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“The historical roots of regional divergence: Sweden, 1571-1850.”

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The historical roots of regional divergence:

Sweden, 1571-1850

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Abstract

The causes and extent of regional inequality in the process of economic growth are at the core of historical economic research. So far, much attention has been devoted to studying the role of industrialization in driving regional divergence. Empirical studies on relatively unequal countries such as Italy or Spain show that inequality was high already at the outset of the Industrial Revolution (Felice, 2011; Rosés et al., 2010). However, due to lack of data, it has been so far virtually impossible to extend GDP series further back than mid-19th century. This paper aims to address this issue by for the first time looking at a pre-industrial European economy. To this end, we use new estimates of regional GDP for the Swedish regions in the period 1571-1850 (Enflo and Missiaia, 2017). We find that regional inequality increased dramatically between 1571 and 1750 and stayed high until the outbreak of the Industrial Revolution, discarding industrialization as the main driver of regional divergence. We suggest that institutional factors served to increase regional inequality in the early pre-industrial period: the creation of the Swedish Empire, monopoly trading rights and protective industrial policy created an economic structure in terms of employment and GDP per capita that made the capital region of Stockholm stand out compared to the “rest”, increasing inequality. The relaxation of these policies later on reduced regional inequality in spite of the industrialization of the country.
1. Introduction

How regional inequality evolves during the different phases of economic growth is a much debated issue in historical economic research. So far, scholars have focused on the role of industrialization in driving regional inequalities. In a pioneering article, Williamson (1965) proposed the view that industrialisation led to increasing regional inequality. The evidence was collected for several countries, but covered only a relatively short time period in the middle the 20th century. With this dataset, Williamson found a peak in regional inequality occurring sometime in the interwar period, and he attributed it to the process of industrialisation. Since then, economic historians have extended the evidence calculating regional GDP for longer time periods. With the new datasets it has become more and more clear that regional inequality and large differences in the level of GDP already existed well before industrialization. For instance, recent estimates of regional GDP for Sweden from 1860 to 2010 show that inequality was high already at the outset of the Industrial Revolution (Enflo et al., 2014). The same is true for other large European countries such as Italy (Felice, 2011) or Spain (Rosés et al., 2010). However, due to lack of data it has been deemed virtually impossible to extend most regional GDP series further back than mid-19th century (see the forthcoming book by Rosés and Wolf with European data that starts around 1900 for most counties). Since the industrial take-off arguably occurred in the 19th century in most cases, the existing evidence tells us very little about how regional inequalities came about and how they evolved as industrialization unfolded.

This paper aims to address this issue by looking for the first time at a pre-industrial European economy through a newly compiled dataset of regional GDP that covers every decade in the period 1750-1850 as well as the early benchmark of 1571. By connecting our series to the existing ones by Enflo et al. (2014a) for the period 1860-2010, we are able to produce the longest set of regional GDP series to date for any single country. The series will be analyzed through the coefficient of variation as main indicator of the overall regional inequality for the entire period. Besides this, we are going to propose an analysis of the determinants of regional inequality in GDP per worker. The Economic Geography literature proposes two views of the causes of regional divergence/convergence: trade theory predicts that regional income is determined by the regional economic structure, i.e. the share of each

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1 The second longest regional GDP series have been estimated for Belgium, starting in 1819 (Buyst, forthcoming).
2 To this end, it is not possible to include the 1571 benchmark as we lack labour force estimates for this year.
sector of the economy; New Economic Geography theory predicts that regional differences in productivity within the same sector can drive inequality. To test these two hypotheses, Martínez-Gallaraga et al. (2015) propose for the case of Spain a decomposition of inequality of GDP per worker, measured through the Theil index, in within and between components. The within component represents the weighted average of regional inequality in labour productivity within each sector. The between component represents the labour productivity differences among sectors of the economy. We find that this latter was the main driver of inequality across Swedish counties.

Our results show that the Swedish case contradicts the stylized view pioneered by Williamson (1965). Williamson’s view can be summarized as regions being poor and equal before industrialization, but increasingly unequal emerged as some regions transited into a more industrial economy, yet as more and more regions become industrial, inequalities gradually disappear and the long-run inverted U-shape in regional inequality emerges. In this view, structural change (i.e. the between component) is the main driver of both upswing and declines in regional inequality. We find that Sweden was relatively equal in the 16th century, it became quite unequal some 100 years before its industrialization, while industrialization had an equalizing effect. Basically, the U-shaped pattern observed in Sweden appears disconnected to its industrialization process. We point to institutional factors to interpret the counter-intuitive trajectory of the Swedish regions.

Our paper speaks to a burgeoning literature on pre-industrial inequality. Analyzing inter-personal income inequality, van Zanden (1995) has suggested the existence of a long-run “super-Kuznets curve”. Demonstrating that income in the Dutch agricultural sector was relatively evenly distributed, he shows that modern economic growth and rising income inequalities were connected. Similarly, Milanovic et al. (2011) have suggested that poor and agrarian societies should be characterized by relatively low inequality, since there is a limited amount of surplus that can be extracted from people living at subsistence. According to these writers, modernization of the economy with rising productivity gaps between sectors would not only make societies richer, but also more unequal. Although the literature has so far focused on inter-personal inequality, there are two main reasons to hypothesize that inter-personal inequality could translate into regional inequality. Firstly, hypothesizing that regions in the pre-industrial period already exhibited some specialization into different sectors with differing productivity, rising productivity gaps between sectors will not only translate into individual inequality, but also regional inequality. Secondly, local elites extracting surplus
from the population may not be evenly spread across regions. If much taxation was carried out by national authorities, extraction and local elites could possibly concentrate disproportionally in the capital region.

Our paper also speaks to the literature about the geographical roots of the Industrial Revolution. While it is possible to hypothesize that regions exhibiting pre-industrial dynamism might also become successful industrializers, others have stressed that the Industrial Revolution was a radically different in its potential to benefit areas that were previously backward. There is a long tradition of explaining the Industrial Revolution in terms of national events, but lately scholars have started to pay attention to its regional roots (for example Kelly et al., 2015). Similarly, economic geographers have paid substantial attention to the issue of path dependency in constructing long-run evolutionary approaches to regional development (Martin and Sunley, 2016). By analyzing a novel dataset on regional GDP that cover a time span long enough cover almost five centuries, we will be in a better position to scrutinize claims about long-run regional path dependency and whether pre-industrial regional growth was decisive in determining the early location of the Industrial Revolution. Thus, our dataset will open the door to a very long run analysis that has so far only been performed on national series or between individuals.

The paper is organized as follows. Section 2 provides an overview of the existing research on regional disparities in Sweden in the long run; Section 3 describes the methods and sources used in the analysis; Section 4 illustrates the results, with an analysis of the long run trends in regional inequality, a close up discussion of the upswing in regional inequality in pre-industrial times and an analysis of structural change as a driver of pre-industrial regional inequality; Section 5 concludes.

2. The regional dimension of Sweden’s long-run evolution

Sweden in the pre-industrial period has often been described as a poor and agricultural economy in the periphery of northern Europe. According to estimates by Schön and Krantz (2015), GDP was low and stagnant with especially sluggish performance in the agricultural sector from 1560 to 1810. However, there is evidence of substantial dynamics in the industrial and service sectors. The mining industry boomed starting from the 17th century with iron ore exports from Sweden constituting more than 80% of the London imports (Olsson-Spjut, 2007)
and copper covering about two thirds of the European market (Falu copper mine). Simultaneously, state capacity grew. When Sweden entered a turbulent period of warfare and imperial expansion (sometimes described as the Great Empire Era, 1611-1718), the economy had to be modernized in terms of fiscal and military capacity.

From the 17th century the Crown imposed mercantilist policies to take control and tax the increasing revenues from trade. Several policies were landed to modernize the rural towns with planned manufactories and monopoly rights to trade. The prime instruments of mercantilist policies were tariff protection to promote exports and the creation of industrial privileges to promote urbanization (Heckscher: 1968, p. 112). Although Heckscher deemed the fruites of these policies “few and insignificant” (ibid), new GDP figures from Schön and Krantz (2012, 2015) nevertheless show a period of economic growth during the 17th century. But eventually Malthusian forces, agricultural stagnation and the continued costs of war hampered the evolution and there was no real take-off into modern economic growth until the mid-19th century. However, the increased militarization and administrative resources of the state bear witness of an economy in the process of change. The State could not generate enough resources by simply taxing trade, instead direct taxation had to be developed to extract surplus from the inhabitants. Thus, an administration capable of taxing households was required. Indeed, much of our underlying sources in estimating regional GDP are the detailed tax records of individuals and households, first set up by the local bailiffs conducting Älvsborgs ransom (1571) and thereafter in the detailed church registers reporting the population in the Tabellverket data (1750-1850), as well as in the Befolkningsstatistik (1855-1900) and the Folkrakningen (1910-2000) in later periods.

The pattern of regional inequality among the Swedish regions has already been observed from the mid-19th century in previous studies. The first to point out that Swedish regions experienced an early industrialization that did not lead to an increase of regional inequality were Enflo et al. (2014a), who produced GDP per capita estimates for 10-year benchmarks from 1855 to 2000. Enflo and Rosés (2015) use the same series to inquire into the drivers of regional inequality in the very long run. They find that structural change was the main driver behind this convergence process. In particular, they point at convergence in the productivity across sectors in the earlier decades and labour reallocation and between-industry convergence in the post-WWII period.
This paper aims at providing a long term picture of the regional inequality of Sweden, covering for the first time both in the century preceding industrialization (1750-1850) and a very early benchmark of 1571. The next section illustrates the sources and the methodology used to this purpose.

3. Methods and sources

3.1. Regional GDP reconstructions

When estimating historical regional GDP figures, one big challenge is the availability of reliable and homogeneous regional statistics before the mid-19th century. As for many types of historical sources, Sweden represents the exception among European countries: labour force statistics from population censuses at regional level are available from the mid-18th century onwards. These can be used to allocate to regions the national estimates of agriculture, industry and services recently produced by Schön and Krantz (2015). The methodology, introduced by Geary and Stark (2002), is standard practice for historical estimates and is considered the most reliable when direct measures of output are not a viable option. GDP in county \( i \) \((Y_i)\) is defined as:

\[
Y_i = \sum_j y_j \beta_j \left( \frac{w_{ij}}{w_j} \right) \times L_{ij}
\]  

(1)

where \( y_{ij} \) is the average value added per worker in county \( i \) and sector \( j \), \( w_{ij} \) is the level of wages in county \( i \) in sector \( j \) and \( L_{ij} \) the number of workers in county \( i \) and industry \( j \). \( \beta_j \) is a scalar that will reflect regional relative differences. Geary and Stark (2002), using UK data show that their method yields to results of promising precision. For the Swedish regions, Enflo et al. (2014a) demonstrate that the method produces reasonable results for the second half of the 19th and the whole 20th century. This is the method used by Enflo and Missiaia (2017) to produce GDP estimates for the period 1750-1850 for Sweden’s 24 counties (roughly corresponding to NUTS-level 3). The series produced cover five sectors: agriculture, manufacturing, mining, private services and public services.

Enflo and Missiaia (2017) also provide a benchmark for 1571 produced using a different methodology: the main source is a one-off wealth tax called the “Älvsborgs ransom”. 
Between 1563 and 1570 Sweden and Denmark engaged in one of many wars for the control of the Baltic Sea. During the war, the castle of Älvsborg fell under Danish control. The castle was of strategic importance because it granted access by Sweden to the Nordic Sea. In order to gain it back, Sweden paid 150,000 silver coins. To pay the ransom, a special wealth tax comprising of a tenth of all cattle, agricultural surplus and metal goods was imposed. The data from this source have already been used by scholars and is considered of exceptional good quality for the period. Historian Hans Forsell was the first between 1872 and 1883 to organize the data at parish level. The coverage of the source is of about 84,000 households and 500,000 taxed individuals, covering some 1100 parishes from Sweden at its historical borders. The ransom is the main source used by Enflo and Missiaia (2017) to derive regional GDP series for 1571 Sweden at current borders. The series produced cover three sectors: agriculture, industry and services.

In this paper we therefore use the new estimates by Enflo and Missiaia (2017) to produce evidence of Sweden’s long-run regional inequality from 1571 to 1850. We will also provide in Section 4.1 a very long-run overview of regional inequality until today by connecting our series to the existing ones by Enflo et al. (2014a). It should be noted that the sets of existing regional GDP mentioned above are all estimated to be consistent with the Swedish historical accounts. Thus, summing all the regional GDP will result in the same level of national GDP as reported by Schön and Krantz (2015). It was therefore straightforward to connect the newly produces series for 1571 and 1750-1850 to the existing ones from 1860 onwards.

Before indulging on the results from our long-term analysis of regional GDP, a critical discussion on the methodology used to reconstruct the series is necessary. When attempting to estimate historical GDP, one must ask how a statistical framework designed to describe the production value in the industrial world can be adapted to describe a pre-industrial economy. The estimates will by definition be surrounded by large margins of error and uncertainties. Yet, recent developments of national accounting methods allowed taking GDP as far as back to the 13th century (Broadberry et al. 2011; Malanima, 2011; van Zanden and van Leeuwen, 2012 among others). Still, the sectoral classification of the historical national accounts is

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3 Additional sources have been used in the estimation to refine the estimates as well as to add the seven current Swedish regions that belonged to Denmark at the time. Detailed information regarding sources and estimation methods can be found in Enflo and Missiaia (2017). The estimates are reported for consistent geographical borders corresponding to the EU NUTS 3-level, or similarly the Swedish counties (län). The database refers to the counties of Sweden at their current border, so we add the seven counties of South and West Sweden that were incorporated in 1658 from Denmark-Norway in our early 1571 benchmark. Despite the addition of new counties in the mid-17th century, Sweden has kept with a stable geographical division of counties over the centuries, making this part of the GDP calculation relatively uncomplicated.
indeed a system of classicization put in place to describe the industrial economy. When adapting such system to a pre-industrial economy, it should be kept in mind that the question of ‘what gets measured’ is not a trivial one. We are aware that the production boundary might well be defined in a very different way compared to the one used for the more recent estimates and in particular for the national series by Schön and Krantz (2015), where non-marketed part of production is not included. However, the historical national account series for Sweden provide a sectorial disaggregation that is unique and allows us to apply the widely used Geary-Stark method with the highest level of precision. We believe that the possible disadvantages of using these series in terms of production coverage are well offset by the advantages in terms of data disaggregation and consistency through time. Moreover, we would like to point out to the reader that the main purpose of the series is to provide a picture of the long term regional inequality, making the overall level provided by the historical national accounts of secondary importance compared to the relative differences across counties.

3.2. Theil index decomposition

After illustrating the patterns of regional inequality in our series through the use of a standard coefficient of variation, we will propose a further indicator of regional divergence: the Theil index of inequality. Following Martínez-Gallaraga et al. (2015), we define the Theil index $T$ as:

$$T = \sum_j \sum_i \left( \frac{Y_{ij}}{Y} \right) \log \left( \frac{\frac{Y_{ij}}{E_{ij}}}{\frac{Y}{E}} \right) = \sum_j \sum_i \left( \log \left( \frac{x_{ij}}{\bar{x}} \right) - \log \left( \frac{x_{ij}}{\bar{x}} \right) \right) \frac{Y_j}{Y}$$

(2)

Where $Y$ is per capita GDP, $E$ is employment, $\bar{x}$ is GDP per worker, $j$ indexes the sectors and $i$ indexes counties. The index can be disaggregated into two components, the within component $T_w$ (the weighted average of regional inequalities of labour productivity within...
each sector across regions) and the between component $T_b$ (the weighted average of regional inequalities of labour productivity between our five sectors).

$$T = T_w + T_b = \sum_{j=1}^{5} \frac{Y_j}{Y} T_j + \sum_{j=1}^{5} \left( \frac{Y_j}{Y} \right) \log \left( \frac{\bar{x}_j}{\bar{x}} \right)$$  \hspace{1cm} (3)

where:

$$T_w = \sum_{j=1}^{5} \left( \frac{Y_j}{Y} \right) \sum_i^n \left( \log(x_{ji}) - \log(\bar{x}_j) \right) \frac{Y_i}{Y}$$  \hspace{1cm} (4)

$$T_b = \sum_{j=1}^{5} \left( \frac{Y_j}{Y} \right) \log \left( \frac{\bar{x}_j}{\bar{x}} \right) = \sum_{j=1}^{5} \left( \log(\bar{x}_j) - \log(\bar{x}) \right) \frac{Y_j}{Y}$$  \hspace{1cm} (5)

The decomposition of the index identifies two different sources of labour productivity differentials across regions: the \textit{within-sector} inequality describes the inequality originated from the same sector having different productivity levels in different regions while the \textit{between-sector} inequality describes the inequality originated by different sectors with different overall productivity being present to different extents in different regions (basically this is inequality from structural change).

4. Results

In this section we present the empirical results, first starting with some general comments on the long run trends in GDP per capita and then moving to analyzing the specific sub-periods before the industrialization of the mid-19th century.

4.1. General patterns: long-run regional inequality in Sweden

In Figure 1 we present the long-run coefficients of variation obtained after connecting our new pre-industrial GDP series to the existing figures from 1860 onwards. As we can see in the figure, regional inequality was low in 1571 but had increased substantially by 1750. It remained high for about 100 years until the onset of industrialization, when it started to decrease. Thus, we observe a long-run inverted U-shape of regional inequality, but quite contrary to the famous inverted U-shape hypothesis defined by Williamson (1965), our results point to the pre-industrial dynamics as the main driver of inequality.
Figure 1. The very long-run coefficient of variation, Sweden 24 counties.


Figure 1 suggests that regional inequality was large already one century before the Industrial Revolution touched Sweden. The coefficient of variation fluctuates around 0.25 to 0.3 which is a relatively high level of regional inequality. Studies for Spain and Italy have reported similar levels of inequality for the late 19th century (Rosés et al. 2010, Felice 2011). Thus, Sweden appears to have been a relatively unequal country in regional terms. This squares rather well with the evidence collected by Bengtsson et al. (2017) on personal wealth inequality, which is found to be relatively high already in 1750.

How do we reconcile increasing regional inequality with stagnant GDP per capita in the Early Modern Period? We argue that Sweden in 1571 cannot have been stretched to its Malthusian equilibrium since increasing regional inequality until 1750 must have translated into decreasing GDP per capita in the poorest regions over the centuries. This view of a relatively homogenous and prosperous 16th century can be corroborated by the findings of a food situation in the 16th century that was “apparently relatively satisfactory” Heckscher (1968, p. 70). Gradually in the seventeenth century living standards declined (Myrdal and Morell, 2011).

Table 1 reports the GDP per capita estimates for all years from Enflo and Missiaia (2017), indexed to the national average (Sweden=100), plus the estimates for 2010 from Enflo et al. (2014a) to provide a current benchmark. The results are also made visible in the maps of
Figure 2. The maps show how compressed regional inequality was in 1571. The Danish counties of the south and the mining district of center Sweden stand out as relatively richer, while Stockholm is close to the national average. In 1750, many counties have decreased their relative position (especially those in the former Danish parts) while Stockholm has emerged as the county with uncontended highest regional GDP per capita, indexed to 171.

Figure 2. The relative evolution of GDP per capita 1571-2010.

![Maps showing regional inequality from 1571 to 2010](image)

Source: our elaboration on Enflo and Missiaia (2017) and Enflo et al. (2014a).

The role of Stockholm in driving regional inequality over the long run is confirmed in Figure 3, where we observe the long-run relative position of Stockholm to the national average 1750-2010. From 1750 the relative GDP per capita of Stockholm county was almost twice as large the GDP of Sweden as a whole. This position was sustained until the outset of industrialization around 1860, when Stockholm gradually lost out to other parts of the country taking off into modern economic growth.
Table 1. GDP per capita in the Swedish regions (1571-2010, Sweden=100).

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<td>107</td>
<td>99</td>
<td>97</td>
<td>102</td>
<td>114</td>
</tr>
</tbody>
</table>

TOTAL              | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  |

Source: our elaboration on Enflo and Missiaia (2017) and Enflo et al. (2014a).
From the more general picture of long-run regional inequality we are able to distinguish three main periods of Swedish long run regional inequality: an upswing of regional inequality in 1571-1750; a constant relatively high regional inequality in 1750-1850; and long-term convergence 1850-2010. The next two sections will discuss the first two of these periods, which are the ones covered for the first time by our new regional GDP estimates.

4.2.1571-1750: the upswing in regional inequality

The analysis of the first two centuries of our sample shows an important upswing of regional inequality among the Swedish regions. The analysis of this early period is based on the scant evidence that exists of regional inequality in a backward country long before industrialization. Nevertheless, the picture that emerges is of a relatively equal country in 1571, replaced by a one of a much more unequal country in 1750. Comparing the maps from 1571 with 1750 in the left panels of Figure 2, two main issues stand out: the relative collapse of the southern and western counties (i.e. counties that were incorporated into Sweden in the 17th century) and the remarkable relative increase of Stockholm’s GDP per capita.

Although these two phenomena are naturally related, we start by giving an account of the economic consequences of becoming Swedish for the formerly Danish counties. In 1571, the Swedish borders were substantially different from the current ones. After the peace treaty of
Roskilde in 1658, Sweden incorporated the counties of Malmöhus, Kristianstad, Blekinge and Bohuslän from Denmark (which at the time was in a union with Norway). The counties of Halland, Jämtland and Gotland had already been incorporated in 1645 but continued to shift between Sweden and Denmark for some decades. After 1675, the seven counties became stable parts of Sweden and a policy of “Swedification” of these regions started being implemented. From a regional GDP perspective, we may conclude that these incorporated counties were relatively better off during Danish-Norwegian rule, as all of them (apart from the county of Jämtland) drop in the relative GDP per capita ranking between 1571 and 1750.

This result indicates that the seven former Danish provinces were richer on average than the counties that formed Old Sweden. This is a result that may feed into the construction of historical national accounts at the national level: existing estimates for the 16th century build on the assumption that data collected for Old Sweden are representative for Sweden at current borders. Thus, previous Swedish historical national accounts assumed that the share of GDP from the incorporated counties was proportional to the share of their population. However, our calculations for 1571 suggest that share of GDP to total in the new counties amounted to 35% of GDP, while the share of population was only 31%. Thus, taking our regional estimates seriously would mean a revision of the SHNA upwards for the pre-1665 period.

However, although relatively rich in 1571, the incorporated counties performed disastrously when they became part of Sweden. For example, looking at the results in Table 2, Malmöhus län change from being the second richest county with 18% higher GDP than the national average, to being one of the poorest regions with 76% of the average in 1750. Historian Skansjö (1997, p. 177) has documented the economic loss for the region in term of loss of market access as Medieval trading routes across the Öresund were distorted. In 1658 the Swedish monarchy imposed a tax on all ships crossing the sound. In addition, export taxes and prohibition to of grain export were imposed. From being and integrated part of Denmark, in the 17th century a more advanced economy, and vividly trading across the Öresund, the southern part of Sweden became a periphery in relatively poorer Sweden.

The position and growth of Stockholm is probably more related to its geographical suitability to trade, than any natural conditions in terms of agricultural suitability or availability or iron

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5 This assumption has already been considered ‘not wholly satisfactory’ by Krantz (2004, p. 119).
6 This meant that surplus agriculture had to be shipped to Swedish regions or the gained provinces across the Baltic Sea (Estonia, Pomerania). When the southern provinces were part of Denmark, the surplus had been shipped to Copenhagen and Amsterdam where prices were higher.
ore. Thus, Stockholm in 1571 did not stand out in GDP per capita terms compared to the rest of Sweden. Instead, it was other areas such as the mining district of Bergslagen (especially counties Västmanland and Örebro) that exhibited the highest GDP per capita among the counties of old Sweden in 1571. The relative strength of the mining regions is evident in the historical uproars against the Monarchy from the 16th century (i.e. Dala-upproren).

4.3. 1750-1850: pre-industrial inequality and the stagnating metropolis

How can we explain the large inequalities in regional GDP per capita in the more recent pre-industrial period emerging from Figure 2? We argue that three factors are potentially important: 1) productivity differentials in both agriculture and industry; 2) unevenly distributed industrial sectors and 3) Stockholm’s protected position due to the implementation of mercantilist policy favouring the capital.

Firstly, we find that productivity differentials in both agriculture and industry were present before industrialization. Starting with agriculture, wages suggest that there were regional productivity differentials in agriculture. Figure 6 shows the evolution of relative agricultural wages from Jörberg for the period 1750-1850. As seen from the figure, wage differentials were large in 1750 but diminished somewhat until 1850. In 1750 labor market relations were still marked by more coercive labour relations on the manors, and cash wages and short-term notice replaced payments in kind and yearly employment periods. Gradually however a more modern labor market was created with individual employment contracts between two equal parties (Prado et al., 2016). In practice, internal migration was very restricted and emigration prohibited before 1860. This resulted in areas of surplus labor having little adjustments mechanisms apart from lowering wages. Although there were large institutional barriers to wage convergence prior to 1860, we do nevertheless see a long-run reduction in wage differentials in agriculture. We may speculate that it could be stemming from increased migration becoming more standard, and internal passport laws increasingly ignored in practice, during our period. After 1860, internal migration and migration became a strong force of regional wage convergence in agriculture, as institutional barrier to free movements of labor was removed as internal passports were no longer required (Enflo et al., 2014b). Simultaneously, trade liberations in grain markets, such as the 1775 repeal of the import restrictions on the domestic grain trade, may have impacted on wage convergence. If
the regional variation in product prices decreased, agrarian employers may have been squeezed to adjust the agricultural wages in response to that (Prado et al., 2016).

Figure 6. The CV of agricultural wages.

![Graph showing CV of agricultural wages from 1750 to 1850.](image)

Source: Jörberg (1972) market price scales for day workers.

But there were productivity differentials in industry too. Especially since mining was an important part of industrial value added. Also, wages in the mining sector suggest that the skill-premium in the industry was high. However, mining was concentrated to specific parts of the country, influencing regional inequality.

The Theil index decomposition can help us qualify these claims. Table 2 and Figures 7 and 8 provide the overall Theil index as well as the within and between components.
Table 2. Theil inequality index, Swedish GDP per worker, 1750-2000.

<table>
<thead>
<tr>
<th></th>
<th>1750</th>
<th>1760</th>
<th>1770</th>
<th>1780</th>
<th>1790</th>
<th>1800</th>
<th>1810</th>
<th>1820</th>
<th>1830</th>
<th>1840</th>
<th>1850</th>
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<tbody>
<tr>
<td>Within</td>
<td>0.058</td>
<td>0.038</td>
<td>0.055</td>
<td>0.021</td>
<td>0.013</td>
<td>0.019</td>
<td>0.019</td>
<td>0.026</td>
<td>0.025</td>
<td>0.030</td>
<td>0.033</td>
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<tr>
<td>Between</td>
<td>0.553</td>
<td>0.581</td>
<td>0.387</td>
<td>0.433</td>
<td>0.509</td>
<td>0.226</td>
<td>0.226</td>
<td>0.154</td>
<td>0.213</td>
<td>0.220</td>
<td>0.199</td>
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<tr>
<td>Overall</td>
<td>0.611</td>
<td>0.618</td>
<td>0.441</td>
<td>0.454</td>
<td>0.522</td>
<td>0.245</td>
<td>0.245</td>
<td>0.181</td>
<td>0.238</td>
<td>0.250</td>
<td>0.232</td>
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<td>Within %</td>
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<td>6</td>
<td>12</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>15</td>
<td>10</td>
<td>12</td>
<td>14</td>
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<tr>
<td>Between %</td>
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<td>92</td>
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<tr>
<td>Overall</td>
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<td>100</td>
<td>100</td>
<td>100</td>
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Figure 7- Evolution of Theil index, 1750-1850, 5 sectors.

Source: see Table 2.

Figure 8- Within and between components of Theil index, 1750-1850, 5 sectors.

Source: see Table 2.
The first thing to notice is that there is a general decrease in inequality overall, with the sharpest drop at the end of the 18th century. The decomposition of the overall Theil index in *within* and *between* components suggests that the *between*-sectors component thus appears to explain most of Sweden’s pattern in regional inequality throughout the entire period.\textsuperscript{7} Economic activity was initially unevenly distributed regionally and structural change became a driving force of regional convergence in the 19th century. In Figure 9 we see the regional distribution of industrial workers is mapped for 1750, 1800 and 1850.

Figure 9. The share of industrial workers in each county, 1750-1850.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure9.png}
\caption{The share of industrial workers in each county, 1750-1850.}
\end{figure}

\textsuperscript{7} Here we present the Theil index with mining and manufacturing as separate. We have also repeated the exercise with industry as one unique sector, as in Martínez-Gallaraga et. al. (2015) and the within component roughly doubles in share in the first three benchmarks, while it stays around the same share in the later benchmarks. This suggests that in the first decades of our sample, mining was far more productive that manufacturing. As the Swedish mining sector continued declining in the second half of the 18th century and the manufacturing sector started arising in new regions (i.e. on the West coast), regional inequality decreased.
Throughout the period, Stockholm stands out in its exceptionally large share of industrial workers. Actually, more than 60 percent of Sweden’s manufacturing workers were in Stockholm in 1750 (Söderberg et al. 1984, Table 1). But early industry shows substantial regional variation over time and space, even if taking Stockholm’s exceptional position apart. In 1750, the industrial belt is concentrated around the mining district of Bergslagen in mid-Sweden. These are also the counties that display the highest regional GDP. However, industry gradually spread to the urbanized areas around Gothenburg, Malmo and Uppsala. In 1850, counties close to Stockholm and to the very south have industrialized more than the former mining regions. This suggests that early industrialization was not path dependent in terms of locating near pre-industrial industrial locations.

Finally, we argue that institutional factors, especially Stockholm’s protected position as capital, main foreign trading port and home to the lion share of the protected manufactories explain the pre-industrial upswing in regional inequality. By 1750, Stockholm had emerged as the richest part of the country. Our dataset unfortunately does not allow for a detailed analysis of the dynamics of the centuries between 1571 and 1750. We therefore cannot account with precision when Stockholm started to emerge in terms of GDP per capita. However, we can guess that the city’s success was established with the growth of the Swedish Empire (1611-1721). During this period, Stockholm became the home for a number of national institutions and a growing public bureaucracy. Between 1600 and 1750, the population of the capital almost increased by sevenfold (from 9,000 to 59,000 inhabitants). Several mercantilist regulations and privileges were granted to Stockholm to ensure its status. The system if staple rights ensured that only a few towns got privileges to trade with foreign ports. Stockholm enjoyed an extremely privileged position since it was ruled that no town north of Stockholm would be allowed direct access to foreign markets. In short, all trade had to be passing through Stockholm first. Of particular importance is that most of the lucrative iron trade was channeled through the Stockholm harbor.

Simultaneously, the state tried to encourage industrial production in the so-called manufactories. These production units focused on various goods, mostly textiles (but also sugar and tobacco) for home consumption, and were founded through generous state support and strictly regulated. The Swedish historiography has not acknowledged to manufactories any prominent role in the subsequent industrialization and more broadly in the success of the Swedish economy (Heckscher, 1968, p. 184). This is because production was often regulated and directed into industries in which Sweden had no comparative advantage (like cultivation
of tobacco or mulberry trees for silk production). But, although the manufactories were stagnant throughout the 18th century, the relative concentration of manufacturing workers to Stockholm still meant that the capital city enjoyed a remarkably favored position in terms of concentration of employment.

Towards the end of the 18th century, it can be observed how Stockholm started to stagnate. One of the reasons is that mercantilist policies were gradually being removed. In 1765, Stockholm lost its monopoly rights on trade with foreign ports, which meant that other towns could start expanding. One such town was the western port of Gothenburg, which gradually increased in terms of population size, but also in terms of GDP per capita. Between 1750 and 1850, the county of Gothenburg moved from a relative position of average GDP per capita to 50% above the average, according to our calculations. The stagnating trend of Stockholm in terms of population and industrial employment has been noted by Söderberg et al. (1984). Population dynamics show how a much smaller town such as Gothenburg grew at faster speed throughout the period 1730-1850.8

5. Concluding remarks

The main goal of this paper was to provide for the first time a picture of the long run patterns of regional inequality in Sweden, covering the period 1750 to today with regular 10-year benchmarks for regional GDP, with the addition of an early benchmark for 1571. Our results show that in 1571 regional inequality was relatively contained but that it roughly doubled in the next two centuries. This means that regional inequality was large and persistent already 100 years before Sweden’s take-off into modern economic growth. Although 18th century Sweden was predominantly agricultural, large productivity differentials existed among the counties. Moreover, there was substantial dynamism in the industrial sector long before the beginning of industrialization. However, industry was confined to either the mining district or the protected manufactories that were placed mainly in the urban areas, especially in Stockholm. As industry generated a substantial share of national value added, the regional concentration of early industry drove inequality, even before any large-scale take-off into modern economic growth and industrialization. Another element that might explain the high

8 It should be noted that although population stagnated in Stockholm, Söderberg et al. (1984) claim that productivity may not have fallen to the same extent as employment.
level of pre-industrial inequality is that the capital city of Stockholm was extremely favored by mercantilist laws, indicating a concentration of service and industry to the capital and potentially also that extractors of surplus were disproportionally located in the area. As some of the mercantilist restrictions were gradually removed, Stockholm’s county stagnated between 1750 and 1850.

The decomposition of inequality in within and between components suggests that structural change was the main driver of the overall inequality, which declined when regions other than Stockholm started industrializing in the 19th century. In spite of the wage differentials observed in agriculture and industry, the role of the within component was quite limited.

Finally, this paper connects not only to the literature about long-run regional inequality; it also suggests the lack of a clear regional connection between productive areas before industrialization and the regions that were taking off into modern economic growth in the mid-19th century. As such, the paper questions that long-run path dependence carried over from the pre-industrial period to industrialization, or the pre-industrial growth was decisive in explaining where modern economic growth was taking place.

These findings on the pre-industrial period, along with the previous results on the decline of inequality during industrialization by Enflo et al. (2014a) and Enflo and Rosés (2015), provide a very distinctive picture of Swedish regions that contrasts with classic priors on regional inequality dynamics and possibly speak to other cases of pre-industrial economies that might have experienced high levels of regional inequality not caused by the process of industrialization but rather to particular institutional settings and economic policies.
References


Krantz, O. and F. Olsson-Spjut (forthcoming) Estimates of Swedish Iron Production and Export from the Middle Ages to the Nineteenth Century, *MIMEO Umeå University*.


