2.631			1.808	1.802			1.012	1.009		
1680	0.0474	0.0466			3.891	3.831			2.665	2.624			1.492	1.470		
1681	0.0464	0.0457			4.171	4.105			2.857	2.812			1.600	1.575		
1682																
1683	0.0431	0.0434		0.0347	4.043	4.073		3.251	2.769	2.789		2.226	1.551	1.562		1.247

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1684	0.0864	0.0870			6.117	6.159			4.189	4.219			2.346	2.363		
1685	0.0622	0.0628		0.0419	5.615	5.668		3.783	3.846	3.882		2.591	2.154	2.174		1.451
1686	0.0895	0.0903			8.908	8.986			6.101	6.155			3.417	3.447		
1687	0.0660	0.0679	0.0316	0.0419	6.603	6.788	3.159	4.196	4.523	4.649	2.164	2.874	2.533	2.603	1.212	1.609
1688	0.0740	0.0748			7.788	7.868			5.335	5.389			2.987	3.018		
1689	0.0577	0.0583		0.0416	5.111	5.160		3.684	3.501	3.534		2.523	1.961	1.979		1.413
1690																
1691	0.0553	0.0560		0.0347	5.442	5.508		3.411	3.727	3.772		2.336	2.087	2.113		1.308
1692	0.0541	0.0545			4.948	4.984			3.389	3.414			1.898	1.912		
1693	0.1500	0.1527			11.812	12.024			8.091	8.236			4.531	4.612		
1694	0.0499	0.0502			4.637	4.670			3.176	3.199			1.779	1.791		
1695	0.0954	0.0963			7.522	7.594			5.152	5.202			2.885	2.913		
1696	0.1004	0.1003			6.827	6.815			4.676	4.668			2.619	2.614		
1697	0.0518	0.0524			3.464	3.500			2.372	2.397			1.328	1.342		
1698	0.0546	0.0557		0.0416	3.264	3.326		2.487	2.235	2.278		1.704	1.252	1.276		0.954
1699	0.0516	0.0520			3.340	3.369			2.288	2.308			1.281	1.292		
1700	0.0756	0.0758		0.0367	6.457	6.471		3.135	4.423	4.432		2.147	2.477	2.482		1.202
1701	0.0601	0.0619		0.0309	5.419	5.581		2.785	3.711	3.822		1.908	2.078	2.140		1.068
1702	0.0707	0.0757	0.0319		6.774	7.254	3.061		4.640	4.969	2.096		2.598	2.783	1.174	
1703	0.0616	0.0625	0.0169		5.790	5.873	1.587		3.966	4.023	1.087		2.221	2.253	0.609	
1704	0.0409	0.0411			3.787	3.809			2.594	2.609			1.453	1.461		

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1705	0.0603	0.0608			5.546	5.593			3.799	3.831			2.127	2.145		
1706	0.0715	0.0732			6.216	6.368			4.257	4.361			2.384	2.442		
1707	0.0475	0.0503	0.0163		4.411	4.666	1.515		3.021	3.196	1.038		1.692	1.790	0.581	
1708	0.0650	0.0593	0.0196		4.955	4.514	1.490		3.394	3.092	1.021		1.900	1.732	0.572	
1709	0.0508	0.0521	0.0115		2.934	3.008	0.663		2.010	2.060	0.454		1.125	1.154	0.254	
1710	0.0634	0.0648	0.0200		3.887	3.969	1.227		2.662	2.719	0.841		1.491	1.522	0.471	
1711	0.0504	0.0511	0.0145		3.729	3.778	1.073		2.554	2.588	0.735		1.430	1.449	0.412	
1712	0.0676	0.0702	0.0162		5.521	5.738	1.326		3.782	3.930	0.909		2.118	2.201	0.509	
1713	0.0401	0.0364	0.0173		3.237	2.934	1.392		2.217	2.009	0.953		1.242	1.125	0.534	
1714	0.0530	0.0412	0.0203		3.625	2.818	1.387		2.483	1.930	0.950		1.390	1.081	0.532	
1715	0.0471	0.0281	0.0183		3.566	2.125	1.388		2.442	1.455	0.951		1.368	0.815	0.532	
1716	0.0523	0.0371	0.0209	0.0529	3.010	2.133	1.205	3.041	2.061	1.461	0.825	2.083	1.154	0.818	0.462	1.166
1717	0.0510	0.0357	0.0158		2.105	1.472	0.653		1.442	1.009	0.447		0.807	0.565	0.250	
1718	0.0260	0.0261			0.665	0.667			0.455	0.457			0.255	0.256		
1719	0.0674	0.0868	0.0190		2.869	3.693	0.808		1.965	2.529	0.554		1.101	1.416	0.310	
1720	0.0757	0.0625	0.0201	0.0549	4.173	3.445	1.107	3.028	2.858	2.359	0.758	2.074	1.601	1.321	0.425	1.162
1721	0.0630	0.0666	0.0208		3.511	3.714	1.158		2.404	2.544	0.793		1.347	1.425	0.444	
1722	0.0658	0.0672			4.339	4.430			2.972	3.034			1.664	1.699		
1723	0.0515	0.0487	0.0205		3.337	3.156	1.326		2.285	2.162	0.908		1.280	1.210	0.509	
1724	0.0611	0.0659	0.0205		3.993	4.309	1.339		2.735	2.952	0.917		1.531	1.653	0.513	
1725	0.0602	0.0630	0.0150		3.632	3.799	0.904		2.488	2.602	0.619		1.393	1.457	0.347	

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1726	0.0607	0.0564	0.0197		3.054	2.840	0.990		2.092	1.945	0.678		1.171	1.089	0.380	
1727	0.0442	0.0399	0.0159		2.331	2.105	0.837		1.596	1.442	0.573		0.894	0.808	0.321	
1728	0.0424	0.0234	0.0141	0.0412	3.028	1.667	1.007	2.938	2.074	1.142	0.690	2.013	1.161	0.639	0.386	1.127
1729	0.0551	0.0408	0.0188		3.842	2.844	1.312		2.632	1.948	0.898		1.474	1.091	0.503	
1730	0.0574		0.0191		4.350		1.445		2.980		0.990		1.669		0.554	
1731	0.0479	0.0482	0.0137	0.0318	3.463	3.485	0.990	2.295	2.372	2.387	0.678	1.572	1.328	1.337	0.380	0.880
1732	0.0599	0.0412	0.0182		4.539	3.120	1.382		3.109	2.137	0.946		1.741	1.197	0.530	
1733	0.0529		0.0130		3.532		0.867		2.419		0.594		1.355		0.333	
1734	0.0494	0.0503	0.0146		3.026	3.079	0.897		2.073	2.109	0.614		1.161	1.181	0.344	
1735	0.0481	0.0472	0.0147		2.816	2.764	0.861		1.929	1.893	0.590		1.080	1.060	0.330	
1736	0.0467	0.0481	0.0134		2.464	2.539	0.706		1.688	1.739	0.484		0.945	0.974	0.271	
1737	0.0565	0.0564	0.0200		3.351	3.345	1.186		2.296	2.291	0.812		1.285	1.283	0.455	
1738	0.0586	0.0592	0.0158		3.762	3.800	1.016		2.577	2.603	0.696		1.443	1.458	0.390	
1739	0.0504	0.0509	0.0168		2.854	2.885	0.951		1.955	1.976	0.651		1.095	1.107	0.365	
1740	0.0537	0.0531	0.0202		2.272	2.245	0.854		1.556	1.538	0.585		0.871	0.861	0.327	
1741	0.0506	0.0509	0.0189		2.291	2.305	0.854		1.569	1.579	0.585		0.879	0.884	0.328	
1742	0.0513	0.0520	0.0116		2.453	2.485	0.556		1.680	1.702	0.381		0.941	0.953	0.213	
1743	0.0536	0.0540	0.0192		2.491	2.511	0.893		1.706	1.720	0.612		0.956	0.963	0.343	
1744	0.0581	0.0585	0.0189	0.0662	2.644	2.664	0.860	3.010	1.811	1.825	0.589	2.062	1.014	1.022	0.330	1.155
1745	0.0505	0.0510	0.0137	0.0630	1.908	1.927	0.516	2.381	1.307	1.320	0.354	1.631	0.732	0.739	0.198	0.913
1746	0.0481	0.0484	0.0132	0.0630	2.002	2.014	0.547	2.622	1.371	1.380	0.375	1.796	0.768	0.773	0.210	1.006

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1747	0.0542	0.0551	0.0154	0.0630	2.205	2.241	0.625	2.564	1.511	1.535	0.428	1.756	0.846	0.860	0.240	0.984
1748	0.0578	0.0580	0.0220	0.1059	2.173	2.183	0.829	3.985	1.488	1.495	0.568	2.730	0.833	0.837	0.318	1.529
1749	0.0559	0.0555	0.0233	0.0412	2.342	2.327	0.976	1.726	1.604	1.594	0.668	1.182	0.898	0.892	0.374	0.662
1750	0.0744	0.0753	0.0204		3.389	3.431	0.927		2.321	2.350	0.635		1.300	1.316	0.356	
1751	0.0572	0.0572	0.0224	0.0296	2.381	2.381	0.932	1.232	1.631	1.631	0.638	0.844	0.913	0.913	0.358	0.473
1752	0.0553	0.0551	0.0223		2.250	2.240	0.907		1.541	1.534	0.621		0.863	0.859	0.348	
1753	0.0581	0.0584	0.0163	0.0408	2.263	2.276	0.634	1.587	1.550	1.559	0.434	1.087	0.868	0.873	0.243	0.609
1754	0.0643	0.0654	0.0168	0.0253	2.291	2.332	0.598	0.903	1.569	1.597	0.410	0.619	0.879	0.895	0.229	0.346
1755	0.0742	0.0753	0.0187		2.390	2.424	0.604		1.637	1.660	0.414		0.917	0.930	0.232	
1756	0.0736	0.0749	0.0164		2.258	2.296	0.503		1.547	1.573	0.345		0.866	0.881	0.193	
1757	0.0721	0.0744	0.0203		1.945	2.005	0.546		1.332	1.373	0.374		0.746	0.769	0.210	
1758	0.0983	0.1012	0.0193		2.630	2.707	0.517		1.801	1.854	0.354		1.009	1.038	0.198	
1759	0.0969	0.0988	0.0241		2.834	2.888	0.706		1.941	1.978	0.484		1.087	1.108	0.271	
1760	0.0798	0.0828	0.0150		2.157	2.237	0.405		1.477	1.532	0.278		0.827	0.858	0.155	
1761	0.1001	0.1014	0.0148		2.366	2.398	0.349		1.620	1.642	0.239		0.907	0.920	0.134	
1762	0.1222	0.1233	0.0332		1.956	1.973	0.532		1.339	1.351	0.364		0.750	0.757	0.204	
1763	0.1167	0.1191	0.0180	0.0953	2.111	2.155	0.326	1.725	1.446	1.476	0.223	1.181	0.810	0.826	0.125	0.662
1764	0.1125	0.1134	0.0330		1.984	2.001	0.582		1.359	1.371	0.399		0.761	0.768	0.223	
1765	0.1414	0.1444	0.0178		2.469	2.522	0.310		1.691	1.727	0.213		0.947	0.967	0.119	
1766	0.1451	0.1484	0.0356		3.109	3.178	0.763		2.129	2.177	0.522		1.193	1.219	0.293	
1767	0.1321	0.1324	0.0855		3.679	3.690	2.382		2.520	2.527	1.632		1.411	1.415	0.914	

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1768	0.1255	0.1258	0.0561		3.795	3.805	1.696		2.599	2.606	1.162		1.456	1.459	0.651	
1769	0.1189	0.1246	0.0148		3.870	4.057	0.482		2.651	2.779	0.330		1.484	1.556	0.185	
1770	0.1176	0.1208	0.0222		2.772	2.848	0.524		1.899	1.951	0.359		1.063	1.093	0.201	
1771	0.1152	0.1155	0.0534		2.217	2.221	1.028		1.518	1.521	0.704		0.850	0.852	0.394	
1772	0.1209	0.1213	0.0380		2.506	2.513	0.787		1.716	1.721	0.539		0.961	0.964	0.302	
1773	0.1189	0.1160	0.1058		2.622	2.560	2.333		1.796	1.754	1.598		1.006	0.982	0.895	
1774	0.1308	0.1262	0.1409		3.458	3.337	3.724		2.369	2.286	2.551		1.326	1.280	1.428	
1775	0.1363	0.1374			2.884	2.907			1.975	1.991			1.106	1.115		
1776	0.1200	0.1070	0.0630		2.156	1.922	1.131		1.477	1.317	0.775		0.827	0.737	0.434	
1777	0.1175	0.1202			2.028	2.076			1.389	1.422			0.778	0.796		
1778	0.1194	0.1185			1.941	1.926			1.329	1.319			0.744	0.739		
1779	0.1533	0.1331	0.0740		2.681	2.328	1.295		1.836	1.595	0.887		1.028	0.893	0.497	
1780	0.1298	0.1301	0.0428		2.229	2.234	0.734		1.527	1.530	0.503		0.855	0.857	0.282	
1781	0.1217	0.1244			1.893	1.935			1.297	1.325			0.726	0.742		
1782	0.1153	0.1101	0.1178		1.578	1.506	1.611		1.081	1.032	1.103		0.605	0.578	0.618	
1783	0.1248	0.1262			1.646	1.663			1.127	1.139			0.631	0.638		
1784	0.1142	0.1150			1.570	1.581			1.075	1.083			0.602	0.607		
1785	0.1244	0.1257			1.547	1.564			1.059	1.071			0.593	0.600		
1786	0.1393	0.1411			1.749	1.772			1.198	1.214			0.671	0.680		
1787	0.1070	0.1207	0.0240		1.350	1.524	0.303		0.925	1.044	0.207		0.518	0.585	0.116	
1788	0.1172	0.1313	0.0372	0.0589	1.334	1.495	0.424	0.671	0.914	1.024	0.290	0.460	0.512	0.574	0.162	0.257

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1789	0.0967	0.1111	0.0356	0.0578	1.086	1.247	0.400	0.649	0.744	0.854	0.274	0.445	0.416	0.478	0.153	0.249
1790	0.1251	0.1250			1.489	1.487			1.020	1.019			0.571	0.570		
1791	0.1340	0.1356			1.381	1.398			0.946	0.957			0.530	0.536		
1792	0.1240	0.1264			1.192	1.216			0.817	0.833			0.457	0.466		
1793	0.1277	0.1294			1.150	1.165			0.788	0.798			0.441	0.447		
1794	0.1238	0.1260			1.074	1.093			0.736	0.749			0.412	0.419		
1795	0.1517	0.1536			1.308	1.325			0.896	0.908			0.502	0.508		
1796	0.2107	0.2122			1.852	1.865			1.268	1.278			0.710	0.715		
1797	0.1877	0.1899	0.8546		1.556	1.574	7.085		1.066	1.078	4.853		0.597	0.604	2.717	
1798	0.2017	0.2095	0.1556		1.490	1.548	1.150		1.021	1.061	0.787		0.572	0.594	0.441	
1799	0.1827	0.1851			1.189	1.205			0.815	0.825			0.456	0.462		
1800	0.2303	0.2309			1.203	1.207			0.824	0.827			0.462	0.463		
1801	0.2568	0.2587			1.479	1.490			1.013	1.020			0.567	0.571		
1802	0.2609	0.2364	0.3473		1.550	1.404	2.063		1.061	0.962	1.413		0.594	0.539	0.791	
1803	0.2500	0.2349	0.5242		1.966	1.847	4.122		1.347	1.265	2.823		0.754	0.709	1.581	
1804	0.2509	0.2338	0.6548		1.898	1.769	4.953		1.300	1.212	3.393		0.728	0.678	1.900	
1805	0.2696	0.2714			1.931	1.944			1.323	1.332			0.741	0.746		
1806	0.2614	0.2378	0.6989		1.714	1.559	4.584		1.174	1.068	3.139		0.658	0.598	1.758	
1807	0.2401	0.2407	0.3274		1.570	1.574	2.141		1.075	1.078	1.466		0.602	0.604	0.821	
1808	0.3042	0.3090			1.595	1.621			1.092	1.110			0.612	0.622		
1809	0.2777	0.2788			1.471	1.477			1.008	1.012			0.564	0.567		

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1810	0.3786	0.3828			1.920	1.942			1.315	1.330			0.737	0.745		
1811	0.5266	0.5200	0.9263		2.263	2.234	3.980		1.550	1.530	2.726		0.868	0.857	1.527	
1812	0.5003	0.5037			1.710	1.721			1.171	1.179			0.656	0.660		
1813	0.5365	0.5478			2.059	2.102			1.410	1.440			0.790	0.806		
1814	0.6310	0.6349			2.444	2.459			1.674	1.684			0.937	0.943		
1815	0.6789	0.6848			2.679	2.701			1.835	1.850			1.027	1.036		
1816	0.5931	0.5975			2.272	2.289			1.556	1.568			0.871	0.878		
1817	0.4290	0.4363			1.631	1.659			1.117	1.136			0.626	0.636		
1818	0.4055	0.4141			1.468	1.499			1.005	1.027			0.563	0.575		
1819	0.4274	0.4342			1.593	1.618			1.091	1.108			0.611	0.621		
1820																
1821	0.5033	0.5057			2.231	2.241			1.528	1.535			0.856	0.860		
1822	0.5271	0.5311			2.413	2.431			1.653	1.665			0.926	0.933		
1823	0.5120	0.5154			2.399	2.414			1.643	1.654			0.920	0.926		
1824	0.5365	0.5478			2.622	2.678			1.796	1.834			1.006	1.027		
1825	0.5325	0.5410			2.336	2.374			1.600	1.626			0.896	0.910		
1826	0.5628	0.5675			1.993	2.009			1.365	1.376			0.764	0.771		
1827	0.4689	0.4720			1.965	1.978			1.346	1.355			0.754	0.759		
1828	0.4689	0.4720			2.120	2.135			1.452	1.462			0.813	0.819		
1829	0.4866	0.4991			2.017	2.069			1.381	1.417			0.774	0.794		
1830	0.5619				2.175				1.490				0.834			

Casual workers	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women	all men	urban men	rural men	women
year	nominal	nominal	nominal	nominal	daily real wage	daily real wage	daily real wage	daily real wage	250 days	250 days	250 days	250 days	140 days	140 days	140 days	140 days
1831																
1832	0.8980		0.3502		3.636		1.418		2.491		0.971		1.395		0.544	
1833	1.3581		0.3817		5.711		1.605		3.912		1.099		2.191		0.616	
1834	0.6614		0.3207		2.604		1.263		1.783		0.865		0.999		0.484	
1835																
1836																
1837																
1838	0.3579		0.1612		1.343		0.605		0.920		0.414		0.515		0.232	
1839	0.5965		0.2832		2.329		1.106		1.595		0.757		0.893		0.424	
1840	0.6493		0.2857		2.455		1.080		1.681		0.740		0.941		0.414	
1841	0.4131		0.1861		1.321		0.595		0.905		0.408		0.507		0.228	
1842	0.7057		0.2958		2.473		1.037		1.694		0.710		0.948		0.398	
1843	1.0253		0.4801		3.954		1.851		2.708		1.268		1.516		0.710	
1844	0.4920		0.2266		2.229		1.026		1.526		0.703		0.855		0.394	
1845	0.7792		0.3442		2.824		1.248		1.934		0.854		1.083		0.479	
1846	1.7315		0.8403		6.087		2.954		4.169		2.023		2.335		1.133	
1847	0.6795		0.2978		2.581		1.131		1.768		0.775		0.990		0.434	
1848	0.4396		0.2171		1.754		0.866		1.202		0.593		0.673		0.332	
1849	0.7673		0.3543		3.128		1.444		2.143		0.989		1.200		0.554	

Appendix Table 2: Annual workers' nominal and real wages

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1517	0.452	0.507				0.743	1.195		1.249			1.703		1.788		
1518	0.623	0.694				0.670	1.294		1.364			2.081		2.203		
1519	0.590	0.655				0.639	1.229		1.294			2.078		2.195		
1544				0.266		1.181				1.447					1.260	
1545				0.200		1.176				1.376					1.192	
1546				0.200		1.207				1.407					1.191	1.143
1547	3.149		0.500		0.166	1.163	4.313	1.663			1.329	4.088	1.490			1.149
1548	1.553		0.196	0.167	0.180	1.205	2.758	1.402		1.372	1.385	2.465	1.185		1.157	1.149
1549	0.952		0.196	0.167	0.183	1.231	2.183	1.427		1.397	1.413	1.891	1.184		1.156	1.147
1550	1.830		0.231	0.167	0.193	1.310	3.140	1.541		1.476	1.503	2.620	1.205		1.147	1.105
1551	1.068		0.135		0.137	1.301	2.369	1.436			1.438	1.948	1.120			1.095
1552				0.167	0.123	1.299				1.466	1.423				1.150	1.121
1553	0.691		0.087	0.167	0.169	1.402	2.092	1.489		1.568	1.571	1.571	1.072		1.138	1.162
1554	1.156		0.138		0.212	1.305	2.461	1.443			1.517	2.006	1.120			1.122
1555	1.553		0.196	0.167	0.172	1.412	2.965	1.608		1.579	1.584	2.268	1.160		1.136	1.151
1556	1.418		0.179		0.259	1.714	3.132	1.893			1.973	1.981	1.124			1.161
1557	8.188		1.300		0.268	1.659	9.848	2.959			1.927	6.745	1.912			1.178
1558	1.553		0.196		0.268	1.510	3.063	1.707			1.778	2.180	1.149			
1559						1.594										
1560						1.293										1.217

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1561					0.277	1.279					1.557					1.188
1562	0.978		0.118		0.262	1.395	2.373	1.513			1.657	1.807	1.097			1.167
1563	0.884		0.106		0.253	1.510	2.394	1.617			1.763	1.659	1.079			1.186
1564	2.783		0.325		0.315	1.689	4.472	2.014			2.004	2.841	1.215			1.138
1565	2.982		0.369		0.239	1.729	4.711	2.098			1.968	2.936	1.239			1.110
1566	1.707		0.212		0.198	1.792	3.498	2.003			1.989	2.072	1.133			1.143
1567	1.042		0.136		0.269	1.886	2.928	2.023			2.155	1.623	1.082			1.260
1568	2.450		0.297		0.462	1.781	4.232	2.079			2.244	2.542	1.187			1.221
1569	1.083		0.138		0.400	1.814	2.897	1.952			2.214	1.666	1.085			1.162
1570	2.379		0.312		0.366	2.252	4.631	2.563			2.618	2.180	1.155			1.190
1571					0.431	2.269					2.700					1.168
1572	1.408		0.158		0.432	2.570	3.978	2.728			3.001	1.608	1.068			1.187
1573	1.408		0.158		0.481	2.572	3.980	2.730			3.053	1.610	1.068			1.175
1574	1.626		0.183		0.520	2.965	4.590	3.147			3.485	1.599	1.067			1.165
1575	2.277		0.281		0.464	2.810	5.087	3.091			3.273	1.875	1.108			1.178
1576	1.886		0.235		0.417	2.347	4.233	2.581			2.764	1.886	1.110			1.284
1577	2.173		0.254		0.470	1.654	3.827	1.908			2.124	2.510	1.176			1.216
1578	1.610		0.199		0.359	1.663	3.273	1.862			2.022	2.132	1.140			1.240
1579	2.400		0.296		0.375	1.561	3.961	1.858			1.936	2.748	1.216			1.224
1580	2.277		0.281		0.409	1.824	4.101	2.105			2.233	2.424	1.176			1.242

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1581	1.842		0.250		0.458	1.895	3.737	2.145			2.354	2.117	1.152			1.236
1582	1.842		0.250		0.438	1.857	3.699	2.107			2.295	2.156	1.157			1.241
1583	2.414		0.279		0.409	1.697	4.111	1.976			2.105	2.637	1.189			1.248
1584	3.069		0.354		0.372	1.500	4.569	1.854			1.872	3.390	1.276			1.239
1585	1.574		0.192		0.386	1.613	3.186	1.805			1.999	2.129	1.138			1.227
1586	1.207	1.243	0.250		0.381	1.681	2.888	1.931	2.924		2.062	1.832	1.172	1.858		1.211
1587	2.064	3.364	0.236	1.333	0.387	1.835	3.899	2.071	5.199	3.169	2.222	2.309	1.150	3.134	1.846	
1588	1.619		0.205			1.751	3.370	1.956				2.061	1.134			
1589				2.584		1.833				4.417					2.619	1.200
1590	1.844	2.107		5.000	0.387	1.939	3.782		4.046	6.939	2.326	2.105		2.263	3.996	1.179
1591	1.583	1.672	0.234	5.000	0.387	2.159	3.743	2.393	3.832	7.159	2.546	1.855	1.126	1.903	3.699	1.157
1592	1.560	1.645	0.236	5.000	0.332	2.118	3.678	2.354	3.762	7.118	2.449	1.845	1.128	1.891	3.709	1.161
1593	1.686	1.642	0.246	5.000	0.314	1.953	3.640	2.199	3.596	6.953	2.268	1.998	1.145	1.972	3.959	
1594	2.062		0.270			2.180	4.242	2.451				2.099	1.144			1.192
1595					0.442	2.298					2.741					1.202
1596	1.767	1.649	0.446	5.000	0.437	2.169	3.936	2.615	3.818	7.169	2.607	1.944	1.238	1.881	3.672	1.190
1597	1.538	1.703	0.189		0.442	2.329	3.868	2.518	4.033		2.772	1.772	1.095	1.854		
1598	1.842		0.250			2.320	4.162	2.570				1.914	1.124			
1599	1.476	1.656		0.666		2.360	3.836		4.015	3.026		1.733		1.822	1.331	
1600	1.496	1.678		0.666		2.180	3.676		3.858	2.846		1.791		1.887	1.352	

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1601	1.437	1.611				2.372	3.808		3.983			1.701		1.786		
1602	1.519	1.703				2.586	4.105		4.289			1.675		1.757		
1603	1.519	1.703				2.703	4.222		4.406			1.651		1.730		
1604	1.519	1.703				2.501	4.020		4.204			1.700		1.785		
1605	1.519	1.703				2.106	3.625		3.809			1.823		1.923		
1606	1.519	1.703				2.021	3.540		3.724			1.866		1.971		
1607	1.519	1.703				1.964	3.483		3.667			1.888		1.995		
1608	1.900	2.133		2.632		2.094	3.994		4.228	4.726		2.056		2.186	2.463	
1609	1.903	2.133		5.000		2.698	4.601		4.832	7.698		1.824		1.924	3.165	
1610	2.053	2.302		5.000		2.428	4.481		4.730	7.428		1.973		2.091	3.369	
1611	2.799	3.302		5.000		2.339	5.139		5.642	7.339		2.377		2.625	3.460	
1612	3.110	3.488		5.000		2.145	5.255		5.633	7.145		2.655		2.855	3.660	
1613	2.635	2.999		5.000		2.621	5.256		5.621	7.621		2.158		2.318	3.197	
1617	3.933	4.410		5.000		1.979	5.912		6.389	6.979		3.217		3.486	3.819	
1628	3.969	4.450		5.000		3.548	7.516		7.998	8.548		2.292		2.449	2.628	
1647	1.791		1.299			4.039	5.830	5.337				1.490	1.355			
1650				7.194		5.298				12.491					2.555	
1651				5.301		5.036				10.337					2.191	
1652	3.743	4.730		5.000		5.084	8.827		9.815	10.084		1.848		2.072	2.133	
1653	4.016	4.996		5.000		4.069	8.085		9.065	9.069		2.098		2.367	2.368	

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1654	3.228	4.207				3.373	6.601		7.580			2.043		2.360		
1655	7.538	10.729		2.549		3.483	11.021		14.212	6.032		3.367		4.369	1.801	
1656	4.006	5.053		3.644		3.677	7.683		8.730	7.321		2.183		2.492	2.076	
1657	3.312	4.381		2.656		3.684	6.997		8.065	6.340		1.966		2.278	1.775	1.279
1658	3.709	4.661		3.407	1.106	3.958	7.667		8.619	7.365	5.063	2.025		2.288	1.942	
1659	3.456	4.761	0.211	3.284		4.281	7.736	4.491	9.041	7.564		1.914	1.056	2.259	1.869	
1660	3.947	5.507	0.346	3.644		4.437	8.384	4.783	9.944	8.081		1.986	1.086	2.376	1.910	
1661	4.344	5.489		3.644		5.346	9.691		10.835	8.990		1.927		2.171	1.777	1.241
1662	2.483	3.151		4.101	1.106	4.591	7.075		7.742	8.692	5.697	1.601		1.763	1.993	1.044
1663	4.711	5.953		3.644	0.182	4.126	8.838		10.079	7.770	4.308	2.257		2.588	1.972	1.046
1664	2.797	4.164	0.486	3.644	0.182	3.938	6.735	4.424	8.102	7.582	4.120	1.775	1.135	2.153	2.009	1.039
1665	3.825	5.571	0.493	3.879	0.182	4.638	8.463	5.131	10.209	8.517	4.820	1.916	1.118	2.334	1.929	
1666	3.740	5.172	0.478	3.879		4.517	8.256	4.995	9.689	8.396		1.917	1.117	2.268	1.951	
1667	3.889	5.053	0.468	3.879		4.134	8.023	4.603	9.188	8.014		2.031	1.124	2.340	2.029	
1668	3.762	4.761		3.879		3.851	7.614		8.612	7.730		2.074		2.360	2.108	
1669	4.282	5.547		2.656		3.688	7.970		9.234	6.343		2.259		2.630	1.781	1.312
1670	4.380	5.537		5.667	1.197	3.840	8.220		9.377	9.507	5.037	2.253		2.583	2.620	1.273
1671	4.610	5.973			1.177	4.311	8.920		10.283		5.487	2.197		2.552		1.267
1672	3.468	4.689		3.388	1.077	4.032	7.501		8.721	7.420	5.110	1.952		2.287	1.930	1.232
1673	3.991	5.003	1.330	4.381	0.957	4.135	8.126	5.464	9.137	8.516	5.092	2.065	1.355	2.335	2.170	1.110

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1674	3.917	5.208	1.330	3.388	0.556	5.047	8.964	6.377	10.255	8.435	5.603	1.864	1.293	2.149	1.748	1.053
1675	4.065	5.156	0.616	3.527	0.258	4.880	8.945	5.496	10.036	8.407	5.138	1.920	1.139	2.167	1.798	1.026
1676	1.713	2.626	0.201	3.388	0.120	4.523	6.236	4.724	7.149	7.911	4.643	1.414	1.049	1.635	1.819	
1677	3.584	4.939	0.497	16.577		5.057	8.641	5.554	9.996	21.634		1.780	1.108	2.075	4.607	1.155
1678	3.875	5.544		3.388	0.862	5.553	9.428		11.096	8.940	6.414	1.783		2.121	1.685	1.155
1679	4.016	5.037	0.997	5.174	0.814	5.266	9.281	6.263	10.303	10.440	6.079	1.849	1.211	2.064	2.093	1.149
1680	3.589	4.570	1.108	6.775	0.660	4.443	8.032	5.551	9.013	11.219	5.103	1.885	1.273	2.127	2.671	
1681	3.128	4.614	1.375	4.658		4.060	7.187	5.434	8.673	8.718		1.852	1.375	2.257	2.269	
1682	2.783	4.550	0.888	9.147		3.759	6.541	4.647	8.309	12.905		1.809	1.258	2.322	3.658	
1683	2.852	4.224		3.388		3.893	6.745		8.118	7.281		1.803		2.189	1.954	
1684	2.985	4.473		3.388		5.153	8.138		9.626	8.541		1.652		1.977	1.740	
1685	1.699	4.144	0.672	3.388		4.046	5.745	4.719	8.190	7.434		1.459	1.182	2.119	1.914	
1686	2.894	4.287		3.388		3.668	6.562		7.954	7.056		1.869		2.287	2.017	
1687	3.282	4.724		4.870		3.649	6.931		8.373	8.518		1.995		2.432	2.476	1.207
1688	4.127	4.847	0.995	7.000	0.718	3.469	7.596	4.464	8.316	10.469	4.187	2.318	1.318	2.548	3.235	
1689	3.547	4.567	0.995	5.496		4.124	7.670	5.118	8.691	9.619		1.967	1.271	2.246	2.499	
1690	3.503	4.792		4.870		3.908	7.411		8.701	8.778		2.001		2.370	2.392	
1691	3.047	4.379		4.962		3.710	6.757		8.088	8.672		1.912		2.310	2.485	
1692	3.528	4.767		5.408		3.988	7.516		8.754	9.396		1.987		2.333	2.513	
1693	3.278	4.460		4.891		4.634	7.912		9.094	9.525		1.799		2.087	2.192	

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1694	3.517	4.783		5.962		3.927	7.443		8.710	9.889		1.977		2.328	2.656	1.529
1695	3.689	5.068		5.376	2.450	4.630	8.320		9.699	10.007	7.080	1.895		2.230	2.305	1.524
1696	4.027	4.713	2.722	4.909	2.816	5.370	9.397	8.091	10.083	10.279	8.186	1.862	1.582	2.009	2.050	
1697	3.917	4.491	2.768	4.492		5.461	9.377	8.229	9.952	9.953		1.822	1.581	1.942	1.942	
1698	3.399	4.567		4.909		6.109	9.508		10.676	11.018		1.645		1.866	1.931	
1699	3.852	5.110		5.021		5.635	9.487		10.745	10.656		1.783		2.039	2.021	
1700	4.134	5.474		5.606		4.273	8.407		9.747	9.879		2.076		2.426	2.460	
1701	3.065	4.298		4.571		4.050	7.115		8.348	8.621		1.839		2.176	2.251	1.919
1702	3.779	4.787			3.500	3.808	7.586		8.595		7.308	2.087		2.377		1.901
1703	3.564	4.613	3.109	4.797	3.500	3.886	7.450	6.995	8.499	8.683	7.386	2.000	1.872	2.294	2.346	1.889
1704	3.661	4.515	2.920	5.375	3.500	3.939	7.601	6.859	8.454	9.314	7.439	2.011	1.807	2.247	2.485	1.603
1705	3.509	4.301	3.079	5.375	2.394	3.968	7.477	7.046	8.269	9.342	6.362	1.961	1.843	2.178	2.472	1.285
1706	3.424	4.843	1.969	5.375	1.197	4.196	7.620	6.165	9.039	9.571	5.393	1.898	1.516	2.270	2.409	1.609
1707	3.655	5.197	2.298	5.375	2.394	3.932	7.587	6.230	9.129	9.307	6.326	2.011	1.636	2.438	2.487	
1708	4.235	5.688	2.548	5.431		4.791	9.026	7.339	10.479	10.222		1.977	1.588	2.313	2.254	
1709	3.424	5.490	1.745	5.508		6.321	9.746	8.067	11.812	11.829		1.626	1.319	2.004	2.007	1.040
1710	2.693	3.766	1.344	5.508	0.239	5.958	8.651	7.301	9.724	11.465	6.197	1.511	1.255	1.714	2.044	
1711	3.354	4.399	1.957	5.508		4.936	8.290	6.893	9.336	10.444		1.760	1.443	1.996	2.247	
1712	2.793	3.615	1.789	5.508		4.468	7.261	6.257	8.083	9.976		1.687	1.440	1.889	2.354	
1713	3.147	4.080	0.768	5.508		4.525	7.671	5.293	8.605	10.033		1.763	1.186	1.989	2.335	

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1714	2.744	4.109	0.553	5.508		5.340	8.084	5.893	9.449	10.847		1.571	1.115	1.855	2.145	
1715	2.932	3.903	1.397	5.508		4.823	7.755	6.220	8.726	10.331		1.659	1.314	1.878	2.238	
1716	2.674	3.857	0.882	5.508		6.345	9.019	7.228	10.202	11.853		1.465	1.154	1.671	1.959	
1717	2.767	3.291	1.517	7.000		8.838	11.605	10.355	12.129	15.838		1.348	1.191	1.414	1.881	
1718	3.666	4.610		7.000		14.280	17.947		18.890	21.280		1.299		1.376	1.570	
1719	3.831	4.566	2.371	5.508		8.578	12.408	10.948	13.143	14.085		1.492	1.304	1.586	1.707	1.153
1720	3.899	4.940	3.902	5.715	1.016	6.622	10.521	10.524	11.562	12.337	7.638	1.634	1.634	1.803	1.929	1.240
1721	2.370	4.412	1.283	5.508	1.572	6.547	8.917	7.829	10.959	12.054	8.119	1.393	1.213	1.731	1.913	1.300
1722	4.064	4.777	2.659	5.508	1.658	5.535	9.599	8.194	10.312	11.043	7.193	1.787	1.515	1.926	2.067	1.237
1723	5.971	7.712	3.127	20.486	1.333	5.633	11.604	8.760	13.345	26.119	6.966	2.147	1.601	2.482	4.935	1.214
1724	3.799	4.640	2.435	5.508	1.197	5.581	9.380	8.016	10.221	11.089	6.778	1.741	1.475	1.905	2.074	1.243
1725	3.791	4.788	2.468	6.357	1.473	6.054	9.845	8.523	10.843	12.411	7.527	1.686	1.447	1.866	2.150	1.184
1726	4.132	5.270	1.797	6.357	1.334	7.252	11.384	9.049	12.522	13.609	8.586	1.641	1.279	1.818	1.987	1.183
1727	4.250	5.678	1.962	6.357	1.266	6.919	11.169	8.881	12.597	13.276	8.185	1.688	1.318	1.919	2.029	1.239
1728	4.341	5.980	1.463	6.357	1.223	5.114	9.455	6.577	11.094	11.471	6.337	1.907	1.306	2.250	2.328	1.246
1729	4.594	6.855	1.968	6.357	1.289	5.235	9.829	7.203	12.090	11.592	6.524	1.950	1.407	2.418	2.315	1.311
1730	3.659	4.619	1.751	6.722	1.497	4.818	8.477	6.568	9.437	11.540	6.314	1.813	1.389	2.026	2.493	1.237
1731	4.156	5.002	1.858	7.538	1.197	5.052	9.208	6.910	10.054	12.590	6.249	1.893	1.399	2.075	2.620	1.297
1732	4.963	6.870	1.983	6.357	1.433	4.816	9.779	6.799	11.686	11.173	6.249	2.106	1.442	2.531	2.416	1.265
1733	4.845	7.568	2.088	5.508	1.450	5.468	10.313	7.557	13.036	10.976	6.918	1.963	1.415	2.504	2.095	1.308

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1734	4.669	6.621	2.221	6.357	1.833	5.959	10.628	8.180	12.580	12.316	7.792	1.845	1.402	2.199	2.151	1.251
1735	4.946	6.297		6.357	1.567	6.238	11.184		12.535	12.595	7.805	1.859		2.094	2.104	1.225
1736	5.269	6.638	2.088	6.722	1.557	6.913	12.181	9.001	13.551	13.635	8.470	1.833	1.330	2.050	2.063	1.223
1737	4.747	6.104	2.189	6.722	1.375	6.152	10.898	8.340	12.255	12.874	7.526	1.827	1.381	2.063	2.171	1.219
1738	4.962	6.291	2.242	5.841	1.245	5.690	10.652	7.932	11.982	11.531	6.935	1.923	1.417	2.171	2.087	1.209
1739	4.290	6.736	1.381	5.928	1.348	6.443	10.733	7.824	13.179	12.371	7.791	1.720	1.232	2.131	1.995	1.188
1740	4.415	6.574	1.601	7.322	1.617	8.624	13.040	10.226	15.198	15.946	10.242	1.572	1.207	1.851	1.948	1.167
1741	3.996	7.546	1.588	4.949	1.350	8.063	12.059	9.650	15.609	13.011	9.413	1.547	1.217	2.033	1.677	1.178
1742	3.491	8.075	1.550	4.949	1.357	7.635	11.126	9.185	15.710	12.584	8.992	1.499	1.222	2.154	1.707	1.178
1743	3.910	8.363	1.842	5.722	1.395	7.849	11.759	9.691	16.213	13.571	9.244	1.542	1.255	2.159	1.793	1.169
1744	3.712	7.946	1.667	4.949	1.359	8.021	11.734	9.689	15.968	12.970	9.380	1.504	1.226	2.078	1.671	1.140
1745	3.436	8.001	1.434	4.949	1.355	9.660	13.096	11.094	17.661	14.608	11.015	1.395	1.165	1.921	1.569	1.159
1746	3.825	7.647	1.537	4.657	1.392	8.775	12.600	10.313	16.422	13.432	10.167	1.478	1.192	1.956	1.582	1.149
1747	3.841	8.193	1.587	4.949	1.336	8.971	12.811	10.557	17.164	13.919	10.307	1.473	1.195	2.009	1.609	1.143
1748	3.796	7.402	1.582	4.949	1.391	9.702	13.498	11.284	17.104	14.650	11.093	1.429	1.179	1.837	1.559	1.170
1749	3.753	7.516	1.777	4.949	1.483	8.706	12.459	10.483	16.221	13.654	10.189	1.465	1.220	1.931	1.613	1.153
1750	3.751	6.131	1.525	6.066	1.224	8.015	11.766	9.541	14.146	14.081	9.240	1.494	1.201	1.808	1.799	1.147
1751	5.456	7.489	1.390	5.810	1.284	8.764	14.220	10.154	16.253	14.574	10.048	1.662	1.169	1.909	1.705	1.157
1752	3.979	7.224	1.523	4.949	1.406	8.972	12.951	10.495	16.196	13.920	10.378	1.472	1.181	1.857	1.587	1.152
1753	3.679	7.428	1.851	6.864	1.423	9.374	13.053	11.225	16.802	16.238	10.797	1.417	1.210	1.841	1.777	1.140

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1754	3.985	7.493	2.024	5.288	1.431	10.238	14.223	12.262	17.731	15.526	11.669	1.418	1.213	1.787	1.555	1.141
1755	4.195	7.570	2.043	5.288	1.597	11.336	15.531	13.378	18.906	16.624	12.933	1.403	1.196	1.727	1.508	1.151
1756	4.287	7.864	2.185	3.341	1.799	11.903	16.190	14.088	19.767	15.244	13.702	1.395	1.201	1.724	1.308	1.125
1757	3.551	6.107	1.994	3.341	1.686	13.539	17.091	15.533	19.646	16.880	15.225	1.293	1.165	1.504	1.276	1.110
1758	3.969	7.184	2.145	3.341	1.503	13.640	17.609	15.785	20.824	16.981	15.143	1.321	1.173	1.581	1.270	1.144
1759	4.033	6.790	2.213	3.565	1.795	12.485	16.518	14.698	19.275	16.050	14.280	1.346	1.190	1.582	1.306	1.091
1760	4.266	7.052	2.199	4.149	1.225	13.506	17.772	15.705	20.558	17.655	14.731	1.336	1.173	1.556	1.327	1.130
1761	4.259	7.121	2.135	3.341	2.009	15.440	19.700	17.575	22.561	18.781	17.449	1.297	1.149	1.496	1.233	1.087
1762	4.401	7.816	2.340	3.565	1.975	22.801	27.202	25.141	30.617	26.367	24.777	1.216	1.115	1.384	1.175	1.111
1763	5.095	7.147	3.121	3.565	2.240	20.174	25.269	23.295	27.322	23.740	22.414	1.276	1.169	1.387	1.193	1.111
1764	4.862	7.863	2.839	3.565	2.300	20.689	25.551	23.528	28.552	24.254	22.989	1.257	1.150	1.416	1.189	1.118
1765	5.279	7.743	3.122	3.565	2.477	20.908	26.187	24.031	28.651	24.473	23.385	1.276	1.164	1.406	1.187	1.128
1766	5.129	9.288	2.830	3.565	2.186	17.038	22.167	19.867	26.325	20.603	19.224	1.326	1.180	1.590	1.226	1.156
1767	5.637	6.981	3.697	3.565	2.044	13.101	18.739	16.798	20.082	16.666	15.145	1.466	1.305	1.577	1.295	1.168
1768	6.728	8.279	4.446	3.565	2.030	12.071	18.798	16.516	20.350	15.636	14.100	1.621	1.410	1.764	1.329	1.176
1769	5.303	7.812	3.458		1.978	11.210	16.513	14.667	19.022		13.187	1.520	1.339	1.766		1.118
1770	6.837	8.880	3.778	6.027	1.830	15.482	22.318	19.259	24.362	21.508	17.312	1.491	1.272	1.638	1.433	1.122
1771	5.140	7.812	3.893		2.308	18.972	24.112	22.865	26.784		21.280	1.309	1.234	1.470		1.130
1772	4.920	7.812	3.508		2.289	17.617	22.537	21.125	25.429		19.907	1.314	1.224	1.498		1.099
1773	4.197	7.812	2.837	4.080	1.646	16.545	20.741	19.382	24.357	20.624	18.190	1.283	1.191	1.526	1.275	1.124

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1774	3.455	7.812	2.562	4.080	1.706	13.807	17.262	16.369	21.619	17.887	15.514	1.273	1.202	1.618	1.322	1.008
1775	3.396	7.812	2.534	4.080	0.137	17.248	20.644	19.781	25.060	21.327	17.384	1.219	1.163	1.503	1.263	1.055
1776	2.711	7.812	1.920	4.080	1.124	20.320	23.031	22.240	28.132	24.400	21.444	1.147	1.104	1.423	1.221	1.064
1777	3.314	11.048	2.401	8.160	1.355	21.138	24.452	23.539	32.186	29.298	22.493	1.173	1.125	1.577	1.426	1.063
1778	4.030	11.048	3.083		1.425	22.459	26.490	25.542	33.507		23.885	1.200	1.153	1.549		1.061
1779	3.024	11.048	2.226	1.590	1.267	20.868	23.892	23.095	31.917	22.458	22.136	1.160	1.118	1.585	1.084	1.084
1780	2.674	2.718	2.349		1.795	21.255	23.929	23.604	23.974		23.050	1.139	1.122	1.141		1.078
1781	4.188		3.131		1.828	23.460	27.647	26.591			25.287	1.200	1.150			1.067
1782	6.784		4.663		1.801	26.680	33.464	31.343			28.481	1.284	1.195			1.010
1783	5.954		4.634		0.270	27.686	33.640	32.320			27.955	1.241	1.188			1.027
1784	2.122		1.684		0.711	26.551	28.673	28.235			27.262	1.089	1.070			1.064
1785	1.037		0.586		1.869	29.344	30.381	29.930			31.213	1.040	1.023			1.066
1786	7.044	7.202	4.463	4.439	1.914	29.056	36.100	33.519	36.258	33.495	30.970	1.272	1.172	1.278	1.171	1.064
1787	8.025		5.379		1.860	28.915	36.939	34.293			30.774	1.306	1.205			1.057
1788	8.205		5.232		1.842	32.060	40.265	37.292			33.902	1.286	1.182			1.047
1789	5.446	2.326	4.587		1.536	32.505	37.950	37.092	34.830		34.041	1.188	1.158	1.080		1.059
1790	5.066	2.330	5.192	2.636	1.795	30.675	35.741	35.867	33.005	33.311	32.470	1.183	1.187	1.084	1.095	1.057
1791	7.278		5.116		2.015	35.418	42.696	40.534			37.433	1.224	1.158			1.046
1792	8.539	8.047	5.948	17.569	1.727	37.961	46.500	43.909	46.008	55.530	39.688	1.247	1.172	1.233	1.509	1.041
1793	8.747	8.047	5.837	17.569	1.667	40.526	49.273	46.363	48.573	58.095	42.193	1.235	1.157	1.217	1.473	1.047

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1794	6.768	8.047	5.024	17.569	1.970	42.060	48.829	47.085	50.108	59.629	44.030	1.178	1.132	1.212	1.462	1.063
1795	9.095	8.047	6.134	17.569	2.645	42.316	51.411	48.450	50.363	59.885	44.961	1.238	1.161	1.211	1.460	1.052
1796	8.070	8.047	6.971	17.569	2.148	41.525	49.595	48.495	49.572	59.094	43.672	1.209	1.180	1.208	1.455	1.069
1797	8.478	8.047	7.614	17.569	3.037	44.027	52.505	51.642	52.074	61.596	47.064	1.207	1.186	1.197	1.430	1.077
1798	7.634	8.047	6.432	17.569	3.824	49.393	57.027	55.825	57.440	66.962	53.217	1.170	1.143	1.179	1.392	1.056
1799	7.382	5.938	6.270	17.569	3.119	56.079	63.461	62.349	62.017	73.648	59.199	1.147	1.125	1.118	1.350	1.056
1800	8.031	7.904	5.594	5.032	3.917	69.833	77.864	75.428	77.737	74.865	73.750	1.130	1.091	1.128	1.082	1.056
1801	8.099	7.020	5.856	11.752	3.576	63.393	71.492	69.249	70.414	75.146	66.969	1.143	1.104	1.124	1.208	1.053
1802	9.758	8.047	6.863	17.744	3.272	61.455	71.212	68.318	69.502	79.199	64.726	1.181	1.127	1.149	1.329	1.073
1803	9.792	8.047	7.142	17.744	3.385	46.415	56.208	53.558	54.463	64.159	49.801	1.234	1.170	1.192	1.423	1.088
1804	9.847	7.972	7.291	17.744	4.263	48.251	58.097	55.541	56.223	65.994	52.513	1.226	1.167	1.183	1.407	1.085
1805	10.158	8.674	7.680	19.913	4.325	50.958	61.116	58.638	59.632	70.871	55.283	1.220	1.167	1.188	1.432	1.072
1806	10.922		7.918		3.994	55.654	66.576	63.572			59.648	1.219	1.159			1.073
1807	10.211	8.047	8.176	25.737	4.048	55.826	66.037	64.002	63.873	81.563	59.874	1.203	1.162	1.160	1.510	1.060
1808	10.713	8.047	8.616	25.737	4.178	69.607	80.320	78.222	77.654	95.344	73.785	1.172	1.139	1.130	1.414	1.067
1809	10.245	7.381	7.995	25.737	4.610	68.897	79.142	76.892	76.278	94.634	73.507	1.163	1.127	1.117	1.408	1.080
1810	9.061	5.945	7.942	25.092	5.787	71.954	81.016	79.896	77.899	97.046	77.741	1.135	1.118	1.089	1.374	1.079
1811	13.678	10.029	10.155	36.403	6.742	84.944	98.622	95.099	94.974	121.347	91.686	1.176	1.131	1.129	1.469	1.067
1812	16.303	10.029	12.026	36.403	7.130	106.805	123.108	118.831	116.835	143.208	113.935	1.171	1.126	1.105	1.381	1.077
1813	16.752	10.029	12.637	36.403	7.304	95.116	111.869	107.754	105.146	131.519	102.420	1.195	1.147	1.117	1.424	1.060

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1814	18.459	10.029	13.988	25.092	5.693	94.248	112.707	108.236	104.277	119.340	99.941	1.215	1.163	1.117	1.293	1.026
1815	14.883	9.884	13.377	36.403	2.394	92.519	107.402	105.895	102.402	128.922	94.912	1.176	1.158	1.117	1.430	1.025
1816	8.433	10.029	4.696	36.403	2.394	95.288	103.721	99.985	105.318	131.691	97.682	1.098	1.054	1.116	1.422	1.025
1817	10.420	12.976	4.696	36.403	2.394	95.980	106.401	100.677	108.956	132.383	98.374	1.119	1.054	1.149	1.417	1.024
1818	13.823	12.976	15.362	36.403	2.394	100.858	114.680	116.220	113.834	137.261	103.251	1.152	1.169	1.142	1.399	1.024
1819	10.420	12.976	4.696	36.386	2.394	97.954	108.374	102.650	110.930	134.339	100.347	1.117	1.053	1.146	1.410	1.107
1820	13.263	16.054	4.696	27.976	9.575	89.461	102.724	94.157	105.515	117.437	99.035	1.161	1.057	1.194	1.339	1.116
1821	13.664	12.976	31.309	36.386	9.575	82.342	96.006	113.651	95.318	118.727	91.916	1.178	1.409	1.169	1.475	1.120
1822	13.664	12.976	31.309	36.386	9.575	79.730	93.394	111.039	92.706	116.116	89.305	1.185	1.423	1.175	1.492	1.123
1823	13.664	12.976	31.309	36.386	9.575	77.913	91.577	109.223	90.889	114.299	87.488	1.188	1.431	1.178	1.500	1.128
1824	13.664	12.976	31.309	36.386	9.575	74.668	88.332	105.978	87.644	111.054	84.243	1.194	1.445	1.184	1.517	1.166
1825	21.581	23.710	31.309	33.564	13.784	83.181	104.762	114.490	106.890	116.745	96.965	1.276	1.401	1.303	1.430	1.109
1826	17.773	12.976	16.094	36.386	11.217	103.090	120.863	119.184	116.066	139.476	114.307	1.192	1.174	1.140	1.393	1.094
1827	18.843	12.976	15.310	36.386	8.186	87.086	105.929	102.396	100.062	123.472	95.272	1.234	1.190	1.161	1.452	1.155
1828	20.016	12.976	17.213	36.386	12.497	80.704	100.719	97.917	93.680	117.089	93.200	1.267	1.230	1.173	1.486	1.109
1829	20.034	12.976	28.339	36.386	9.575	88.062	108.096	116.401	101.038	124.447	97.636	1.247	1.350	1.160	1.449	
1830	23.118	25.376	31.309	33.564		94.293	117.410	125.602	119.668	127.857		1.268	1.363	1.294	1.389	1.115
1831	11.337	12.976		41.641	12.131	105.629	116.967		118.605	147.270	117.760	1.120		1.137	1.439	1.168
1832	23.855	12.976	30.958	41.641	15.174	90.138	113.994	121.097	103.114	131.779	105.312	1.287	1.373	1.156	1.502	1.193
1833	26.512	16.330	32.857	41.641	16.727	86.795	113.307	119.652	103.125	128.436	103.522	1.328	1.406	1.202	1.514	1.175

Annual workers	Unskilled (u.s.) men	u.s. urban men	u.s. rural men	low-skilled urban men	women		unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women	unskilled men	u.s. urban men	u.s. rural men	low-skilled urban men	women
year	cash wage	cash wage	cash wage	cash wage	cash wage	Malmö resp basket	nominal wage	nominal wage	nominal wage	nominal wage	nominal wage	real wage	real wage	real wage	real wage	real wage
1834	23.162	16.330	30.157	41.641	16.257	92.714	115.877	122.871	109.044	134.355	108.971	1.271	1.352	1.191	1.486	1.184
1835	27.093	28.899	29.036	48.944	16.916	91.838	118.931	120.874	120.737	140.782	108.754	1.320	1.343	1.341	1.578	1.160
1836	25.959	16.330	34.724	66.255	14.808	92.344	118.302	127.068	108.673	158.599	107.152	1.305	1.408	1.192	1.779	
1837	26.450	16.330	36.110	63.368		97.579	124.029	133.689	113.909	160.947		1.299	1.408	1.185	1.716	1.174
1838	14.209	16.330		68.356	16.916	97.289	111.499		113.619	165.646	114.206	1.161		1.184	1.772	1.188
1839	27.098	16.330	34.320	68.356	17.596	93.493	120.591	127.813	109.823	161.849	111.089	1.315	1.399	1.190	1.795	
1840	33.990	33.823	38.753	57.945		96.557	130.547	135.310	130.380	154.502		1.383	1.437	1.381	1.653	
1841	14.209	16.330		52.152		114.170	128.379		130.500	166.323		1.139		1.160	1.511	1.124
1842	14.209	16.330		52.152	12.926	104.166	118.375		120.495	156.318	117.092	1.151		1.174	1.554	1.209
1843	18.148	16.330		52.152	19.809	94.659	112.807		110.988	146.811	114.468	1.209		1.188	1.600	1.213
1844	27.541	12.535	36.448	52.152	17.187	80.579	108.120	117.027	93.114	132.731	97.765	1.371	1.491	1.169	1.702	1.170
1845	33.597	36.661	34.489	42.236	17.102	100.694	134.292	135.183	137.355	142.930	117.797	1.375	1.385	1.409	1.471	1.151
1846	31.504	12.535	39.319	51.827	15.672	103.832	135.337	143.151	116.367	155.660	119.504	1.340	1.424	1.135	1.559	1.103
1847	39.065		39.900		9.874	96.097	135.162	135.998			105.971	1.451	1.460			
1848	45.107		45.938	25.432		91.462	136.569	137.400		116.894		1.535	1.544		1.301	
1849	43.898			25.432		89.519	133.417			114.951		1.532			1.308	
1850						94.87013										

Appendix Table 3: Price baskets

	Malmö		Stockholm		Kalmar	
Year	Respectability	Subsistence	Respectability	Subsistence	Respectability	Subsistence
1500	0.65	0.22	0.70	0.21	0.49	0.12
1501	0.63	0.22	0.64	0.18	0.49	0.12
1502	0.65	0.22	0.64	0.18	0.47	0.12
1503	0.68	0.22	0.65	0.18	0.45	0.12
1504	0.66	0.23	0.69	0.20	0.41	0.12
1505	0.69	0.24	0.69	0.20	0.46	0.13
1506	0.64	0.22	0.65	0.18	0.44	0.12
1507	0.58	0.21	0.62	0.18	0.39	0.11
1508	0.75	0.25	0.80	0.24	0.43	0.13
1509	0.63	0.22	0.72	0.21	0.37	0.11
1510	0.70	0.24	0.72	0.21	0.47	0.13
1511	0.71	0.24	0.70	0.20	0.45	0.12
1512	0.68	0.24	0.66	0.18	0.47	0.12
1513	0.67	0.24	0.72	0.20	0.46	0.12
1514	0.67	0.23	0.70	0.19	0.42	0.11
1515	0.75	0.27	0.75	0.25	0.49	0.16
1516	0.76	0.26	0.81	0.23	0.52	0.15
1517	0.74	0.25	0.80	0.24	0.48	0.14
1518	0.67	0.23	0.76	0.23	0.43	0.13
1519	0.64	0.22	0.84	0.28	0.40	0.13
1520	0.68	0.23	0.95	0.33	0.41	0.14
1521	0.68	0.23	1.17	0.41	0.48	0.16
1522	0.73	0.24	1.29	0.43	0.60	0.19
1523	0.83	0.27	1.06	0.33	0.79	0.22
1524	0.78	0.25	0.90	0.28	0.74	0.19
1525	0.74	0.24	0.88	0.26	0.60	0.16
1526	0.80	0.25	0.93	0.29	0.55	0.16
1527	0.81	0.26	1.06	0.32	0.59	0.17
1528	0.84	0.28	1.12	0.34	0.62	0.18
1529	0.81	0.28	0.92	0.31	0.59	0.19
1530	0.89	0.29	1.05	0.33	0.58	0.17
1531	0.88	0.30	0.98	0.33	0.52	0.17
1532	0.85	0.30	0.83	0.28	0.56	0.17
1533	0.92	0.33	0.97	0.33	0.58	0.19

Year	Malmö		Stockholm		Kalmar	
	Respectability	Subsistence	Respectability	Subsistence	Respectability	Subsistence
1534	0.82	0.29	0.90	0.29	0.50	0.16
1535	0.70	0.25	1.00	0.27	0.60	0.14
1536	0.73	0.25	0.84	0.27	0.50	0.15
1537	0.69	0.23	0.85	0.28	0.45	0.14
1538	0.69	0.23	0.87	0.28	0.44	0.13
1539	0.81	0.27	0.90	0.29	0.54	0.18
1540	0.85	0.29	0.98	0.33	0.58	0.20
1541	0.88	0.29	0.93	0.29	0.59	0.18
1542	0.89	0.30	0.96	0.30	0.53	0.17
1543	1.06	0.36	1.16	0.42	0.55	0.20
1544	1.18	0.40	1.48	0.47	0.72	0.23
1545	1.18	0.40	1.31	0.42	0.65	0.21
1546	1.21	0.43	1.34	0.43	0.69	0.22
1547	1.16	0.42	0.96	0.30	0.65	0.19
1548	1.21	0.43	1.12	0.38	0.56	0.19
1549	1.23	0.44	1.17	0.39	0.65	0.21
1550	1.31	0.47	1.45	0.50	0.70	0.24
1551	1.30	0.47	1.58	0.55	0.74	0.25
1552	1.30	0.47	1.55	0.53	0.79	0.27
1553	1.40	0.49	1.37	0.48	0.80	0.28
1554	1.31	0.44	1.56	0.52	0.77	0.25
1555	1.41	0.48	1.48	0.53	0.85	0.30
1556	1.71	0.62	1.59	0.54	0.98	0.34
1557	1.66	0.59	1.93	0.67	0.88	0.30
1558	1.51	0.54	1.52	0.50	0.81	0.26
1559	1.59	0.56	1.60	0.53	0.85	0.28
1560	1.29	0.43	1.42	0.48	0.70	0.23
1561	1.28	0.45	1.64	0.59	0.70	0.25
1562	1.39	0.48	1.71	0.61	0.77	0.27
1563	1.51	0.51	2.11	0.81	0.73	0.27
1564	1.69	0.54	2.16	0.82	0.83	0.30
1565	1.73	0.56	2.41	0.93	0.89	0.32
1566	1.79	0.58	2.21	0.85	0.99	0.37
1567	1.89	0.63	2.05	0.74	1.04	0.36

	Malmö		Stockholm		Kalmar	
Year	Respectability	Subsistence	Respectability	Subsistence	Respectability	Subsistence
1568	1.78	0.58	2.45	0.89	1.14	0.40
1569	1.81	0.58	2.71	0.98	1.20	0.41
1570	2.25	0.65	3.49	1.35	1.41	0.50
1571	2.27	0.63	4.34	1.78	1.38	0.52
1572	2.57	0.78	7.06	3.03	1.84	0.70
1573	2.57	0.80	6.60	2.57	2.50	0.90
1574	2.96	0.90	8.09	3.24	2.76	1.01
1575	2.81	0.85	8.26	3.26	3.07	1.14
1576	2.35	0.87	2.22	0.71	3.14	0.88
1577	1.65	0.59	2.07	0.67	2.78	0.73
1578	1.66	0.62	2.14	0.70	1.03	0.32
1579	1.56	0.54	2.20	0.71	0.99	0.31
1580	1.82	0.62	2.36	0.77	1.08	0.34
1581	1.90	0.67	2.75	0.97	1.02	0.34
1582	1.86	0.67	2.16	0.67	1.22	0.36
1583	1.70	0.61	2.01	0.62	1.04	0.30
1584	1.50	0.54	2.06	0.63	1.05	0.31
1585	1.61	0.58	2.16	0.68	1.01	0.31
1586	1.68	0.61	2.26	0.74	1.02	0.32
1587	1.84	0.66	2.41	0.81	1.05	0.34
1588	1.75	0.62	2.43	0.83	0.98	0.32
1589	1.83	0.63	2.71	0.97	1.05	0.36
1590	1.94	0.69	2.70	0.94	1.20	0.39
1591	2.16	0.77	2.68	0.91	1.27	0.41
1592	2.12	0.74	2.30	0.75	1.16	0.36
1593	1.95	0.72	1.98	0.63	1.18	0.34
1594	2.18	0.79	2.96	1.09	1.11	0.39
1595	2.30	0.81	2.70	0.93	1.37	0.45
1596	2.17	0.77	2.68	0.91	1.22	0.40
1597	2.33	0.84	4.06	1.58	1.33	0.48
1598	2.32	0.82	4.68	1.93	1.28	0.48
1599	2.36	0.84	4.00	1.57	1.50	0.54
1600	2.18	0.77	3.84	1.51	1.26	0.45
1601	2.37	0.82	2.84	0.97	1.54	0.50

Year	Malmö		Stockholm		Kalmar	
	Respectability	Subsistence	Respectability	Subsistence	Respectability	Subsistence
1602	2.59	0.93	3.90	1.51	1.17	0.42
1603	2.70	0.99	3.86	1.52	1.29	0.47
1604	2.50	0.92	3.01	1.10	1.32	0.45
1605	2.11	0.73	3.44	1.31	1.25	0.44
1606	2.02	0.68	3.40	1.27	1.43	0.50
1607	1.96	0.65	3.08	1.08	1.48	0.50
1608	2.09	0.71	3.39	1.21	1.56	0.53
1609	2.70	0.98	3.37	1.20	1.56	0.52
1610	2.43	0.85	3.23	1.13	1.52	0.51
1611	2.34	0.82	3.78	1.40	1.56	0.54
1612	2.14	0.73	2.91	0.98	1.69	0.54
1613	2.62	0.93	3.32	1.18	1.55	0.53
1614	2.44	0.85	3.37	1.20	1.65	0.56
1615	2.27	0.78	3.37	1.20	1.70	0.57
1616	2.56	0.91	3.83	1.42	1.75	0.60
1617	1.98	0.62	3.74	1.39	1.67	0.58
1618	2.05	0.66	2.96	0.99	1.79	0.57
1619	2.18	0.73	3.78	1.42	1.64	0.58
1620	1.96	0.62	3.33	1.21	1.72	0.60
1621	2.08	0.69	4.19	1.69	1.74	0.58
1622	3.34	1.28	4.55	1.85	1.88	0.66
1623	3.23	1.25	4.61	1.79	1.76	0.62
1624	3.31	1.27	4.69	1.87	1.80	0.66
1625	2.78	0.96	4.62	1.83	1.92	0.70
1626	2.70	0.95	4.30	1.54	1.95	0.65
1627	2.51	0.82	3.93	1.40	1.91	0.66
1628	3.55	1.31	4.42	1.56	2.23	0.80
1629	4.01	1.50	4.68	1.58	2.62	0.95
1630	4.35	1.69	4.49	1.50	2.81	1.06
1631	3.81	1.40	4.70	1.50	3.20	1.20
1632	3.27	1.09	5.07	1.63	3.51	1.28
1633	3.53	1.25	5.79	1.96	3.93	1.32
1634	4.08	1.33	6.27	2.16	3.97	1.40
1635	3.67	1.14	6.09	2.16	4.10	1.43

Year	Malmö		Stockholm		Kalmar	
	Respectability	Subsistence	Respectability	Subsistence	Respectability	Subsistence
1636	3.96	1.30	5.90	2.11	4.00	1.35
1637	4.06	1.34	5.72	1.99	4.02	1.39
1638	3.90	1.28	5.96	2.14	3.82	1.34
1639	3.80	1.21	6.09	2.14	3.85	1.31
1640	4.03	1.33	6.22	2.20	3.95	1.36
1641	3.88	1.24	5.28	1.72	3.91	1.38
1642	3.86	1.24	5.23	1.70	3.92	1.41
1643	4.01	1.29	5.42	1.75	4.37	1.54
1644	4.16	1.35	5.65	1.85	4.45	1.53
1645	4.15	1.36	6.53	2.32	4.38	1.54
1646	4.11	1.35	5.72	1.89	4.77	1.60
1647	4.04	1.30	5.90	1.94	4.60	1.51
1648	4.53	1.51	6.40	2.20	4.77	1.67
1649	5.04	1.79	6.38	2.18	4.49	1.64
1650	5.30	1.89	7.02	2.17	5.20	1.83
1651	5.04	1.82	6.64	2.15	5.23	1.97
1652	5.08	1.77	6.67	2.15	6.23	2.30
1653	4.07	1.27	6.84	2.19	6.46	2.16
1654	3.37	0.93	6.57	2.33	6.10	1.96
1655	3.48	1.01	6.55	2.32	4.78	1.59
1656	3.68	1.06	6.97	2.52	4.56	1.58
1657	3.68	1.03	7.39	2.72	4.55	1.62
1658	3.96	1.11	9.02	3.28	5.90	1.80
1659	4.28	1.32	8.32	3.14	5.29	1.89
1660	4.44	1.33	7.57	2.71	4.85	1.78
1661	5.35	1.84	6.70	2.24	5.34	1.97
1662	4.59	1.49	6.58	2.14	5.43	2.01
1663	4.13	1.30	6.42	2.09	5.60	2.08
1664	3.94	1.23	6.80	2.34	5.30	1.97
1665	4.64	1.53	7.13	2.42	5.76	2.05
1666	4.52	1.46	7.57	2.58	5.98	2.05
1667	4.13	1.31	7.43	2.53	6.00	2.07
1668	3.85	1.20	7.59	2.66	5.99	2.08
1669	3.69	1.14	7.62	2.77	5.69	1.87

Year	Malmö Respectability	Subsistence	Stockholm Respectability	Subsistence	Kalmar Respectability	Subsistence
1670	3.84	1.20	7.14	2.45	5.80	1.85
1671	4.31	1.44	6.63	2.19	5.72	1.85
1672	4.03	1.29	6.47	2.05	5.39	1.84
1673	4.13	1.32	6.88	2.21	5.48	1.91
1674	5.05	1.64	6.49	2.02	5.75	2.02
1675	4.88	1.60	7.66	2.43	6.06	2.15
1676	4.52	1.41	7.52	2.39	7.07	2.41
1677	5.06	1.58	8.08	2.79	6.42	2.34
1678	5.55	1.92	9.80	3.61	6.39	2.35
1679	5.27	1.75	12.05	4.68	6.96	2.52
1680	4.44	1.39	10.74	4.19	6.75	2.33
1681	4.06	1.29	7.91	2.76	6.44	2.14
1682	3.76	1.13	7.41	2.61	5.67	1.89
1683	3.89	1.18	7.99	2.80	5.74	1.89
1684	5.15	1.75	8.73	3.19	5.35	1.92
1685	4.05	1.27	8.46	3.10	5.55	1.99
1686	3.67	1.15	8.34	3.08	5.96	2.10
1687	3.65	1.15	9.43	3.63	5.29	1.86
1688	3.47	1.09	8.30	3.04	5.26	1.86
1689	4.12	1.42	6.80	2.30	5.48	1.90
1690	3.91	1.29	7.12	2.39	5.85	1.97
1691	3.71	1.20	7.46	2.51	5.96	1.97
1692	3.99	1.31	7.47	2.50	6.17	1.95
1693	4.63	1.62	7.84	2.68	5.65	2.02
1694	3.93	1.27	9.17	3.12	6.46	2.28
1695	4.63	1.59	8.66	2.85	7.33	2.59
1696	5.37	1.96	8.46	3.05	6.16	2.32
1697	5.46	2.01	8.64	2.87	6.32	2.38
1698	6.11	2.35	8.93	2.92	7.45	2.84
1699	5.64	2.12	8.00	2.56	7.77	2.95
1700	4.27	1.46	6.61	2.00	7.74	2.73
1701	4.05	1.34	6.15	1.85	6.82	2.38
1702	3.81	1.22	6.08	1.80	6.51	2.23
1703	3.89	1.27	6.56	1.99	6.03	2.14

Year	Malmö Respectability	Malmö Subsistence	Stockholm Respectability	Stockholm Subsistence	Kalmar Respectability	Kalmar Subsistence
1704	3.94	1.27	6.92	2.00	6.82	2.24
1705	3.97	1.29	7.06	1.94	6.85	2.10
1706	4.20	1.37	6.51	2.02	5.69	2.06
1707	3.93	1.24	6.63	2.08	5.82	2.13
1708	4.79	1.65	7.42	2.39	6.00	2.26
1709	6.32	2.36	7.95	2.49	7.40	2.71
1710	5.96	2.20	8.09	2.44	8.04	2.91
1711	4.94	1.69	6.65	1.95	8.73	2.93
1712	4.47	1.43	6.99	1.93	7.75	2.31
1713	4.52	1.39	6.58	1.87	7.37	2.31
1714	5.34	1.81	7.24	2.02	7.64	2.35
1715	4.82	1.52	7.66	2.15	7.84	2.48
1716	6.35	2.02	8.22	2.41	8.18	2.72
1717	8.84	2.90	10.30	3.17	8.25	2.94
1718	14.28	5.86	12.71	4.11	9.46	3.60
1719	8.58	3.05	13.21	4.21	11.87	4.47
1720	6.62	2.20	12.00	3.56	13.05	4.69
1721	6.55	2.08	9.63	2.87	13.10	4.49
1722	5.54	1.68	9.19	2.76	9.54	3.37
1723	5.63	1.71	8.84	2.75	8.68	3.13
1724	5.58	1.71	8.52	2.65	7.82	2.82
1725	6.05	1.93	8.42	2.65	7.49	2.73
1726	7.25	2.56	9.02	2.97	7.13	2.69
1727	6.92	2.43	8.42	2.64	7.42	2.72
1728	5.11	1.53	7.33	2.14	8.21	2.75
1729	5.23	1.57	7.11	2.11	7.99	2.70
1730	4.82	1.35	6.94	2.09	7.23	2.50
1731	5.05	1.49	6.85	2.08	6.92	2.42
1732	4.82	1.39	7.21	2.31	7.26	2.56
1733	5.47	1.64	9.08	3.24	7.52	2.90
1734	5.96	1.64	8.93	3.17	7.67	2.92
1735	6.24	1.73	9.19	3.30	8.16	3.10
1736	6.91	2.00	9.55	3.43	7.78	2.98
1737	6.15	1.60	9.02	3.22	7.66	2.91

Year	Malmö Respectability	Malmö Subsistence	Stockholm Respectability	Stockholm Subsistence	Kalmar Respectability	Kalmar Subsistence
1738	5.69	1.38	8.70	3.04	7.15	2.68
1739	6.44	1.74	9.35	3.39	6.47	2.51
1740	8.62	2.76	9.77	3.55	7.84	3.07
1741	8.06	2.48	10.94	3.92	8.16	3.19
1742	7.64	2.19	9.75	3.45	8.01	3.09
1743	7.85	2.23	9.12	3.30	7.92	3.07
1744	8.02	2.31	9.30	3.26	8.25	3.16
1745	9.66	3.02	10.33	3.78	8.84	3.47
1746	8.78	2.51	11.08	4.12	11.50	3.41
1747	8.97	2.76	11.43	4.12	12.75	3.69
1748	9.70	2.94	11.91	4.31	11.35	4.39
1749	8.71	2.39	11.59	4.14	9.10	3.54
1750	8.02	2.00	9.13	3.12	7.92	2.99
1751	8.76	2.22	9.93	3.57	8.24	3.18
1752	8.97	2.29	10.92	3.97	9.08	3.55
1753	9.37	2.32	9.88	3.50	8.56	3.33
1754	10.24	2.64	10.65	3.83	8.76	3.41
1755	11.34	3.10	11.84	4.37	10.18	4.05
1756	11.90	3.34	12.49	4.75	11.57	4.71
1757	13.54	4.08	13.07	4.89	12.83	5.21
1758	13.64	3.92	13.74	5.14	12.65	5.09
1759	12.49	2.99	11.26	3.82	9.84	3.72
1760	13.51	3.21	12.41	4.24	10.54	4.05
1761	15.44	3.96	15.14	5.62	13.04	5.07
1762	22.80	7.34	17.43	6.49	19.89	7.97
1763	20.17	5.81	19.92	7.62	20.84	8.45
1764	20.69	6.11	20.48	7.58	19.40	7.85
1765	20.91	6.27	18.77	7.01	17.04	6.88
1766	17.04	5.25	17.89	6.76	14.19	5.66
1767	13.10	3.92	13.57	5.03	13.82	5.33
1768	12.07	3.98	13.38	4.92	11.79	4.67
1769	11.21	3.42	14.01	5.00	12.71	5.01
1770	15.48	4.69	14.52	5.40	13.19	5.36
1771	18.97	6.40	19.26	7.63	16.10	6.72

Year	Malmö Respectability	Malmö Subsistence	Stockholm Respectability	Stockholm Subsistence	Kalmar Respectability	Kalmar Subsistence
1772	17.62	5.66	19.50	7.51	16.25	6.66
1773	16.54	5.17	16.55	5.95	15.28	6.09
1774	13.81	4.12	14.45	5.24	14.39	5.65
1775	17.25	5.59	16.93	6.39	16.11	6.58
1776	20.32	6.63	22.18	8.31	19.27	7.75
1777	21.14	6.76	21.87	8.13	20.49	8.29
1778	22.46	7.51	22.53	8.42	22.02	9.01
1779	20.87	6.73	22.66	8.32	21.83	8.93
1780	21.26	6.82	23.30	8.72	21.34	8.73
1781	23.46	7.93	25.23	9.72	20.54	8.47
1782	26.68	9.24	24.07	8.88	22.25	9.07
1783	27.69	9.67	24.60	9.43	22.67	9.46
1784	26.55	8.43	24.59	9.06	21.66	8.80
1785	29.34	9.80	29.14	11.33	22.57	9.43
1786	29.06	9.58	26.74	10.63	23.89	10.10
1787	28.91	8.80	25.51	9.81	21.60	8.76
1788	32.06	10.08	25.82	10.09	23.92	9.77
1789	32.50	10.19	28.04	11.12	24.35	9.88
1790	30.67	9.18	29.30	11.44	24.13	9.80
1791	35.42	9.24	25.43	9.61	24.98	9.90
1792	37.96	10.44	29.50	11.40	27.61	11.21
1793	40.53	10.40	29.19	11.09	28.55	11.38
1794	42.06	11.93	31.89	12.27	32.82	13.24
1795	42.32	12.38	33.91	12.66	35.59	13.93
1796	41.52	10.29	31.79	11.86	31.18	11.70
1797	44.03	11.08	32.00	12.28	32.74	12.58
1798	49.39	14.20	35.55	13.96	39.27	16.51
1799	56.08	16.92	44.50	17.40	41.96	18.48
1800	69.83	23.15	54.98	22.02	50.60	22.53
1801	63.39	20.09	51.51	21.09	52.72	24.24
1802	61.45	21.24	49.36	20.28	50.04	22.86
1803	46.42	14.44	33.91	13.58	33.43	13.99
1804	48.25	15.07	34.36	14.16	34.65	14.26
1805	50.96	15.93	36.42	14.82	36.24	14.57

Year	Malmö Respectability	Malmö Subsistence	Stockholm Respectability	Stockholm Subsistence	Kalmar Respectability	Kalmar Subsistence
1806	55.65	17.95	41.56	17.51	44.06	18.83
1807	55.83	17.79	42.13	17.86	42.53	18.13
1808	69.61	23.73	56.28	23.23	53.51	23.26
1809	68.90	20.85	55.57	22.24	49.90	20.71
1810	71.95	21.46	49.95	19.97	52.41	21.62
1811	84.94	26.55	60.27	24.74	60.55	25.31
1812	106.81	35.98	77.04	32.46	79.52	34.23
1813	95.12	30.91	72.81	30.17	75.79	32.79
1814	94.25	30.71	68.12	27.36	71.80	30.68
1815	92.52	30.00	67.60	27.06	70.18	30.21
1816	95.29	31.15	74.23	30.47	70.53	30.59
1817	95.98	31.32	75.60	31.37	70.40	30.68
1818	100.86	33.94	80.78	33.53	75.22	32.86
1819	97.95	32.60	77.19	31.57	74.92	32.88
1820	89.46	28.54	69.34	27.37	67.71	28.85
1821	82.34	25.94	58.46	23.01	62.01	26.24
1822	79.73	25.16	59.66	23.69	56.96	23.60
1823	77.91	23.76	57.44	23.10	56.38	23.27
1824	74.67	21.53	56.25	21.90	56.40	22.95
1825	83.18	23.46	61.20	23.79	55.79	22.51
1826	103.09	34.16	80.03	33.01	74.69	31.78
1827	87.09	26.74	68.38	27.04	66.43	27.86
1828	80.70	23.85	60.83	23.43	57.33	23.19
1829	88.06	27.26	65.23	25.63	61.30	25.38
1830	94.29	29.47	70.52	28.19	64.33	27.04
1831	105.63	34.82	83.88	33.90	75.01	31.87
1832	90.14	27.34	70.99	28.03	65.41	27.17
1833	86.79	25.58	65.18	25.15	63.73	26.37
1834	92.71	28.67	69.20	27.61	68.59	29.12
1835	91.84	28.82	72.06	28.83	65.82	27.67
1836	92.34	29.03	69.51	27.53	64.33	26.80
1837	97.58	33.00	75.48	30.40	68.65	28.95
1838	97.29	32.55	79.35	32.30	74.58	31.79
1839	93.49	29.95	73.24	29.03	67.53	27.97

Year	Malmö Respectability	Malmö Subsistence	Stockholm Respectability	Stockholm Subsistence	Kalmar Respectability	Kalmar Subsistence
1840	96.56	31.09	75.01	30.11	70.20	29.02
1841	114.17	39.66	90.55	37.65	85.08	36.33
1842	104.17	35.89	76.62	31.08	77.40	32.87
1843	94.66	30.81	72.01	29.13	68.77	29.01
1844	80.58	26.51	63.99	25.31	57.89	23.90
1845	100.69	35.72	85.10	36.02	77.84	33.82
1846	103.83	36.72	77.16	31.56	71.97	31.04
1847	96.10	33.05	77.92	31.27	76.02	32.45
1848	91.46	29.42	68.65	26.81	62.85	25.81
1849	89.52	28.72	70.61	27.58	64.66	26.55
1850	94.87	31.29	78.21	31.56	70.14	29.76
1851	107.35	36.08	81.35	33.07	74.95	32.22
1852	103.98	33.54	82.18	33.37	73.50	31.39
1853	127.05	44.12	93.88	38.68	84.21	36.58
1854	128.78	42.12	98.20	38.99	82.21	35.17
1855	150.17	51.74	114.03	47.32	104.39	44.51
1856	133.89	43.58	101.46	41.38	104.36	42.98
1857	130.46	41.75	98.22	38.63	103.38	41.85
1858	116.84	35.74	84.00	32.43	78.51	31.71
1859	115.59	34.92	81.78	31.67	76.34	30.64
1860	128.16	39.36	90.50	35.54	85.53	35.06
1861	134.63	43.06	101.13	41.08	95.43	39.86
1862	121.70	38.94	90.59	35.86	88.00	36.20
1863	114.06	35.43	84.95	33.76	81.75	33.72
1864	108.38	34.23	77.47	29.83	73.16	29.73
1865	119.04	39.84	84.26	32.89	78.44	32.14
1866	119.72	40.07	84.92	33.63	85.02	35.36
1867	144.56	51.60	114.47	48.57	111.06	48.31
1868	133.28	46.59	102.91	42.85	100.36	43.71
1869	110.45	37.44	86.35	36.66	81.18	35.63
1870	115.35	39.67	90.46	38.15	83.39	35.37
1871	118.90	41.35	93.94	39.76	92.42	40.00
1872	120.57	42.78	95.78	40.59	92.32	40.23
1873	135.90	48.61	107.34	45.24	98.88	43.01

	Malmö		Stockholm		Kalmar	
Year	Respectability	Subsistence	Respectability	Subsistence	Respectability	Subsistence
1874	132.76	46.73	108.20	45.52	102.89	44.90
1875	127.44	44.75	100.64	42.06	97.60	42.45
1876	126.35	45.05	104.61	40.64	97.15	41.15
1877	123.10	43.82	103.28	40.09	98.95	42.17
1878	116.23	40.62	90.64	34.47	87.23	36.12
1879	114.41	39.85	91.92	35.06	84.74	35.04
1880	127.08	46.10	108.81	43.47	92.85	39.26
1881	131.85	48.27	109.02	43.66	97.71	42.21
1882	118.28	41.22	94.38	36.23	91.13	38.12
1883	118.83	41.64	92.22	35.11	89.14	36.94
1884	115.21	40.33	88.79	33.74	84.44	35.14
1885	105.84	36.29	82.75	31.14	74.10	30.70
1886	98.08	32.93	76.99	29.23	67.80	28.49
1887	92.78	30.43	68.36	25.35	61.14	25.23
1888	105.53	36.44	81.65	31.55	72.87	30.74
1889	109.37	38.32	84.66	32.94	75.28	31.78
1890	110.80	38.76	88.21	34.20	78.51	33.07
1891	119.11	43.11	104.49	42.21	96.83	41.90
1892	110.05	38.51	90.81	34.89	83.27	35.11
1893	104.41	35.79	85.70	32.50	74.57	31.28
1894	96.60	31.97	76.53	28.26	67.46	27.66
1895	104.36	35.83	78.27	29.48	71.75	29.96
1896	104.17	35.63	81.39	31.07	73.95	31.08
1897	110.63	38.69	85.73	33.17	76.68	32.38
1898	114.04	39.09	87.62	33.71	79.98	33.53
1899	123.40	42.80	95.67	37.49	87.21	36.03
1900	120.71	40.87	93.32	36.46	90.99	36.69
1901	123.03	41.53	92.94	36.02	89.74	35.83
1902	123.89	42.04	91.26	34.74	90.91	35.90
1903	124.71	41.71	91.62	34.91	90.28	35.94
1904	127.44	42.58	89.96	34.37	91.85	36.77
1905	129.59	43.19	91.87	35.41	92.47	37.09
1906	135.69	45.65	95.65	36.46	94.56	37.61
1907	147.70	51.23	100.34	38.13	107.10	43.35

	Malmö		Stockholm		Kalmar	
Year	Respectability	Subsistence	Respectability	Subsistence	Respectability	Subsistence
1908	144.21	48.72	102.21	38.94	105.52	42.48
1909	141.42	47.42	101.60	38.52	103.11	41.80
1910	132.56	41.75	96.67	36.45	96.28	38.32
1911	137.67	44.03	99.26	37.98	104.18	42.70
1912	145.25	47.47	104.85	39.17	104.67	42.07
1913	143.33	46.44	105.42	39.34	105.75	42.17
1914	149.45	49.35	122.35	47.86	124.03	51.07

Paper II

Constructing equality? Swedish women's wages for physical labor, 1555-1760

Kathryn E. Gary

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. While the focus has predominantly been on men and how their income relates to familial support, women's wages and their relationship to household dynamics and economic development is increasingly at the focus (for example de Moor and van Zanden 2010, Voigtländer and Voth 2011, Voigtländer and Voth, 2015). This can be connected, as Jane Humphries has put it, to a 'Trojan Horse'[1] of women's work: the huge impact of women on the major swings of economic history is becoming increasingly apparent to the mainstream, and as such women's work, wages, and economic participation are 'infiltrating' into meta-narratives, no longer forced to remain 'lurking in the wings' (Humphries 1991).

This is not to deny a long history of both intensive and extensive work on women's historical work and daily lives, especially from feminist historians or historians of women and gender. But this has not often resulted in long-term data series which can be compared to other women and men working in similar contexts. Even quantitative studies have rarely made it into the mainstream use. This has begun to shift in the recent past, and there have been notable – as well as innovative – contributions which have resulted in stronger quantitative series. There have been many locally focused works, including Burnette 2004, van Nederveen Meerkerk 2010 and van Zanden 2011 which have contributed valuable wage information.

[1]Keynote addresses; "From the Wings to Centre Stage: Women and Economic Growth and Structural Change in Europe during the Pre-Industrial and Industrial Eras" WEHC Boston, 3 August 2018

Recent work such as Humphries and Weisdorf's 2015 study, which constructs long-run wage series for British women in many historical occupations, has demonstrated both the availability of data comparable to that used for men as well as the complexity and variety of women's historical work; further attempts to extend this across Europe are also ongoing (de Pleijt and van Zanden 2018). This adds important density and comparative power, but also necessarily sacrifices some detail at the local level.

Despite this progress there is still much to be done. There is still comparatively little known about women's earning and labor patterns in the early modern period. There is even less known about women and work in the European periphery, and northern Europe especially. This work contributes to the progress being made in historical studies of women's work. It pushes back against the long-held implicit acceptance of male-breadwinner models, which have cast a shadow over the ways in which we reconstruct historical data and statistics in the distant past, despite evidence that these were not typical arrangements (for example Pinchbeck 1930, Burnette 2008, de Vries 2008, Horrell and Humphries 1995). It expands our geographical coverage of data about women in the past; there is very little known about women in the European periphery. This work also brings women's involvement in 'male' forms of labor into greater prominence. It is not the first study to focus on women in construction; Humphries and Weisdorf (2015) includes construction workers and both Jansson et al (1991) and Musgrave (1993) focuses extensively on construction workers; in Stockholm and Brittany respectively. De Pleijt and van Zanden (2018) also make use of women's wages in construction work for their comparative study. However, this is the first study which is able to dive deeply into women's participation and labor patterns in construction work in order to make a more thorough analysis of individual working patterns and wages.

This study investigates the wages of Swedish women, to determine the relationship of women's work and payment to the overall shifts in the Swedish economy. Were women's wages set by market forces, customary rates, discrimination, or some combination of these factors? How do these factors relate to the development of the overall Swedish economy? I take advantage of data from the Swedish construction sector – one of the few areas where we can observe a spot market in early modern Sweden. Here, men and women were employed together, working on the same tasks and projects. This allows for a direct comparison of work in a physical labor market.

Findings indicate that women were employed at higher rates during periods of higher labor demand. Women were employed more often when work was most intense, and women were typically paid on par with men when they were employed together. When work was less needed and projects were smaller women and men were more often employed separately; this is when women's relative wages became much lower. This indicates that women's wages and employment was substantially influenced by market forces, though reverted to a more discrimination-based system during less intense periods.

Wage labor was a marginal form of labor in early modern Europe – the majority of work was done on annual contracts and often for in-kind compensation (see discussion in Humphries and Weisdorf 2015). This means that building labor provides a rare chance to see women's waged labor – and indeed, men's waged labor – in a context where work, employment, and wage patterns are more likely to react more quickly to changes than in long-term employment.

The time period, during a crucial phase of Swedish and Scandinavian state building, also provides a unique chance to observe the changes of women's relative wages and relative employment during periods of changing labor demand and work intensity.

Women's work in pre-industrial Europe

Women's work in the past has been systematically less studied than men's, especially in long-term quantitative studies. 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, both of which have made them harder to observe and collect (Humphries and Sarasúa 2012, Horrell and Humphries 1995). However the large number of difficulties does not mean that there is no data, and as the importance of different kinds of labor in the paid market becomes more apparent the focus on women has been increasing. There have also been several creative and intensive studies which have recreated women's labor force participation and occupational structure, including Humphries and Sarasúa 2012 and Sarasúa 2018.

When women's work has been studied it has tended to be from a gender history perspective, often in thorough studies driven by extensive archival material which illuminate complexities and nuances of female labor, but which tend to not be integrated into mainstream quantitative analysis (for example Pinchbeck 1930, Ogilvie 2003, Burnette 2008, Ågren 2017). The present study is one of several recent and ongoing projects which attempts to bridge this gap.

Humphries and Weisdorf's (2015) study shifted historical data for women's earnings into the mainstream with a comprehensive and 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 for early modern and late medieval Britain.

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 series of data, but instead look closely at a particular farm or set of farms on a more micro-level in order to gain a fuller picture of the working environment and division of labor between the sexes. Joyce Burnette (2004) expands 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. Hiring was a different calculation, since men's higher physical strength would have led to their higher labor productivity in physical agricultural labor.

There is also evidence for a widening gender wage gap through the late medieval and early modern periods, following relative parity in the years after the Back Death. Women's unskilled wages declined relative to men's at Winchester College in England, with initial wage parity in the early sixteenth century rapidly falling to 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 there is increasing empirical evidence about women's wages and the development of gender wage gaps, there are still difficulties in explaining what factors are driving different payment rates between the sexes, especially historically. The debate typically centers on whether wage differences were due to discrimination or whether they are based on differences in women's and men's productivity and are thus rationally reflective of market forces.

Much of the long-term decline in women's relative wages has been connected to the labor shortage following the Black Death. 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. However, Humphries and Weisdorf find no such effect of higher women's relative wages following the Black Death (van Zanden 2011, Humphries and Weisdorf 2015).

Bardsley (1999, 2001) criticizes the historiography that claims that women were paid on par with men following the Black Death and that women's wages reflected their relative labor productivity; 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 wage determination 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. These findings are similar to those conveyed by Musgrave (1993) who finds that women were often quite integrated into construction work but kept to the lowest skill levels. Women were consistently paid less than their male counterparts for the same tasks, even when the task was something like mixing mortar which might not be as directly strength-dependent. At times a shortage of male workers could bring in more women, but the typical response was for men to work harder toward their exclusion.

Burnette 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, 2008).

Burnette 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 and scythe 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. The discussion is slightly complicated by van Neverdeen Meerkerk (2010), who compares Dutch women and men spinning various fibers in the seventeenth century Dutch Republic. She finds that when men and women were performing the same task, typically paid for the piece, they received the same payment, but that the occupational structure was highly segmented which prevented women from performing more highly-paid tasks. Here wages are driven by market forces, but custom-driven occupational segregation prevents women's full economic advancement.

Swedish research takes advantage of later and more thorough data during Sweden's first period of industrialization at the end of the nineteenth century. Schultz (1985) follows the link between changing global factor prices and women's labor specialization in agriculture 1860-1910, and finds that the increase of dairy products, typically produced by women, relative top grain pushed up women's relative wages and is linked to a decrease in fertility. Stanfors et al (2014) look more closely at the personal determinants of gender wage gaps in cigar manufacturing at the end of the nineteenth century, a context in which individual productivity is easily measured; here, skill and experience explain much of the pay gap. Firms that did discriminate tended to fail. Together, these argue for a market-based foundation for women's wages in Sweden at the end of the nineteenth century.

Apart from wage development, women's relative participation in paid work is also not well understood, though recent efforts have made substantial progress. Humphries and Sarasúa (2012) and Sarasúa (2018) 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. Importantly, these works also show that men's work was much the same, and complicate our understanding of both women's and men's labor force participation in the past. 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 through a mechanism such as the European Marriage Pattern, which has been used to connect this decline in women's relative earning power to the decline in women's marriage ages that was occurring in the eighteenth century (de Moor and van Zanden 2010, van Zanden 2011).

This collection of studies on women’s work and wages should make it clear that the integration of women into paid work and the ways in which they are compensated can reflect important characteristics of and shifts in an overall economy and society. This study adds to this growing body of literature through its analysis of women’s wages and presence in the labor force in a work environment where men and women worked together on the same tasks. It is especially compelling because of its use of data from the construction industry, an industry which relies on physical strength. The long time period of the study also allows for an examination of what happens to women’s wages and their work participation under a series of different labor market conditions. The ability to examine wages and the feminization of the labor force concurrently is also an important insight into how women enter into the paid labor force.

Data and coverage

Sweden and Denmark were by and large a part of the European periphery during the early modern period, two rural and agricultural economies which remained so more or less until the nineteenth century – figure 1 shows the development of Swedish GDP per capita from 1534 through 1875, and the up-and-down economic fluctuations it underwent. Sweden was at its most prominent during the 17th century; it was during this time that Stockholm was transformed into a relatively prominent European capital, and during which the Swedish empire began its regional expansion. But already by the eighteenth century Stockholm and Sweden had faded back into relative stagnation and was again relatively peripheral. The development of per capita GDP tracks this development reasonably well, with increases from the beginning of the sixteenth century falling to a low point from the beginning of the eighteenth.

The archival data in this study come from the south, from Malmö and other manorial sources in the southern region Scania as well as the town Kalmar, on the southern part of the east coast. Scania was actually a part of Denmark until 1658, after which it was ceded to Sweden along with several other territories at the end of the Second Northern War. It was an important regional town, across the Oresund Sound from the Danish capital of Copenhagen. As a part of Denmark Malmö was the second largest town, but when it became a part of Sweden it was not more than the fifth largest (Tomner 1977), and much more peripheral to the capital. Malmö’s population was about 2800 in 1571, growing to about 5700 by 1699; however after this point the population declined and did not recover to 1690s levels until 1810 (Andersson-Palm 2000). During these wars Kalmar was a border town, on the Swedish side of the Swedish-Danish border. Kalmar is the smallest town

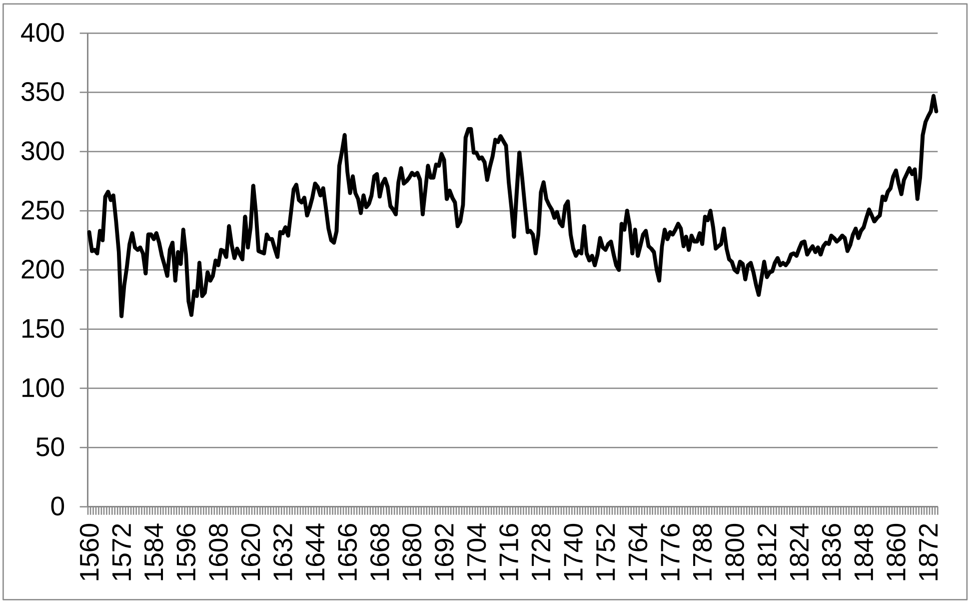

Figure 1: Swedish GDP per capita 1560-1875. Constant prices, 1910/12 price level. Source: Schön and Krantz 2012

investigated here, with only about 1500 inhabitants in 1571 and about 2000 in 1699. Nevertheless, its location made it prominent regionally, and it is a very old and well-established urban center within Sweden. Stockholm was the capital and by far the largest city, with 9600 inhabitants in 1571 growing significantly to 57,000 in 1699. The sixteenth and first part of the seventeenth century were periods of territorial and economic growth for Sweden as Sweden became the dominant power in the Baltic region. Sweden lost its military preeminence after its loss in the Great Northern War at the end of 1718, after which the country underwent stagnation and economic decline until the turn of the century. There was recovery and growth again during the nineteenth century, though Sweden did not substantial economic growth until the beginning of the twentieth century.

All of the data are from day laborers working in the construction industry[2]. Published wages data from construction workers in Stockholm are added to produce a more robust coverage. these are published series from similar types of sources, also reflecting women's and men's day labor in construction; women are recorded

[2]See Gary (2018b) for a deeper description of the data.

from 1600-1719, and men from 1500 through 1719 (Jansson , Andersson-Palm, and Söderneg 1991).[3]

The total primary database from which these wages are taken comprises over 29,000 observations of daily wage payments; the final sample used for this study contains about 22,700 observations of payments to unskilled workers, of which about 1,700 refer to women. These observations translate to roughly 144,000 paid days of male unskilled work and 9303 days of female unskilled work. These are combined with published data from Stockholm to create a more robust series of unskilled construction wages throughout modern day Sweden.

Relative wages are calculated locally, between women and men working at the same location at the same time. This allows them to be calculated directly from the recorded currency, and also removes concerns of price effects between different regions in the main analysis. When long-term nominal wages are shown they are calculated by fixed-effects regression, as described in Gary (2018b).

The records of work are fairly general. They often list a group of workers under a single heading, without specific tasks delineated. When specific tasks are mentioned, these unskilled workers were typically doing menial work such as digging out foundations or carrying stones, but some worked more specifically as assistants to masons and as mortar mixers. The primary wage data assessed in this study is extremely modal, both for men and women. When there are large building projects and large groups are listed and paid in the same ledger entries, the mode is especially strong; both men and women are typically paid the same rate for doing the same work. Women and men are typically mixed together with little differentiation in these entries, indicating that their work and the hours at work were not seen as differentiable by those hiring and paying them (see Gary 2018b for more discussion).

A female worker can be identified either through a gendered occupational title, a female relationship indicator, or by her name. Women are not systematically separated from men through their titles or recorded occupations, though differences do sometimes make the gender clear: In Malmo, women are sometimes identified as a digger's wife (*grävarens*), but other times they are called simply a digger (*grävare*), the same title given to men. Women do also appear with the feminized title of a mortar mixer (*kalkslagerska,* as opposed to the male *kalkslagare*), but this is one of the few instances where the title itself is feminine. Often, all unskilled workers are subsumed under the title '*hantlangare',* an unskilled worker. In many instances individuals are named, which not only makes identifying the gender of the

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

worker straightforward but means that we can be confident that we are not misidentifying female workers as male. This misgendering could be a problem in some instances: when there is no gender identifier the worker is assumed to be male by default.

Not much is known about the casual and seasonal labor market. Scandinavia is generally regarded as having been characterized by the (Western) European Marriage Pattern (EMP), in which young people left home early to work for other households or estates before marriage, saved up, and married in their mid to late twenties, if they married at all – the EMP is characterized by both a later age at first marriage and a high rate of non-marriage. Marriage rates were lower than non EMP regions because young couples needed to accrue enough resources in order to establish their own households, and not all people were able to afford this (Hajnal 1965, Lundh 2003, de Moor and van Zanden 2010). This labor, on annual contracts, supplied the labor needed for agriculture almost entirely, leaving very little market for casual agricultural work – an expectation reflected in the near-absence of agricultural labor in the almost 30,000 observations of paid day labor collected for this study.

This implies that the greater number of younger and unmarried workers are expected to have worked in service in the households of others, and not for casual labor, and that the workers we do observe would be older or married. But the data itself gives little indication of marital status. Swedish women did not change their names at marriage until the middle of the nineteenth century, so it is difficult to link married couples unless it is explicitly stated in the ledgers. Women were given a patronym, with their father's first name attached to the suffix –dotter, or daughter. But this also gives little indication of potential familial relationships, as there was a relatively slim number of given names which were shared by many people, meaning that someone with the surname 'Nilsdotter' or 'Nilsson' could refer to several different fathers, with no indication of the age. Occasionally the data do make reference to a builder's wife working alongside a husband (or working solo), but so too are there mentions of daughters working with their fathers or with their mothers. While it is more common to find a reference indicating a woman might be married, it is not universal, and indications of relationship or generational status of any type are far in the minority.

Women's relative wages in Sweden

Figure 2 shows the five year average of women's wages as a percentage of men's in Sweden, disaggregated by source and region. While it has many moving parts, it is important for two reasons. The first important take away from this figure is the similarity of the movement of the relative wage, despite the substantial differences between each of these markets. This similarity in trends is important; because each region or data source has a similar movement we can infer that similar pressures exist beyond a local market; this is strong justification for examining the gender pay gap on a national scale. The trend throughout is an increase in women's relative earnings from the end of the sixteenth and into the seventeenth century, followed by a steady decline through the seventeenth century; this in turn is followed by a slight indication of a recovery at the beginning of the eighteenth century, but this is more tentative. The main departure in the trend is the sudden increase in women's relative wages in Kalmar in the late 1640s and into the 1650s; this is connected to a local fire which destroyed the city and is addressed directly below. What is clear is that over the course of about two working generations women's wages declined from relative parity across several different regions during a period of expansion and development, to relative wage levels as low as forty percent of men's, during a time when Sweden was economically stagnating.

The second important point is that there are several moments in each region – Kalmar, Stockholm, and Malmö – where women were able to out-earn unskilled

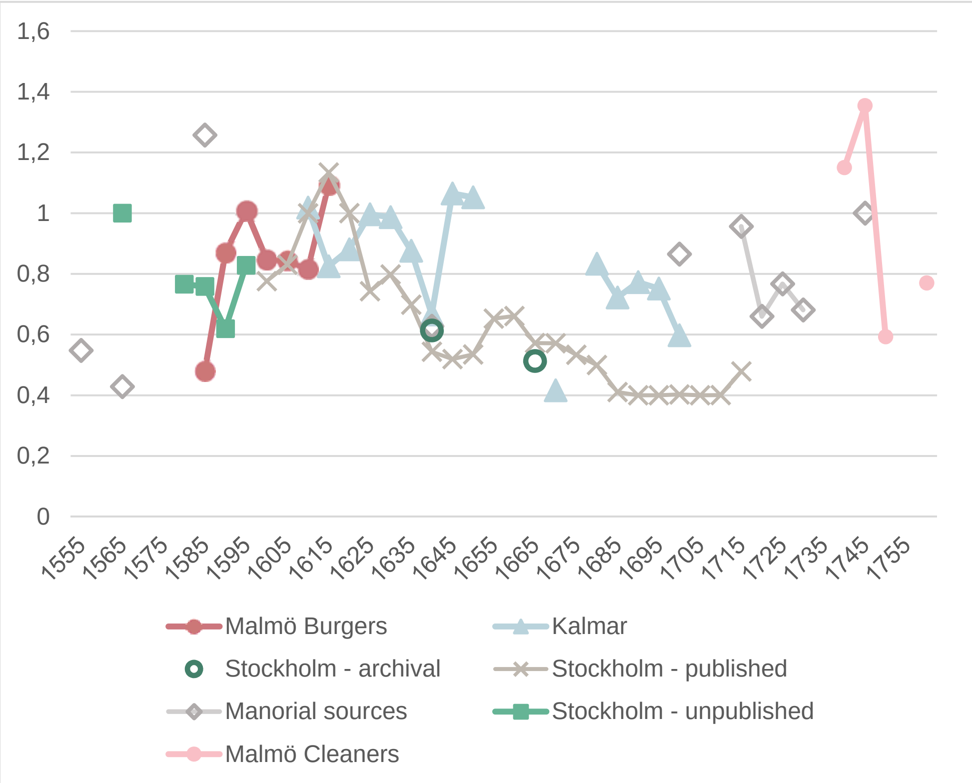

Figure 2: Women's relative wages in casual Swedish construction 1555-1760. Source: Stockholm published Jansson et al 1991. Stockholm unpublished: Johan Söderberg, personal communication. All rest: Author's calculations.

men in a physically demanding industry. This is unexpected. Economic theory (and social expectations) would predict that men would earn more in strength-based occupations; men on average have higher upper body strength, which means that they will typically be more efficient in tasks which are highly strength dependent, as early modern construction would be. We could expect this to be reflected in higher wages (see Burnette 2008).

What can explain these trends? The rest of the paper will investigate the development of construction patterns throughout Sweden which could explain both the similar development of women's relative wages throughout the different regions as well as the occasions when relative wages are greater than one, and women's average annual wage is higher than men's.

Demand for building labor

The cross-Sweden trend follows a similar pattern as a construction boom and expansion connected to both a process of Swedish (and Danish) state building and a series of wars between Denmark and Sweden.

During the period of Sweden's military expansion, both before and after Scania was ceded from Denmark, both Scandinavian countries were administering a project of state-building and reinforcement, first building up already-existing cities and fortifications and later, especially in the Swedish case, establishing new towns and settlements In Denmark a parallel development was underway, of a centralization of the tax system despite the relative strength of Denmark's nobility over the crown. One of the first phases was a reinforcement of already-extant cities, especially the most important and strategic. This of course included Stockholm, as the Swedish capital, as well as cities such as Malmö which were important defenses both when in Danish and in Swedish hands. This building phase is reflected in the national accounts – Schön and Ktantz's (2012) measurement of building to Swedish GDP peaks in the first half of the seventeenth century. Söderberg (2010) also comments on the increased demand for labor, both in building and in shipbuilding, in particular during Stockholm's extensive population growth and bureaucratic expansion in the early seventeenth century. Stockholm became much more urban and much more present on a European scale, rising to become one of the more visible and important European capitals, with its population growing at least fourfold over the century (Söderberg 2010, North 2015).

Repairs and expansions were also necessary in the south of modern-day Sweden in particular, as extended conflicts between Sweden and Denmark took their toll on fortifications and infrastructure. Malmö's fortifications were reinforced by the

Danish king in 1575 and again around 1600 (Tomner 1977), building projects which are visible in the data used in this study.

A second part of this state-building was the creation of totally new towns, often cut from whole cloth and established directly by the crown. This naturally increased the demand for construction throughout Sweden, not just in those towns which already existed or were in need of reinforcement from the Danish and Swedish wars. This didn't necessarily mean that there was a dramatic increase in urbanity – many of the newly granted charters came at the expense of older towns, especially those which had been Danish prior to 1658 (Cermeño and Enflo 2018). Peasant farmers in the countryside were generally reluctant to move into these new towns (Heckscher 1941), but their establishment certainly led to a demand for labor from those within and near to the new towns.

Despite this increase in building and the urbanization within Stockholm, Sweden remained predominantly rural and agricultural through the early modern period. Urban centers remained small – Stockholm, the capital and the largest city, was still only 40,000 inhabitants strong at the end of its rapid growth in 1668 (North 2015). This meant that labor markets were spread thin. This presents a different reality than what would have been common in, for example, England or Germany where villages and towns were located more closely together and there might have been a higher availability of more mobile labor. In rural Sweden people would need to work together to ensure that necessary work was completed, perhaps without the luxury of specialization that might be encountered in larger urban areas or more densely populated regions. These patterns could certainly be behind the higher ratio of women's wages in the early part of the seventeenth century, especially in the smaller towns – there were still only about 5700 in Malmö and 2000 in Kalmar by 1700 (Andersson-Palm 2000).

This pattern of high building labor demand raising women's wages is further enforced by local events in Kalmar. Kalmar was a border town between Sweden and Denmark before the acquisition of Scania. It was already an old and well-established town, and while small, was still an important part of Eastern Sweden. The Kalmar War was fought between Denmark and Sweden from 1611-1613; in 1614 the wage ratio was 1.2. This is likely connected to an urgent need to repair and rebuild after damage from the war, and a probably-lower supply of working men.

Wage levels in the late 1640s are perhaps even more telling, and are to some extent a deviation which reinforces the pattern overall. These wage levels occur in the years directly following a fire that devastated Kalmar in 1647; the town was rebuilt at a slightly removed location (Hedlund 1982), and building labor would certainly have been in high demand, helping to explain the wage ratio of 1.33 in that year and continuing high wages in the years to follow.

We can look at this relationship between building demand and women's relative wage more directly, by charting relative wages against the amount of paid work being done. This is measured through the number of paid work days in the archival data which underlies the wage series. Because the wage series from Stockholm are published without the underlying individual data the measurement of work being done relies on the archival sources from Malmö, Kalmar and Scania. This is taken to be a rough estimate of labor demand – it is of course indirect, since it more accurately reflects some equilibrium of supply and demand within the respective markets. But the hiring institutions are taken to be more-or-less price setters, and are important institutions within each town. Because of this the paid work days can be taken as a loose representation of labor demand, especially as they coincide with the qualitative evidence about Stockholm and the rest of Sweden's building projects.

Figure 3 shows building demand, as measured by paid workdays in the archival sources, charted against women's relative wages. There is a clear association between periods of greater work projects and higher women's relative wages – the correlation coefficient is approximately 0.6. It is quite possible that it would be even higher is the data for work in Stockholm were also included, especially since the wages from Stockholm area such an important part of the overall series from 1600 through 1719. Regardless, it is clear that women were consistently paid a higher percentage of their male coworkers' wages when there was a greater demand for work.

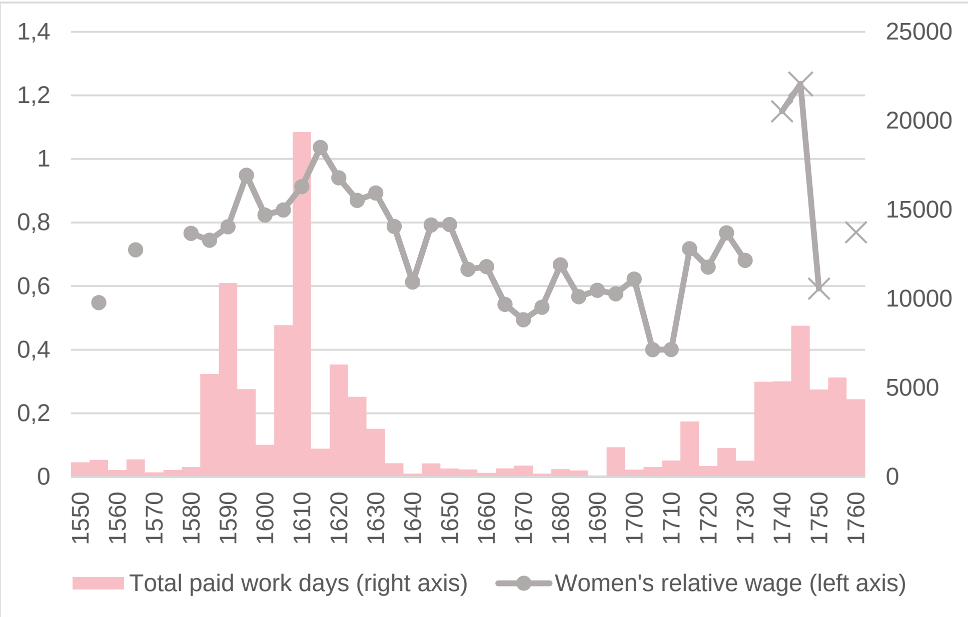

Figure 3: Demand for building labor and women's relative wages in Sweden, 1550-1760

There is less evidence for a nation-wide building boom in the early eighteenth century; this was the period after Sweden's defeat in the Great Northern War in 1719. In the first decades of the eighteenth century observations of women's wages come only from manorial sources around Scania and from Malmö Burgers. There is a bit of a shift within Malmö, however – women are no longer employed as construction workers but are paid to clean the city hall. Because these payments occur several times during the early eighteenth century they are included here, along with observations from manors. These observations are marked with 'X' to indicate that they are somewhat different from the others.

Both women and men are employed to scrub and clean the city hall, and the relative wage shown here refers to the wages for this type of work only. The wages are quite high – a comparison against the yearly unskilled male wage actually yields a higher relative wage than a direct comparison between only cleaners. It is possible that this is connected to the large amount of work being carried out by and within the city hall itself. The building work is more local to Malmö. Still, the relationship between women's relative wages and labor demand holds.

This demand for more building labor, combined with a thin labor market, could pull in marginal workers in order to meet building demand needs. Marginal workers who have a high opportunity cost are likely to require a larger incentive to join the labor market. Women, especially married women, are likely to have high opportunity costs, with taking care of the household and meals along with pregnancy and child care. This need to pull in marginal labor can easily explain why women's wages rise relative to men's in high demand (or low supply) periods. It can even explain why wages might be equal – in big projects, it could be much simpler to higher workers at the same price, and to divide them where they are most useful and will be most efficient. It is harder, however, to explain why unskilled women might be out-earning unskilled men.

Wage modality and gender specialization

Why were women occasionally out-earning men? In Malmö and Kalmar it is possible to look more deeply at the individual workers and wage payments to better understand how the labor and payment patterns reflect the average relative wages.

There are a few reasons for the years when women out-earn men. It is uncommon for women working alongside men to actually earn more than then men. It is most common for people, men and women, to earn the same rate – though in some instances women can be paid less, especially into the seventeenth century when work was less intense.

The first explanation is one of composition. As stated above, when there are substantial building projects taking place the wages in the archival sources are extremely modal. This also means that the majority of recorded wages are modal, since the majority of wage records come from these larger projects. Typically there is a de facto set wage rate within a given place during a year. All people within a certain skill group or task group are typically listed together and paid the same level. There might be some variations – for example, in Malmö there appears to be a system of having unskilled workers act as supervisors, whereas in Kalmar an unlabeled supervisor is listed together with the skilled workers. Sometimes work in the off season would be paid less (though occasionally it was paid more – perhaps there was an emergency which could not wait), which also distorts the wage parity. For the most part, wage ratios from 0.8 and higher, including when women out-earn men, are more a function of different people working at different times than of different wage levels when work is done together. It to a large extent, at least during high work periods, reflects composition rather than actual wage equality.

Even if high points (and some lower points) are largely a function of statistics, it could still be surprising that women tend to earn equal wages when working on construction with men. There is some indication of gender specialization in the construction field; or, at least, a tendency toward specialization for women who frequently undertake construction. When Kalmar was rebuilt following the fire, burgers were given tax credits for building in stone, instead of wood (Hedlund 1982). 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 *kalkslagare*, or the feminine *kalkslagerskor*, who frequently appeared with the same mason regularly. Masons' assistants in particular seem to be a feminized profession in southern Sweden, and their persistence in the records indicates that some worked particularly closely with particular masons. This position was often held by women, especially in Kalmar. This is not unique to Sweden – both Musgrave (1993) and Burnette (2008) comment on women working as *femmes au mortier* and masons' assistants in Brittany and Durham, England, respectively.

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. This relationship is similar to what Stephenson (2018) suggests regarding the London building industry; she proposes that many of these men were in fact semi- or quasi- skilled, thus leading researchers to overestimate the level of unskilled pay.

In this case women's wages, especially, are very modal – as mentioned above, almost all unskilled workers working together receive the same or a very similar wage rate. However, there is a clear persistence of certain women who frequently appear with certain skilled men, notably masons, in years where unskilled labor is otherwise scarce. But the general trend is that women's wages are highest relative to men's during the period when Sweden (and Denmark) were in the midst of their nation-strengthening building booms.

Even given the particular 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.

Why did women's wages fall?

Women's relative wage decline can be seen clearly through 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 grow. Figure 4 shows yearly nominal wages for men and for women; this is a simple average of the nominal wages for women and men in both Stockholm and the archival sources. Relative wage levels in previous figures were calculated locally to avoid regional price effects, but here higher price levels in Stockholm result in much higher nominal wage le for men than for women by the middle of the eighteenth century. The total flatness of women's nominal wages in the seventeenth century compared to men's in figure 4 is because nominal wages in different areas re growing at different rates – wages in Stockholm for both women and men are very sticky in this period, while wages in Malmo are more fluid. However, there is a greater contribution from Malmo of men's wages to the macro series during this period than women's. A major debasement in the 1560s and 1570s and a lesser debasement in the 1590s account for some of the extreme changes in nominal wages; the spike in the 1630s is likely connected to the devaluing of copper coins vis-a-vie silver coins from 1633 (Edvinsson 2010). 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. But it is clear that from the 1640s women's wages reached a ceiling which men's did not. The exceptions are following the disruptions of war and fire in Kalmar; exceptions which only serve to strengthen the rule.

Why, when women's wages had been so close to men's around the turn of the seventeenth century, did they fall so completely behind? A deeper look into the records of Kalmar, where recorded wage payments are most complete and most consistently contain names, might give some insight. Kalmar was not a large town; it had only about 1500 inhabitants around 1571, rising only to 2000 by the beginning of the eighteenth century. The surrounding countryside was also sparsely populated (Andersson-Palm 2000), which was fairly normal for a Swedish town in the period. This typicality together with the more thorough records makes the town a useful case study.

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

(dark red)	>60% women
(pink)	30 – 59% women
(grey)	Top quartile (n) of paid workdays

Table 1 shows the number of payments made to women along with the number of recorded payments in five year periods. This is presented for both the percentage of the unskilled labor force and the total labor force. Clearly the 1620s and 1630s were the biggest years for work hired by Kalmar Cathedral, the source here. There is also a large spike in skilled labor, largely carpenters, in the late 1640s following the fire. While the number of unskilled workers hired by the Cathedral didn't boom to the same extent, knowing that the entire town was being rebuilt clearly shows the strong demand for building labor in the private sector, for which records do not survive.

Women are a substantial part of the labor force throughout these high-building periods; 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.

It is also clear that the periods of the highest relative women's wages, especially in Kalmar, coincide with the periods when building work was heaviest or when demand was highest, as indicated by historical sources. This further strengthens the conclusions from above, that women were more likely to be seen working when labor demand was highest. But it also suggests something further; women's wages were highest when demand was highest, but also when women were a larger proportion of the labor force. There are two sets of mechanisms which present themselves and which act in different directions, though it was likely a combination of the two along with other factors which determine the final wage rates. The first is that when there was a lot of work to be done it was simply easiest to pay everyone a fixed rate. Together with this, women might have been able to wield a form of collective action when there were so many of them working together and they were such a large component of the labor force. This means that women's massive participation in construction work is in some way a cause of higher relative wages; the work is dependent on them and will pay them well for it.

The second is that we are probably seeing two different types of working women; those who are reliant on waged construction work and those who would only work in the construction industry when the wages were very high. The first group would be much more likely to continue working even in low-pay periods because of their dependence on this source of income, while the second group would enter into paid construction work in higher numbers when wages were high enough to overcome the opportunity costs of taking time away from their other responsibilities. This relationship attests that the wages are fully set by employers, and that unskilled (female) builders were wage takers. Individual working patterns do support this hypothesis. The women who worked the most regularly during high-work periods are also typically those who continue to work during low-pay periods, indicating that they may have fewer alternative wage sources.

However there is also evidence for the first claim, that there is some existence of either large-scale payments at the same rate or a collective bargaining effect when women are working in larger groups and alongside men. Burnette (2008) has observed that wage discrepancies tend to be larger when occupational segregation is stronger. This is true in the case of early modern Kalmar construction as well. In the periods when building was more scarce it is much more common to find women and men working on smaller projects, often only one person at a time. It is similarly more common to find different wage levels in these times. Women working separately from men, and in smaller numbers, are much more likely to have a lower pay rate.

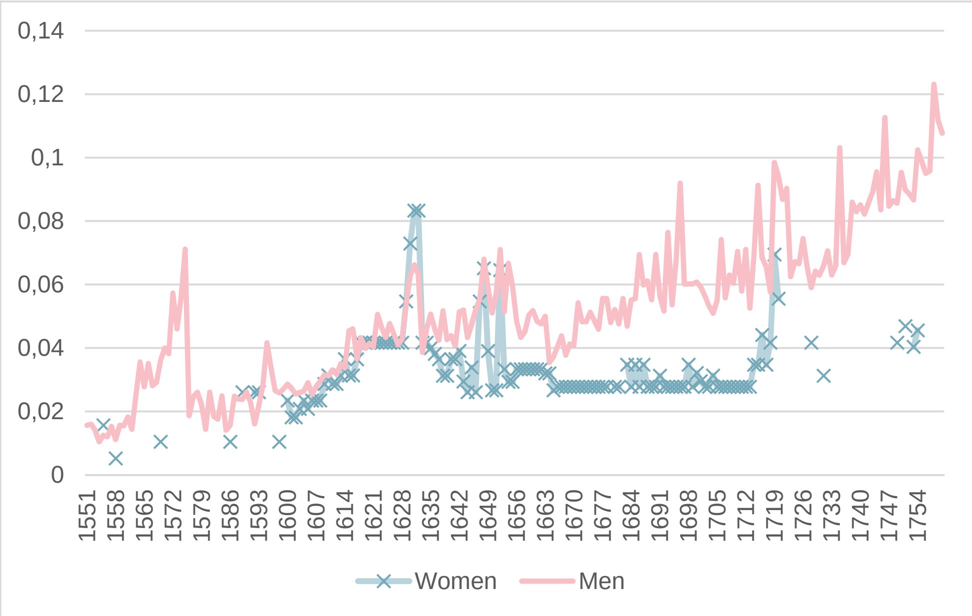

Figure 4: Women's and men's nominal day wages in SEK, 1550-1760

Women as written in the sources

Additional evidce from the ways in which women are recorded in the sources indicates a lack of distinction between female and male unskilled laborers. This lack of differentiation is an important indicator for the cultural place women's physical labor occupied; it seems to have been fairly typical, or at least not worth any especial notation. 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 history because it is impossible from the data to see that they are women.

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.

The vast majority of paid day labor in the archival sources that are utilized for this study are construction work, for both women and men, and with the small exception of Malmö city's cleaning work in the eighteenth century construction work is the only paid work represented in the figures. However, women and men appear together doing most of the tasks that have been excluded, including night guard work and cart-driving. Are the patterns from these tasks similar to what we find in building work? For the most part they are, at least in tasks which are more closely related to construction work.

In 1601 two entries for an unnamed carpenter's wife –possibly the same woman on two different occasions – record her being paid to 'guard the wall' (*vaktat vallen*) Malmo city. This was a fairly typical job; there are ten different entries for this task in 1601 alone, a total of six of which refer to Peder Knöll or Peder Swendtzsön who are typically tasked with 'guarding the wall against pigs and others' (*vaktat vallen för svin och annat*), probably working to keep the grazing animals from entering the city walls. Peder Knöll and Peder Swendtzsön are employed for periods between eight and twelve days and earn about three to five times what our carpenter's wife does when wages are calculated as day rates. However the carpenter's wife worked for much longer periods, which is often associated with a lower daily rate; she is recorded for two spells of 140 and 156 days. Jacob Pedersen is the final guard in 1601; he is recorded in the same way as the carpenter's wife, with two spells of 140 and 156 days each, and for each entry he makes the same wage. This instance illustrates to a much more extreme level than most how women's relative wages can become closer to men's the more closely observations are compared, and how these relationships depend on the data which is selected.

The case is more straightforward for women who drive carts in Kalmar, the only place where women are clearly observed doing this work. Two women who are employed alongside seven men are paid what is clearly the standard going rate for cart driving, twelve *öre* per day. In fact it is a man, Carl Bryngelsson, who is on two occasions paid less, on one occasions ten *öre* and on another 8.5.

Toward the later part of the eighteenth century day work in construction declines, and women become much more scarce in the building industry, and instead are more frequently observed doing work such as cleaning the city hall, which is discussed above as well. These wages could be quite high, and were typically higher than the wages of men doing the same work, as well as often higher than the day rate paid to unskilled men in construction in the same years. These wages are the exception to the general finding in this paper, as well as in other work (cf Burnette 2008), that women were more likely to be paid less while working in segregated labor markets.

Constructing Equality?

The paper has investigated women's work and earnings in early modern Swedish construction work, using individual-level archival data. One of the predominant findings is that women were able to earn as much as, and sometimes more than, men working alongside them in the early modern construction industry. This is surprising because of the physical aspect of the work; men would be expected to have a wage advantage here because of their greater strength and subsequent higher productivity (Burnette 1997, 2008). However, women's high earning power does not persist in all periods. When building pressure declines, women's relative wages plummet. In 1600 a woman could likely have supported herself through construction, her granddaughter almost certainly could not. How does this compare to women in other places?

Many authors have worked to collect and analyze women's wages from preindustrial societies, predominantly from Northwestern Europe. These have tended to be more diverse than examinations of men's wages, probably because the data is more scarce and so authors are not able to as selective about which type of data they use. This means that unlike men's wages, which almost always come from construction, women's wages come from many different occupations. Some, including the data for this study, do come from construction. Others, including the work in van Nederveen Meerkerk (2010) rely on spinning in the Netherlands – work commonly done by women but difficult, but with hard-to-track wages. The ubiquity of agriculture means that these wages are often more available; several prominent studies, including Burnette (1997 , 2004, 2008), rely predominantly on agricultural wage data from England. These studies, like this one, have the benefit of being able to closely examine wage relationships in different markets, but at the same time suffer for their specificity; their detailed investigations make it difficult to broadly compare women's wages both against men's wages and between places. Humphries and Weisdorf (2015) shifted this through their creation of a large-scale wage series for English women working in a large variety of occupations.

There are still many steps needed to make women's work throughout early modern Europe as broadly comparable as men's. One first step is currently being undertaken by de Pleijt and van Zanden (2018) who compare women's relative wages throughout Europe. They draw a line through Europe, separating the South and the North, into two primary paradigms of women's labor: the South, where women's relative wages were low, but stable in the very long term; and the North, a stronger influence of market forces meant that women's relative wages could fluctuate substantially. In the middle they identify an 'intermediary' pattern, with institutional factors such as strong guild presence tempering women's participation as well as wage potential. As might be expected, Swedish women's periods of high relative wages put them firmly within de Pleijt and van Zanden's 'northern' paradigm. But the ability to earn wages on par with men during certain high-demand periods was a double-edged sword: de Pleijt and van Zanden make the observation, as does this study, that in places where women had more market based wage rates they could earn high wages when the market allowed it, but were extremely vulnerable to market changes. Women in these markets were marginal workers, and when the market shifted against them their wages dropped and their earning power was greatly diminished. In southern regions the relative wage rate was much more stable, typically at about fifty percent of men's wages. This did not allow for periods of increased female earning power, but neither did it lead to periods where women suffered complete wage collapse. Flat wage rates, while initially appearing to disadvantage women entirely, likely did provide some protection.

De Pleijt and van Zanden's study, like this one, makes a careful attempt to directly compare the wages of women and men working in the same industry at the same time, to examine a wage gap with as little interference as possible. However, there is a degree of artificiality in this. Women were not able to find work in all fields, and even in the fields where they did work they were not able to work in all positions. This paper, along with Burnette (2004, 2008), Bardsley (1999, 2001), van Nederveen Meerkerk (2010) and Stanfors et al (2014), describes a market where women were able to earn equal wages to men –but only in specific circumstances. All studies find strong support for gender segregated labor markets and access to high-paid work, across a variety of places, periods, and industry. It is abundantly clear that while women have the possibility to earn an income, they do not have the possibility to advance in the workplace – their earning power was ultimately constrained by these limitations. However, the analysis here has helped uncover some of the specific ways in which women responded market forces and were active alongside men.

Conclusions

This study has shown that not only did women work extensively in the early modern Swedish construction industry, but that they were at times able to command high wages and became regular employees while doing so**.** Women were responsive to demand factors, and periods of higher wages coincided with both higher periods of labor demand and higher rates of female employment. Relative wages dropped after the seventeenth century when women's nominal wages stagnated while men's generally continued to increase; at the same time larger building projects became less frequent, and men and women were increasingly employed separately.

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.

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. At the same time, high earning periods alongside periods of decline argue against persistent or unchecked discrimination, though it does indicate some reversion to a discriminatory state after the building needs were over, and a cultural norm in which women were not 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 unsustained. Women's response to demand factors also enrichens a literature which tends to focus on the supply side of women's labor in pre-industrial Europe and urges us to continue investigating historical labor markets in deeper detail. Regardless of what is causing the changes in relative payments it is clear that women are separated into the lower 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 still severely limited in their working options.

These findings indicate a limited agency due to demographic pressures and labor needs, as theorized to have happened after the Black Death. However, the very rapid fall of wages from their peak indicate that this agency would have been limited – certainly difficult for women to rely on for long-term support or true independence, and not longstanding enough to establish itself as a cultural norm for several generations. This thus adds mixed support for a true 'Girl Power' environment of greater female economic power, as has at times been suggested (see de Moor and van Zanden 2010).

Nevertheless, women were clearly integrated workers and economic actors. Future research calls for further investigations not only into women's wage rate, but into a more multi-dimensional investigation of women in whole labor markets, to better understand the operation of the total labor markets.

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Paper III

The distinct seasonality of early modern casual labor and the short durations of individual working years: Sweden 1500-1800

Kathryn E. Gary

Real wage studies have built much of the foundation of our understanding of economic history. Through them we have sketched the development of modern economies and estimated the ebbs and flows of household wealth. However real wage studies have never been able to truly or accurately address the changes in the working year. Real wages have almost always been based on the wages of unskilled and casual laborers, often in construction but sometimes in agriculture. These people are typically paid by the day, and their annual incomes are not clear or obvious – the income is directly dependent on how many days they work.

Implicitly the literature has assumed that the number of days worked is a matter of labor's decision of how much labor to supply – and that they will work essentially as many days as they are able. This is true both in the standard contemporary methodology, as introduced by Allen (2001) and the theoretical interpretation of early modern economic and social development. Two of the most influential interpretative theories – the Industrious Revolution (de Vries 2008) and the Golden Age of the peasantry following the Black Death – assume that the unskilled working class work, on their own accord, well beyond their subsistence needs in order to increase their own standard of living. Typical real wage studies rely on a guestimate framework which assigns all workers in all regions and in all centuries a fixed number of workdays – typically 250 – but there is a lack of empirical evidence which can be used to support this.

But the actual work year, both at the individual level and for a statistical 'typical' worker, has remained to a large extent a black box. Some efforts have been made at estimating changes in labor seasonality or the work year using proxies, but none have been able to address it over the very long term using direct data on wages or work patterns. Teasing out this kind of information is heavily data-demanding; it requires repeated observations over a significant period of time using records which are likely to have been recorded in an inconsistent manner. It also requires direct payment records, rather than legal wage rates or recordings of a standard pay level, in order to connect directly to an individual's repeat employment. This has not been available in many instances, either because of the high costs involved with collecting complete sets of data or because data come from less direct sources.

This paper makes use of nearly 28,000 observations representing over 151,000 paid workdays across over 300 years to investigate individual work patterns, work availability, and the changes in work seasonality over time. This sample is comprised of workers in the construction industry, and includes unskilled men and women as well as skilled building craftsmen – the industry which is often used to estimate comparative real wages through early modern Europe. Data come predominantly from Scania, the southernmost region in modern day Sweden, and especially from Malmö, the largest town in the region.

A large proportion of these data record the name and explicit occupation of the worker, which makes it possible to reconstruct individual work histories. Even when names are not included the date and work period is still included, which allows for a long-term reconstruction of industry work patterns and seasonality. Because the overwhelming majority of this data comes from a major source of employment for casually hired individual we can hope for a fairly representative picture.

This paper seeks to understand the seasonality of the casual labor market, and through it to estimate the amount of casual labor available. The methods we use to estimate real wages directly informs the conclusions we draw about highly debated topics, including the functioning of the pre-industrial labor market, changes in strategies families and individuals used to support themselves, and household living standards in the past. The seasonality and availability of work is of utmost importance for addressing these topics.

Was there a reasonable opportunity for unskilled workers to work enough throughout the year in order to support themselves and their families? What about other sources of casual labor; were there reasonable alternatives to construction work which might make it easier to piece together a living? This study also uses information on individual's work years to examine what labor attachment looked like from an individual level. Do work patterns line up with what seasonality implies about work availability? Do workers return to the same worksite, and so have a 'reliable' source of income? Finally, is it reasonable to expect the patterns found in Sweden to be universal throughout Europe?

Findings indicate that workers probably do not engage in paid labor on a purely labor-supply based schedule, but are instead also impacted by the demand for construction labor, which was highly seasonal. Seasonality was stronger further back in the past, indicating that finding long-term work may have been more difficult in earlier periods. Additionally, there is a split modality in work patterns: workers who were regularly employed were more likely to be employed the full year round, though received lower off-season wages – this left only a small amount of seasonal labor for the truly causal workers, and certainly not enough to meet either the 250 days-a-year assumptions or a subsistence level of income.

Related Literature

This is not the first study to take an interest in labor patterns and seasonality and over the long-run; many studies have made headway, but almost all of them have relied on indirect evidence to make estimations. These can be divided into two primary groups: studies which investigate changes in the seasonality of labor, which determines when work was available within a given year; and attempts to infer probable changes in the number of days worked in a year over time.

Perhaps the most well-known study of labor seasonality is Ann Kussmaul's 1993 study of the timing of early modern English servants' marriages which finds a declining seasonality of marriages over time, indicating a decrease in seasonality of labor as well. People tended to marry in patterns that reflected their work environment, during times when their workloads were slack and their resources were greatest; this allows the use of marriage records to act as a proxy for labor seasonality in the past. In a rural environment, the busy harvest work season led to fewer marriages while the spring slow season became a popular wedding period. In a more urban or industrialized environment, the Christmas season was the most likely to be off work, followed by other religious holidays, and marriages confirm this pattern. One might expect labor seasonality to follow a similar pattern in unskilled construction, when winter temperatures and darkness kept outdoor work and brick-and-mortar work from completion.

Dribe and van de Putte (2012) use a similar approach as Kussmaul to estimate Swedish labor seasonality from 1690 to 1895, also finding a flattening out of a 'class grain' seasonal marriage pattern, but with increases in December marriages. The authors expect this to reflect work patterns better than a similar analysis in a Catholic country; in Catholic countries marriages were prohibited during Lent and Advent, which would likely skew the marriage seasonality pattern away from the labor seasonality pattern.

Other indirect measures, such as changes in seasonal wage premiums, can give an indication of the degree of competition for labor within a larger labor market and so changes in seasonality – Engerman and Goldin's (1991) study of harvest wage premiums in nineteenth century America also indicates a declining agricultural seasonality over time, adding to the robustness of quantitative, though indirect estimates of labor demand seasonality.

While seasonality itself is not a direct measure of the work year, strong patters of seasonality heavily constrain available work and flexibility within the labor market. This could however act in divergent ways; highly seasonal labor needs could employ relatively many individuals but for a shorter period; this could free up other time periods for alternative work. On the other hand, a more flattened seasonal pattern could provide more stable employment, though possibly for fewer individuals. Further, the relationship between changes in seasonality and the measures that do exist for the working year help deepen our understanding of the development of labor.

Studies examining the number of workdays in the year has indicated that the European working year increased over the early modern period, largely as customary 'saint Mondays' and a large number of saints days were discarded as holidays and became regular working days. These studies are most closely associated with de Vries' (1994, 2008) work, as well as Voth's (1998) use of court records to infer what individuals called to give testimony were doing on specific days of the week. This evidence has been used to support the theory of an 'industrious revolution', a period toward the end of the early modern era during which workers, fueled by a desire to purchase the new and more varied goods that became available through the consumer revolution, increased their working year in order to raise their annual income. However this theory, too, is by necessity based on indirect pieces of evidence, and the gap between traditional real wage accounts and GDP estimates. Other interpretations suggest that while the standard working year may have in fact increased, it could at times be largely out of necessity, as lower real wages required laborers to work more in order to make ends meet. This was especially likely to be the case in rural economies (Allen and Weisdorf 2011).

In recent years there has been an increased attempt to measure the duration of working year more precisely, and to match these estimations to the construction wage data which is used in comparative studies of real wages. At this point the focus has been predominantly on the British data which have been instrumental in the structuring of early modern wage history.

Current real-wage models assume not only a constant number of workdays over time, but also a constant number across space. Using the wages paid to laborers who work by the day is a standard way to estimate annual income, and, as an extension, well-being; methodologically the length of the working year which is input has a direct influence on measurement outcomes (see Allen 2001 and related studies). But very little is known about the amount of working days in a typical year, both on an industry-level and on the individual level, which presents large theoretical and empirically problems when definitionally, the number of work days is a direct determinant of annual income estimates.

Typically models assume that workers labored for 250 days in a year (Allen 2001, 2013), though some assume as many as 260 (see Humphries and Weisdorf 2015). This is based as much on the number of non-holiday working days available in a year as it is on direct data or on the amount of work needed to meet household needs. It is also influenced by modern preconceptions of work patterns, in which individuals are consistently employed for the majority of the year at the same occupation.

Allen and Weisdorf (2011) invert the standard real wage methodology, estimating the number of days an unskilled man would have needed to work in order to meet his living needs in a year; in other words, annual income is assumed and held constant instead of presumed work days. Results show an increasing number of work days needed in order to meet subsistence. These proxy-estimates of what Allen and Weisdorf call the 'implied working year' line up fairly well with the scattered available direct evidence of the length of the working year.

Robust indications of an increasing work year come from Humphries and Weisdorf (2015, 2017), who estimate annual incomes from unskilled female (2015) and male (2017) workers both in casual employment and in annual service. There is a discontinuity between the two types of wage systems, with, again, an increasing number of casual work days required to earn an income equal to annually-employed counterparts. Gary and Olsson (2018) finds a related relationship in early modern southern Sweden, where increasingly more work days are needed for causal workers to both meet their subsistence needs and to make the same wage as those employed on annual contracts. These findings all give an indication that the work year for casual workers would be increasing over time.

In a very recent work, Stephenson (2018) uses a similar approach to investigate similar questions in the London construction sector; this is the only other study to my knowledge which, like the present study, also makes a start at directly estimating the working year and what this means for casually employed builders' work and pay which examines builders' work years, hours, and pay in eighteenth century London. Her study covers only a few years, but has the benefit of directly addressing the data upon which many of the great economic history debates have been constructed. Her findings reflect those found in this study; the typical working year (or possible working year) was far shorter than what real wage estimates assume. However there was a substantial degree of bi-modality in work years: a split between 'regular' employees, who were essentially full-time, though still paid by the day, and those who were truly causal workers and worked far less than their regular peers.

Early modern Swedish context

The Swedish case presents an appealing test environment, with its late industrialization and slow urbanization preserving many older systems of production and work much later through the early modern period than in the growth leaders such as England and the Netherlands. Only with the Swedish industrial revolution, in the later part of the nineteenth century, was there rapid development of population and urban centers (Bengtsson and Dribe 2005). Other regions in the European periphery were not unlike Malmö or southern Sweden during much of the early modern period, remaining predominantly rural and agricultural into the nineteenth century. The majority of Europe, especially in the central and eastern regions, was overwhelmingly rural, as was Sweden. This means that Sweden was dependent on the natural economy and constrained by low-technological paradigm quite late. The patterns which can be observed in the Swedish data as late as the eighteenth century can possibly provide insight into realities of rural European life in a more distant past.

Swedish cities were small, and only about ten percent of the population lived in cities by 1800; by 1850 it was still only about twenty percent urbanized. Sweden depended predominantly on agriculture well into the nineteenth century. Rural labor markets and small population centers meant a thin labor market throughout much of early modern Sweden.

Furthermore, the labor market in Swedish cities would have been more restricted than, for example, that in London. Internal migration was high across short distances, but minimal for either long distances or from rural areas into cities and towns – most who did migrate did not go more than fifteen kilometers (Dribe 2000). Strict regulations controlled internal migration. During previous centuries there had been even less mobility, as Sweden operated under a pseudo-feudal system with a rather coercive labor regime (Enflo and Missiaia 2018). Manorial consolidation led to evictions and a proletarianization of the peasant-farmer classes during the eighteenth and nineteenth centuries (Gary and Olsson 2017) which freed some labor for entry into other markets, but transition was still slow before the mid-nineteenth century (Bengtsson and Dribe 2005). This was especially the case in the peripheral south; even in 1750 over sixty percent of Sweden's manufacturing workers were located in Stockholm, the only truly urbanized area in the country, and Scania, the 'breadbasket' of Sweden, industrialized at a much slower pace (Enflo and Missiaia 2018).

This means that data for urban inhabitants is hardly representative of a typical early modern Swedish labor market. Even less so is an urban construction laborer representative: Enflo and Missiaia (2017) estimate the share of GDP arising from the construction industry at only seven percent nationally in 1571, and estimate that Malmöhus county, where Malmö town is located, had about an 80 percent labor force share in agriculture in 1750, above Sweden's national average of 76 percent. Malmöhus's agricultural share rose slightly through the 1770s, and had only declined to about 79 percent in 1800, after which it dropped more steadily to about 66 percent in 1850. This is a region which clearly remained agricultural and rural late into the early modern period.

Data

The data used to calculate real wage estimates for southern Sweden (Gary 2018b) offer a unique opportunity to also examine the patterns of the working year, both for individuals and for availability of work within the casual labor market on a macro level, using wage data from Malmö, the largest city in the south; Kalmar, a smaller southern town; and their rural surroundings in order to refine our understanding of what a typical working year might look like in the early modern periphery.

The primary data used to investigate the seasonality and work year in casual labor industry come from payments for construction labor carried out in southern Sweden between 1500 and 1799. All records refer to direct payment to individuals, or to a

Figure 1: number of paid work days in southern Sweden. Source: Author's calculations

small number of workers, which means that it is relatively straightforward to connect paid days of work to the month in which it was performed when timing is recorded. The source dataset contains over 28,000 observations, which represent approximately 151,000 individual paid workdays. Approximately 8.5 percent of the total sample does not include a specific enough date to narrow the work period to the month, and so cannot be used in the seasonal analysis. This lowers the number of observations to just under 25,500, covering almost 102,400 workdays. The majority of these incomplete observations come from the first part of the sixteenth century. Of the observations with seasonal data, 5,557 are skilled builders and 19,919 are unskilled – 5,557 of these unskilled builders are women, Figure 1 shows the distribution of work days throughout the period.

Additional data sources which are not as long in duration or complete enough to answer the research questions themselves are also introduced to explore potential additional sources of income for casual laborers. It is fairly well acknowledged that casual workers, both men and women, pieced together work from several sources (Humphries and Sarasúa 2012), and so it would not be surprising to find that identifiable individual workers did not work enough in one industry to meet their yearly cash needs. It isn't possible to link individuals directly across data sets, but by analyzing any similarities or differences in seasonal work patterns, or in other indicators of financial access or stress, it can be possible to piece together a larger picture of work opportunities or constrains. These sources represent other sources of urban work such as employment at Malmö's city harbor, as well as work in the countryside in agriculture on rural manor estates (Olsson 2002).

The seasonality of construction labor

Figure 2 shows the monthly distribution of paid work days for unskilled men working in the casual construction industry in southern Sweden, including both Kalmar and Malmö towns as well as casual building work on rural manors, over the entire period of study. The unit of measurement is paid work days, not observations, because it is not uncommon for observations to record more than one workday or more than one worker at a time. The pattern is overwhelmingly seasonal, with peak labor periods in June, July, and August – almost twenty percent of paid days of labor are in July, with an average of about three percent in December through March.

Using the same wage data utilized in this study, Gary and Olsson (2018) estimate that an unskilled man working 200 days in construction would have typically earned enough to support his household in Scania. But this estimate, as well as the assumption of 250 work days in the standard model, is built on a labor market in

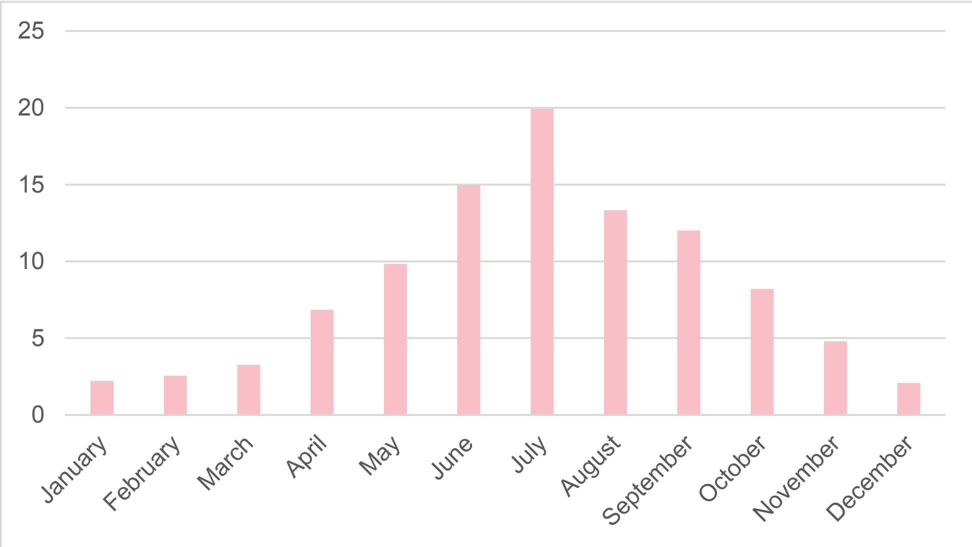

Figure 2: Distribution (percent) of workdays in construction by month when month of work is known, 1500-1799. All workers. Source: Author's calculations.

which workers could choose to work as much as they wanted – but was the labor market able to accommodate workers labor needs?

Assuming a work week of six days, 200 days of labor would require full-time employment for 33.3 weeks, or 8.3 months. A five day work week, which is less common though not unusual in Malmö, would require ten full months' employment. If we take April to November, the eight months remaining after those months with the fewest percentage of workdays are removed, as the 'standard' work year, this figure implies that only a small minority of workers who were employed at this worksite would have been able to access enough work days to equal 200 per annum. If only about five percent of paid work is done in November but there is so much work in the summer that twenty percent of all work days are undertaken in July, then only about one quarter of those employed during the peak summer months could hope for a job by the end of the fall. Even fewer would have been employed at the end of the spring. The winter workforce was cut to a minimum, and work would have been very scarce within the construction industry.

Seasonality over time

It is clear from above that the work year in construction was strongly seasonal, but was employment consistently seasonal for entire 300 years? Indirect estimates of labor seasonality have found a declining seasonal trend in more recent centuries. These studies have been primarily focused on the influence of agricultural

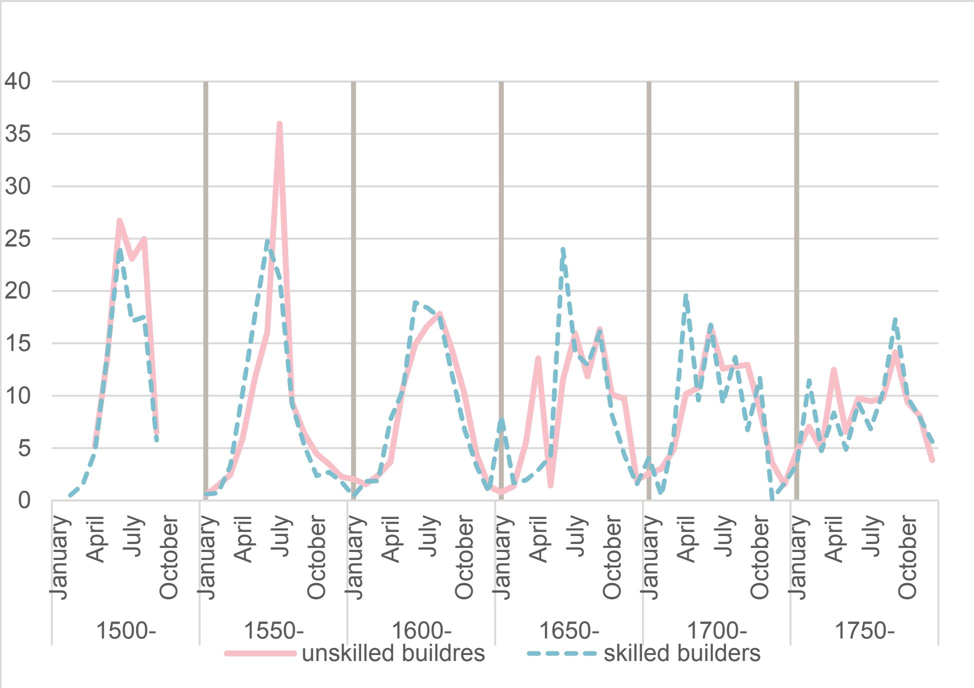

Figure 3: Distribution (percent) of unskilled and skilled workdays by month in fifty year periods. Source: Author's calculations. Unfortunately the data in the first half of the sixteenth century are the least likely to include a time specification beyond the year – about 35 percent of these observations cannot be included in the seasonality analysis because of this missing information. Missing seasonal information in other periods ranges between about three and 16 percent.

seasonality, since agriculture was of course the dominant employer as well as the structure around which society was focused,[1] and have relied on wage and marriage timing data in order to infer changes in actual work patterns.

Here we can directly assess the changes in seasonal labor distribution. Figure 3 divides seasonal payment information into fifty year periods from 1500 through 1799 for skilled and unskilled workers. The amount of day labor recorded is highest in the late sixteenth and early seventeenth centuries (figure 1) – this can be connected to GDP growth as well as the general program of state-building and fortification which was ongoing in both Sweden and Denmark during this period (Enflo and Missiaia 2018b; see also Gary 2018a) as well as the inclusion of data from Kalmar city from the seventeenth century, augmenting the sample during this time. Paid labor then decreases substantially in the second part of the seventeenth

[1] Kussmaul 1981; Dribe and van der Putte 2012; Engerman and Goldin 1997. Engerman and Goldin also investigate the complementarity of manufacturing employment seasonality in 19th century America, but find that the two were likely both influenced individually through sectoral shifts and the decreasing reliance on climate in both industries.

century – a period of stagnation entering into economic decline in the early eighteenth century.

Figure 3 shows the distribution of work for every month throughout each period. The decline in seasonality for both skilled and unskilled male workers is suggestive – from peaks of 25 to 35 percent of construction labor carried out in the summer months in the first two periods, to under fifteen percent in the later periods. Also important is the shift to more work being done in the late winter and early spring, which is less apparent in the earliest periods.

While the predominant trends for skilled and unskilled men are the same, there are some differences that indicate somewhat different labor patterns. Skilled workers tend to have their labor peaks slightly before their unskilled coworkers, especially in later periods when skilled workers, in particular, are working earlier in the season. This could be connected to a changing in the structure of the labor market, or perhaps to a greater need (or ability) to prepare when building projects are smaller.

This indicates a changing dependence on seasonal conditions for labor, as found in previous though less direct studies. With a less seasonal work pattern, a larger number of individual workers would be able to work more days in the year – this is a mechanical function of a flatter distribution. When only those workers who are employed are examined, this can give the impression of increased industriousness; that is, it looks like people started working more. But this doesn't necessarily mean that there was more work being done, or remunerated, in the economy at large. A flatter distribution means instead that a smaller number of workers could work longer, but that fewer individuals could access work. Figure 1, which shows the distribution of the data used in this study, clearly shows changes in the extensively of work throughout the 300 years which the data covers. This relationship is important to keep close to mind when assessing changes in industriousness in the very long term.

Personal work patterns

Was seasonality universally applied? Which workers were able to continue their work into the winter months? Approximately 11,400 observations in the primary dataset include individuals' names; these represent nearly 2,900 individuals who can be identified in repeat observations and their working year isolated. Figure 4 shows the distribution of individuals' workdays within a given year; they clearly tend to be very few. Sixty percent of all workers work ten days or fewer on a particular worksite; the mean number of workdays is 18, and the median 8. Skilled workers do work a bit more than unskilled workers with a mean of 28 and a median

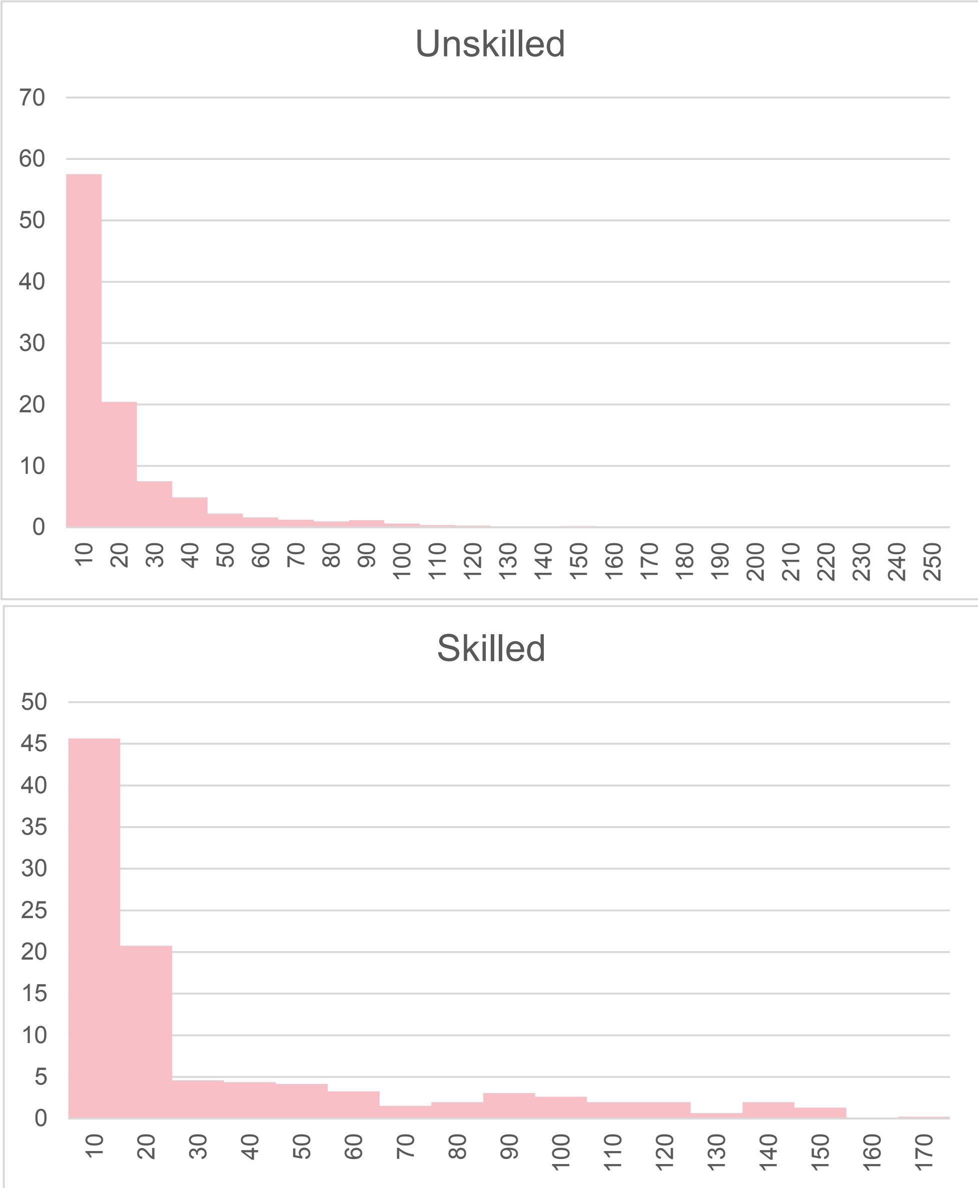

Figure 4: Distribution (percentage) of unskilled (top) and skilled (bottom) workers' annual days of work in the entire sample, 1500-1799. Source: Author's calculations

of 10, which is reasonable since they likely are leading projects. However this is still not a very large number of days.

It is difficult to know exactly what the share of employment in unskilled labor is for the worksites which are examined in this study; this is made even more difficult by the different amounts of labor occurring at each work site from year to year. The extent of work carried out throughout each year varies even between records from the same source; some years record work in all twelve months while another year may have work only during peak periods. This of course makes it difficult to compare individual work patterns directly across the entire period – it is reasonable to expect that workers would spend more days working in a year when there was more total work.

One way to test if work patterns might be different between years or sites with different degrees of labor intensity is to limit the sample to years in which greater or lesser amounts of work are being undertaken. The great majority of data in this dataset comes from Malmö city. In the records which are included in this dataset, the year's workload ranges from a handful of workdays to a bit more than 6,500. Table 1 shows the relationship between work years of 100, 400, 1000, 2000, and 4000 work days and individuals' work years. Results are shown for both all years with more than n work days and for years with a number of workdays between two levels.

Results are fairly robust to different degrees of work intensity; table 1 shows that the median unskilled worker works typically one or two weeks in a year, whether there were 100 or 4000 available days of work, though it was less when there were fewer than 100 paid work days. The mean does increase consistently from about five days with under 100 days of work up to about 25 during the busiest years. The rather high standard deviations recall the long right tail of the distribution. But it also indicates that a worker who works as much as two standard deviations more than the mean would only be working 30 to 85 days in a given year, given more than 100 work days.

Skilled workers did work more, but the difference is not usually very large. As visible in figure 4, there is a much shorter right tail on skilled workers' individual working patterns. This is almost certainly because of the far smaller number of skilled workers who repeatedly appear in the sources. Even in the periods when there are the largest number of unskilled workers – when we observe between 1000 and 2000 days of paid work – there are only 9 individual skilled workers recorded. However, this is also when the skilled workers were working the most. Given 100 or more days of paid work in the year, a skilled worker who works for two standard deviations beyond the mean is still only working 30 to 110 days, though the number is likely closer to 89.

This is not very many days of work. It is certainly not enough to meet standard methodological assumptions, nor is it enough to meet the substantially lower estimation of 200 necessary workdays for Scanians' comfortable support in Gary and Olsson (2018). The relatively short working year for any given individual fits with the seasonality of construction labor discussed previously, and the evidence from actual working years gives an even stronger impression of a very casual degree of labor attachment for individual workers.

These patterns indicate that individual attachment to a single work source was uncommon. This is supported by the short year-to-year persistence of individual workers. About 85 percent of workers cannot be linked together over more than one year, and almost fifteen percent can be seen across two and five years. Only 20 individuals are identifiable for more than 5 years' of work, with the longest-connected individual, Anna Dikerska, appearing across 14 individual years working in Kalmar. The nature of the data means that there is probably more persistence of work habits, but that the data does not survive to record it. For example, while Anna Dikerska appears in fourteen individual years, there are missing years during this period; Anna works from 1619 to 1637, a period of 19 years. Workers who were reliant on paid work would have been required to work for several different employers across years and within years unless they had other serious means of support. Regardless, the evidence does indicate a flexible employment for the unskilled cash wage market.

Table 1: Median and mean number of men's workdays in Malmö, by number of paid workdays in the year

All years with more than (n) paid workdays		median	mean	s.d.	Obs (individual workers)
100 >= n	Unkilled	3	4.94	5.74	201
	Skilled	3.5	6.1	7.6	28
100 < n <= 400	Unkilled	6	8.95	11.8	211
	Skilled	7.5	11.8	19.2	33
400 < n <= 1000	Unkilled	11	18.7	22.2	270
	Skilled	13.5	27.6	30.1	40
1000 < n <= 2000	Unkilled	6	20.1	31.8	461
	Skilled	50	51.1	29.9	9
2000 < n <= 4000	Unkilled	11	24.8	36.4	62
	Skilled	18	30.5	28.8	36
4000 < n	Unkilled	12	24.8	34.2	234
	Skilled	9.5	9.2	4.5	4

However, even if we assume that individual workers spread their working time between several different forms or sites of casual labor, the confines of seasonal work availability across industries still paint a picture of limited work years, out of synch with our traditional understanding of early modern work. The short individual work years also indicate significant transaction costs in finding work, and it does not seem unlikely that there would have been many potential work days lost to job-seeking.

Seasonality in other industries

The overall seasonality pattern of construction work is important not only because of how much time it allows each individual to work for pay within the construction industry itself, but also because of how it impacts individuals' ability to work in other industries. Due to the constraints of the preindustrial economy, especially in a region far enough to the north for seasonal differences in daylight to dramatically impact the working day, certain seasons offer more opportunity for work.

Data for work patterns on this level are hard to compile, of course, especially over such a long period. But some data are available both for direct estimations of historical work days and for some industries which can allow an approximation of what associated labor's seasonality could have looked like.

Agricultural labor

The most obvious competing labor is of course in agriculture. Agricultural labor was the backbone of any pre-industrial European society, and this is especially the case for Sweden, which remained predominantly agricultural well into the nineteenth century. As mentioned previously, migration was fairly low in the pre-industrial period and so it does not seem likely that there would have been a significant number of people who would have gone between city and countryside in order to seek out seasonal labor. But it is still important to understand if the labor patterns in the cities are representative of those throughout the region of if they only reflect the small number of laborers who are directly tied to seasonal urban labor.

Sweden had a rather coercive labor system in which labor rent was a regular part of many tenancy agreements. In combination with the labor from live-in servants on annual contracts, this system took care of the majority of agricultural labor needs until the later part of the eighteenth century, which means that it is difficult to find records of agricultural day labor during the majority of the period covered by construction work in this period. Records of paid agricultural day labor make an appearance in the late eighteenth century but only become more common in the nineteenth. Figure 5 shows the number of day laborers working at Årup manor and Dybeck manor, both fairly typical manors in Scania, in the middle of the nineteenth century. While this is later than the construction data the seasonal patterns are likely to be fairly representative; if anything they would be less seasonal and so underestimate the similarity due to a decrease in agricultural seasonality in eighteenth and nineteenth century Scania (Dribe and van der Putte 2012).

Figure 4 demonstrates a very similar seasonality pattern in agriculture as found in construction, especially for men, with peak labor needs typically during high summer. Årup relies on a large amount of female labor which has sharp peaks in September during the potato harvest – women were employed to harvest and men to drive the filled carts. But women's work is also in relatively high demand in the summer months, alongside men's and construction labor. Of course not all labor patterns are identical; Dybeck manor has a similar seasonal pattern to Årup but with lower degrees of seasonal variability. Women have the same pattern in Dybeck as in Årup, with a strong spike in September, but do not make us as large a portion of Dybeck's daily laborers as Årup. But the overall picture is one that makes clear the difficulties in finding complimentary employment between construction and agriculture very apparent.

Other urban labor

Comparing seasonality between construction labor and other casual labor within the city is also difficult; there simply are not cohesive records from most institutions or from private individuals. But some proxy comparisons can be made.

Malmö city was an important port town in the early modern period, and casual labor in the harbor is an intuitive comparison to construction work. It must have been quite some task to load barrels of grain from storage warehouses onto the out-bound ships, remove incoming cargo, and take care of all the menial labor needed to keep the harbor running.

Data from Malmö's harbor in the beginning of the nineteenth century captures work ongoing at the harbor; 1810 is examined in detail here. In figure 6a it is clear that the work at the harbor followed a seasonal pattern almost identical to that in construction, though with a (very) slightly lower July peak and somewhat flatter level of winter work. Recorded payments refer primarily to what is probably construction work along with summer-time dredging of the harbor. There are three primary tasks which appear in the records: general or unspecified labor, which is labelled as 'various work' (*diverse arbeta*) and is probably construction or upkeep related; dredging the harbor from a barge in the water; and carpentry work. The

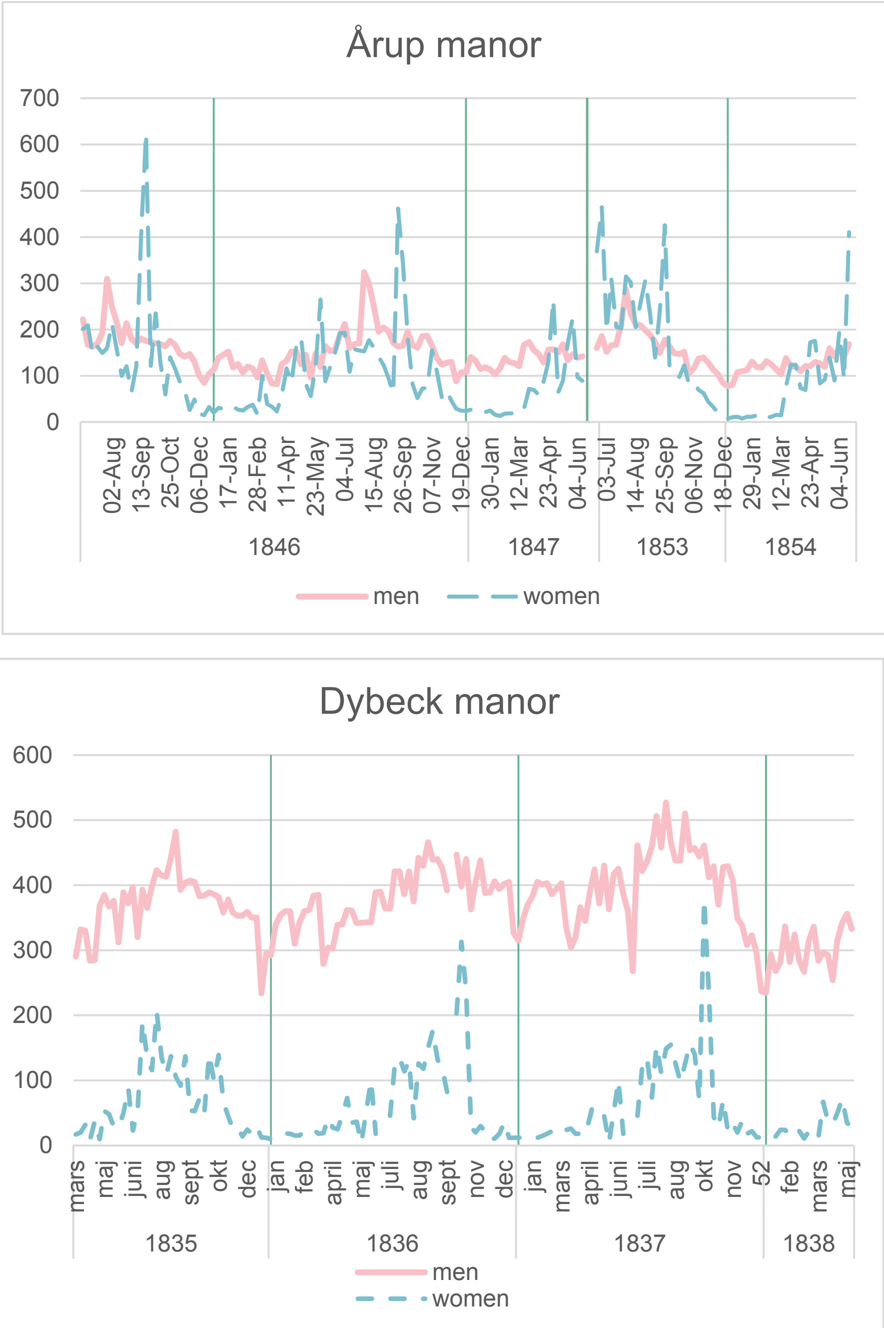

Figure 4: Annual days of labor at Årup and Dybeck manors. Source: Olsson 2002

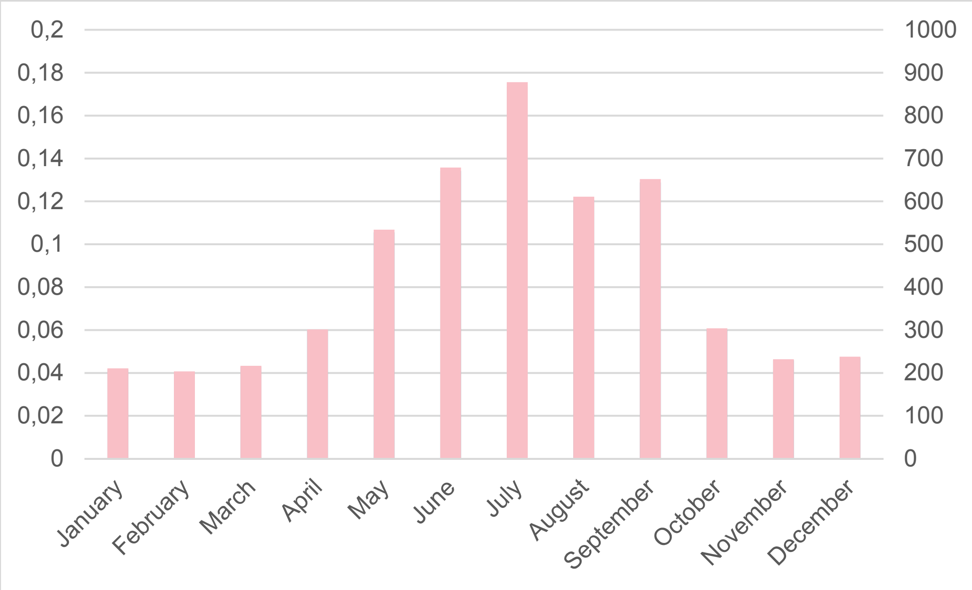

Figure 5: Distribution (left) and number (right) of paid work days at Malmö Harbor, 1810. Source: Author's calculations

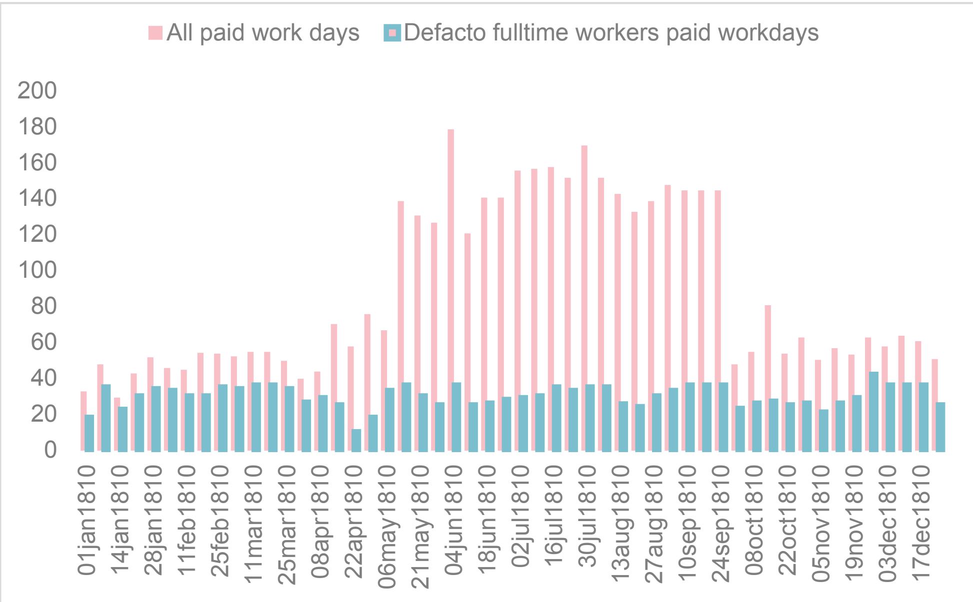

Figure 6: Weekly days of paid work by worker frequency, Malmö harbor 1810

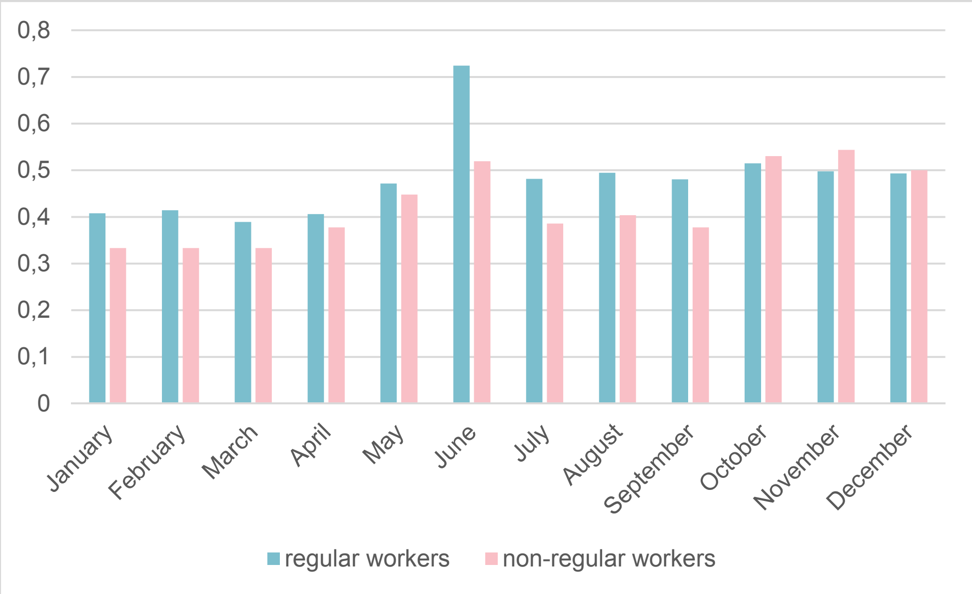

Figure 7: monthly average wages by work frequency, Malmö harbor 1810. Source: Author's calculations

men (and one boy) who work on the barge and as carpenters in the summer are employed essentially year round; they are the only workers who appear in the records during the winter, performing unspecified *diverse arbeta*. In mid-May they move to the barge, with several soldiers to help, and in mid-June some of the men begin explicitly working as carpenters.

Throughout the summer the regular employees are assisted by solders, who are paid at a slightly lower rate than the regulars' summer rates, though still above the regulars' winter rates. These are an interesting group because of how they are recorded; while every other worker is explicitly listed, the soldiers are grouped together as a unit, for example as '8 soldiers' (*8 st soldater*), performing either *diverse arbete* or listed as 'the workers at the harbor' (*Arbetarene vid Hamnen*). The bulk of this extra summer work was done by non-regular workers (figure 6b); this picture is likely one which is reflected through much of the early modern casual labor market, where a core number of workers were retained throughout the larger part of the year, leaving the seasonal swells to others who would have to seek alternative work through much of the rest of the year.

Soldiers in 1810 would not have been actively engaged in military exercises, and so would have been both available, and likely looking, for casual labor to supplement their rather low annual income. Soldiers were hired and paid by municipalities and freeholders as part of their tax responsibilities; soldiers could also receive a small croft as part of this support, but neither land nor wage were particularly luxurious, and so soldiers would likely have needed to supplement their incomes with day labor in either agriculture or in the cities.

It is difficult to say what this meant for the labor market and the frictions associated with hiring. By the way the soldiers are listed in the records, unnamed and grouped together into one line while every other worker is individually listed, it would appear that those in charge or hiring labor at the harbor simply contacted the local regiment and asked for a certain number of workers to be provided. Perhaps the workers were the same from week to week, but it is also possible they changed rather often: in many weeks, while individuals are recorded working for 5 or 6 days, there are different line entries, each for eight to ten soldiers, for each workday in that week. This indicates a certain lack of attachment to the worksite for any individual soldier, and in turn only a small number of work days throughout the year. However, it is of course possible that other worksites also had similar relationships to regiments and used the soldiers as readily-available day labor.

There is also some degree of pay difference between the regularly employed and the casual and soldier workers. In figure 7 there is a clear difference in the average day wage by month paid to ‘regulars’ and the more causal workers. The most industrious worker was actually a boy, *gossen Anders* (the boy Anders), who is paid a lower rate than the adult workers. He is excluded from the wage analysis, though his inclusion does not change the results. Only in October and November do the non-regular workers slightly out-earn the regular workers – this is due to some extra carpenter labor during these months combined with fewer lower-earning casual workers, and possibly some urgency to finish a project before December. Otherwise the regular workers enjoy a wage premium, even when they are doing general work which is probably unskilled. The premium would probably have been even higher in the summer. During the summer months a great number of the regular employees, including gossen Anders, were working on a barge dredging the harbor. For this work they seem to have received both a day wage, which is represented in figure 7, as well as a piece rate for the number of loads removed from the harbor in the week, which is more difficult to quantify and is not included in the graph. It is fairly clear that, at least at the harbor in 1810, regular employees have access both to more work and to better paid work as a general rule.

Implications for the working year

So what does this say about a ‘typical’ work year? It is abundantly clear from the preceding sections that a typical work year in any one place was quite short, and unlikely to supply a full year’s worth of work; workers who relied on the market for their primary support clearly would have gone between several different employers over the course of the work season, which makes it difficult to estimate the length of a 'typical' worker's full work year directly from the wage data. However it does seem clear that relying on alternative paid work in the offseason would not have been a reliable strategy because of the consistency of seasonality throughout alternative sources of paid work. While there may have been substantial flexibility in places of work, there appears to be less flexibility in the timing of work. This section puts together the evidence from the preceding sections in order to estimate a benchmark number of work days which could be applied to an adjusted Allen-style (2001) framework to give a more accurate picture of Swedish income development in the early modern period than current assumptions would imply.

The seasonality of work is a big constraint to universal fulltime employment for those who rely on casual labor for subsistence. Obviously not everyone employed at the major construction worksites can rely on fulltime employment. Peak work occurs in July, when about 20 percent of all paid work days occur. In winter months there are as few as two percent of work days monthly, giving a half-way point of nine percent. It's not unreasonable to assume that in months with an above-the-mean number of work days that most work-seekers would be able to find paid work. Five months, from May to September, have nine percent of more of all paid workdays; including October, with 8.2 percent, gives five to six months (see figure 2 above). With a six day work week this translates to between 120 and 144 days of paid work.

The workers at the upper end of the distribution of annual work days can also give some insight into what a 'full' year of work could have been. Some workers did work quite long years, and a few even as much as 200 days in the same place. But the numbers are small; 180 individuals worked more than 50 days in a given place in one year, 58 more than 100, and only 11 more than 200. These distributions are also all left-skewed, with means higher than medians, and there is no clear grouping that would indicate a 'typical' pattern within this worker group. Because of the skewness the mean number of work days rises quite substantially when the sample is limited, which means that any limiting criteria is unfortunately rather arbitrary.

Test thresholds of 50 and 100 workdays are chosen as levels which clearly represent a strong commitment or association with a particular workplace, but are not so high as to only include the most extreme outliers who cannot be considered representative. Workers who worked 50 days or more in the same place in a year worked a mean of 97 and a median of 82 days, and those who worked more than 100 days worked a mean of 153 and a median of 132. This does show a tendency toward higher worksite attachment for those who work might have a stronger relationship with a particular worksite or market. It is possible that this represented the strong majority of annual income for these workers, and we can take these values as somewhat of a benchmark for what a full year could look like for those who

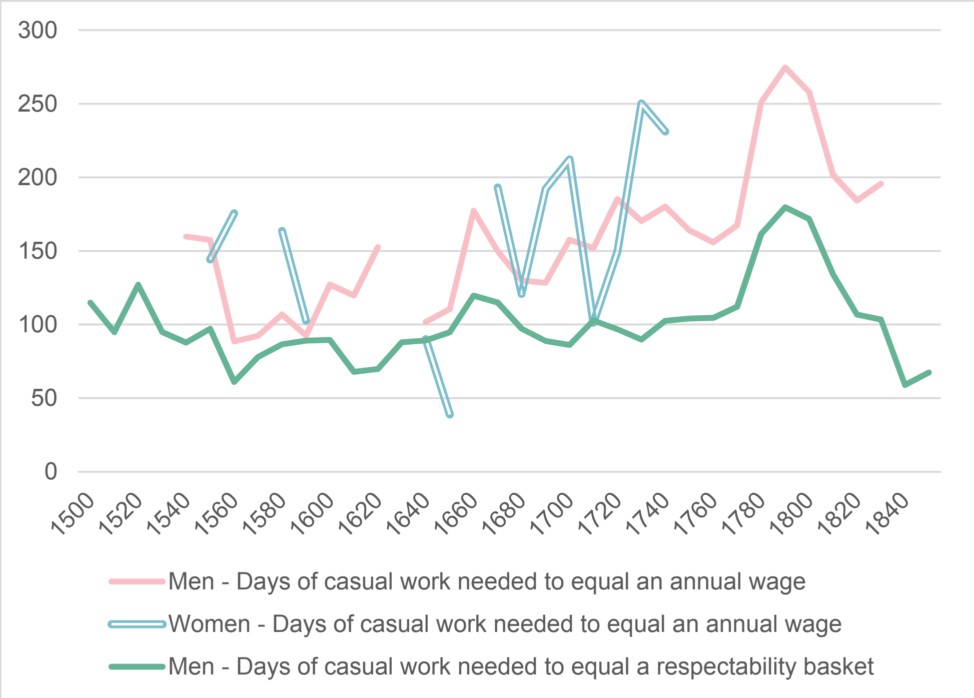

Figure8: Days of casual work needed to equal an annual wage, and a respectability basket. Source: Gary 2018

carried out much or most of their paid work at a single location. However these workers are not necessarily typical workers, apart from being more attached to a particular market: both of these groups are more skilled than the general sample; 28 percent of fifty- and 26 percent of hundred-day-or-more workers are skilled, compared to about 13 percent skilled in the general sample.

Two types of comparisons between wages and prices have inferred a working year based on either what was needed to reach subsistence or what was needed to earn the same wage as an annual workers (Allen and Weisdorf 2011, Humphries and Weisdorf 2015, Humphries and Weisdorf 2017). Instead of assuming a fixed number of days, it is assumed instead that casual employees would work enough to meet consumption goals, after which they would prefer leisure or non-market work. Obviously these are not direct estimates of a working year, but this type of inferential estimates can provide a more plausible metric of what the labor market could have looked like, especially if there is even a small amount of market equilibrium between different types of work.

Figure 8 shows the number of days of causal work needed for unskilled men and women to meet the level of income that they could receive if they were employed on an annual contract instead. It also shows the number of casual work days an unskilled man needed to make enough to support himself at the ‘respectability’ level of subsistence, defined as the costs of food, other consumables and rent needed to support one man for a year. The ‘respectability’ level simply indicates that the goods included in the calculation represent a comfortable lifestyle, rather than simply the basics needed to survive (see Allen 2012). The data are from Gary (2018b) and Gary and Olsson (2018); wages for causal labor are based on the same data which are used here to estimate labor seasonality.

There is a fairly clear trend toward more work days needed in order to meet an annual wage; the large increase in the late eighteenth and early nineteenth century is particularly apparent. These years featured particularly low wages and high prices, most likely related to high prices following the Napoleonic Wars and Sweden’s continued (and not entirely successful) military engagement with Russia during this period. After the Finish War ended in 1809 the relationship returned to levels closer to its previous trajectory.

The average number of work days needed to earn the equivalent of an annual income through the entire period is about 150 days of work, though of course increasing over time. This is surprisingly in line with the estimates from both the seasonality patterns in construction and the individual work patterns of the highly-attached workers, though it is on the high end of those estimates. A work year of 150 days is also marginally above the number of work days which are needed to earn one respectability basket. This is a reasonable benchmark estimate for a typical Scanian work year. The figure fits well within the earning needs of an individual supporting themselves. It is slightly above what is suggested directly for a ‘full year’ by the highly industrious workers directly in the sample of paid construction workers, but it is reasonable to pin a benchmark a few days above these levels which are taken directly from data in which both median and mean are so below what a full year’s support must have been. In some ways this does make 150 days a conservatively high estimate, though still one much below what previous literature have assumed.

This estimate of a working year of about 150 days is substantially below the standard assumption of 250. It is also below the estimate in Gary and Olsson (2018) which estimates 200 days of work for a man to support a family (at a level between a bare subsistence and a respectability level). One hundred and fifty days of work is enough for one man to support himself very comfortably, but is not enough for a man to support a wife and children as the sole earner; substantial contributions from other household members would have been essential. This is additional confirmation of previous findings for both Sweden and other parts of Europe that the male breadwinner model is not a realistic representation of early modern household economies.

Is labor seasonality universal?

Sweden is a northern country, with strong seasonal changes in temperature and, especially, in hours of daylight. This has a big impact on the amount of work which can be carried out outside and the periods in which it can be executed. The restrictions are of course strongest on agriculture, but we have seen above that construction also follows a strong seasonal pattern.

The seasonal constraint on construction work were temperature and daylight – construction labor, in particular masonic or brickwork, could not be carried out in the winter or during particularly cold periods. If the brick or mortar froze before it was completely dried and set the ice crystals inside would destroy the structural integrity, and anything using these materials would be fragile and unsafe. Even if it were possible to reliably predict mild temperatures through the winter season the shorter length of the day would greatly restrict winter working hours. In the preindustrial period it would have been costly and difficult to illuminate a workspace during dark hours.

It is not unreasonable that the seasonality of construction and other non-agricultural work would have been less pronounced in regions with warmer and brighter winters and less seasonal change. In the Mediterranean and in southern Europe there was quite probably a longer building season, which could have led to a very different system of labor organization.

Fragmentary evidence backs this hypothesis up. Hamilton (1936) describes a Valencian construction work year that is much longer than what the data from Sweden would suggest. Cold weather did impact the working year, but this came typically in October, when production could go into overdrive to compensate for the soon-ending season. Hamilton comments also on the holiday days which take away from the working year, highlighting that the most lost were in December, between the 24th and 28th – but this itself highlights the normalcy of continued labor throughout December.

In the first part of twentieth century Sweden construction was still seasonally constrained, with a strong impact on the bargaining power and, subsequently, wages of masons relative to those who worked in manufacturing, indoors year-round. Swenson (1991) connects the construction wage premium in Stockholm and Copenhagen to the average winter temperature, comparing it to much lower (or negative) construction wage premia in cities such as Rome, where the winter temperature was substantially higher.

However, Sweden, and southern Sweden in particular, was not dissimilar to much of eastern and central Europe, in either seasonal patterns or in social and labor structure. While the lower seasonality of the Mediterranean may have led to a different building season there, the larger portion of Europe would have felt the constraint of the winter months much more severely – though likely still with some variation. Stephenson, in her recent working paper (2018) suggests that building laborers in London's eighteenth century constructions sites worked for about 180 days in a year – some number more than what the Swedish data suggest, but also substantially below the number which has been used since Allen (2001) developed his model. The variation is not out of line with the differences which would arise from a different climactic pattern.

Further research is needed to understand the extent of climactic impact on early modern construction work, but it is not extreme to assume that the typical working year would have varied quiet substantially between regions with different seasonal weather patterns. Given more concrete data from specific locations it could be very possible to construct a model which could adjust for the potential working year in order to control for regional variations, and help estimate a more nuanced view of early modern work and wage patterns.

Conclusions

This paper has used a new data set in a novel way, by measuring the seasonal pattern of paid work in construction, the industry typically used to measure and calculate real wages in early modern Europe. It is the first to be able to take such a direct measurement of labor seasonality in the early modern period. It has shown that the Swedish construction industry was highly seasonal, and is increasingly seasonal the further back in time. Individual work patterns show a low attachment to any particular work site and a low recurrence of work done in the same place; this indicates frictions in the labor markets and likely high levels of inefficiency involved in matching workers and employer.

How do we understand the low number of annual workdays, both by nature of a seasonal industry as well as the empirical working patterns observed for individuals? It is clear from the evidence presented here that there was substantially more work done in the summer than in the winter, and that the overwhelmingly seasonal nature of several different industries would have made it quite difficult to string together predictable work throughout the year. When people did perform paid work it was necessary to spread it between several different worksites and, likely, types of work, but it appears that individuals still engaged in less paid work that what we assume a work year looks like from our modern perspective, likely not more than 150 days a year for men and quite probably some days fewer.

This study does have limitations – it relies predominantly on a single industry, and on data from only a few, albeit major, sources. It is possible that smaller institutions or individuals took advantage of the months between the winter when it was too cold to work and the peak seasons, somewhat evening the seasonality of the total labor market. More importantly, the construction industry was not a dominant economic factor, as discussed earlier in this paper. While it represents a large body of literature on early modern wages, it does not represent a large proportion of the early modern economy.

Putting all of these pieces of evidence together, it becomes clear that we cannot properly understand past experiences when our assumptions too strongly reflect a modern labor market. It further suggests that we cannot treat the inhabitants of the past uniformly: differences in labor seasonality, both temporally and geographically, strongly influence both the number of workers who would have been able to find work and the amount of time they would have been able to work. These are not minor differences, especially when we compare the development of wages and well-being between regions over long periods of time. Future research is needed to refine our approaches and to deepen our understanding of what our early modern predecessors did to support themselves over the years. In the meantime, we must work to remember that "the past is a foreign country", and to not let our own perspectives too heavily lead our interpretations.

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Paper IV

Men at work: Real wages from annual and causal labor in southern Sweden 1500-1850

Kathryn E. Gary and Mats Olsson

How did people in the past make a living, and what did they earn? Was one person's income enough to get by, or did the whole family have to chip in? How much did these things change over time, and why? The basic survival and wellbeing of common people have been some of economic history's central questions for nearly the last century. Countless real wage series of various types of laborers and over different lengths of time have investigated these questions. However, nearly all have relied on the same set of methodologies and data sources: using the wages of (male) day laborers to somehow impute changes in well-being on a national level, or at least for a class of workers.

Only recently has the research field come to explicitly and empirically address the limited descriptive function on this approach, with studies that address wages both in this type of casual employment as well as new analysis of income from annually positions. Fixed-term contracts were a more standard labor practice in early modern and medieval Europe, but this type of work has not been previously empirically addressed in the same way as casual wages. The hesitance to deal with annual wages has predominantly been due to the nature of employment and the difficulties inherent in measuring the actual compensation; most workers of this sort were paid predominantly through room and board, with only a small component paid in wages – how then to quantify their 'pay'?

In this paper, we use a brand new dataset to estimate and compare wages for casually and annually hired workers in early modern southern Sweden. This allows for a much more sophisticated and in-depth investigation of early modern living standards and well-being, but more importantly allows for an interrogation of some of economic history's most important questions, in a somewhat more 'typical' early modern economy than the leader, England. We follow methodology laid out by Humphries and Weisdorf in recent analysis of England (2015, 2017) and add the cost of living to the cash wage to estimate a wage-equivalent for annually employed workers who received room and board from their employers.

More directly, we ask who was better off; those working by the day or those working on fixed annual contracts? How much would a casually employed worker need to work to make the same income as someone employed on a year-long contract, and how did this relationship change? How did urban and rural wages differ? These findings allow us to understand the early modern labor market more clearly and to get at a more realistic understanding of what the standard of living and typical income might have been. These findings further facilitate a deeper investigation into the impact of changing labor markets due to population development and the proletarianization of the Swedish workers: in what ways did the labor markets change with population and urban development? Do results support the theory of an ‘industrious revolution’, an increase in time spent in market work in order to maintain or increase consumption?

Research on Swedish labor market before the industrial revolution has influentially been characterized as a mercantilist labor regime (Lundh 2002 and 2004, 104). This is connected to the regulation of trade and most other economic activities, national decrees regarding working conditions and even wages, and a patriarchal foundation of labor relationships. We will show that this institutional framework is only partly accurate as a general characteristic of the early modern labor market: changes in demand and supply due to population development or external shocks caused by events such as wars or local disasters affected wages – both for annually and casually hired workers.

Real wages in economic history

Real wage studies of course tell us something about the progression of wages and what workers could afford at certain times, and this has been a useful and important tool for understanding the back-and-forths of a population’s well-being at a more concrete or relatable level than, say, GDP per capita.

But wages have also been used to formulate and test some of the major debates and theories in economic history, through their use alone, in comparison with other wage data, and in contrast to other statistics. Part of this is because wage data are often the most frequent survivors of history’s cull of written information. Wages were and are ubiquitous, and are paid to top level employees as well as casual farm hands. Though not all were written down, many of course were, and it is upon these which we have based our quantitative investigations of the past.

Because of both their usefulness and their relative frequency in archival sources, wage data is at the backbone of many of economic history's most important and perennial debates (see Gary 2018a) However, wages are not straightforward. While they in some ways feel intuitive and simple to interpret, the ways in which wages are calculated, manipulated, and compared have massive impacts on what type of market functions they represent, both at the global and at the household level. So too can a focus on a particular type of data – either because of convention or difficulty in finding and using other data – lead to significantly different interpretations of both local and global developments.

It is difficult to overstate the importance of the differences in interpretation and results that different uses – or misuses – of wage data have led to, and how they have shaped and reshaped the meta-interpretations of early modern European economic development. Wage studies have been the foundation for the most influential theories in the development of the modern economy; high real wages in the late medieval period are the cornerstone of Robert Allen's (2009) explanation of the Great Divergence and why England industrialized first – high wages and low costs of factor endowments such as coal led to employers and capitalists to invest in labor-saving capital and machinery, which in turn led to innovation and mechanization. Earlier, the increase in day wage rates after the Black Plague is connected to both transition to economic growth in the North Sea region as well as to women's increased engagement in paid labor and late age at marriage (de Moor and van Zanden 2010). Wages are also the foundation of the Industrious Revolution hypothesis (de Vries 1994, 2008), which posits that English workers increased their engagement in paid work after 1650. A growing gap between nominal wages and GDP per capita indicated an increase in the amount of work being done per person, which would generate higher GDP while wage rates themselves did not change. Many of these theories are grounded in the gaps between (British) real wages and GDP (see Gary (2018a) for a discussion).

These theories are all based on men's day wages. But a different story can emerge when different kinds of wages are investigated; Humphries and Weisdorf (2017) demonstrates that incomes from annually employed men much more closely match developments of GDP and other macro-level indicators in England, while casually earned wages were famously out of synch. Reassessing historical trends with a focus on annually earned wages eliminates many of these divergences and calls for a reassessment of many economic historical theories. This is a strong indicator that the focus on casual employment has led toward some misleading understandings of relationships between wages and economic development, and that a focus on more 'typical' labor, such as annual contracts, might help refine our understanding of early modern lives and well-being.

A first step in this process is to collect data and to estimate different kinds of wages for a broader section of early modern Europe. This paper takes this step for the first region outside of England: southern Sweden. By examining casually earned wages together with annually earned wages, the sets of data together are able to offer more than the sum of their parts and provide significant insight into labor markets and living standards in an early modern society.

Labor institutions in early modern Sweden

Early modern Sweden was largely a rural society with a predominantly agrarian economy. As late as in the 1860s about 70 percent of the population was occupied in agriculture, while only 10 percent was occupied in manufacturing industry and another 5-6 percent in building and construction (Schön and Krantz 2012). Even in this time, some 90 percent of Swedish people were living in rural environments.

Annual labor in early modern Sweden was a largely a life course event, especially in the countryside, typically performed by young people between leaving home and the time of marriage. Almost all young people left home between the age of 15 and 20 (Dribe 2000), and the mean age at first marriage in Sweden overall was high; around 28 for men and 26 for women (Sundbärg 1907). In Scania, the southernmost province and the source of the data used here, age at first marriage was higher: in seven Scanian parishes from 1650–1750 men married at an average of 34.3, and women at 29.1, sinking by 1850 to around 29 for men and 27 for women (Lundh 2003). With the young age of leaving home and late age at marriage, the Western European marriage Pattern was well established in Sweden, which meant that there was a considerable group in their twenties living on wage labor (Harnesk 1990).[1]

[1]Economic historians have separated day labor and casual labor by the groups of people who be employed in these sectors. Annual unskilled labor is closely associated with young, unmarried young people, especially in rural areas, while casual labor is more closely associated with married adults. This model is based around the Western European Marriage Pattern (EMP). The EMP was first coined by Hajnal in his 1965 paper, in which he describes several broad and general differences in marriage and life-cycle patterns between the northwestern parts of Europe and the East and South, as well as the majority of the rest of the world. According to Hajnal (1965), there is an imaginary line across Europe from St Petersburg to Trieste; to the north and west the EMP dominates, while to the south and east a more ‘traditional’ marriage pattern is more common.

Within regions characterized by the EMP children left their parental home in their mid-teens to go work for another household, and live in as domestic servants or farm hands. During the next several years they would work to accumulate enough wealth to marry and establish their own households upon marriage, which would typically take place in the late 20s for both women and men.

In the dominant agricultural sector this meant young people would serve as a farmhand or maid on one-year-contracts, but the pattern was similar in the towns, although often more strictly formalized for men with the master – journeymen – apprentice system (Edgren 1987). Women mostly served in town households, though these were also important employers for male labor. But there were also people that were more permanently hired on annual basis and outside of this lifecycle system, both within the towns and out in the countryside. Some of them were in administrative or managerial positions, often married. Others belonged to the relatively large group (10–15 percent) of the population that never was married. With increasing proletarianization and landlessness after the mid-1700s, the proportion of married annually hired wage laborers started to rise, first in agriculture with the system called *statare* (married farmhands) (Utterström 1957), second in towns when industry expanded in the second half of the nineteenth century. Swedish towns had undergone a state-subsidized, mercantilist wave of industrialization in the eighteenth century. This did not more than marginally impact the distribution of labor between agriculture and industry at a national level, but within the towns it did increase the number of skilled and unskilled workers. The heydays of these "manufactories" were in the 1750s, but from the international trade crises 1763 and onwards, the state subsidies were weakened or abolished and the whole sector was in decline (Nyström 1955, 242). This left a substantial portion of the urban workforce without employment.

We still know very little about the size of the annually hired workforce in preindustrial Sweden or about their wages and standards of living. This lack of information is even greater for casual and seasonal labor. There was a growing group of rural landless and semi-landless; in some areas, including the south of Sweden, they appear to have already been half of the population by the end of the eighteenth century (Lundh and Sundberg 2002) and they were definitely the majority in the whole of rural Sweden by 1850 (Winberg 1975). Poor relief systems existed, and were based on the parish responsibilities for their poor, but these were rudimentary and normally only supported one or a few percent of the inhabitants. Their focus was predominantly the disabled and the old (Skoglund 1992), which leant little relief to the unemployed. Those without land must have found ways of supporting themselves, but we still know very little about their actual paid day wages – the information we do have is more commonly from administrative wages which were set every year on the county level, but did not reflect actual labor and contain no information about typical work patterns (see Jörberg 1972 and Collin 2016).

More recent research on servants in eighteenth century Sweden by Carolina Uppenberg (2017) does give us some more insight into the relationships between those serving as annual contract workers and those working for day wages. The period was marked by a growing population, though one that was still largely bound by agriculture, with 80 percent tied to agricultural production for a living. However this was also a period of growing landlessness – as more children survived to adulthood and inheritances were increasingly split, fewer and fewer men could expect to end their period of servitude by becoming landowning farmers themselves, and instead were resigned to a lifetime of wage labor. This shift did not necessarily impact basic living standards, but it did change the incentivization for spending time as a servant. Previously, this life-cycle service as a servant on a neighboring farm was a training period for one's own time later as a farm owner; this was especially true for young men as they would hope to inherit land. When the chance to inherit decreased so significantly, the incentive to train on another's farm, where a servant's freedom could be severely restricted, was profoundly reduced. This shifted the lifecycle relationship of work. Some younger men preferred to immediately enter into casual labor, and others continued as year-long servants past their marriage. Land owners also sometimes shifted to temporary labor, though this of course could be a risk during harvest time for farmers (see Kussmaul's (1981) discussion on farmers' preferences for labor, also addressed in Uppenberg 2017).

Previous studies of Swedish servants have identified a general reluctance to submit oneself to annual contracts, despite the fact that this was perhaps the most secure means of earning a wage available to unskilled workers in the period (Uppenberg 2017, citing Harnesk 1990). Those who did take work as annually employed servants typically did not stay on above the minimum one-year requirement (see also Dribe 2000). The same investigation found that servants tended to work to meet their consumption needs, and would prefer to substitute their time for leisure rather than additional consumption – this is also in line with Allen and Weisdorf's 2011 investigation of British workers.

Day versus annual labor-compensating differentials

There were of course benefits and downsides for individuals employed in both causal day labor and for those working on a fixed term on a contract. Construction work was seasonal, and of course depended on general demand; it would be difficult to guarantee work both within a given year and from year to year. Economic theory states that there must be some wage differential to induce workers to undertake seasonal work, where the risk of some degree of unemployment was high or even certain. On the counter side, there are many non-wage benefits to be considered with fulltime or contractual work, which could induce a more risk-adverse individual to take a lower paying job if they were sure that the job was stable. One could assume that this is especially true if a position covered all of an individual's daily living needs for the year.

Other costs and benefits affect both work types: assuming a large enough market, working in construction by the day could in theory give a worker more flexibility over their own working schedule or to work for a different employer if the conditions didn't suit them; a person working on annual contract would have no such flexibility, at least not regularly. It is fairly established that once an annual worker in service accepted a contract they were in many ways at the mercy of their employer (Kussmaul 1981, Dribe 2000). However, much of early modern Europe, especially Sweden, was highly rural, and a large enough market to support substantial amounts of paid causal work may not have existed (see also Gary 2018d).

Employers also had to make a calculation; in a market where timing was very important – such as in agriculture, especially during the harvest period – it was also important to have labor on hand at short notice. The cost of paying day laborers could be extremely high if there was competition with other farmers, and there was a risk of lost income if there were not workers available. However, supporting a fulltime servant could also be expensive, though there was perhaps some economy of scale in providing room and board. During times of high food prices, one of the first household survival tactics would be to dismiss annually-hired labor in order to save more food for the family – in this sense, the calculation of how to split between annually and causally hired labor is likely to draw more on the employers' decisions than on the workers'.

Contemporary investigations of equalizing wage differentials – that is, higher wages for short-term or non-fixed labor contracts to compensate for the risk of non-employment – find mixed evidence to support its presence in the real labor market; when there is evidence the differential tends to be moderate at best (see discussion in Brown 1980). Historical evidence is more difficult to come by; we expect transaction costs due to transit and information flows to have been much higher the further back in time we go (Collin 2016). It is also quite likely that social trends or expectations, such as lifecycle employment, would have some overriding effect over workers' assessment of work options – it is not unreasonable to assume that for many in annual service, casual labor was not a true option.

That a system largely reliant on annually employed labor persisted so late into the early modern period in Sweden, beginning to dissipate only in the late eighteenth century and lasting in practice far into the nineteenth, would indicate that the need of having labor on hand as well as the cultural norm of lifecycle service gave preference to annual service for a large proportion of Swedish labor.

Casual versus annual work

The types of jobs represented in casual and long-term employment are different, as are the people who worked them. The rural portion of the annually employed sample are predominantly servants who lived in, working in rural manor houses. These positions are commonly associated with life-cycle service, working as maids or farmhands. The most common titles for men include various types of manservant (*dräng*), most commonly *dräng* and *stalldräng*, a stable hand. Other occupations include pastoral tasks like shepherds or bull-herds (*fäherde, fäherde för tjurar*) or agricultural work such as threshing (*tröskman*).

Work in annual service was prescribed by the state; legal acts regulating the servant-master relationship were first legislated in 1644, and were revised approximately twice a century from then through the middle of the nineteenth century. These acts were read publically at least once, and sometimes twice a year, which meant that they were well understood by the population in general (Uppenberg 2017). While these acts offered some protection to servants, they also mandated that unlanded individuals be registered as servants and under the protection (or control) of a master or mistress, or they could be subject to vagrancy fines. This applied to both married and unmarried individuals; unmarried people were more likely to live in with their employers, whereas married people were more likely to live in a small cottage or croft on their masters' land, and pay their rent with occasional work. This means that annual hires were more likely to be unmarried, while day laborers were more likely to be married, for both men and women – this is in line with similar assumptions for England made by, for example, Humphries and Weisdorf (2015). Regulations did gradually lessen through the eighteenth and nineteenth century, both allowing married people to more easily work as live-in servants in 1762 and then exempting married people from service in 1805 (Uppenberg 2017).

The urban annually employed sample are individuals who worked for municipalities. These data come predominantly from public institutions such as city councils, churches, and hospitals. These workers are clearly city servants, with many custodians/caretakers either for the city or churches (*stadstjänare, [stads]vaktmästare*). The sample also contains many sailors stationed in the city of Malmö and town of Kristianstad. This proportion of the labor force increased during the early modern period as Sweden underwent an important phase of state formation. This increase was necessary not only as municipalities themselves grew but as the role of formalized taxation became increasingly important as a mechanism for funding the state apparatus (Ågren 2014). This increased employment led to a large number of low level officials tasked with carrying out the more mundane tasks

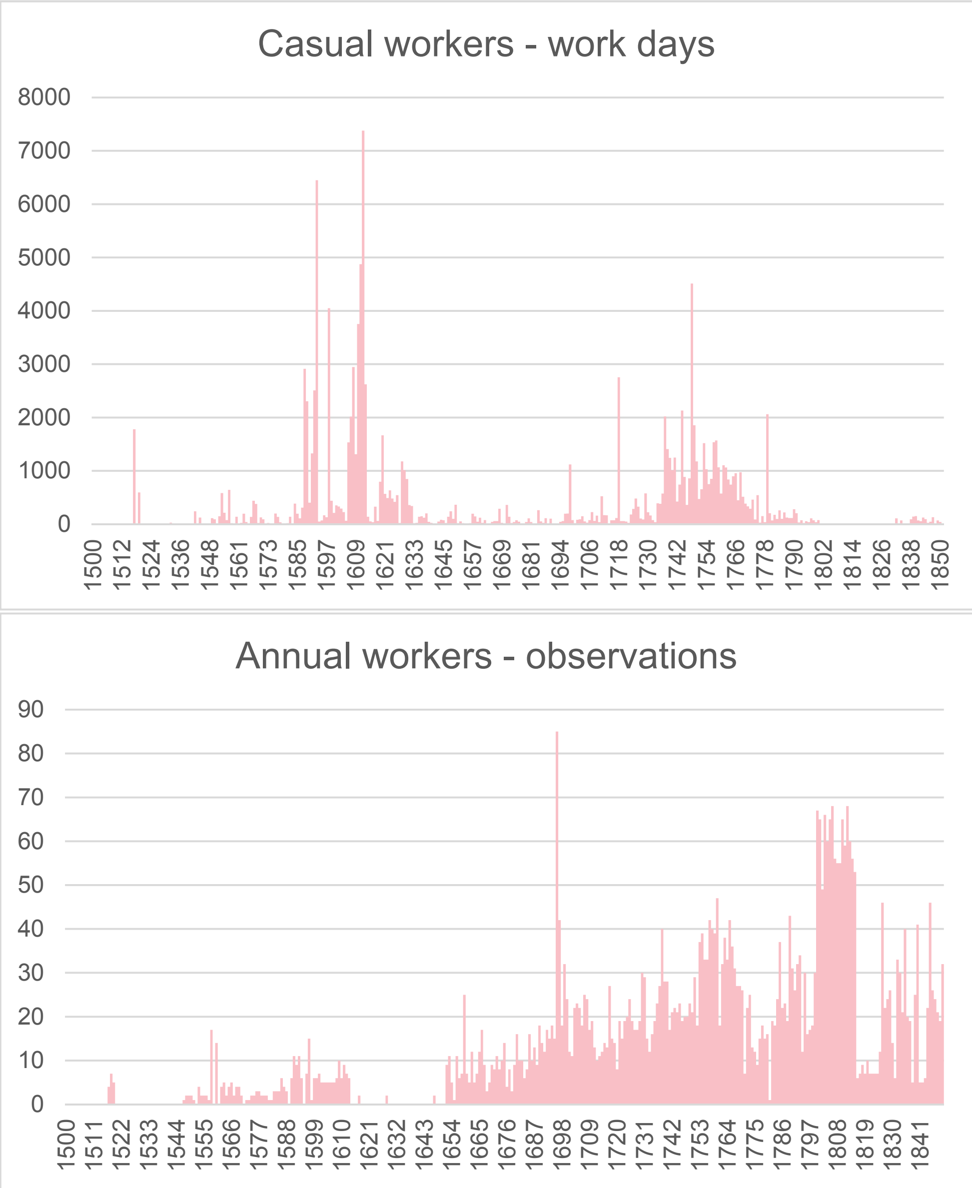

Figure 1: Distribution of observations of unskilled male casual and annual employment. Note than annual workers are observations of employed and casual workers are paid work days

of the city and taking care of the town; it is these types of workers that make up the urban annually employed sample in this dissertation. There is much less expectation that these individuals would be part of the lifetime service system; instead, these men are more likely to be married and to stay in these positions for many years. It is clear that many of these men who are annually employed in the city are not part of the life-cycle pattern of service which we observe in the rural sector; there are explicit mentions of stipends or pensions made to sailors' widows, and some of the city custodians are employed for very long periods of time. This is a useful test of wage payments made to men who are outside of the 'youth' period where low wages, or compensation mainly in kind, would not necessarily be expected.

All unskilled causal laborers in this dataset are construction workers, both in the country and in urban areas. Job titles or identifiers include unskilled worker (*hantlangare*), a mortar mixer or mason's assistant (*kalkslagare)* or a digger (*grävare*). A sample of only building laborers from manorial as well as urban sources is in some ways unusual in a European context; in many Western European countries, including England, there would have been a fairly large market for casual labor in the agricultural sector, especially during the harvest season. But in Southern Sweden there was a corvée labor system, under which tenants paid part or all of their annual rent in agricultural labor, which took care of the majority of agricultural labor needs at the landed estates through the late eighteenth century (Olsson 2002). In combination with the wide-spread life-cycle servant system discussed above, this means that there was very little market for paid casual labor in agriculture, even during peak seasons (see Gary 2018a for more discussion). Because of this we can operate with the understanding that the causal labor that is found in the data is likely to be more representative and capture a greater portion of the casual labor market than similar types of data in other institutional contexts.

Data and methodology

Primary data for men's daily and annual wages come from archives around southern Sweden. This paper is concerned with the wages paid to unskilled men both in annual employment and service and to those men who work in the casual construction industry Both types of data come from the same set of bureaucratic, church, and manorial sources around the south of what is now Sweden. There are 21,348 observations of casual work payments and 4,822 of annually hired men. Later in the paper data on 563 observations of annually-employed low-skilled urban workers are also utilized to examine the changes in the urban market in particular.

Figure 1 shows the distribution of observations of both paid workdays in causal labor and observations of annually paid workers. It is important to note that the unit of observation is different for each group. For causal workers a full year of work is one observation. For casual workers each paid day or work is an observation. For both groups each observation is treated equally; if one institution hired two workmen during the same year for the same rate, each entry is counted. In the same way, if one individual is observed to work several times in the same year on a casual basis, each paid work day is also counted. A deeper discussion of the processing of the archival data and estimation of wage values can be found in Gary (2018b).

Casual wages

Moving from a yearly estimation of a pay rate for casual labor to an annual income is deceptively complex and has been the subject of many spirited debates in recent years (see discussion in Gary 2018a). The calculation to take day rates to an annual real wage requires three components. In the numerator is the day rate itself, together with the number of days worked to calculate the annual nominal wage. In the denominator is the CPI (consumer price index), basic living costs. From Allen (2001) calculations of historical real wages have typically included a fourth component, household size, in order to develop real wage indices which refer to an entire household. This has been a useful technique for normalizing wages to a useful consumption unit, but has also not been without difficulty when the needs of a growing and aging family are taken into consideration (see Humphries 2013, Allen 2015).

Allen (2001) and the majority of those who have followed his methodology have used a guestimate of 250 work days to inflate the daily pay rate into an annual nominal wage, but this number has not found substantial empirical support. Gary 2018d examines the probable length of the working year in early modern Sweden and estimates that 140 days is a more likely number of working days for an early modern Swedish man's casual working year. Because of this the analysis will focus predominantly on the real wage calculated with a 140 day working year, but will also include reference to a 250 day working year to enable readers to more easily reference the international literature. Some assumption is necessary to directly compare casual earners with annual earners, but it is important to keep in mind that these are both assumptions.

Prices are collected for commodities from Southern Sweden, following the methodology of Allen (2009). Some adjustments are made to more accurately reflect a Scandinavian diet; the most substantial is replacing half of meat consumption with fish, based on Morell (1989) which shows high consumption of fish in Swedish institutions (see Gary 2018b). Table 1 shows the components of the consumption baskets at both the subsistence and the respectability levels. A subsistence price basket represents the cost of maintaining an adult man on only the most basic and cheapest commodities. A respectability basket represents the cost of maintaining an adult man with a large variety and higher quality of consumables. Both meet the same level of caloric requirements, with approximately 2100 calories per day. However the value of enjoyment is very different; the subsistence basket is basic to the extreme, and does not reflect what people would actually hope to be eating throughout the year (Myrdal 1933). Because of this the respectability basket is used for the majority of the analysis.

Table 1: Components of consumption baskets.		
	Subsistence	Respectability
kg bread	-	234
kg grains	155	-
kg peas	20	50 /
kg meat	2.5	13
kg salt fish	2.5	13
liters beer	-	182
kg cheese + butter	3	10.4
eggs (n)	-	52
kg soap	1.3	2.6
m linen	3	5
kg candles	1.3	2.6
liters lamp oil	1.3	2.6
M BTU fuel	2.0	5.0
rent	5%	5%
Source: Gary 2018b		

This paper is interested in the earning capacity of individual men, and so does not make an assumption on the size or caloric needs of a dependent family. The final value of the real wage represents how many ‘consumption baskets’ earner would be able to purchase with his yearly wage. A final value of one indicates that the wage would exactly support the earner. A value of two indicates that needs could be met two times over, and a value below one indicates that earner would be suffering from hunger and a lack of resources or would depend more heavily on additional household production or wage labor.

Annual wages

When workers were employed on fixed contracts, the wage payments they received often represented only a portion of their full compensation: in many cases, workers were paid a relatively small cash wage, but received full room and board, and possibly other perquisites, as a part of their contract. This is difficult to quantify since it is typically not explicitly recorded. This paper follows the methodology established in Humphries and Weisdorf (2015), by assuming that workers employed on long-term contracts received room and board approximately at the value of the respectability basket.

To estimate the total value of annual compensation, the value of the respectability basket is added to the cash wage; this sum is treated as the nominal wage for annually-employed workers (see Humphries and Weisdorf 2015, 2017). The respectability basket is selected because we believe it more fully reflects the consumption of servants. According to Uppenberg (2017), one of the few reasons that a servant could be given permission break an employment contract and seek employment elsewhere was because of an unreasonably lean diet – the Servant Acts of 1805 officially codified this. Of course servants' complaints could be relative to the times; Fredrik Magnusson reports that farm servants on Sweden's west coast protested against the excess of salmon they were expected to eat on a weekly basis. Myrdal (1933), in his study of the cost of living in Sweden during the nineteenth century, reports a Swedish household budget roughly in line with Allen's 2009 respectability budget for the earlier part of the nineteenth century. Morell (1989) also describes consumption at a level closer to Allen's 'respectability' levels in his study of diets and consumption by Swedish poor-relief hospitals from the sixteenth

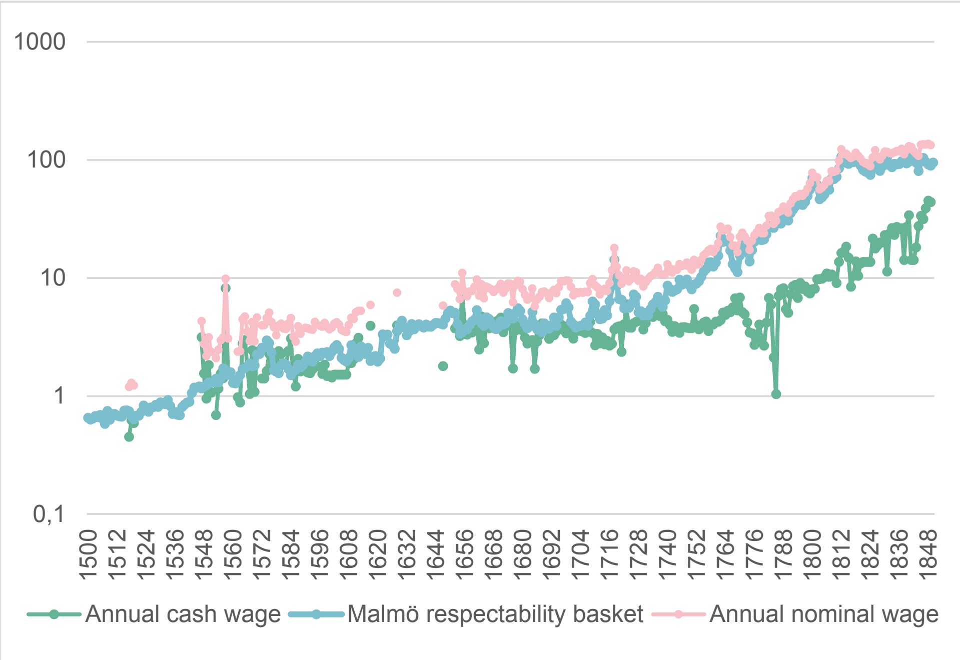

Figure 2: Components of men's annual wages in SEK. Semi-log scale

through the early nineteenth centuries. These institutionally provided diets had a relatively high proportion of proteins from fish and meat, above what is included in Allen's household consumption baskets, though Morell does find an increasing dependence on grain through the period. Humphries and Weisdorf (2015, 2017) also prefer the respectability basket as the base for the nominal wage portion of annual workers' wage estimates; selecting the same base gives our wage levels better comparability.

Men's nominal wages for casual and annual labor

Because of the mechanical construction of each type of wage, the range of possible values for day and annual wages is different. When calculated from day wages the lower bound of annual income approaches zero, as wage values in the numerator decrease and food costs in the denominator increase. The lower bound of annual income when calculated from wages from long-term contracts is one; because the price basket is included in both the numerator and denominator, even as cash payments fall to zero, this method makes the mechanical assumption that all basic needs are met.

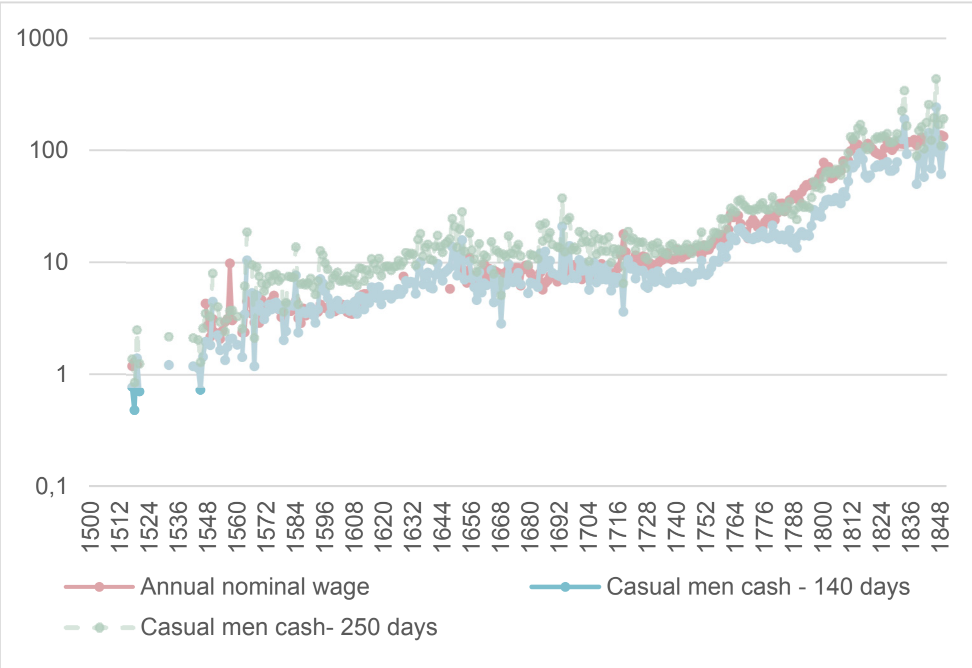

Figure3: Comparison of different nominal wage types in SEK. Semi-log scale

The inclusion of the price series in annual nominal wages also means that it is important to investigate both the cash portion and the value of the prices together, in order to understand which changes are driven by payment and which are driven by costs. Figure 2 shows the development of men's cash wages from annual service alongside the respectability basket, along with the full nominal wage, which is the sum of the cash wage and the respectability basket. These are shown in log scale; significant inflation in the middle of the eighteenth century means that developments are obscured when viewed with a linear scale. Tables with all annual values can be found in the appendix of Gary 2018b.

Prices rise through the sixteenth century, are fairly stagnant through the seventeenth, and then rise at a steeper pace in the eighteenth, finally leveling off again in the nineteenth. This is largely in line with what we know about Sweden's development from previous work such as the development of GDP (Schön and Krantz 2012).

The cash portion of the wage is almost always lower than the value of in kind perquisites, except for some scattered years in the early seventeenth century (figure 2). Typically, the cash component is between about 20 and 45 percent; the average value is about 33 percent. Because the room and board component is such a large proportion of the total annual wage, the total nominal wage is obviously not substantially higher than the value of the respectability basket, and is also strongly influenced by the development of the price basket.

The cash component of the wage is in general greater during the earlier parts of the period, especially in the late sixteenth and into the seventeenth century. There is a clear decrease in the relative value of the cash component into the middle of the eighteenth century; cash payments are stagnant for several decades while price increasingly accelerate. This means that developments at the end of the period, especially, are much more connected to price changes than to wage development.

Figure 3 shows the log-nominal development of the two wage series for men, with daily wages multiplied by both 140 and 250 to give a range of approximations of total income. As discussed above, 140 days represents the likely length of a typical working year in this labor market while 250 is the number used in standard practice. The largescale trends of both wage series are similar to those of the price series; increase in the sixteenth century, some stagnation in the seventeenth, a rise again in the eighteenth, and flattening out going into the nineteenth century.

Earnings with a 140 day work year are very similar to those from an annual contract; they only begin to diverge at the beginning of the 18^{th} century. At this point the annually earned nominal wage pulls ahead, and by the end the period is higher than even the cash earned with 250 days of work. The period when annual wages begin to overtake 140 days' of casual wages is right after prices have recovered following the crisis of Sweden's 1721 defeat in the Great Northern War. Cash wages had been lower in previous years, but recovered after the war. While those working for the day before this point could probably have had an advantage, it is clear that the value of this type of work is quickly falling.

The huge decline in the relative value of casual work is readily seen by which series of casual income is on par with an annual salary's cash value. While 140 days of work is reasonably in line with the value of an annual wage for the majority of the period here, there is a clear divergence from the eighteenth century and the series for 250 work days is much more comparable. However, it is clear that even 250 days' work begins to be too little to equal an annual wage during some years in the middle of the nineteenth century.

Men's real wages for casual and annual labor

We have demonstrated that the cash component of the annual wage was continually declining during this period, meaning that the value of the annual wage is increasingly dependent on the rising cost of living essentials. We have also seen that annual wages pulling ahead of casual wages in the eighteen centure. Given this relationship, how do these nominal wages compare to the costs of essentials?

In figure 4 daily-earned wages are again multiplied by 140 and 250 to represent two possible functions of the working year. These series, together with the cash value of remuneration from annual work, are deflated by the respectability basket. Both annually earned wages and daily earned wages are divided by a single man's respectability basket, and show how they could support the earner directly. Despite some differences in development both wage types have a similar trend, with growth during the sixteenth century, peak wage levels in the beginning of the seventeenth, and decline through the rest of the period, especially from the 1770s and into the 1790s. Both wages have a slight decrease around the time of the Great Northern War in the early eighteenth century, while only casual wages indicate a decrease during the Second Northern War during the mid-seventeenth century, when Denmark lost Scania to Sweden. There is some recovery going into the nineteenth century, following a low point especially for casual wages in the last years of the eighteenth century.

As previously stated, the annual earned wages are not much above the annual cost of the basket, since the cash portion of the wages was rather low compared to the value of in-kind benefits. This leads to a slightly flatter development of annual wage values compare to casual wages. Annual wages range from just one basket to slightly above two baskets in some periods, keeping closer to this higher level for the majority of the seventeenth century and into the eighteenth. These wages are not necessarily expected to be high – as discussed above, the majority of people who

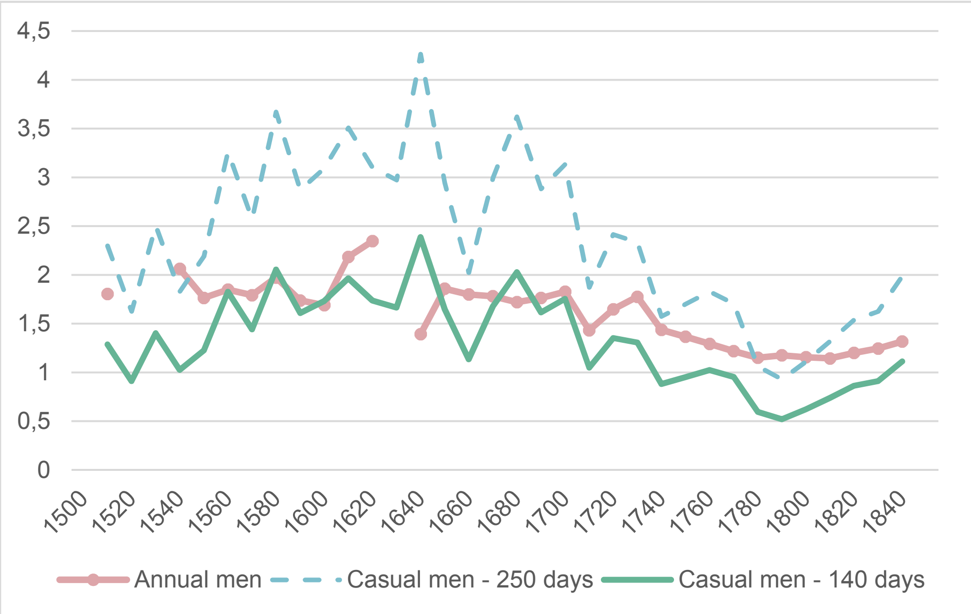

Figure 4: Casual vs annual real wages

were annually employed in the countryside would have been younger individuals, working outside of their parents' home while saving before marriage, and working mostly for room and board (Dribe 2000). Within that context it is not surprising that their levels were close to one or two consumption baskets. However, the especially low wage levels during the end of the eighteenth and into the nineteenth century are surprising; the cash component has become especially low. It is quite possible that the relationship between cash and in-kind payments had been fairly consistent over the duration of the lifecycle servant system, which then breaks down as the Swedish economy and demographic character begins to shift entering the nineteenth century. This would account for the relatively stable and higher levels of annual income in the sixteenth century during decades when casual wages were lower, as well as the steady decline in wage levels toward the end of the period.

Wages earned by the day are more volatile. Assuming 140 days of work, they range from about 0.5 to about 2.4 baskets, a difference of a factor of 4.8. At this level of work intensity annual income from day labor is reasonably in line with income from annually-hired work. However it is substantially lower in both the beginning of the period and in the majority of the eighteenth and into the nineteenth century. Wages earned by the day suffer a sharp decline from the beginning of the seventeenth century through the end of the period. While there is some indication of a resurgence at the beginning of the nineteenth century, this is only after daily wage rates hit their absolute bottom at the end of the eighteenth century. Wages in this period are so low that even when a work year of 250 days is assumed and subsistence basket prices are used, an individual man would not have been able to earn enough to support a typical family, showing how necessary it would have been for other family members to work or produce household goods. This decline is in line with what we know about the general development of Sweden entering the nineteenth century based on evidence from wages and GDP from Stockholm (Schön and Krantz 2012; Söderberg 2010; Gary 2018a) though the decline in Malmö is earlier and lower than in Stockholm (Gary 2018a). GDP per capita was falling, and at the same time there was a significant increase in landlessness and men looking for work in the casual-hire market, as opposed to year-long fixed contracts. There was also increased competition for year-long contracts as they were increasingly open to married men and families, where they had been previously restricted to predominantly unmarried men in the countryside.

Late sixteenth century high wage levels are likely connected to Denmark's strong export sector as well as state-led building programs that would have increased the demand for casual construction work in particular (see Gary 2018a, 2018c). The middle of the eighteenth century saw a state-led push for small-scale industrial productin in the cities; while the venture did not shift the demographics of Sweden on a macro level, it did lead to an increase in the proportion of unskilled workers in the towns. The project ultimately failed (Walldén 1955, 343–47). This collapse together with a proletarianization of the Swedish peasantry and increasing number of landless workers resulted in higher rates of unemployment in the towns and a subsequent downward pressure on workers' wages At the end of the eighteenth century these lower wages were compounded by a total currency change – in 1777 all old currency was replaced with an entirely new system which led to inflation and some monetary confusion (Edvinsson 2010). Grain prices had been rising since the second half of the century, but rapidly rose during the grain shortages of the Napoleonic Wars. The end of the eighteenth century was a difficult time for unskilled Scanian workers, with high unemployment, low wages, and high prices.

Urban-rural differences

The sections above have shown the major development trends of prices and wages in the south of Sweden in the early modern period. This has examined the entire region, with wage data coming from both rural and urban sources. However, there are important differences between these types of data.

In the first instance, the types of work being done by annually employed men were different, as were the likely age and background of these workers. Casually employed were working in construction in all areas.

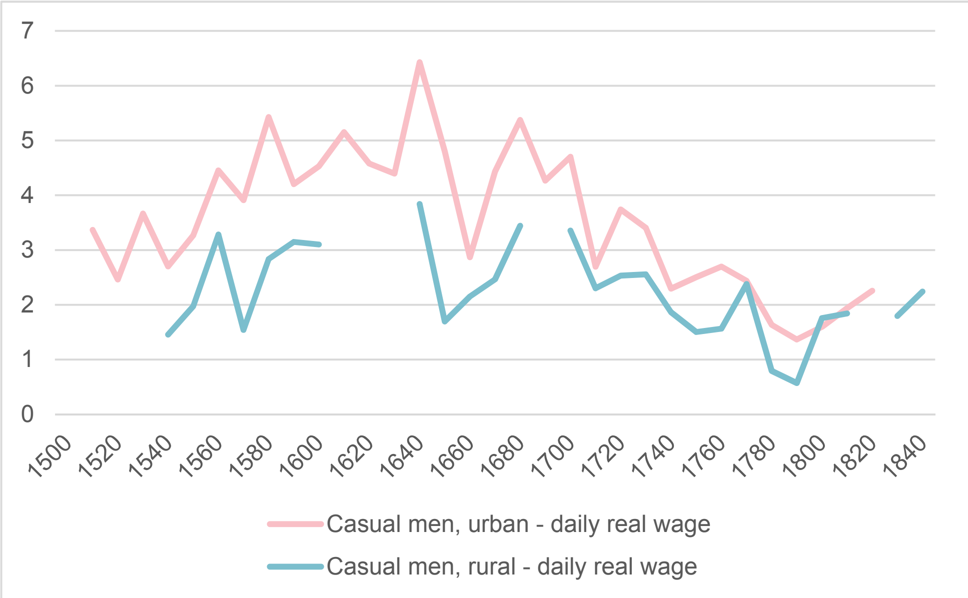

Figure 5: Per-day real wage rate for urban and rural casual construction workers.

The second important difference is how the two types of work changed. While Sweden was still very rural and agricultural throughout the entire period studied here, there were still important development in urban centers. One of the clearest is the increase of an urban bureaucracy. This is readily apparent in the records themselves; in Malmö for example, the payrolls list 32 people in 1517, the earliest year in which they are available. In subsequent decades the count could be as low as 7 or 9, and throughout the sixteenth century was rarely more than 25. During these periods the payroll was typically dominated by unskilled and unspecialized men, such as city custodians (*bysven)*. By the end of the 1760s, after which the recording system was reorganized, the annual payroll had grown to almost 90 people, and a much larger percentage were skilled and specialized workers including city councilmen *(rådsman)*, police *(profoss)*, tax inspectors *(tullinspektor),* and city midwives *(stadsjordemoder)*.

In the previous comparison between casually and annually earned wages, the low annual wages in the eighteenth century were surprising; this is especially surprising when it becomes clear how many earners in the sample lived in urban areas and were not a part of the lifecycle service pattern The following sections will disaggregate the data to tease out some of the differences between urban and rural earners.

Casual wages

Real wages for urban and rural casual workers are shown in figure 5; they are shown here as daily real wages; the numerator is the day rate and the denominator is the annual CPI divided by 365. This allows us to look at the relative development of these different wages without any assumptions about the length of the working year. Rural wages are consistently slightly lower than urban wage. The development patterns are almost identical, and there is increasing convergence in the eighteenth century. The difference in wage levels is probably somewhat misleading, as rural prices were likely to have been somewhat lower, indicating a closer parity of urban and rural causal wages.

Rural wages – comparison with existing data

Currently, the most-used wage series for early modern wages outside of Stockholm are from Jörberg (1972), who relies on market scales to estimate wage series for agricultural workers in each of Sweden's 24 counties. Because they are virtually the only wages available so far in the past, and because of their extensive coverage and level of disaggregation, these are regarded as the 'canonical' wage series in Swedish economic historiography. However, these are not observed actual wages but contemporary estimates in order to commute taxes in labor to taxes in cash. The wage levels were agreed on annually after a process of mediation on district level.

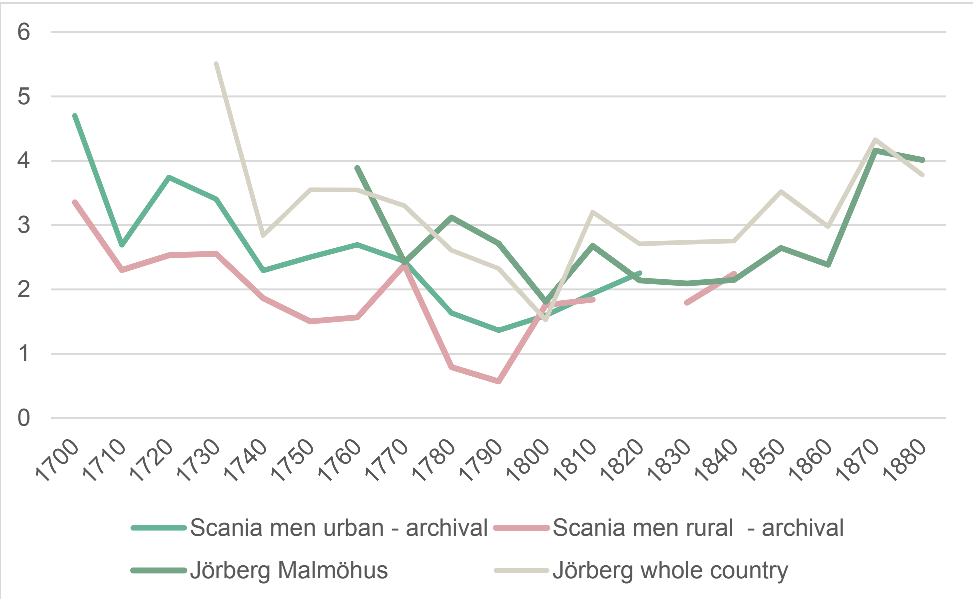

Figure 6: comparison of urban and rural casual wages with administrative (market scale) wage rates. Daily real wages. Source: Scanian archival wages: Gary 2018a. Jörberg market scale wages: Jörberg 1972. Price deflator: Gary 2018a.

There were of course different power dynamics at work when these wage levels were being determined; Utterström reports that the peasantry was often upset at the rates which were agreed upon, complaining that they were far too high for the actual labor market, and must instead be the price levels in the cities (Utterström 1957, 877).

Figure 6 shows real wage levels – again in real wages calculated by the day – for the observed wages of the urban and rural workers examined here, as well as the market scale wage rates from Jörberg (1972). Based on the comparison, the upset peasant farmers were reasonable in their frustration: the market scale rates for Malmöhus County are fairly consistently above the observed wage rates in the Scanian countryside, and are often above those in the cities as well. The national average is even higher, though of course this figure incorporates more high-priced markets as well. The differences, while shifting, are as large as two respectability baskets, though are probably more accurately presented as one basket's difference. This is considerable, given the low wage rates at the time.

Long-term contracts

There is significantly more divergence between urban and rural workers on long term contracts (figure 7). As alluded to previously, this is likely due to the different types of occupations as well as the ways in which urban employment shifted in the later part of the eighteenth and into nineteenth centuries. While those working in the countryside were likely mostly working in husbandry in service, those in the city were more likely to be working in jobs that were not necessarily tied to lifecycle service, and more likely to be held for a longer period – many of these urban workers were city custodians, *stadstjänare*, and *tornväktare*, guards in the towers. This high wage period was also the peak of Danish state-led building and expansion – this could also have led to an upward wage pressure on state jobs. Regardless, it is clearly these urban jobs which drive the annually-employed wage increase in the seventeenth century which parallels the increase in casual wages at the same time. Unfortunately there is not data from rural workers at this time, so it is not possible to see if this wage spike is happening there as well.

More interestingly, urban unskilled wages dip to the level of wages in the countryside in the late eighteenth and into the nineteenth century. This finding is surprising; it would have been more expected that urban development would lead to increased wages in the cities relative to the countryside, and that urban wages would stay at least equal to, if not above, rural wage levels. But this wage inversion is taking place during a period when urbanization is just beginning to develop in Sweden, and with this budding urbanization came a growth of the public sector and of employment directly by the municipalities. It is abundantly clear in the data itself that public sector employment is increasing, both in the kinds and variety of positions as well as the number of employees per position. One of the dominant trends is the increase in employment of lower-skilled workers, most notable in Malmö, the largest city in the sample. These growing positions included occupations such as customs officials (*tullskrivare*) and city police (*stadsprofoss*), both positions which required some skill or connection, but which Ågren (2014) describes as being rather lowly, often disliked by the people of the city, and not very well paid. While these positions might require some literacy skills, they were only a small step up from the bottom.

This increase in more specialized work most likely pushed down the relative responsibility and remuneration of those workers in the least-skilled occupations, the ones which have been tracked in the previous analysis. We can expect some level of 'de-skilling' of these least-skilled positions, typically city custodians such as *bysven* and *stadstjänare*, as roles become more specialized. And in fact this is apparent in the urban wage development. Figure 8 shows men's wage rates only in Malmö city, the largest town in the sample and the most important town in Scania, from 1650 until 1850. The yearly real wage for casual workers is shown at both 140 and 250 days of work, along with the wage for annually employed unskilled workers in Malmö. In addition, low-skilled men working on annual contracts are shown. These men's wages develop largely in line with unskilled annually employed men's,

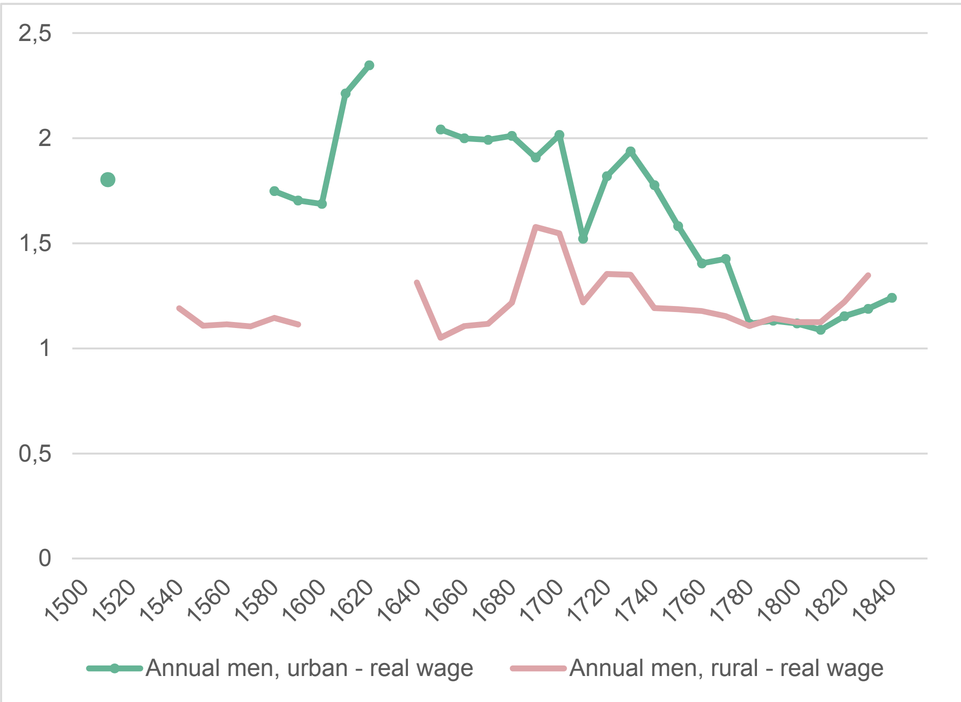

Figure 7: Rural and urban annually earned real wages in consumption baskets

Figure 8: Comparison of wage rates in Malmö

though are typically somewhat higher, as would be expected. There is convergence between them, especially in the early eighteenth century when wage levels are falling. At this point low-skilled workers even dip slightly below the unskilled workers, though this is not a particularly large difference.

Table 3. Annual and casual worker's wages in Kristianstad Hospital 1818–1821 (kronor)

	Cash wage, men	Resp. basket	Total (nominal) wage, men
1818 Casual (250 days)	146		146
1818 Annual	5	91	96
1819 Annual	5	89	94
1820 Annual	5	83	88
1821 Annual	33	77	110

A substantial divergence is apparent between the two annual wage types from the 1780s, when unskilled wages remain stagnant while low-skilled wages increase, even as casual wages continue to fall. Low-skilled wages continue to rise and further diverge through the end of the period, indicating that the trend of specialization also continues. This is an indication that, as the end of the early modern period approaches, the classic 'unskilled' jobs which we have used to measure the working class might no longer be the most representative group.

Both the cash and in kind parts of annual wages tended to be sticky, so among workers employed by church or administration in towns and by manorial estates in the countryside. An example of the relationship between annual and casual labor can be found in Kristianstad Hospital 1818, when one of the two annual male workers died in the middle of the year. A casual replacement was hired to the price of 0,583 kronor (equivalents) per day for 127 days – an especially long period due to the need to replace the full time worker. The administrative set agricultural day wage (see above) for the county was 0.75 kronor that year, which implies that this was not an especially high payment. In Table 3, the actual wage paid to the replacement is normalized to 250 days for the full year comparison. Even with the respectability basket, the total salary for the annual hires is clearly below the cost of employing a casual worker for the full year. A couple of years later the cash wages at Kristianstad Hospital were substantially improved, rising from 5 to 33 kronor per year by decree from the Royal Serafim Order Guild, the organization which ran the hospital. We can only speculate whether this action was trigged by the salient wage gap that appeared when the replacement came in three years earlier.

Differences in work year needs – who was 'better off'?

We have examined differences in the development of wages paid to different types of male workers in early modern southern Sweden, but has so far not quantified the differences in a way which describes the differences in labor needed to make an income large enough for annual support. Can we use these relationships to address who was 'better off' in early modern Sweden, or at least to explore the changing payoffs to different types of labor strategies? Answers to this question are in some ways rather elusive – it is difficult to compare directly the well-being from the two types of wages because the costs and benefits of each type are reciprocal to one another.

Recent literature has continually questioned the standard methodological approach which has, from Allen's (2001) paper, assigned workers 250 days of work in a year. It did not typically take this long for workers to make enough to support themselves in England (Allen and Weisdorf 2011) and it did not take so many days of work for an English to make the same income as what a person in annual employ would make

(Humphries and Weisdorf 2015, 2017). Other authors have criticized this methodological approach, correctly pointing out that working so many days during peak wage periods would have made causal laborers much wealthier than their land-owning neighbors (Hatcher 2011). From a more practical level, long working years would not have been feasible during lower-wage periods, when the caloric needs for long working years might not have been met (e.g. Humphries 2013). Results from investigations on working patterns and seasonality in early modern southern Sweden also point to a much shorter working year (Gary 2018d). Together, this research points to a degree of equilibrium in annual income levels throughout early modern societies, with the typical worker preferring to substitute toward leisure or home-based labor, and away from paid labor, on a casual basis, especially. To this end, it is not unreasonable to take annual earning and the baseline support needs as an indicator of what individuals would strive to earn in a year. This section builds on this premise to compare the different degrees of work which each type of occupation might entail.

Figure 9 shows the number of working days needed for a casually working man to earn the amount of money needed to equal a subsistence basket, a respectability basket, and an annual worker's cash-income-equivalent. The underlying assumption is that men would be aiming to earn an income at approximately the same value as a respectability basket or an annual income, but the 'work day' values of the subsistence basket also give us a range of 'survivable' working years.

Throughout the majority of the study period it would take only 150 to 200 days for a casually employed man to earn as much as an annually working man; he need only

Figure 9: Days of casual work needed to equal an annual wage, a subsistence basket, and a respectability basket

work 100 to 150 days to earn a respectability basket's value – as little as 50 days were needed for a subsistence level support. Up until the mid-to-late eighteenth century a man relying on casual work would have been able to meet their annual needs with far fewer work days than what an annually employed man was expected to work. He could then spend the rest of the year working on domestic production or in leisure.

The trend is fairly steady, with some fluctuations, until the late eighteenth century. Here nominal casual wages stagnate and prices rise, and real wage rates for casual workers in particular plummet. Söderberg (2010) connects this low point in real wages to an eighteenth century trend of rising grain prices, especially exacerbated at the end of the century by food shortages caused by the Napoleonic Wars. Here it became increasingly more work to earn the same cash equivalent as an annually employed man or respectability basket. At this point it would likely be more beneficial to be employed on an annual basis, especially if meals were guaranteed by the employer. Even if living standards for annually employed fell, they were still housed and supported by their employers. The risk here though is that households (and municipalities) would cut employment when food costs rose too high. And in fact this seems to be exactly what was happening, as estates increasingly shifted peasants off their land over the eighteenth century and shifted towards casually-hired labor, and the Swedish population became increasingly landless.

Conclusions

In spite of a partly regulated labor market and sticky wages, there was a great deal of variation in salaries, both for annually and casually hired in Early Modern Sweden – wages and working conditions tended to fluctuate with changes in demand and supply. These fluctuations could be driven by long trends in population development and labor demand, but they could also be due to sudden shocks caused by events such as wars or local disasters.

We have seen a substantial departure between the casual and annual hire labor markets, with the relative wage earned by day laborers falling over the course of the early modern period. Their well-being per day of work also fell as prices rose faster than wages, especially during the second half of the eighteenth century. Rural wages were normally below urban, but converged around the year 1800. Findings also indicate a shift within urban labor markets, as the least skilled jobs which previously could provide reasonable support became less well remunerated; at the same time a growing class of low-skilled (versus non-skilled) workers took their place – a shift not seen in smaller towns. It is abundantly clear that workers in the towns were more likely to suffer wage insecurity over the long run, especially from the late eighteenth century.

An early modern day laborer normally had to work 150–200 days per year to equal the implicit wage of an annually employed man, and he could earn his bare bones subsistence with less than 50 days' work. However, this does not mean that he could support a family at a respectable consumption level – relying only on men at work was not sufficient for a household's consumption needs. Especially during the last two decades of the 1700s, additional work from other family members was necessary. This pushes back against a male breadwinner model – most unskilled households relying on their men would go hungry. Women would have needed to be well engaged in the labor force, and children's work, at home our outside, would have likely also been required. It is also further evidence for an industrious revolution though the eighteenth century, though not in order to decorate their homes or indulge in new finery, as de Vries (2008) describes in some markets. Swedish working class families had to work more during the course of the eighteenth century in order to fight to maintain a decent consumption level.

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Paper V

The impact of border changes and protectionism on real wages in early modern Scania

Kathryn E. Gary and Cristina Victoria Radu

One of the central questions surrounding both economic history and modern political economy is the impact of borders and protectionism on the movement and stability of prices and wages. Central to these conversations is the extent to which these macro-level policies impact regular workers whose livelihoods might be influenced, directly or indirectly, by changes in policy and institutions – how do the decisions of the elites trickle down to those with much less? Do they impact all people to the same extent, or are there differential effects on people with different levels of skill or who live in cities versus the countryside? An additional question of new economic geography asks *how does location matter for economic growth and wellbeing?* – and *how does second nature geography, in particular, impact well-being?*

The Scanian case is a useful experiment for addressing both of these questions in the case of early modern Scandinavia. The province of Scania (in Swedish *Skåne*) was reassigned from the kingdom of Denmark-Norway to Sweden in 1658, along with provinces Halland, Blekinge, and Bornholm, as a condition of the Treaty of Roskilde at the end of the Second Northern War. Apart from Bornholm, which was returned to Denmark, these three provinces today form the southernmost part of Sweden, with Scania as the most southern tip. Before this territorial change Denmark had controlled the territory on both sides of the Oresund Sound (Swedish *Öresund,* Danish *Øresund*) the straight which allowed access into the Baltic – now the sound separated Denmark from Sweden. The city of Malmö is located on the Scanian coast, across the water from Copenhagen but still within sight of the city, as shown in figure 1. The change in territory meant that Malmö was very quickly transformed from its kingdom's second largest city, in the capital region, to a peripheral town now several days' travel from its new nation's capital, Stockholm. This border change was accompanied by a series of protective legislation which prevented inhabitants of Scania from selling their products to Danish markets, which in turn had a direct route to the vital Dutch trade networks.

This paper will use the redrawing of the border as an historical test-case to examine the impact of the abrupt changes in second-nature geography and protectionism on the wellbeing of common workers in Scania. This is accomplished by assessing real wages for unskilled and skilled workers in Denmark, Scania, Stockholm, and Kalmar – a Swedish town on the old Swedish-Danish border, now much more protected within Sweden –to investigate whether the redrawn border had a differential impact on the wages of workers in Scania, the primary market impacted

Figure 1: Map of southern Scandinavia, with the main locations in this investigation. Scania is shaded dark grey and the other ceded territories medium grey.

by the changes. Analysis is based on a difference-in-difference-type strategy, using real wages in rural Denmark and Copenhagen on one side, and Kalmar and Stockholm on the other, as ‘untreated’ markets to test the differential impact on Scania. This analysis utilizes archival data on wages for many different types of workers, including skilled and unskilled workers in towns and in the countryside, in order to estimate the changes in real wages for those living in Scania.

This paper complements ongoing work investigating wellbeing and inequality in Sweden and Scandinavia in the very long run. Findings are in line with Enflo and Missiaia (2017, 2018) and Bengtsson et al (2017) which show a decrease in relative contribution to national GDP from Malmöhus county, the county which contains Malmö city and covers about half of Scania, as well as growing internal inequality from the late sixteenth to eighteenth century. Results from Enflo and Missiaia (2017, 2018) show greatly diminished wealth in the Scanian province from their benchmark year of 1571 and their more complete series beginning in 1750; but how much of this can be connected with the border and institutional changes, and how much of this was felt by ordinary working men in the region? Or, was this decline just a part of a growing impoverishment that could be felt throughout the region, including in Denmark and in Kalmar, as Scandinavia lost its foothold as a European imperial power?

Results indicate that real wages fell throughout southern Scandinavia, but fell especially in Scania and in its largest town, Malmö. Wages dropped about forty percent more than those in Denmark, and about twenty percent more than in Kalmar and Stockholm. Results are robust to many checks, including the impact of other wars.

Related literature

This paper draws on three primary strands of literature relating wellbeing to location and borders. The first is the impact of border effects and changes in borders on economic growth and the wellbeing of workers. ‘Border effects’ refers to the tendency of two neighboring regions separated by a national border to trade much less than what otherwise might be expected, given distance or measurable costs.

Heinemeyer et al (2008) take advantage of the erection of borders within the former Hapsburg Empire after the First World War to examine the existence and persistence of border effects. They find that border effects were already visible before the borders were made official, following regional divergences in the ethno-linguistic makeup of the population, and conclude that differences in language and culture have an important effect on trade. On the other hand, Yi (2003) looks at the case of the border between the United States and Canada and builds a theoretical model to show that the observed border effects can be explained by vertical specialization in a region. He finds that regions tend to specialize in one stage of the production of a type of good and are less likely to trade an unfinished good across national borders than across regional ones, thus explaining the difference in trade without an unobserved trade barrier such as language or culture. In the case of a mostly agrarian economy like early modern Scandinavia, an unfinished product that could be expected to trade less would be milk, unlike butter and cheese which would be easier to ship through Stockholm.

Another important aspect of borders and boarder changes is their impact on wages. Most studies have looked at the effect of border *opening* on wages in a contemporary context, with mixed results on the direction of impact. Some have found positive effects on wage from border openings (such as Brülhart ND) while others have found a negative impact for lower skilled workers (Wood 1995). This paper should bring evidence of what happens when the opposite happens, that is, when the borders are closing, transforming an important city like Malmo into a peripheral one. It is also an important chance to study the impact of border changes on wages in an historical context.

The third strand is the importance of location for economic success. There are two standpoints concerning the impact of geography on wages (or well-being): first is the role of the first nature geography, which refers to the physical landscape such as access to waterways, temperature, climate, and natural resources (e.g. Hall and Jones 1999). The second is the role of second nature geography, which refers to the human-made landscape, including location relative to consumer markets and the impacts of knowledge spillovers. Second nature geography has become a dominant set of explanations for understanding the differences in countries' or regions' income levels, especially after Krugman (1991). Hanson (1998) used data on U.S. counties and found that wage growth in a given location is positively correlated with changes in economic activity in neighboring locations, showing that spatial interactions are instrumental for understanding the process of geographic concentration. In a later study, Hanson (2005) shows that the market access of a location has a significant positive impact on local nominal wages. Redding and Venables (2004) expand this study and use US county level data on per capita income, trade, and the relative price of manufacturing goods to estimate a structural model of economic geography. They show that access to markets and sources of supply is critical in explaining cross-country variation in per capita income.

Similar results were found for Italy by Mion (2004), for Belgium by De Bruyne (2009), and for Germany by Brakman et al. (2004). Pires (2006) analyzed Spain, finding that wages in a region are positively determined by income and wages in the surrounding regions, as well as the support for the importance of scale economies and transport costs. For the whole of the European Union, Breinlich (2006) constructed a New Economic Geography model in which he linked income levels to a measure of access to goods and markets and showed that the later determines the former. Lopez-Rodriguez and Faiña (2007) reached similar conclusion.

This study is able to engage with all three of these strands of the literature using an historical case. This study is especially well placed to shed some light on the effects of borders on prices and wages because of the similarity in language and culture between Sweden and Denmark. This allows our analysis to show how much institutional barriers to trade mattered. Our data is particularly well suited for this; we are able to take advantage of time series for a difference-in-differences based approach (e.g. Heinemeyer, Schulze, and Wolf 2008).

This study also connects to the proximity of trade markets and location. Malmö's shift from Denmark to Sweden had a strong impact on its second nature geography. Malmö lost its capital proximity when its capital changed from Copenhagen to Stockholm, and the town was transformed from an important trade city located within sight of the capital to a distant periphery with limited trade capacity. This offers a valuable setup to test the impact of second order geography in a quasi-experimental context: Scanians underwent very little linguistic or cultural change, but had their connection to their capital and trade routes abruptly changed.

Southern Scandinavia in the early modern period

Scandinavia's early modern period was a time of expansion, war, collapse, and economic and political swings. Sweden was emerging as the dominant imperial power of region, pushing back against Denmark-Norway, then united in a political union under the Danish crown.

Fighting between the two polities was constant over the early modern period. The point of analysis for this paper follows one of these many wars, at a point when territory exchanged hands: Following the treaty of Roskilde at the end of the Second Northern War[1] in 1658, Scania, along with neighboring regions Blekinge, Holland, and the island of Bornholm, was ceded from Denmark to Sweden. Bornholm returned to Denmark in 1660, but the other provinces remain Swedish today. Fighting in both the Scanian region and in Copenhagen continued intermittently into the 1700s[2], but Denmark was unable to retake Scania or the other mainland provinces. This event was one of several border changes during the period – including Sweden's annexation of other territories around the Baltic coast – but it is the only one which concerned a territory which was so culturally and linguistically similar to Sweden. It is this which makes this event such an interesting case for study.

Denmark-Norway and Sweden were largely similar in language and in culture throughout the early modern period, and many of the rights and customs of those living in the new Swedish territories were preserved while the nobility was guaranteed a continuation of their previous rights. Church services were conducted in Swedish instead of Danish, but the linguistic barrier was small, and the differences little more than a dialect or accent (Kirby 1990: 283). Swedish, Danish, and Norwegian remained de facto dialects of the same language, mutually intelligible but for regional accents. It is more likely that a Swede from the south of would have difficulty understanding a Northern Swede than a nearby Dane. This means that observed changes can be more directly linked to the change in institutional oversight and connection with important trade links, or to changes in second-level geography.

During the middle ages Scania was an important source of income for the Danish crown. The abundance of herring in the Oresund lead to the development of the herring market in Skanør and Falsterbo, at the very southwest tip of Scania across from Copenhagen (Venge 1987). The Scanian herring market became the most important Northern European market in the 14th century, drawing trade from across Europe. The Danish crown imposed a tax on the salt used for the preservation of the fish, which became the second most important income for the state, after the Sound customs regulating access to the Baltic. However, at the beginning of the 15th century, the herring shoals moved farther from the land and became unfishable, and

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[1] The Second Northern War was a war between Sweden and Denmark–Norway from 1657–1660: between Sweden and Polish–Lithuanian Commonwealth from 1655–1660, Russia (1656–1658), Brandenburg-Prussia (1657–1660), and the Habsburg Monarchy (1657–1660)

[2] The final attempt to regain Scania was made by Denmark 1709-19 during the Great Northern War.

the market quickly lost its importance. After that, Scania's main exports became grain and cattle, much like the regions surrounding it (Henriksen 2007). These were both important exports, but with the loss of the herring market Scania had taken an economic hit.

Scandinavia was predominantly rural and agricultural well into the nineteenth century. In both Sweden and Denmark over 80 percent of the population was employed in agriculture and living in the countryside up through the middle of the nineteenth century. The labor systems were somewhat different: In Denmark there was a system of serfdom system called "vornedskab" which was introduced in the late fifteenth century on the islands of Zealand, Lolland and Falster. At the time, Zealand was the most developed and the most populated region in Denmark. It is also the most represented in the data used here (Radu 2018). This bound men to the manors where they were born and compelled them to work the land. Although the system was abolished in 1702, another system of serfdom, called adscription ("stavnsbånd" in Danish), was reintroduced three decades later, in 1733, for the whole of Denmark (which no longer included Scania) (Jensen et al 2018). The motivation was to ensure enough supply of men for the military (Lampe and Sharp, 2018) though also ensured workers for the land. In Sweden there was no serfdom, though those peasant farmers who were working on estates owned by the nobility or the crown were subjected to rent payments in the form of labor. While this was not serfdom - neither Sweden nor Scania ever had a system of serfdom –it was a system of limited movement and freedom: permission from the parish priest was required in order to relocate, and the labor-rent payments were substantial (Olsson 2006). Scania was an especially manor-rich region, as was much of Denmark (Gary and Olsson 2017).

The frequent warfare during the late middle ages and early modern period was hard on all of Scandinavia. The end of the Second Northern War was a harsh defeat for Denmark-Norway, and cemented Sweden as the power for the next century, until Sweden's defeat by Russia at the beginning of the eighteenth century. This turmoil can be seen in the national statistics.

Swedish per capita GDP estimates show an increase from the beginning of the sixteenth century followed by more-or-less stagnation and then a strong decline in the second half of the eighteenth century (Schön and Kratz 2012), which maps fairly well with Sweden's military history. However these macro-level estimates do not show regional divergence or patterns, and before the eighteenth century data are drawn primarily from Stockholm, which was much more urban than the rest of the country even in this period.

Enflo and Missiaia (2017, 2018) compute regional GDP for modern-day Swedish counties back to 1750, with an additional benchmark estimate in 1571. These data give a very important look at regional development and inequality, which is a vital view during a period when within-country inequality was often greater than between-country inequality. However, the data aren't on a fine enough level to observe what happened during Scania's reassignment to Sweden. The regions of modern-day Sweden that were in 1571 a part of Denmark were all relatively richer in GDP per capita terms in 1571 than they were in 1750 after they were assimilated completely into Sweden. Scania's GDP per capita did not begin to increase until after the 1790s.

Data on GDP before 1800 are not available for Denmark[3], but real wage development during this period show a similar response to the constant warfare (Abildgren 2017). From 1487 to 1550 wages declined as the wars to keep Sweden from seceding from the Kalmar Union – a political union between Denmark, Norway, and Sweden which Sweden left in 1523 – and the violence of the Protestant Reformation raged on. State reclamation of church lands helped fund the ongoing conflicts, but this did not support the military for long. Wages declined during the Northern Wars through the middle of the eighteenth century. The state faced a fiscal crisis and had to sell crown lands and increase taxes in order to bear the costs of these wars and the reintroduction of serfdom was connected directly to the need for a more robust military. More detailed wage data (Radu 2018) during the eighteenth century shows strong variations during the war years followed by a stabilization and stagnation in real incomes for the rest of the century. The end of the Great Northern War marked Sweden's defeat in Russia and Denmark's final attempt to reclaim its lost provinces, and there was relative peace for the remainder of the century.

The development of both kingdoms continued along parallel lines after the border change. A combination of forced 'Swedification' and merchantilistic policies changed trade routes and the import and export practices of both countries. The Swedish monarchy imposed trade protections to encourage Scania toward Swedification, including tariffs on trade across the sound to Copenhagen (Enflo and

[3] A group of researchers at the University of Southern Denmark are currently working on a project involving the development of GDP numbers before 1800, with the help of a grant received from the Danish Research Council

Missiaia 2017) and the establishment of Lund University in 1666 as an alternative to Copenhagen University, prohibiting Swedish attendance to the latter. As a part of this policy of integration and economic protection, trade out of Scania was redirected toward Stockholm and the rest of Sweden and cut off from its previous path of direct distribution to Copenhagen, and from there to the Netherlands. Grain exports were now prohibited. It is possible that this prohibition could have given some protection to Danish farmers, since they were not competing directly against Scanian exports at the same time as Scanian farmers were no longer able to sell on a free market.

At the same time Denmark was not eager to import cattle and grain which would compete with their own domestic production of the same products. These policies together caused an essential total re-route of Scanian trade, both changing the channels through which it would travel and the eventual destination market. Scania was abruptly shifted from a central export market with direct routes to the capital and to Dutch trading networks into a peripheral region, in then 'relatively poorer Sweden' (Enflo and Missiaia 2017).

Alongside a protectionist and mechantilistic trade policy both countries took an absolutist turn. These were not identical shifts; even though absolutism took an anti-aristocratic character in both countries, the circumstances that led to this major change were different. In Denmark, this event was instigated by a revolution led by Frederik III. This pushed back against the Danish aristocracy, which had gained power over the crown from 1647-1660 but had been severely discredited by the poor performance during the wars with Sweden in the late 1650s (Lampe and Sharp, 2018). A unified tax system was introduced in 1662 which taxed the productive capacity of agricultural land in order to secure government finances, helping aid fiscal recovery (Kjærgaard 1994, 204–5).

By contrast, the transition to absolutism in Sweden was smoother and less reactionary than Denmark's (Lockhart 2004). The institutions underlying the Swedish Government, the collegial administration and the *Riksdag* remained primarily unchanged. Swedish law already allowed for the monarch to consolidate and strengthen his own power, and the crown used its authority in this period to reform the tax system and strengthen its land holdings by means of reclaiming land from the nobility (Gary and Olsson 2017).

An example of the differences between Danish and Swedish absolutism is visible in the tenancy rights of those who worked the land on noble estates; a mid-sixteenth century Danish law gave noble tenants the right to take measures to make their ‘property’ (*gods*) as useful as possible – gods, like the English ‘property’, can ambiguously refer to both real estate and movable property; while the law was likely intended to refer to movable property, the Danish nobles established a precedent wherein the law gave them the right to evict tenants without any form of process. The Swedish nobility adopted this practice. While the Danish monarchy was able to eliminate the practice in 1660, it continued in Sweden and was explicitly ensconced into the legal system in 1723 (Gary and Olsson 2017).

It is clear from a review of the existing data that Scania did decline sometime around the time of its annexation to Sweden. However, the rest of the Scandinavian region was also in decline. What we do not know is if Scania’s decline or stagnation was directly connected to shifting borders, and to what extent this decline could be felt by ‘everyday’ inhabitants. At the end of the eighteenth century Scanian real wages, as estimated by dividing the daily wage by the price of rye, were fairly stable, and only began to rise in the mid- to late- nineteenth century (Bengtsson and Dribe 2005). Gary (2018a) shows a decline of Scanian wages similar to the fall described by Enflo and Missiaia (2017, 2018), with a peak level around the end of the sixteenth century falling more-or-less steadily until the end of the eighteenth century, though with some volatility in the middle of the seventeenth century, just around the time the borders changed.

The reassignment of Scania from Denmark to Sweden was not a profound change in organization or institutional structure. The far larger implications were from the new location relative to the capital and redirected trade routes – along with, of course, the direct impact from war. This gives us a unique opportunity to test the impact of these changes in trade access on the wages of the everyday workers. Both kingdoms were undergoing changes and political developments, but these changes were progressing in similar directions. We exploit this border change to test the extent to which it impacted the livelihoods of common workers; did these geopolitics matter for people just trying to get by in early modern southern Scandinavia?

Data

Wages

Day wages for Malmö, Scania, and Kalmar come from primary archival sources from the south of Sweden, including city archives, churches, manorial estates, and hospitals. The majority of the data come from the city of Malmö and the town of Kalmar, but there are also data from other small towns as well as rural sources within Scania. The wages represent payments to both skilled and unskilled workers in construction, paid by the day. Between 1500 and 1850 there are over 21,300 observations of unskilled men, nearly 6,500 of skilled men, and nearly 1,700 of unskilled women. Skilled workers are predominantly carpenters and masons, while unskilled workers are assistants, mortar mixers, or diggers. These are direct wage payments as recorded in the financial records of these institutions and manors (see Gary 2018b). Secondary data from Stockholm on the day wages of unskilled construction workers come from Jansson et al (1991). These are presented as annual averages.

Wages for Denmark and Copenhagen are based on multiple sources and compiled by Radu (2018). Data is drawn from two main collections. The first set, spanning

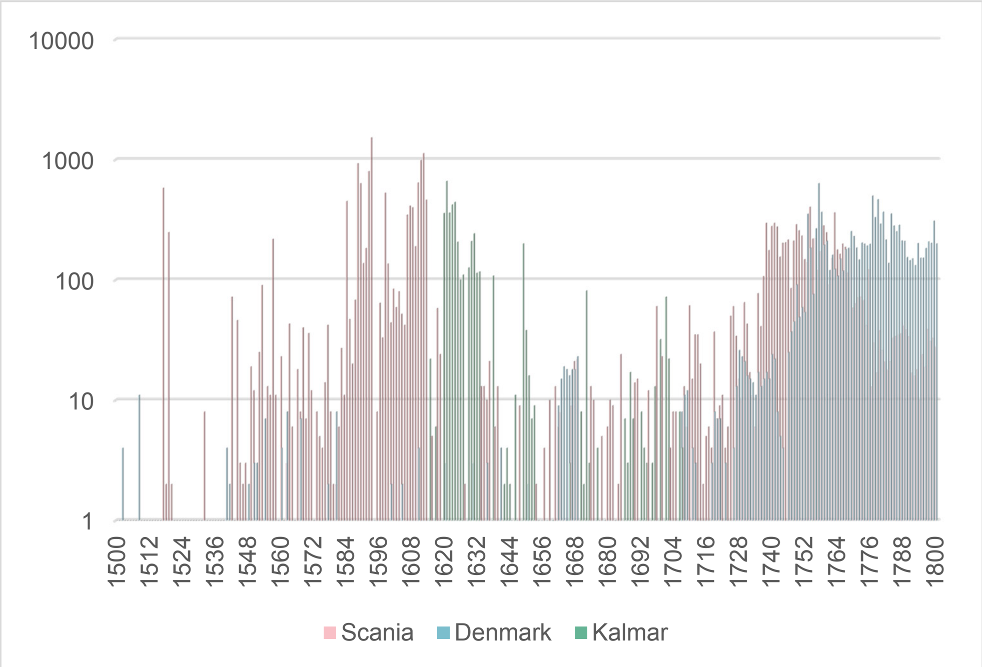

Figure 2: Distribution of primary observations for Scania, Denmark, and Kalmar. Figure shown in log scale.

the period from 1500 to 1700, is extracted from secondary sources by Falbe-Hansen (1869) and Scharling (1869). Their records come from governments documents, manor and church archives, and include observations for both cities including Copenhagen, Roskilde and Odense as well as from the countryside. The majority of the data from this period is from unskilled workers, though there are some skilled workers, typically craftsmen. The second set of data span1660 to 1805, and are compiled by the Danish Price History Project. These data are replicated as primary wage observations from institutions such as the Danish government, the royal court and its property, the army, private firms, and churches (see Radu 2018). The majority of these are from the construction and agricultural sectors, with around 11500 and 7500 observations respectively, but there are also around 2800 records of other occupations such as housekeepers, seamstresses, postman, or judges. While most of the data, around 20900 observations, are from rural areas, approximatively 850 records are from urban areas, mostly from Copenhagen.

Figure 2 shows the number of observations and temporal distribution of day wages for Scania (including Malmö), Denmark, and Kalmar from 1500 through 1800. Note that these are shown in log scale. Unfortunately there are fewer observations in the late seventeenth century, though because of the strength of the data sources in general there is sufficient data for the current analysis.

Prices

Prices are constructed as 'consumption baskets'; the cost of consumption needs for a single adult man over the course of a year (Allen 2009) with some adjustments to better represent a Scandinavian diet. The principle adjustment is substituting half of the allotment for meat with herring (see Morell 1989, discussed in Gary 2018b). When certain prices are not available they are complimented with price data for neighboring and economically integrated regions, adjusted to Stockholm levels (herring, peas, beer, and bread based on van Zanden [no date]). Prices are extrapolated backward using either the Swedish CPI for Stockholm and Kalmar (Edvinsson and Söderberg 2007) the Danish CPI for Malmö (Scania) (Abildgren 2010) or an appropriate substitute good, such as tallow for beef or butter for cheese. A more thorough discussion of the price basket construction is found in Gary (2018b).

Price data for Denmark are taken from the same sources as Danish wages and use the same budget weights as those used for Sweden in table 1. Similarly, prices for missing years were either extrapolated using similar goods (such as milk for cheese for example) or using the Danish CPI calculated by Abildgren (2010).

Nominal currencies for all data have been converted into skilling, which was a sub-unit of currency in both countries but is a synthetic measurement for the majority of the period; currency units changed several times between 1500 and 1800. Currencies were similar in both countries and were at par in 1658, but each country did experience different inflationary trends (see Gary 2018a). Sweden's extreme inflation in the later part of the eighteenth century is apparent in the graphs of nominal wages and the price series.

Figure 3 presents the evolution of the consumption bundle from 1487 to 1800 for Malmö (Scania), Kalmar, Stockholm, and rural Denmark (Funen and Zealand). The differences in price development are clear in the flatter and more stable development

	Subsistence	*Respectability*
kg rye bread	-	234
kg rye	155	-
kg peas	20	52
kg meat	2.5	13
liters milk	-	-
liters beer	-	182
kg cheese + butter	3	10.4
eggs (n)	-	52
kg salt fish	2.5	13
kg soap	1.3	2.6
m linen	3	5
kg candles	1.3	2.6
liters lamp oil	1.3	2.6
M BTU fuel	2	5
rent	5%	5%

Table 1. The content of the subsistence and respectability baskets

Source: Gary 2018b

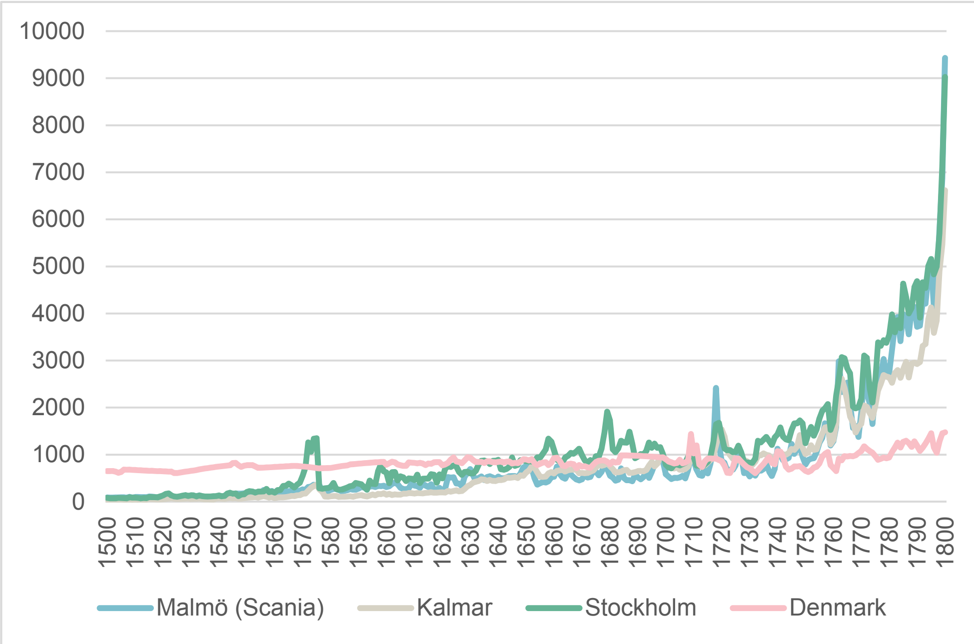

Figure 3: Consumption baskets (subsistence level) for Denmark, Malmö (used also for Scania), Stockholm, and Kalmar 1500-1800.

of the Danish price basket. Sweden's financial instability is visible in the spikes in price levels due to debasements, such as in the Stockholm price series in the late sixteenth century or the price shocks following the end of the Great Northern War in 1719 (see Edvinsson 2010). Later periods of rapid inflation, connected to financial instability and changes in currency, are readily apparent from the later part of the eighteenth century.

GIS

We also use GIS data as an extra robustness check on wage changes. We plot the locations of archival sources and calculate the straight-line distance to Copenhagen and Stockholm, the capital cities, as well as to the nearest shore to proxy sea access. Sea access could be a way in which Scania could have adapted to the new trade restrictions. However, all of the main locations which we analyze are less than 20 kilometers away from the sea, so there is not a large degree of variation here. The furthest town from the coastline is Växjö, nearly 80 km from the shore. Växjö's closest route to sea access would likely have been through Kalmar.

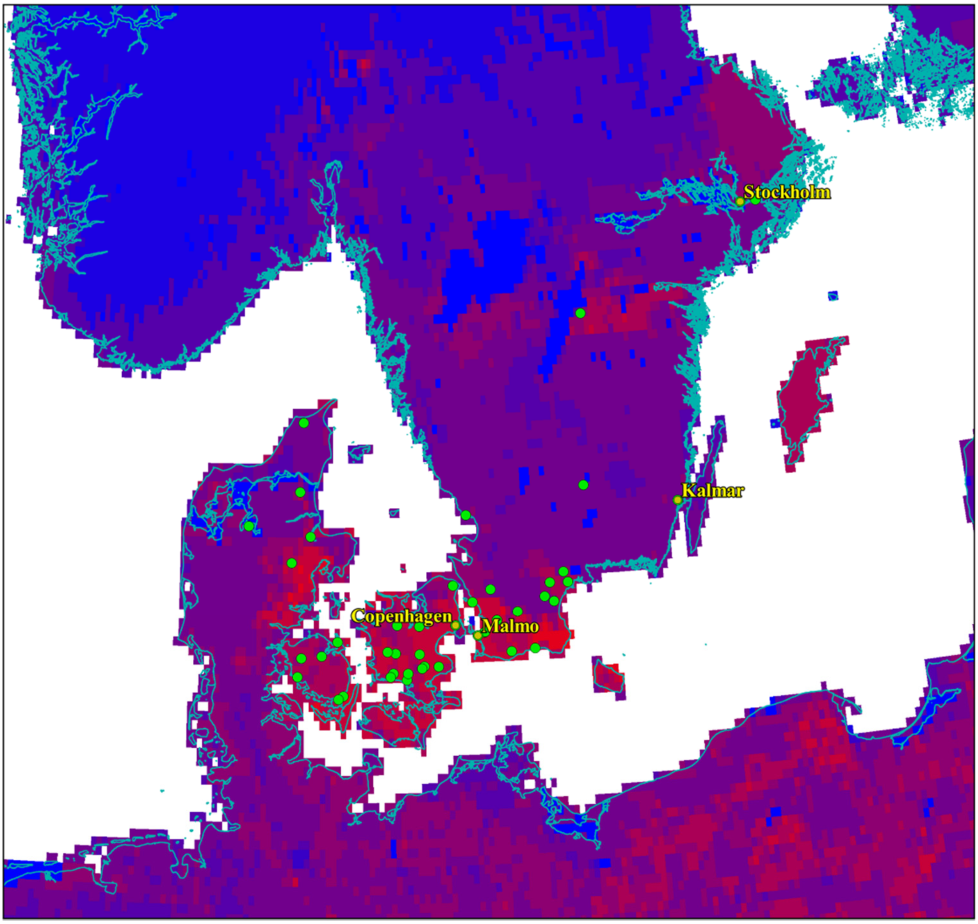

Figure 4: Map of southern Scandinavia, with the main locations in this investigation and rye suitability. Red indicates higher suitability, blue lower suitability.

We also include controls for soil suitability for different grains such as rye, barley, oats and wheat. Rye was the backbone of early modern Scandinavian diets, as reflected by our consumption baskets. We use data from the GAEZ database (Global Agro-Ecological Zones) created by the UN Food and Agriculture Organization supply maps of suitability for growing different crops, based on factors such as soil composition, climate, and terrain. We employ maps for rain fed crops (with no irrigation systems) and a low input of labor and technology. The soil suitability assigned to each location was calculated as the average within a 30 kilometer radius of the coordinates.

Soil suitability for rye is shown in Figure 4; other grains had a similar suitability pattern. Red indicates the best suitability and blue the worst, plotted together with the locations for our wage observations. Most observations are concentrated around the Oresund, in the regions of Zealand and Scania. Scania was much more similar to neighboring regions in Denmark than to the majority of Sweden, with much higher suitability for rye and other crops – this is well in line with Scania's reputation as the 'bread basket' of Sweden. From this perspective, one could expect that famers could command a higher price for their grain in Sweden, which could in turn have a positive effect on wages. However, protectionism and higher transit costs could have also driven down price levels.

Nominal and real wages

Nominal wages in Malmö, Kalmar, rural Scania, Stockholm, and rural Denmark are shown in figure 5 as annual averages. Nominal wages for all regions follow a more-or-less similar trend as the price series. This is particularly evident in the slow increase followed by a faster inflationary rise in the Malmö data. There is also a similar development between the regions until the eighteenth century, after which there is a clear dispersion with wages in Stockholm and Malmö inflating far more than those in other regions, especially those in Denmark. There are a few points where nominal wage divergences are quite apparent; a large increase in Stockholm's

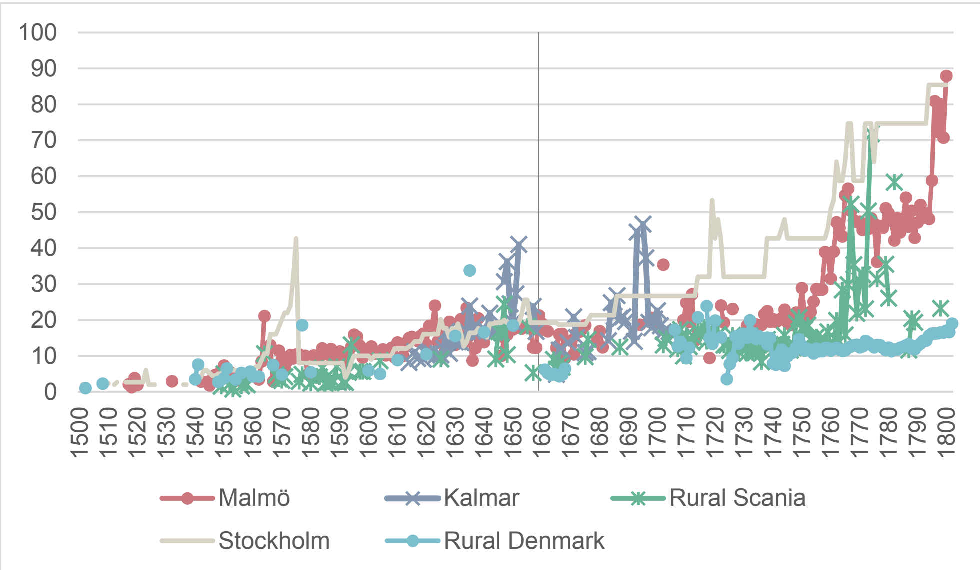

Figure 5: Nominal wages (skilling) in Malmö, Kalmar, Rural Scania, Stockholm, and Rural Denmark, 1500-1800. Vertical bar denotes the border change.

nominal wages in the sixteenth century is connected to the same debasement that caused prices to increase above (see Edvinsson 2010). Wage spikes in Kalmar in the middle of the seventeenth century are connected to the Kalmar War along with a fire that devastated the city a few years after. Wage spikes in the late 17th century appear to be connected to a local price shock.

All series except Stockholm have a distinct dip in years just following Scania's annexation. This is easier to see in figure 6, which shows decadal averages of the same nominal wages from 1600-1719, the period of analysis for the base model. The vertical line is placed in 1660 because the border change was late in the previous decade. As in the long-term nominal series wages in Stockholm appear to continue more or less at the same level through the annexation period. Everywhere else they fall; this is strongest in Kalmar and rural Denmark. Wages had already been declining in rural Scania before the border change. The dramatic changes in Kalmar's nominal wage levels are likely connected to its own experiences of the Kalmar War.

Real wages (figure 7) are calculated for the day, by dividing the daily wage rate by a single day's fraction of the consumption basket; again this is presented as the annual average and the vertical line is set at 1660. All analysis in the study is

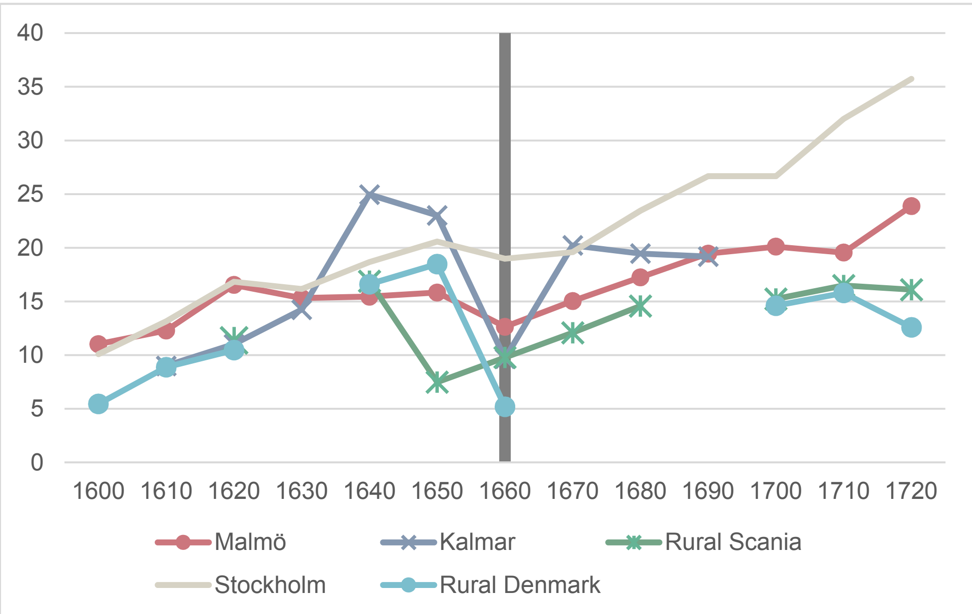

Figure 6: Nominal wages in skilling (decadal averages) in Malmö, Kalmar, Rural Scania, Stockholm, and Rural Denmark, 1600-1719. The vertical bar denotes the change in territory.

conducted using the subsistence basket for a single adult. This eliminates any need to make assumptions about the length of the working day or the dumber of dependents (see Gary 2018d and Humphries 2013, respectively, for discussions about difficulties associated with these assumptions).

The clear trend is one of convergence between all wage series. This is interesting because the opposite was occurring between the nominal wages; there was greater convergence before the border event than after. Danish real wages, represented both by rural Denmark and by Malmö, are consistently higher than those in Stockholm before the border change. Lower real wage levels in Rural Scania could be a price effect – they are deflated by the same consumption basket as Malmö town, while rural prices could have been lower. Fluctuations in the rural Danish real wages are likely connected to fewer observation than in the other series, but the average trajectory is in-line with Malmö's wages. So too are real wages in Kalmar; these are available only from 1614 through the end of the century, but they also follow a similar path to Malmö, albeit with slightly more extreme swings. After the border changes wages in all regions recover somewhat, but then face a fall through the end of the period in 1800.

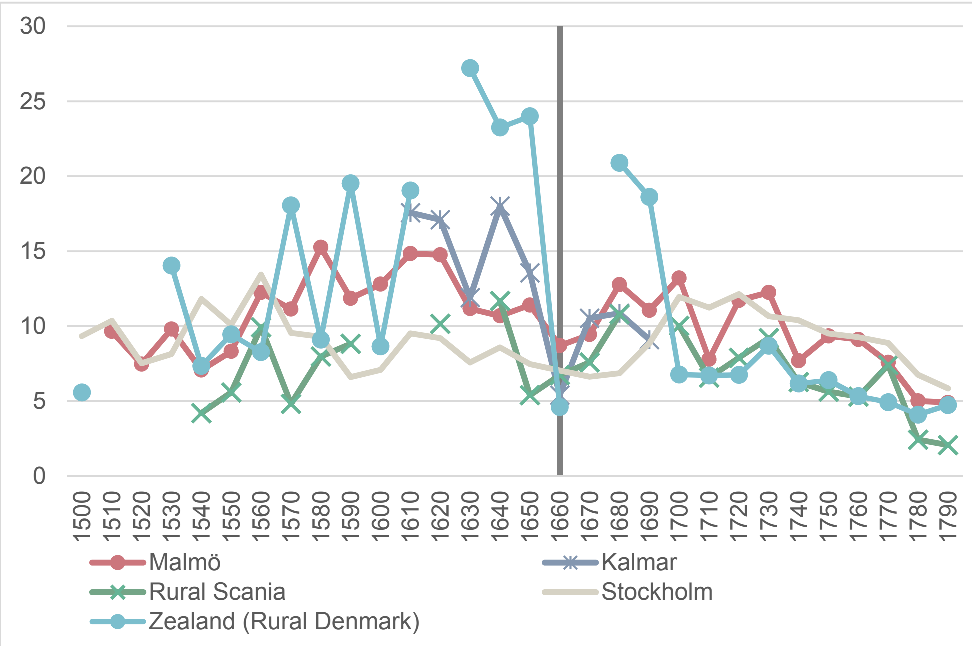

Figure 7: Real wages (for one day's work) in Malmö, Rural Scania, Rural Denmark, Kalmar, and Stockholm

The period of interest includes 1658, which is the year when Scania was ceded from Denmark to Sweden. This is a period with substantial warfare, which would have impacted wages and prices in all regions. However, it is clear that the wage decline is not uniform between regions. It is also difficult to tell from annual and regional aggregates what kind of changes were happening on an individual or specific group level. The following sections will dive deeper to examine how real wages changed on an individual. Did people living and working in Scania suffer a drop in their well-being specifically connected with the border change? Or was any decrease simply part of the trend throughout southern Scandinavia?

Empirical analysis

Design

The empirical strategy assumes that workers in Scania and neighboring regions of Denmark were more-or-less the same and were developing under more-or-less similar conditions. If this assumption is met, we can further assume that real wages should have developed in parallel in lieu of any major upset.

We know that the regions were not exactly the same – as mentioned earlier Denmark had been richer, and during the time of Scania's annexation Sweden was becoming more dominant. However, by using wage data from several different towns and regions we hope to capture the development of all the nearly-parallel paths developing in the extended southern Scandinavian region, and so isolate the impact of the border changes and change in second nature geography on Scania specifically.

We use the occurrence of a major upset – the redrawn Scandinavian borders and changes in protective trade regulations – to test the impact of border changes and regulation on the wages of workers in the region. We exploit several different types of data from rural and urban areas. The test region is Scania, which changed hands from Denmark to Sweden and was directly impacted by new protectionist regulations. Data come both from the town of Malmö and from the surrounding countryside. We test the change in Scanian real wages primarily against wages from Denmark, with the assumption that Scanian wages would have continued on the same trajectory without the border change.

The second major comparison is Kalmar, situated just across the old Swedish-Danish border. This entire region suffered during the extended Danish and Swedish conflicts; this means that the economic impact of fighting on wages, either positive or negative, should have been present in both regions. However, Kalmar's previous trade routes and physical relationship to the capital, Stockholm, would not have been impacted. This makes Kalmar an extremely useful reference to isolate the impact of the border changes and increased protectionism in Scania, net of the impacts of fighting. In most models nearby Växjö is included alongside Kalamr.

Finally we include Copenhagen and Stockholm as comparisons. Copenhagen is an important test against Malmö town, since Malmö had been the second largest Danish city before its transfer. However, the data from Copenhagen are a bit scarce to rely on it as the primary analytical comparison. Stockholm represents the least impacted region, at least in terms of proximity to fighting. However these data are only available on an annual basis and so we are unable to compare on an individual level in this case. Because individual level observations are not available for the Swedish capital we cannot control for factors such as occupation and gender for the individual level observations and need to assume that these differences are not great enough to impact our findings.

The primary analysis is undertaken from 1600-1719. This time period covers the 58 years before the border change and ends at the close of the Great Northern War. The end of this war is selected as the end of the primary analysis because of the inflation and price disruptions which followed its conclusion (Edvinsson 2010, Gary 2018b).

Difference in difference analysis

We apply a difference in difference estimation in order to compare the relative difference in wage changes before and after the border redrawing between Sweden and Denmark. We exploit that the border change is likely to have had a differential impact on people living in Scania, under the assumption that log wages would have been on parallel trends for those living in Stockholm, Scania, Kalmar, and Denmark in the absence of the border change. To this end, we estimate the following equation for the period 1600-1719:

$$lnw_{it} = Scania_{it}border_{1658}\beta + \alpha_t + X_{it}'\gamma + \varepsilon_{it},$$

In which lnw_{it} denotes log wages; i indicates individual and t indicates time; $Scania_{it}$ indicates whether the individual lives in Scania; $border_{1658}$ is a dummy variable which equals 1 for the period 1658-1800; β measures the effect of the border change on the standard of living of individuals living in Scania; α_t indicates the year fixed effects; X_{it}' is a vector of control variables for occupation and region.

We use fixed effects to control for year, occupational, and regional effects in order to account for differences across occupations and between regions with different types of data or workers. The year fixed effects capture any event that influenced wages across regions while the other fixed effects capture differences in wages between occupations and regions.

A further test checks if the decrease in wages that we see is more closely tied to the detrimental impact of the wars between Sweden and Denmark. Despite using Kalmar as a reference it is still possible that the wars had different impacts in different areas. In order to test this we introduce dummy variables for each war between the two countries during the seventeenth and eighteenth centuries. These include: Russo-Swedish War (1554–1557), The Livonian War (1558–1583), The Northern Seven Years' War (1562–1570), The Russo-Polish or Thirteen Years' War (1654–1667), The Second Northern War (1655–1660), The Scanian War (1674–1679) (also called Swedish-Brandenburgian War), The Great Northern War (1700–1721), (also called the Third Northern War). Finally, in order to demonstrate that wage developments are identified correctly we employ a flexible model using period dummies for all years for which data are available, as follows:

$$\ln w_{it} = \sum_{j=1500}^{1800} Scania_{it}\beta_{ijt} + \alpha_t + X_{it}'\gamma + \varepsilon_{it}$$

In this equation, βijt shows the difference in income between Scania and rural Denmark for a specific year. Plotting these coefficients helps to determine how the wages in Scania changed over time relative to those in Denmark. All standard errors are clustered at the occupational (HISCO) level.

Results

The results for the base model are shown in table 2. All the regressions show a negative and strongly significant impact of the annexation of Scania on real wages. Column 1 is the base model, where we include fixed effect to control for years, different jobs and different regions. The coefficient indicates that wages after 1658 were around forty percent lower than what we would expect without the intervention of the border change. Column 2 tests on a more local level and examines location fixed effects instead of region; again, results are statistically and economically significant. In column 3 we added a control variable which takes the value of the average wage by decades before annexation and 0 for the wage observations from after the change. This controls for wage trends before the annexation and gives more strength to our difference-in-difference model. The results here differ only slightly form those from the base model.

We also obtain a negative coefficient when the comparison is made to Kalmar and Stockholm. The decline in wages against these areas is closer to twenty percent on average. The lower relative decrease is reasonable, given that Sweden was already poorer than Denmark at this point, and Stockholm was in a long period of stagnation. That the effect is still so strong and significant against real wages in Kalmar, which also was impacted directly by the recent fighting, indicates that there truly is a separate effect on real wages in Scania that can be tied to the annexation and change in market access.

Next, we consider a longer time frame, 1500-1800 (table 3). The longer period allows us to control for a large number of conflicts between Denmark and Sweden which might have had an impact on wages similar to the border change – are our previous results simply an effect of war, or are they truly related to the border changes? In order to test this we use the same controls as above, but also include dummy variables for all the conflicts between Denmark and Sweden during the period 1500-1850 which could also have had an impact on wages – these results are presented in columns 3, 6, and 8.

The base results are still quite large and statistically significant, and in line with the magnitude of the results from the previous table. There is some variation when the dummies for wars are included – the difference compared to Denmark decreases, while it increases slightly when compared to Kalmar – but the differences are not systematic or substantial enough to indicate a consistent trend. The predicted decrease in Scanian wages is still substantially stronger when compared to Danish wage levels than with those in Kalmar and Stockholm. Even when other wars and conflicts are taken into account the border change still has a significant impact on real wages in Scania.

Previous research on contemporary markets has found a differential effect of border opening on the wages for skilled and unskilled workers. It is not unreasonable to expect that we would find a difference, especially in a preindustrial context when many people were not particularly specialized. Within the data tested here there are a large number of construction workers; this is especially true for the skilled workers. Many of them are masons and carpenters, who would have been more specialized. The effect could reasonably go in either direction; a diminished access to regional markets could drive down wages, or the large-scale new building projects, including Lund University, could increase them. This would apply for both skilled and unskilled construction workers.

	Dependent variable = real wages 1600-1719							
	Scania compared to:							
	Denmark (Zealand, Funen and Jutland)			Kalmar and Växjö			Stockholm	
	1	2	3	4	5	6	7	8
Scania x change	-0.558***	-0.454**	-0.558***	-0.136**	-0.193***	-0.136**	-0.225***	-0.225***
	[-3.48]	[-2.07]	[-3.48]	[-2.25]	[-2.50]	[-2.25]	[-3.10]	[-3.10]
Observations	5,687	5,687	5,687	8,268	8,268	8,268	234	234
R-squared	0.666	0.674	0.666	0.482	0.508	0.482	0.682	0.682
Fixed effects for:								
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hisco FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Region FE	Yes	No	Yes	Yes	No	Yes	Yes	Yes
City FE	No	Yes	No	No	Yes	No	No	No
Sex FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Avg_Decadal_Wage<1658	No	No	Yes	No	No	Yes	No	Yes

Table 2. Main results for the border change. Base Model.

Scania compared to Denmark, Kalmar and Stockholm for the period: 1600-1719

Notes: The table shows the effect of the border change on real wages for men and women in Scania (measured as the natural logarithm of the daily real wage). Scania is compared to Denmark, more specifically with Zealand, Funen and Jutalnd (columns 1-3), Kalmar region (columns 4-6), and Stockholm (columns 7-8). The sample period is 1600-1719. The variable "Scania x change" represents a dummy variable which takes the value of 1 for observations from Scania in the period after the borders were changed (1658-1719); in the case of Stockholm, the difference in difference analysis was conducted on time series averages of real wages. Models include fixed effects for years, occupation, region, location as indicated by "Yes" or "No"; "Avg_Decadal_Wage<1658" is a variable that takes the value of the average wage by decades before annexation and 0 otherwise; coefficients are reported with the robust t-statistics in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$) and the standard errors are clustered at occupation level

	Dependent variable = real wages							
	Scania compared to:							
	Denmark (Zealand, Funen and Jutland)			Kalmar and Växjö			Stockholm	
	1	2	3	4	5	6	7	8
Scania x change	-0.703 ***	-0.939***	-0.703***	-0.162***	-0.187***	-0.163***	-0.291***	-0.290***
	[-5.80]	[-5.90]	[-5.80]	[-2.92]	[-2.69]	[-2.92]	[-5.52]	[-5.52]
Observations	42,086	42,086	42,086	23,411	23,411	23,411	531	531
R-squared	0.866	0.873	0.866	0.536	0.550	0.536	0.685	0.685
Fixed effects for:								
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hisco FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Region FE	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Sex FE	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
War dummies	No	No	Yes	No	No	Yes	No	Yes
Location FE	No	Yes	No	No	Yes	No	No	No

Table 3. Main results for the border change with war years

Scania compared to Denmark, Kalmar and Stockholm 1500-1800

Notes: The table shows the effect of the border change on real wages for men and women in Scania (measured as the natural logarithm of the daily real wage). Scania is compared to Denmark, more specifically with Zealand, Funen and Jutalnd (columns 1-3), Kalmar (columns 4-6), and Stockholm (columns 7-8). The sample period is 1500-1800. The variable "Scania x change" represents a dummy variable which takes the value of 1 for observations from Scania in the period after the borders were changed (1658-1800); in the case of Stockholm, the difference in difference analysis was conducted on time series averages of real wages. Models include fixed effects for years, occupation, region, location, wars as indicated by "Yes" or "No"; coefficients are reported with the robust t-statistics in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$) and the standard errors are clustered at occupation level

In table 4 we test if the impact from the border change had a differential effect on skilled and unskilled workers by running the same models separately for the lower skilled (unskilled and lower skilled HISCLASS) and for the higher skilled workers (medium and higher skilled HISCLASS). Because of the lower number of skilled Danish workers before Scania's annexation we use the longer time period 1500-1800.

The impact of the border change continues to be significant and negative for all unskilled Scanian workers. However the impact is much more mixed for those in skilled work groups. A large proportion of these skilled workers were craftsmen working in construction; this group would have been fairly mobile, typically working on a casual or short-term basis on projects throughout their town or region. The impact on their wages is negative and significant when we control for region, but strongly positive when we control for specific archival locations. This probably means that those skilled workers who were able to get work after the border change were better off, but that work disappeared in some high wages areas.

The negative effect for skilled workers by region could also be connected to the loss of competition from the Danish market. It is quite possible that there would have been a substantial degree of mobility between Copenhagen and Malmö – the cities today are within easy sight of each other, and the water between them is fairly protected and calm. In the sixteenth century records for Malmö there are wages paid to men who come from Jutland and deeper in Denmark – this is clear in their recorded names. These workers make it clear that there was some movement between the different parts of Denmark. This would be much more difficult after the annexation.

The final check examines wages only from towns and cities. This lets us examine the effects only in urban areas. It additionally helps to ensure that the differences in data composition – the large amount of data from Malmö within Scania, but small amount of data from Copenhagen within Denmark – are not disrupting our results. The same analysis as previously was carried out and results are presented in table 5 for the period 1600-1719. Again, the results are largely in line with what has been seen in previous analyses. Perhaps the primary difference is the smaller drop in Malmö's real wages compared to Kalmar than the decline in all of Scania's wages. Smaller and rural areas might have suffered more without as many other options as those in the larger towns.

Next, we test for pre-trends to evaluate the validity of our identifying assumption of parallel trends. Our concern is that all wages were declining together and that we are not truly observing an effect that is connected to the border change. To this end, we estimate a fully flexible model; instead of having a single dummy variable which takes the value 1 for Scania after 1658, we have a series of variables, one for each decade, that take the value 1 if the observation is from Scania and from that decade and 0 otherwise, in order to determine when the difference between Scania and the control regions becomes significant. We include these variables in the base model with decade, region and occupation fixed effects and we apply this model on the

Figure 8:Difference between Danish and Scanian log real wages by decade

Figure 9:Difference between Scanian and Kalamr log real wages by decade

data from Scania and Denmark and Scania and Kalmar. The coefficients are plotted in figure 8 (Denmark) and figure 9 (Kalmar) and show the difference in log real wages between Scania and the control group, for each decade. In Denmark there is no statistically different trend before the annexation; the difference appears after the border change and then dissipates after a few decades. In Kalmar (figure 9) there is a statistically significant difference in the 1640s; however, this is connected to a specific local event, a fire that destroyed the town of Kalmar and led to both a building boom and high levels of real wages (see Gary 2018c for a discussion of the events). This is therefore not a part of a general wage trend that significantly differentiates Kalmar from Scania. These results suggest that our identification of the treatment event holds.

Robustness checks

To test the robustness of our base model we perform a series of tests by adding control variables for a number of factors that could influence our results. The first check aims to reveal the effect of agriculture on our model, by including the suitability for growing the most important crops at the time – rye, wheat, barley and oats. In this period agriculture was the backbone of the economy in southern Scandinavia. Our price baskets rely heavily on rye as well, which could impact the basic calculation of real wage. The second model in the table tests for easy access to trade, by including control variables like the distance to shore and distance to the two capitals. Locations closer to the sea and the capital would likely trade more than the others. Distance to the sea is less important for the towns which we know are coastal – Stockholm, Kalmar, Malmö, and Copenhagen – but this helps account fo the heterogeneity of our panel. The third model adds latitude and longitude as controls to account for any variation across space as different sources come in and out of our panel.

The last model combines the controls by including the main crop, rye, alongside distance from shore and distance from capitals, latitude and longitude. Analyzing the results, presented in table 3, we get significant negative coefficients for all our test cases and thus our model passes the robustness checks. In the case of Kalmar we see a stronger effect than for the base model. This could be explained by the fact that there is a bigger difference in soil suitability, and distance to capitals between Kalmar and Scania as opposed to Denmark and Scania, and once these variations are accounted for, we get a stronger result

Finally, we deviate from the difference in difference method in order to investigate the influence of the distance from the capital on the real wage rate. To do this we change the treatment variable from the border change to the distance to the region's capital, regressing real wage on the distance to the capital and fixed effects for year, region and occupation. While for Denmark and Kalmar this distance is constant over time, Scania's capital distance changes by 580 kilometers when the capital changes from Copenhagen to Stockholm. We also conduct robustness checks similar to those used for the difference in difference approach, including soil suitability for the main crops in the second regression, distance from the sea and both Copenhagen and Stockholm in the third one and the suitability for rye, distances to the sea and to the capital cities, and latitude and longitude in the fourth regression.

For all specifications we obtain significant and negative coefficients both when comparing against Denmark and against Kalmar, suggesting that the distance to the capital negatively impacts wages. While the coefficient has a very small value, it is multiplied with the distance in kilometers from the capital, meaning that wages decrease by 0.1 percent per kilometer, predicting a drop in wages of as much as 40.5 percent after Scania changes hands from Denmark to Sweden. The value is around the same as the one predicted by the difference in difference approach. This suggests that the increased distance to capital is a plausible mechanism that could explain the decrease in real wages, both through longer trade routes as a barrier to trade, but also by removing the outside option for craftsmen that could previously travel to the capital for work.

Conclusions and discussion

The annexation of Scania in the 17th century is an historical case which allow us the opportunity to investigate the impact of features such as borders, protectionism, and the distance to the capital have on the well-being of common people. After conquest by Sweden, Scania was abruptly shifted from a region located right next to the national center of power and trade to a peripheral region far from the capital. Protectionist measures further cut Scania off from its previous trade routes through Denmark and to the Netherlands. In order to exploit these changes, we estimated real wages based on wages and prices in Denmark, Scania, Kalmar and Stockholm in order to compare the changes in wellbeing between regions.

Real wages indicate that Scania was well off in the sixteenth century, on par with the rest of Denmark. But after the wars between Sweden and Denmark Scanian wages fell below those in rural Denmark.

This paper has employed a difference in difference approach to demonstrate that these lower wages fell more than those in surrounding regions, and it has shown that this difference can be tied to the change in the border. It suggests that this fall is due in particular to the new distance from the national capital, but it is not able to specifically identify a mechanism.

	Dependent variable					
	Unskilled, lower skilled			Medium, higher skilled		
	1	2	4	5	6	8
Scania x change	-0.657***	-0.382	-0.382	-0.307	1.138***	2.152***
	[-3.29]	[-1.06]	[-1.06]	[-1.20]	[7.63]	[8.08]
Observations	4,750	4,750	4,750	937	937	937
R-squared	0.658	0.664	0.664	0.754	0.774	0.775
Fixed effects for:						
Year FE	Yes	Yes	yes	Yes	Yes	Yes
Hisco FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	No	No	Yes	No	No
Location FE	No	Yes	Yes	No	Yes	Yes
Sex FE	Yes	Yes	Yes	Yes	Yes	Yes
Dum_war	No	No	Yes	No	No	Yes

Table 4a. Results for the border change.

Scania compared to Denmark by HISCLASS: 1500-1800

Notes: The table shows the effect of the border change on real wages for men and women in Scania (measured as the natural logarithm of the daily real wage). The data was divided according to the HISCLASS scheme into unskilled, lower skilled, medium skilled, higher skilled. Scania is compared to Denmark, more specifically Zealand, Funen and Jutalnd. The sample period is 1500-1800. The variable "Scania x change" represents a dummy variable which takes the value of 1 for observations from Scania in the period after the borders were changed (1658-1800); models include fixed effects for years, occupation, region, location, wars as indicated by "Yes" or "No"; coefficients are reported with the robust t-statistics in parentheses (*** p<0.01, **p<0.05, *p<0.1) and the standard errors are clustered at occupation level

	Dependent variable = real wage					
	Scania compared to:					
	Unskilled, lower skilled			Medium, higher skilled		
	1	2	3	4	5	6
Scania x change	-0.039	-0.200*	-0.200*	-0.099	0.152*	0.152*
	[-0.26]	[-1.80]	[-1.80]	[-0.87]	[1.77]	[1.77]
Observations	6,775	6,775	6,775	1,493	1,493	1,493
R-squared	0.483	0.485	0.485	0.551	0.585	0.585
Fixed effects for:						
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Hisco FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	No	No	Yes	No	No
Location FE	No	Yes	Yes	No	Yes	Yes
Sex FE	Yes	Yes	Yes	Yes	Yes	Yes
Dum_war	No	No	Yes	No	No	Yes

Table 4b. Results for the border change.

Scania compared to Kalmar by HISCLASS: 1500-1800

Notes: The table shows the effect of the border change on real wages for men and women in Scania (measured as the natural logarithm of the daily real wage). The data was divided according to the HISCLASS scheme into unskilled, lower skilled, medium skilled, higher skilled. Scania is compared to Denmark, more specifically Zealand, Funen and Jutalnd. The sample period is 1500-1800. The variable “Scania x change” represents a dummy variable which takes the value of 1 for observations from Scania in the period after the borders were changed (1658-1800); models include fixed effects for years, occupation, region, location, wars as indicated by “Yes” or “No”; coefficients are reported with the robust t-statistics in parentheses (*** p<0.01, **p<0.05, *p<0.1) and the standard errors are clustered at occupation level

	Dependent variable = real wages							
	Malmo compared to:							
	Copenhagen			Kalmar			Stockholm	
	1	2	3	4	5	6	7	8
Malmo x change	-1.263***	-0.929***	-0.929***	-0.243**	-0.225***	-0.225***	-0.378***	-.378***
	[-5.75]	[-4.79]	[-4.79]	[-2.24]	[-3.29]	[-3.29]	[-4.77]	[-4.77]
Observations	5,384	5,384	5,384	7,819	7,819	7,819	223	223
R-squared	0.643	0.646	0.646	0.520	0.525	0.491	0.708	0.708
Fixed effects for:								
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hisco FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Region FE	Yes	No	Yes	Yes	No	Yes	Yes	Yes
City FE	No	Yes	No	No	Yes	No	No	No
Sex	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Avg_Decadal_Wage<1658	No	No	Yes	No	No	Yes	No	Yes

Table 6. Results for the border change, towns only

Malmo compared to Copenhagen, Kalmar, and Stockholm 1600-1719

Notes: The table shows the effect of the border change on real wages for men and women in Malmo (measured as the natural logarithm of the daily real wage). Malmo is compared to Copenhagen (columns 1-3), Kalmar (columns 4-6), and Stockholm (columns 7-8). The sample period is 1600-1719. The variable “Malmo x change” represents a dummy variable which takes the value of 1 for observations from Malmo in the period after the borders were changed (1658-1719); in the case of Stockholm, the difference in difference analysis was conducted on time series averages of real wages. Models include fixed effects for years, occupation, region, location as indicated by “Yes” or “No”; “Avg_Decadal_Wage<1658” is a variable that takes the value of the average wage by decades before annexation and 0 otherwise; coefficients are reported with the robust t-statistics in parentheses (*** p<0.01, **p<0.05, *p<0.1) and the standard errors are clustered at occupation level

	Dependent variable = real wage							
	Scania compared to:							
	Denmark				Kalmar and Växjö			
	1	2	3	4	5	6	7	8
Scania x change	-0.509***	-0.634***	-0.433**	-0.535***	-0.167***	-0.223***	-0.203***	-0.274***
	[-2.70]	[-3.44]	[-2.39]	[-3.14]	[-2.65]	[-5.12]	[-4.11]	[-5.29]
Observations	5,687	5,687	5,687	5,687	8,268	8,268	8,268	8,268
R-squared	0.668	0.666	0.667	0.668	0.503	0.504	0.503	0.505
Fixed effects for:								
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hisco FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sex	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rye suitalbility	Yes	No	No	Yes	Yes	No	No	Yes
Wheat suitability	Yes	No	No	No	Yes	No	No	No
Barley suitability	Yes	No	No	No	Yes	No	No	No
Oat suitability	Yes	No	No	No	Yes	No	No	No

Distance to Copenhagen	No	Yes	No	Yes	No	Yes	No	Yes
Distance to Stockholm	No	Yes	No	Yes	No	Yes	No	Yes
Distance to coast	No	Yes	No	Yes	No	Yes	No	Yes
Latitude	No	No	Yes	Yes	No	No	Yes	Yes
Longitude	No	No	Yes	Yes	No	No	Yes	Yes

Table 7. Results for the border change, Testing for soil suitability and geographical features

Scania compared to Denmark and Kalmar 1600-1719

Notes: The table shows the effect of the border change on real wages for men and women in Scania (measured as the natural logarithm of the daily real wage). Scania is compared to Denmark, more specifically with Zealand, Funen and Jutalnd (columns 1-4), and Kalmar and Växjö (columns 5-8). The sample period is 1600-1719. The variable "Scania x change" represents a dummy variable which takes the value of 1 for observations from Scania in the period after the borders were changed (1658-1719); Models include fixed effects for years, occupation, region, suitability for different crops, distance to Copenhagen, Stockholm, to coast, latitude and longitude as indicated by "Yes" or "No"; Coefficients are reported with the robust t-statistics in parentheses (*** p<0.01, **p<0.05, *p<0.1) and the standard errors are clustered at occupation level

	Dependent variable = real wage							
	Scania compared to:							
	Denmark				Kalmar and Växjö			
	1	2	3	4	5	6	7	8
Distance to capital	-0.00103**	-.00082**	-.00108***	-0.00091**	-0.00029***	-0.00036***	-0.00038***	-0.00046***
	[-2.56]	[-2.29]	[-2.78]	[-2.33]	[-3.65]	[-3.69]	[-6.14]	[-5.15]
Observations	5,687	5,687	5,687	5,687	8,268	8,268	8,268	8,268
R-squared	0.666	0.668	0.666	0.668	0.500	0.503	0.504	0.505
t-statistics in brackets								
*** p<0.01, **p<0.05, *p<0.1								
Fixed effects for:								
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hisco FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sex	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rye suitalbility	No	Yes	No	Yes	No	Yes	No	Yes
Wheat suitability	No	Yes	No	No	No	Yes	No	No
Barley suitability	No	Yes	No	No	No	Yes	No	No
Oat suitability	No	Yes	No	No	No	Yes	No	No

Distance to Copenhagen	No	No	Yes	Yes	No	No	Yes	Yes
Distance to Stockholm	No	No	Yes	Yes	No	No	Yes	Yes
Distance to coast	No	No	Yes	Yes	No	No	Yes	Yes
Latitude	No	No	No	Yes	No	No	No	Yes
Longitude	No	No	No	Yes	No	No	No	Yes

Table 7. Alternative specification: results for the distance to the capital

Scania compared to Denmark and Kalmar 1600-1719

Notes: The table shows the effect of the border change on real wages for men and women in Scania (measured as the natural logarithm of the daily real wage). Scania is compared to Denmark, more specifically with Zealand, Funen and Jutalnd (columns 1-4), and Kalmar and Växjö (columns 5-8). The sample period is 1600-1719. The variable "distance to capital" is measured in km; Models include fixed effects for years, occupation, region, suitability for different crops, distance to Copenhagen, Stockholm, to coast, latitude and longitude as indicated by "Yes" or "No"; Coefficients are reported with the robust t-statistics in parentheses (*** p<0.01, **p<0.05, *p<0.1) and the standard errors are clustered at occupation level

These findings lend support to the idea that locations matter beyond the relationship to physical features. Here, a prosperous region, though already in decline, was more adversely impacted by its change in second nature geography than surrounding regions which, though impacted, maintained more continuity in institutional and proximity to national capitals and established local networks.

These findings are a useful test case to help understand the impacts of other territorial and border changes, both historical and contemporary. It is especially valuable to understand that even during periods of war and conflict, geopolitical changes are still capable of trickling down and impacting the daily survival of common workers. Contemporary Crimea, faced with severed trade routes after its annexation by Russia, has suffered increasing prices and diminished markets for its exports. Geopolitics, now and then, are more than just lines on a map – they impact the well-being of people everywhere.

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Work, Wages and Income

Remuneration and Labor Patterns in Sweden 1500–1850

An income is more than just a wage, and compensation for work is more than just an income. Wages, income, and labor patterns are all moving pieces of a complex labor market which come together to determine the well-being of individuals and households. This dissertation asks, *what does a wage represent?* and, *how does a wage turn into income?* within the context of early modern Southern Sweden. To address these larger questions it undertakes several smaller investigations:

- How did wages develop for different groups in the long run?
- What were the differences between women's and men's wages?
- What caused women's wages and work patterns to change?
- How much did people work?
- Did income develop differently between different types of workers?
- How did geopolitical changes impact the lives of everyday workers?
- How do the answers to these questions inform the approaches we use to study historical work, wages, and income?

The results show a labor market in which women were integrated into manual labor and could earn wages equal to men's, and women and men probably worked only as much as they needed to in order to meet their annual needs. However, this became more difficult for all groups into the eighteenth and nineteenth century as urban growth and increasing landlessness made making a living progressively more difficult.

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