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Geography, market potential and industrialization in Italy 1871–2001*

Vittorio Daniele, Paolo Malanima, Nicola Ostuni

Department of Legal, Historical, Economic and Social Sciences, Campus S. Venuta - University «Magna Graecia» of Catanzaro, 88100 Catanzaro, Italy (e-mail: v.daniele@unicz.it, malanima@unicz.it, ostuni@unicz.it)

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Abstract. This paper deals with industrialization in Italy between 1871 and 2001, and is based on data on the labour force per province (NUTS 3) from population censuses. Particular attention is devoted to long-term trends and North–South disparities. After the analysis of the geographic spread of industry and its changes, we test the role of access to markets on the distribution of the labour force in manufacturing. The results show that access to markets played a main role in Italian industrialization and in the evolution of inequalities among Northern and Southern regions.

JEL classification: N94, R18

Key words: Market potential, regional development, industrialization, Italy

1 Introduction

The location patterns of industry depend on diverse factors. In the new economic geography (NEG), firms' location is the resultant of the interaction of some major economic forces: distance from markets, transport costs and scale economies (Krugman 1991a, 1991b; Baldwin 2005). Both in the classical theories of location (Lloyd and Dicken 1972) and in the NEG, the distance between production and consumption of goods plays a major role in the choice of location (Krugman 1991a, 1991b; Krugman and Venables 1996; Venables 2008). Schematically, with high transportation costs and poorly developed infrastructures, firms are scattered. Their regional location depends on the distribution of population and 'first nature' factors, such as resource endowment and geography. The reduction of transport costs allows producers to serve different markets through trade. Physical proximity to each local market, hence, becomes less important. Firms with increasing returns have an incentive to locate in regions with larger

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market access: at this stage, in a self-reinforcing process, the geographic concentration of industry increases. A further reduction of transportation costs – as well as rising congestion costs and international integration – favours the spatial dispersion of firms. However, the advantages deriving from proximity and agglomeration economies remain important, also in today's highly integrated economies (Paluzie 2001; Rodríguez-Pose and Crescenzi 2008; World Bank 2009). Empirical studies confirm how the process of economic development is related to changes in the geographic distribution of industry (Kim 1998; Combes et al. 2011; Betran, 2011; Badia-Miró et al. 2012; Martínez-Galarraga et al. 2015). The pattern of concentration/dispersion of industry describes a bell-shaped curve, similar to that found by Williamson (1965) for inequalities in regional economic development.

A comparable trend also occurred in Italy, from the end of the nineteenth century: while premodern industry was basically scattered, modern industry, initially localized in a few Northern regions, slowly involved the rest of the country, especially during the main phase of economic growth, between 1950 and 1970. The South, however, was only marginally touched by the spread of industry, and especially the manufacturing industry. From the 1970s, when industry began to shrink in the North, it dropped dramatically in the Mezzogiorno (Southern Italy). The disparities existing today among Italian regions, and particularly between North and South, depend above all on this unequal spread of industrialization (Daniele and Malanima 2013).

The multifaceted interest in Italian industrialization lies, first of all, in the possibility of following a long time frame, from the beginning of modern growth until the present day. The Italian case provides interesting insights for the NEG perspective, regarding the effects of economic integration on a spatial distribution of economic activities (Krugman 1991b; Krugman and Venables 1996; Ascani et al. 2012). Italy's particular geography – a 1,200 km long peninsula with the North bordering the economic core of the European continent, that is, the widest world market area, and the South well embedded in the Mediterranean periphery – adds interest to the case study. Given the geography of Italy, it is arguable that not only internal differences in social and historical factors, but also distance from larger markets represented a force capable of influencing regional industrialization.

The aim of this paper is twofold. First, by using data on population censuses, it analyses the distribution of the manufacturing industry at the provincial (NUTS 3) level during the period 1871–2001. Second, it estimates the access to markets (or market potential) of the Italian provinces, assessing the role of distance between producers and consumers in industrialization and, hence, economic development. Unlike related studies, this paper encompasses the history of Italian industrialization from the development of modern manufacturing until its spread, between 1950 and 1975, and later decline. In addition, for the first time to our knowledge, it investigates the relationship between market potential and the geographic distribution of manufacturing at the provincial level for about a century.

The role of geography and, particularly, of access to markets, in shaping the regional distribution of industry, has been examined for diverse countries and different time spans, by a growing body of studies (Crafts, 2005; Wolf 2007; Rosés 2003; Martínez-Galarraga et al. 2015; Ronsse and Rayp 2016). In the case of Italy, while the role of social and institutional factors in regional inequalities has been stressed by several scholars (Putnam et al. 1993; Perrotta and Sunna 2012; Felice 2013), the effect of geography, although discussed in the past (Nitti 1900; Fortunato 1911), has been far less investigated. The influence of geographic factors, that is, resource endowment and access to markets, has only recently stimulated the interest of researchers (A'Hearn and Venables 2013; Martinelli 2014; Ciccarelli and Fachin 2016; Missiaia 2016). In particular, A'Hearn and Venables (2013) showed how both domestic and foreign market access favoured the industrialization of Northern regions, while Missiaia (2016) found how, in the period of early Italian industrialization (1871–1911), the Northern regions benefited from a larger domestic market than those in the South.

This paper is divided into five sections. Section 2 presents data and sources; Section 3 examines the process of concentration-dispersion of manufacturing; Section 4 analyses the link between market potential and provincial distribution of manufacturing. The main lines of our research are summarized in the concluding Section 5.

2 Data and sources

In order to examine the provincial distribution of manufacturing, we used data on labour force (employed and unemployed) from population censuses held in the years 1871, 1911, 1936, 1951, 1961, 1971, 1981 and 2001 (Maic-Dirstat 1875, 1911; Istat 1939, 1957, 1967, 1977, 1985, 2005). We also exploited industrial censuses per decade from 1937, when the quality of data becomes more reliable (Istat 2011), to 2001 (Istat 1951–2001; Svimez 2011). Data from industrial censuses is used only for comparison, since, for their methodology, they are not consistent with those from population censuses. In our series, manufacturing includes the following sectors: food and tobacco, textiles, clothing, wood and furniture, engineering, leather and skins, chemicals, oil refineries and utilities (energy and water). The analysis will focus basically on the manufacturing industry: a sector that includes industries not tied to a particular location. We will refer to industry on the whole, or a secondary sector, whenever we include mines and construction together with manufacturing.

In our elaboration we followed census data carefully. 'Labour force' includes minors whose employment was legal at the time of any census: in 1871 youths under 15 years; in 1911 and 1936 young workers over the age of 10; in 1951, the census does not distinguish minors from other workers, while from 1971 onwards minors were excluded from the labour force.

The Italian national borders are those of the years when the censuses were held. Trentino Alto Adige and Friuli Venetia Giulia enter our database only after the First World War, that is, when these regions became part of the Italian State. For this reason, and due to the rearrangement of the administrative borders, the number of provinces changes over time. In 1871 and 1911 they were 69, 91 in 1936, 92 in 1951, 94 in 1971 and 103 in 2001.

Our analysis focuses on six censuses in particular, corresponding to benchmark years in Italian industrial history (Figure 1). The 1871 census represents industry and manufacturing

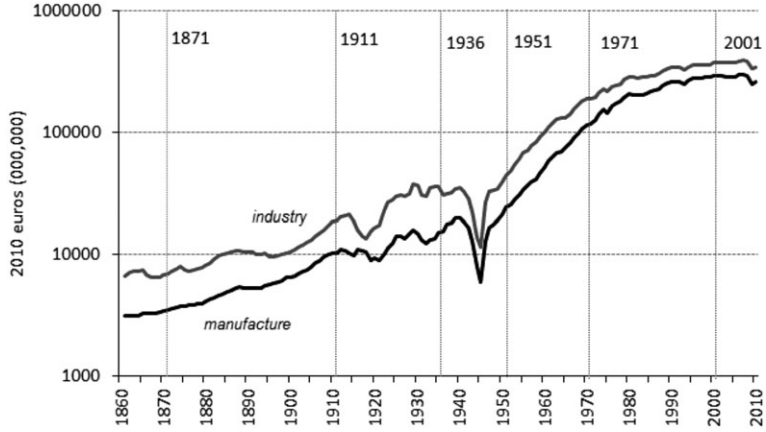

Fig. 1. The product of industry and manufacture 1861–2010 (in millions of 2010 euros) and the six censuses we focus on (log vertical axis)

Source: Baffigi (2013).

before modern industrialization. The forty years from 1871 to 1911 correspond to the first phase of industrial growth. The period 1911–1951 includes three censuses, encompassing four decades of slow increase due to the falls during both World Wars and international stagnation from 1929: the period 1951–1971 was the golden age of Italian industrial history, before stability in absolute value in the decade 1971–1981, and then until 2001 and a decline in relative terms (both as a share of GDP and employment).

The first three Italian population censuses, held in 1861, 1871 and 1881, have often been seen as less reliable than those that followed (Vitali 1970; Zamagni 1987). In 1871 census officials had already warned about a possible overestimation of the female population employed in Southern industries (Giordano and Zollino 2015). Yet more recently, scholars have begun to be less critical about those early censuses (Ciccarelli and Missiaia, 2013; Ciccarelli and Fenoaltea 2013). Our choice has been to include the 1871 census only partially and in particular to exclude this census from the analysis of market access.

In Table 1 we compare the original data from 1871 with those worked out weighting the female labour force as half, justified by the lower engagement of women in manufacturing. Since the employment of women in industry was more widespread in the South than the North, this revision results in a reshaping (but not an overturning) of industrial occupation in the South (as we see in columns 4 and 5 of Table 1).

3 The geographic distribution of manufacturing

3.1 Regional comparisons

Industrialization started in Italy from the 1880s onwards (Fenoaltea 2003a, 2003b, 2006) and lasted about a century, until the 1970s–1980s. In order to provide an outline of modern Italian industrial history, we start from some aggregate descriptive statistics on the labour force in industry and manufacturing and participation rate per macro-area in our six censuses. The four panels (a), (b), (c) and (d) of Table 2 are linked by the following equation:

$$\frac{Lm_j}{P_j} = \frac{Ls_j}{L_j} \cdot \frac{Lm_j}{Ls_j} \cdot \frac{L_j}{P_j}, \tag{1}$$

Table 1. Labour force in manufacturing in 1871 census (columns 1 and 3) and revised data assuming a lower female working time in manufacture (columns 2 and 4)

	1 Labour force in manufacturing (census data)	2 Labour force in manufacturing (revised data)	3 Labour force in manufacturing on population (census data)	4 Labour force in manufacturing on population (revised data)	5 Difference between census data and revised data (%)
Centre–North	1,635,307	1,288,561	10.0	7.85	2.11
North–West	828,836	644,383	11.5	8.94	2.56
North–East	415,254	335,463	8.7	7.05	1.68
Centre	391,217	308,715	8.8	6.95	1.86
South–Islands	1,138,907	808,206	11.0	7.77	3.18
Italy	2,774,214	2,096,766	10.4	7.82	2.53

Source: 1871 population census (see text).
Notes: in Figure 2, we report both the original census data and the revised ones. A revision of the original census data, following different criteria, was proposed by Fenoaltea (2001). The coefficient 0.50 in order to quantify female work intensity is close to the coefficients used in *Monografie di famiglie agricole* (Giusti 1940).

Table 2. Labour force in manufacture on population, labour force in industry, labour force in manufacture and participation rate 1871–2001 (%)

	1871	1911	1936	1951	1971	2001
(a) Labour force in manufacturing on population (*Lm,j/Pj*)						
North–Centre	10.0	13.4	11.8	12.5	14.1	11.7
North–West	11.5	16.8	17.3	18.6	18.1	12.9
North–East	8.7	9.8	8.2	9.3	12.7	13.3
Centre	8.8	11.7	8.0	7.8	9.8	8.6
South–Islands	11.0	8.5	5.7	5.1	5.7	4.7
Italy	10.4	11.5	9.6	9.8	11.2	9.2
(b) Labour force in Industry on total labour force (*Ls,j/Lj*)						
North–Centre	21.2	32.7	32.5	37.0	47.6	36.2
North–West	23.6	37.8	42.4	48.6	55.2	38.7
North–East	20.1	26.6	25.4	30.1	43.9	38.4
Centre	18.5	30.1	25.3	28.0	39.2	30.0
South–Islands	23.6	25.2	22.4	22.7	34.4	26.3
Italy	22.1	30.0	29.4	32.2	43.6	33.5
(c) Labour force in manufacturing on labour force in industry (*Lm,j/Ls,j*)						
North–Centre	82.0	84.8	78.0	77.9	79.7	77.7
North–West	83.0	86.5	83.3	85.7	84.8	78.7
North–East	80.1	82.1	71.9	71.1	76.7	78.9
Centre	81.9	83.6	71.3	66.7	71.7	74.1
South–Islands	85.6	80.5	67.6	60.2	55.1	64.2
Italy	83.4	83.5	75.6	73.7	73.8	74.8
(d) Participation rate (*Lj/Pj*)						
North–Centre	57.2	48.2	46.5	43.5	37.2	41.8
North–West	58.7	51.3	49.0	44.7	38.6	42.4
North–East	54.2	45.2	45.1	43.6	37.6	43.9
Centre	58.1	46.6	44.4	41.7	34.8	38.9
South–Islands	54.2	41.9	37.4	37.1	30.2	28.1
Italy	56.1	45.8	43.2	41.1	34.8	36.8

Source: Population censuses (see text).

Notes: Here we report for 1871 the original data from the census, without any revision (see Table 1 for the revised data). The North and Centre, is divided into three main subareas, that is North–West (Piedmont with Val D'Aosta, Lombardy and Liguria), North–East (Venetia, Alto Adige and Friuli), and Centre (Emilia Romagna, Tuscany, Marches, Umbria and Latium). Since participation rate is different in any subarea (as we see in panel c), and is declining in the South from the beginning of the series, we use the ratio between labour force in manufacturing and total population instead of the ratio of labour force in manufacturing and total labour force. So doing we capture in our calculations the 'discouraged–worker' effect, more relevant in the South than the North.

where Lm_j is the labour force employed in manufacturing in the area j, Ls_j is the labour force employed in the secondary sector, Lj is the total labour force in any area and Pj is population.

In panel (a) of Table 2, we can follow the parabola of the secondary sector in Italy and the depth and times of the structural changes which occurred from about 1880 (Ciccarelli and Fenoaltea 2009–2014). At the time of its Unification in 1861, Italy was still an agrarian country. More than 65 per cent of its labour force was employed in agriculture. The weight of the industrial sector in terms of employment, equal to 18 per cent in 1861, rose fast between 1871 and 1911, the first wave of Italian industrialization; when the industrial product rose by 50 per cent in forty years (Daniele and Malanima 2011; Baffigi 2013, 2015). Industrial production remained more or less stable until 1936 (or increased very little whenever we compare 1911 and 1951). It boomed between 1951 and 1971, the second wave of Italian industrialization, when industrial product rose by 50 per cent in twenty years. Since then, industry has diminished in importance in relative terms.

After a period of de-industrialization between 1871 and 1951, the South also underwent a period of industrialization in the 1950s and 1960s, followed by the same decline experienced by the Northern macro-areas and Italy as a whole from 1973–1980. The perspective on the industrial South cannot but change whenever we look at Table 2 (panels (b) and (c)) and focus on manufacturing and participation rates. It may be seen, in fact, that while in Italy as a whole the manufacturing sector, the most innovative part of the industry, gently diminished as a share of the secondary sector from the decades 1871–1911 onwards, in the South its decline was much sharper. The participation rate (panel (c)), already lower in the South than in the rest of the country in 1871, diminished remarkably from then on, with the consequence that in the South the labour force in manufacturing declined (actually halved), compared to the total population, from the beginning of our series until the end, while the North-West, North-East and Centre remained stable or increased.

The industrial censuses, although less reliable than population censuses until 1981 (Istat 2011), confirm the far lesser importance of manufacturing (and utilities) in the South than the North for the period 1937–2001 and its relative stability, with a very modest increase in 1981 (Table 3). In fact, after 1951, industrialization in the South was supported by the construction sector rather than by manufacturing.

3.2 The changing geography of manufacturing

Figure 2 shows the share of the labour force in manufacturing of the total labour force in 1871 (without any revision of the census data in (a) and with the revision of the female labour force in (b)).

In 1871, the industrial geography of Italy was that typical of pre-industrial economies, in which the location of economic activities ultimately depends on natural resources and on the

Table 3. Percentages of the workers in manufacturing (a), mining (b), utilities (c), construction (d) and industry as a whole (e) on population per macro–area and in Italy 1937–2001

	1937–1939	1951	1961	1971	1981	1991	2001
(a) Manufacturing							
North–Centre	10.94	9.95	12.29	13.12	14.23	13.21	12.08
South–Islands	4.12	3.15	3.36	3.83	4.86	4.86	4.44
Italy	8.48	7.42	9.01	9.88	10.90	10.19	9.33
(b) Mining							
North–Centre	0.31	0.24	0.20	0.14	0.11	0.10	0.07
South–Islands	0.33	0.28	0.22	0.13	0.10	0.08	0.06
Italy	0.32	0.25	0.21	0.13	0.11	0.09	0.07
(c) Utilities							
North–Centre	0.12	0.24	0.28	0.34	0.35	0.33	0.25
South–Islands	0.07	0.12	0.16	0.21	0.25	0.24	0.19
Italy	0.10	0.20	0.23	0.29	0.31	0.30	0.23
(d) Constructions							
North–Centre	1.64	1.42	2.26	2.19	2.42	2.63	3.09
South–Islands	0.71	0.64	0.98	1.23	1.56	1.86	2.04
Italy	1.30	1.13	1.79	1.86	2.12	2.35	2.71
(e) Industry (A + B + C + D)							
North–Centre	13.00	11.85	15.03	15.78	17.11	16.28	15.49
South–Islands	5.23	4.18	4.72	5.40	6.77	7.04	6.72
Italy	10.20	8.99	11.25	12.16	13.44	12.94	12.34

Source: Data from industrial censuses are available in the Istat website: http://dwcis.istat.it/cis/index.htm. This data relating to 1951–2001 are partially reported by Svimez (2011). Col. 1937–39 is from Istat (1947).

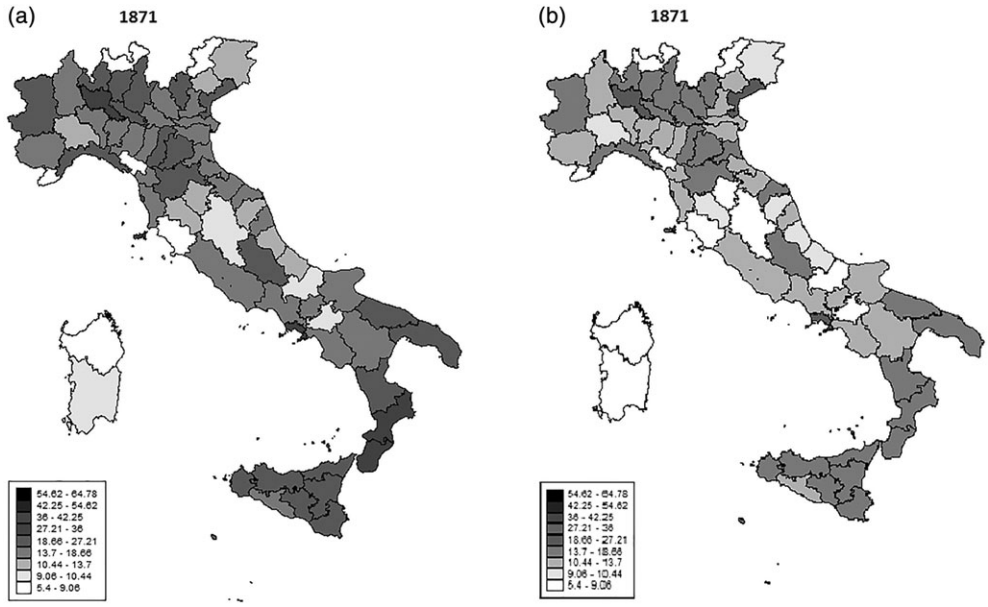

Fig. 2. Percentage of the labour force in manufacture on total labour force in 1871 (according to two different calculations of female labour force)

Source: 1871 population census (see text).

Notes: Map (a) follows census data without any change. In map (b) female workforce in any province has been multiplied by 0.5. See Section 1 and Table 1.

size of local markets (Krugman 1991a). At that time, the Italian industrial system was mainly made up of home-based manufacturing, in the form of the 'putting out' system, especially in textiles (e.g., in the silk sector near the Alps and in Calabria), and artisans' work, carried out in the cities to satisfy the demand of the local population (Cafagna 1989b; Fenoaltea 2001). A modern factory system was almost totally absent. The small scale of firms and the scarcely developed infrastructure and transport system, made it convenient for the firms to be located in proximity of final demand. The national market was scarcely integrated: similar regional productive structures and poor infrastructures hampered interregional trade (Cafagna 1989a; Federico and Tena-Junguito 2014). Overall, the geographic distribution of manufacturing was still comparable to that of the previous, pre-unification States (Ciccarelli and Fenoaltea 2013).

Modern industrialization started in Italy at the end of the nineteenth century. In its first phase, industrial development mainly involved the North-Western regions, especially the so-called Industrial Triangle, localized between Genoa, Turin and Milan (Fenoaltea 2006, 2001). In 1911, in this area of the country, about 17 per cent of the population worked in manufacturing; in the other Northern regions, the share was around 9 per cent. In the South, the percentage was lower (Figure 3).

The process of geographic concentration of manufacturing in the North, particularly in the so-called Triangle, was much more pronounced in 1951. At the time, the South was an agricultural area: 55 per cent of its labour force was still employed in the primary sector, while in the North it was 39 (Daniele and Malanima 2011). This geographically unbalanced industrialization process was accompanied by the deepening of the North–South development gap. From 1911 to 1951 regional disparities increased notably. In 1951, *per capita* GDP in the South was about 50 per cent of that in the Centre-North (Daniele and Malanima 2013).

The map of 1971 shows remarkable changes compared to twenty years earlier. In the previous two decades, manufacturing progressively spread in the regions of the North-East

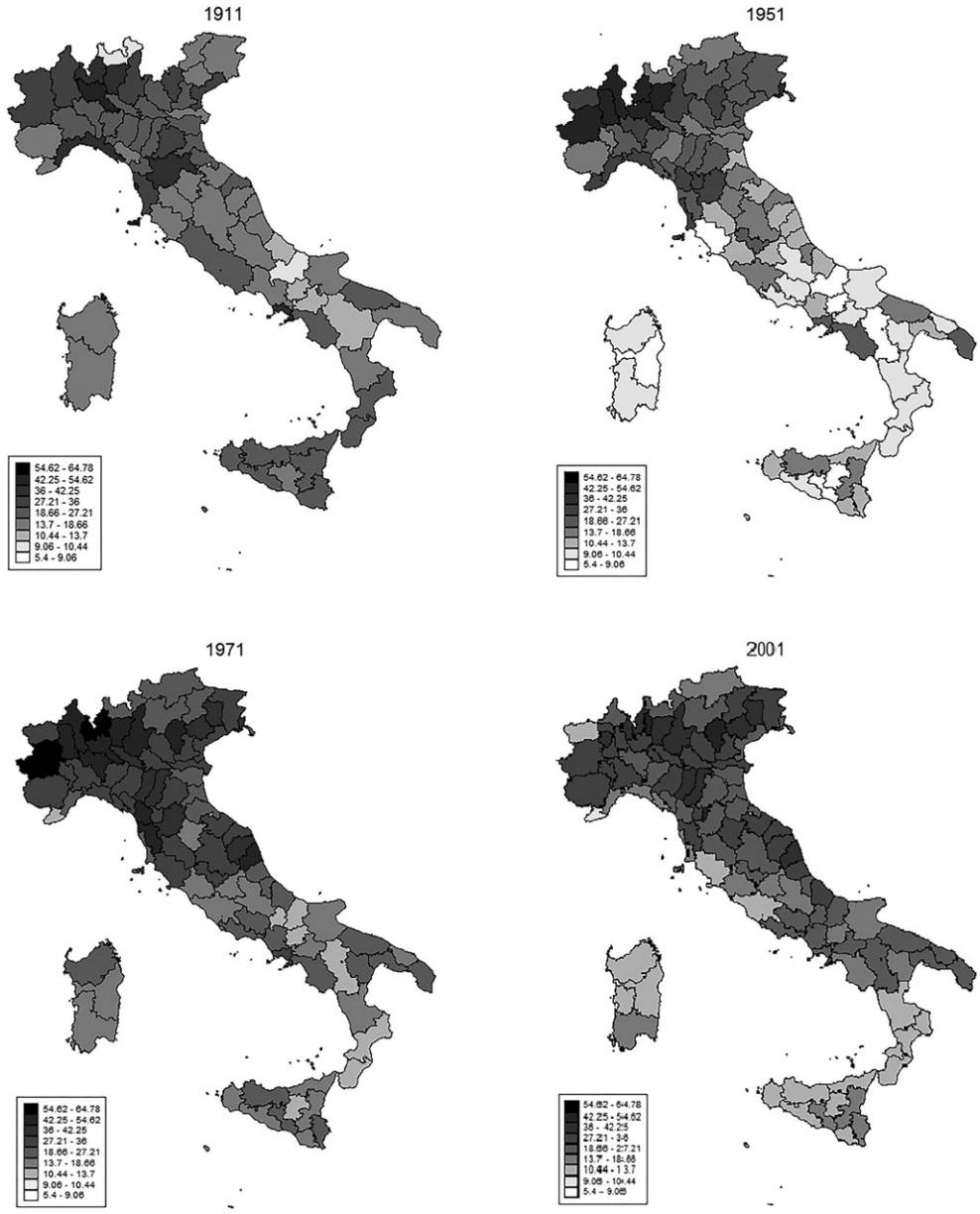

Fig. 3. Percentage of the labour force in manufacture on total labour force in 1911, 1951, 1971, 2001
Source: Population censuses 1911, 1951, 1971, 2001 (see text).

and Centre, and, to a lesser extent, the South. The golden age of Italian industrialization, between the 1950s and 1970s, involved the South as well, thanks to investments by the State (Cassa per il Mezzogiorno) and private entrepreneurs (Terrasi 1999; Daniele and Malanima 2011, 2013). The bulk of the industrial production was, however, concentrated in the North. The country was industrializing, but at different speeds.

These diverse paces of development are the main determinant of the massive emigration from the South toward the industrialized regions of the North during the 1950s–1970s: an unlimited supply of labour from the poor, agrarian Southern regions supported Northern

industrialization (Kindleberger 1967). In 1981, between 16 and 26 per cent of the populations of Abruzzi and Molise, Campania, Apulia, Sicily and Sardinia, and between 31 and 42 per cent of those of Calabria and Basilicata, lived and worked outside the regions where they were born (Vitali 1975; Del Panta et al. 1996).

From the 1980s, the share of manufacturing on GDP and total employment progressively diminished: Italy became a post-industrial economy. In 2001, the provincial distribution of manufacturing was essentially the same as existed thirty years earlier. Regional differences in manufacturing – and in *per capita* GDP levels – remained, however, roughly the same, as well as the gap between North and South.

3.3 The concentration of manufacturing

Both the classical regional development theory (Myrdal 1957) and the NEG models (Krugman 1991a) predict that, during the first stage of industrialization, the degree of spatial concentration of industry will increase, due to agglomeration economies and linkages from the demand side. Given the self-reinforcing pattern of industrial development, the initial location of firms in a given area (or industrial pole) attracts other firms and workers. In turn, agglomeration economies and larger markets stimulate the birth and location of complementary sectors, producing intermediate inputs, thus enhancing the process of development or the spillovers of industry from a pole to nearby regions. This is the phase when advantages accruing from the growth of industry predominate. In a later stage of development, this circular and cumulative process may stop, as a result of diseconomies and congestion costs working as centrifugal forces that favour the geographic spread of economic activities (Myrdal 1957; Krugman 1991a; Baldwin 2005; Prager and Thisse 2009:; Fujita and Mori 2005).

To summarize the trends in the distribution of manufacturing across Italian provinces, we use the following measure of concentration, which is a modified version of the index of geographic concentration proposed by Ellison and Glaeser (1997)[1]:

$$EG = \sum_{i=1}^{N} |Lm_i - a_i|, \tag{2}$$

where Lm is the share of the labour force employed in manufacturing in province i of the national total and a_i the share of the area of province on the country area. If the manufacturing labour force share of each province equals its relative area, there is no geographic concentration ($EG = 0$): the bigger the value of EG, the higher the degree of concentration (for a discussion of the index, see Spiezia 2002). Figure 4 illustrates the trend of the EG index over the period 1871–2001.

The curve clearly shows how the degree of geographical concentration of industry steadily increased during the period 1871–1961 and decreased thereafter. Overall, over the 130 years we analysed, the provincial concentration of manufacturing followed an inverted-U curve. This trend is consistent with the historical patterns of industrialization of Italy and with theoretical predictions of unbalanced regional growth theories cited above, and is similar to that described by Williamson (1965) for regional inequality in GDP *per capita*. The same trend is apparent during modern industrialization in other countries, such as the USA (Kim 1998), France (Combes et al. 2011), Portugal (Badia-Miró et al. 2012) and Spain (Betran, 2011; Martínez-Galarraga et al. 2015).

[1] This formulation of the index corrects for the possible bias due to territorial aggregation, which, in our case, depends on the changes in the number of provinces (Spiezia 2002).

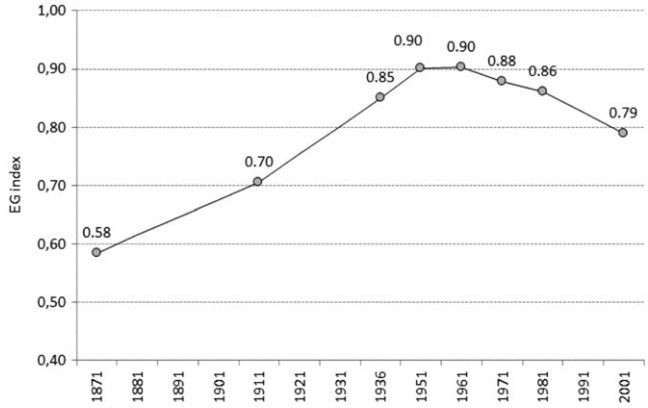

Fig. 4. Concentration index (EG) 1871–2001

Source: See text.

4 The role of markets

4.1 Market integration

Both in the classical theories of location (Lloyd and Dicken 1972) and the NEG (Krugman 1991a, 1991b), the accessibility of markets plays a major role in the geographic distribution of the manufacturing industry. With low economic integration, the spatial distribution of industry is widespread and each market is locally provided with goods. The progress of market integration triggers self-reinforcing agglomeration processes, increasing industrial concentration. Later, when economies become highly integrated, the geographical distribution of production tends to be more spatially dispersed (Cutrini 2009; Ascani et al. 2012). However, despite economic integration and the fall in transport costs, the advantages deriving from geographical proximity and agglomeration economies still matter for the location of economic activities (Rodríguez-Pose and Crescenzi 2008).

At the time of its unification, Italy was not yet a fully integrated market. Federico (2007), examining the volatility of wheat prices, argued that the process of integration started before 1861, mainly due to the advances in maritime transportation, and that unification did not foster the convergence. The unification of the administrative systems and the adoption of a single currency, together with the development of infrastructures, promoted economic integration, although interregional trade remained very limited as late as the 1880s (A'Hearn and Venables 2013). In the first decades after unification, due to the high trade costs and poor infrastructures, industries were still located near the largest local markets, that is, near the main cities (Ciccarelli and Fenoaltea 2011). This 'traditional' industrial geography increasingly changed with economic development and market integration. Between 1860 and 1880, the railway network increased from 2,400 to 9,290 km, while the length of the road system (national and provincial) grew from 22,500 to 35,500 km. In 1871 and 1882, the railway tunnel of Cenisio, connecting Genoa and Turin with France, and the San Gottardo tunnel between Italy and Switzerland, were respectively opened. Northern regions benefited especially from these important connections with the main European markets. The merchant fleet's carrying capacity rose from 654,174 tons in 1862 to 945,677 tons in 1886, while coastal shipping grew by 137 per cent and international navigation by 90 per cent (Pescosolido 1998). Until the end of the 1880s, the bulk of trade was carried out by ship, since rail freight rates were expensive, and transport networks still not wholly developed (Fenoaltea 1984). The volume of domestic trade remained, however, remarkably lower than that of other European countries, such as Germany or France. In the 1880s, trade from South

to North still accounted for only 12 per cent of rail shipments (A'Hearn and Venables 2013). From the end of the nineteenth century, the development of road networks continued to foster trade, even though the South remained disadvantaged in comparison with the North in terms of infrastructure endowment (Svimez 1961). The growing importance of road transportation is apparent whenever we look at the number of licensed trucks, which increased from 200 in 1910 to 17,000 in 1920 reaching 60,000 in 1930. The share of freight traffic carried by trucks reached 20 per cent of the total in 1933 (A'Hearn and Venables 2013). From the 1950s onwards the road system grew remarkably with the construction of new motorways. It increased from 500 km to 5,000 kilometres between 1955 and 1975. The progressive economic integration of Italy into the world economy may be summarized by data on exports and trade composition (Table 4).

During 1911 to 2001, the share of exports represented, on average, 12.4 per cent of Italian GDP at current prices (Baffigi 2013). In the 1860s, the Italian economy was largely rural: manufactured goods were barely 14 per cent of exports, in comparison with 50–60 per cent for France in the 1860s, and 70 per cent for Germany in the 1880s (Federico et al. 2011; Federico and Wolf 2013). From unification until 1911, the share of exports on GDP remained below 10 per cent. As in other countries, international trade collapsed during the Great Depression. The fall of Italian international trade was also due to the autarchic policies pursued by the fascist regime after 1925. Following the Second World War, trade policies changed drastically. Italy was the first OECD country to remove all quotas on imports, opting, in 1951, for trade liberalization (Graziani 1998; Pistoresi and Rinaldi 2012). In 1951 exports represented about 11 per cent of GDP, although their composition was, by now, considerably different from that of previous decades. Manufactured goods began to represent the main share of exports (Vasta 2010). The accession of Italy to the European Community and the 'economic miracle' of the 1960s, boosted exports, especially towards its main European partners such as France, Germany and Benelux. In 1970, Italy's export share exceeded all previous values and continued to grow. Over the period 1971 to 2001 it represented, on average, 21 per cent of GDP at current prices**.** The integration of the Mezzogiorno into the world economy has been comparatively modest. In the period 1971–2001, its exports were about 10 per cent of the national total (Svimez 2011).

4.2 Provincial market potential

The market potential index, proposed by Harris (1954) to explain the distribution of manufacturing industries in the US and their relations with different local markets, has been widely adopted in the analysis of industrial location patterns (Lloyd and Dicken 1972; Rich 1978). The theoretical bases of Harris's original market potential function were provided in the NEG framework

Table 4. Degree of openness and trade composition of Italy 1871–2001 (%)

	Exports on GDP (%)	Export composition		Import composition	
		Manufacture	Primary	Manufacture	Primary
1862	8.4	17.2	82.8	39.1	60.9
1871	12.1	13.7	86.3	41.3	58.7
1911	10.9	38.9	61.1	35.8	64.2
1951	11	70.2	29.8	23.8	76.2
1971	16.2	82.5	17.5	49	51
2001	26.9	92.6	7.4	78.5	21.5

Source: For the share of export, Baffigi (2013); for the trade composition, Federico and Wolf (2011).
Notes: Share of export on GDP at current prices.

(Krugman 1993; Brakman et al. 2009), while the relevance of market in firms' locations has been supported by a large number of empirical studies covering various countries and different time spans (Hanson 2005; Boulhol et al. 2008; Combes et al. 2008; Paluzie et al. 2009; Martínez-Galarraga 2012).

Following Harris (1954), the market potential (MP) of a province *i* may be defined as the summation of all markets, domestic and foreign, accessible to *i,* divided by the distance *dij* to province *j*. The size of each market is proxied by its GDP. MP may be broken down into domestic market potential (DMP) and foreign market potential (FMP). Domestic market potential is given by Equation (3):

$$\mathrm{DMP}_i = \sum_{J \neq i}^{n-1} GDPjd_{ij}^{-1} + GDP_i d_{ii}^{-1}, \tag{3}$$

where $GDP_i d_{ii}^{-1}$ is the internal market (the self-potential) of province *i,* computed by assuming that provinces are circular, so their radius is $r_i = \sqrt{a/\pi}$ (where *a* is the area) and the internal distance is calculated following Keeble et al. (1982) as $d_{ii} = \frac{1}{3} r_i$. The distance between provinces is measured in kilometres between their main towns; for the provinces of the islands, 100 km are added to distances, as a penalty for insularity (with the exception of the distances between the provinces of the same island). Similar definitions of DMP are widely used in the literature (Combes et al. 2008; Bruna et al. 2015; Ronsse and Rayp 2016). In some studies, instead, regional domestic market potential is computed taking interregional transportation costs or travel times within-regions distance into account (Crafts 2005; Holl 2012; Martínez-Galarraga 2012). Whenever we deal with a long period, dramatic changes in transportation technologies, efficiency and costs, make it very hard to include transportation costs in provincial MP. Yet the use of Equation (3), which only takes the distance into account to measure the potential market, does not undermine our results, for diverse reasons. First, it is well known how a trade elasticity to distance of -1 is a robust empirical finding in the literature on gravity equations. Second, the results obtained by using Harris's (1954) market potential, do not change significantly when we exploit other measures of trade costs, such as travel times, or follow more sophisticated procedures, rather than distance (Breinlich 2006; Bruna et al. 2015). Finally, and most important for our research, the purpose of our analysis is to estimate, for each year, the potential market for each province, and not its changes over time. Since the improvements in the transport system have affected all the provinces[2] more or less simultaneously, the relative distance from markets is the main variable that can influence trade and, therefore, firms' locations.

The foreign market potential FMP of province *i* is computed by considering the sum of GDP of the main trading partners of Italy (*f*) weighted by the inverse of relative distances between *i* and *f*:

$$\mathrm{FMP}i = \sum_{f}^{N} GDP_f d_{if}^{-1}. \tag{4}$$

FMP is calculated on the basis of geodetic distances between each province and the capital cities of the main trading partners of Italy – Austria, France, Germany, Switzerland – with whom the bulk of trade occurred overland. For the UK, the Netherlands and the US, we

[2] From 1911 onward, the endowment of railways (km per 1,000 km^2 of area) was the same in the Centre-North and in the Mezzogiorno. The South remained disadvantaged, at least until the 1950s, in terms of road density. In 1970s, the km of roads per km^2 of area was the same. A difference between the two areas remains if the density of motorways is considered (see Svimez 2011).

employed the principal maritime routes (www.sea-distances.org) between the main Italian ports[3] and those of London, Rotterdam and New York. In 1871, these countries represented 88 per cent of total Italian exports; in 1911, 65; in 1951, 48 and, in 2001, 56 per cent (Federico et al. 2011; Istat, *seriestoriche*, online). For Italian provinces without ports, their distance to the nearest maritime node was added. It can be noted how the European countries included are sufficient to estimate the accessibility index of provinces: given the peculiar geography of Italy, European markets may be reached only by road or railway through the Northern borders. Adding other countries to those already considered would not, therefore, change the relative indices for each province.[4]

Our specification of foreign market potential (Equation 4) has been often used, since it has a strong explanatory power, and yields results very similar to those of more complex indices designed to estimate trade costs on the basis of trade gravity equations (Breinlich 2006). In particular, by using a specification for FMP as in Equation (4), Breinlich and Cuñat (2013) found a strong positive correlation between proximity to large markets and levels of manufacturing activity in a large sample of countries. In other words, proximity to markets for products matters for industrialization, so Equation (4) can be considered as a centrality index. Alternative formulations for FMP have been proposed taking tariffs into account (Crafts 2005; Martínez-Galarraga 2012). The Appendix presents the differences between our estimates and FMP including trade tariffs for the year 1911. Their inclusion does not change the results, however.

A major problem in calculating domestic market potential at the provincial level consists in the availability of data on GDP.[5] Provincial homogenous GDP time series are, in fact, available only for the 1990s onwards, from the Italian national institute of statistics. To estimate provincial GDP in 1911 and 1936 we used data on value added in the three economic sectors – agriculture, industry and services – available for the years 1911 and 1938 (Felice 2005a, 2005b). For each sector, regional value added was imputed to the provinces on the basis of their respective shares of labour forces. The implicit assumption is that, for each sector, the provinces of the same regions had equal labour productivity – which is not unrealistic, given that provinces share common features. For 1951 and 1971, data on provincial income per capita was taken from Tagliacarne (1960, 1977). Finally, for 2001, provincial GDP data are from Istat (*Conti economici territoriali*, online). *Per capita* GDP in the various years was taken with respect to the Italian average (= 1), and converted into 2010 euro using data from Daniele and Malanima (2011). GDP was then obtained by multiplying by population (from censuses). For foreign countries, GDP is from Maddison (2013). Resulting provincial estimates of domestic and foreign market potential were, finally, computed relative to the Italian average.

Figure 5 outlines the relative market potential in the years 1911, 1951 and 2001 (Italy =100). In 1911, market potential in the North-West was higher than in the South and in the Eastern provinces (the Adriatic provinces from Venetia to Apulia). In 1911, Milan was the province with the greatest domestic market potential, followed by Naples, which was, at the time, the

[3] Ravenna, Trieste, Genova, La Spezia, Leghorn, Venice, Ancona, Civitavecchia, Naples, Brindisi, Taranto, Cagliari, Catania, Messina, Palermo and Trapani.

[4] One of the most robust findings in international economics is that distance has a strong negative impact on trade. The gravity models of international trade show how doubling the distance from 1,000 km to 2,000 km reduces trade by about 60 per cent. At a distance of 8,000 km, the trade flows are just 7 per cent of those at 1,000 km (Venables 2008). The fall of trade costs over time, especially for shipping, has undoubtedly increased total Italian trade. The distance of each province from the nearest port is, on average, a very small fraction of sea distance from considered foreign countries. Consequently, in a given year, the total distance from markets represents the crucial variable in determining the relative market access for each province. In addition, in the case of Italy, the bulk of exports is to near European countries. In the period 1951–2001, on average, about 70 per cent of exports was toward Europe and the rest towards the other continents.

[5] We stressed in Section 3 the difficulty of computing the female labour force from census data for 1871. Despite this, we included the 1871 census in the concentration index of the manufacturing labour force. We excluded the same census from the econometric analysis, since reliable estimates of provincial or regional GDP for the same year are lacking.

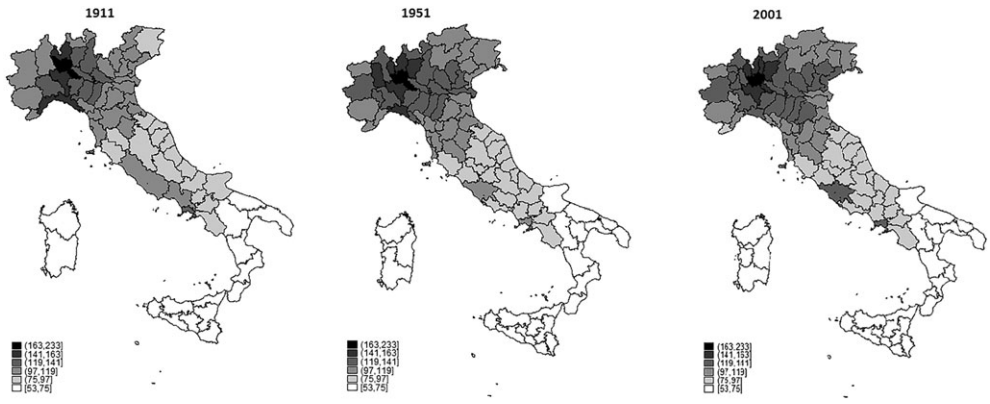

Fig. 5. Market potential of any province 1911, 1951 and 2001 (Italy =100)
Source: See text.
Notes: The shading of the maps show the relative market potential per province.

only Southern province among the first 20 in the provincial ranking. In 1951, the domestic market potential of Naples was 60 per cent of that of Milan and lower than that of the other North-Western provinces. The North–South gradient in total market potential, already visible in 1911, increased from then on, and remained more or less stable between 1951 and 2001. The lower market potential of the South was the consequence both of the lower GDP (the numerator of the market potential equation) and the higher distance from large markets (the denominator), that is the Central and Northern regions and European trade partners. This picture – showing an initial larger market access of the North-Western provinces – is consistent with the results by A'Hearn and Venables (2013). According to their estimates, in 1890 the domestic market potential of Lombardy and Piedmont was already 50 per cent greater than that of Campania, the region with the second highest share of its labour force employed in manufacturing.

4.3 Manufacturing and market potential

In order to test the relationship between market potential and industrialization per province, we estimated different specifications of the baseline Equation (5):

$$\frac{LM_{i,t}}{P_{i,t}} = \alpha + \beta MP_{i,t} + \delta \mathbf{X}_{i,t} + \varepsilon_{i,t}, \tag{5}$$

where the dependent variable is the share of the labour force employed in manufacturing on population, MP is the provincial market potential relative to the Italian average, and **X** a set of control variables. Equation (5) has been estimated both by means of cross-sectionals OLS and panel models. Although the long time-span covered and the provincial disaggregation limited the availability of time-consistent data, in the subsequent analysis different control variables have been used. The controls are: an index of provincial urbanization, latitude and two dummies, respectively for provinces with the regional capital city and for landlocked provinces. In addition, we also control for the effect of literacy.[6]

Urban density is one of the main variables related to manufacture distribution, and proxy of urbanization have been used in empirical studies in the NEG framework (Brakman et al. 2009). For each province, urbanization is given by the share of people living in cities with more

[6] Italy is a country poor in natural resources, especially from the subsoil. The share of labour force in the mining sector was overall negligible.

Table 5. Manufacture and domestic market potential – OLS

	1911	1936	1951	1971	2001
const	–3.16	–10.5***	–11.9***	–15.7***	–19.6***
	(−0.962)	(−3.08)	(−3.18)	(−5.03)	(−5.28)
Ln Domestic MP	0.653***	0.303**	0.752***	0.514***	0.417***
	(4.65)	(2.02)	(5.14)	(3.90)	(3.00)
Urbanisation	0.181***	0.283***	0.180**	0.175**	–0.0318
	(3.08)	(3.97)	(2.31)	(2.15)	(−0.305)
Capital city	0.143*	0.0119	0.0160	–0.108	–0.179**
	(1.72)	(0.134)	(0.166)	(−1.47)	(−2.02)
Landlocked	–0.0381	0.0736	0.0283	0.0740	0.0905
	(−0.526)	(0.870)	(0.329)	(1.05)	(1.09)
Ln Latitude	0.174	2.14**	2.45**	3.51***	4.57***
	(0.202)	(2.37)	(2.48)	(4.27)	(4.68)
n	69	91	92	94	103
R^2	0.56	0.48	0.68	0.73	0.74

Notes: Heteroscedasticity–robust standard errors, HC1; *t*–statistics in parentheses; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

than 20,000 inhabitants on the total provincial population (data were taken from censuses, www.sistat.istat.it); the resulting figures were then normalized with respect to the national level.[7] As noted by A'Hearn and Venables (2013), although the relative share of population in the North and the South remained roughly constant over the last century, the balance of urban population changed. From 1901 onwards, urban population increased much more in the North than in the South.

A dummy for regional capital cities is also included among the regressors since, at the local level, capitals are generally the main centres where the administrative functions and services are concentrated. The dummy for landlocked provinces captures the possible negative effect on trade deriving from the lack of direct access to the sea, which is a severe constraint for some areas (World Bank 2009). Finally, latitude directly control for regional geographic differences related to the North–South gradient. It is noteworthy how, in the case of Italy, a number of socio-economic factors, such as *per capita* GDP, educational levels, institutional variables and social capital measures (De Blasio and Nuzzo 2010; Daniele 2015) present a clear North–South gradient and are also correlated to latitude.

Since the effect of each of the included variables may have changed over time, we first run the cross-section estimates for each census year. Given the crucial effect of a home market for industry location, we estimate the regressions for domestic (DMP) and total market potential (MP) separately. The results are presented in Tables 5 and 6. The relationship between manufacture and provincial market is positive and highly significant over the entire period for both measures. Urbanization is also significant, but its explanatory power diminished over time and became null in 2001. This result is consistent with the changes in the location patterns of industry, which are historically related to transportation costs. When, as in the past, transportation infrastructures are poorly developed and, hence, transportation costs are high, firms localize close to their customers or suppliers. In that case, the size of the domestic market, proximity to cities and densely populated areas are crucial determinants for the development of manufacture. When transportation costs fall, industry location is no longer driven by population distribution (Krugman 1991a; Glaeser and Kohlhase 2004).

[7] The threshold value of 20,000 inhabitants could appear too high for 1911 and too low for 2001. In any case, since our calculations are always computed assuming Italy = 1, the use of different and varying thresholds does not result in a different picture (such as our sensitivity tests reveal).

Table 6. Manufacture and total market potential – OLS

	1911	1936	1951	1971	2001
const	5.18	–0.195	–2.95	–10.0**	–20.1***
	(1.21)	(−0.0416)	(−0.676)	(−2.54)	(−4.56)
Ln Total MP	1.32***	1.02***	1.55***	0.981***	0.520**
	(5.32)	(3.67)	(6.34)	(4.31)	(2.25)
Urbanisation	0.159***	0.226***	0.167**	0.168**	0.0210
	(2.97)	(3.30)	(2.24)	(2.21)	(0.202)
Capital city	0.124	0.0165	0.0112	–0.112	–0.181*
	(1.60)	(0.204)	(0.135)	(−1.59)	(−1.93)
Landlocked	–0.0468	0.0187	–0.0186	0.0539	0.109
	(−0.723)	(0.235)	(−0.236)	(0.755)	(1.26)
Ln Latitude	–2.04*	–0.595	0.0648	2.00*	4.68***
	(−1.82)	(−0.481)	(0.0562)	(1.92)	(4.02)
n	69	91	92	94	103
R^2	0.61	0.54	0.72	0.74	0.73

Notes: Heteroscedasticity–robust standard errors, HC1; *t*–statistics in parentheses; * indicates significance at the 10% level; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

The effect of the other variables is not statistically significant, with the exception of latitude, which is positively and significantly linked to manufacture whenever DMP is included. Instead, when MP is taken into account, its coefficient is negative and weak for 1911. Yet latitude becomes positive in 1971 and 2001. These differences may be explained by changes in the geographical distribution of manufacturing activities. Over time, in fact, the rising concentration of industry in the Northern regions makes the North–South gradient in manufacturing employment much more apparent than in the first decade of the twentieth century.

Industrialization may be influenced by some social factors, and primarily by the level of literacy. In the case of Italy, it has been argued that higher levels of education represented an important prerequisite for the development of Northern regions (Felice 2012). The role of education may have been especially relevant in the first decades following national unification. At that time, in some Northern regions, such as Piedmont and Lombardy, illiteracy rates were about 55 per cent, while in the South they were close to 90 per cent (Svimez 2011). Even though the levels of literacy increased both in Northern and Southern regions over time, regional disparities long persisted. In 1951, in the Centre-North, the illiteracy rate was, on average, 6.4 per cent, while in the South it was still 24.4 per cent, mainly due to the oldest population's cohorts (Svimez 2011; Ballarino et al. 2014). Unfortunately, for the period 1871–1936, data on educational levels (e.g., schooling rates) at the provincial level are not available. We therefore took data on literacy rates from population censuses, available for provinces for the years 1911, 1931 and 1951 (since in 1936 census literacy was not recorded, we used data relating to 1931). We focused on the period 1911–1951 for two main reasons: the first is that, due to the cumulative process of industrialization, the first years were crucial in shaping subsequent distribution; the second reason is that in 1971 provincial differences in literacy were no longer relevant.

Table 7 reports cross-sectional estimates including literacy. Given the correlation among the regressors, urbanization was not taken into account, in order to avoid multicollinearity problems. However, for all the estimates, multicollinearity was checked through the variance inflation factor (see note to table). As expected, literacy results are significantly related to manufacture in all specifications. It can be noted, however, in Italy, in the past, literacy rates were correlated to institutional and social capital measures that, as previously noted, also present a North–South gradient.[8]

[8] In fact, at the regional level, the correlation between illiteracy rates and the social capital measure proposed by Nuzzo (2006) is very high: in 1911 $r = -0.88$.

Table 7. Controlling for the effect of literacy – OLS

	1911	1936	1951	1911	1936	1951
const	8.85***	16.0***	3.01	13.5***	19.0***	6.34
	(3.15)	(4.42)	(0.694)	(4.16)	(4.95)	(1.45)
Ln Domestic MP	0.708***	0.325***	0.722***			
	(5.89)	(2.70)	(5.46)			
Ln Total MP				1.34***	0.792***	1.45***
				(5.62)	(3.19)	(6.01)
Ln Literacy	0.660***	3.00***	2.93***	0.464***	2.64***	2.02***
	(3.97)	(7.60)	(4.41)	(2.68)	(6.55)	(3.03)
Capital city	0.118	0.0424	0.0315	0.113	0.0420	0.0347
	(1.39)	(0.542)	(0.371)	(1.38)	(0.571)	(0.462)
Landlocked	–0.171**	–0.0684	–0.0564	–0.149**	–0.0811	–0.0870
	(−2.49)	(−1.08)	(−0.768)	(−2.21)	(−1.31)	(−1.24)
Ln Latitude	–2.84***	–4.67***	–1.38	–4.12***	–5.50***	–2.29**
	(−3.89)	(−4.94)	(−1.21)	(−4.80)	(−5.43)	(−1.99)
n	69	90	92	69	90	92
R^2	0.59	0.63	0.70	0.60	0.64	0.72

Notes: Heteroscedasticity–robust standard errors, HC1; *t*–statistics in parentheses; ** indicates significance at the 5% level; *** indicates significance at the 1% level. Given the significant correlation among the regressors, to detect possible multicollinearity, the variance inflation factor (VIF) of each specification was computed. In specifications with *Total MP*, VIF values are <6, however under the critical value of 10 (O'Brien 2007).

Industry distribution may be influenced by several factors. The number of variables available at the provincial level is, however, scant for the entire period under examination. Previous results may then suffer from omitted variables bias. To overcome this problem, controlling for unobserved heterogeneity, we estimated a panel model for the period 1911–2001. Table 8 presents the pooled OLS estimates. Columns 1 and 2 report the estimates for DMP and MP without controls. Coefficients are significant at the 1 per cent level, and the R^2 are relatively high. Market potential explains the more than 50 per cent provincial variation in manufacturing employment. Urbanization is still positively and significantly related to manufacture. Table 8 also reports the *F* test and Hausman's test for each specification. These tests indicate that the fixed effects (FE) estimator is adequate to our data. The results of FE estimates – including those with time fixed effects – confirm the previous ones (Table 9).

An important aspect regarding the estimates is the possible endogeneity of market potential. Firms' locations are affected by the accessibility of markets, but, in turn, spatial concentration of industry in a given location widens the size of markets. By buying goods and services from providers and by attracting workers, firms create backward and forward linkages that lead to further concentration: the market is, to some extent, endogenous (Krugman 1991b; Baldwin 2005). The possible endogeneity of MP may be addressed through a two stage least squares (TSLS) estimation model. In related literature, MP has been instrumented by long lags of the endogenous variable (Combes et al. 2008; Holl 2012) or by distance from main economic centres (Redding and Venables 2004) such as, in the case of the European regions, the distance from Brussels (Brakman et al. 2009). Following this last strategy, the log of distance from Milan (the main economic centre) is used as an exogenous instrument for DMP and MP. In comparison with the use of lagged values of MP, the adoption of distance from Milan presents some advantages.[9] First, the availability of GDP data does not allow, in our case, to obtain long lags of MP; second, the number of observations (provinces) and their areas change over time. As a consequence, the

[9] We also estimated the TSLS model by using the lagged MP values as instrument. MP in 1911 was instrumented with MP in 1891 (regional GDP data from Daniele and Malanima (2011) were imputed to provinces). The results do not differ from those obtained by using distance as instrument. A'Hearn and Venables (2013) show how the distance from Milan explains a large fraction of variation in regional market access during the period 1891–2001.

Table 8. Manufacture and market potential – pooled OLS

	(1)	(2)	(3)	(4)	(5)	(6)
const	–2.37***	–2.43***	–11.9***	–2.39***	–2.50***	–5.47*
	(−92.3)	(−48.6)	(−4.67)	(−106.6)	(−57.8)	(−1.67)
Ln Domestic MP	0.896***	0.892***	0.564***			
	(17.6)	(17.2)	(5.31)			
Ln Total MP				1.27***	1.28***	1.12***
				(19.1)	(19.2)	(5.80)
Urbanisation		0.0702	0.168***		0.125***	0.159***
		(1.48)	(3.52)		(2.95)	(3.60)
Capital city			–0.0314			–0.0367
			(−0.496)			(−0.645)
Landlocked			0.0516			0.0283
			(0.912)			(0.526)
Ln Latitude			2.50***			0.781
			(3.72)			(0.903)
n	449	449	449	449	449	449
Adj. R^2	0.53	0.54	0.56	0.57	0.58	0.58
F stat.	3.19	3.26	2.82	2.52	2.44	2.40
	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hausman – H	5.53	8.0	12.95	5.52	5.60	6.32
	(0.018)	(0.018)	(0.001)	(0.018)	(0.06)	(0.04)

Notes: Robust (HAC) standard errors; *t*–statistics in parentheses; for F–test for fixed effect and Hausman's test, p–values are reported; * indicates significance at the 10% level; *** indicates significance at the 1% level.

Table 9. Manufacture and market potential – fixed–effects

	(1)	(2)	(5)	(3)	(4)	(6)
const	–2.32***	–2.52***	–2.51***	–2.35***	–2.55***	–2.56***
	(−57.1)	(−22.8)	(−22.0)	(−62.7)	(−23.5)	(−23.2)
Ln Domestic MP	1.47***	1.38***	1.21***			
	(3.09)	(2.92)	(2.91)			
Ln Total MP				2.32***	2.13**	1.83**
				(2.71)	(2.52)	(2.40)
Urbanisation		0.222**	0.283***		0.223**	0.289***
		(2.19)	(2.74)		(2.24)	(2.78)
Time dummies	no	no	yes	no	no	yes
n	449	449	449	449	449	449
Adj. R^2	0.69	0.69	0.76	0.68	0.68	0.75

Notes: Robust (HAC) standard errors; *t*–statistics in parentheses; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

observations of the instrument are, in some specifications, less than the instrumented variables. The TSLS estimates were performed on the pooled OLS including time dummies (Table 10). The weak instrument test (Stock et al. 2002) indicates that the distance from Milan is a relevant instrument. The effect of MP on manufacture remains significant at the 1 per cent level.

Overall, the empirical analysis shows how both domestic and total MP are powerful variables related to manufacture. The results are in line with those reached in other studies regarding other countries, such as Spain (Rosés 2003; Martínez-Galarraga 2012), Belgium (Ronsse and Rayp 2016), or Poland (Wolf 2007). Our results are also consistent with research on the geographical distribution of industry in the EU (Midelfart-Knarvik et al. 2000; López-Rodríguez and Faíña 2006; Niebuhr 2006; Bruna et al. 2015) and at the international level (Breinlich and Cuñat 2013).

Table 10. Testing endogeneity – TSLS

	(1)	(2)	(3)	(4)	(5)	(6)
const	–2.303***	–1.755	–2.489	–2.336***	1.163	–0.507
	(−61.69)	(−0.486)	–0.6104	(−61.47)	(0.374)	(−0.144)
Ln Domestic MP	1.023***	1.043***	1.044***			
	(15.00)	(6.21)	(5.18)			
Ln Total MP				1.319***	1.482***	1.429***
				(17.73)	(7.89)	(6.318)
Ln Latitude		–0.145	0.0384		–0.931	–0.515
		(−0.152)	(0.035)		(−1.12)	(−0.551)
Urbanisation			0.069			0.128**
			(1.069)			(2.55)
Capital city			–0.037			–0.043
			(−0.514)			(−0.732)
Landlocked			–0.022			–0.0006
			(−0.332)			(−0.012)
n	449	449	449	449	449	449
Adj. R^2	0.58	0.58	0.58	0.62	0.61	0.63
Weak Instr. – F	255.3	182.9	102.2	213.6	161.4	102.1

Notes: Robust (HAC) standard errors; Instrumented: log MP_T. Instrument: log Distance from Milan; Weak instrument test (Stock et al. 2002), the first-stage F-statistic is reported. Time dummies were included in the regressions. Z statistic in parentheses; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

5 Conclusion

By using data on labour forces, we analysed the geographic distribution of manufacturing across Italian provinces (NUTS 3), over the period 1871–2001, and the role of market potential in industrialization. Our investigation shows how, during the period 1871–1951 − a phase which coincides with the process of integration of the national market and the industrialization of Italy – the geographic concentration of manufacturing increased. In the subsequent period, industrialization spread and spatial concentration decreased, although at the end of the period, in 2001, it was much higher than in 1871. In Italy, the pattern of concentration/dispersion of manufacture followed an inverted U-shaped curve, analogous to that found in other countries (Williamson 1965; Kim 1998; Combes et al. 2011; Badia-Mirò et al. 2012).

Our analysis also shows how, over the period 1911–2001, market potential was a powerful variable for explaining provincial differences in manufacturing employment across Italian provinces and, hence, regions. According to our estimates, the North benefited from a wider market potential than the South. This relatively wider market potential of the North was the consequence of several factors: higher population density and development levels, in particular in North-Western regions; geographical proximity to large European markets; more developed infrastructure networks. The particular geography of Italy privileged the North under other aspects. It is easy to note, in fact, how a barycentric point of the North – the city of Milan – allows access, within a given radial distance, to a comparatively larger population than a barycentric location in the South. In a cumulative process, the increasing concentration of manufacture in the Northern regions polarized the economic geography of Italy. For its industrialization and development levels, the North became similar to the most advanced regions of the European economic core, while the South, instead, to the peripheral and relatively poor regions.

While the role of political and institutional factors has been widely examined to explain the gap between the North and South of Italy, the effect of geography and, in particular, the distance from markets, has long been overlooked. Only recently was it explicitly addressed by some scholars, at the regional level or for relatively short time-spans (A'Hearn and Venables, 2013;

Missiaia, 2016). Our contribution points out how a potential market has been a crucial factor in shaping the regional distribution of manufacturing and, therefore, economic development. We cannot neglect, however, that other determinants – concerning, for example, social or institutional settings – influenced regional economic development. In particular, the availability of time-consistent data at the provincial level does not allow us to test the effect of other variables, such as the institutions, potentially capable of influencing the results. Despite its limitations, and consistent with findings regarding other countries, our analysis indicates how geographic-related factors, and particularly distance from large markets, should be taken into account to explain the evolution of economic disparities between the North and South much more than they have been. The 'cost of distance' was, in any case, a main obstacle in the way of the industrial development of the South. Regional industrialization is a path dependent process, and even though technology notably contributes to reduce transport costs, the benefits deriving from agglomeration economies and proximity to markets still account for the location of economic activities (Krugman, 1991c; Rodríguez-Pose and Crescenzi, 2008). A closer economic integration of the Italian peripheral regions, through more efficient infrastructures and communications, coupled with other policy measures, would certainly contribute to bridging their gap with more advanced regions.

Appendix: Inclusion of trade tariffs

To take into account the effect of tariffs on provincial FMP, Equation 4 can be re-written as:

$$\text{FMP}i = \sum_{f}^{N} GDP_f d_{if}^{\alpha} t_f^{\gamma}, \tag{A1}$$

where t are tariffs; f stands for foreign countries and the parameters α and γ are given, respectively, by trade elasticity to distance and tariffs estimated by gravity equations. We estimated the FMP for the year 1911 according to Equation (A1). Data on average manufacturing tariffs relate to the year 1913 and are taken from Bairoch (1989), James and O'Rourke (2011) and Estevadeordal (2006). The parameter γ was set at -1.56 as in Estevadeordal et al. (2003: 383). The results (Figure A1) show how the correlation between the two FMP estimates (one that includes tariffs and one without) is close to 1 ($R^2 = 0.96$).

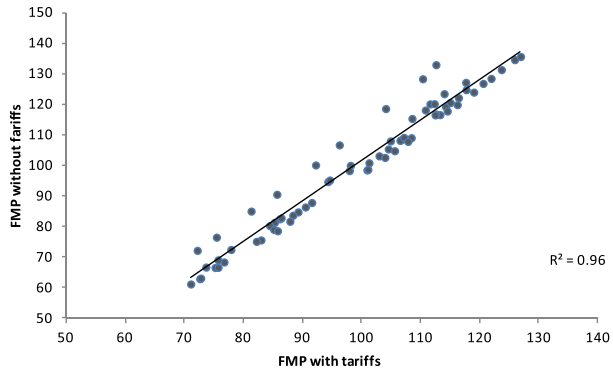

Fig. A1. The relationship between foreign market potential (FMP) with and without tariffs

The reason for such results is straightforward. Given the FMP function, in which the GDP of foreign countries is taken into account to estimate the market size, the inclusion of tariffs into the equation affects all provinces almost symmetrically, with negligible effects on the relative provincial FMP that depends entirely on distance. Changes in trade tariffs would affect the FMP of Italy over time, but in our paper estimates regard relative provincial FMP in each of the considered years, not its variations over time.

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