



# Territorial disparities in labour productivity, wages and prices in Italy: What does the data show?

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## Abstract

In Italy, both at the regional and sub-regional levels, labour productivity and average wages are strongly correlated. Overall, in industry and services, the gap (about 30%) in productivity between Southern and Central-Northern regions is almost offset by that in the average wage: unit labour costs are similar. Since, in Italy, in each sector, nominal wages are set through national collective agreements – and therefore are the same throughout the country – regional differences in wage per employee depend solely on the composition of the occupational structures. The small difference in the unit labour cost suggests that also the North–South disparity in labour productivity is largely due to the characteristics of the respective productive structures. Across Italian regions, average wages and price levels are positively correlated. Spatial price differentials mainly depend on the prices of services and housing. In turn, prices influence regional nominal productivity in sectors producing non-tradable goods. The North–South difference in price levels substantially equalises the average real wage in the two areas. Nevertheless, thanks to the lower prices and the equality in nominal wages, in the South employees enjoy a greater purchasing power than their colleagues in the rest of the country with analogous job positions. The Italian case suggests that, at the regional level, labour productivity, average wages and prices are interrelated. The analysis of their mutual relationships is of great importance for regional policies.

## Keywords

Italy, price differentials, regional disparities, regional productivity, regional wages

## Introduction

Regional disparities in labour productivity may be found everywhere. Disparities are large, for example, within Belgium, Germany, Poland, Spain and the UK (OECD, 2018). Within countries, wages also exhibit local variations that, at least in part, offset those in productivity, thus smoothing unit labour cost (ULC) differentials across territories (Adamchik and Hyclak, 2017; Broersma and Van Dijck, 2005; Kampelmann et al., 2018; Kluge and Weber, 2018). Furthermore, across regions and local areas, price

levels also differ, reducing disparities in nominal incomes, productivity and wages (Blien et al., 2009; Janský and Kolcunová, 2017; Roos, 2006b).

Italy represents an interesting case for the analysis of spatial disparities in labour productivity and wages for at least two reasons. First, because Italy is historically characterised by a remarkable economic

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divide between the Central-Northern and Southern regions (Daniele et al., 2018). Nowadays, in the South, GDP per capita is 55% of that of the Centre-North, and value added per worker is about 70% (SVIMEZ, 2019). Moreover, in the South, the unemployment rate is structurally higher than in the rest of the country: in the period 2000–2019 it was, on average, 16.2% compared with 5.7% in the North.

The second reason that makes Italy an interesting case study is that wage rates are set through national sectoral collective agreements. Decentralised collective labour agreements, at territorial or company levels, are envisaged, although, since they must integrate national agreements generally improving salaries, their relevance is actually very limited (Leonardi et al., 2017; Recchia, 2017).

Studies indicate that the North–South differential in product per worker is mainly explained by differences in total factor productivity (TFP) levels (Aiello et al., 2014; Erbetta and Petraglia, 2011; Locatelli et al., 2019; Rungi and Biancalani, 2019). Since nominal wages are substantially the same throughout Italy, large disparities in TFP levels should result in a proportionally higher ULC in the South. This would impact negatively both on the competitiveness of firms and on the attraction of external investments. In Italy a long-lasting debate exists, in fact, regarding the opportunity of adopting a decentralised wage bargaining system, which would allow wages to align to local productivity levels (Aquino, 2001; Ichino et al., 2019).

Needless to say, at the territorial level, labour productivity is an average value that depends on the characteristics of productive structures. Thus, its levels say very little about the degree of competitiveness of territories if wages are not taken into account. In the case of Italy, the spatial relationship between productivity and wages has not been investigated, until now, by the literature on regional disparities. Through data on industrial activity and services, this paper provides a descriptive analysis of the distribution of labour productivity and wages across Italian regions, sub-regional areas, and provincial capital cities. We then estimate the effect of price differences on North–South disparities in productivity and wages.

Data show that in Italy, whatever the territorial level considered, productivity and average wages are almost perfectly correlated. Due to heterogeneities in productive and occupational structures, a gap exists between the Central-Northern and Southern regions of about 30% in labour productivity and 25% in the average wage. The differential in ULC (the ratio between total wages and value added) is, instead, of 2–3 percentage points. Overall, these findings suggest that regional differentials in TFP are modest.

As in other European countries, such as Germany (Weinand and von Auer, 2020), Spain (Costa et al., 2015) and the UK (Hearne, 2020), and in Italy too, prices are higher in the most developed regions. The difference in mean price level between Central-Northern and Southern Italian regions has been estimated as being about 16–20 percentage points (Amendola and Vecchi, 2017; Cannari and Iuzzolino, 2009). Considering a basket of goods and services used to compute poverty thresholds, in the South the price level turns out to be 22% lower than in the North.

In international economics, the positive correlation between per capita income and price level is typically explained by the Balassa–Samuelson effect (Balassa, 1964; Samuelson, 1964). According to the Balassa–Samuelson hypothesis, differences in the price levels between rich and poor countries ultimately depend on differences in productivity (and hence in wages) in the sectors producing tradable goods. According to some scholars, the Balassa–Samuelson effect would also explain price level differences within countries (Hearne and De Ruyter, 2019; Nenna, 2002; Perevyshin et al., 2019). Yet, other models emphasise the role of demand-side factors in international price differences (Bahmani-Oskooee and Nasir, 2005; Bergstrand, 1991; De Gregorio et al., 1994). According to these models, in countries with higher per capita income, there is a comparatively larger demand for services that drives up their prices. Thus, the relative price of services tend to increase with income per capita.

Studies for Germany, Poland and Russia show how nominal wages are a major determinant of regional price differences (Perevyshin et al., 2019;

Rokicki and Hewings, 2019; Roos, 2006b). Moreover, there is ample evidence that interregional price differentials mainly depend on the price of services, and especially of housing and rents (Karády and Koren, 2009; Tabuchi, 2001; Weinand and von Auer, 2020). This paper shows how, across Italian provinces, average wages are positively and significantly correlated to average price levels and to house prices. This suggests that the average wage, affecting the local demand for services and houses, plays a role in driving local prices. The productive and occupational composition of each regional economy, on which the average wage ultimately depends, thus indirectly influences regional prices.

The difference in price level substantially equalises the *average* real wage in Central-Northern and Southern Italian regions. Nevertheless, as wages in Italy are set through a centralised bargaining system, in the South employees enjoy a higher purchasing power than their counterparts, with analogous job positions, in the Centre-North. Finally, differences in prices affect regional nominal productivity in sectors producing non-tradable goods and services. At the territorial level productivity, wages and prices are interrelated.

The outline of this paper is as follows: the next section describes the data and illustrates the main differences in economic structures between Central-Northern and Southern regions; the subsequent section analyses the territorial disparities in productivity and wages; the penultimate section examines the relationships between regional wages and price levels; and the last section discusses the findings and sets out the conclusions.

## The differences in economic structures

### *Data description*

Data used in the following analysis are taken from the surveys carried out by the Italian National Institute of Statistics (Istat) on about 4.7 million local units of firms in the industry and service sectors, with the exclusion of some divisions of monetary and financial intermediation, insurance and domestic services (Istat, 2019). Sole-proprietorship

enterprises, the self-employed and freelance professions are included in the sample. Data cover the main budgetary indicators of firms, including operational costs, sales revenues, value added and the number of employees (Istat, 2019).

Data are available for the 20 Italian regions, for 611 sub-regional areas (the so-called local labour markets) and for municipalities. For sub-regional areas and cities, data cover industry and services as a whole, while for regions are also available for sections and divisions of economic activities, according to the NACE Rev. 2 classification (Istat, 2009a). These data represent a rich source for comparing labour productivity and wage levels across Italian regions and sub-regional areas. In the subsequent analysis, I have used data for the year 2016, the most recent currently available.

### *Differences in economic structures*

As a result of the uneven economic development that historically characterises Italy (Daniele et al., 2018; Dunford, 2008), the productive structures of the Southern and Central-Northern regions present remarkable differences both in sectoral composition and in the average size of firms. The distribution of firms and employment by sections of activity is presented in Table 1.

The productive structure of Southern regions is characterised by a comparatively higher share of the service sector and, consequently, by a lower share of manufacturing with respect to the rest of the country. It is important to note that differences in productive structures among macro-regions regard mainly the sectoral distribution of employment. In the North, in fact, the manufacturing sector represents 10% of the local units of firms, and 26% of employment by all firms; in the Centre the shares diminish, respectively, to 8.8% and 18.6%, while in the South manufacturing industries represent 8% of the firms and 15.5% of total employment. Yet, in this last area, the employment in services, and particularly in some activities, such as the wholesale and retail trade, is comparatively larger than in the rest of Italy.

A firm's size is of major importance for productivity and wages (Berlingieri et al., 2018; Haldane, 2017). In Italy, in 2016, value added per worker of

**Table 1.** Firms and employment in industry and services by section of economic activity in the Italian macro-regions 2016.

NACE Sections	Firms (%)			Employment (%)		
	North	Centre	South	North	Centre	South
B) Mining and quarrying	0.1	0.1	0.1	0.1	0.1	0.2
C) Manufacturing	10.0	8.8	8.1	26.1	18.6	15.5
D) Electricity, gas, steam,	0.3	0.3	0.3	0.5	0.6	0.6
E) Water supply, sewerage, waste. . .	0.2	0.3	0.4	0.9	1.2	1.8
F) Construction	12.0	10.6	10.4	7.7	7.7	9.5
G-S) Services activities	77.3	80.0	80.8	64.7	71.8	72.4
G) Wholesale and retail trade and repair of motor. . .	23.1	24.6	32.6	18.7	19.7	25.2
Total	100	100	100	100	100	100

Source: Calculations on Istat, Registro statistico delle Unità locali (ASIA UL).

**Table 2.** Firms by size in classes of employment in industry and services in 2016 (%).

	0–9	10–49	50–249	250 +
<b>North</b>	94.0	5.1	0.8	0.09
<b>Centre</b>	95.1	4.3	0.5	0.07
<b>South</b>	96.1	3.5	0.4	0.04
<b>Italy</b>	94.8	4.5	0.6	0.07

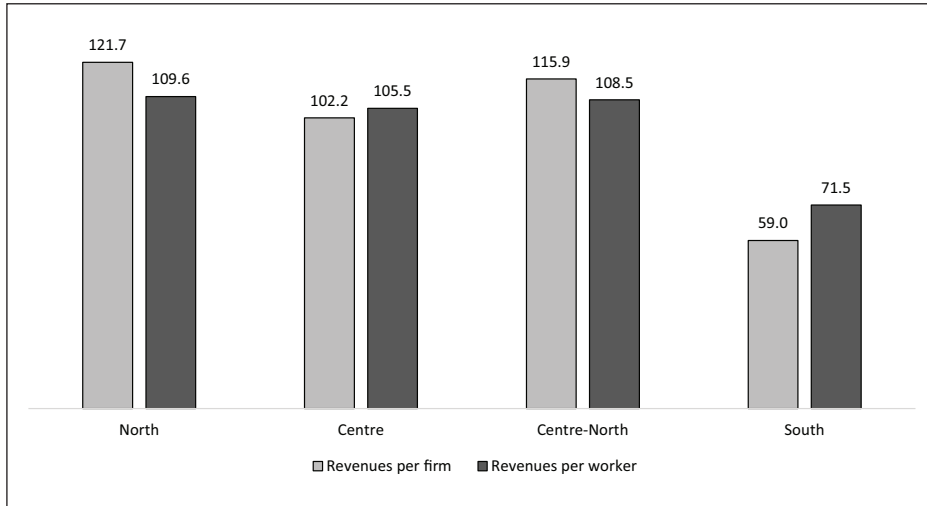
Source: Calculations on Istat (2019) .

small firms (0–9 employees) was 40% of that of firms with more than 250 employees, while the wage per employee was 60% (Istat, 2019). In Southern regions, the average size of firms is smaller than in the other regions: firms employ, on average, 2.9 workers, compared with 3.4 in the Centre, and 3.9 in the North. Furthermore, in the South, the share of firms with one worker (sole-proprietorship enterprises, the self-employed and in freelance professions) is greater than in the rest of the country, representing, in fact, 36% of total employment in industry and services, compared with about 27% in the Centre-North.

As shown in Table 2, in the North the percentage of medium and large firms, that is those with over 50 employees, is twice that of the South. The differences are even greater in the manufacturing sector. In the South, in fact, 1% of manufacturing firms have more than 50 employees, while those with over 250 employees represent 0.1% of the total; in the North, the share of large firms is threefold.

North–South differences are striking when the size of firms is estimated on the basis of their revenues from sales. In 2016, sales revenue per firm in the South was about 50% of those of the North, while sales revenue per employee was 65% (Figure 1). In other words, in the South, both the size of production plants, as measured by the average number of workers, and the economic size of firms, measured by average sales, were notably lower than in the rest of the country.

In Italy, as in many other countries, the geographical distribution of multinational companies is characterised by huge asymmetries. Foreign multinationals are, in fact, concentrated in the Northern regions, particularly in Lombardy. In 2017, just 5,087 out of the 39,800 local units of foreign multinational companies established in Italy were located in the South, that is 13% of the total (Istat, 2020). In the South, moreover, the size of multinational firms is, on average, smaller than in the rest of the country: 26 employees per firm compared with 32.5 in the Centre-North.



**Figure 1.** Sales revenues per firm and per worker in Italian macro-regions – index Italy = 100 (2016). Source: Calculations on Istat (2019).

**Table 3.** Labour productivity, average wages and unit labour cost (ULC) in Italian macro-regions, 2016.

	Italy = 100		ULC (%)
	Labour productivity	Wage per employee	
North	111.9	109.1	39.1
Centre	99.1	97.0	38.2
Centre-North	108.4	105.9	38.9
South	71.9	79.0	41.0
Italy	100	100	39.2

Note: for Italy, value added per worker was 46,575 euros and the average wage was 25,952 euros. Source: Calculations on Istat (2019).

Due to their uneven spatial distribution, the role of foreign multinationals in regional economies is notably different. In 2017, they contributed to 16% of overall value added produced in industry and service sectors (excluding financial activities) in Central-Northern regions, compared with 7.6% in the South (Istat, 2020). International studies show that multinational and exporting firms have, on average, significantly higher productivity and wages than domestic firms (Haldane, 2017). Overall, the heterogeneities in the sectoral composition of productive structures, in the size of firms and in the distribution of multinationals, contribute to explaining the large differences in apparent

labour productivity (value added per worker) and in average wages between the South and the rest of Italy.

## The distribution of productivity and wages

### Macro-regions

In 2016, in the industry and service sectors, labour productivity and average wage in the South were, respectively, 33% and 25% lower than in the Centre-North (Table 3). The ULC, given by the ratio of total wages to value added, was very similar across all

**Table 4.** Labour productivity and average wages in firms by classes of employment in Italian macro-regions, 2015 (Italy = 100).

Workers per firm	Value added per worker		Wage per employee	
	Centre-North	South	Centre-North	South
0 – 9	108.8	76.9	106.9	83.6
10 – 49	105.4	79.9	104.9	82.0
50 – 249	104.5	77.7	103.3	83.6
250 +	104.8	75.2	103.6	81.6

Source: Calculations on Istat (2019).

macro-regions. Despite the large gap in labour productivity, the ULC in the South was, in fact, just 2 percentage points higher than in the Centre-North. This is, in part, explained by the fact that, as previously noted, in the Southern regions the share of self-employed workers and sole-proprietorship enterprises over total employment is greater than in the rest of the country.<sup>1</sup>

The differences in productivity and wages among the Italian macro-regions exist whatever the scale of firms. As shown in Table 4, across all the size classes, Southern firms show lower productivity and wages than in the Centre-North, with the highest gaps for those with the smallest dimensional scale. When firms with more than 10 workers are considered, the ULC was 45% in the North, 44% in the Centre and 48% in the South.<sup>2</sup>

Table 7 in the Appendix reports data for labour productivity, average wages and ULC in some manufacturing divisions and groups of economic activities, selected from among the most representative in terms of number of firms and employment. It is, thus, possible to observe that there are large North–South disparities in productivity and wages, but not in the ULC. In manufacturing industries as a whole, the ULC in the South is 2.5 percentage points higher than in the rest of Italy, but it varies across divisions of economic activities. In the South, for example, the ULC is comparatively lower in the electrical industry and in the group of ‘other manufacturing’ industries, while it is significantly higher in others, including the construction sector. Analogous variations can be found across the industries of the service sector (Table 8).

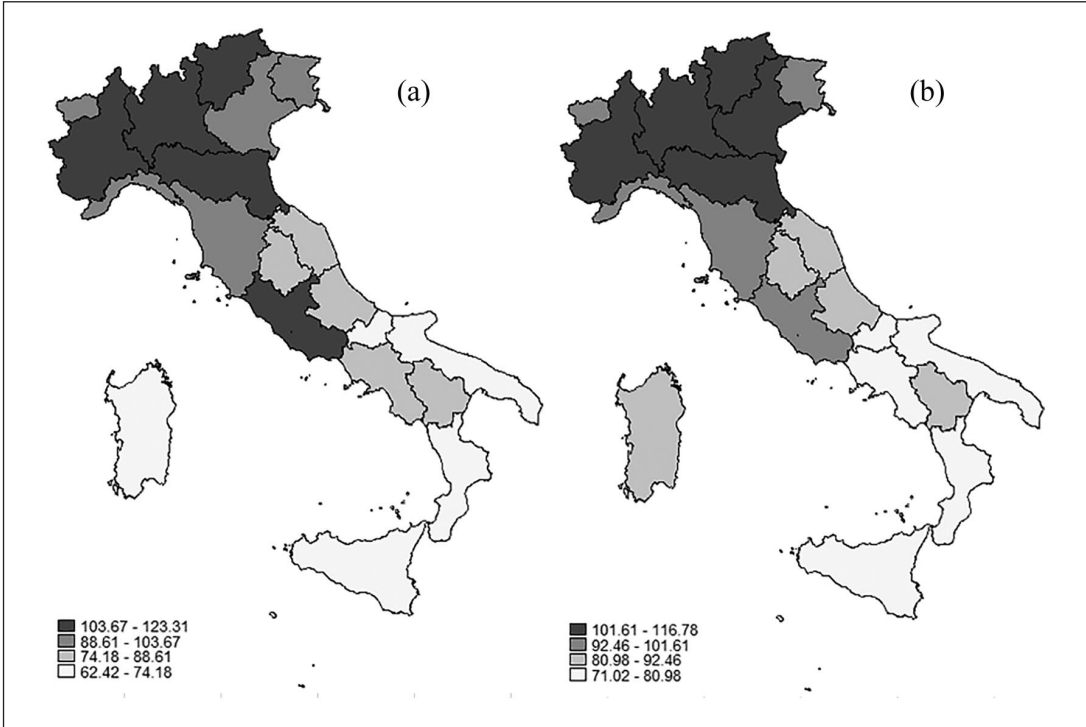
### Regions, sub-regional areas and cities

Throughout the Italian peninsula, regional labour productivity and average wage levels exhibit an evident latitudinal gradient (Figure 2). In Southern regions (islands included), both variables are, in fact, significantly lower than the national average. In 2016, the gap in productivity between Calabria and Lombardy, respectively the least and the most industrialised Italian regions, was around 50%, while that in the average wage was around 40%.

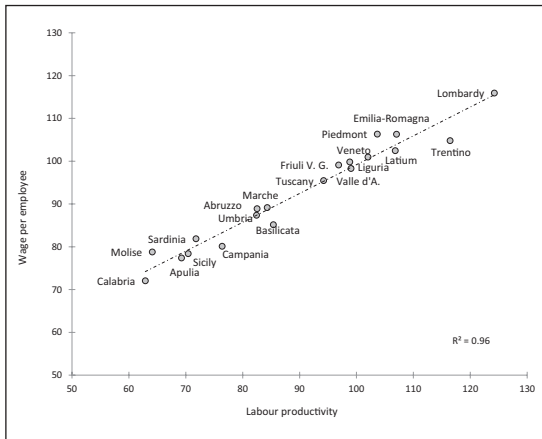
However, as shown by Figure 3, the correlation between productivity and wage per employee across regions is almost perfect ( $r=0.97$ ). Consequently, there is not a North–South gradient in the ULC. In fact, in some Southern regions the ULC is similar to, if not lower than, that of some Northern regions. For example, the ULC in Basilicata was 38.5%, and 39% in Calabria, while in Lombardy and Veneto, two of the most industrialised regions of Italy, it was 39% and 39.7%, respectively.

The close relationship between regional labour productivity and wages is also found for the sections of economic activities. For example, as shown in Figure 4, in the manufacturing sector both variables are almost perfectly correlated ( $r=0.95$ ). Consequently, even in the manufacturing sector, the ULC in the Southern regions is not unlike that of the rest of the country.

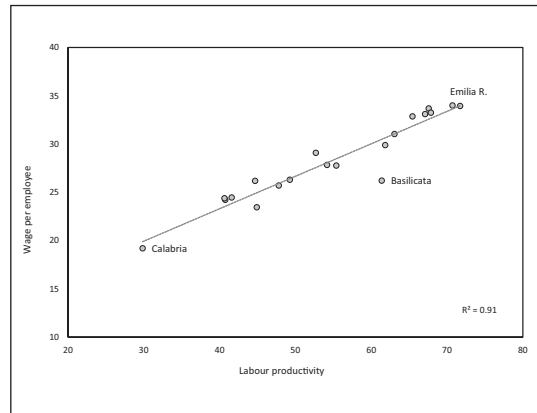
Figure 5 plots this relationship between 110 Italian provinces (NUTS 3) in the industry and service sectors: again, the correlation is almost perfect. As shown in Figures 10 and 11 in the Appendix, the correlation also remains very high when the industry



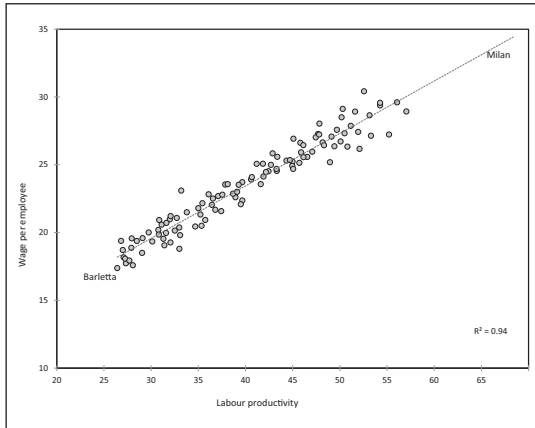
**Figure 2.** Labour productivity (a) and average wage (b) in Italian regions (Italy = 100).  
Source: Calculations on Istat (2019).



**Figure 3.** Productivity and wages per employee in industry and services in 20 Italian regions (2016).  
Note: Thousands of euros. Source: Calculations on Istat (2019).



**Figure 4.** Productivity and wages per employee in manufacturing industry in 20 Italian regions (2016).  
Note: Thousands of euros. Source: Calculations on Istat (2019).

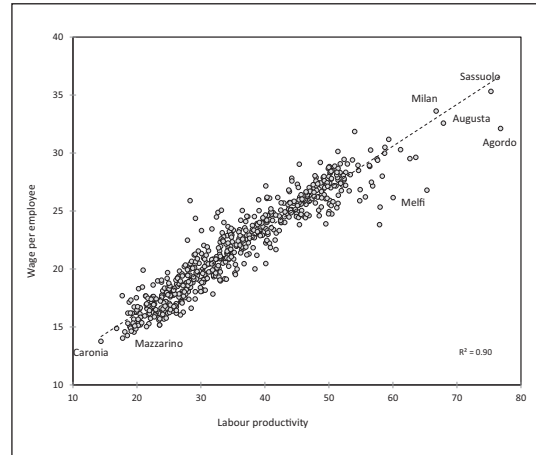


**Figure 5.** Productivity and wages per employee in industry and services in 110 Italian provinces (2016). Note: Data refer to provinces and metropolitan cities. Thousands of euros. Source: Calculations on Istat (2019).

and service sectors are considered separately. It is possible to note, however, that for the latter sector, the correlation is slightly higher than that for industry.

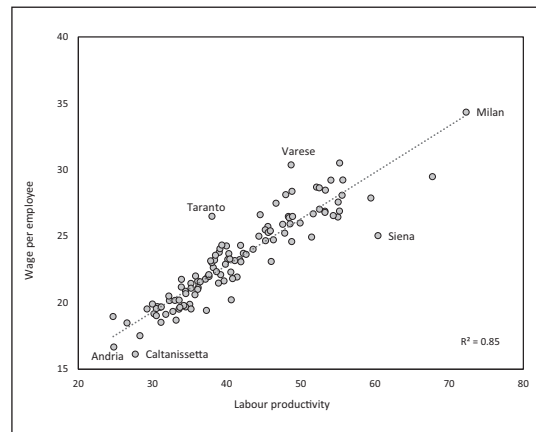
Figure 6 refers to even smaller territorial units, that is 610 Italian labour market areas (LMAs) – local labour systems (SLLs) in Italy. Defined by the National Institute of Statistics on a functional basis, LMAs are sub-regional areas where the bulk of the local labour force lives and works, and where firms can find the largest number of the required labour force. Again, for the aggregate of industry and service sectors, labour productivity and average wages are almost perfectly related ( $r=0.95$ ).

The highest labour productivity is recorded in the LMA of Agordo, in Veneto, seat of one of the world's most important companies in the optical sector; the lowest being registered in Mazzarino and Caronia, two agricultural, poorly industrialised areas of Sicily, which also have the lowest average wage. Among the most highly productive LMAs, and with higher wages, are those in Milan, followed, a few positions lower, by Augusta, in Sicily, site of a petrochemical plant, and Melfi, in Basilicata, where the FCA Automobiles industrial plant is located.



**Figure 6.** Productivity and wages per employee in industry and services in 610 Italian labour market areas (LMAs) (2016).

Note: the LMA of Pomarance in Tuscany was excluded, since in that area one of the world's most important geothermal power plants is located. Thousands of euros. Source: Calculations on Istat (2019).



**Figure 7.** Productivity and wages in industry and services in 116 Italian provincial capital cities (2016).

Note: Thousands of euros. Source: Calculations on Istat (2019).

Finally, the close relationship between productivity and wages can be found at the city level, too. Figure 7 plots this relationship for 116 Italian provincial capital cities. In Milan, the city at the top of distribution, productivity is 2.9 times greater, and the



**Table 5.** Regressions for 110 Italian provinces.

	Labour productivity		Wage per employee	
	(1)	(2)	(3)	(4)
Const.	3.03*** (92.5)	0.554*** (4.79)	2.72*** (112)	1.07*** (12.1)
Employees/firm	0.825*** (20.4)		0.547*** (18.3)	
Sales/firm		0.505*** (27.0)		0.336*** (23.4)
<i>n</i>	110	110	110	110
<i>R</i> <sup>2</sup>	0.79	0.87	0.76	0.84

Note: OLS estimates; t-stat in brackets. \*\*\* significant at the 1% level.

average wage 2 times more, than in Andria, at the bottom. It is worth noting that, at the small territorial scale, such as cities or local areas, productivity and average wages may be significantly influenced by the presence of large establishments, as in the case of the city of Taranto, where one of the main European steel firms is located. Yet, the relationship between productivity and average wages remains very high ( $r=0.92$ ).

The spatial distribution of productivity and wage levels depends strictly on the average size of firms in each territory. Table 5 reports the results of regressions for 110 Italian provinces. Productivity and wages in industry and services were regressed on the average size of firms, measured by the number of employees and by revenue from sales per firm.

Both variables are highly significant: firms' average sales revenues, in particular, explain the 87% of variance in productivity, and 84% of that in wage per employee, across the Italian provinces. These results are perfectly consistent with data presented in previously that show that, in Central-Northern regions, the average size of firms and the sales revenues per firm and per worker are higher than in Southern regions.

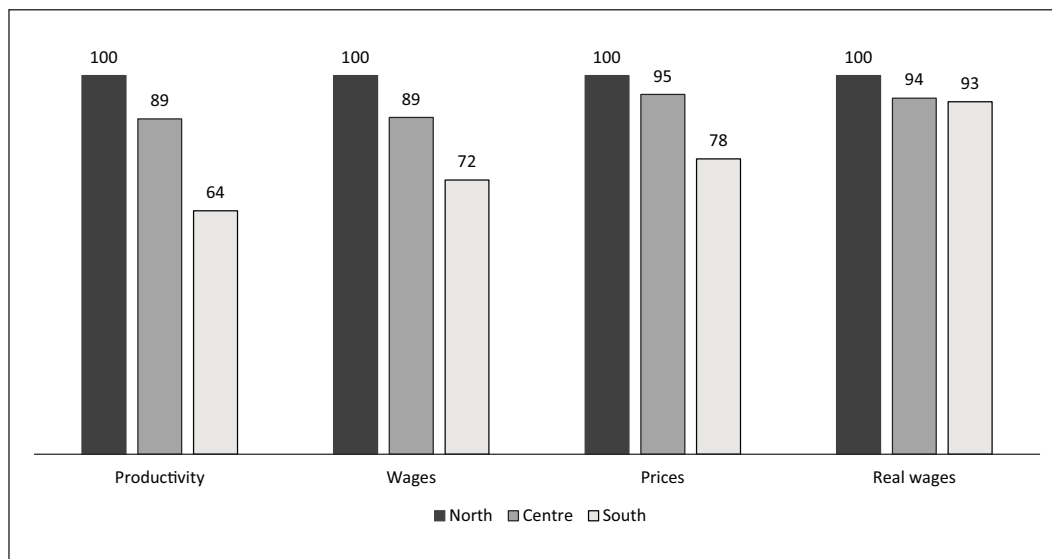
## Two equilibria

In all countries, interregional differentials in productivity and wages are coupled with those in the average

price levels. The methods used for calculating the subnational purchasing power parities (PPPs) are mostly those used in international comparisons (ILO et al., 2004). Official data on regional PPPs are published regularly for few countries, such as the US, while in others the statistical offices have carried out experimental research.<sup>3</sup> Since, in most countries, information on prices at the subnational level is not available, regional PPPs are computed by using data from consumer price indexes (CPIs) or estimated through various methodologies, such as the True Cost of Living Index (TCLI) (Majumder and Ray, 2020, for a review).

Estimates of regional PPPs, based on different methodologies, have been provided for some countries, such as France (Clé Sauvadet et al. 2016), Germany (Blien et al., 2009; Roos, 2006a, 2006b), Poland (Rokicki and Hewings, 2019), Spain and the UK (Hearne, 2020; Hearne and De Ruyter, 2019), as well as for all the European Union's regions (Costa et al., 2019; Janský and Kolcunová, 2017).

In Italy, no official data on regional PPPs are available, but there are some estimates. First estimates of PPPs for the 20 regional capital cities in 2009 were provided by the National Institute of Statistics (Istat, 2010), which reported a difference of about 11% in prices between the 'most expensive' and the 'cheapest' cities. Cannari and Iuzzolino (2009) estimated that, including imputed



**Figure 8.** Productivity, average wages and prices levels in Italian macro-areas – index North = 100.

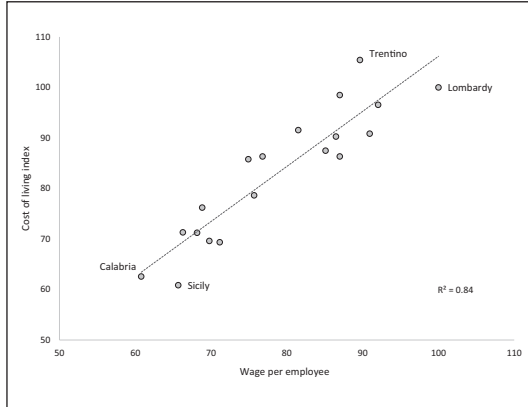
Source: Data on poverty thresholds from Istat (<https://www.istat.it/it/dati-analisi-e-prodotti/contenuti-interattivi/soglia-di-poverta>; retrieved on 9/9/2020).

rents, in 2016, price level in the South was 17% lower than in the Centre-North, with a difference of about 25% between the least- and the most-expensive regions (Calabria and Lombardy, respectively).<sup>4</sup> Supplementing these results, Amendola and Vecchi (2017) estimated a price differential of 16%–20% between the two areas. These disparities are similar to those found in other countries. According to the estimates, in fact, in 2012 in Spain, the price level in Extremadura was 30% lower than in Madrid (Costa et al., 2015); in Germany, the difference between Hamburg and Saxony-Anhalt was about 16% (Costa et al., 2019).

Given the difficulty of computing a representative and consistent CPI for Italian regions, a viable method to proxy spatial price levels is to use the absolute poverty thresholds, published annually by Istat. The poverty thresholds are computed on the basis of a basket of goods and services that satisfies the basic needs of an Italian family (Istat, 2009b). The underlying assumption is that the basic needs, and the goods and services able to satisfy them, are identical all over Italy, while prices vary in the diverse areas of the country. The ‘basket of poverty’ is composed of 106 ‘elementary

products’ (10.8% of elementary products included in the CPI for 2016) that fall into six macro-components: food, housing, heating, electricity, durable goods and a ‘residual component’ that includes furniture and the maintenance of dwellings, health, education, transport, clothing, communications and more (Istat, 2009b). The poverty thresholds are differentiated by family size, by geographical distribution (North, Centre and South) and by types of municipality. Thus, the price of the basket in the three Italian macro-regions can be considered an implicit spatial price deflator (D’Alessio, 2020).

Below, the poverty thresholds for a two-adult household were computed by averaging the price of the basket in the three municipality aggregates.<sup>5</sup> Data were taken from the online Istat database. Figure 8 reports the average price levels, derived from the poverty thresholds, in Central and Southern regions as percentages of that in the North and, for comparison, the relative levels of productivity and average nominal wages. In the South, the price level turns out to be 22% lower than in the North and 17% lower than in the regions of Central Italy. Consequently, the real average wage in the South is



**Figure 9.** Wage per employee and nominal cost of living in 19 Italian regions (2016).

Note: index for Lombardy = 100; on the vertical axis the nominal TCLI by Menon et al. (2019) is shown.

7% lower than in the North and analogous to that of Central regions.

Caution is required when dealing with these results. By definition, in fact, the basket of absolute poverty is not representative of the consumption of Italian households on the whole. Despite this, it is noteworthy how the price of the basket over time is closely related to that of the CPI for blue- and white-collar Italian households (Figure 11, Appendix).<sup>6</sup> Moreover, relative price levels in macro-regions derived from poverty thresholds are similar to those estimated in previous works. For example, if the price indices by Amendola and Vecchi (2017) are used to deflate nominal wages, the average real wage in the South is about 10% lower than that in the North, and analogous to that of the Central regions. It is important to recall that these estimates do not include the public sector. Since in the Southern regions the share of employees in the public sector over total employment is greater than in the North, its inclusion would further reduce the gap in average real wages.

Interestingly, the North–South differential in price levels is a long-term feature of Italian economic development. It has been estimated that already in the period 1862–1878, that is in the first years after national unification, prices in the South were 15% lower than in the Centre-North (Daniele and

Malanima, 2017). In the period 1947–1951, the difference in price levels was about 10%, and progressively increased, reaching 20% in the last 10 years (Amendola and Vecchi, 2017).

Figure 9 plots the relationship between nominal wages per employee and the TCLI estimated by Menon et al. (2019) for the Italian regions, showing that the two variables are highly related ( $r=0.92$ ). Furthermore, regional average wages are also highly correlated ( $r=0.82$ ) with regional price levels, estimated by Costa et al. (2019).

The lower price level in the South not only entails that the *average* real wage is similar to that of the Centre-North. It results in another consequence as well. Since, in Italy, within each sector, nominal wages are set through national collective bargaining agreements, Southern employees enjoy a higher purchasing power than their colleagues in the Centre-North with analogous job positions.

To clarify this point, let us consider an economy with two regions, North and South, and two sectors, *A* and *B*. In sector *A*, firms have a higher productivity than those in sector *B*. As a consequence, the wage in *A* is higher than in *B* ( $w_A > w_B$ ). Let us suppose that, on a nominal basis,  $w_A$  and  $w_B$  are the same throughout the country, but in the North the *share* of firms in sector *A* that pays  $w_A$  is  $\frac{1}{2}$ , while in the South it is  $\frac{1}{3}$ . Consequently, due to their different productive structures, in the North *both* productivity and the *average* nominal wage are higher than in the South. For simplicity's sake, let us suppose now that a North–South gap exists in price levels analogous to that in the average nominal wage. As a result, the *average* real wage in the two regions is equalised. Nevertheless, in the South, thanks to the lower prices, *both* employees who receive  $w_A$  and those who receive  $w_B$  enjoy a greater purchasing power than the employees in the same sectors in the North.

The North–South disparities in GDP per capita, wages and prices are similar to those found between countries with different levels of development. In order to explain the systematic cross-countries relationship between real per capita income and price levels, different theories have been proposed: the productivity-differentials model by Balassa (1964) and Samuelson (1964); the relative-factor-endowments (Heckscher–Ohlin) model; and a third

**Table 6.** Matrix of correlations – 110 Italian provinces in 2016.

		(1)	(2)	(3)	(4)	(5)	(6)
(1)	Productivity	1.00	0.97	0.41	0.33	0.54	0.35
(2)	Wage per employee		1.00	0.41	0.33	0.49	0.35
(3)	Firms' density			1.00	0.97	0.49	0.26
(4)	Population density				1.00	0.41	0.21
(5)	House prices in capital cities					1.00	0.71
(6)	House prices in provinces						1.00

Correlation coefficients, 5% critical value (two-tailed)=0.19 for  $n=110$ .

approach that emphasises the role of demand-side factors (Bahmani-Oskooee and Nasir, 2005). The productivity-differentials model states that high-income countries have higher levels of productivity, and therefore higher wages, in sectors producing tradable goods, than poor countries. Assuming intersectoral labour mobility, in rich countries wages (and prices) in sectors producing non-tradable goods will also be comparatively higher. Since, by the law of one-price, the prices of traded goods tend to equalise across countries; international price differences fundamentally depend on the prices of non-tradable goods and services.

The Balassa–Samuelson model has been applied to explain differences in inflation rates and price levels within countries, including Italy (Costa et al., 2019; Hearne and De Ruyter, 2019; Nenna, 2002; Perevyshin et al., 2019). Although this model is generally supported by cross-countries studies (Chen et al., 2015), its extension to subnational contexts is not straightforward. For example, the assumption of international immobility of a labour force is not tenable within countries. Furthermore, and contrary to the predictions of the Balassa–Samuelson model, in the Italian case, nominal wages are equal throughout the country, consequently the higher price level in the Northern regions cannot be attributed to higher wages in the service sector relative to the South.

Alongside the supply-side-oriented models, alternative explanations of international price differences exist that focus on the role of demand (Bergstrand, 1991; Kravis and Lipsey, 1982; Tang, 2012). According to these explanations, in countries with higher real per capita income, there is a comparatively

higher demand for services, which increases their prices relative to those of traded goods. Therefore, there is a positive correlation between real income and the price of services.

Empirical studies for Germany, Poland and Russia show how wage levels – together with other factors including population density – are a major determinant of interregional price differentials (Kluge and Weber, 2018; Perevyshin et al., 2019; Rokicki and Hewings, 2019; Roos, 2006b). There is, furthermore, ample evidence that price differentials are largely due to the price of services and, especially, of housing and rents (Karády and Koren, 2009; Stroebel and Vavra, 2019; Tabuchi, 2001; Weinand and von Auer, 2020). In Italy too, remarkable North–South differences exist in house prices which, at the municipality level, are related to household incomes, labour market conditions, and population size (Casolaro and Fabrizi, 2018).

The examination of the determinants of wages and price level differentials goes beyond the aim of the present paper. However, in Table 6, the correlations among productivity, wages per employee, density of firms (firms per km<sup>2</sup>), population density and average house prices in 110 Italian provinces and in their respective capital cities are reported. Firms and population densities are proxies by the local demand that, as shown by studies (Karády and Koren, 2009; Roos, 2006b), is positively related to wages and house prices. Data on average house prices in 2016 were taken from the Italian Observatory of the Real Estate Market (OMI). Consistent with the mentioned research, productivity and wages are positively correlated to density of

firms ( $r=0.41$ ), population density (0.33) and to house prices. Average wages, in particular, are significantly correlated to house prices in provincial capital cities ( $r=0.49$ ) which, in turn, are related to the density of firms (0.49).

The role of demand may help explain why the prices of services and housing present regional variations. In regions with higher *average* wage (and per capita income) there is a comparatively greater demand for higher-priced services than in poorer regions.<sup>7</sup> Since services are, by definition, spatially constrained, if their supply is inelastic, prices tend to be pushed up by demand – an effect especially relevant for rents and house prices (Karády and Koren, 2009; Tabuchi, 2001; Weinand and von Auer, 2020).

Interregional migrations, determining shifts in demand, can reinforce this process (Saiz, 2007; Sanchis-Guarner, 2017). In more developed areas, in fact, immigration increases the demand for land and houses, and their prices; conversely, in poorer areas, emigration, if sufficiently large, tends to depress the demand for services and houses, decreasing prices. Internal migrations represent a long-term feature of Italian economic development. In the period 2002–2017 alone, about 2 million people emigrated from Southern to Central-Northern regions (SVIMEZ, 2019).

Even though, as proposed by the above-mentioned studies, wages influence price levels, it is worthy of note that prices, in turn, affect regional nominal productivity in sectors producing non-tradable goods and services (Daniele, 2019; Müller, 1999; Office for National Statistics [ONS], 2017). For example, on a nominal basis, the productivity of a hairdresser or a mason located in a Northern city is, *ceteris paribus*, higher than that of their Southern colleagues, due to the differences in the prices of their respective services. In other words, productivity, wages and prices are mutually inter-related, and their interrelation determines different local equilibria.

## Concluding discussion

This paper provides a descriptive analysis of the spatial distribution of labour productivity, wages

and ULCs in Italy. Southern and Central-Northern regions have different levels of development, and thus heterogeneous productive and occupational structures. Due to these heterogeneities, apparent labour productivity is about 30% lower in the South than in the rest of the country and the average wage is also 25% lower, while the ULC is 2–3 percentage points higher. In some Southern regions with low productivity, the ULC is analogous to, or even lower than, that in most Northern industrialised regions.

Productivity and average wage levels vary across regions, sub-regional areas and cities, but they are strongly correlated whatever the territorial level considered. Across provinces, both variables are also highly related to the size of firms, measured in terms of employment and, particularly, to average revenues from sales.

Although merely descriptive, these findings have remarkable implications for the analysis of spatial distribution of productivity. Many studies found that disparities in labour productivity among Italian regions mainly depend on differences in TFP, that is in technology and allocative efficiency levels (Erbeta and Petraglia, 2011; Locatelli et al., 2019; Mussini, 2019). For the manufacturing sector, it has been estimated that, after controlling for sectoral composition and firm-level heterogeneities in size and capital intensity, the difference in TFP between Southern and Northern regions is in the order of 30%–48% (Locatelli et al., 2019; Rungi and Biancalani, 2019). The spatial distribution of productivity and wages does not support these findings. As already mentioned, for each type of job and workers' qualification, wages are, in fact, the same throughout Italy. Therefore, if, *ceteris paribus*, firms were 30%–48% less productive in the South than in the Centre-North, this should result in a proportionally higher ULC and lower profits. But, as seen, the differences in the ULC are modest.

How, therefore, can we reconcile the evidence of small ULC differences, in the face of large labour productivity differentials among Italian regions and territories? A possible explanation is the heterogeneity in productive and occupational structures. In the Southern regions, there is a comparatively

higher *share* of firms that have, for the industry in which they operate, for their size and/or for the types of products they produce, a comparatively lower productivity, and employ workers with lower qualifications (and, consequently, with lower wages) than in the Centre-North. As a result, in the South, not only productivity, but also the *average* wage, is comparatively lower, and this results in a modest difference in ULC compared with the Centre-North. This suggests that TFP estimates are inflated by residual heterogeneities, among regional industrial structures and among firms, that are not – and probably cannot be – totally cancelled out in territorial comparisons.<sup>8</sup>

These findings are consistent with those concerning other countries. For example, an analysis on UK sub-regional and urban areas shows how, once value added per worker is adjusted for the industry mix and occupational characteristics of each area, the apparent differences in ‘efficiency’ greatly reduce (Beatty and Fothergill, 2019, 2020). Similar results were reached by Webber et al. (2009).

The results of the present paper have implications for the thesis according to which, in Italy, due to the large regional differences in productivity, national sectoral labour bargaining should be substituted by decentralised labour agreements, at the firm or territorial levels (Aquino, 2001; Ichino et al., 2019). In reality, data show how, at the regional and sub-regional levels, productivity and wages are closely related. A different question regards the adoption of incentivising policies, aimed at encouraging firms to locate in Southern regions by reducing labour cost. Such policies had been implemented from the 1960s to the early 1990s (Poy, 2017), and have recently been proposed again, although the disappointing economic and occupational performances of Southern regions over the period in which they were implemented cast doubts on their effectiveness.

In Italy, as in other countries, regional average wages are positively correlated to house prices and consumer price levels. Previous studies have estimated a gap in price level of 16%–20% between Central-Northern and Southern regions (Amendola and Vecchi, 2017; Cannari and Iuzzolino, 2009). Based on a basket of goods and services used to compute absolute poverty, the gap in prices is 22%.

As a result, the *average* real wage in the Italian macro-regions is similar. However, the lower level of prices and the equality in nominal wages together imply that, in Southern regions, employees enjoy a greater purchasing power than their colleagues with equivalent job positions who live in the Centre-North. Finally, local differences in prices affect firms’ revenues and nominal productivity in industries producing non-tradable goods and services sold in local markets – an effect that should be taken into account when territorial productivity levels are compared.

Estimates of regional PPPs are essential to compare real income, living standards and poverty levels within countries, and are also relevant for regional policies (Janský and Kolcunová, 2017). A limitation of this article is that the poverty basket used to estimate the North–South difference in price levels is not, by definition, representative of the consumption of all households. In the case of Italy, the calculation of differences in price levels, and the understanding of the factors that drive them, would require further research.

In synthesis, the previous analysis showed how, in Italy, regional productivity, wages and price levels turn out to be mutually interrelated. Their mutual relationships lead to local equilibria that, ultimately, reflect the underlying characteristics of productive structures. That of the South is, however, a high-unemployment equilibrium.

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## Notes

1. The ratio of total wages to value added (the ULC) is the share of value attributed to the labour factor. In industry and services, employees represent 71% of total employment in the Centre-North, while in the South, 67%. Obviously, in each region, total value added is produced by all firms in the sample, including self-employed workers, sole-proprietorship firms and freelance professions. Thus, the differences in the relative shares of employees contribute to explaining the small difference in the ULC between Centre-North and South, as opposed to the large difference in value added per worker.
2. This calculation avoids the effect deriving from the differences in regional occupational composition on ULC (see Note 1).
3. For example, the Office for National Statistics (ONS, 2018) published PPPs for 2016 for the UK's regions.
4. The difference in price level between Centre-North and South estimated by Cannari and Iuzzolino (2009), ranges between 16% and 20% according to the methodology adopted.
5. Centres of metropolitan areas; periphery of metropolitan areas and municipalities with more than 50,001 inhabitants; other municipalities. The results, however, do not change if each of the municipality types is considered individually.
6. Over the period 2005–2019, the yearly variations of the CPI for Italian households are correlated  $r=0.91$  with yearly variations in the price basket of absolute poverty in the North, and  $r=0.82$  with the same basket in the South.
7. Remember that, at the territorial level, *average wage* depends on the composition of occupational structure.
8. For example, territorial comparisons are typically based on samples of firms grouped in 'divisions' or 'groups' of activities (NACE classification). As is known, these classifications include different types of economic activities and, in addition, even within the same industry, products are differentiated under many aspects.

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## Appendix

**Table 7.** Value added per worker, wage per employee (Italy = 100) and ULC (%) in selected industrial activities, 2016.

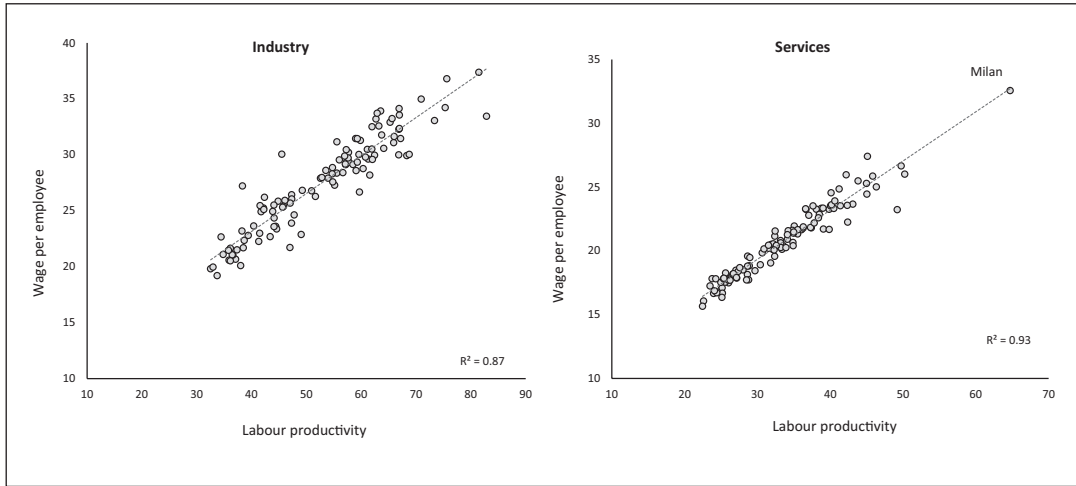
Section and divisions	Productivity			Wages			Unit labour cost (ULC) (%)		
	Centre-North	South	South	Centre-North	South	South	Centre-North	South	
C. Manufacturing	94.9	72.0	86.3	102.5	86.3	42.8	45.3		
10. Food products	114.1	66.4	71.9	110.7	40.3	40.3	40.9		
13. Textiles	103.5	61.8	69.0	102.5	46.1	46.1	46.3		
14. Wearing apparel	109.6	67.2	75.6	107.2	46.6	46.6	54.2		
16. Manufacture of wood and of products of wood and cork . . .	109.5	61.2	76.2	105.4	40.7	40.7	48.1		
22. Manufacture of rubber and plastic products	102.0	84.7	86.2	101.8	42.4	42.4	43.3		
25. Manufacture of fabricated metal products, except machinery . . .	105.4	71.5	82.2	103.1	44.7	44.7	48.6		
26. Manufacture of computer, electronic and optical products	101.1	95.1	93.1	101.6	50.4	50.4	50.3		
27. Electrical equipment	98.4	113.2	98.8	100.1	45.1	45.1	38.9		
28. Machinery and equipment n.e.c.	101.4	77.7	81.1	101.2	45.6	45.6	47.1		
29. Motor vehicles, trailers. . .	108.6	81.8	84.9	107.1	43.6	43.6	46.3		
31. Furniture	105.1	66.6	75.0	103.7	45.5	45.5	50.9		
32. Other manufacturing	105.6	57.6	70.9	102.5	41.9	41.9	35.0		
F. Construction	105.6	84.9	86.2	106.0	39.8	39.8	47.4		

Source: Elaborazione su dati Istat, *Risultati economici delle imprese a livello territoriale*, online database <http://dati.istat.it>.

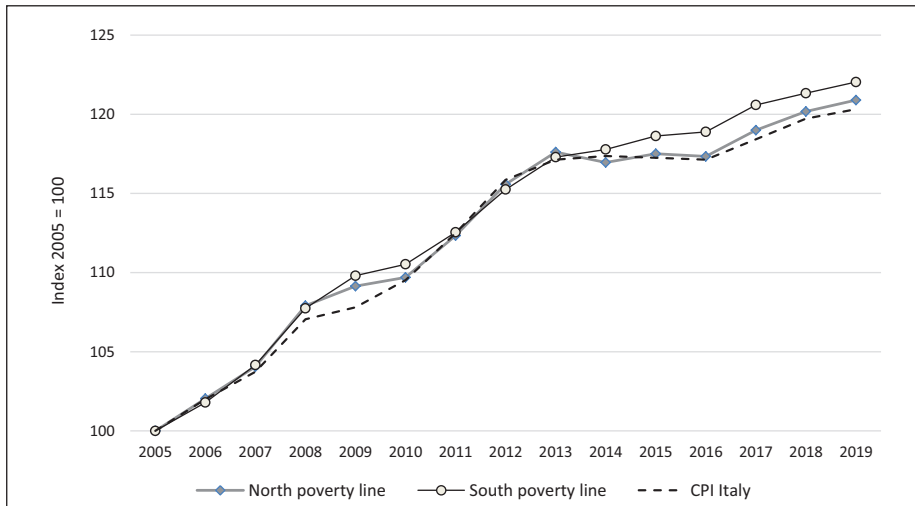
**Table 8.** Value added per worker, wage per employee (Italy = 100) and ULC (%) in selected service activities, 2016.

Sections/divisions/groups	Productivity			Wages			Unit labour cost (ULC) (%)		
	Centre-North	South	South	Centre-North	South	South	Centre-North	South	
G. Wholesale and retail trade and repair of motor vehicles and motorcycles	114.5	74.6	80.6	110.2	37.9	37.9	39.2		
45. Wholesale and retail trade and repair of motor vehicles and motorcycles	113.6	62.9	75.0	108.0	38.7	38.7	42.6		
45.1. Sale of motor vehicles	113.5	58.5	73.6	107.5	36.3	36.3	42.3		
46. Wholesale trade, except of motor vehicles and motorcycles	112.5	60.6	64.5	110.2	34.2	34.2	33.7		
47. Retail trade, except of motor vehicles and motorcycles	111.1	75.5	82.5	106.9	43.5	43.5	42.7		
H. Transportation and storage	103.7	88.7	94.4	101.8	45.8	45.8	50.1		
I. Accommodation and food services activities	104.7	86.3	88.2	104.0	47.6	47.6	48.6		
55. Accommodation	102.2	93	90.6	103.3	40.9	40.9	42.5		
56. Food and beverage service activities	126.0	100	100.0	123.3	51.1	51.1	52.0		
M. Professional, scientific and technical activities	108.6	86.1	90.2	103.6	29.3	29.3	25.9		
96. Other personal service activities	107.7	78.2	83.3	105.7	40.0	40.0	42.3		

Source: Elaborazione su dati Istat, *Risultati economici delle imprese a livello territoriale*, online database <http://dati.istat.it>.



**Figure 10.** Labour productivity and wage per employee in 110 Italian provinces in industry and in services in 2016.



**Figure 11.** Poverty thresholds and consumer price index (CPI) in Italy 2005–2019 – Index 2005 = 100.

Note: The Italian consumer price index (CPI) for blue- and white-collar households (FOI) is considered; 2005 is the first year for which data for the absolute poverty basket are available. Source: for the CPI, Istat <https://www.istat.it/it/archivio/30440>; for the poverty thresholds, Istat, <https://www.istat.it/it/dati-analisi-e-prodotti/contenuti-interattivi/soglia-di-poverta> (retrieved on 09/11/2020).