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Abstract

We study aggregate profitability dynamics in Italy from 1995 to 2009, by stressing its regional trends. We make use of various analytic approaches, such as decompositions, analysis of the ranking of the profit rate of the various regions and of their coefficient of variation, as well as of a shift-share analysis. We find that the distribution of regional profit rates changed little over time and that aggregate profitability dynamics was driven by within region developments rather than by changes of the weights of the regions within the national economy. Policy and theoretical implications are discussed in the light of the previous literature of reference.

Keywords: Aggregate profitability dynamics, regions, Italy

JEL Codes: R10, E11

1. Introduction

The analysis of aggregate profitability is the subject of a considerable number of economic contributions. Broad reviews were offered in Shaikh and Tonak (1994) and Vaona (2011). We will briefly focus here on highlighting recent trends in the literature of reference, which took a variety of directions.

Some scholars used the lenses of aggregate profitability dynamics to analyse the post-2008 economic crisis (Maniatis and Passas, 2013; Basu and Vasudevan, 2013; Izquierdo, 2014; Tsoulfidis and Tsaliki, 2014). Some other continued to assess the long-run dynamics of aggregate profitability, also applying non-stationary econometrics tools to better appreciate long-run trends (Marquetti et al., 2010; Basu and Manolakos, 2013)

One further group of works started to analyse the interweaving between structural change and aggregate profitability by making also use of decompositions. In the effort to pursue this new research direction, two paths have been followed. On the one hand, there are works focusing on changes in the role of the different economic sectors across the economy (Wolff, 2003; Vaona, 2011). On the other, there are scholars that stressed the importance of gender issues, by decomposing aggregate trends into those of male and female activities (Zacharias and Mahoney, 2009; Tescari and Vaona, 2014).

Both in this sub-stream of literature and in the general literature of reference, the regional dimension of countrywide economic developments has been by and large overlooked. Three exceptions are Rigby (1991a, b) for Canada and Glassman (2007) for Thailand[1]. Remarkably, none of these studies made use of ranking analysis, inspection of the variation coefficient of profit rates over time, panel unit root tests and a shift-share analysis. Furthermore, Rigby (1991a, b) resorted

[1] Other studies focus on either one single industry or one single region (see the papers quoted in Rigby, 1990). Our distinctive feature is focusing on many regions and many sectors and making use of a set of analytical tools new to the field.

to different profit rate decomposition than ours. His decompositions aim at distinguishing the effects of market and production competition on the profit rate dynamics. Ours are tailored to distinguish between factors within regions and changes of the weight of the regions within the national economy.

The scarce attention to the spatial dimension of aggregate profitability dynamics is all the more striking given the importance that seminal contributions in economic geography have traditionally attributed to capital accumulation and profitability dynamics (see for instance Harvey, 1982, 2001, 2006; Smith, 2008). Our originality, therefore, consists in applying a number of different empirical methods to a regional analysis of aggregate profitability also considering a country with well-known regional divides, namely Italy (Mauro, 2004; Aiello and Pupo, 2012; D' Agostino and Scarlato, 2013; Lüttge, 2014).

The remainder of this work is structured as follows. First, our data, including their definitions and sources, are illustrated. Then we will illustrate the methods we adopt in the course of our analysis, before delving into a regional analysis of aggregate Italian profitability. In so doing we will focus on the private sector only, as many studies in the literature of reference[2]. Finally we will conclude by giving context to our results and discussing policy and theoretical implications.

2. Data sources, definitions and description

Data are from the Italian Institute for Statistics (ISTAT) and cover the period 1995-2009[3]. All 20 Italian regions are included in the analysis: Abruzzo (S), Basilicata (S), Calabria (S), Campania (S), Emilia-Romagna (NE), Friuli-Venezia Giulia (NE), Lazio (C), Liguria (NW), Lombardia (NW), Marche (C), Molise (S), Piemonte (NW), Puglia (S), Sardegna (S), Sicilia (S), Toscana (C), Trentino- Alto Adige (NE), Umbria (C), Valle d'Aosta (NW), Veneto (NE). Note that "S" denotes Southern regions, "C"

[2] This is usually done to tackle somehow the issue of productive and unproductive labor, an open question in contemporary quantitative marxism (for a review see Vaona, 2011).
[3] http://www.istat.it/it/archivio/75111.

central ones, “NW” North-Western ones and “NE” those in the North-East. Since Italy united in 1861, Southern regions have been less economically developed than Northern and Central ones. North-Western regions have experienced considerable industrial restructuring since the 1970s as their economy was based on shrinking large factories. North-Eastern and Central regions are world renown for their post-industrial development based on districts and external-to-firms economies. (Bagnasco, 1977; Brusco, 1982; Scott, 1988).

The variables available from the database at the regional level are: the value added (VA), the number of employees (EMPE), the total number of persons engaged in production (EMPN*)*, and the wages and salaries of employees (LABR*)*. The base year of the gross output deflator and of the gross investment is 2005.

We do not compute any variable net of capital depreciation, since this is not available in the ISTAT dataset. However, both Wolff (2003) for the US and Vaona (2011) for Italy - over a similar time period to ours - did not find net and gross profit rates to have markedly different dynamics.

The corrected gross operating surplus (GOPS’) is our measure for total profits and it is computed as:

$$GOPS' = GOPS - \left(\frac{LABR}{EMPE}\right) * \left(EMPN - EMPE\right)$$

where

$$GOPS = VA - LABR .$$

The correction above is widespread in the literature of reference and it is customarily introduced to better account for the labour cost of the total number of persons engaged in production, under the hypothesis that the opportunity cost of being self-employed and not an employee is on average equal to the industry average wage (see Wolff, 2003).

Similarly, the total wage bill was computed as

$$wn = LABR \quad \left(\frac{LABR}{EMPE}\right)*\left(+EMPN \quad EMPE\right)$$

and the national gross income as

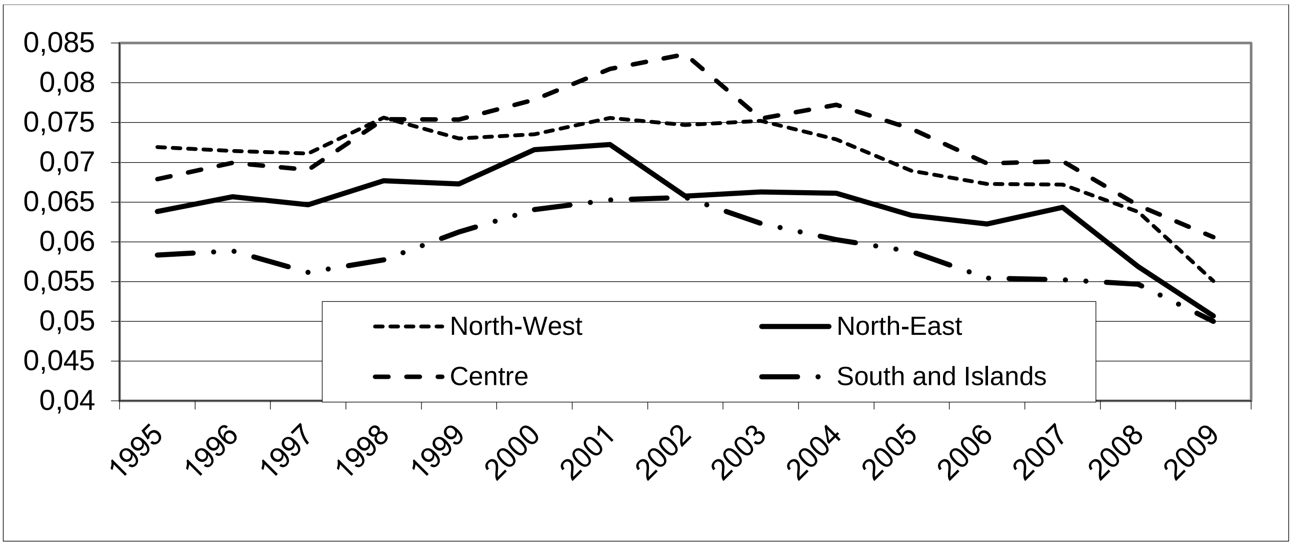
GNI=GOPS'+wn

Regional data on fixed capital at regional level are not available from ISTAT, therefore we use the national stock of fixed capital at current replacement cost. From this, we compute regional capital stocks following Gleed and Rees (1979), as applied to Italian data for instance by Paci and Pusceddu (2000), Destefanis and Sena (2005), Destefanis and Coppola (2007), Costantini and Destefanis (2009). More specifically, we redistribute the national capital stock to the 20 Italian regions on the basis of their regional shares of gross fixed investments (with a weight of 0.75) and the regional share of persons engaged in production (with a weight 0.25). To assess the robustness of the new variable, building on Costantini and Destefanis (2009), we compute regional capital stocks with two further coefficients, giving to the regional share of gross fixed investments weights of 0.90 and 0.50 and to the regional share of employment weights of 0.10 and 0.50 respectively. In the following, we will denote the three computation approaches as 7525, 9010 and 5050 respectively.

Finally, in accordance with the literature of reference, we define (the money equivalent of) the rate of surplus value as the ratio of net profits over total wages and (the money equivalent of) the organic composition of capital as the ratio of the market value of the capital stock and the total wage bill.

The remainder of this section is devoted to a description of the time trend of some important magnitudes, such as the profit rate, the profit share, the rate of surplus value, capital-per-worker and the organic composition of capital. For ease of exposition and to better highlight some properties of the data, we consider a coarser level of disaggregation than in the following of this work. Namely, instead of analysing each of the 20 Italian regions listed above, we focus on the North-East, North-West, Centre and South and Islands.

Figure 1 – Profit rates in Italian macro-regions (1995-2009)



Note: regional capital stocks were computed by using the 7525 approach. Other approaches would yield very similar results.

As one could expect, profit rates were higher in Northern and Central Italy than in the South and Islands (Figure 1). However, it is remarkable how, notoriously successful regions, such as North-Eastern ones, during recession periods, tended to have similar profit rates than Southern ones.

Figures 2 and 3 show that the geographic pattern above is reversed once considering profit shares and the rate of surplus value. It would be possible to interpret this facts in two ways. On the one hand, Italian regions might have different industry mixes, each with its own peculiar income distribution. On the other hand, income distribution might compensate for external-to-the-firm diseconomies in backward regions, such as corruption, lack of infrastructure and criminality. Though capital had a similar distributional advantage in Southern and Central regions, profit rates were much lower in the former than in the latter ones[4], showing that the bespoken compensation was not strong enough in the South. We will assess the relative importance of regional specificities and industry mixes below, as this is particularly relevant for policy implications.

Figure 2 - Profit shares in Italian macro-regions (1995-2009)

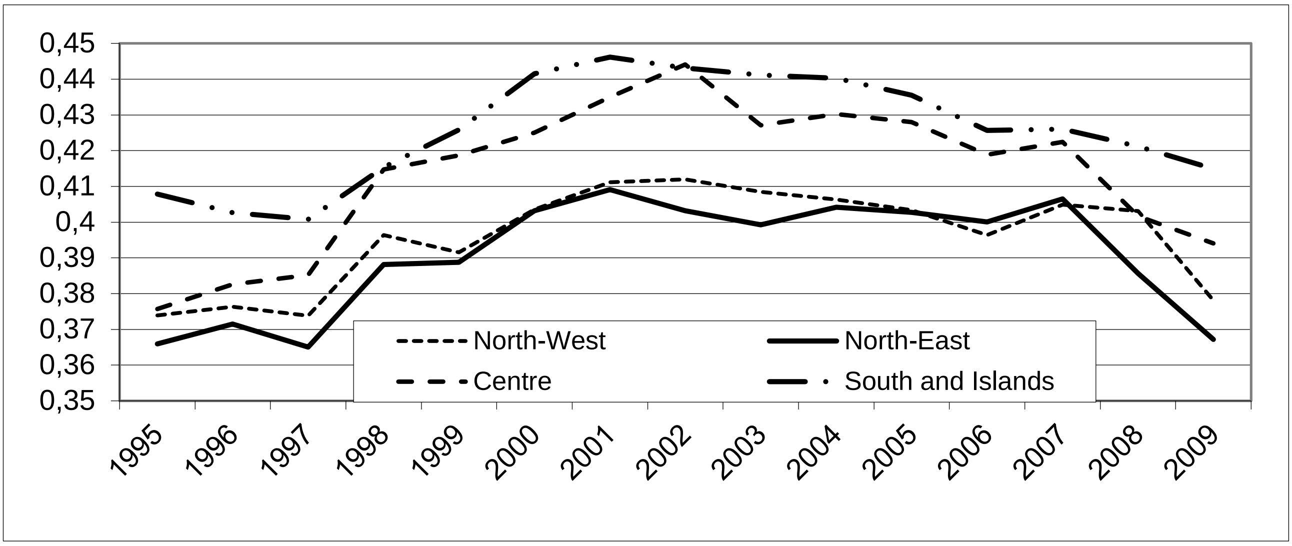
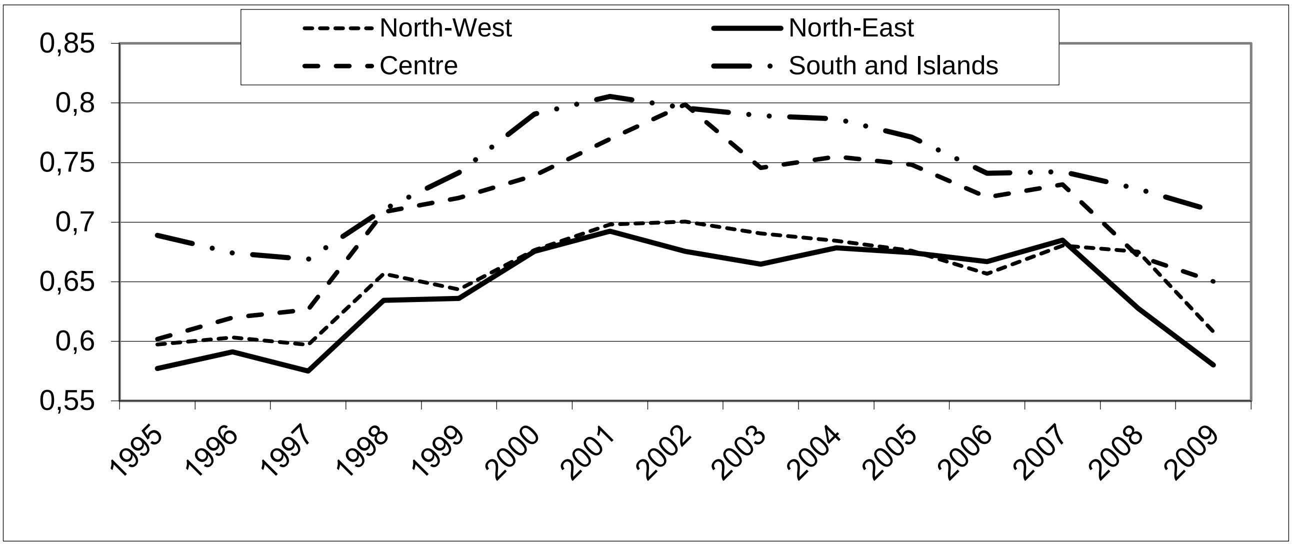


Figure 3 – Rates of surplus value in Italian macro-regions (1995-2009)



[4] Central Italy was the most profitable macro-region.

Figure 4 – Organic composition of capital in Italian macro-regions (1995-2009)

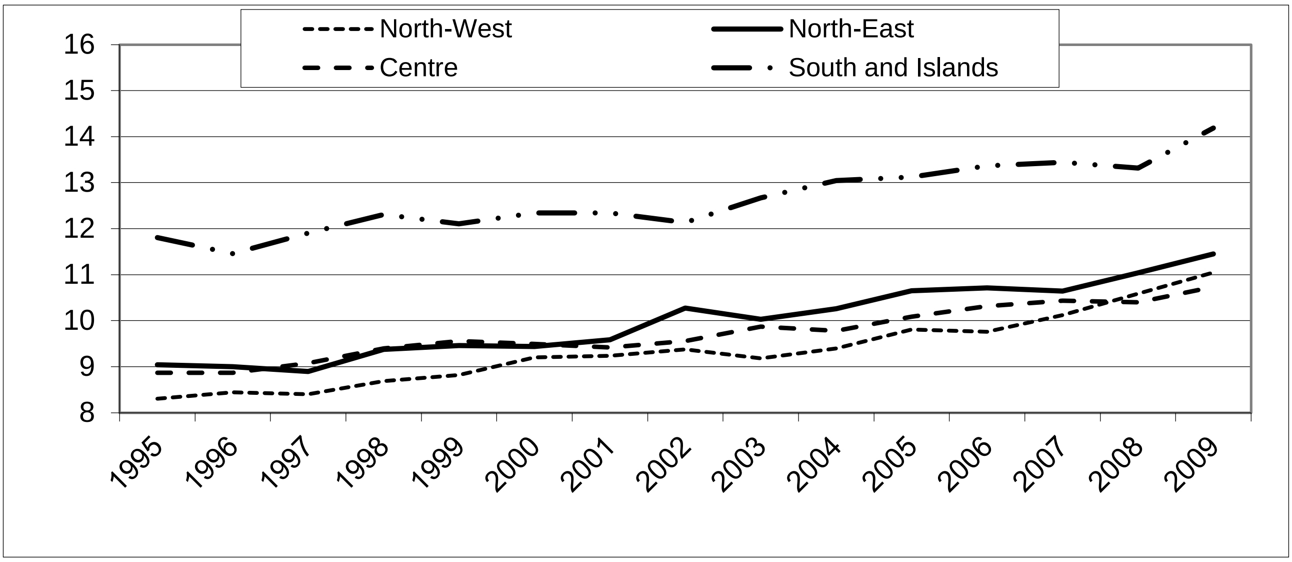
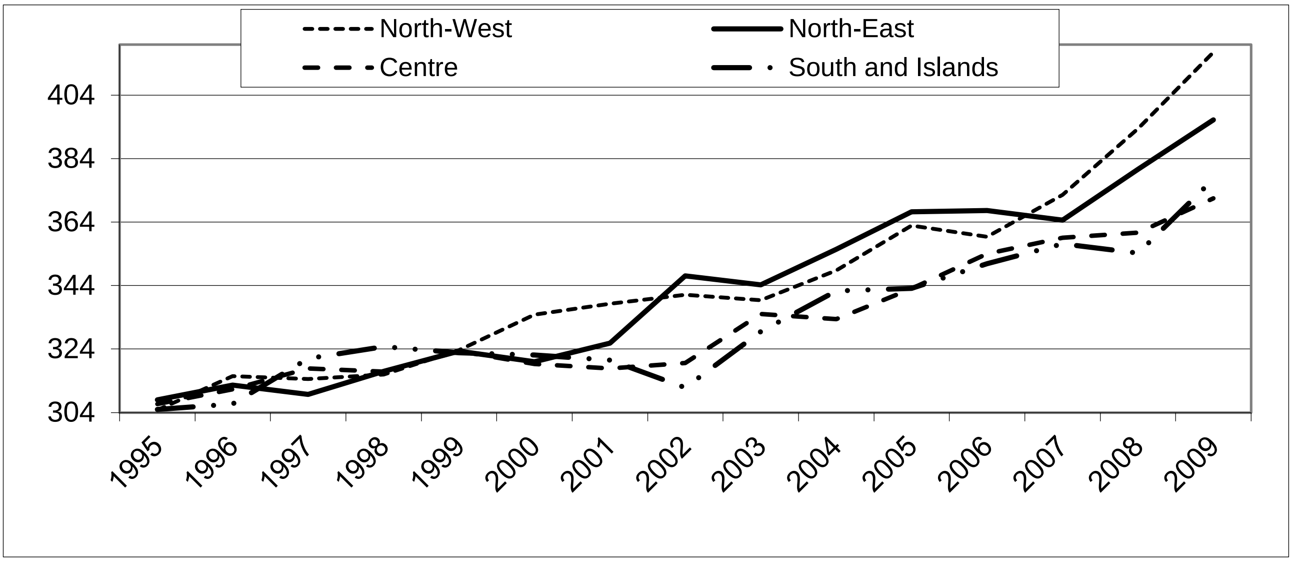


Figure 5 — Capital-labour ratio in Italian macro-regions (1995-2009), millions of 2005 Euros per worker



Two further interesting variables to consider are the organic composition of capital and capital per worker (Figures 4 and 5). The former turned out to be much higher in the South and Islands than in other macro-regions, while the latter was similar across the four macro regions. Given that the organic composition of capital is the product between capital per worker and the (average) capital deflator over the nominal (average) wage, it seems that the relative cost of capital and labour was much higher in Southern regions than in other parts of Italy, as a possible by-product of lack of infrastructures, higher transportation costs and last, but not least, lower nominal wages in the South. Remarkably, the nominal wage, during the period of observation, was, on average, 27% lower in the South and Islands than in the North-West. It was 7% lower in the North-East compared to the North-West. It was almost the same in the Centre and in the North-West, instead.

Methods

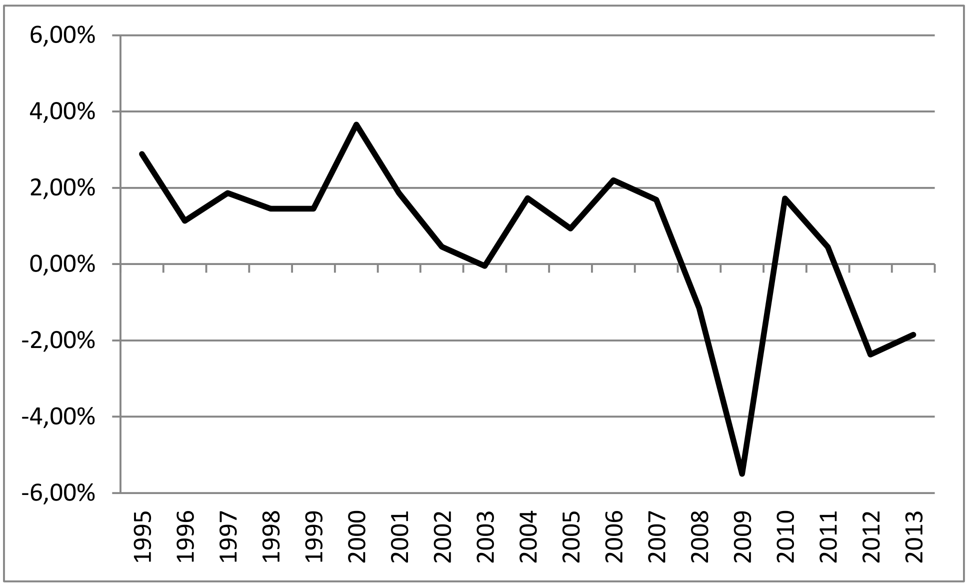
Profit rate decompositions

The first method we adopt is decompositions which are based on a simple identity. If $y=ab$, then $y_{t=2}- y_{t=1}=a^{*}(b_{t=2}-b_{t=1})+b^{*}(a_{t=2}-a_{t=1})$, where t is a time index and asterisks denote average values between time 1 and 2. Of course when facing a dataset with many regions (or sectors) computations become much more involved than this. Full details of our calculations were already set out in Vaona (2011, 264-266).

Decompositions are an accounting technique and they cannot *per se* highlight causal relationships. Economic interpretation is needed to assess the results. Under this respect, however, regression based estimates are not superior in themselves, as correlation is not causality. Economic reasoning - regarding, for instance, model specification, exclusion restrictions and instruments choice - is often necessary in gauging regression results too.

Our aim is to capture medium-run trends, if not long-run ones. In order to do so, we consider the growth rate of the Italian economy and we select as years of reference those with weak or negative growth, namely 1996, 2003 and 2008 (Figure 6). Note that, using the Hodrick-Prescott filter on this series in the form proposed for annual data by Ravn and Uhlig (2001), the trend growth rate turns out to be 1.39% in 1996, 1.41% in 2003 and -1.61% in 2008. Yet we feel useful to consider also a year towards the end of the sample for sake of robustness. In addition, given that the recession after 2008 has not proved to be transitory, we felt interesting to take as reference a year within this recession to carry out a first investigation of trends in the Italian economy during this peculiar period. Note that in the Appendix we report results once taking as reference the year 2007.

Figure 6 - Real growth rate in Italy, 1996-2013.



Unit root tests

Computations to assess the role of regional trends in aggregate profitability dynamics will be different whether imposing or not the restriction of equal regional rates of surplus values. On considering industry data, Wolff (2003) exploits this restriction, while Vaona (2011) does not do so. It is therefore important to check whether regional rates of surplus value have any tendency to convergence over time. In order to do so, we adopt panel unit root tests after Im, Pesaran and Shin (1995, 2003), and Maddala and Wu (1999). We also use the test after Pesaran (2007) and Lewandowski (2006) that allows for cross-sectional dependence. Note that, even when implementing the Im, Pesaran and Shin (1995, 2003) and the Maddala and Wu (1999) tests, we first cross-sectionally demean the series so to control for the possible effects of cross-sectional dependence as suggested by Im, Pesaran and Shin (1995, 2003). These tests are thoroughly discussed in Baltagi (2005). Later we apply the same tests in order to answer a different question, namely whether regional profit rates have any tendency to equalize across regions over time.

Ranking analysis

Following Boyle and McCarthy (1990), as applied also by Liddle (2009) and Vaona (2013), another way to study whether regional profit rates have any tendency to equalize is to focus on time changes in the profitability ranks of regions by means of an index of rank concordance that ranges from zero to one

$$\gamma = \frac{Variance\left[AR(I)_{it} + AR(I)_{i0}\right]}{Variance\left[2 * AR(I)_{i0}\right]} \tag{2}$$

where $AR(I)_{it}$ is the rank of region *i*'s profit rate in year t and $AR(I)_{i0}$ is the rank of region *i*'s profit rate in the initial year of observation.

Time changes in the variation coefficients

One further indicator we consider is the variation coefficient of regional profit rates. We do not only analyse the change of the coefficient of variation, *K*, across regions over time, but we also compute its 95% confidence interval, Λ, as proposed by Vangel (1996):

$$\Lambda = \left(\frac{K}{\sqrt{t_1}}, \frac{K}{\sqrt{t_2}} \right) \tag{1}$$

where $t_1 = \frac{\chi^2_{n-1,0.025}}{n-1}$, $t_2 = \frac{\chi^2_{n-1,0.975}}{n-1}$, *n* is the number of observations for each year (namely 20) and χ^2 denotes the chi-squared distribution. In our view, a decrease in the point estimates of the coefficient of variation can be regarded as a sign of convergence only if it falls outside the 95% confidence interval of the first period of observation.

Shift share analysis

We next carry out a shift-share analysis on the footsteps of Esteban (1999), with the purpose of understanding whether regional differences in aggregate profitability are due to their industry mix, to region-specific profitability differentials, or to an allocative component - which gives an indication about the efficiency of a region in allocating resources across different industrial sectors. Specifically, Esteban (1999), shows that

$$y_i\text{-}y=\mu_i+\pi_i+\alpha_i \tag{3}$$

where y_i-y is the differential of the profit rate in region *i* with respect to its national value, $\mu_i = \sum_j \left(p_i^j - p^j\right) y^j$ is the *industry-mix* component, $\pi_i = \sum_j \left(y_i^j - y^j\right) p^j$ is the *region-wide* profitability differential component, $\alpha_i = \sum_j \left(y_i^j - y^j\right)\left(p_i^j - p^j\right)$ is the allocative component, *j* is an industry index, p^j is the share of industry *j* in total output at the national level, while p_i^j refers to region *i*. Finally y_i^j is the profit rate of industry *j* in region *i*. The industry mix component is obtained by keeping the profit rate fixed at its national level. In the region-wide profitability differential component, instead, the industrial structure is kept equal to the national one. The allocative component, finally, offers a measure of the tendency of region-wide profitability differentials and industry mix effects to go hand in hand. By making use of basic statistics, one can decompose the variance of y_i-y in the variances and covariances of its components.

We also double-check our results by comparing the explanatory power of three econometric models

$$y_i\text{-}y=a_\mu+b_\mu\mu_i+\upsilon_{\mu,i} \tag{4}$$

$$y_i\text{-}y=a_\pi+b_\pi\pi_i+\upsilon_{\pi,i} \tag{5}$$

$$y_i\text{-}y=a_\alpha+b_\alpha\alpha_i+\upsilon_{\alpha,i} \qquad (6)$$

where a_k, b_k for $k=\mu,\pi,\alpha$ are coefficients to be estimated and υ denotes errors.

Note that in the shift share analysis we consider five sectors: i) Agriculture, Fishing and Forestry; ii) Finance, Insurance and Real Estate Activities; iii) Wholesale and Retail Trade; iv) Construction; v) Manufacturing. When estimating capital stocks at the industry level, we stick to the same computation approach discussed above.

Results of regional analyses

Profit rate decompositions and unit root tests on regional rates of surplus value

The first decomposition we consider is based on the fact that aggregate capital per worker can be expressed as the sum of regional capital per worker ratios weighted by the share of each region in total employment. This allows to assess whether the aggregate dynamics of capital per worker was driven more by changes in the weights of the regions in national employment than by developments in capital per worker within each region. Results are set out in Table 1.

Table 1 - Regional decomposition of the capital-labour ratio

Capital computation method	5050		7525		9010	
Time periods	96-03	03-08	96-03	03-08	96-03	03-08
Change in capital-labour ratio	8.1%	10.9%	8.1%	10.9%	8.1%	10.9%
Change in regional capital-labour ratios	8.1%	10.8%	8.1%	10.8%	8.1%	10.8%
Employment shift	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%

Note: 5050, 7525 and 9010 denote regional capital computation methods, varying according to the weights given to the regional shares of gross fixed investments and of persons engaged in production. For more details see the Section on "Data sources, definitions and description".

As it is possible to see, the bulk of the change in aggregate capital-labor ratios are driven by within region developments rather than by changes in the employment shares of the various regions in total employment. Note that different computation approaches of regional capital stocks do not have any effect on our analysis.

Table 2 - Regional decomposition of the organic composition ratio

Capital computation method	5050		7525		9010	
Time periods	96-03	03-08	96-03	03-08	96-03	03-08
Change in organic composition	10.4%	9.4%	10.4%	9.4%	10.4%	9.4%
Change in regional organic compositions	10.4%	9.5%	10.4%	9.5%	10.4%	9.5%
Wage bill shift	0.0%	-0.1%	0.0%	-0.1%	0.0%	-0.1%

Note: 5050, 7525 and 9010 denote regional capital computation methods, varying according to the weights given to the regional shares of gross fixed investments and of persons engaged in production. For more details see the Section on “Data sources, definitions and description”.

Our second decomposition builds on the fact that the aggregate money equivalent of the organic composition of capital can be expressed as the sum of regional organic compositions weighted by the share of each region’s wage bill in the national wage bill. Similarly to the previous decomposition, it is therefore possible to understand whether aggregate trends were driven more by changes in the weights of the regions in national wage bills than by developments of the organic composition of capital within each region. Table 2 illustrates our results concerning this point.

Also considering the regional organic composition of capital, therefore, it is possible to conclude that aggregate trends were driven by within region developments more than restructuring of the weight of each region within the national wage bill.

Our last decomposition builds on the fact that the profit rate can be expressed as the ratio between the rate of surplus value over the organic composition of capital. The aggregate rate of surplus value, in its turn, can be expressed as the sum of the regional rates of surplus values weighted by the product between the ratios of the regional wage over the national one and of regional employment over the national one. Furthermore, the changes in regional rates of surplus values can be traced to changes in output per worker and changes in the average real wage, upon considering that net profits are equal to net output minus the wage bill.

Moreover, as already showed in Table 7, the organic composition can be expressed as the sum of regional organic compositions weighted by the share of regional wage bills in total wage bill. These shares are, then, nothing more than the product of the shares of regional employment in total employment and of the regional wage relative to the national one.

As a matter of consequence, the aggregate percentage change in the profit rate can be decomposed into the change in the rate of surplus value minus the change in the organic composition of capital. The former one can, then, be decomposed into a regional productivity effect, a regional real wage effect and a wage bill shift effect. This last effect can be further split into an employment shift effect (namely the effect of the changes of the regional shares of national employment) and a relative wage effect (namely the effect of the ratio of the average regional wage over the national one).

Regarding the percentage change in the organic composition, it can be decomposed into the change in the regional organic composition and the change in the regional shares of the aggregate wage bill, which can be split in a similar way to the one contained in the change in the rate of surplus value. Full details of the overall decomposition described above are given in Vaona (2011, 265-66).

As mentioned in the "Methods" Section, a key aspect of this last decomposition builds on whether there exists evidence, in the considered dataset, of convergence in regional rates of surplus values, whose dynamics, therefore, has to be studied, before delving into decomposition computations. Figure 7 shows the cross-sectionally demeaned time series of regional rates of surplus value. It is possible to notice that regional deviations from the cross-sectional mean are persistent. There exist regions like Abruzzo, Basilicata, Piemonte, Emilia-Romagna whose rate of surplus value is persistently below the mean. In other regions, like Lazio, Liguria, Calabria, Puglia and Sicilia the rate of surplus value is above the mean. Therefore, though there is a tendency for Southern regions to have higher rates of surplus value than Northern ones, the divide is not so clear-cut, as testified by the case of Liguria.

Figure 7 - Deviations of the regional rates of surplus value from their cross-sectional means

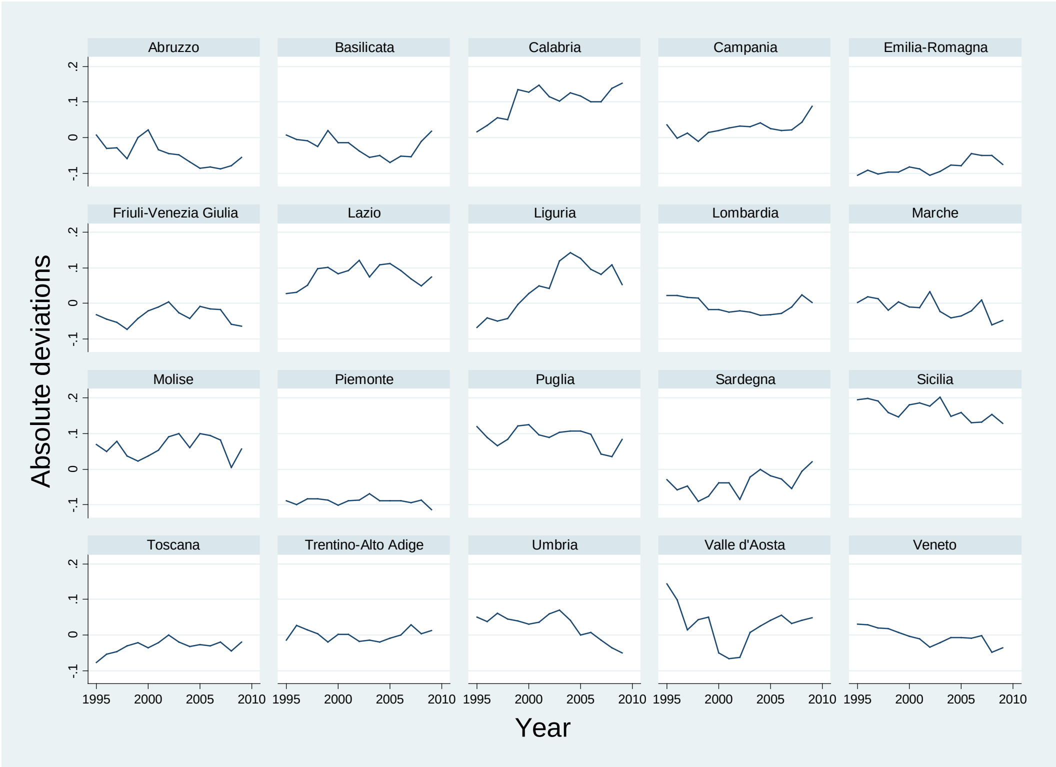


Table 3 shows the results concerning panel unit root testing once applied to the rates of surplus value. As it is possible to see, the null of the presence of unit roots is not rejected in a considerable number of regional series.

Regarding the Pesaran (2007) test, we play with different lags, ranging from 1 to 4. Once excluding from the sample the regions Piemonte, Molise, Trentino-Alto Adige, Toscana and Puglia, the null of the presence of unit roots in the regional series of the rate of surplus value is never rejected even at the 10% level as the least p-value is equal to 0.11 and the largest to 1. Upon including, in the deterministic portion of the model, also a trend and not only a constant as before, the minimum p-value rose to 0.32. Note that in all our Pesaran (2007) tests, we always extract the first period cross-sectional average and extreme t-values are truncated. Therefore, panel unit root testing would point to the approach by Vaona (2011) as the most suitable to our dataset when computing profit rate decompositions, whose results are set out in Table 4.

Once again developments within regions are much more important than changes of weights of the regions in the overall economy.

Table 3 – Panel unit root tests on the ratio between industrial profits and wage bills (rates of surplus value)

	Model without a time trend		Model with a time trend	
	Probability	Observations	Probability	Observations
Im, Pesaran and Shin W-stat	0.07	252	0.55	249
ADF - Fisher Chi-squared	0.15	252	0.59	249
PP - Fisher Chi-squared	0.15	252	0.34	252

Note: lags were automatically selected on the basis the Schwartz Information Criterion. We rely on the Newey-West bandwidth selection using a Bartlett kernel. For the PP - Fisher Chi squared test we drop the regions Marche and Puglia on the basis of individual Im, Pesaran and Shin tests

Table 4 - Regional decompositions of the net profit rate

Capital computation method	5050		7525		9010	
Time periods	96-03	03-08	96-03	03-08	96-03	03-08
Actual change in the profit rate	4.9%	-14.0%	4.9%	-14.0%	4.9%	-14.0%
Change in net profits over total wages	15.0%	-5.7%	15.0%	-5.7%	15.0%	-5.7%
Regional productivity effect	6.0%	6.3%	6.0%	6.3%	6.0%	6.3%
Regional real wage effect	9.0%	-12.0%	9.0%	-12.0%	9.0%	-12.0%
Wage bill shift	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Employment shift	0.0%	0.4%	0.0%	0.4%	0.0%	0.4%
Regional relative wage effect	0.0%	-0.4%	0.0%	-0.4%	0.0%	-0.4%
Change in organic composition	-10.1%	-8.3%	-10.1%	-8.3%	-10.1%	-8.3%
Change in regional organic compositions	-10.2%	-8.4%	-10.2%	-8.4%	-10.2%	-8.4%
Wage bill shift	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Employment shift	0.1%	-0.5%	0.1%	-0.5%	0.1%	-0.5%
Regional relative wage effect	0.0%	0.4%	0.0%	0.4%	0.0%	0.4%

Table 5 – Levels, indexes of rank concordance and variation coefficients of profit rates in Italian regions in selected years

Capital computation method	9010			7525			5050		
Years	**1996**	**2003**	**2008**	**1996**	**2003**	**2008**	**1996**	**2003**	**2008**
Abruzzi	0.0594	0.0568	0.0430	0.0588	0.0569	0.0437	0.0578	0.0571	0.0450
Basilicata	0.0525	0.0531	0.0500	0.0525	0.0523	0.0492	0.0526	0.0510	0.0479
Calabria	0.0511	0.0644	0.0505	0.0508	0.0629	0.0504	0.0503	0.0605	0.0501
Campania	0.0512	0.0568	0.0639	0.0515	0.0570	0.0618	0.0520	0.0574	0.0586
Emilia-Romagna	0.0645	0.0680	0.0613	0.0638	0.0675	0.0609	0.0627	0.0667	0.0602
Friuli-Venezia Giulia	0.0650	0.0663	0.0540	0.0647	0.0664	0.0542	0.0643	0.0665	0.0546
Lazio	0.0791	0.0828	0.0709	0.0797	0.0838	0.0712	0.0807	0.0854	0.0718
Liguria	0.0684	0.0768	0.0774	0.0680	0.0780	0.0766	0.0672	0.0801	0.0752
Lombardia	0.0778	0.0794	0.0650	0.0779	0.0791	0.0660	0.0781	0.0787	0.0677
Marche	0.0592	0.0640	0.0597	0.0593	0.0634	0.0577	0.0593	0.0624	0.0548
Molise	0.0582	0.0667	0.0523	0.0582	0.0660	0.0513	0.0582	0.0648	0.0496
Piemonte	0.0576	0.0647	0.0545	0.0581	0.0654	0.0546	0.0591	0.0665	0.0547
Puglia	0.0666	0.0679	0.0491	0.0650	0.0667	0.0490	0.0624	0.0648	0.0490
Sardegna	0.0506	0.0573	0.0525	0.0507	0.0572	0.0520	0.0510	0.0570	0.0513
Sicilia	0.0709	0.0707	0.0625	0.0707	0.0706	0.0618	0.0704	0.0704	0.0606
Toscana	0.0653	0.0711	0.0650	0.0645	0.0704	0.0633	0.0633	0.0692	0.0607
Trentino Alto-Adige	0.0625	0.0585	0.0498	0.0640	0.0605	0.0517	0.0666	0.0639	0.0551
Umbria	0.0602	0.0739	0.0439	0.0612	0.0731	0.0451	0.0628	0.0717	0.0471
Valle d'Aosta	0.0821	0.0853	0.0621	0.0812	0.0829	0.0622	0.0799	0.0793	0.0623
Veneto	0.0676	0.0661	0.0550	0.0679	0.0666	0.0553	0.0685	0.0674	0.0558
γ	-	0.9098	0.7549	-	0.9203	0.7850	-	0.9316	0.8504
Variation coefficient	0.1449	0.1314	0.1555	0.1435	0.1299	0.1500	0.1429	0.1311	0.1449
95% confidence interval	0.1102	0.0999	0.1183	0.1091	0.0988	0.1141	0.1086	0.0997	0.1102
	0.2117	0.1919	0.2272	0.2095	0.1897	0.2191	0.2087	0.1914	0.2116

Note: γ is the index of rank concordance.

Ranking analysis and unit root tests on regional profit rates

Table 5 shows the levels, the index of rank concordance and the variation coefficients of profit rates in Italian regions in 1996, 2003 and 2008 across different capital computation methods.

As it is possible to see, the degree of rank reshuffling among regions is limited and the variation coefficient never falls outside the confidence interval of 1996. This means that the distribution of regional profit rates does not substantially change over the period of observations. In fact, upon computing percentage changes between 2003 and 1996 and between 2008 and 2003 it is possible to see that, with few exceptions, profit rates all tend to grow in the first period and fall in the second one.

The same picture emerges considering the time series of regional profit rates over the entire period of observation as in Figure 8. Regions with either above or below average profit rates do not tend to change their relative positions. Evidence of lack of convergence also emerges from panel unit root tests as shown in Table 6. Shocks do not tend to die away for a considerable number of regional profit rate deviations from the cross-sectional mean. It is worth stressing that Southern regions - such as Abruzzo, Basilicata, Calabria, Campania and Sardegna – tend to have lower profit rates than those in either the Centre or the North of Italy – such as Lombardia, Liguria and Valle d'Aosta.

Figure 8 - Deviations of the regional profit rates from their cross-sectional means

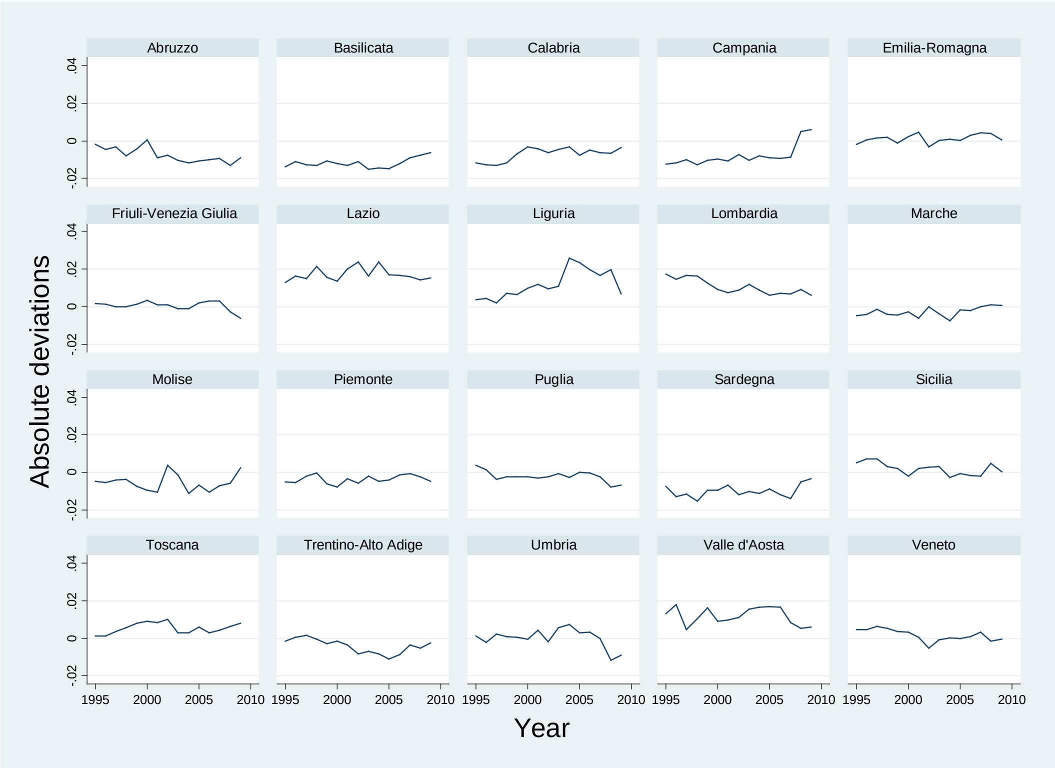


Table 6 – Panel unit root tests on profit rates

	Model without a time trend		Model with a time trend	
	Probability	**Observations**	**Probability**	**Observations**
Im, Pesaran and Shin W-stat	0.08	224	0.41	221
ADF - Fisher Chi-squared	0.16	224	0.51	221
PP - Fisher Chi-squared	0.24	224	0.69	224

Note: lags were automatically selected on the basis the Schwartz Information Criterion. We relied on the Newey-West bandwidth selection using a Bartlett kernel. For the PP - Fisher Chi squared test we dropped the regions Emilia-Romagna, Friuli-Venezia Giulia, Lazio, and Piemonte on the basis of individual tests

Regarding the Pesaran (2007) test, we adopt for regional profit rates a similar procedure to the one we used for the regional rates of surplus value. We exclude from the sample – similarly to the other panel unit root tests applied to regional profit rates - Piemonte, Emilia Romagna, Friuli Venezia Giulia and Lazio. P-values range from 0.10 to 1 without a trend in the deterministic portion of the model and from 0.07 to 1 upon including a time trend.

Table 7 – Share on total variance by components.

	var(μ_i)/ var(x_i)	***var(π_i)/ var(x_i)***	***var(α_i)/ var(x_i)***	***2cov(μ_i, π_i)/ var(x_i)***	***2cov(α_i, π_i)/ var(x_i)***	***2cov(α_i, μ_i)/ var(x_i)***
1996	0.07	1.02	0.08	-0.03	-0.18	0.03
2003	0.08	1.33	0.11	-0.05	-0.47	-0.01
2008	0.02	0.94	0.01	0.05	-0.03	0.01
MEAN	0.06	1.10	0.07	-0.01	-0.23	0.01

Note: x_i is the differential of the profit rate in region i with respect to its national value

Table 8 – Parameter estimates for the profitability differential components.

		Model μ			Model π			Model α		
		Coef.	p-value	Adj-R^2	Coef.	p-value	Adj-R^2	Coef.	p-value	Adj-R^2
1996	b	1.01	0.50	0.02	0.89	0.00	0.81	0.13	0.87	-0.05
	a	0.00	0.42		0.00	0.00		0.00	0.33	
2003	b	0.63	0.57	-0.02	0.81	0.00	0.86	-1.12	0.07	0.09
	a	0.00	0.33		0.00	0.01		0.00	0.09	
2008	b	2.20	0.01	0.07	1.01	0.00	0.96	-0.18	0.95	-0.06
	a	0.00	0.22		0.00	0.25		0.00	0.12	

Shift share analysis

The results of our shift-share analysis are very stable across time (Table 7)[5]. Region-wide profitability effects account for the bulk of the variance of regional profitability differentials, though being somewhat offset by their negative correlation with allocative factors. In other terms, the industry mix has a minor role once *holding regional profitability effects constant*. Regions with high profitability tend to have this feature in all industries. However, this tendency is mitigated by the fact that regions with high profitability are somewhat less efficient in allocating resources across different sectors. These results are confirmed by estimating equations (4), (5) and (6). Table 8 shows that the highest R^2 can be obtained for equation (5). In addition, only the point estimates of b_π are positive and significant, while those of b_α and b_μ are not significant

Contextualization for policy and theoretical implications

To infer policy implications from our work, it is necessary to gauge it within the existing literatures on both regional profit rates and the Italian economic conditions. This is so because we focus on economic indicators and analytic tools that stress the regional dimension of aggregate profitability dynamics, as seldom done in the past. This is original and it can add to a number of further aspects previous contributions stressed, so that policies can be based on a broader picture able to fully appreciate local complexities.

Our results are consistent with the finding by Rigby (1991a) about the relevance and time persistence of the regional component of aggregate profitability. More in general, we also find that regional specificities can also influence developments in the capital-labor ratio and in the organic composition of capital. Therefore, the evidence we have produced supports the policy advise contained in Rigby (1991a). Promoting the development of advanced industries in

[5] The results set out in Tables 7 and 8 rely on a 7525 approach to computing capital stocks. Once shifting to either a 5050 or a 9010 approach, results would hardly change.

backward regions might not be conducive to higher profitability. The same applies to regions with lower capital intensity, as these might not be able to have a greater impact on employment than those of high capital intensity once this magnitude is driven more by regional than sectoral trends. Development strategies should, instead, focus on geographic specificities, encouraging those conducive to higher profitability and to a more inclusive economy and correcting those that hamper the achievement of these targets.

Our results can also be interpreted in the light of the distinction by Glassman (2007) between two different development strategies, a “high-road” and a “low-road spatial fix”. The former is characterized by capital shifting from production to urban infrastructure, technology and “human capital”. The latter, instead, is marked by investments in sites with lower production costs and in (export) activities with low value added and low wages. The “low-road” can have two variants, according to whether capital is relocated either within its country of origin or abroad. Glassman (2007) argues that the “high-road fix” tends to concentrate economic activity in space and to reaffirm geographic economic divides. On the other hand, the “low-road fix” is more diffusive when it takes place within a country, but not so at the international level as foreign direct investments tend to concentrate in specific areas to exploit agglomeration economies (Glassman, 2007, 364-365).

The Italian case can be better assessed within an international context. Over the last three decades, many developed countries have adopted economic policies aiming at curtailing wages resulting in a fall in the wage share of income (see, for instance, Horn et al., 2009; Hein, 2011).

The macroeconomic consequences of this development have been far reaching. Some countries, like the US, the UK, Greece, Ireland and Spain, avoided a general glut thanks to consumption booms sustained by a ballooning debt in either the private or public sector. In other countries -

such as Austria, Belgium, Germany, Japan and China - neo-mercantilist policies were adopted, based on promoting exports towards debt prone countries. Note that these countries could specialize either in high value added export activities, such as Germany, or in low value added ones, such as China.

Italy tried, without success, to follow the latter path, namely a “low-road fix” in Glassman’s terms. Simonazzi et al. (2009) and Simonazzi (2012) document how business restructuring met only too late a series of labor market reforms that curtailed labor costs. As a result of this delay, of scant innovation and of weak specialization Italy lost competitiveness, notwithstanding a sizeable redistribution of income from labor to capital (Vaona, 2011, SVIMEZ, 2014).

Further evidence of the above development strategy is that, by international standards, Italy customarily ranks very low in indicators of innovation performance and that its considerable innovation gap vis à vis other developed countries remains to be filled in order to recover competitiveness (Bugamelli et al., 2012, SVIMEZ, 2014). In addition Italy ranks very low in education statistics and education wage premium (OECD, 2005, 2006); not to mention the fact that the latter variable experienced a declining trend in the private sector and a muted one in the public sector in recent years (Naticchioni et al., 2010).

This development strategy was not diffusive for a number of reasons. In the first place, firms had a number of options to survive international competitiveness, including innovation, off-shoring and going into the black market. Amendolagine et al. (2014) show that offshoring firms tend to be larger, more innovative, and located in provinces with a lower share of the black economy. Firms in provinces with a larger share of the black economy are less likely to internationalize. In addition, firms entering the black economy may have negative spillover effects ending with lowering productivity and propensity to innovate. Of course these are mechanisms that tend to favor the persistence of profitability differentials, instead of their convergence.

To these problems one should add a sharp reduction of government transfers to lagging regions, criminality, corruption, high taxation, inefficient bureaucracy, and a lack of rule of law due to inefficient courts. Note that even Southern firms were off-shoring activities to Eastern Europe (SVIMEZ, 2000-2009).

In the end, a successful development strategy for Italy has an international part. The partition between "neo-mercantilist" and "debt-led" economies has not proved to be sustainable. Increasing inequality and income redistribution from labor to both capital and rentiers should be reversed to spur wage-led growth, within a global – or at least European - Keynesian New Deal. Hein and Truger (2010) and Hein (2011) set out detailed policy prescriptions in this direction. Tescari and Vaona (2014) highlighted the need for further measures to tackle the Italian backwardness regarding gender aspects. The present work stresses the need for a regional policy able to overcome secular regional divides, by exploiting the geographic position of Southern Italy in the Mediterranean sea, its cultural heritage both in big cities and internal areas and by supporting innovation in large and medium firms (SVIMEZ, 2014).

As a final note, our study has theoretical implications too. Smith (2008) highlights the dialectic between, on one side, the tendency of spatial equalization of profit rates - due to capital moving from one region to the other and due to rents rising where natural advantages first assure higher profitability – and, on the other, technological uneven development, that tends to perpetuate profitability spatial differentials. From our analysis, there emerges that regional profitability differentials tend to persist for a long time, without quickly dying away.

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Appendix

Table A1 - Regional decomposition of the capital-labour ratio

Capital computation method	5050		7525		9010	
Time periods	96-03	03-07	96-03	03-07	96-03	03-07
Change in capital-labour ratio	8.1%	8.0%	8.1%	8.0%	8.1%	8.0%
Change in regional capital-labour ratios	8.1%	8.0%	8.1%	8.0%	8.1%	8.0%
Employment shift	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Note: 5050, 7525 and 9010 denote regional capital computation methods, varying according to the weights given to the regional shares of gross fixed investments and of persons engaged in production. For more details see the Section on "Data sources, definitions and description".

Table A2 - Regional decomposition of the organic composition ratio

Capital computation method	5050		7525		9010	
Time periods	96-03	03-07	96-03	03-07	96-03	03-07
Change in organic composition	10.4%	7.3%	10.4%	7.3%	10.4%	7.3%
Change in regional organic compositions	10.4%	7.3%	10.4%	7.3%	10.4%	7.3%
Wage bill shift	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Note: 5050, 7525 and 9010 denote regional capital computation methods, varying according to the weights given to the regional shares of gross fixed investments and of persons engaged in production. For more details see the Section on "Data sources, definitions and description".

Table A3 - Regional decompositions of the net profit rate

Capital computation method	5050		7525		9010	
Time periods	96-03	03-07	96-03	03-07	96-03	03-07
Actual change in the profit rate	4.9%	-8.3%	4.9%	-8.3%	4.9%	-8.3%
Change in net profits over total wages	15.0%	-1.5%	15.0%	-1.5%	15.0%	-1.5%
Regional productivity effect	6.0%	8.8%	6.0%	8.8%	6.0%	8.8%
Regional real wage effect	9.0%	-10.4%	9.0%	-10.4%	9.0%	-10.4%
Wage bill shift	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%
Employment shift	0.0%	0.6%	0.0%	0.6%	0.0%	0.6%
Regional relative wage effect	0.0%	-0.5%	0.0%	-0.5%	0.0%	-0.5%
Change in organic composition	-10.1%	-6.8%	-10.1%	-6.8%	-10.1%	-6.8%
Change in regional organic compositions	-10.2%	-6.8%	-10.2%	-6.8%	-10.2%	-6.8%
Wage bill shift	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%
Employment shift	0.1%	-0.4%	0.1%	-0.4%	0.1%	-0.4%
Regional relative wage effect	0.0%	0.4%	0.0%	0.4%	0.0%	0.4%

Note: 5050, 7525 and 9010 denote regional capital computation methods, varying according to the weights given to the regional shares of gross fixed investments and of persons engaged in production. For more details see the Section on "Data sources, definitions and description".

Table A4 – Levels, indexes of rank concordance and variation coefficients of profit rates in Italian regions in selected years

Capital computation method	9010			7525			5050		
Years	**1996**	**2003**	**2007**	**1996**	**2003**	**2007**	**1996**	**2003**	**2007**
Abruzzi	0.0594	0.0568	0.0523	0.0588	0.0569	0.0521	0.0578	0.0571	0.0517
Basilicata	0.0525	0.0531	0.0539	0.0525	0.0523	0.0525	0.0526	0.0510	0.0502
Calabria	0.0511	0.0644	0.0562	0.0508	0.0629	0.0552	0.0503	0.0605	0.0536
Campania	0.0512	0.0568	0.0524	0.0515	0.0570	0.0529	0.0520	0.0574	0.0536
Emilia-Romagna	0.0645	0.0680	0.0661	0.0638	0.0675	0.0656	0.0627	0.0667	0.0648
Friuli-Venezia Giulia	0.0650	0.0663	0.0649	0.0647	0.0664	0.0646	0.0643	0.0665	0.0641
Lazio	0.0791	0.0828	0.0769	0.0797	0.0838	0.0774	0.0807	0.0854	0.0782
Liguria	0.0684	0.0768	0.0788	0.0680	0.0780	0.0780	0.0672	0.0801	0.0767
Lombardia	0.0778	0.0794	0.0676	0.0779	0.0791	0.0683	0.0781	0.0787	0.0695
Marche	0.0592	0.0640	0.0622	0.0593	0.0634	0.0615	0.0593	0.0624	0.0605
Molise	0.0582	0.0667	0.0540	0.0582	0.0660	0.0544	0.0582	0.0648	0.0549
Piemonte	0.0576	0.0647	0.0614	0.0581	0.0654	0.0610	0.0591	0.0665	0.0604
Puglia	0.0666	0.0679	0.0609	0.0650	0.0667	0.0593	0.0624	0.0648	0.0570
Sardegna	0.0506	0.0573	0.0471	0.0507	0.0572	0.0475	0.0510	0.0570	0.0482
Sicilia	0.0709	0.0707	0.0595	0.0707	0.0706	0.0597	0.0704	0.0704	0.0600
Toscana	0.0653	0.0711	0.0665	0.0645	0.0704	0.0657	0.0633	0.0692	0.0645
Trentino Alto-Adige	0.0625	0.0585	0.0562	0.0640	0.0605	0.0581	0.0666	0.0639	0.0615
Umbria	0.0602	0.0739	0.0625	0.0612	0.0731	0.0614	0.0628	0.0717	0.0597
Valle d'Aosta	0.0821	0.0853	0.0703	0.0812	0.0829	0.0699	0.0799	0.0793	0.0691
Veneto	0.0676	0.0661	0.0646	0.0679	0.0666	0.0647	0.0685	0.0674	0.0648
γ	-	0.9098	0.8977	-	0.9203	0.8970	-	0.9316	0.9008
Variation coefficient	0.1449	0.1314	0.1324	0.1435	0.1299	0.1318	0.1429	0.1311	0.1335
95% confidence interval	0.1102	0.0999	0.1007	0.1091	0.0988	0.1002	0.1086	0.0997	0.1015
	0.2117	0.1919	0.1934	0.2095	0.1897	0.1925	0.2087	0.1914	0.1949

Table A5 – Share on total variance by components.

	var(μ_i)/ var(x_i)	*var(π_i)/ var(x_i)*	*var(α_i)/ var(x_i)*	*2cov(μ_i, π_i)/ var(x_i)*	*2cov(α_i, π_i)/ var(x_i)*	*2cov(α_i, μ_i)/ var(x_i)*
1996	0.07	1.02	0.08	-0.03	-0.18	0.03
2003	0.08	1.33	0.11	-0.05	-0.47	-0.01
2007	0.03	1.25	0.09	-0.05	-0.33	0.02
MEAN	0.06	1.20	0.09	-0.04	-0.33	0.01

Note: we adopted the 7525 capital computation approach. Using other computation approaches would produce very similar results.

Table A6 – Parameter estimates for the profitability differential components.

		Model μ			Model π			Model α		
		Coef.	p-value	Adj-R^2	Coef.	p-value	Adj-R^2	Coef.	p-value	Adj-R^2
1996	b	1.01	0.50	0.02	0.89	0.00	0.81	0.13	0.87	-0.05
	a	0.00	0.42		0.00	0.00		0.00	0.33	
2003	b	0.63	0.57	-0.02	0.81	0.00	0.86	-1.12	0.07	0.09
	a	0.00	0.33		0.00	0.01		0.00	0.09	
2007	b	0.45	0.23	-0.05	0.85	0.00	0.89	-0.79	0.28	0.00
	a	0.00	0.68		0.00	0.08		0.00	0.19	

Note: we adopted the 7525 capital computation approach. Using other computation approaches would produce very similar results.