



LUND UNIVERSITY

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

Gary, Kathryn

2019

Document Version:
Other version

[Link to publication](#)

Citation for published version (APA):

Gary, K. (2019). *The distinct seasonality of early modern casual labor and the short durations of individual working years: Sweden 1500-1800*. (Lund Papers in Economic History. Education and the Labour Market ; No. 2019:189).

Total number of authors:
1

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Lund Papers in Economic History



No. 189, 2019

Education and the Labour Market

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

Kathryn E. Gary

Lund Papers in Economic History
ISRN LUSADG-SAEH-P--19/189--SE+22

© The author(s), 2019

Orders of printed single back issues (no. 1-65)
Department of Economic History, Lund University
Postal address: P.O. Box 7083, S-220 07 Lund, Sweden
Telephone: +46 46 2227475
Telefax: +46 46 131585

Full-text electronic issues (no. 58, 60, 61, 66--)
www.ekh.lu.se

Lund Papers in Economic History are published by the Department of Economic History, Lund University, Sweden. This series replaces the former series under the title *Meddelande från ekonomisk-historiska institutionen, Lunds universitet*. The change of name reflects the orientation of the series towards an international readership. The series is multilingual, but the majority of the working papers appear in English.

Lund Papers in Economic History include papers in the following topic areas:

General Issues

Development Economics

Education and the Labour Market

Population Economics

Lund Papers in Economic History are published as occasion arises, not at fixed intervals. Printed issues are distributed to libraries. From 1999 and onwards, full-text electronic issues are also available on www.ekh.lu.se. Those who would be interested in receiving information by email on new issues of **Lund Papers in Economic History** are requested to send an email message to Lund.Papers@ekh.lu.se.



LUND
UNIVERSITY

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

Kathryn E. Gary

Lund University

Department of Economic History

kathryn.gary@ekh.lu.se

Abstract

Historical 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, typically paid by the day. 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, 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.

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.

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. A typical work year would probably not have been longer than 150 days, and would be made up of shorter work spells at several different sites. This is not enough work to meet standard assumptions of 250 days, or enough work for an unskilled man to support his family at a respectable level (see Allen 2001).

Keywords: working year; seasonal work; labor patterns; early modern; Sweden

JEL: J23, N13, N34

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 casual 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 patterns 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 casual 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 casual 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.

An underlying assumption of this study is that the rural nature of Sweden and Scania, coupled with the thin labor markets even within towns, would substantially limit the availability of

casually paid work. The data sources, discussed below, are all large institutions or manors, which would have been dominant in their respective locations – in Malmö the dominant source is Malmö City Hall, and in Kalmar it is Kalmar Cathedral. Because of this, the employers who are recorded here are treated as quasi-monosomies, setting both wage rates and employment levels.

Data

The data used to calculate real wage estimates for southern Sweden (see 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 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

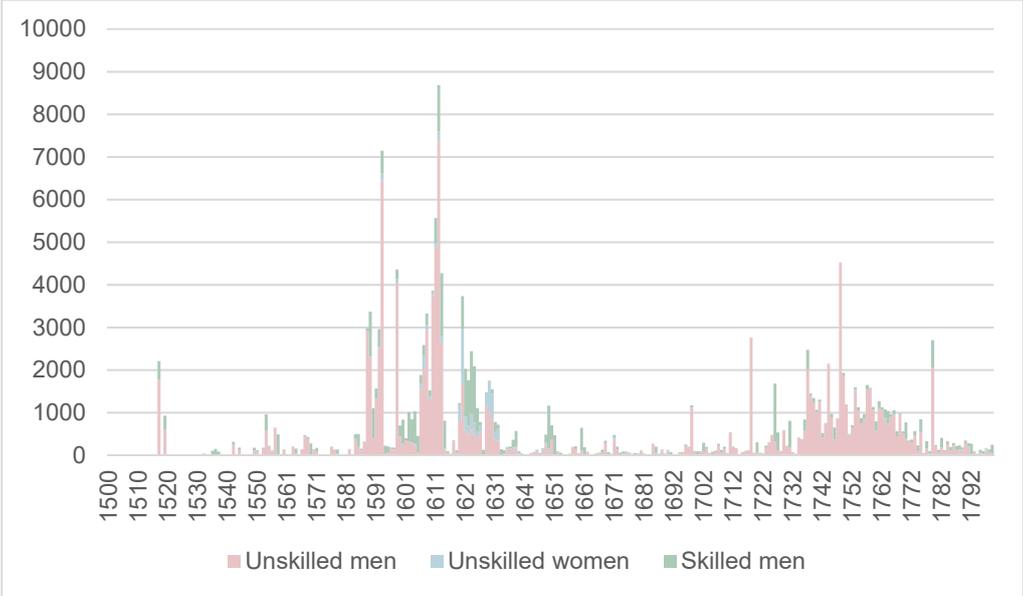


Figure 1: number of paid work days in southern Sweden. Source: Author's calculations

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.

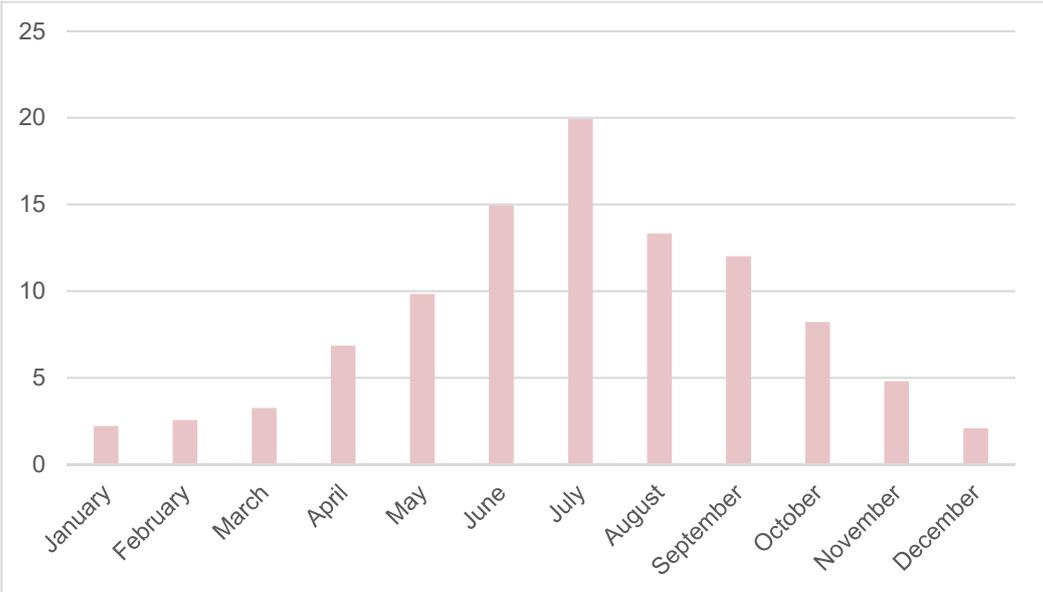


Figure 2: Distribution (percent) of workdays in construction by month when month of work is known, 1500-1799. All workers. Source: Author's calculations.

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 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 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

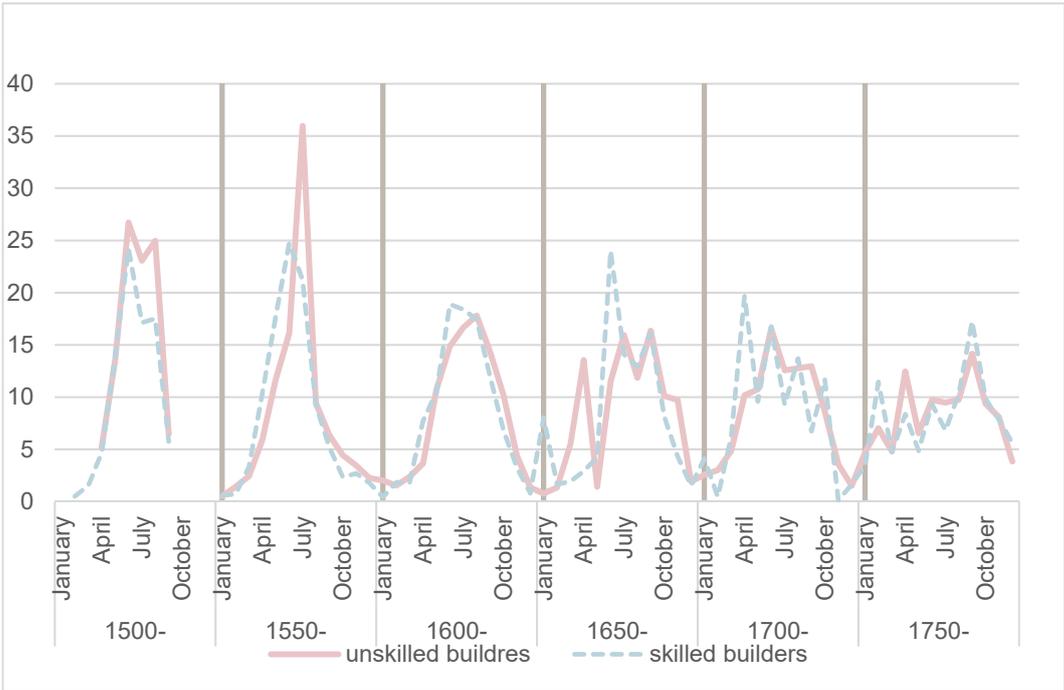


Figure 3: Distribution (percent) of unskilled and skilled workdays by month in fifty year periods. Source: Author’s calculations. Unfortunately the data in the first half of the sixteenth century are the least likely to include a time specification beyond the year – about 35 percent of these observations 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.

state-building and fortification which was ongoing in both Sweden and Denmark during this

¹Kussmaul 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.

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 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 extensiveness 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 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.

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	Unskilled	3	4.94	5.74	201
	Skilled	3.5	6.1	7.6	28
100 < n <= 400	Unskilled	6	8.95	11.8	211
	Skilled	7.5	11.8	19.2	33
400 < n <= 1000	Unskilled	11	18.7	22.2	270
	Skilled	13.5	27.6	30.1	40
1000 < n <= 2000	Unskilled	6	20.1	31.8	461
	Skilled	50	51.1	29.9	9
2000 < n <= 4000	Unskilled	11	24.8	36.4	62
	Skilled	18	30.5	28.8	36
4000 < n	Unskilled	12	24.8	34.2	234
	Skilled	9.5	9.2	4.5	4

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

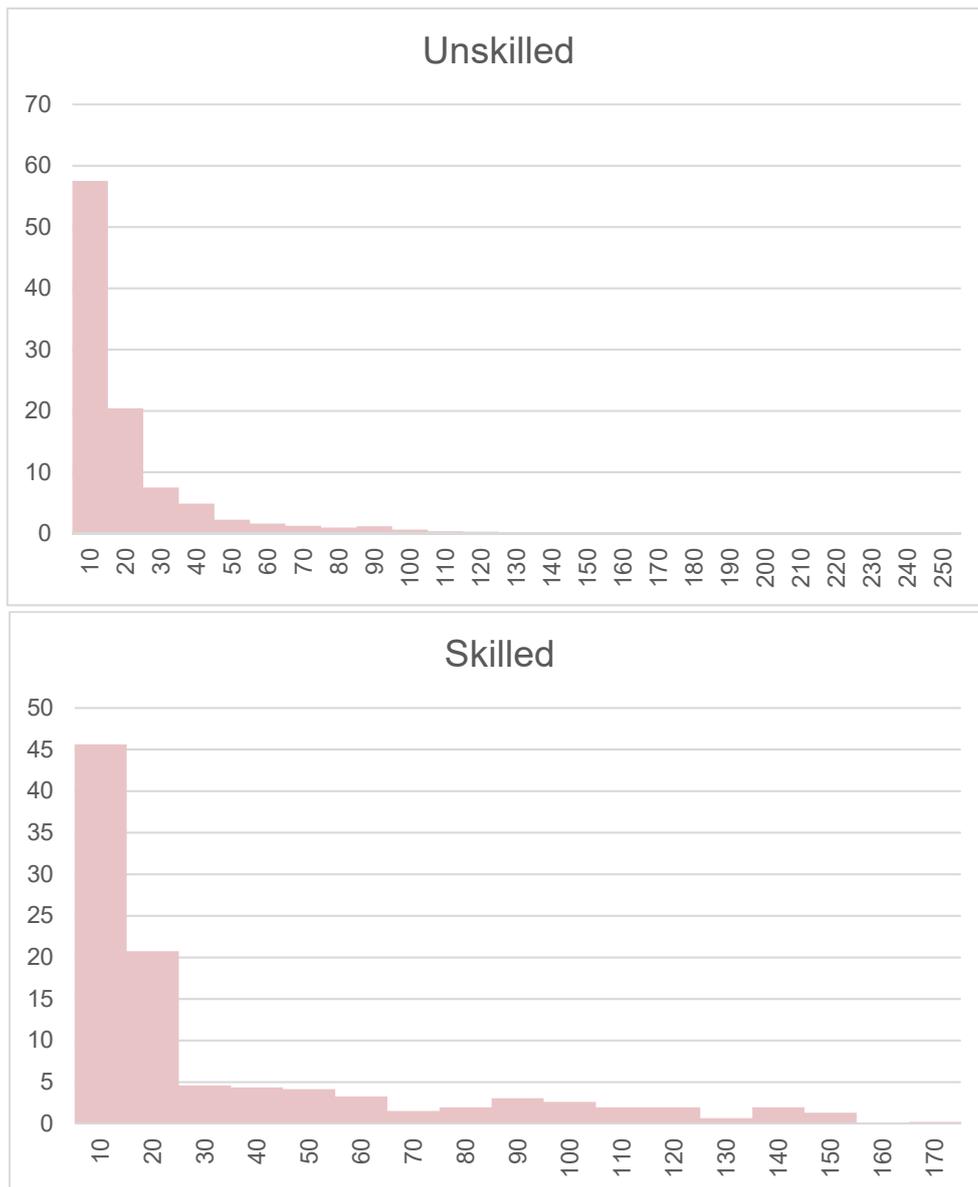


Figure 4: *Distribution (percentage) of unskilled (top) and skilled (bottom) workers’ annual days of work in the entire sample, 1500-1799. Source: Author’s calculations*

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.

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 or 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



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

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 up 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 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 soldiers, 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.

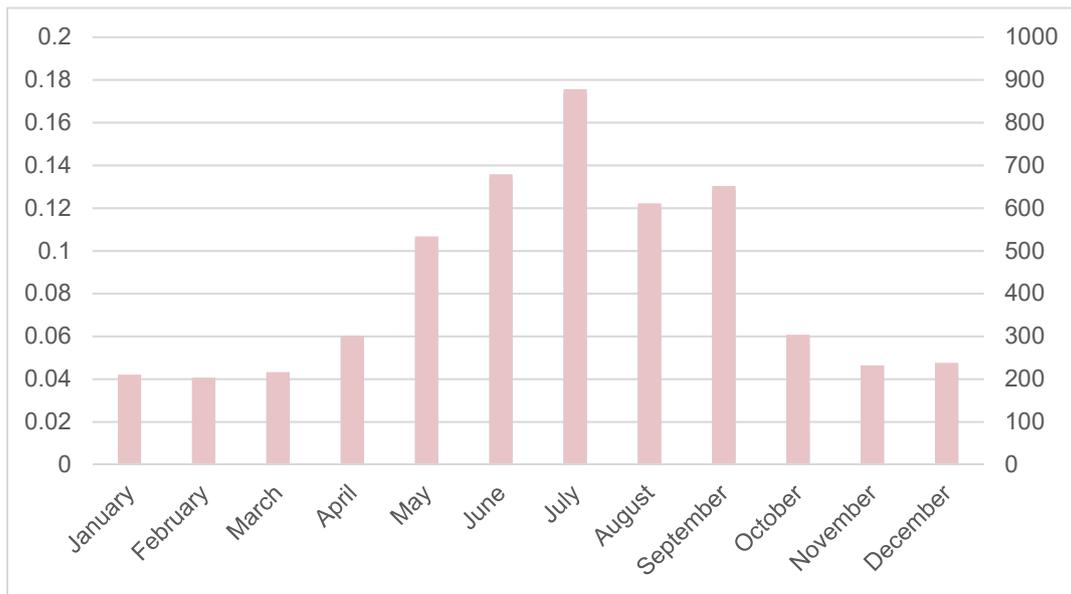


Figure 5: Distribution (left) and number (right) of paid work days at Malmö Harbor, 1810. Source: Author's calculations

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 casual workers. The most industrious worker was actually a boy,

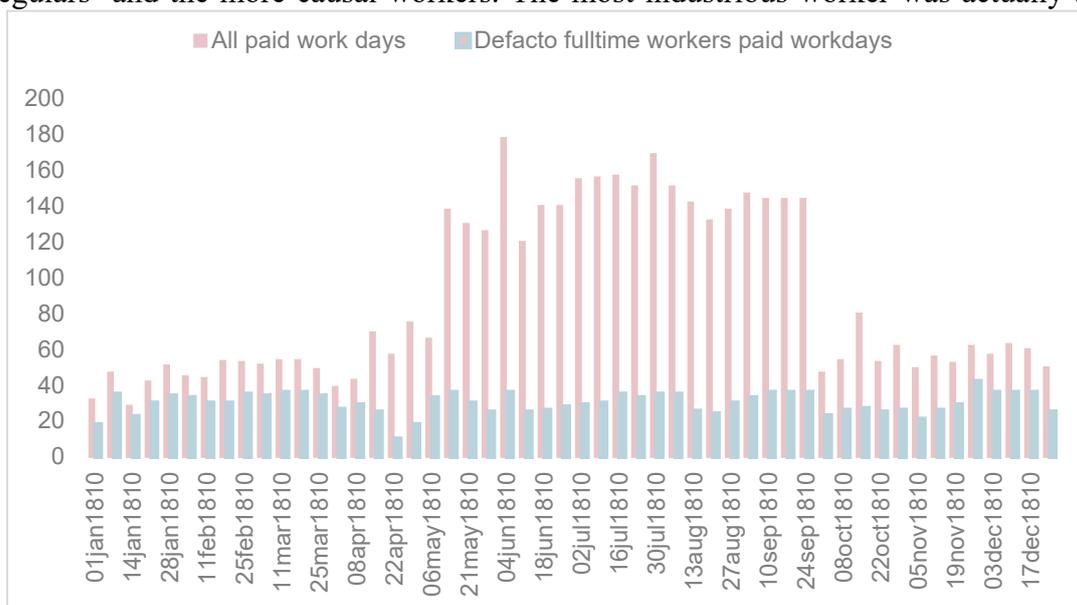


Figure 6: Weekly days of paid work by worker frequency, Malmö harbor 1810

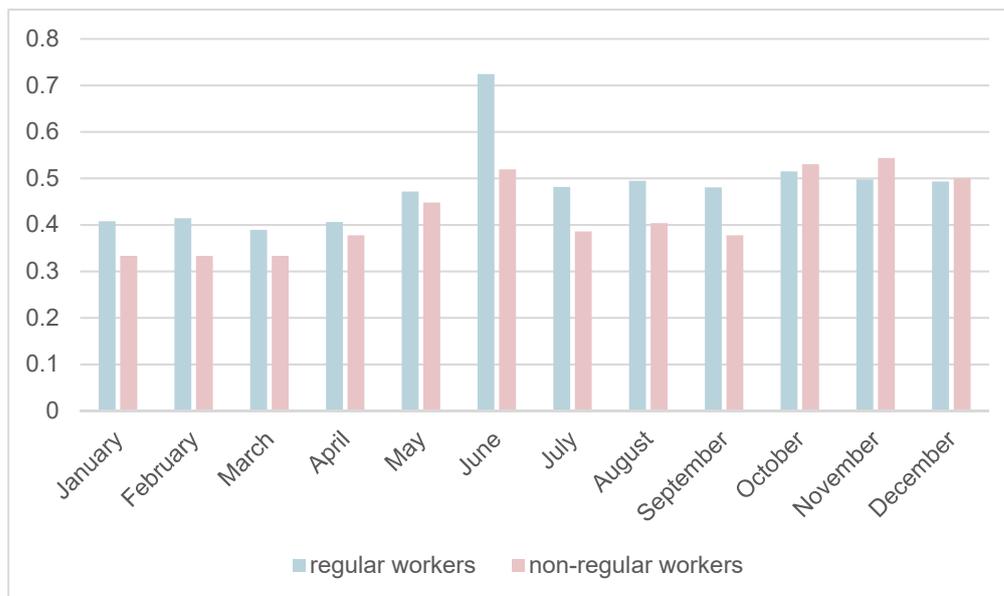


Figure 7: monthly average wages by work frequency, Malmö harbor 1810. Source: Author's calculations

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.



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

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 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 casual 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 quite 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 than 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.

References

- Allen, R. C. (2001). "The Great Divergence in European Wages and Prices from the Middle Ages to the First World War." Explorations in Economic History **38**: 11-447.
- Allen, R. C. (2013). "Poverty Lines in History, Theory, and Current International Practice."
- Allen, R. C. and J. L. Weisdorf (2011). "Was there an 'industrious revolution' before the industrial revolution? An empirical exercise for England c. 1300-1830." The Economic History Review **64**(3): 715-729.
- Bengtsson, T. and M. Dribe (2005). New evidence on the standard of living in Sweden during the 18th and 19th centuries: Long-term development of the demographic response to short-term economic stress. Living Standards in the Past: New Perspectives on Well-Being in Asia and Europe. R. C. Allen, T. Bengtsson and M. Dribe. Oxford, Oxford University Press.
- de Vries, J. (1994). "The Industrial Revolution and the Industrious Revolution." The Journal of Economic History **52**(2): 249-270.
- de Vries, J. (2008). The Industrious Revolution. Cambridge, Cambridge University Press.
- Dribe, M. (2000). Leaving Home in a Peasant Society. Economic Fluctuations, Household Dynamics and Youth Migration in Southern Sweden, 1829-1866. Lund, Almqvist & Wiksell International.
- Dribe, M. and B. van de Putte (2012). "Marriage seasonality and the industrious revolution: southern Sweden, 1690–1895." The Economic History Review **65**(3): 1223-1146.
- Enflo, K. and A. Missiaia (2017). "Between Malthus and the industrial take-off: regional inequality in Sweden, 1571-1850." Lund Papers in Economic History(2017:168).
- Enflo, K. and A. Missiaia (2018). "Regional GDP estimates for Sweden, 1571–1850." Historical Methods: A Journal of Quantitative and Interdisciplinary History: 1-23.
- Engerman, S. and C. Goldin (1991). "Seasonality in Nineteenth Century Labor Markets." NBER(20).
- Gary, K. E. (2018a). Kappa. Work, Wages, and Income: Remuneration and labor patterns from different types of labor in Sweden 1500-1850.
- Gary, K. E. (2018b). "On the construction of nominal and real wage series: Southern Sweden 1500-1850." Working paper.
- Gary, K. E. and M. Olsson (2017). "Business as Usual: Nobility and Landed Estates in Sweden." Essays in Economic and Business History **XXXV**(1): 151-173.
- Gary, K. E. and M. Olsson (2018). "Men at Work: Wages from annual and causal labor in southern Sweden 1500-1850." Working paper.
- Hamilton, E. J. (1936). Money, Prices, and Wages in Valencia, Aragon, and Navarre, 1351-1500. Boston, Harvard University Press.

Humphries, J. and C. Sarasúa (2012). "Off the Record: Reconstructing Women's Labor Force Participation in the European Past." Feminist Economics **18**(4).

Humphries, J. and J. Weisdorf (2015). "The Wages of Women in England, 1260-1850." Journal of Economic History **75**(405-447).

Humphries, J. and J. Weisdorf (2016). "Unreal wages? A new empirical foundation for the study of living Standards and economic growth in England, 1260-1860." Oxford Discussion Papers in Economic and Social History.

Kussmaul, A. (1993). A general view of the rural economy of England, 1538-1840. Cambridge, Cambridge University Press.

Stephenson, J. Z. (2018). "Looking for work? Or looking for workers? Days and hours of work in London construction in the eighteenth century." WP.

Swenson, P. (1991). "Bringing Capital Back in, or Social Democracy Reconsidered: Employer Power, Cross-Class Alliances, and Centralization of Industrial Relations in Denmark and Sweden." World Politics **43**(4): 513-544.

Voth, H.-J. (1998). "Time and Work in Eighteenth-Century London." The Journal of Economic History **58**(1): 29-58.