ECONOMIA ITALIANA

Fondata da Mario Arcelli

La produttività delle imprese italiane: andamento, determinanti e proposte per un rilancio

2020/2

LUISS
CASMEF Centro Arcelli per gli Studi Monetari e Finanziari

UNIVERSITÀ CATTOLICA del Sacro Cuore
CESPEM
Centro Studi di Politica economica e monetaria "Mario Arcelli"

Economia Italiana

Fondata da Mario Arcelli

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numero 2/2020
Pubblicazione quadrimestrale
Roma

ECONOMIA ITALIANA
Rivista quadrimestrale fondata nel 1979 da Mario Arcelli

(Pubblicità inferiore al 70%)

Autorizzazione Tribunale di Roma n. 43/1991

ISSN: 0392-775X

Finito di stampare nel mese di settembre 2020 presso Press Up, Roma.

www.economiaitaliana.org

Editrice Minerva Bancaria srl

DIREZIONE E REDAZIONE Largo Luigi Antonelli, 27 – 00145 Roma
redazione@economiaitaliana.org

AMMINISTRAZIONE EDITRICE MINERVA BANCARIA S.r.l.
presso P&B Gestioni Srl, Viale di Villa Massimo, 29 - 00161 - Roma -
amministrazione@editriceminervabancaria.it

Segui Editrice Minerva Bancaria su:

Sommario

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CONTRIBUTI

RUBRICHE

RECENSIONI

Productivity dynamics over the last decade. Evidence from the universe of Italian firms

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Abstract

In this paper we exploit a unique dataset covering the universe of Italian firms with at least one paid employee to investigate the mechanisms underlying aggregate labor productivity growth in Italy between 2007 and 2016. Using the dynamic decomposition proposed by Melitz and Polanec (2015), we distinguish the contribution of the within component, of allocative efficiency, of firm demography. We find that allocative efficiency has given a positive contribution throughout the whole period thanks to size increases by the most productive firms and size decreases by the least productive ones. This mechanism has been reinforced by the cleansing effect occurred through the exit process. The contribution of average productivity growth of incumbent

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The views expressed herein are those of the authors and do not involve the responsibility of the Bank of Italy.

firms has always been negative, due to the disproportionate weight of micro and small firms that experienced an efficiency loss.

Sintesi - La dinamica della produttività nell'ultimo decennio. Evidenze dall'universo delle imprese italiane.

Questo lavoro utilizza i dati relativi all'universo delle imprese italiane con almeno un dipendente retribuito per studiare i meccanismi alla base della crescita aggregata della produttività del lavoro in Italia tra il 2007 e il 2016. Usando la scomposizione dinamica proposta da Melitz e Polanec (2015), il lavoro distingue il contributo di 3 diversi fattori: la produttività media di impresa, l'efficienza allocativa, la demografia di impresa. I risultati indicano che l'efficienza allocativa ha dato un contributo positivo in tutto il periodo di analisi grazie alla crescita dimensionale delle imprese più efficienti e alla riduzione di quelle meno efficienti. Questo meccanismo è stato rafforzato dall'effetto di "cleansing" associato al processo di uscita dal mercato delle imprese con più bassi livelli di produttività. Il contributo della crescita della produttività media delle imprese è sempre stato negativo, a causa del peso sproporzionato di quelle micro e piccole che hanno registrato cali di produttività.

JEL Classification: L25; O47.

Parole chiave: *Produttività; Crescita; Efficienza Allocativa; Italia.*

Keywords: Productivity; Growth; Allocative Efficiency; Italy.

1. Introduction

The increased availability of granular data has spurred a wealth of theoretical and empirical literature documenting large and persistent productivity differences across countries and firms. As a result, our understanding of aggregate productivity dynamics has largely improved, highlighting in particular two main mechanisms of adjustment. The first one is related to the technological and managerial decisions made by entrepreneurs (Aghion et al., 2009; Bloom and Van Reenen, 2010). It therefore points to those firm characteristics and external enablers (as, for example, the functioning of the capital and labor markets) that influence a firm's most relevant strategic decisions, such as investment in tangible and intangible capital, product, process and organizational innovation, hiring and firing of workers. The second one reflects the ability of an economy to allocate resources towards the most productive units (Hsieh and Klenow, 2009; Olley and Pakes, 1996; Melitz and Polanec, 2015). Intuitively, the larger the share of inputs employed in the more productive firms, the higher the aggregate productivity.

To understand the driving forces of aggregate productivity growth, we follow the approach proposed by Melitz and Polanec (2015) who extend to a dynamic context the methodology proposed in the seminal paper by Olley and Pakes (1996). This methodology amounts to decompose aggregate labor productivity growth in three components. The first is the productivity growth of the average incumbent firm, the so-called *within component*, which captures exactly the first mechanism outlined above. The second component is *allocative efficiency*, which is proxied by the covariance between size and productivity at the firm level and reflects the efficiency of the reallocation mechanism among existing firms. This is also known as the *between component* and is positive when employment dynamics is such that the employment share of the most productive firms grows in relative terms. The third component is linked to the *selection process in and out of the market*. It is a pure demographic component aimed at measuring how much the entry and the exit of firms

into the market contribute to aggregate productivity growth. Typically, low productivity firms are forced out of the market, mechanically supporting aggregate growth. New businesses contribute negatively on impact because their initial productivity is lower than that of the average incumbent firm but then it typically grows rapidly, conditional on survival, thus adding to aggregate dynamics.

Given this toolkit, in this paper we focus on labor productivity dynamics in Italy, which has been quite disappointing with respect to its main euro area peer countries. We take advantage of a unique dataset covering the universe of Italian firms with at least one paid employee operating in the private business non-agriculture and non-financial sector over the period 2007–2016.

While largely available for other countries (among others, U.S., France and Belgium), data on the universe of firms is relatively new for Italy. The dataset, which is the outcome of a collaboration between the Italian National Statistical Agency (ISTAT) and the Bank of Italy (BoI), combines several information from statistical, administrative and fiscal sources. It contains information on firms' location, legal form, date of incorporation, industry classification, number of employees, turnover and value added (see Abbate et al. (2017) for a detailed description of the dataset).

Our results show that between 2007 and 2016, both in manufacturing and services, the within component has contributed negatively to aggregate productivity dynamics, while reallocation has supported it thanks to the higher relative employment growth of the most efficient firms. The net contribution of firm demography has always been positive: the exit of less productive firms has more than compensated for the entry of newly born firms, whose productivity level at entry turns out to be on average lower than that of the incumbent firms, especially in manufacturing. In other words, the productivity levels of new entrants turn out to be higher than those of exiting firms, thus supporting aggregate productivity growth through a positive selection mechanism.

Then we uncover some interesting stylized facts on the mechanics under-

lying those three terms.

First, a positive reallocation term implies that employment growth is uneven along the productivity distribution. In particular, we find that less productive firms are downsizing in all the three sub-periods, while firms with productivity above the 60th percentile are expanding: this is exactly the essence of reallocation. Unfortunately, this adjustment has been accompanied by a rise in unemployment.

Second, the effect of net entry is always positive. Entry and exit rates are negatively correlated with the ranking of the productivity distribution, but the curve is steeper for exit rates: since 2010 the entry rates of firms belonging to the bottom decile of the productivity distribution have been around 40 percent, against exit rates in the range between 45 and 55 percent. Before 2010, instead, the contribution of net entry has been negligible – even negative in the service sector – due to very similar entry and exit rates.

Third, productivity growth of incumbent firms is, on average, negative. Smaller firms are the ones driving this result: the average productivity growth for firms up to 9 employees is always negative and since the heavy weight of this size class, average productivity growth turns out negative. Firms in the 50+ class size increase their efficiency, except for the 2010-2013 period during which productivity has shrunk in any given class size.

These results provide clear evidence that the Italian economy has undertaken some structural adjustments, eventually reinforced during the crisis that has led to the exit of unproductive firms (cleansing effect) and favored the reallocation of the workforce towards the best performing ones. Taken as a whole, our results indicate that the poor productivity performance of the Italian economy has been heavily driven by the decline in average productivity, while the reallocation of inputs and the business demography has had a positive effect.

Two warnings on these positive developments are needed. On one side, they could be mostly driven by the long recession rather than by the structural reforms implemented over the years. On the other, it is very likely that these

adjustments may still be too small to trigger the needed structural changes in the Italian economy. Indeed, Andrews and Cingano (2014) show how the degree of allocative efficiency in 2005 was in Italy much lower than the OECD average.

The evidence provided in this paper is in line with Linarello and Petrella (2017) and Bugamelli, Lotti et al. (2018). There are, however, other contributions in the economic literature providing a less optimistic view on the dynamics of allocative efficiency in Southern Europe and in Italy.

Some recent studies have identified misallocation as one of the possible causes behind the productivity slowdown experienced by many advanced economies (Cette et al., 2016). Gopinath et al. (2015) show that the decline in real interest rates, observed in Southern Europe, was associated with capital inflows increasingly misallocated towards firms with high net worth, though not necessarily the most productive ones. García Santana et al. (2016) document, for the case of Spain, that the increase in misallocation has been more severe in those industries in which the influence of the public sector is larger (e.g. through licensing or regulations).

Several works have analyzed the role of allocative efficiency in Italy. Gamberoni et al. (2016) — using data on corporations with more than 20 employees — show an increase in allocative efficiency after the global financial crisis in Italy, as well as in other European countries. Calligaris et al. (2016), using data on incorporated firms, document for the Italian manufacturing sector an increase in the allocative efficiency starting in 2008. With the same data, Lenzu and Manaresi (2019), focusing on frictions in the labor and credit markets, find that an optimal reallocation of resources may increase aggregate output by 6-8 percent.

There are some drawbacks in the way we measure productivity and allocative efficiency. First, our measure of productivity (value added per worker) might not be informative about the underling dynamics of technical efficiency since it could instead reflect changes in prices and markups. Second, despite the dynamic OP covariance has several attractive features as discussed

above, it can be negatively correlated with model-based measures, where the dynamics of aggregate productivity is typically captured by changes in output that are not explained by changes in inputs expenditure (in the spirit of Solow (1957); see Petrin and Levinsohn (2012) for a detailed discussion). Following the pioneering contribution of Hsieh and Klenow (2009), several studies used the dispersion in revenue productivity as a proxy for misallocation. However, Bartelsman et al. (2013) argued, both theoretically and empirically, that the within industry covariance between size and productivity (the OP covariance) is a robust measure to assess misallocation, as it does not suffer from specification problems and is quite intuitive. In a more recent contribution, Haltiwanger et al. (2018) show that the condition in the Hsieh and Klenow model (HK) that maps from observed production behaviors to allocative distortions holds in a single theoretical case, with strict assumptions on both the demand and supply side. On the demand side, every producer must face an isoelastic residual demand curve, while on the supply side, producers must have marginal cost curves that are invariant to quantity and are negative unit elastic as regards to total factor productivity (measured with respect to output quantity, i.e., TFPQ).[1]

The paper is structured as follows. In the next section, we describe the dataset and provide some preliminary evidence. Section 3 is devoted to the methodology proposed by Olley and Pakes (1996) and Melitz and Polanec (2015). The results are presented in section 4. The last section concludes.

2. Data

Our firm-level dataset covers all active firms between 2007 to 2016, i.e. firms whose production processes were active for at least 6 months in a given

1 The authors also show that applying the HK methodology when these strict hypotheses do not hold implies that the distortions recovered from the data may not reflect misallocation.

business year, with at least 1 paid employee. For the purpose of our analysis, we apply the productivity decomposition to three sub-periods: 2007-2010 covering the international financial crisis, 2010-2013 dominated by the sovereign debt crisis and 2013-2016 with the subsequent recovery. The dataset combines several information from the business registry and statistical, administrative and fiscal sources and relies heavily on the FRAME-SBS dataset, which is an integrated firm-level census, built over the last few years by the Italian National Statistical Institute (ISTAT). It contains information on firm location, legal form, incorporation date, industry classification (Nace rev. 2), number of people employed, turnover and value added[2].

We exclude from our analysis the following sectors: agriculture, mining and quarrying (Nace divisions 1-9); regulated sectors such as gas, energy and waste (Nace divisions 35-39), whose productivity dynamics tends to reflect mostly changes in prices; the financial sector (Nace divisions 64-66) for which we do not dispose of structural business statistics; those non-business service sector (Nace divisions 84-88 and 90-99) where the presence of the public sector may bias the productivity measure. We also exclude other small sectors whose aggregate productivity dynamics based on our firm-level data diverges significantly from the National Account statistics.[3]

At the aggregate level, our firm-level dataset closely mimics National Accounts data. The correlation of the growth rates of value added between the two data sources is 0.96. In the manufacturing sector, the goodness of fit for both value added and labor productivity dynamics is excellent with a correlation equal to 0.98. Some differences emerge in the business services sector (where the correlation is 0.92), largely due to the fact that National Account data include estimates of underground economy and illegal workforce, that are typically more important in such activities than in manufacturing. According to the latest official figures, the illegal economy accounts for 7 per

2 See also Abbate et al. (2017) for a detailed description of the dataset.

3 These sectors are: Manufacture of coke and refined petroleum products (Nace divisions 19), Construction (41-43), Postal and courier activities (53), Telecommunication (61), Real estate activities (68).

cent of people employed and 6 per cent of value added in manufacturing, against 16 per cent and more than 20 per cent in business services.

In our final firm-level dataset the number of firms in the manufacturing sector has declined almost every year; in 2016 such number was lower than in 2007 by 53,000 units. In the business services, the number of firms at the end of period was higher than at the beginning (by 130,000 unit) even if the evolution over time did not exhibit a clear increasing pattern. Average firm size — measured by the number of people employed — increased in the manufacturing sector (15.0 in 2016 versus 14.7 in 2007), while it slightly decreased in the business service sector (from 8.2 in 2007 to 8.0 in 2016).

Aggregate labor productivity — measured as real value added per worker —declined during the global financial (2007–09) and the sovereign debt crisis (2012–13), and recovered subsequently. The aggregate dynamics reflects heterogeneous patterns across macro sectors. In particular, in the manufacturing sector it increased by 1.6 percent per year between 2007 and 2016, while in the services it almost stagnated stagnant (0.3 percent per year). The increase of labor productivity in the manufacturing sector was largely due to the fall of employment, while value added in 2016 was back at its pre-crisis level, despite large swings during the decade. In the business services, the weak dynamics of aggregate labor productivity reflects increases of value added and the number of people employed by about the same magnitude (1.7 and 1.3 percent per year; respectively).

3. Productivity decompositions

In this section, we describe the productivity decomposition that we use to disentangle the mechanics of Italy's aggregate labor productivity growth over the period 2007-16.

Aggregate labor productivity (Φ) in year t corresponds to the weighted

average of individual firms' productivity (ϕ_i), where weights (ω_i) are given by each firm's share on total employees. In formal terms, if we take a snapshot at time t, we have the following:

$$\Phi_t = \sum_{i=1}^{n} \phi_{it}\omega_{it} \tag{1}$$

After rearranging, expression (1) can be written as the sum of the unweighted average firm productivity ($\overline{\phi}$) and the covariance between firm productivity and the share of employees (i.e., firm size):

$$\Phi_t = \overline{\phi} + \mathrm{cov}(\phi_{it}, \omega_{it}) \tag{2}$$

The covariance term $\mathrm{cov}(\phi_{it}, \omega_{it})$ is often referred to as static "Olley and Pakes (*OP*) covariance" and it captures efficiency in the allocative mechanism. In words, allocative efficiency is high when firms that are more productive are also larger.

The most recent developments in the economic literature devote an increasing attention to allocative efficiency, since it is influenced by the institutional and regulatory features that may benefit or distort the functioning of the markets. As an example, Olley and Pakes (1996) document that, in the Eighties, the aggregate productivity of the US telecommunications industry grew considerably after an episode of market liberalization, and that this increase was largely due to an improvement of allocative efficiency. In another study, Bartelsman et al. (2013) quantify the contribution of allocative efficiency by showing that US aggregate labor productivity is roughly 50 per cent higher with respect to a hypothetical scenario where workers are randomly allocated across firms.

Moving to a dynamic representation of equation (2) is quite useful to gauge insights on some different factors through which aggregate growth may change over time. In this paper, we distinguish the relative contribution of three groups (g) of firms: the surviving firms – also called the incumbents –

the entrants and the exiting firms. More precisely, the entrants (E) are those firms that are active in year t but not in year $t-1$, i.e. they enter in year t; exiting firms (X) are, at the opposite, active in $t-1$ but no longer in t which turns out to be the year of exit; incumbent firms (S) are active on the market in both years. [4]

Melitz and Polanec (2015) recently proposed a dynamic version of equation (2) which is known as the *dynamic OP decomposition*. Considering two consecutive years, it is possible to express the aggregate productivity of the first period (Φ_1) as the weighted average of the productivity of the incumbent firm and that of firms that will exit the market in the next year. Analogously, the aggregate productivity in the second period (Φ_2) can be expressed as the weighted average of the productivity of the incumbent firms and that of the firms that just entered the market. In formulas,

$$\Phi_1 = \Phi_{S1}\omega_{S1} + \Phi_{X1}\omega_{X1} \tag{3}$$

$$\Phi_2 = \Phi_{S2}\omega_{S2} + \Phi_{E2}\omega_{E2} \tag{4}$$

The difference between Φ_2 and Φ_1 gives the change in aggregate productivity:

$$\Phi_2 - \Phi_1 = (\Phi_{S2} - \Phi_{S1}) + \omega_{E2}(\Phi_{E2} - \Phi_{S2}) + \omega_{X1}(\Phi_{S1} - \Phi_{X1}) \tag{5}$$

The first term ($\Phi_{S2} - \Phi_{S1}$ represents the change in the average productivity of the incumbent firms, ie those active in both subsequent years. The second term ($\Phi_{E2} - \Phi_{S2}$) is the contribution of entrants, which is positive (negative)

4 In all the analyses presented below, firm demographics has been purged from false entry and false exits, in the spirit of Geurts and Van Biesebroeck (2014). To identify false entry and exits, we use an administrative register of events that collects information on corporate operations. Consequently, we are able to clean our data from operations such as mergers and spinoffs.

if their productivity is higher (lower) than the one of the incumbents and larger, in absolute value, as higher is their weight in terms of employment (a sort of entry rate). The third term $(\Phi_{S1} - \Phi_{X1})$ is the contribution of exiting firms, which is positive (negative) if their productivity is lower (higher) than the one of the incumbents and larger in absolute value as higher their weight in terms of employment (a sort of exit rate).

Following the spirit of the static *OP* decomposition described in equation (2), the productivity growth of incumbent firms in the two periods can be written as $\Phi_{S1} = \overline{\phi}_{S1} + \mathrm{cov}(\phi_{S1}; \omega_{S1})$ and, $\Phi_{S2} = \overline{\phi}_{S2} + \mathrm{cov}(\phi_{S2}; \omega_{S2})$ respectively. This further decomposition allows us to re-write the term $(\Phi_{S2} - \Phi_{S1})$ as the change of the incumbents' simple (unweighted) average productivity $(\triangle\phi = \overline{\phi}_{S2} - \overline{\phi}_{S1})$ and that of the covariance between incumbents' productivity and the share of employees $(\triangle\mathrm{cov}(\phi_S; \omega_S) = \mathrm{cov}(\phi_{S2}; \omega_{S2}) - \mathrm{cov}(\phi_{S1}; \omega_{S1}))$, capturing the efficiency of the reallocation process among incumbents.

The final equation comprising all the terms just described is the following:

$$\Phi_2 - \Phi_1 = \triangle\overline{\phi} + \triangle\mathrm{cov}(\phi_S; \omega_S) + \omega_{E2}(\Phi_{E2} - \Phi_{S2}) + \omega_{X1}(\Phi_{S1} - \Phi_{X1}) \quad (6)$$

For the sake of simplicity, we have just described the baseline Melitz and Polanec (2015) decomposition, which defines aggregate productivity as a weighted average of individual firms' *log* productivities. While making the decomposition easier to understand, this approach has two drawbacks. First, the growth of aggregate productivity measured in logs does not correspond to that in levels, which is the one that should be preferred when evaluating welfare implications (Petrin and Levinsohn, 2012). Second, in the baseline decomposition, the covariance term would not be invariant to changes in average productivity; in other words, a uniform increase in productivity for all firms would not affect only the within component as it should be, but also the covariance term. Melitz and Polanec (2015, p. 374) explain how these issues

can be addressed by showing the decomposition applied to data in levels and by defining a scale-independent covariance term.

All the results presented in this paper are based on the decomposition in levels so that we can overcome the two problems above.

4. Results

In Table 1 we show the outcome of the dynamic decomposition of equation (6). As said, it allows us to infer a complete picture of the mechanics of aggregate productivity growth by distinguishing the performance of the average firm from the reallocation process. The latter is split into the "pure" reallocation of market share among incumbent firms and the firm demography related to the entry of new firms and the exit of others.

In the Table we show the decomposition for the total economy (upper part), for the manufacturing sector (central part) and for the bundle of private non-financial services (lower part). We distinguish the period including the financial crises (2007-10), the subsequent one with the sovereign crisis (2010-13) and the recovery (2013-16).

The first column contains the contribution of the average incumbent firm to the dynamics of aggregate productivity (the within component). It must be acknowledged that it reflects not only true changes in technical efficiency at the firm level but also fluctuations in the demand faced by firms, that may influence —especially in the short run— the pricing strategies of firms. This is inevitable when price variations cannot be perfectly controlled and netted out at the firm-level; indeed, as in many other studies, the best we can do to move from a value-based measure of productivity to a quantity-based is to use (2 digit) sectoral price deflators. More precisely, this implies that any heterogeneity in price dynamics within such 2-digit classification is going to appear as differential productivity dynamics across firms.

The second column shows the contribution of the reallocation among the

surviving firms; in other words, it measures how much of the aggregate productivity dynamics is due to the movement of employment among firms with different productivity levels. Thus, it is positive if, on average, less efficient firms get smaller and/or more efficient ones larger.

Net entry (third column) comprises of two factors. On one side, the contribution of entrant firms that depends on the entry rate and the difference between the productivity (level) of new firms at entry with respect to that of incumbent firms: since the latter is typically negative, gross entry subtracts to aggregate productivity growth. Such productivity gap of entrants may derive from their smaller output or from their tendency to compress markups, setting up more aggressive price strategies upon entry to rapidly acquire market shares (Foster et al., 2016). In both cases, measured labor productivity is reduced. On the other side the contribution of net entry tends to benefit from the exit dynamics that reflects the selection mechanisms forcing the exit from the market of the least productive firms. Again, the contribution of gross exit is positive if, as expected, exiting firms are less productive than incumbents.

The first striking evidence emerging from the Table is that in all sub-periods and in both manufacturing and private services, the contribution of average productivity has been always negative in the decade under analysis. To clarify, this means that the *average* incumbent firm has been losing efficiency over time, to say that this negative development is quite diffused in the Italian productive system. Looking more closely to the figures, we see that such negative contribution has been weakening over time.

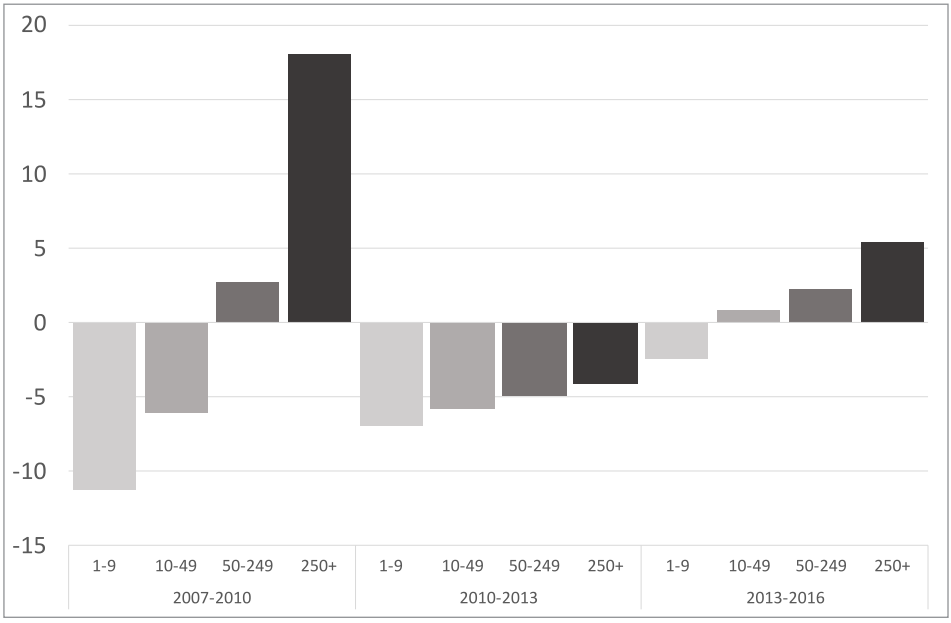
Table 1 **Melitz-Polanec's decomposition of aggregate productivity growth**

	Average productivity	Reallocation	Net entry
		(a) Total economy	
2007/2010	-10.4	10.0	0.3
2010/2013	-7.7	5.4	1.7
2013/2016	-1.9	4.2	3.1
		(b) Manufacturing	
2007/2010	-11.0	8.4	1.8
2010/2013	-4.1	5.0	2.6
2013/2016	-2.7	6.6	3.3
		(c) Services	
2007/2010	-9.9	11.1	-0.8
2010/2013	-9.9	5.6	1.2
2013/2016	-1.5	2.9	2.9

To dig deeper into the heterogeneous dynamics of the within component, in Figure 2 we plot the unweighted average productivity growth for incumbent firms by firm size, measured by the number of person employed. Quite evidently, average productivity growth differs significantly by firm size and period of analysis. During the financial crises (2007-10) average productivity decreased among small and medium firms (up to 49 employees) while it increased among larger firms (more than 50 employees). This divergent dynamics might reflect the ability of larger firms to better adjust the labor input during crisis periods and to recover quickly into the export market. During the sovereign debt crisis, which is included in the period 2010-13, average productivity growth was negative for all firms, but the decline was stronger among micro and small firms. Finally, during the recovery (2013-16), while average productivity growth was positive among firms with more than 10 employees, it remained negative among the micro firms (less than 10 employees). Therefore, in all the sub-periods the productivity growth rate is monotonically increasing with firm size, thus depicting an increased hetero-

geneity in performance and efficiency along the size dimension. Moreover, we can infer that, given the exceptionally large presence of micro and small firms in the Italian economy as compared to the other advanced countries, their unsatisfactory performance is the main drag on average productivity growth among incumbent firms.

Figure 1 **Within component of productivity growth, by firm size**

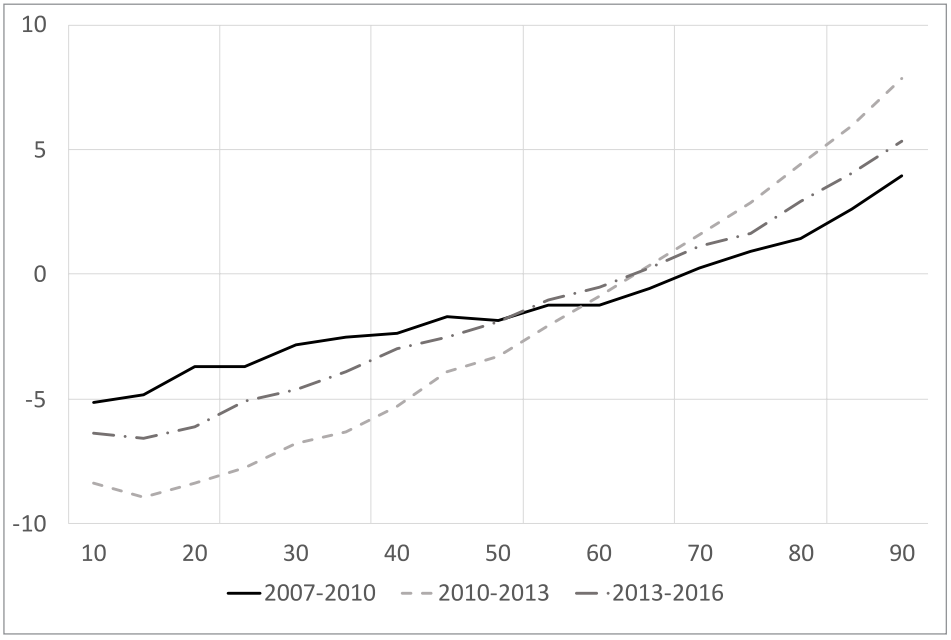


The decline of average firm productivity has been counterbalanced by a positive contribution of reallocation in every sub-period and macro-sector (Table 1). This is a signal that the Italian productive system has been able over the last decade to improve its allocative efficiency moving employment from the least to the most productive firms. Obviously, such a result may be the outcome of different adjustment mechanisms, some better than other from a social point of view. Indeed, the best scenario is one in which unemployed workers are absorbed into the labor market with labor demand steep-

ly growing in firm productivity. Alternatively, leaving the unemployed rate unchanged, another favorable scenario entails the "immediate" hiring by the most productive firms of those workers that are displaced by the less efficient ones: the former firms grow in size, while the latter ones decrease. However, a positive contribution from the reallocation effect can also come from a situation in which unemployment grows due to firing but in such a way the relative size of the most productive firm increase. This can be due to the latter firms either hiring or firing less than the least productive ones. In both cases, allocative efficiency improves.

What happens to employment growth along the firm productivity distribution is represented in Figure 2. In the 2007-10 period, when unemployment has risen from 6.7 to 8.4 per cent, we see that allocative efficiency improves thanks to the downsizing of all firms up to the 70 percentile of the distribution and the growth of the others. The same has occurred during the sovereign debt crisis that caused a further increase in unemployment to 12.1 per cent in 2013. While the threshold between shrinking and growing firms lowered at the 60 percentile of the productivity distribution, there is a much larger heterogeneity in terms of rates: more negative for shrinking firm, more positive for growing firms. During the recovery phase, unemployment has reduced slightly (to 11.7 per cent in 2016) and the allocative efficiency has seen again a positive size growth by the best 40 per cent of Italian firms and a milder decrease by the others.

Figure 2 **Employment growth by initial percentile of productivity distribution**



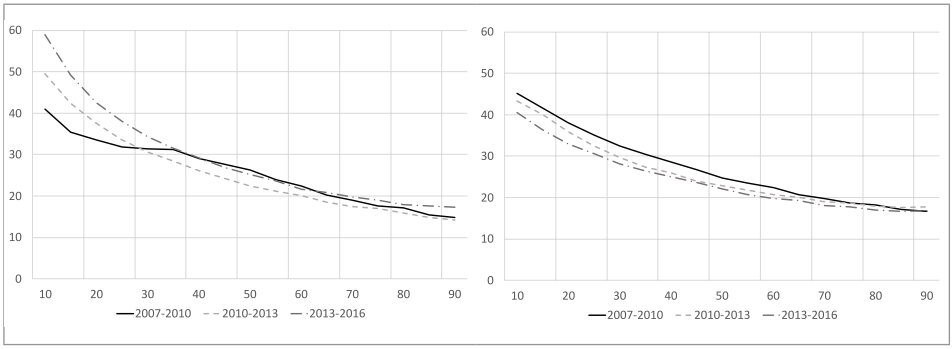
To sum up, the positive contribution of reallocation to aggregate productivity growth in the last decade has been the result of a significant amplification of the degree of heterogeneity within the Italian productive system with a relatively smaller group of highly efficient firms increasing their market size and the rest of firms losing ground. The net effect on employment has been overall negative.

Finally, aggregate productivity growth is influenced by firm demography. Though less important in absolute terms than the within and the reallocation components, the contribution of net entry is always positive, with the only exception of services in 2007-10. As explained earlier, such a positive contribution reflects the adjustment on the exit margin with the exit of low-productivity firms from the market. In all macro sectors the support of net entry to aggregate productivity growth has intensified over time, proving that the exit occur after some number of recessionary years.

Figure 3 visualizes the patterns of the exit rates along the cycle. Quite reasonably, the exit rate reduces at a fast rate as we move to more productive firms, i.e. exit is a more common outcome among the least efficient firms. While the exit rate remains quite stable along the cycle among the upper deciles of the productivity distribution, it changes sensibly in the lower deciles. In particular, it increases as the crisis period gets longer. It is therefore lower in 2007-10 with respect to 2010-13 when the sovereign debt crisis added up to the international financial crisis. This process has continued and further intensified during the subsequent recovery to prove that over the last decade the Italian productivity system has been going through a thorough cleansing.

The cyclical pattern of the entry rate is definitely less pronounced.

Figure 3 **Exit and entry rates along the productivity distribution**



5. Conclusion

In this paper we exploit a unique dataset covering the universe of Italian firms with at least one paid employee operating in the non-agricultural and non-financial sector over the period 2007–2016, in order to document the driving forces behind the dynamics of aggregate productivity. Following the Olley and Pakes (1996) methodology in its dynamic version proposed by Melitz and Polanec (2015), we decompose aggregate labor productivity growth in three components: the average productivity growth of incumbent firms, the reallocation of resources among existing firms and the demographic component related to the entry and exit process.

We find that the contribution of allocative efficiency is always positive and increasing over the entire horizon (2007 – 2016): less productive firms are downsizing in all the three considered sub periods, while firms with productivity above the 60th percentile are expanding.

Also the net contribution of firm demography is always positive and is given by the exit of least productive firms that more than compensates the negative contribution from the entry of small low-productivity newborn firms.

Lastly, we find that the productivity growth of incumbent firms is, on average, negative and that smaller firms drive this result: the average productivity growth for firms up to 9 employees is always negative and given the disproportionate weight of this size class, aggregate growth is negative.

Understanding the mechanisms that explain productivity growth is key to look ahead and to interpret the economic consequences of the Covid-19 pandemic. Given the lack of timely data, we can only speculate about the possible trends of the components that we have analyzed so far, in the light of the first signals coming from the Italian productive system. The lockdown and the contagion containment measures have made urgent to undertake a path towards a greater digitization and the reorganization of the production processes, with consequent efficiency advances. What the aggregate effect of these productivity gains will be crucially depends on how many firms will

be able to make this qualitative step. As for allocative efficiency, the effect is linked to the intensity of both supply and demand shocks and to the extent to which regulatory barriers will make resource reallocation sluggish. For the US, Barrero et al (2020) argue that the economic effects of the pandemic will result in a major reallocation shock: while some sectors of the economy were closed down, others had their demand growing, but the net effect is expected to be negative. For incumbent firms, the authors estimate 3 new hires for every 10 layoffs. For Italy, we can expect this effect to be present, but to a lesser extent, thanks to the strengthening of the measures aimed at preserving working relationships. Lastly, we expect the demographic component to embed the cleansing effect that we usually observe during economic slowdown. While firms' exit is prevented by the government measures aimed at guaranteeing the liquidity necessary to deal with shocks of this magnitude, we already observe a slowdown in the entry of new businesses. Together, these two phenomena will lead to a negative contribution from the demographic component to aggregate productivity growth, at least in the short run.

All in all, we expect that even in Italy, the pandemic will induce a reallocation shock, but given the structural characteristics of our economy and the extent of government measures, the transition to a new equilibrium may be sluggish, with possible productivity losses in the transition phase.

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ECONOMIA ITALIANA 2020/2

La produttività delle imprese italiane: andamento, determinanti e proposte per un rilancio

La stagnazione della produttività accomuna la maggior parte dei paesi Ocse e appare come un tratto emergente della attuale fase del capitalismo contemporaneo. Tuttavia, il quadro italiano è ancora più preoccupante rispetto al contesto internazionale poiché il rallentamento della produttività ha origini più profonde e lontane nel tempo. Questo numero di Economia Italiana, Editors **Matteo Bugamelli, Marcello Messori e Roberto Monducci**, fornisce alcuni elementi interpretativi, approfondisce alcune delle cause della situazione nel nostro Paese e contribuisce al dibattito di *policy*.

A differenza di quanto accaduto in quasi tutti i paesi economicamente avanzati, l'insieme delle imprese italiane della manifattura e – soprattutto – dei servizi non ha saputo adattarsi, fra la fine degli anni Ottanta e i primi anni Novanta del secolo scorso, alle novità strutturali indotte dalle innovazioni nell'ICT e dalla tendenziale unificazione dei mercati internazionali.

In Italia la stagnazione della produttività e la scarsa crescita del PIL negli ultimi venticinque anni dipendono dall'**inadeguato numero di imprese dinamiche** cui corrisponde, sul fronte opposto**,** un eccesso di imprese che – soprattutto nelle dimensioni minori – risultano poco efficienti e la diffusa capacità da parte di aziende con poche prospettive di crescita a rimanere sul mercato.

I quattro saggi sul tema contenuti in questo numero offrono **prime e possibili spiegazioni di questo assetto strutturale del sistema delle imprese che caratterizza l'Italia nel confronto con gli altri sistemi economicamente avanzati,** contribuendo ad individuare i fattori che ostacolano lo sviluppo del sistema produttivo e le leve sulle quali agire per un pieno dispiegamento del suo potenziale di crescita. Si tratta, in particolare, di carenze organizzative e manageriali, di una scarsa propensione all'innovazione, di posizioni subordinate nelle catene internazionali del valore. Questo 'vuoto' riflette anche le difficoltà strutturali della nostra società: l'ambiente politico-istituzionale e burocratico accresce l'incertezza e premia i comportamenti passivi, rafforzando esternalità negative. Recuperare già nel breve termine parte del ritardo accumulato è un obiettivo difficile ma non velleitario.

ECONOMIA ITALIANA nasce nel 1979 per approfondire e allargare il dibattito sui nodi strutturali e i problemi dell'economia italiana, anche al fine di elaborare adeguate proposte strategiche e di *policy*. L'Editrice Minerva Bancaria si impegna a riprendere questa sfida e a fare di Economia Italiana il più vivace e aperto strumento di dialogo e riflessione tra accademici, *policy makers* ed esponenti di rilievo dei diversi settori produttivi del Paese.

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