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## Abstract

In the aftermath of Brexit there has been increased speculation into what national borders mean for economic and individual wellbeing. Investigating similar events in history can help us understand some of these potential effects. Malmö, a city in modern-day southern Sweden, was a part of Denmark until the middle of the seventeenth century, located just across the Sound from the capital of Copenhagen. Malmö and its surrounding regions were ceded to Sweden at the end of the Second Northern War in 1658 and Sweden immediately established barriers to trade and to human capital flow between its new territories and Denmark, going so far as to prohibit Swedish attendance to Copenhagen University and instead establishing its own university in Lund in 1666. Malmö and its surrounding region, Scania, quickly shifted from an important trade city located within sight of the capital to a distant periphery with limited trade capacity. This change in possession of Scania provides a historical experiment that can highlight the effect of the second nature geography changes as well as protectionism on well-being. We use a novel database of Danish and Swedish real wages to investigate the impact of these changes on Scanian living standards by employing a difference in difference approach to show that wages fell more in Scania than those in surrounding regions in relation to the border change and associated protectionism.

JEL Codes: J31, N33, N93

**Keywords:** Border Changes, Real Wages, Second Nature Geography, Welfare Ratios, Standard of Living, Denmark, Sweden, Malmö, Scania, Scandinavia, Early Modern Period

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

Kathryn E. Gary and Cristina V. 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 1995) 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 latter 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<sup>1</sup> 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<sup>2</sup>, 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 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 led 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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<sup>1</sup> 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)

<sup>2</sup> 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<sup>3</sup>, but real wage development during this period show a similar response to the constant warfare. In the 1500s Denmark starts as a poor country, where workers earned around half of the minimum amount they needed to support a family (Radu 2018), 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. From these low values, Danish agricultural wages increase after 1600. At this time, the kingdom controlled access to the Baltic Sea and the state grew wealthy from collecting Sound dues from passing merchant ships. 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.

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<sup>3</sup> 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

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 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 merchantilistic 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

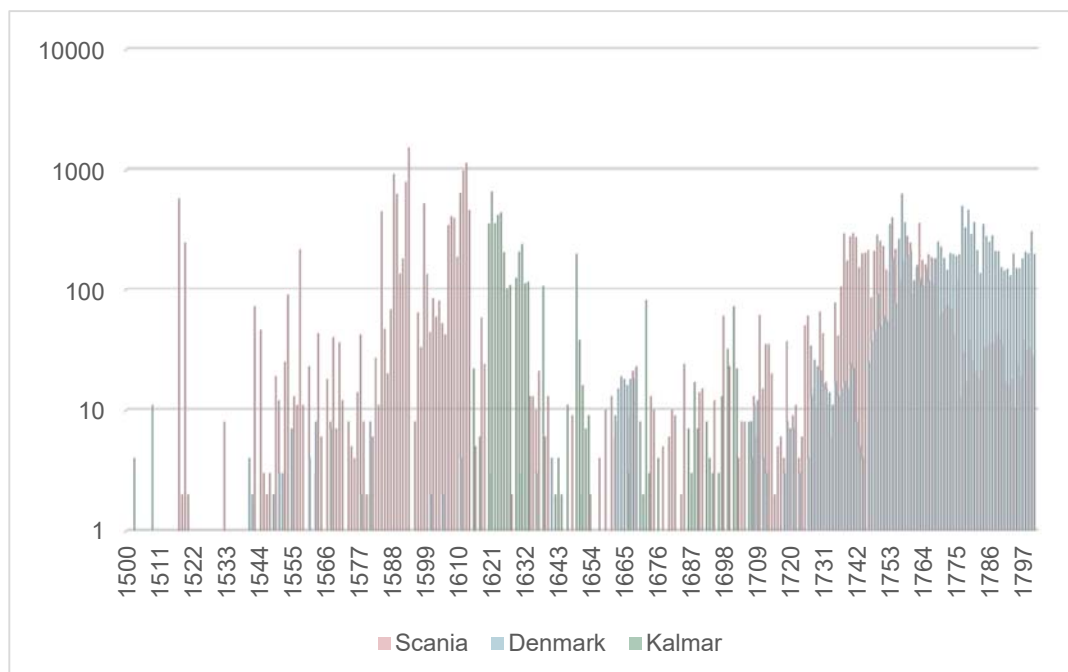


Figure 2: Distribution of primary observations for Scania, Denmark, and Kalmar. Figure shown in log scale.

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 span 1660 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, approximately 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

	<i>Subsistence</i>	<i>Respectability</i>
<i>kg rye bread</i>	-	234
<i>kg rye</i>	155	-
<i>kg peas</i>	20	52
<i>kg meat</i>	2.5	13
<i>liters milk</i>	-	-
<i>liters beer</i>	-	182
<i>kg cheese + butter</i>	3	10.4
<i>Eggs (n)</i>	-	52
<i>kg salt fish</i>	2.5	13
<i>kg soap</i>	1.3	2.6
<i>m linen</i>	3	5
<i>kg candles</i>	1.3	2.6
<i>liters Lamp oil</i>	1.3	2.6
<i>M BTU Fuel</i>	2	5
<i>Rent</i>	5%	5%

Table 1. The content of the subsistence and respectability baskets.

Source: Gary 2018b



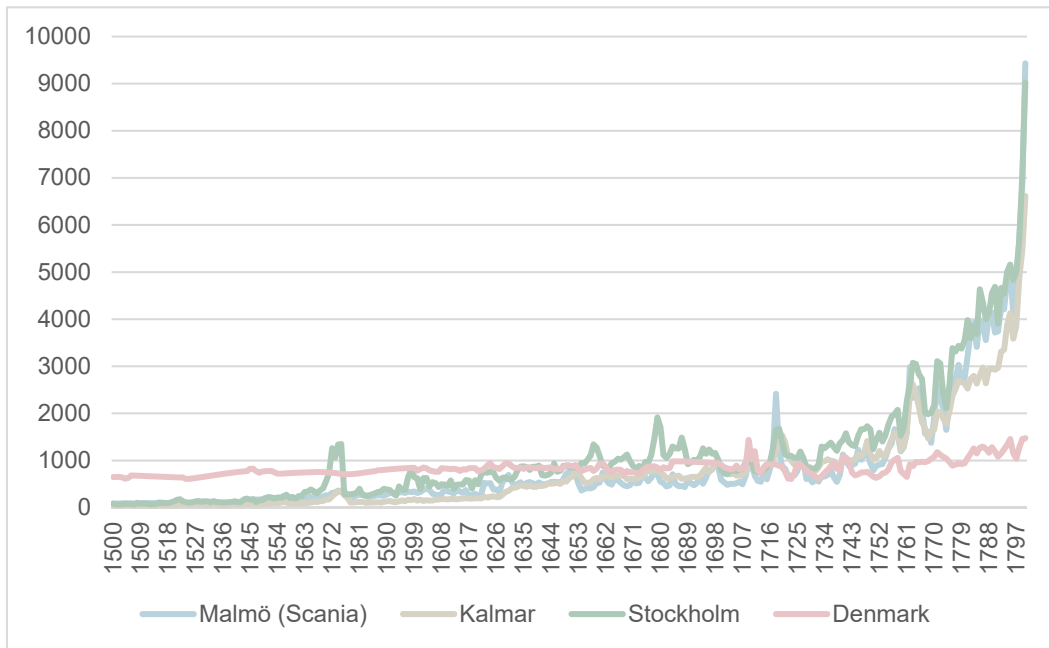


Figure 3: Consumption baskets (subsistence level) for Denmark, Malmö (used also for Scania), Stockholm, and Kalmar 1500-1800.

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.

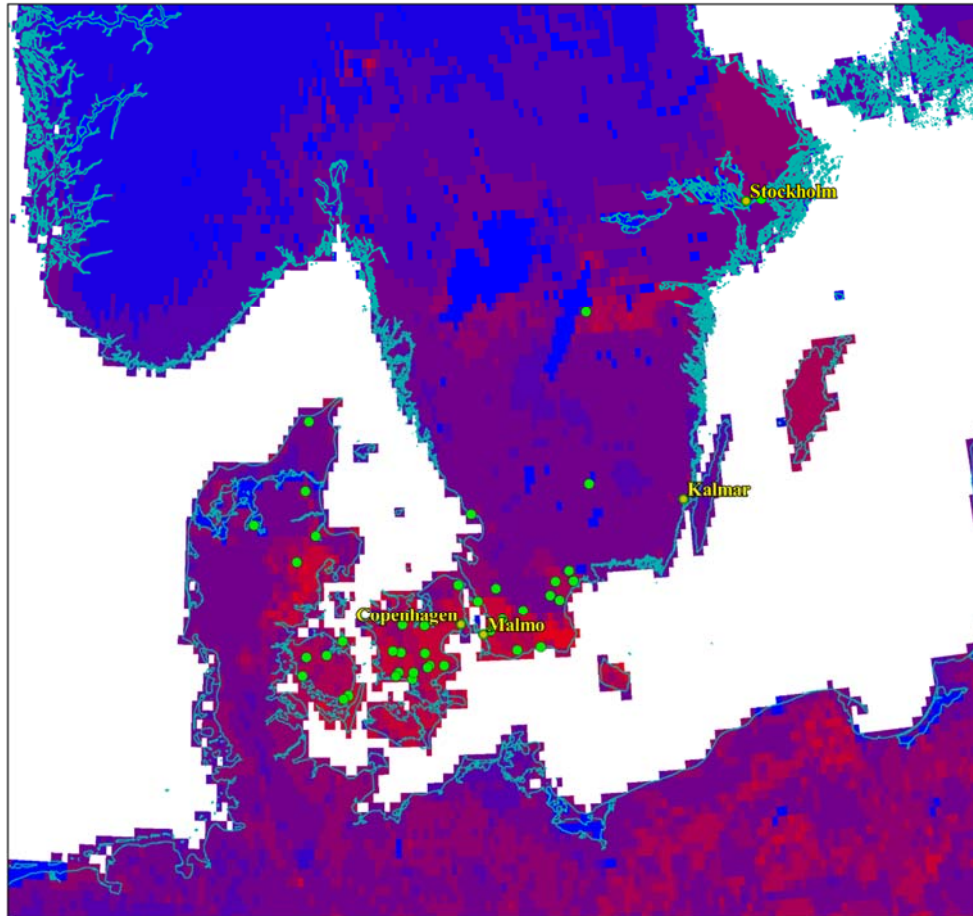


Figure 4: Map of southern Scandinavia, with the main locations in this investigation and rye suitability. Red indicates higher suitability, blue lower suitability.

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 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 farmers 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

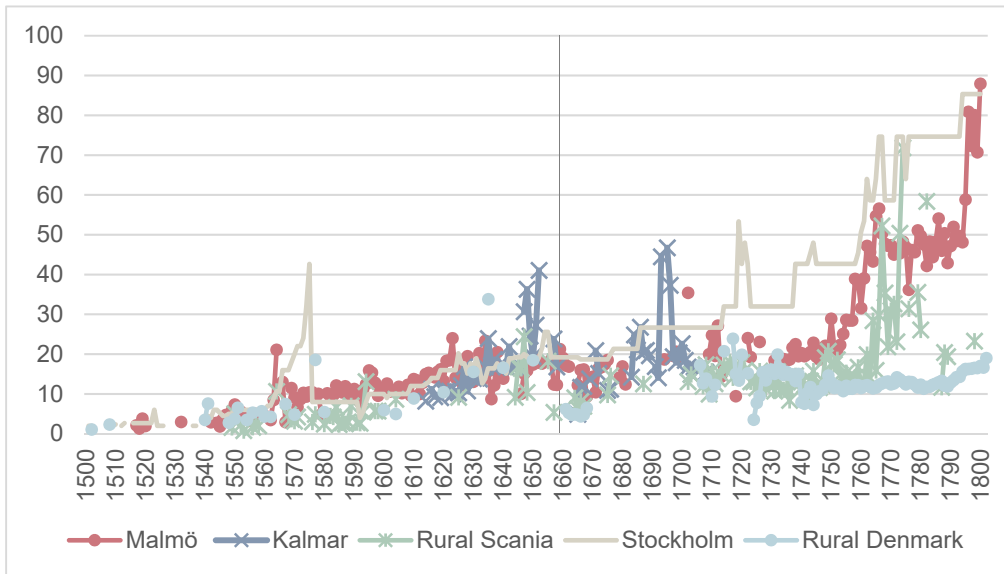


Figure 5: Nominal wages (skilling) in Malmö, Kalmar, Rural Scania, Stockholm, and Rural Denmark, 1500-1800. Vertical bar denotes the border change.

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 17<sup>th</sup> 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

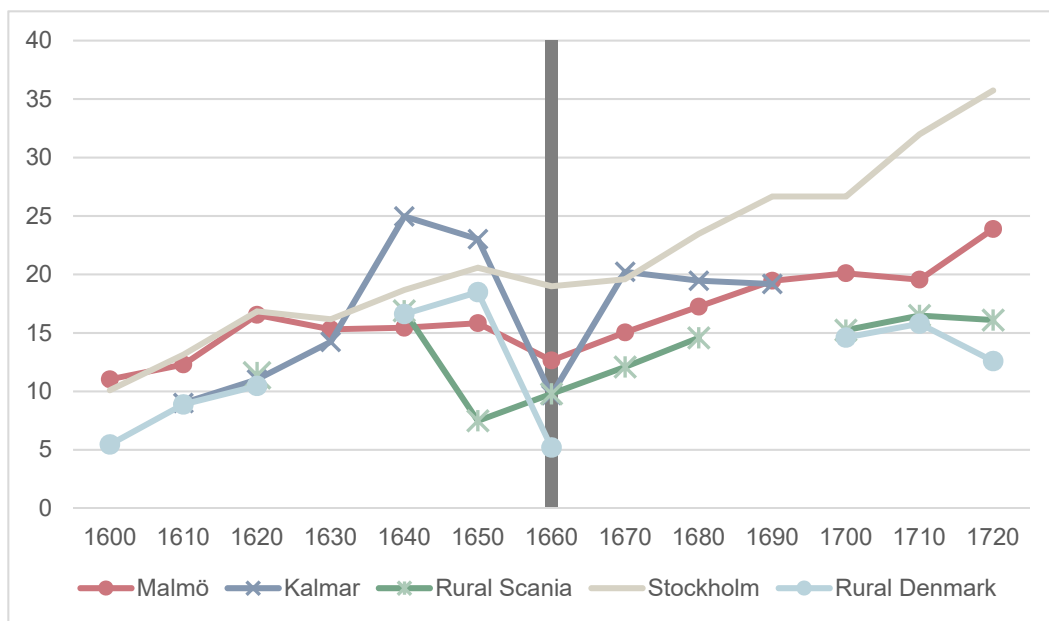


Figure 6: Nominal wages in skilling (decadal averages) in Malmö, Kalmar, Rural Scania, Stockholm, and Rural Denmark, 1600-1719. The vertical bar denotes the change in territory.

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 number 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 from Malmö town, while rural prices could have been lower. Fluctuations in the rural Danish real wages are likely connected to fewer observations 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.

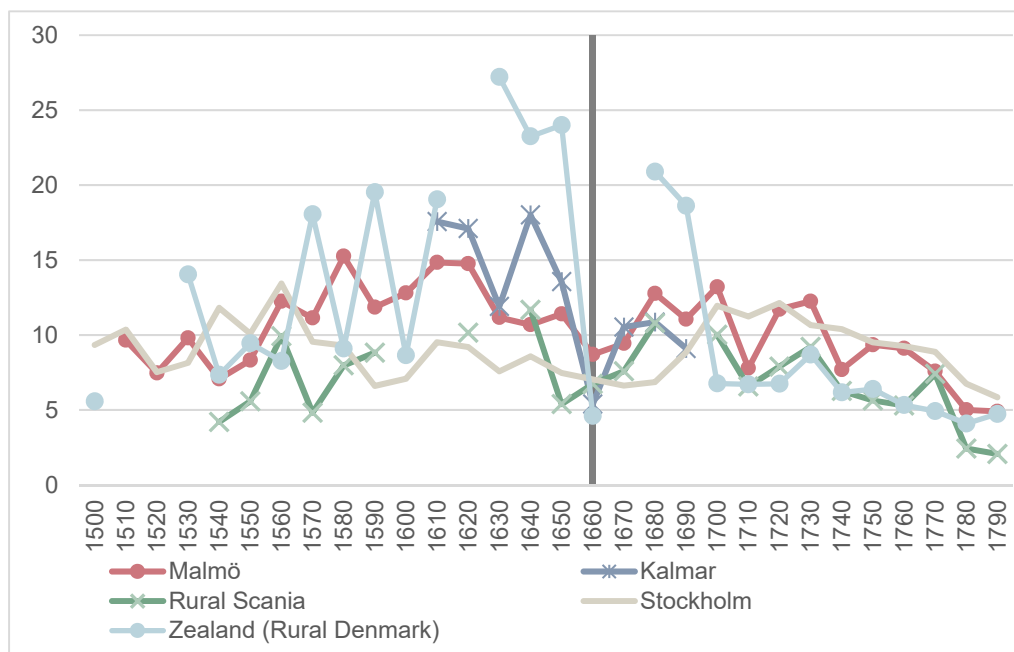


Figure 7: Real wages (for one day's work) in Malmö, Rural Scania, Rural Denmark, Kalmar, and Stockholm

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 Kalmar.

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:

$$\ln w_{it} = \text{Scania}_{it} \text{border}_{1658} \beta + \alpha_t + X_{it}' \gamma + \varepsilon_{it},$$

In which  $\ln w_{it}$  denotes log wages;  $i$  indicates individual and  $t$  indicates time;  $\text{Scania}_{it}$  indicates whether the individual lives in Scania;  $\text{border}_{1658}$  is a dummy variable which equals 1 for the period 1658-1800;  $\beta$  measures the effect of the border change on the standard of living of individuals living in Scania;  $\alpha_t$  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,  $\beta_{ijt}$  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 from 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*** [-3.48]	-0.454** [-2.07]	-0.558*** [-3.48]	-0.136** [-2.25]	-0.193*** [-2.50]	-0.136** [-2.25]	-0.225*** [-3.10]	-0.225*** [-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 Jutland (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 *** [-5.80]	-0.939*** [-5.90]	-0.703*** [-5.80]	-0.162*** [-2.92]	-0.187*** [-2.69]	-0.163*** [-2.92]	-0.291 *** [-5.52]	-0.290*** [-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 Jutland (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 tables 4 and 5 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 6 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

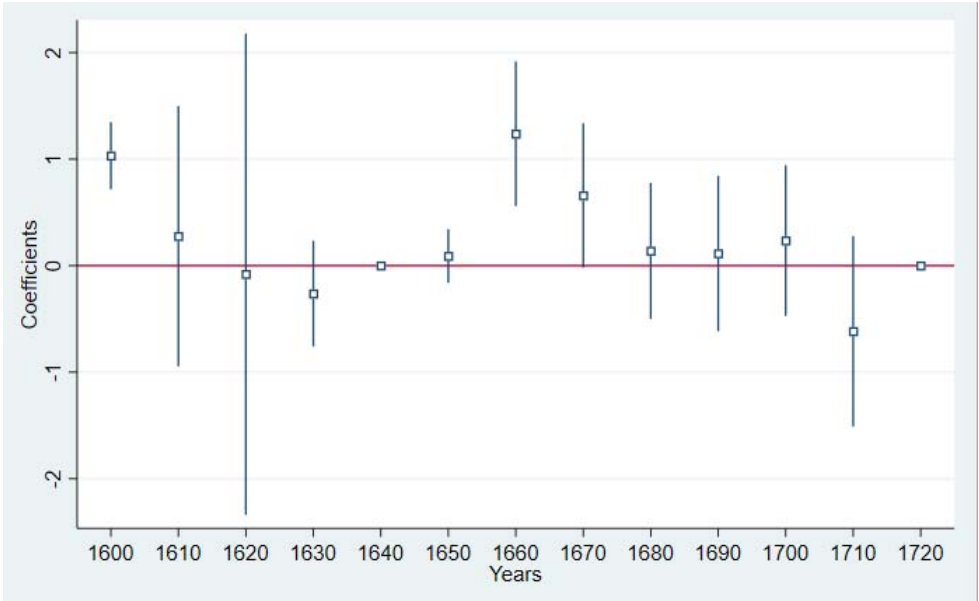


Figure 8: Difference between Danish and Scanian log real wages by decade

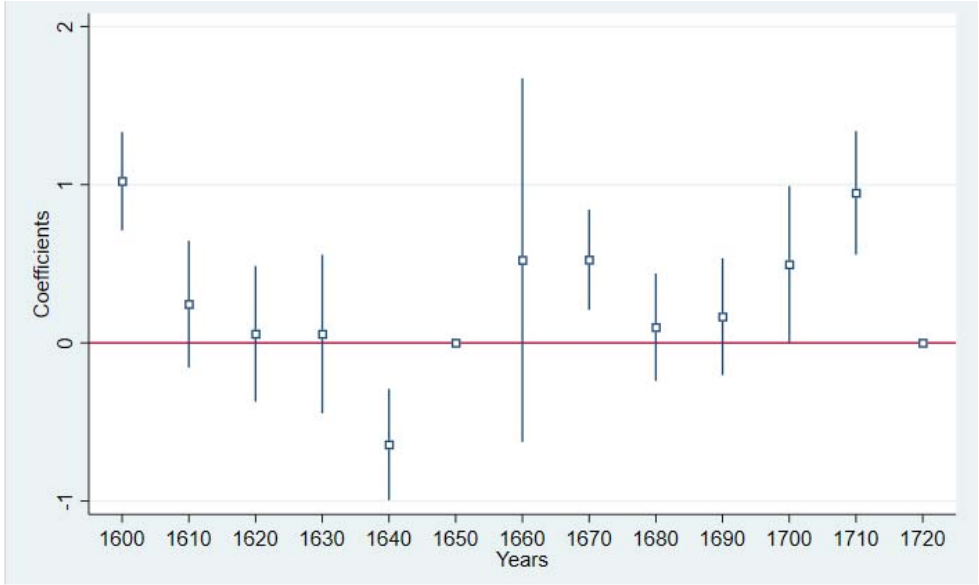


Figure 9: Difference between Scanian and Kalamr log real wages by decade.

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 for 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 7, 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 (table 8) 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.

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.



	Dependent variable					
	Unskilled, lower skilled			Medium, higher skilled		
	1	2	4	5	6	8
Scania x change	-0.657*** [-3.29]	-0.382 [-1.06]	-0.382 [-1.06]	-0.307 [-1.20]	1.138*** [7.63]	2.152*** [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 4. 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 [-0.26]	-0.200* [-1.80]	-0.200* [-1.80]	-0.099 [-0.87]	0.152* [1.77]	0.152* [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 5. 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 Jutland. 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*** [-5.75]	-0.929*** [-4.79]	-0.929*** [-4.79]	-0.243** [-2.24]	-0.225*** [-3.29]	-0.225*** [-3.29]	-0.378*** [-4.77]	-.378*** [-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 Västmanland			
	1	2	3	4	5	6	7	8
Scania x change	-0.509*** [-2.70]	-0.634*** [-3.44]	-0.433** [-2.39]	-0.535*** [-3.14]	-0.167*** [-2.65]	-0.223*** [-5.12]	-0.203*** [-4.11]	-0.274*** [-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 suitability	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 Jutland (columns 1-4), and Kalmar and Västergötland (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 Västmanland			
	1	2	3	4	5	6	7	8
Distance to capital	-0.00103** [-2.56]	-.00082** [-2.29]	-.00108*** [-2.78]	-0.00091** [-2.33]	-0.00029*** [-3.65]	-0.00036*** [-3.69]	-0.00038*** [-6.14]	-0.00046*** [-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 suitability	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 8. 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 Jutland (columns 1-4), and Kalmar and Västergötland (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

## References

- Abildgren, K. (2010). "Consumer prices in Denmark 1502-2007." Scandinavian Economic History Review **58**(1): 2-24.
- 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."
- Bengtsson, E., et al. (2017). "Wealth inequality in Sweden, 1750–1900." The Economic History Review **0**(0): 1-23.
- 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.
- Brakman, S., et al. (2004). "The Spatial Distribution of Wages and Employment: Estimating the Helpman-Hanson Model for Germany." Journal of Regional Science **44**(437-466).
- Breinlich, H. (2006). "The Spatial Income Structure in the European Union - What Role for Economic Geography?" Journal of Economic Geography **6**: 593-617.
- Brühlhart, M. (1995). "Industrial specialization in the European Union: a test of the "new trade theory"." Trinity Economic Paper Series Technical Paper No. 95/5.
- De Bruyne, K. (2009). "The Location of Economic Activity: Is There a Spatial Employment Structure in Belgium?" Working Papers 2009/28.



Edvinsson, R. (2010). The multiple currencies of Sweden-Finland 1534-1803. Historical Monetary and Financial Statistics for Sweden: Exchange rates, prices, and wages 1277-2008. R. Edvinsson, T. Jacobson and D. Waldenström. Halmstad, Sveriges Riksbank and Ekerlids Förlag. **1**: 453-478.

Edvinsson, R. and J. Söderberg (2007). A Consumer Price Index for Sweden 1290-2006. <http://www.riksbank.se/en/The-Riksbank/Research/Historical-Monetary-Statistics-/Prices/>, Sveriges Riksbank.

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.

Gary, K. E. (2018a). Work, Wages and Income: An Introduction. 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. (2018d). "The distinct seasonality of early modern casual labor and the short durations of individual working years: Sweden 1500-1800." 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.

Hall, R. E. and C. I. Jones (1999). "Why do some countries produce so much more output per worker than others?" Quarterly Journal of Economics **114**: 83-116.

Hanson, G. (1998). "Market potential, increasing returns and geographic concentration." NBER working paper 6429.

Hanson, G. (2005). "Market potential, increasing returns and geographic concentration." Journal of International Economics **67**: 1-24.

Heinemeyer, H. C., et al. (2008). "Endogenous borders? Exploring a natural experiment on border effects." Centre for Economic Policy Research working paper.

Jensen, P., Radu, C. V., Severini, B., Sharp, P. (2018). "The effect of serfdom on labor markets." EHES Working paper.

Kirby, D. Northern Europe in the Early Modern Period: The Baltic World 1492-1772. Singapore, Longman Singapore Press.

Kjærgaard, T. (1994). The Danish revolution, 1500–1800: an ecohistorical interpretation. Cambridge, Cambridge University Press.

Lampe, M. and P. R. Sharp (2018). A Land of Milk and Butter: How Elites Created the Modern Danish Dairy Industr. Chicago and London, The University of Chicago Press.

López-Rodríguez, J. and A. Faiña (2007). "Regional Wage Disparities in the European Union: What role for Market Access." Investigaciones Regionales **11**: 5-23.

Morrell, M. (1989). Studier i den Svenska livsmedelskonsumtionens historia: Hospitalshjonens livsmedelskonsumtion 1621-1872. Department of Economic History. Upsalla, Upsalla University. **Doctor**.

Olsson, M. (2006). "Manorial economy and corvée labour in southern Sweden 1650–1850." Economic History Review **LIX**(3): 481-497.

Pires, A. J. G. (2006). "Estimating Krugman's Economic Geography Model for Spanish Regions." Spanish Economic Review **8**(82-112).

Radu, C. V. (2018). "Real wages, labour conditions and standard of living in Denmark during the 18th century." Working paper.

Redding, S. and A. J. Venables (2004). "Economic geography and international inequality." Journal of International Economics **62**(1): 53-82.

Schön, L. and O. Krantz (2012). "The Swedish economy in the early modern period: constructing historical national accounts." European Review of Economic History **16**: 529-549.

van Leeuwen, M. D. H. and I. Maas (2011). HISCLASS: A Historical International Social Class Scheme. Leuven, Leuven University Press.

van Zanden, J. L. The prices of the most important consumer goods, and indices of wages and the cost of living in the western part of the Netherlands, 1450-1800.

Williamson, J. G. (2008). "Globalization and the Great Divergence: terms of trade booms, volatility and the poor periphery, 1782-1913." European Review of Economic History **12**(3): 355-391.

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