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(Economic History Working Papers)

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New Perspectives from the Occupational Structure

David Chilosi and Carlo Ciccarelli

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Southern and Northern Italy in the Great Divergence: New Perspectives from the Occupational Structure

David Chilosi* and Carlo Ciccarelli†

Abstract

Structural transformation is a key indicator of economic development. This paper reconstructs and examines spatial patterns of the occupational structure in pre-unification Italy, combining direct observations and urbanization rates. In 1861, the agricultural labour share was higher in Southern Italy than in the Centre and North. During the Risorgimento, provincial wages converged within the Centre-North. The predicted Centre-North/South GDP per capita ratio declined in the fifteenth and sixteenth centuries, as the Centre-North stagnated and the South grew slowly. Southern Italy forged ahead of China after, and fell behind Britain before, the Centre-North did, but by pre-modern standards it nonetheless emerged as a middle-high income area.

JEL Classification: E01, N13, N93, O47, R12

Keywords: occupational structure, economic growth, regional inequality, Italy: pre-1861

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‘E’ noto esser diversa la condizione d’un paese secondo che è diversa la proporzione delle persone che campano del prodotto delle terre, o dei capitali, o dell’industria.’

[It is known that the conditions of countries are different depending on the proportion of people whose livelihood depends on the produce of lands, capitals or industry]

(Regia Commissione Superiore 1839: LXIV)

1. Introduction¹

How did the occupational structure of Italy evolve in the decades and centuries before its unification? The answer to this question has powerful implications for our understanding of the origin of current economic divides, both within Italy and between Italy and the rest of Europe and the world. The conventional wisdom sees the North-South Italian income gap as being sizeable already at the time of the unification (Eckaus 1961; Felice 2013, 2019a; Federico *et al.* 2019).² Revisionist historians disagree: for them, in 1861 there was no difference in standards of living between northern and southern regions and marked differences emerged only in the wake of industrialisation (Daniele and Malanima 2007, 2017). According to Cafagna (1989), the roots of the industrial triangle in North-Western Italy are to be sought in the development of the silk industry during the Risorgimento (see also Ciccarelli and Fenoaltea 2013). This argument sits well with evidence on human capital (Chilosi 2007; Ciccarelli and Weisdorf 2019). However, Federico and Tena-Junguito (2014) find that foreign trade was too static in the decades before the unification to imply major economic changes.

The debate on the origin of the Italian North-South divide echoes that on the “great divergence” between Europe and Asia. Pomeranz (2000) and the California school claim that before the industrial revolution standards of living in the most advanced parts of Asia and Europe were at the same level. Several papers have been written in response to this critique to the Eurocentric perspective, stressing the precocious development of North-Western Europe. However, there are disagreements on the comparative position of Italy and the timing and extent of the pre-modern take-off in North-Western Europe. For Allen (2001), real wages in England became higher than in Italy in as early as the fifteenth century. In a follow up paper, Allen *et al.* (2011) find that by the eighteenth century Italian real wages were much lower than in North-Western Europe and on the same level as in China. Malanima’s (2013) revisions of Allen’s (2001) wage-data, by contrast, are in substantial agreement with GDP estimates (Malanima 2011; Broadberry *et al.* 2015): England took over Italy in around 1700. Broadberry *et al.*’s (2018) estimates imply that between 1400 and 1850 Chinese income per capita was about a half or less than that of Central-Northern Italy, though it is possible that in the most advanced part of China, the Yangzi Delta, GDP pc was at a similar level until about 1700.

¹ We thank Marta Pagnini for outstanding research assistance, Peter Groote for his help with the maps, Jutta Bolt for sharing the latest dataset from the Maddison project, Giovanni Federico, Paolo Malanima, Guido Alfani, Jacob Weisdorf and the participants to the 2019 European Historical Economics Conference and to seminars at the LSE, the Bank of Italy, Bocconi and la Sapienza for comments on drafts of the paper.

² Here we focus on some recent contributions. For a more comprehensive survey of the voluminous literature on the North-South divide at the time of the Risorgimento see Riall (2009: 108-113).

The occupational structure is an obvious place to look to speak to questions of comparative economic development (Kuznets 1966). It is particularly suited for pre-modern economies (Persson 1988). Estimates of the occupational structures are less data demanding than GDP or even real wage estimates, whose underlying assumptions are attracting increasing scrutiny (Broadberry *et al.* 2015; Hatcher 2018; Stephenson 2018; Humphries and Weisdorf 2019; Rota and Weisdorf 2020). At the same time the occupational structure is very informative. Urban sectors, industry and services, tend to exhibit higher productivity and dynamism. Engel's law implies that as income rises, the primary labour share shrinks. Yet the literature has so far neglected Italy's occupational structure before the unification, since, as detailed below, the early national censuses are biased, with an agricultural labour share in Southern Italy which is too low. Moreover, agro-towns in the South make it difficult to extrapolate agricultural labour shares with urbanisation.

This paper reconstructs the occupational structure of the Italian provinces in the decades before the unification and in Centre-North and Southern Italy since 1300 using occupational and population data from censuses carried out by the regional states in the early 19th century. We show that these censuses do not suffer from the same biases as the post-unification censuses in the South. We estimate how agricultural labour shares match into urbanisation rates differently in Central-Northern and Southern Italy. Combining these coefficients with urbanisation rates, we extrapolate the evolution of labour shares in agriculture and the urban sectors over the very long-run. Last but not least, we explore the economic implications of the trends that we observe. We look at wage sigma and beta convergence between 1800 and 1861. We use Groth and Persson's (2016) microeconomic model to exploit Engel's law and estimate the GDP pc in Central-Northern and Southern Italy since 1300.

2. Biases in the early national censuses

Taken at face value, the early national censuses show that at the time of the unification the agricultural labour share was significantly higher in Central-Northern Italy than in Southern Italy,³ and remained so until the turn of the century (figure 1). However, historians (Vitali 1970; Kuznets 1971; Zamagni 1987; Daniele and Malanima 2017) have raised serious concerns on the reliability of these figures. In the early national censuses, they argue, women's participation in the textile industry was overstated because statisticians neglected to distinguish between home production and production for the market. The issue was particularly serious in the South, as the structure of southern agriculture, with fields often distant from homes, implied that women's participation in agriculture tended to be lower than in the rest of Italy. The argument that the labour share of industrial women was too high can be traced back to the official commentary to the 1871 census: "weavers, without other qualification ... are probably those who, owning rough hand looms at home ... weave only

³ Daniele and Malanima (2009) define the Centre-North as all the regions from the Alps to Latium and the South as the other regions, including the islands. This definition fits with the conventional one and is close to the one used in this paper, where we define the South as the Kingdom of Naples and the islands and all the other provinces as Centre-North. These boundaries differ slightly from those used by Malanima (2005, 2011) and Federico and Malanima (2004), who consider Latium as lying outside the Centre-North, due to the structure of agriculture there, but this difference has hardly affects the results, as the robustness checks reported below demonstrate.

for part of the year ... hence our figures, and particularly those of the female weavers, will appear greater than implied by the real importance of textiles in our country” (Ministero d’Agricoltura, Industria e Commercio 1876: IV). Eventually the ministry addressed this issue. The increase in the agricultural labour share in the South in 1901 (figure 1) coincides with a change in the criteria used to demarcate labour participation, with a hardening of the previously porous distinction between active and passive population (Patriarca 1998).

The commentary to the 1861 census gave a different reason for the high industrial labour share in the South from the one stressed by historians. In case of doubt, statisticians allocated people to the industrial sector if they were located in large centres, which were particularly common in the South:

The manufacturing population appears comparatively more numerous in the Sicilian and Neapolitan provinces; that is not, in our view, due to higher industrial development, but because being [southern] inhabitants gathered almost exclusively in big centres ... whenever they performed some art or work they were classified as industrialists (Direzione della Statistica Generale del Regno 1867: 90).

This bias is potentially large. Statisticians at the time considered big centres those with at least 6,000 inhabitants, a threshold which is close to those that we use now (5,000 or 10,000 inhabitants) to estimate urbanisation. As noticed by Malanima (2005: 98-99), using conventional thresholds, 19th-century Southern Italy shows up as one of the most urbanised areas of the world, not because it was one of the most developed, but because several big centres were inhabited by a majority of peasant families. They were agro-towns, rather than cities.

3. Pre-unification censuses: sources and methods

In the early decades of the 19th century, following up the Napoleonic legacy and in the wake of the growth of administrative monarchies (Laven and Riall 2000), Italian regional states began to regularly collect occupational data in population censuses. As seen in the quotation at the beginning of the paper, their motivations were similar to ours: they thought that the occupational structure was informative for mapping comparative economic development. This does not mean that rulers at the time interpreted the figures like we do: an interest in occupational data stemmed from Physiocratic influences (Patriarca 1998). Physiocrats stressed that farmers were the productive class, while manufacturers and traders were sterile (Quesnay 1758), quite the opposite of what we think now, looking at the data with Kuznetsian eyes (Kuznets 1966). Nevertheless, occupational boundaries of the time match well with our distinction between primary and urban sectors and thus are suited for our purposes.

Altogether we look at 354 censuses, 61 of which have occupations, carried out between 1800 and 1859.⁴ Our sources report provincial data, at varying levels of detail. We use the first Italian census from 1861 only for populations and comparison with pre-unification occupations. We disregard occupational censuses from two small areas (Trentino and Modena) on grounds of quality: labour participation rates were in excess of one, since statisticians allocated individuals to multiple occupational groups, like clerks and military (Roncaglia 1850: 10). For the sake of quality, we also ignore the results of the 1835 Sicilian census

⁴ In addition, we use three censuses from before 1800 to interpolate population data in Lucca and the Neapolitan provinces.

(Alberti 2011): they are based on a very partial coverage and they are inconsistent with those of the 1843 census (De Sanctis 1843), which includes also data from the mainland consistent with those from other censuses. We cover virtually all the peninsula and the islands, including also Corsica, Savoy and Istria (figure 2). Populations are available at frequent benchmarks both in the North and the South, with an average of 21 observations per province. Occupations are particularly well-covered in Lombardy and the mainland of the Two Sicilies.

We use standard criteria to measure urbanisation: population living in centres with 5,000 or 10,000 inhabitants divided by total population of the area (Malanima 2005, de Vries 2006).⁵ We thus need population of the cities, as well as the provincial populations recorded in the pre-unification censuses. These censuses report population of the cities at frequent benchmarks only in a few selected cases, mostly the regional capitals. We therefore rely also on other sources on urban populations (Appendix B). We linearly interpolate between available data-points for both cities and provinces. Hence, while we miss short-term shocks, like the cholera epidemics of the 1830s, we nevertheless capture long-term trends. For the cities, we also extrapolate a few missing observations in 1800 with the values fitted by a fixed effect regression of (log of) population over year dummies. The regression specification takes into account that growth rates were higher for centres reaching 10,000 inhabitants than for smaller centres, both in the Centre-North and the South.⁶ We use pre-unification provincial boundaries. These boundaries under-went substantial changes in Tuscany in 1851 and the Kingdom of Sardinia in 1859 (Ministero d’Agricoltura, Industria e Commercio 1862). Since we need urbanisation data to extrapolate the occupational structure, in these two areas, we use constant boundaries at the dates used in the sources reporting occupations: 1841 for Tuscany and 1859 for Sardinia (Appendix B).⁷

Agricultural labour shares are computed with Wrigley’s (2004) Primary-Secondary-Tertiary criteria, allocating mining to the secondary sector, however. “Sailors and fishermen” and “labourers” are ambiguous categories, cutting across the primary and urban sectors. “Owners”, too, included small landowners cultivating their plots: “[farmers include] the owners themselves, a good number of whom attend to the cultivation of the fields” (Ministero del Commercio e dei Lavori Pubblici 1857: 78). “Servants” in some of the provinces included also agricultural labourers: “amongst servants have been written down in some provinces also agricultural daily labourers” (Ministero del Commercio e dei Lavori Pubblici 1857: 79). These provinces, identified as those with particularly high shares of servants (except for Rome), are in the Papacy and the Duchy of Parma. Following Shaw-Taylor *et al.* (2010), who allocate labourers to industry and agriculture depending on whether the observation is from a city, we divide up individuals in ambiguous categories with urbanisation rates.⁸ One census from Veneto and all censuses from Lombardy and the Litorale Illirico report only male occupations. In these cases, we extrapolate the agricultural labour share with the ratio between male and total agricultural labour share in Tuscany (1.09), where the gender break-up is available and the ratio is remarkably stable across provinces. The break-up between genders is also available

⁵ Centres are different from *comuni*, which also include the population of rural areas surrounding cities.

⁶ Results not reported here for reasons of space, but available upon request.

⁷ Though for figure 3, we use Sardinian data at pre-1859 boundaries, which are more precise.

⁸ In the descriptive statistics and analysis, we use urbanisation rates with a 5,000 inhabitants threshold in the Centre-North and a 10,000 inhabitants threshold in the South, because these thresholds provide the best fits between urbanisation and occupational structure (table 5).

for Corsica and the Kingdom of Sardinia. The Tuscan ratio is very close to the average ratio in the two provinces of the Sardinian Island (1.11). By contrast, in Corsica and the mainland of the Kingdom of Sardinia there is hardly any difference in the agricultural labour shares between males and females. We prefer to rely on the Tuscan ratio because it agrees with the expectation that women were less involved in agriculture than men (Shaw-Taylor and Wrigley 2014: 68-69; Broadberry *et al.* 2015: 362; Sarasua 2019) and the structure of industrial production in Lombardy and Veneto is expected to be closer to the Tuscan one than to that of Piedmont, whose economy was peripheral during the key formative period of the “commercial revolution” of the middle ages. For the same reason, we rely on Tuscan figures also to extrapolate the overall labour participation rates of the provinces with male only figures.

We also compute tentative splits between industry and services. Several censuses allow to distinguish between industry and services only imperfectly, as they group together large categories of workers cutting across their boundaries, like “artisans and domestic servants” in the Two Sicilies or “bourgeois, traders and artisans” in Lombardy. When such ambiguous categories are used, for want of better alternatives, we simply distribute workers evenly between industry and services. The available data suggest that there were no systematic differences in the services labour shares across males and females, while the Tuscan data shows that, as expected, industrial labour shares tended to be higher for females than for males. In provinces where male only data are available, we therefore allocate the difference between male and total agricultural labour shares to industry. Table 1 reports the descriptive statistics.

4. Pre-unification censuses: reliability

Pre-unification censuses were run by different administrations from the early Italian censuses. They thus do not necessarily suffer from the same biases. In a context of high linguistic diversity, where 90% or more of the people did not speak Italian as a first language (Berruto 1983), regional states were arguably better equipped to reliably communicate with their citizens than a newly unified state. What follows argues that reliability indicators are reassuring, particularly in the South.

Our first test is a comparison with aggregate populations from previous studies. In 1850, when our panel of provincial populations is balanced, our estimate is 24.45 million at republican borders (without, however, Alto Adige) and 23.86 at 1871 borders, as compared to 24.7 (Del Panta *et al.* 1996: table 4) and 24.16 (Travaglini 1933), respectively. Our populations by macro-area are also very close to those from Del Panta *et al.* (1996: table 4): at republican borders in the South and the Centre-North we record 9.25 and 15.11 million respectively, while their estimates of the same figures are 9.5 and 15.2. Federico and Malanima’s (2004) figures for 1861, 26.9 million for Italy and 15.95 for the Centre-North, are consistent with our figures: using the same borders as them (excluding Latium from the Centre-North) our figure for the Centre-North in 1857 is 14.89 million.

Next, we do an internal consistency check by looking at whether the occupational structure across provinces shows the persistency that one would expect. Repeated occupational measurements in pre-unification censuses are available in Lombardy, Veneto and the Two Sicilies (mainland). Table 2 reports the average correlation coefficients of the sectorial labour shares across provinces in subsequent periods (like the Lombard censuses in 1850 and 1853).

Occupational data are remarkably consistent across the pre-unification censuses: the correlation coefficients are consistently very high, across states and sectors. The only and partial exceptions are industry in Veneto, where we detect a marked increase in the industrial share (figure 5), and to a lesser extent in the Neapolitan state.

Our subsequent test is a comparison with the 1861 census. The new administrative map in 1861 introduced hardly any changes to provinces in the South, but sweeping ones in the Centre-North (Ministero d'Agricoltura, Industria e Commercio 1866: 213-236). We are therefore able to compare the occupational structure in our censuses and the first Italian census in all southern provinces (with the only exception of Corsica), but only in 10 provinces from the Centre-North, which are nevertheless spread across several regions: Emilia (1), Liguria (1), Lombardy (2), Marche (1), Piedmont (4) and Tuscany (1). Table 3 reports correlation coefficients and mean differences between our final years (like 1843 in the Two Sicilies) and the 1861 census.

The correlation coefficients are relatively high for agriculture and services. However, they are not as high as those between pre-unification censuses (table 2) and are very low for industry, which again emerges as the noisiest sector. Noise is not the only issue, though. The correlation coefficients are higher within macro-areas than in Italy as a whole, consistent with an uneven bias in the 1861 census between central-northern and southern provinces. The mean differences are consistent with a particularly high positive bias in 1861 in the industrial labour shares of southern provinces, which translates in a negative bias for agricultural labour shares in the same provinces. While the absolute sizes of the implied biases are very close, the relative size of the bias is much higher for industry, whose labour share is significantly smaller than that of agriculture, leading to particularly low correlation coefficients in industry.

Finally, we explore the role of biases in the pre-unification and 1861 censuses, beginning with the gender bias. Kuznets (1971: 53-54) notices that labour participation rates (active population over total population) in liberal Italy were abnormally high: in around 1870 it was nearly 60%, as compared to around 40% in other developed countries. In support of the argument that inflated industrial participation of women in textiles were behind the Italian anomaly, Kuznets (1971: 53-54) reports that in 1871 the ratio of Italian women in non-agricultural occupations over total population was 12%, the same as in the UK and much higher than in countries, like France (6%) or Germany (4%), where the occupational structure can be expected to be closer to that of Italy's than that of the first industrial nation. Table 4 reports mean labour participation rates and industrial labour shares in the main Italian pre-unification polities, together with those recorded in the first Italian census in 1861 in the same territories. Where available, we also include the break-up by gender and the ratio of non-industrial women to total population. In proto-industrial societies, like Risorgimento's Italy, women are expected to have a lower agricultural and higher industrial labour share than men (Shaw-Taylor and Wrigley 2014: 68-69; Sarasua 2019). Hence, the difference between total and male industrial labour share (column 7 minus column 5) shown in column 9 is an upper bound estimate of the bias in the total industrial labour share due to an over-representation of industrial work amongst women.

Male labour participation rates (column 1) were remarkably similar across polities and years. Consistent with the hypothesis that female work was recorded with errors, the female rates (column 2) were much more volatile. In the Centre-North, the overall labour participation

rates (column 3) were comparatively high, close to 60% or more, both before the unification and in 1861, with only one exception: Lombardy. There the figures appear too low, suggesting under-counting. Lombard censuses were carried out very frequently, but evidently not as thoroughly as in the other polities. Yet, a lower male industrial labour share before the unification than in 1861 suggests that any bias in the pre-unification censuses militates against our finding that Lombardy saw structural transformation (figure 6). High labour participation rates elsewhere in the Centre-North match into relatively high, up to 10%, ratios of non-agricultural female labourers to total population (column 4). Hence, we cannot rule out a positive bias in the female industrial labour share in the Centre-North, in the pre-unification period, too. However, there, industrial labour shares for males (column 5) tended to be rather close to the total ones (column 7) and thus even if there were a bias in the overall figures, it is going to be small (column 8). The only and partial exception is Tuscany, where nevertheless the female labour participation rate was comparatively small.

The inferred maximum bias is very small in the Sardinian isle, where actually both the total labour participation rate and the weight of non-agricultural female labourers were very much in line with the European norm, but not in the rest of the South: for the 1861 census in the Two Sicilies the female industrial labour shares made big differences for the total industrial labour shares. It is therefore reassuring for us that there the pre-unification industrial labour shares were particularly low. Correspondingly, in the mainland, the labour participation rate recorded before the unification shrank by nearly 20 percentage points, confirming the relevance of the bias in female textile workers in the 1861 census there. In Sicily, by contrast, the labour participation rate was relatively low by Italian standards both before and in 1861, suggesting that there the industrial bias cut across genders and the higher industrial labour share amongst women than men was genuine, as the *latifundia* made it difficult for women to participate in agricultural work. Evidently, in Sicily, the main issue with the results of the 1861 census was a different one: agro-towns.

Our last reliability test looks at the role of agro-towns by examining consistency between urbanisation and occupational figures in our two macro-areas. Table 5 reports the results of regressions of agricultural labour shares on urbanisation rates, in the pre-unification and in the 1861 censuses. Specifically, the estimated equation is:

$$ag_{it} = \alpha + \beta urb_{it} + u_{it} \quad (\text{Equation 1})$$

Where ag_{it} is the agricultural labour share and urb_{it} is the urbanisation rate in province i in year t . In the OLS specification, the constant α is the expected value of the agricultural labour share in a province with no urbanisation, or in the country-side. The sum of the constant and the slope β is the expected value of the agricultural labour share in a province with 100% urbanisation, or in a city.

The goodness of fit improves in the Centre-North with a 5,000 threshold and in the South with a 10,000 threshold, again suggesting that southern agro-towns were less prevalent amongst relatively large places.⁹ We therefore focus on these specifications. The results imply that for the pre-unification censuses, the agricultural labour share in southern cities was much higher than in central-northern cities, 42% vs. 27%. This difference almost entirely disappears

⁹ Including Latium in the South has a tiny effect on the size of the coefficients and implies a slightly poorer fit there than under our baseline boundaries.

in the 1861 census. Agro-towns hardly show up there. Moreover, for the pre-unification censuses rural industry and/or services were more developed in the Centre-North than in the South. This difference, too, disappears in the 1861 census, consistent with a positive bias in southern industry also in places with less than 10,000 inhabitants, since that census used 6,000 inhabitants as a threshold to identify cities and the positive bias in industrial women affected rural areas, too. The differences between the pre-unification and the 1861 censuses are also statistically significant. The hypotheses that agricultural labour shares in cities and countryside were the same in Centre-North and South are soundly rejected with the pre-unification censuses data but accepted with data from the 1861 census.¹⁰ In short, the pre-unification censuses emerge as more reliable guides to the agricultural labour shares of southern provinces than the 1861 census.

5. Results: the Risorgimento

To reconstruct time series of provincial labour shares during the Risorgimento, we interpolate between points with occupational data and extrapolate when interpolation is not viable.¹¹ To extrapolate the agricultural labour share, we use urbanisation rates and the fitted differences by our favourite specifications from table 3 (the first and the fourth specifications). However, we use a generalised linear model for fractions to obtain estimated levels bounded between 0 and 1 (Papke and Wooldridge 1996). By definition, the same approach is not viable to distinguish between the two urban sectors. We have thus to assume that extrapolated changes in the agricultural labour shares were evenly split between them. Formally, we extrapolate as follows:

$$\widehat{ag}_{it} = \widehat{ag}_{i,t-1} + \frac{e^{\widehat{\alpha} + \widehat{\beta}urb_{it}}}{(1 + e^{\widehat{\alpha} + \widehat{\beta}urb_{it}})} - \frac{e^{\widehat{\alpha} + \widehat{\beta}urb_{i,t-1}}}{(1 + e^{\widehat{\alpha} + \widehat{\beta}urb_{i,t-1}})} \quad (\text{Equation 2a})$$

$$\widehat{ind}_{it} = \widehat{ind}_{i,t-1} - 0.5\Delta\widehat{ag}_{it} \quad (\text{Equation 2b})$$

$$\widehat{ser}_{it} = \widehat{ser}_{i,t-1} - 0.5\Delta\widehat{ag}_{it} \quad (\text{Equation 2c})$$

Where the hat refers to estimation, *ind* and *ser* stand for industry and services, respectively, and otherwise the notation is the same as for equation 1. All our provincial estimates are in table A1 in online Appendix A. Here we begin by showing the trends by macro-area (figure 3). Since the panel is unbalanced, we use province fixed effects regressions weighted by the means of the provinces' populations. Formally:

$$sec_{it} = \alpha_i + \sum_t D_t t + u_{it} \quad (\text{Equation 3})$$

Where sec_{it} is the labour share for each of the three sectors in province i in year t and D_t are dummies equal to one in year t . Constant weights may potentially introduce distortions in the levels. Yet comparison with weighted averages in the years when these are viable (1848-

¹⁰ The F-statistics with pre-unification censuses are: 169.27*** (null hypothesis that the agricultural labour share in the country is the same in the Centre-North and South) 8*** (null hypothesis that the agricultural labour share in the city is the same in the Centre North and the South). With the 1861 data, the same F-statistics are 0.66 and 0.69 respectively. *** denotes significant at the 1% level.

¹¹ As industry emerges as noisier than the other two sectors (tables 2 and 3), we treat it as a residual category between interpolations. The same approach is used with the results by macro-area.

1853 for the Centre-North and 1838-1861 for the South) shows that while the panel figures for agriculture are slightly too low, the differences are small, just over a percentage point on average and always less than two. While the Italian shares are nearly identical, a similar bias affects the estimates for Centre-North and South, implying that their differences are hardly affected: the error is 0.07 percentage points, on average.

Consistent with the urbanisation rates (figure A1 in the Appendix B), the overall picture is one of stagnation, across the three sectors. The levels yield two related results. First, the data of pre-unification censuses are much more in line with the conventional wisdom than those of the post-unification censuses. We find that the southern provinces were significantly more agricultural than those in the Centre-North, with differences mostly over 10 percentage points. This difference is significantly bigger than that found by Felice (2019a), 4 points, after adjusting 1871 census data exploiting industrial census data and making ad hoc adjustments (following Zamagni 1987). Such a large shrinking of the difference between 1861 and 1871 is un-plausible. Felice's (2019a) downward adjustment of the southern agricultural labour share does not go far enough. Second, the levels point to an interesting and previously un-noticed¹² feature of the North-South divide: while the services labour shares were the same in the Centre-North and in the South, the industrial labour shares were significantly higher in the former than in the latter. It was specifically industry that was comparatively under-developed in the South. Services labour shares higher than the industrial labour shares are in apparent contradiction of Petty's law prediction that the secondary sector expands before the tertiary sector and point to a process of "premature deindustrialisation" (Rodrik 2016) *ante litteram* in Southern Italy.

As stressed, industry and services figures are more tentative than those for agriculture. In part, the result on southern deindustrialisation has to be an artefact of the crude division employed in the censuses of the Two Sicilies, which typically grouped all secondary workers together with domestic servants, while offering a more refined division of other tertiary occupations. Yet the southern difference between labour shares of services and industry are downsized, but nevertheless confirmed, by Petroni's 1826 census, which covered the continental part of the kingdom and offered a very refined occupational division, including nearly 500 different categories. Thus, while for our estimates in 1848 on average the provincial difference was 8%, for the 1824 census it was 5%. The 1824 census also offer insights into the nature of the southern Italian service sectors. Five categories of workers stand out as being much bigger than the rest: priests (12% of services), servants (11%), domestic workers (10%), employees (10%) and sailors (10%) together accounted for about half of the whole sector.¹³ People involved in sales and finance accounted for a relatively low share of services (13%). By way of comparison, while in the Papacy in 1853, as expected, the clergy (10%) and servants (41%) were amongst the largest categories of services, too, "dealers, merchants, bankers and money changers" accounted for over a fifth of services. In the Kingdom of Sardinia in 1858, the share of the clergy (5%) was comparatively small, while domestic servants were also an important category (26%). Commerce accounted for 16% of services. "Capitalists" were grouped together with "owners and pensioners" in a category accounting for over one fourth

¹² The debate on the services/industry split has so far concentrated on the trend in services value added after the unification (cf. eg. Felice 2019b; Fenoaltea 2020).

¹³ In industry, two occupations had a share of more than 10%: "shoe-makers" and "spinners and weavers".

of the tertiary sector. In sum, the evidence suggests that before the unification Southern Italy was already less industrialised and commercialised than the Centre-North.

There were nevertheless significant differences within macro-areas (figure 4). Agricultural labour shares were particularly high in the Neapolitan provinces, which in 1848 all exhibit shares in excess of 70%, with the sole exception of the province of Naples (28%). The Sardinian and Sicilian isles show up as less agricultural than the rest of the South. Moreover, within the South, it was specifically in the provinces of the Two Sicilies that industrial under-development is observed. In both provinces of the Sardinian isle (Cagliari and Sassari), the industrial labour share was actually higher than the services labour share. Within the Centre-North, as expected, the agricultural labour shares tended to be very low in provinces with regional capitals, like Trieste (13%) and Roma and Comarca (33%). Beyond that, we find provinces with agricultural labour shares below 60% in Tuscany, Umbria and Lombardy.

Provincial trends (figure 5) reveal that underneath the aggregate calm, the picture was actually rather dynamic: in agriculture, we detect statistically significant trends in 66 out of 83 provinces,¹⁴ more or less evenly spread between negative (31) and positive (35) trends. We find evidence of significant structural transformation, with yearly changes in excess than (minus) one tenth of a percentage point, in 19 provinces. The provinces with the fastest structural transformation were all in the Lombardo-Veneto – a result that sits well with the positive appraisal of the Habsburg administration offered by Laven's (2002) revisionist study – but significant declines were also seen in provinces of the mainland of the Two Sicilies: Abruzzo Citra, Abruzzo Ultra II, Basilicata and Capitanata. While in nearly all the provinces in Veneto (in the North-East) industry was the main beneficiary of these declines in agriculture, elsewhere the opposite was true. Hence, structural transformation in the North only imperfectly conforms to the hypothesis that the industrial triangle (in the North-West) originated during the Risorgimento. Yet caution is in order. While we are lucky to be able to rely on interpolation in Lombardy, where the development of the silk industry was centred, as well as in Veneto, since our extrapolations cannot capture changes in the occupational structure caused by the development of rural industry we can't rule out missing out on similar developments in Piedmont. It is also worth stressing again the tentative nature of our industry-services split. Increases in agricultural labour shares tended to be slow: only in 9 provinces do we find a pace in excess of one tenth of a percentage point per year. Most of these provinces (6) were in Sicily. This geographical concentration, jointly with the previously noticed relatively low agricultural levels in Sicily and declines in the agricultural labour shares of the continental part of the kingdom, points to a process economic convergence within the South after the unification of the Neapolitan and Sicilian crowns in 1816. As we are now going to see, however, catching up there was very slow.

Since wages are on average higher in urban occupations than in the agricultural sector, our provincial trends (figure 5) could potentially alter patterns of spatial inequality in the peninsula. We estimate provincial wages combining our estimates of the provincial occupational structures with an estimate of the income premium of urban occupations over agricultural ones of 70%. In other words, we estimate provincial incomes as the agricultural labour share plus 1.7 times the urban labour share.

¹⁴ The number is the same for industry, while for services it is 69.

Unskilled labourers in early modern Italy had the same wage rate in building and agriculture (Malanima 2013: 55). The ratio of nominal wage rates of master masons in Italian cities (Florence, Milan and Naples) and wage rates of pruners in the Apulian country-side in the decades before the unification hovered at around 1.5 (Bandettini 1960, Malanima 2006). A premium of 50% matches the typical skill premium in construction in 19th-century Western Europe (van Zanden 2009: 128). The basic skill premium (2nd class mason/navvy) was close to 50% also in Italy in the decades around the unification. However, the premium was much higher for other urban occupations, e.g. it was about 150% for a foreman (Bandettini 1960: 8; Daniele and Malanima 2017: table 3). Hence, differences in average urban and agricultural wage rates cannot be established from wage rates alone. They also depended on the distribution of skill amongst the work-force. If most urban workers were unskilled then the premium would be lower than 50%, as Groth and Persson (2016) argue. If enough urban workers were sufficiently skilled, however, the premium could be higher. Moreover, differences in the length of working year could also introduce potentially large differences between wage rates and incomes (Broadberry *et al.* 2015; Humphries and Weisdorf 2019).

The overall difference between the average labour income in urban and agricultural occupations can be gleaned from national accounting figures. Combining Van Zanden and Felice's (2017: tables 3 and 4) figures on labour and total incomes with sectoral shares implies that in 1427 Tuscany the urban wage premium was 84% and the urban total income premium was 173%.¹⁵ This difference between the wage and total income premia reflects a higher labour income, as opposed to capital/land income, share in agriculture than in the richer urban sectors. Combining value added figures by sector from Baffigi (2015: 178) with our sectoral labour shares (figure 3) in Italy in 1861 yields an urban total income premium of 139%. That this figure is somewhat lower than the corresponding one in 1427 Tuscany confirms Van Zanden and Felice's (2017) contention that there the distribution of incomes across sectors was particularly unequal. Nevertheless, the 1861 figure is also consistent with a comparatively high urban wage premium. Assuming that the ratio between total income and wage income premia were the same as in 1427 Tuscany yields an urban wage premium of 61%, but the figure would be higher if the distribution of capital/land across sectors were not as skewed. We therefore use a figure in between 61% and 84%.

With our data we are able for the first time to quantitatively analyse patterns of convergence/divergence during the Risorgimento. We run standard tests of sigma and beta-convergence (Roses and Wolf 2019) on provincial wages. Assigning wages to provinces on the basis of their occupational structures makes it possible to compare our results with those of other studies. Assuming a constant premium over time neglects that, in the presence of decreasing returns, labour and capital flows should push the premium down, at the same time as they promote convergence in the occupational structure. It is nevertheless an acceptable approximation in our context, where, as seen below, insofar as there was wage convergence, it tended to be very slow. Tests of sigma-convergence are designed to look at overall convergence or divergence, regardless of the initial conditions, and it is typically estimated with the coefficient of variation. Since here we are dealing with an unbalanced panel, we estimate the following equation:

¹⁵ Figures obtained by dividing the wage and total income over sectoral share in urban occupations by those in agriculture.

$$abs \left[\ln \left(\frac{w_{it}}{\bar{w}_t} \right) \right] = \alpha_i + \beta t + u_{it} \quad (\text{Equation 4})$$

Where w_{it} is wage in province i in year t and \bar{w}_t is the national average in the same year. Beta-convergence aims at testing the hypothesis that poor provinces grow faster than rich provinces, or that, in other words, there is catch-up growth. We look at beta-convergence by running the OLS cross-sectional regression:

$$\dot{w}_i = \alpha + \beta \ln(w_{i0}) + u_i \quad (\text{Equation 5})$$

Where \dot{w}_i is the yearly rate of change in province i and w_{i0} is the initial wage in the same province. In both equations the coefficient of interest is β , with a negative (positive) value implying convergence (divergence). We weight the regressions with average provincial populations. For beta convergence, we also compute the speed of convergence, which indicates by how much wage differences changed per year. Beta convergence is necessary but not sufficient for sigma convergence, which also requires that the speed of convergence is sufficiently fast and/or the income differences are sufficiently small (Furceri 2005). Hence, assuming a comparatively high premium biases the analysis against our finding that there was hardly any sigma convergence, since it is bound to increase the level of income dispersion. Since provincial differences in sectorial incomes are bound to increase wage dispersion, neglecting them also biases the analysis against finding little or no sigma convergence. For comparative purposes we also report the results of studies done on the years after the unification.

We find beta convergence in all samples (table 6). However, there were marked differences in the speed, with beta convergence being fast enough to lead to sigma convergence as well only within the Centre-North. In the other two samples, we find an increase rather than decrease of wage dispersion. A higher level of income dispersion in the southern provinces than in those of the Centre-North also contributed to preventing sigma convergence in the southern and Italian samples: on average in the South provincial wages differed by 8%, as compared to 6% in the Centre-North, with Italy lying in between these two extremes (7%).¹⁶ The comparison with other studies highlights that in Italy as a whole and especially within the South beta convergence was extremely slow. Within Italy, the speed of convergence was in the order of a half those observed after the unification, in spite of the fact that the speed of Italian beta-convergence after 1861 was about half the European norm (Felice 2019a). In other words, during the Risorgimento, only within the Centre-North do we find a speed of convergence in line with those seen in other modern European countries.

6. Results: since 1300

To extrapolate backwards the agricultural labour shares again we use the fitted differences by our favourite specifications from table 5, with a generalised linear model for fractions (Papke-Wooldridge 1996). However, since provincial urbanisation rates are not available before 1800, we directly look at macro-areas, Central-Northern and Southern Italy. To obtain the relevant coefficients we still rely on the Risorgimento's data, but we weight the regressions by mean province population. We compute urbanisation rates for the macro-areas

¹⁶ Figures based on the same specification as equation 4, using however only the constant in the right hand side.

since 1300 (see Appendix B for the sources). As Italian populations are at republican borders, we exclude provinces outside those borders from this part of the analysis.¹⁷ The 19th century levels are aggregated provincial agricultural labour shares obtained thus: we first compute state-level estimates, which take into account differences in the labour participation rates across provinces, and then take their population-weighted average, since we cannot rule out that participation rates suffered from different biases in different states, as noticed before in relation to Lombardy (table 4). In the South, we first estimate the agricultural labour share outside Naples and then we aggregate it with that from the city, using populations as weights.¹⁸ To do so, we assume that the Neapolitan agricultural labour share remained at the initial 19th century level (4%). This procedure allows taking into account that Naples was not an agro-town and its nearly tenfold growth from 33,000 inhabitants in 1300 to 320,000 in 1800 significantly increased the relevance of the urban sectors in the southern occupational structure.

Backward extrapolation assumes that the distribution of agricultural workers across cities and country-side did not change much our macro-areas in the five centuries before the unification. While this assumption is standard, the previous literature (eg. Allen 2000) has highlighted how the growth of proto-industry can render it problematic. Yet the issue is less serious in Italy than in other contexts. Allen's (2000) recommends to adjust European estimates by allowing the rural agricultural labour share to rise to 80% in 1500. That adjustment would have a very small effect in Central-Northern Italy, where we find that during the Risorgimento this share was 73%, and none in the South, where this share was 90% (table 5). By the same token, agro-towns can be potentially problematic, too. Yet their origin can be traced back to antiquity (King and Strachan 1978). While the phenomenon did harden in the early modern age, such changes mainly involved centers with less than 10,000 inhabitants (Benigno 2001). Our assumption that in cities with at least 10,000 inhabitants the share of agricultural workers remained broadly constant can thus be considered as legitimate.

Figure 6 presents the resulting estimates, placing the Italian figures in an international perspective. We include figures specifically from Britain and China for three reasons. First, these two countries have been at the centre of the debate on the great divergence. Second, as their occupational shares are based on direct observations of occupational data, they are of comparatively high quality. Third, since in these two countries GDP estimates have been constructed (mostly) independently from these occupational shares, when we move on to examine their relationship with economic growth we do not run the risk of simply capturing a mechanical relationship implied by the construction of the GDP estimates.

Our agricultural labour shares for Central-Northern Italy are very close to those from Malanima (2011: table 3) and the overall picture is the same: secular stagnation. The 1300 value for us (Malanima) is 64% (63%), while the 1861 value is 64% (62%). Our estimates are also consistent with the recent figure in Tuscany computed by Van Zanden and Felice (2017: table 3 and page 22) on the basis of the Florentine Catasto of 1427: between 57% and 59%. This share compares with our estimated agricultural labour share in the regional state in 1500

¹⁷ Namely, Ancey, Chambery, Corsica, Nice and Istria. While we don't have occupational data for Trentino-Alto Adige and the Duchy of Modena, the impact of this gap is on aggregate occupational shares is expected to be negligible.

¹⁸ Though labour participation rates in the capital, which had a mean of 36%, were somewhat lower than in the rest of the South (table 4), they were broadly in line.

of 56%, using the same approach as for the Centre-North and Tuscan population data from Chilosi (2014). Southern Italy, in contrast to the Centre-North, saw slow structural transformation: the agricultural labour share declined from 81% to 75%, implying that the gap with the Centre-North went from a maximum of 19 percentage points in 1400 to a minimum of 11 in 1861, with most of the fall taking place in the 15th and 16th centuries. The level in Southern Italy was very close to those seen in early modern Wales and China. The latter, however, show significantly higher levels towards the end of the period, at the same time as China's deindustrialisation began (Williamson 2011: 62-63). In the late 14th century, the English agricultural labour share was above that in Central-Northern Italy. However, by the early sixteenth century, it had become lower. A large difference emerged in the decades around 1650: the gap went from 5 percentage points in the 1530s to over 10 a century later and over 20 by the early 18th century.

How do the series in figure 6 fit with other available measures of economic development? To answer this question, we run the following regression:

$$ag_{it} = \alpha_i + \beta y_{it} + u_{it} \quad (\text{Equation 6})$$

Where ag_{it} is the agricultural labour share and y_{it} is the GDP per capita or real wage in place i in decade t . GDPs per capita in 2011\$ are from the 2020 version of the Maddison database.¹⁹ Within our sample, they are available for Central-Northern Italy, Britain and China. We consider wages from Allen (2001), assigning Florence to Central-Northern Italy, Naples to Southern Italy and London to Britain, and the subsequent revisions for Central-Northern Italy and England by Malanima (2013).²⁰ Engel's law predicts a negative coefficient for β . Table 7 shows the results, including also, for the sake of comparison, the results of the same income regression for the 19th century and for 20th centuries' developing countries from Clark *et al.* (2012: 366-367).²¹

The message is clear. On the one hand, there is a close match between our results and those of subsequent regressions using GDP pc as the explanatory variable: thus, one hundred extra \$ are expected to decrease the agricultural labour share by 1.37% in our sample and by 1.13% with the 19th century sample. This result is, of course, reassuring. Real wages, on the other hand, do a very poor job at predicting agricultural labour shares, as signalled by insignificant β coefficients with unexpected signs and very poor fits. This result lends support to the reservations of those that argue that daily wages cannot be considered as representative of annual incomes (Broadberry *et al.* 2015; Hatcher 2018; Stephenson 2018; Humphries and Weisdorf 2019; Rota and Weisdorf 2020).

The fixed effects in the first specification show that the agricultural labour share was lower than expected in England and higher than expected in China and especially Italy, on the basis of their GDP figures. Our Britain's fixed effect, 14%, is very close to that estimated by Wallis *et al.* (2018: 889) for the mid-19th century, 16%. A comparatively low agricultural labour share is consistent with an early lead in English agricultural labour productivity (Allen 2000; Wallis *et al.* 2018), dating back to the commercial economy of the middle ages: English

¹⁹ Kindly made available by Jutta Bolt.

²⁰ As the series has not been published, we were not able to use the Chinese real wages from Allen *et al.* (2011). Its inclusion is not expected to alter our conclusions.

²¹ Clark *et al.* (2012) use 2005\$, but that should hardly affect the results. The results with this conversion using 19th data from Crafts (1984) have been given by Gregory Clark to one of the authors in a private correspondence.

wheat markets exhibited significantly lower transaction costs as compared to continental Europe from as early as the 13th century (Chilosi *et al.* 2019).²² A higher fixed effect in Central-Northern Italy than in China could be due to agricultural labour productivity, which in China was relatively high, at least in the most advanced areas (Allen 2009). It could also reflect the fact that early modern China was specialized in the production of manufactures (Williamson 2011: 62).

The coefficients from table 7 (column 1) can be used to estimate the GDP pc in Southern Italy at the time of the unification. Assuming that agricultural labour productivity and thus the fixed effect was the same in Southern and Central-Northern Italy,²³ the agricultural labour share in Southern Italy in 1861 would have been compatible with a GDP pc of 1954 (in 2011 international \$). Our assumption of equal labour productivity is indeed reasonable. Federico (2007: 324) finds that, surprisingly, in 1891 the index of agricultural labour productivity in the South (102.4) was higher than in the Centre (71.8) and the North (87.2). However, he bases himself on census data (figure 1). If we substitute in our estimate of the agricultural labour share in the South in 1861 – a better estimate, in the light of the biases plaguing the liberal Italy’s censuses - the index in the South becomes 77.3, essentially the same as in the Centre-North. Our GDP for the South corresponds to a GDP pc ratio between Central-Northern and Southern Italy of 1.31. That this ratio is higher than that found by Felice (2019a: table 3.7.1) in 1871 (1.18) is consistent with a positive bias in his southern industrial labour share. Our estimate is slightly above Eckaus’ (1961) older upper bound ratio of 1.25 in 1861.

Groth and Persson’s (2016) model exploits Engel’s law and uses a set of elasticities and parameters to construct micro-founded income trends with agricultural labour share data. The strength of the model is that it is undemanding in terms of data availability and is not dependent on daily wage data, the reliability of which is increasingly being questioned, as mentioned before. Parsimony is, of course, a weakness as well, as the model neglects to consider other potentially informative variables, such as relative prices. Yet, there is evidence that the short-cut is effective. As shown by Wallis *et al.* (2018: 890), for Britain in 1530-1800 its predictions are very close to Broadberry *et al.* ’s (2015) trend, based on output figures: the correlation coefficient between the two series is as high as 91%.

We use Groth and Persson’s (2016) method to estimate trends in the GDP pc in Central-Northern and Southern Italy. Their parameters are calibrated to England in 1688, where the income per capita is expected to be not too different from those of our macro-areas. We use the same baseline values as them, with two tweaks, following on our previous discussion of the urban wage premium. First, we set the urban wage premium at 70% instead of 25%. Second, we allow the labour income share to be higher in agriculture than in the urban sectors. Groth and Persson (2016: 21) assume that the labour income share was 66% in the urban sectors. Consistency with other parameters and value added figures in 1688 England

²² An implication of the comparatively high British agricultural labour productivity is that the early Italian lead (Figure 7) had to be due to the urban sectors. A comparatively high productivity in these sectors is to be expected in medieval Italy, which was at the core of the “commercial revolution”. This inference is also consistent with the particularly wide urban-rural income gap noticed by Van Zanden and Felice (2017) in 1427 Tuscany

²³ In the 19th century, both the Centre-North and the South were net exporters of primary products, but as also stressed below, the difference between their values of exports and imports was likely small (personal communication with Giovanni Federico).

imply that their agricultural labour share was 56%. Van Zanden and Felice's (2017: table 3) data from the 1427 Florentine *catasto* show that the urban labour income share (54%) was significantly lower than the agricultural labour income share (80%).²⁴ As mentioned before, this hierarchy is expected if labour income shares are lower for poorer sectors of the workforce. At the same time, probably sector inequality in 1427 Tuscany was relatively high also by Italian standards and therefore we settle for slightly different figures: 60% in the urban sectors and 75% in agriculture. The GDP pc levels are set by our estimate for 1861 for the South and Malanima's (2011) estimate in the same year for the Centre-North, which is based on a more solid statistical basis than earlier estimates. Our model assumes that trade in primary products was balanced, so that changes in the agricultural labour share match changes in the share of income spent on primary products. This assumption is standard for Central-Northern Italy, where trade was a small share of agricultural production (Allen 2000; Federico and Malanima 2004: 447-448). It is even less demanding in the South, where mid-19th century statistics show that the value of trade per capita was much lower than in the central-northern states (Federico and Tena 2014: table 3). Figure 7 shows our estimates and compare them with those of Malanima (2011) for Central-Northern Italy and those of Broadberry *et al.* (2015, 2018) and Xu *et al.* (2016) for Britain and China.

Our long-term trend in Central-Northern Italy is mostly reassuringly close to that of Malanima (2011). There is nevertheless an obvious discrepancy in the aftermath of the Black Death (1348), when we detect decline rather than growth. Our figures are thus more in line with the old view that there was a late medieval depression (Postan 1952; Lopez and Miskimin 1962) than the current orthodoxy that the aftermath of the Black Death was a "golden age of labourers", with rising GDP pc and income labour shares (Jedwab *et al.* 2020; Alfani forthcoming). Whence the difference? As mentioned before, our agricultural labour shares are very close to those of Malanima (2011: table 3), in spite of slightly different borders and he, too, detects a higher agricultural labour share in 1400 than in 1300 and 1350. This is not so surprising: our and Malanima's (2011) estimates are based on very similar urbanisation rates (table A1 in Appendix B). The available evidence suggests that if anything we understate the extent to which the Black Death caused de-industrialisation: in fifteenth-century Tuscany the non-agricultural rural labour share was 6% (Herlihy and Klapisch-Zuber 1978: ch. 10), much less than our estimate for the Centre-North during the Risorgimento of 27% (table 3). The difference with Malanima's (2011) series is caused by fluctuations in daily wages, which are a key input in his series but not ours and shot up after the Black Death. If, as argued by Hatcher (2018), wages after the Black Death went up less and are less representative of incomes than usually thought, the boom and bust in the century and half after 1348 needs to be reconsidered.²⁵

The post-1348 growth also raises issues of consistency with other measures of development. In particular, all else being equal, Engel's law implies that rising incomes are inconsistent with rising agricultural labour shares. Can the two be consistent if we relax the

²⁴ The overall labour income share, 63%, was very much in line with those observed in other pre-modern (and indeed modern) contexts.

²⁵ New and arguably more reliable wage series, based on annual salaries of permanent employees, by Rota and Weisdorf (forthcoming), show long-term stagnation in Tuscan wages since 1500, just like our GDP per capita series in the Centre-North. If the trend produced by wages were spurious our estimate of the southern GDP pc in 1861 could be biased. Nevertheless, re-computing the estimate with our series for the Centre-North shows that our is robust: the ratio remains 1.31.

assumption of stability of the parameters and allow the labour income share to rise after 1348? On the one hand, increased agricultural wages and labour income shares are associated to increased agricultural labour productivity and thus consumption of primary products. By Engel's law such a change reveals a decreased income per capita. By the same logic, on the other hand, an increased labour income share in the urban sectors is associated with increased consumption of urban goods and thus reveals an increased income. Moreover, by definition, increased labour income shares (both primary and urban) match into falls in the capital and land income shares. Hence, for any given agricultural labour share, the sign of the net effect of an increased labour income share on the estimated GDP pc is undetermined a priori, but likely negative in an agricultural society. Indeed, if we allow labour income shares to rise by 20 percentage points between 1348 and 1430 we predict a marked economic contraction.²⁶ While for Malanima (2011) the Centre-North expanded by 22.15%, our baseline estimates are that it grew by 1.14% in the same place and by 3.73% in Southern Italy. With increased labour income shares the same two figures become -50.63% and -35.24%. While these figures are computed assuming that agricultural and income labour shares increased equally, the evidence is that after 1348 the urban wage premium was falling (Malanima 2012). It is thus likely that agricultural income labour shares increased more than the urban ones, implying that the predicted contraction would be even more severe. A more equal distribution of income is also expected to decrease the propensity to save and increase the propensity to consume food. Changing these propensities in these directions implies greater consumption of primary goods at any given a level of income and thus a greater revealed income at any level of agricultural labour share. Yet, the size of these effects is rather modest. Even in the extreme case where we allow people after the Black Death to stop saving altogether and spend virtually all income on food (more than 99%) we would still predict a marked contraction, by -47.80% in the Centre-North and -28.17% in the South. In short, the sensitivity analysis strongly suggests that if anything our baseline specification understates the negative economic consequences of the Black Death in Italy.

A new outburst of the plague in the Seventeenth century was also followed by a similar pattern, with contractions between 1600 and 1650 in the Centre-North and between 1650 and 1700 in the South. Alfani (2013) and Alfani and Percoco's (2019) also stress that the 17th-century plague had negative economic consequences in Italy, where it was particularly deadly, as it led to de-urbanisation and human capital losses. De-urbanisation was particularly long-lasting in the North (as distinct from the Centre-North): the urbanisation rate went from 14.1% in 1600 to 11.3% in 1650 and only recovered the pre-plague level in 1800 (using a 5,000 inhabitants threshold). Lombardy and Veneto in particular were hard-hit by the 17th-century plague. They were also comparatively agricultural in the early 19th century, by the standards of the Centre-North: we find that the agricultural labour shares were 71% in Lombardy (1813) and 83% in Veneto (1823) as compared to 64% in the mainland of the Kingdom of Sardinia (1819), 55% in Tuscany (1810) and 66% in the Papacy (1816). The structural transformation that we observe in Lombardy and Veneto during the Risorgimento (figure 5) can thus be understood, at least in part, as a return to a pre-plague levels of industrial development.

²⁶ We choose 1430 as it is the peak of Malanima's (2011) series. We allow the labour income shares to rise by 20 percentage points because this is the increase observed in England, where the data are comparatively reliable, after the Black Death by Federico *et al.* (2020). Our final levels are those measured by Van Zanden and Felice (2017: table 3) in 1427 Tuscany.

The Italian North-South gap shows up as significantly higher in the late middle ages than on the eve of the unification (figure 8), as the South saw slow economic growth, with a yearly rate of change 0.05% and a total change of 24%, while the Centre-North stagnated. The late medieval gap is even more marked with Malanima's (2011) series for the Centre-North (figure 7), but we expect our GDP pc ratio to be robust to the neglect of information on wages and prices. Prices and wages in the South and the Centre-North were fairly strongly correlated. In Allen's (2001) database the consumer price index and real wages in Florence and Naples exhibit correlation coefficients of 70% and 46%, respectively. In Malanima's (2006) dataset the same figures for Milan and Naples are 79% and 75%. Hence, we expect short-term fluctuations missed out by our procedure to be similar in our two macro-areas and thus a tendency to cancel each other out in the ratio. We explore the sensitivity of the results to the backward extrapolation of the agricultural labour shares, by looking at the 95% confidence intervals implied by the coefficients of the agricultural labour share-urbanisation regression. While the agricultural labour shares are estimated rather precisely, with bands 1 percentage point wide on average and 3.4 points at most, relatively wide bands are caused by the fact that GDP pc figures are rather sensitive to changes in these shares. Nevertheless, the main results hold across the band.

Felice's (2019a) figures on regional inequality in Italy since 1871 imply that the late medieval peak in our series of gdp per capita ratios (1.75 in the 1350s) was not surpassed until the 1950s peak (2.02) and is similar to the current level (1.72). Catch-up growth in Southern Italy occurred in the fifteenth and sixteenth centuries, at the same time as its metropolis, Spain, was also growing. A particularly marked decline during the 17th century crisis and a rebound in the 18th century also makes the Southern Italy trend similar to that of Spain (Alvarez-Nogal and Prados de la Escosura 2013: figure 7). Our revision of the GDP pc ratio at the time of the unification suggests that liberal Italy (1861-1914) saw little changes and the widening of the gap was concentrated in the wars and inter-war period (1914-1950). Movements were much faster in modern than in pre-modern times. Thus, catch-up during the "golden age" (1950-1973) achieved a similar reduction in the GDP ratio as that of the 15th/16th centuries over twenty rather than two-hundred years.

Turning to the international comparison, the timings of the "great" divergence between Europe and Asia and the "little" divergence within Europe are unaffected by the choice of series for the Centre-North, whose income per capita was in the order of twice as big as that of China already at the beginning of the 15th century, was caught up by Britain by 1700 and had fallen behind it by the mid-18th century. Southern Italy was different. In 1300, it, too, was better off than Britain. However, after the Black Death (1348), it was broadly on par with Britain and China, though it temporarily became quite a lot richer than the latter in the 16th century. It markedly fell behind Britain with the latter's take-off of the mid-17th century and forged ahead China with the latter's decline in the 18th century. By the mid-19th century, the GDP pc in Southern Italy was about twice as large as that of China, but less than half that of Britain. Using Broadberry *et al.*'s (2018: 990-991) method to extrapolate the GDP pc in the Yangzi Delta from the Chinese one, implies that South Italy's GDP pc in 1400 was between 60% and 75% of that of the most advanced part of China. However, South Italy had become richer than the Yangzi Delta between 1720 and 1760 and by the mid-19th century its GDP pc was between 25% and 60% greater.

The impression that Southern Italy was relatively well-off by pre-modern standards, in spite of being behind Centre-Northern Italy, is confirmed by a wider comparison of GDP pc levels before 1800 (figure 9). In particular, since we are dealing with an unbalanced panel, we run the following regression:

$$\ln(y_{it}) = \alpha_i + \sum_t D_t t + u_{it} \quad (\text{Equation 7})$$

Where \ln is the natural logarithm operator, y_{it} is the GDP pc in place i in year t and D_t are dummies equal to one in year t . We include our estimates for Central-Northern and Southern Italy and 20 other countries from the Maddison database for which we have more than one observation in the years between 1300 and 1800.²⁷ We then compute the fitted GDP pc values in the middle of the period (1550) and express them relative the value for South Italy.

Southern Italy emerges as a middle-high income place, at the time. Its average income was on par with France and the United States, higher than in most Western European countries and all extra-European countries bar South Africa, whose GDP pc was only a little higher. It was in the order of twice as big as the income per capita in the Southern American, middle Eastern and Eastern European countries in the sample.

7. Conclusion

This paper has reconstructed the agricultural labour share in the decades and centuries before the unification of Italy in order to offer new perspectives on the origin of current economic divides. We relied on pre-unification censuses that do not suffer from the same biases plaguing the early Italian censuses. In line with the conventional wisdom and in contrast to the censuses of the liberal age, we find that the agricultural labour share was higher in Southern than in Central-Northern Italy at the time of the unification, as the southern provinces were not as industrialised and possibly commercialised. In both macro-areas, the aggregate occupational structure changed little between 1800 and 1861. While several provinces saw changes in their agricultural labour shares and there was evidence of structural transformation in Northern Italy, we fail detect economic divergence overall. Rather both within the South and Italy overall, we detect very slow catching-up, with faster convergence within the Centre-North.

An implicit assumption of the debate on the origin of the North-South divide is that not much happened before the unification. Our reconstructions challenge that view: our GDP pc ratio between Central-Northern Italy and Southern Italy was significantly higher in the late middle ages than at the time of the unification, with a large drop between the fifteenth and the sixteenth centuries. The evolution of the agricultural labour share in the Centre-North since 1300 is consistent with secular economic stagnation, while that of the South predicts slow economic growth. Our series are much more in line with the timings of the great divergence identified by GDP than wage data, with Central-Northern Italy being ahead of China already in 1400 and being over-taken by Britain in the decades around 1700. We can also add Southern Italy to the picture. Differently from the Centre-North, we find that Southern Italy in 1400 and 1700 was not much richer than China and it was in fact poorer than the Yangzi Delta. However,

²⁷ Altogether there are 4,251 observations.

a large gap emerged in the wake of China's decline in the intervening period, when South Italy became richer than even its wealthiest part. After the Black Death Britain had caught up with Southern Italy, to forge ahead after the mid-seventeenth century take off. Overall, Southern Italy emerges as a middle-high income place, by the standards of the late medieval and early modern world.

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Tables and Figures

Table 1: Descriptive statistics of the sample

Variable	N	Places	Average	Mean	Standard	Sources
			year		deviation	
Cities population	2,332	622	1834	32,277	62,855	Censuses, others
Provinces population	2,038	99	1838	277,710	175,124	Censuses
Urbanisation rates	4,396	99	1836	16-27%	19-24%	Cities, provinces
Agriculture shares	379	83	1840	67%	15%	Censuses
Industry shares	379	83	1840	15%	8%	Censuses
Services shares	379	83	1840	18%	10%	Censuses

Notes: the range in the urbanisation rates depends on whether the 5,000 or 10,000 inhabitants threshold is used to identify cities; N=number of observations.

Sources: see the text and Appendix B.

Table 2: Comparison between pre-unification censuses: average correlation coefficients of the provincial sectorial labour shares in subsequent periods

State	Provinces	Correlations	Agriculture	Industry	Services
Lombardy	10	23	0.98***	0.98***	0.97***
Naples	14	6	0.96***	0.90***	0.94***
Veneto	8	1	0.89***	0.59	0.91***

Notes: ***=significant at 1% level, **=significant at 5% level, *=significant at 10% level; statistical significance for Veneto refers to the correlation coefficient rather than the average correlation coefficient because there is only one observation; “Naples” = mainland of the Two Sicilies.

Sources: see the text and Appendix B.

Table 3: Comparison between pre-unification (last year) and 1861 censuses: correlation coefficients and mean differences of the provincial sectorial labour shares

	N	Correlation coefficient			Mean difference		
		Agriculture	Industry	Services	Agriculture	Industry	Services
Italy	33	0.60***	-0.29	0.71***	0.105***	-0.123***	0.017
Centre-North	10	0.76**	0.28	0.94***	-0.008	0.022	-0.017**
South	23	0.74***	-0.03	0.73***	0.154***	-0.186***	0.032*

Notes: ***=significant at 1% level, **=significant at 5% level, *=significant at 10% level; N=number of provinces.

Sources: see the text and Appendix B.

Table 4: Labour participation rates, non-agricultural female labourers over total population and industrial labour shares in the pre-unification and 1861 censuses (main polities)

Polity	Census	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Labour participation rate			Non-ag F/P	Industrial labour share			Max. bias
		Male	Female	Total		Male	Female	Total	
<u>Centre-North:</u>									
Piedmont	Pre-unification	74%	60%	67%	9%	21%	18%	20%	-1%
Piedmont	1861	74%	49%	62%	7%	17%	14%	16%	-1%
Lombardy	Pre-unification			23%		12%		18%	
Lombardy	1861	75%	50%	63%	10%	20%	30%	24%	4%
Veneto	Pre-unification			67%				13%	
Tuscany	Pre-unification	76%	34%	55%	10%	19%	40%	26%	7%
Tuscany	1861	74%	41%	58%	10%	22%	36%	27%	5%
Papacy	Pre-unification			62%				13%	
Papacy	1861	78%	51%	65%	9%	15%	24%	18%	3%
<u>South:</u>									
Naples	Pre-unification			50%				6%	
Naples	1861	78%	59%	68%	13%	16%	38%	26%	9%
Sicily	Pre-unification			55%				5%	
Sicily	1861	70%	34%	52%	13%	20%	57%	33%	12%
Sardinia	Pre-unification	71%	14%	43%	4%	17%	32%	20%	2%
Sardinia	1861	72%	17%	45%	6%	12%	13%	12%	0%

Notes: Piedmont=Kingdom of Sardinia (mainland), Naples=Kingdom of Two Sicilies (mainland); Non-ag F/P=non-agricultural female labourers over total population; Max.=maximum; in polities with repeated measurements (Lombardy, Veneto and Naples), we report the mean values.

Sources: see the text and Appendix B.

Table 5: Agricultural labour share-urbanisation OLS regression

Sample	Urbanisation threshold	N	Adj. R- squared	Alfa	Beta	Ag in cities	Ag in country
Centre-North	5,000	267	0.323	0.729***	-0.462***	27%	73%
Centre-North	10,000	267	0.235	0.709***	-0.443***	27%	71%
South ⁺	5,000	112	0.907	0.930***	-0.427***	50%	93%
South ⁺	10,000	112	0.937	0.903***	-0.480***	42%	90%
Centre-North 1861	5,000	34	0.501	0.722***	-0.527***	20%	72%
South 1861 ⁺	10,000	25	0.589	0.695***	-0.409***	29%	69%

Notes: N=number of observations, adj.=adjusted, ag=agricultural labour share, ***=significant at 1% level, **=significant at 5% level, *=significant at 10% level; ⁺ interaction of the slope with Naples dummy allows a different urban agricultural labour share in that province level.

Sources: see the text and Appendix B.

Table 6: Sigma- and beta-convergence during the Risorgimento in comparison with after the unification.

Sample	Unit	Years	Convergence	N	R-squared (%)	Beta*100	Speed of convergence (%)
Italy	Provincial wage	1800-1861	Sigma	3803	0.0	0.003	
Centre-North	Provincial wage	1800-1861	Sigma	2541	1.7	-0.013***	
South	Provincial wage	1800-1861	Sigma	1262	1.6	0.016***	
Italy	Provincial wage	1800-1861	Beta	82	14.7	-0.538***	0.652
Centre-North	Provincial wage	1800-1861	Beta	59	33.2	-1.208***	2.191
South	Provincial wage	1800-1861	Beta	23	18.5	-0.230**	0.248
FNV (2019)	Provincial wage	1862-1913	Beta	69	13.5	-0.89***	1.286
Felice (2019a)	Regional GDP pc	1871-2010	Beta	20	20.8	-0.54 ^a	1

Notes: N=observation, ***=significant at 1% level, **=significant at 5% level, *=significant at 10% level; ^astatistical significance not reported in the source; FNV=Federico, Nuvolari and Vasta.

Sources: see the text and Appendix B.

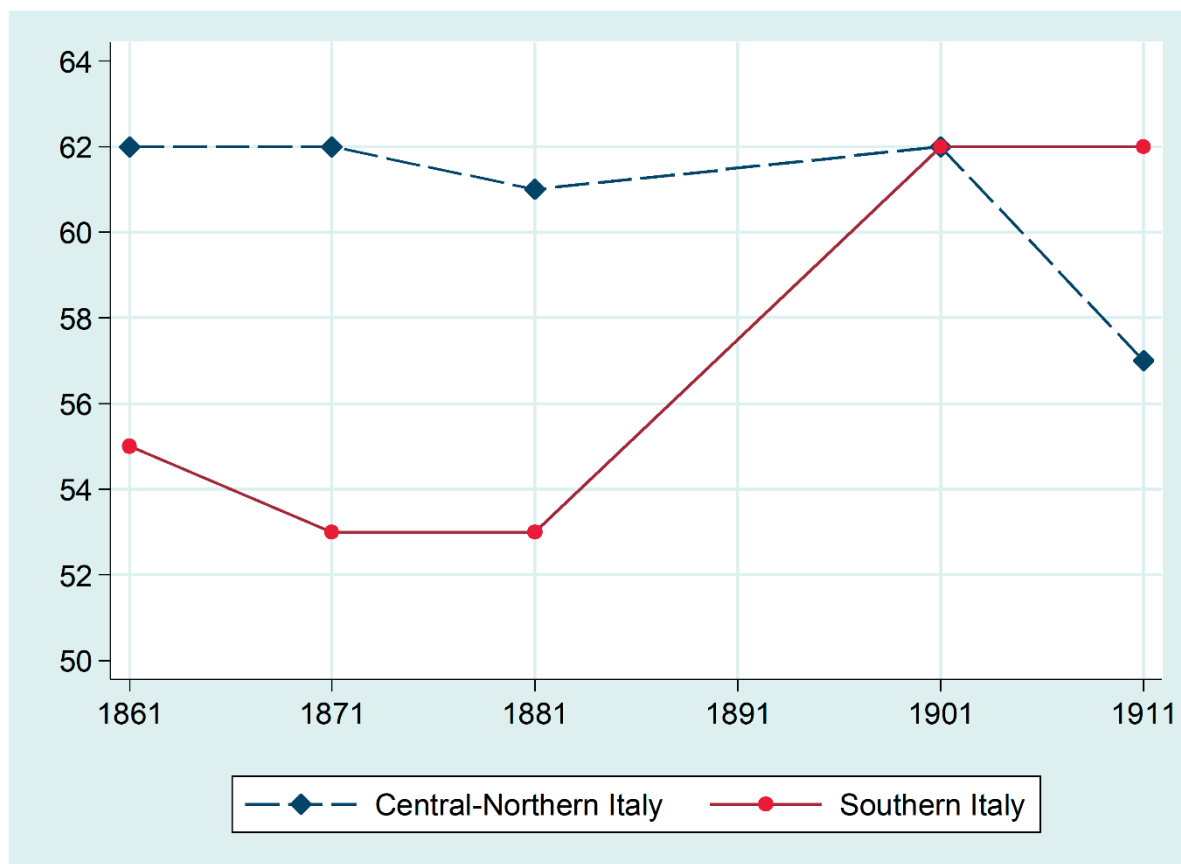
Table 7: Agricultural labour share (%) and income regression

Sample	(1) Ours	(2) 19 th century	(3) 20 th century	(4) Ours	(5) Ours
Constant	90.690***	86.8 ^a	84.9 ^a	60.461***	55.741***
GDP pc	-0.014***	-0.011 ^a	-0.010***		
Wage Allen				0.071	
Wage Malanima					0.353
Central-Northern Italy	10.870***			3.004	5.614***
Southern Italy				16.130***	
Britain	-14.014***			-9.429***	-6.433***
China	3.936***				
R-squared	0.427	0.479 ^b	0.865	0.000	0.008
N	122	81	182	120	103

Notes: ***=significant at 1% level, **=significant at 5% level, *=significant at 10% level; ^a=statistical significance not reported in the source, ^b=from the slightly different specification reported in Crafts (1984: table 3).

Sources: see the text and Appendix B.

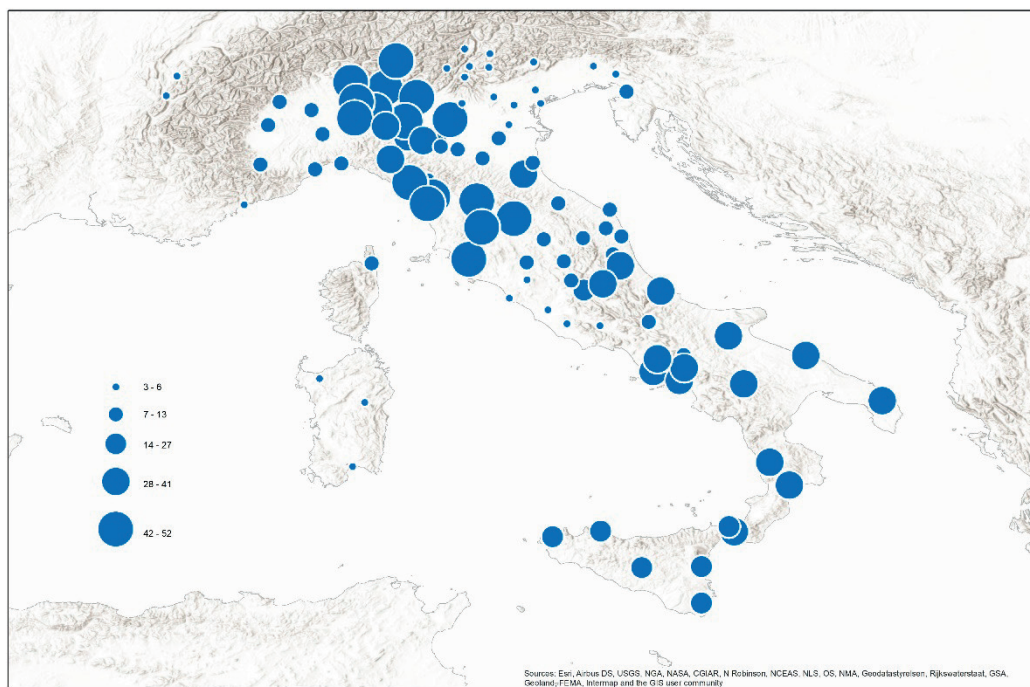
Figure 1: Agricultural labour share in the Italian censuses, 1861-1911 (%)



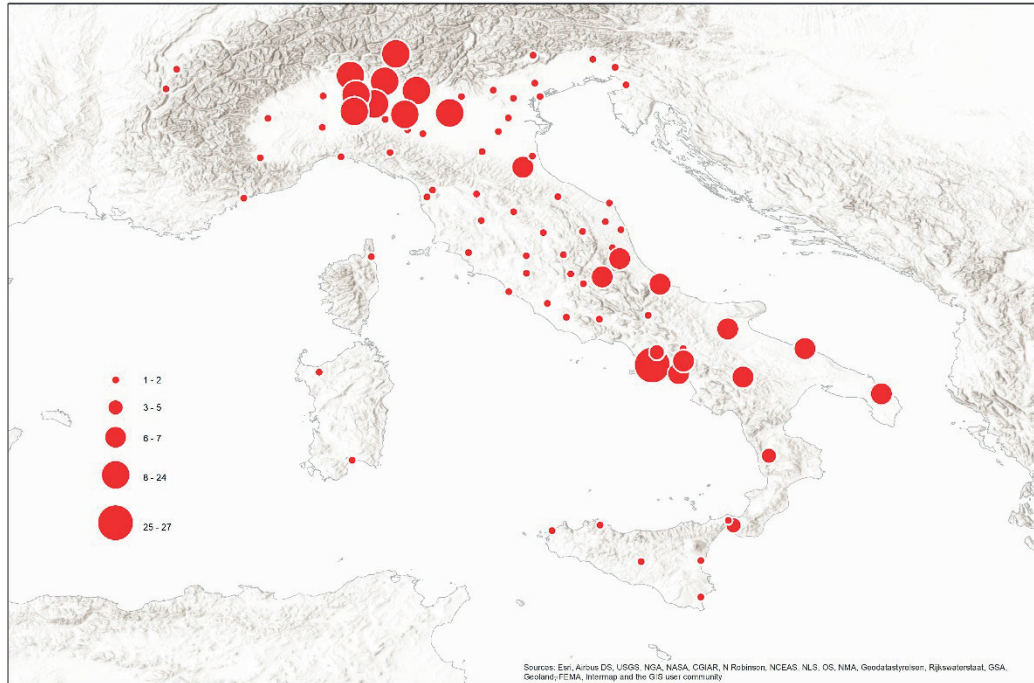
Source: Daniele and Malanima (2009: table 5).

Figure 2: Observations by province, 1800-1861: geographical distribution

a) Populations

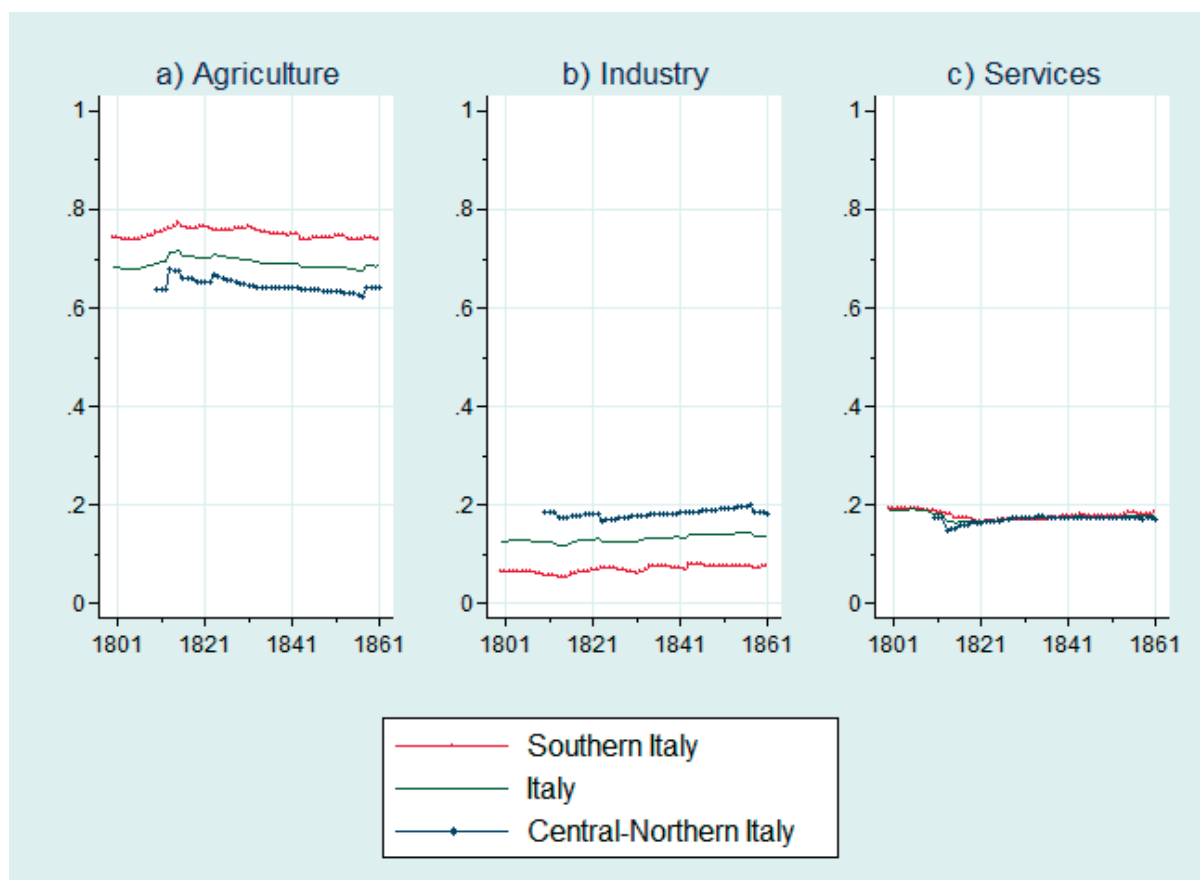


b) Occupations



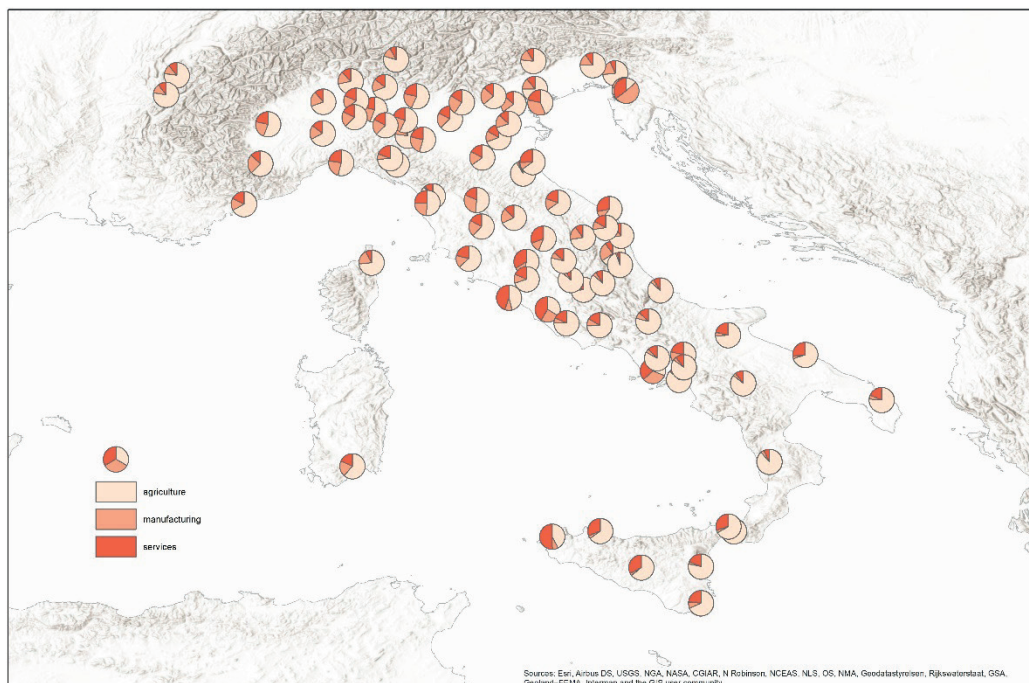
Sources: see the text and Appendix B.

Figure 3: Sectoral labour shares in Italy, 1800-1861



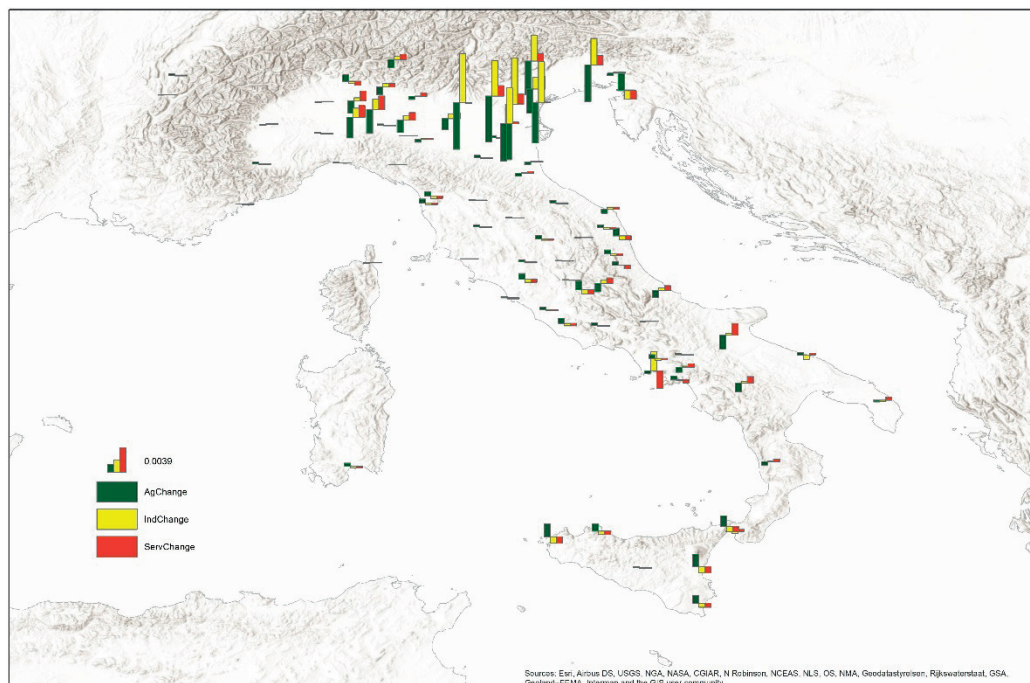
Notes: we omit the Centre-North in 1800-1809 as data are available from only two provinces.
Sources: see the text and Appendix B.

Figure 4: Provincial labour shares in Italy in 1848



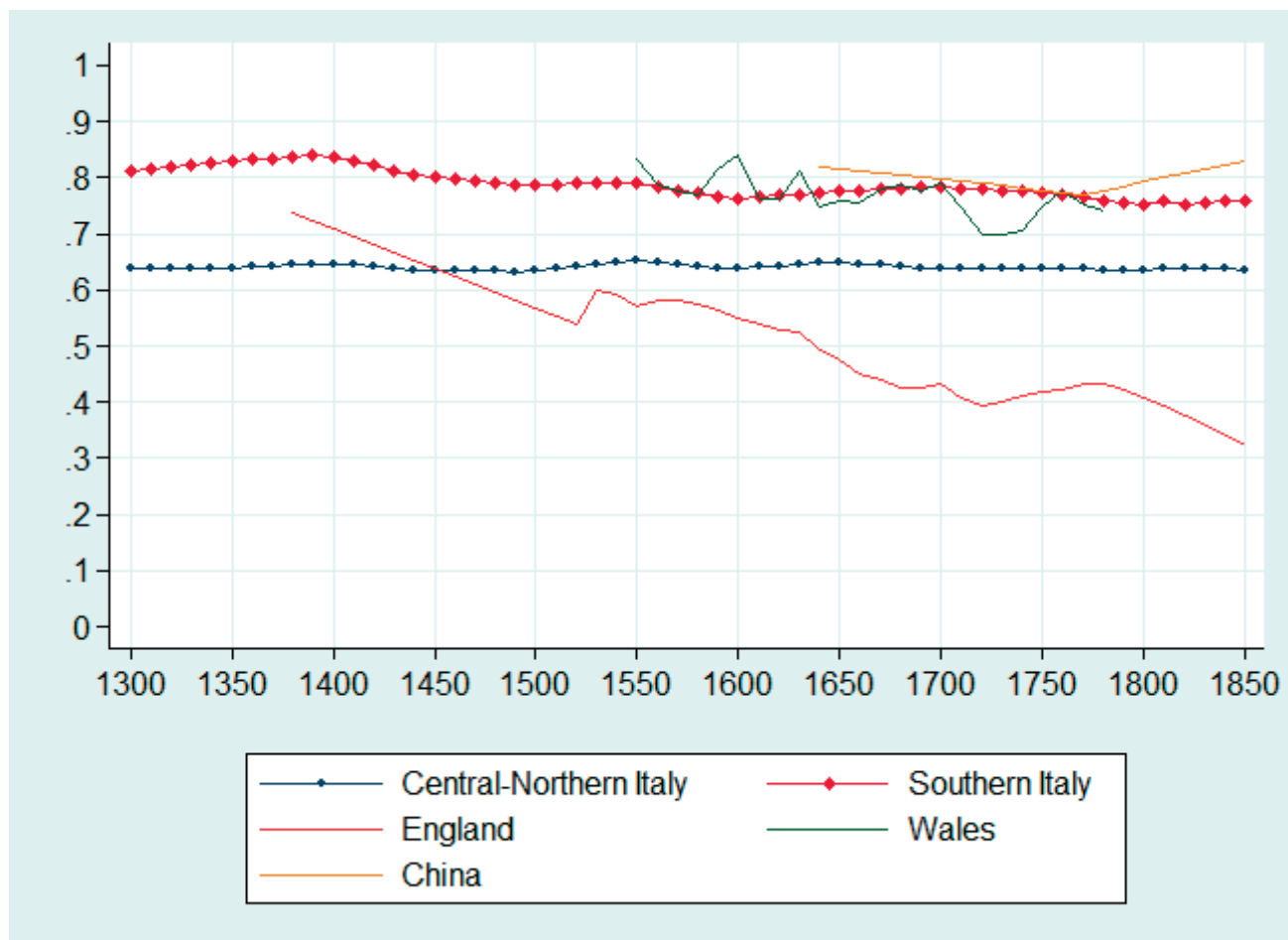
Sources: see the text and Appendix B.

Figure 5: Trends in provincial labour shares in Italy, 1800-1861



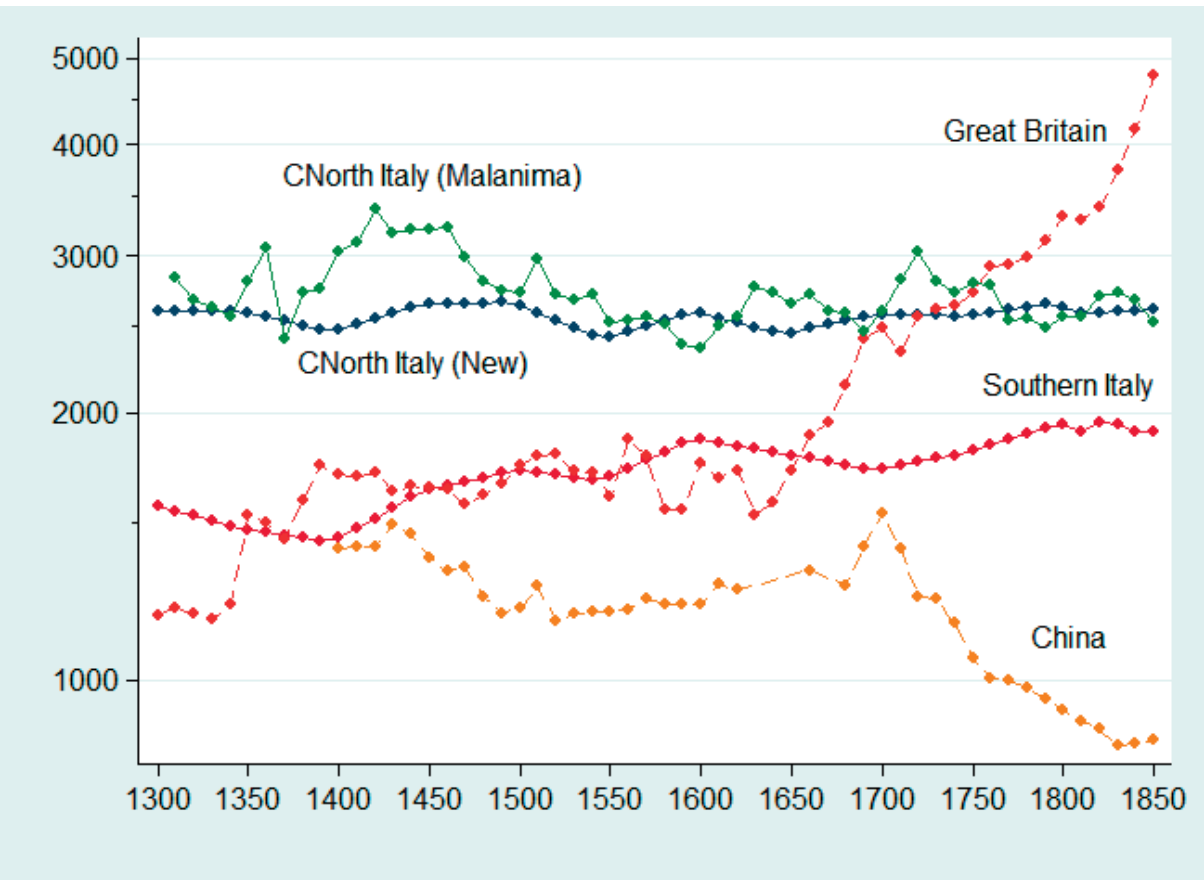
Sources: see the text and Appendix B.

Figure 6: Agricultural labour shares in Italy, Britain and China, 1300-1850



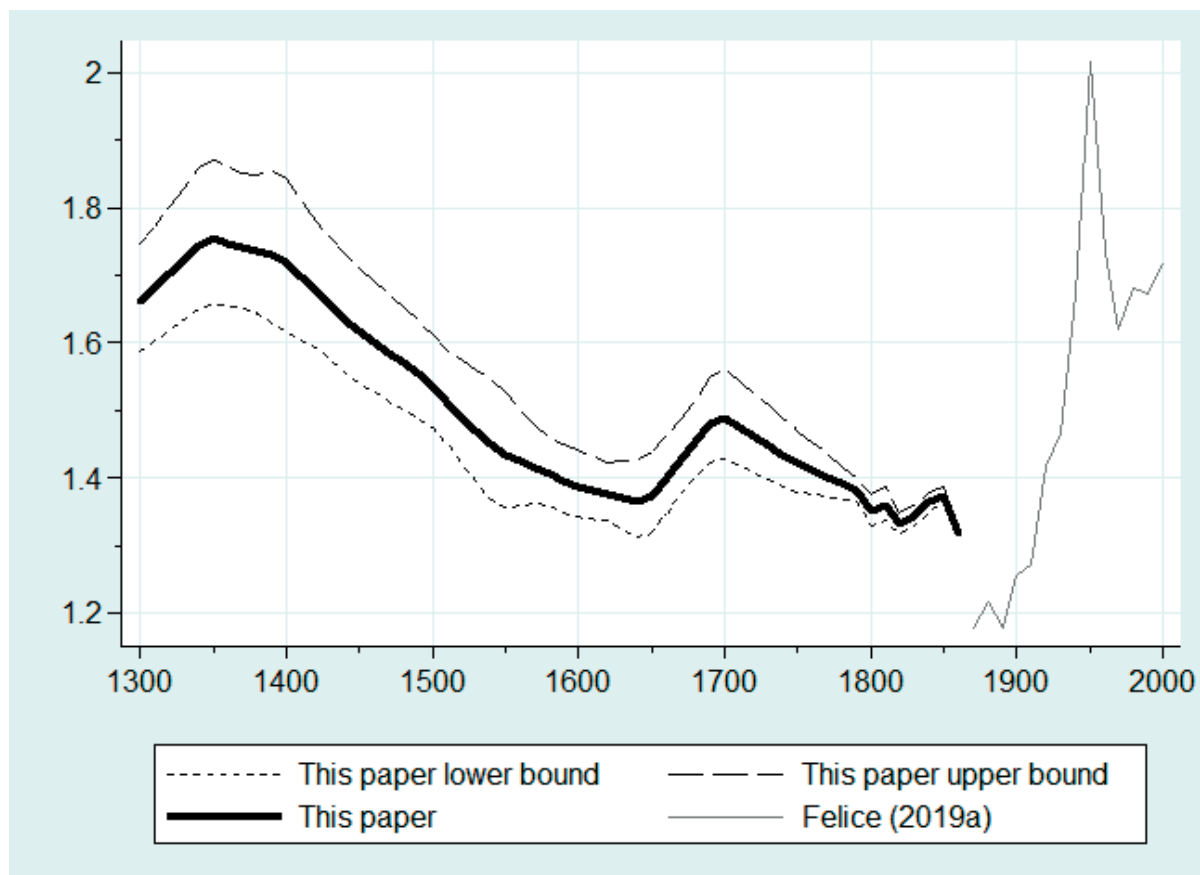
Notes: we linearly interpolate between observations. We omit an obvious outlier at the beginning of the Welsh series. In the 19th century the English data also include the rest of the UK.
Sources: see the text and Appendix B.

Figure 7: GDP per capita in Italy, Britain and China (2011 international \$, log scale), 1300-1850



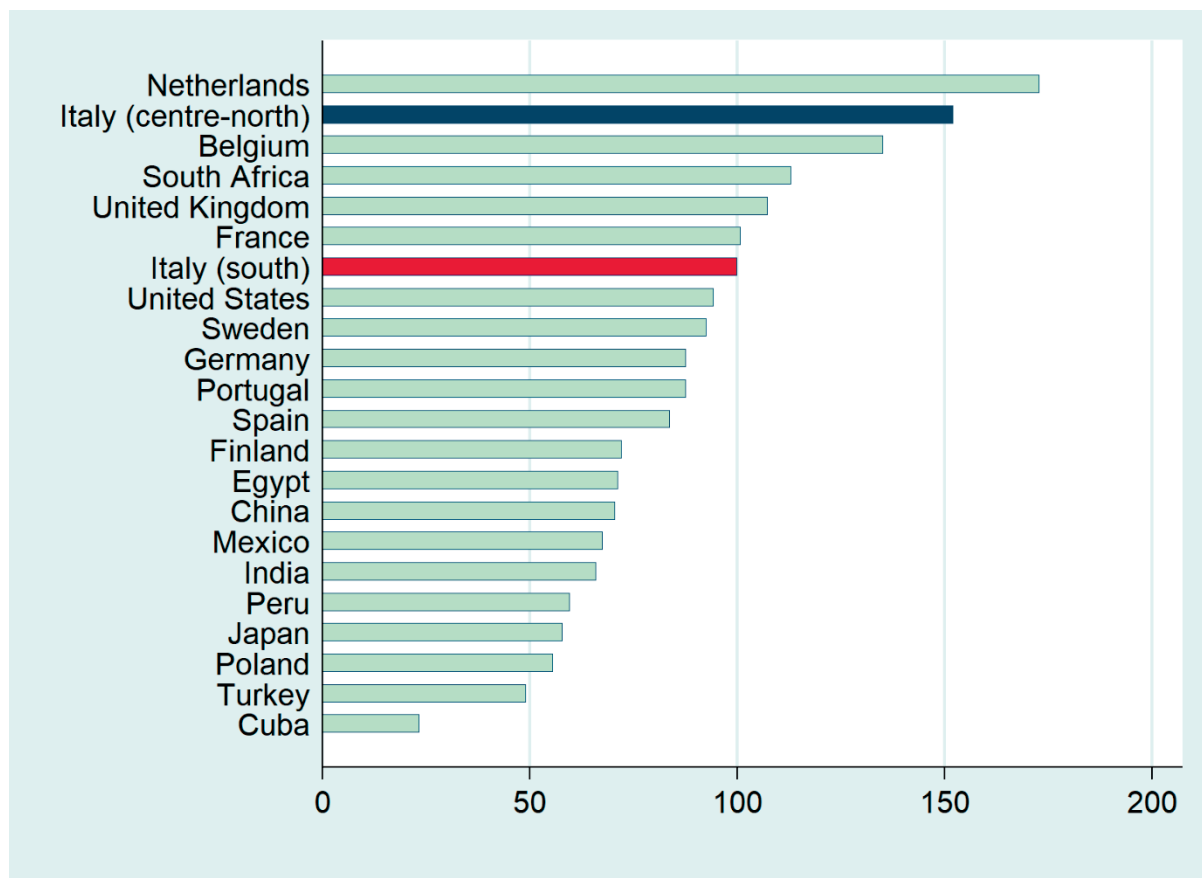
Notes: CNorth=Centre-North. Conversions into 2011 international \$ by the Maddison Project.
Sources: see the text and Appendix B.

Figure 8: GDP pc ratio between Central-Northern and Southern Italy, 1300-2000



Notes: upper and lower bounds implied by the 95% confidence intervals of the coefficients of the ag-urb regression (equation 1) applied to macro-areas with a weighted fractional model for the backward extrapolation. Sources: see the text and Appendix B.

Figure 9: average GDP pc relative to South Italy (%), 1300-1800



Notes: original GDP pc in 2011 international \$ converted by the Maddison project.
Sources: see the text and Appendix B.

Appendix A: Provincial Data

Province	Year	Urb. 5,000	Urb. 10,000	Ag.	Ind.	Ser.	Part.
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Data are available at: <https://www.bancaditalia.it/pubblicazioni/quaderni-storia/2021-0047/index.html>

Appendix B: Sources

Urban population

Since 1800: Bairoch *et al.* (1988), Beloch (1961), Bellettini (1987), Bussini (1982), Malanima (2006: 15, 2015), Marmocchi (1854, 1858a, 1858b, 1862), Marzolla (1832), Ministero d'Agricoltura, Industria e Commercio (1862a, 1864a), Pardi (1921), Petraccone (1974), Schiavoni (1982), Sonnino (1982), Tittarelli (1982), Zangheri (1963). In cases of inconsistencies across sources the following two criteria are used: first, census data is considered to be comparatively reliable; second, several sources are considered to be more reliable than a single one. Before 1800: Alfani and Percoco (2019), Bairoch *et al.* (1988), de Vries (2006), Malanima (2015). Here we considered later sources to be more reliable than earlier ones. We construct estimates at several benchmarks (1300, 1400, 1500, 1550, 1600, 1650, 1700, 1750) at times relying on linear interpolation between the beginning and the end of a century (eg. for Cammarata in Sicily we have data in 1600 and 1700, but not 1650, and thus for the latter year we interpolate).

Provincial population

Bandettini (1961), De Sanctis (1843: 3-4), Lampato (1845), Malanima (2006: 15), Ministero d'Agricoltura, Industria e Commercio (1862a, 1862b, 1866: 213ff). For Tuscany, Bandettini (1961) reports provincial populations at 1850 borders. We convert them at 1841 borders by multiplying them with the average ratios when we have populations with both borders (1834-1839, 1844 and 1846 for the provinces of the Grand-duchy, 1839 and 1842 for Lucca and 1847 and 1850 for Lunigiana and Massa).

Provincial urbanisation

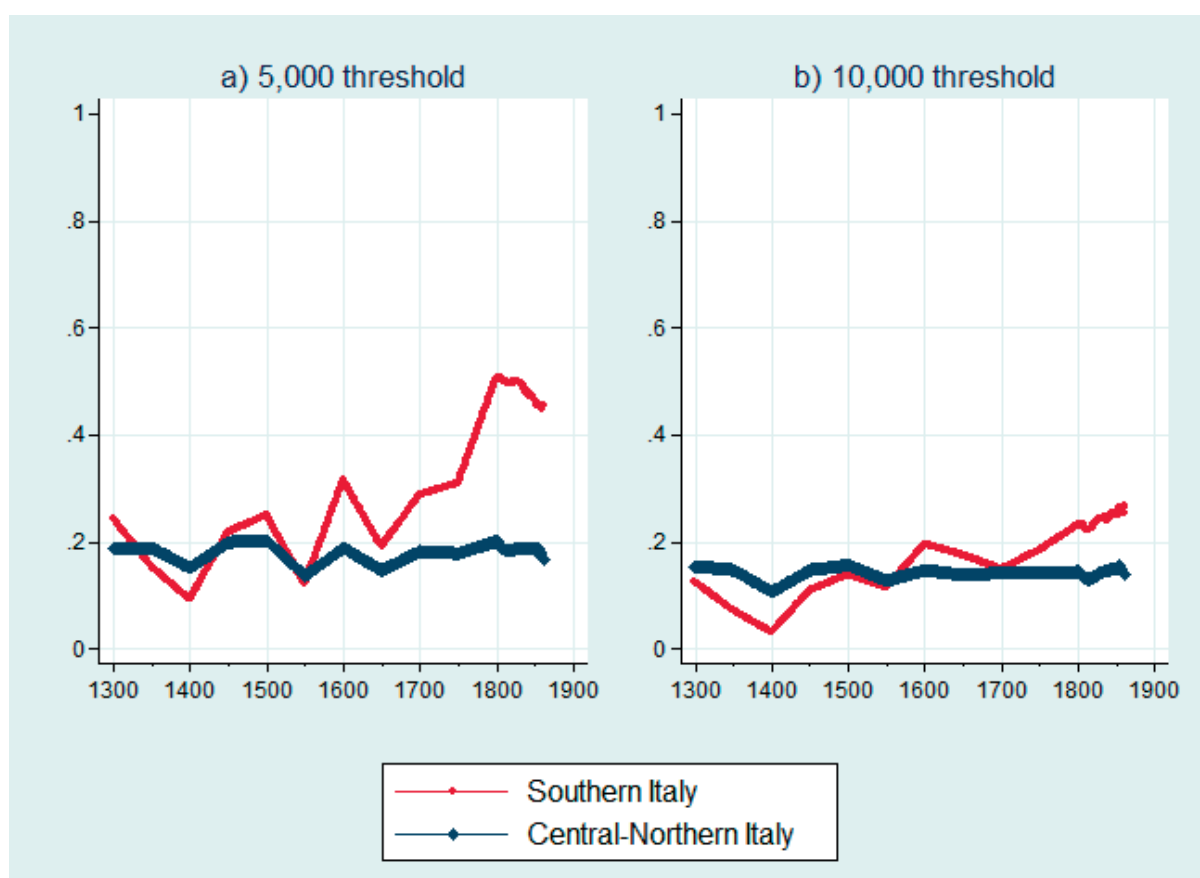
See “urban population” and “provincial population”. For the Kingdom of Sardinia, our source (Ministero d'Agricoltura, Industria e Commercio 1862b) reports occupation at 1859 borders. For the extrapolation, we therefore convert provincial urbanisation at pre-1859 borders into provincial urbanisation at 1859 borders as follows. In the Sardinian isle, where in 1859 the province of Nuoro was split between those of Sassari and Cagliari, we aggregate all the urban and provincial populations to construct urbanisation rates (and labour shares) for the whole island. We also aggregate urban and provincial populations in the old provinces of Torino and Ivrea, which were united in 1859. We compute total urban population in the 1858 province of Alessandria taking into account that the new province included Casale Monferrato and Acqui Terme and assume that the difference in urbanisation rates between the Alessandria province at 1859 and pre-1859 borders (0.02%) remained constant. We compute total urban population in the 1858 province of Genova taking into account that the new province included cities in the old province of Savona but had lost Acqui Terme to the province of Alessandria and assume that the difference in urbanisation rates between the Genova province at 1859 and pre-1859 borders (-1.88%) remained constant. We compute total urban population in the 1858 province of Novara taking into account that the new province had lost Casale Monferrato to the province of Alessandria and assume that the difference in urbanisation rates between the Novara province at 1859 borders and the provinces of Novara and Vercelli at 1859 borders

(1.65%) remained constant. For these last three provinces the same equal trends assumption is made to compute the provincial populations used as weights in figure 4 and table 6.

Urbanisation in the macro-areas

Our provincial populations allow to reconstruct populations in the Centre-North between 1848 and 1853 and in the South between 1838 and 1861. Italian populations at republican borders across macro-areas since 1300 are available from del Panta *et al.* (1996) and Federico and Malanima (2004). Their estimates for Italy as a whole hardly differ between the two sources, but Federico and Malanima (2004) have the advantage of having more frequent benchmarks. We therefore rely on them for the total Italian populations in 1300, 1350, 1400, 1450, 1500, 1550, 1600, 1650, 1700, 1750, 1800 and 1861. However, differently from us and Del Panta *et al.* (1996), Federico and Malanima (2004) define the Centre-North as excluding Latium. We thus rely on weights constructed with the figures from Del Panta *et al.* (1996) to estimate populations in the Centre-North and South, linearly interpolating in the benchmark years not covered by that source (1350, 1400 and 1500). For urban populations see “urban population”. We linearly interpolate for years without data. Figure A1 shows the series:

Figure A1: Urbanisation rates in Italy 1300-1861



Sources: see the text of this Appendix.

As in Malanima (2005, 2020), by the 19th century urbanisation rates were much higher in the South than in the Centre-North, as the South but not the North saw rising urbanisation rates in the long-run, while during the Risorgimento little changed in both macro-areas. Table A1 systematically compares our figures with those of Malanima. To assist the comparison, we re-compute our urbanisation rates allocating Latium to the South.

Table A1: Comparison between our and Malanima’s urbanisation rates (%)

Macro-area	Threshold	Estimate	1300	1400	1500	1600	1700	1800	1861
Centre-North (without Latium)	5,000	This paper	21.4	17.6	21.8	18.9	17.5	19.7	16.3
		Malanima	21.4	17.6	21.0	18.4	16.9	17.5	16.2
		Difference	0.0	0.0	0.8	0.5	0.6	2.2	0.1
	10,000	This paper	17.9	12.4	16.8	14.7	13.5	14.1	13.5
		Malanima	18.0	12.4	16.4	14.4	13.0	14.2	13.3
		Difference	-0.1	0.0	0.4	0.3	0.5	-0.1	0.2
South (with Latium)	5,000	This paper	18.5	8.7	21.8	29.7	28.7	47.7	42.7
		Malanima	23.8	9.3	25.7	31.1	28.2	36.5	42.6
		Difference	-5.3	-0.6	-3.9	-1.4	0.5	11.2	0.1
	10,000	This paper	9.5	3.3	12.7	19.1	16.0	22.6	25.8
		Malanima	9.4	3.3	12.3	18.7	16.1	21.0	25.5
		Difference	0.1	0.0	0.4	0.4	-0.1	1.6	0.3

Sources: this paper: see the text of this Appendix; Malanima: Centre-North (5,000): Malanima (2005: table 1, 2020: table 2), Centre-North (10,000): Malanima (2005: table 1), South (5,000): Malanima (2020: table 2), South (10,000): our computation using urban populations from Malanima (2015) and southern population implied by Federico and Malanima (2004: table 4).

The match with Malanima’s rates is mostly very close, with one notable exception: the South in 1800 according to the 5,000 inhabitants threshold, as our augmented data-set includes several centres not present in the Malanima’s (2015) dataset. For instance, Atessa in Abruzzo Citra is consistently reported as having more than 5,000 inhabitants in the first half of the 19th century by three different sources (Marzolla 1832; Marmocchi 1854; Bairoch *et al.* 1988). On the one hand, that the difference between the 1800 and 1861 figures is slightly lower for our estimates than those of Malanima suggests that our 1800 urbanisation rates are plausible. On the other hand, it is likely that some of these agro-towns were missed also by our sources in previous years, with the result that the sharp rise in urbanisation rates in the second half of the 18th century that we detect in the South using a 5,000 inhabitants threshold is in part an artefact. Yet to extrapolate agricultural labour shares in the South we only use urbanisation rates with a 10,000 threshold. Hence, any potential issue with the southern series before 1800 using a 5,000 threshold has no bearing on the results of our analysis.

Occupations

Italy. Corsica, 1856: Ministero agricoltura, industria e commercio (1862a: 354-355). Parma, 1857: Ministero d'Agricoltura, Industria e Commercio (1864b: 452-453). Litorale Illirico, 1857 (males only): Ministero agricoltura, industria e commercio (1862: 344-345). Lombardy, 1821, 1830, 1832, 1835-1850, 1853-1857 (males only): Ministero agricoltura, industria e commercio (1862a: 210-221). Lucca, 1843: *Bollettino di Notizie Statistiche ed Economiche d'Invenzioni e Scoperte*, Marzo 1845, p. 98. Papacy, 1853: Ministero del Commercio e dei Lavori Pubblici (1857: 317). Sardinia, 1858: Ministero d'Agricoltura, Industria e Commercio (1862b: 604-623). Tuscany, 1841: Bandettini (1956: 114-116). Two Sicilies, 1815, 1817-1822, 1831, 1836-1842, 1850-1852, 1855, 1858-1859 (only province of Naples): Ministero d'Agricoltura, Industria e Commercio 1862a: 127, 130-132); 1812, 1813, 1814 (only mainland): Martuscelli (1979). In the city of Naples these statistics show an unexpectedly high number of farmers which is inconsistent with the information provided by later censuses. We therefore decided to neglect this information. 1824 (only mainland): Petroni (1826). This source includes nearly 500 different occupational categories. These have been allocated to the primary, secondary and tertiary sectors with the help of a range of period and secondary sources, like Del Re (1835: 139), Mastriani (1843: 88-91) and Ago (1998: 11). It has not been possible to allocate a few occupations ("casolj", "cilentaj", "collarari", "creajuoli e faenzaj" and "empiriei"), but their numbers are very small: altogether they account for only 0.03% of the work-force. 1834 (only mainland): Serristori (1842: 260); 1843: De Sanctis (1843). Veneto, 1823: Quadri (1827: 55); 1857 (males only): Ministero agricoltura, industria e commercio (1862a: 330-331).

International. China: Guo *et al.* (2019). England: Broadberry *et al.* (2015), Keibek (2016), Wallis *et al.* (2018). Wales: Wallis *et al.* (2018).

GDP

Belgium: Buyst (2011); Britain: Broadberry *et al.* (2015); China: Broadberry *et al.* (2018); Xu *et al.* (2016), Cuba: Santamaria Garcia (2005), Germany: Pfister (2011), Egypt: Pamuk and Shatzmiller (2011), Spain: Álvarez-Nogal and Prados de la Escosura (2013), Finland: Eloranta, Voutilainen and Nummela (2016), France: Ridolfi (2016), India: Broadberry, Custodis and Gupta (2015), Japan: Bassino, Broadberry, Fukao, Gupta and Takashima (2018), Mexico: Arroyo Abad and van Zanden (2016), Netherlands: Van Zanden and van Leeuwen (2012), Peru: Arroyo Abad and van Zanden (2016), Poland: Malinowski and Van Zanden (2017), Portugal: Palma and Reis (2019), Sweden: Krantz (2017), Turkey: Pamuk (2009), Pamuk and Shatzmiller (2011), United States: McCusker (2006), Sutch (2006), South Africa: Fourie and Van Zanden (2013).

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