II - THE ITALIAN CASE

Italian Firms in Global Value Chains: Updating our Knowledge

Mariarosaria Agostino*
University of Calabria, Rende (Cs)

Anna Giunta§
Roma Tre University
and Rossi-Doria Centre

Domenico Scalera◊
University of Sannio, Benevento

Francesco Trivieri#
University of Calabria, Rende (Cs)

The main goal of this paper is to evaluate participation and positioning of Italian manufacturing firms in Global Value Chains (GVCs) in the period 2009-2014. Findings indicate that: i) *participation in GVC is positively associated with firms' labour productivity;* ii) *Italian firms strongly participate in GVCs but frequently with the least advanced modes of internationalization (*i.e. *as pure exporters);* iii) *the vast majority of Italian firms are positioned in GVCs as suppliers rather than as final firms, thus operating in the less lucrative, intermediate stages of chains. The whole picture looks bleaker for firms located in Southern Italy.*
[JEL Classification: D22; D23; F23; L23].

Keywords: global value chains; firms' internationalization; Italian industry; labour productivity; suppliers.

* <*mariarosaria.agostino@unical.it*>, Department of Economics, Statistics and Finance.
§ <*anna.giunta@uniroma3.it*>, Department of Economics.
◊ <*scalera@unisannio.it*>, Department of Law and Economics.
<*francesco.trivieri@unical.it*>, Department of Economics, Statistics and Finance.
The authors would like to thank Bruegel (Carlo Altomonte and Tommaso Aquilante) for the access to the updated EFIGE data set and the assistance provided in dealing with it.

1. - Introduction

The global integration of markets and the vertical fragmentation of industries have advanced notably since the 1990s, with powerful repercussions on the international division of labour within firms and on firms' behaviour and performance in both advanced and developing countries. The growth of global value chains has been one of the key features of this process (Grossman, Rossi-Hansberg, 2006; Miroudot, Ragoussis, 2009; Oecd, 2012; Amador, di Mauro, 2015).

The term "global value chain" (GVC) denotes the entire complex of operations and transactions within and between firms through which raw materials are transformed into intermediate products and then into final goods. For industrial products, the transformation carried out along GVCs involves many stages, ranging from design, manufacturing and assembly to marketing and distribution; these activities are frequently dispersed over a good number of different firms, regions and countries, so as to exploit the comparative advantages of efficiency in each jurisdiction (Baldwin, Venables, 2013; Costinot *et* al., 2013). Accordingly, the expansion of GVCs in these years has driven a worldwide interconnection of industries and a remarkable growth in world trade, especially trade in intermediate goods and services.[1]

Owing in part to the lack of good quality data at firm level, the impact of participation in GVCs on firms' productivity is still under-researched. It has been investigated by relatively few papers, which in most cases have found a positive effect of GVCs on labour productivity and total factor productivity (for example, Veugelers *et* al., 2013; Baldwin, Yan, 2014; Amador, Cabral, 2015; OECD, 2015). There are in fact diverse channels through which participation in a GVC as exporters, importers or two-way traders and/or through foreign direct investments (FDI) can bring economic benefits. Exporting implies a number of potential advantages, in that access to larger foreign markets may allow a firm to exploit scale economies, to acquire new technologies abroad and learn by exporting, or expose it to stimulating international competition (De Loecker, 2007). Moreover, other benefits may accrue to firms that are active in GVCs through imports of foreign inputs: cost saving, technology transfer, higher input quality, and possible complementarities with domestic inputs (Agostino *et* al., 2016). Third, two-way trading may have the additional advantage of exploiting sunk cost complemen-

[1] The Oecd (2007) calculates that in 2003 about 54% of the world's manufactured imports were intermediate goods; according to De Backer K., Miroudot S. (2014), over 70% of service imports are intermediate services.

tarity and other positive interactions between export and import activities (Kasahara, Lapham, 2013). Lastly, especially for small firms and suppliers (*i.e.* firms selling to other firms), relationships with large buyers and/or assemblers may be extremely fruitful in prompting them to upgrade their technical, relational and managerial capabilities (Humphrey, Schmitz, 2002; Gereffi *et* al., 2005; Agostino *et* al., 2015).

1.1 *The Case of Italy*

Italy, the second largest European manufacturing economy after Germany (industry accounts for 15.8% of GDP in Italy and 22.5% in Germany), has a number of peculiar industrial features that are especially relevant in the GVC context. One key characteristic is pronounced fragmentation: 82.7% of Italian manufacturing firms, occupying almost 25% of the total manufacturing workforce, have fewer than 10 employees, while medium-to-large manufacturing firms with 250 or more employees are rare: 0.3% of the total, employing around 23% of the manufacturing workforce. Division of labour among firms is far-reaching (the well-known Marshallian industrial district model) and, before the surge of market globalization, it was territorially bounded. Italy's comparative advantage has continued to be mainly in the traditional industries (the "Made in Italy" sectors), such as textiles, wearing apparel, leather products, furniture and footwear, all industries that are deeply involved in the international dispersion of production[2].

The "great recession" was particularly severe in Italy, with an 8.5% contraction in GDP between 2008 and 2015. Consumption and investment plunged, and only foreign demand showed a somewhat positive trend, thanks to the "happy few" (Mayer, Ottaviano, 2007), *i.e.* a handful of companies (6.4% of all manufacturing firms) that account for 75% of exports (Mazzeo, 2016). Compared to other firms, these exporters feature larger size, higher productivity and wages, and more highly skilled workers.

Other important characteristics are Italy's lesser ability to attract foreign investment and the geographical divide. Indeed, the historical gap between the comparatively underdeveloped South, (including the regions Abruzzo, Molise, Campania, Basilicata, Apulia, Calabria, Sicily and Sardinia) and the more prosperous regions of the Centre-North is persistent (since the turn of the century

[2] As shown by Dell'Agostino L., Nenci S. (2016), the Italian trade specialization does not change much when calculated taking into account trade in value added, rather than simply observing gross export data.

per capita income in the South has been stuck at around 56% of that in the Centre-North); it reflects the differences in labour productivity and total factor productivity between firms located in the two regions (Giannola *et* al., 2016).

Because of these structural features, globalisation has been a severe shock for Italian firms. Nevertheless, as various papers have observed (Veugelers, 2013; Amador *et* al., 2015; Cappariello, Felettigh, 2015), Italy's participation in GVCs is now more or less on a par with that of Germany and France, as gauged both by the share of foreign value added embodied in Italian exports and by the share of national value added embodied in partners' exports.

Empirical studies at firm level in Italy (Giunta *et* al., 2012; Agostino *et* al., 2015; Brancati *et* al., 2015; Formai, Vergara Caffarelli, 2015; Giovannetti *et* al., 2015) have produced three interesting findings: *i*) beside participation, firms' positioning along the GVC is relevant as well, as it is shown, for example, by the fact that the great recession had more serious repercussions for suppliers[3] than for final product manufacturers, probably because of a "bullwhip effect" connected to the adjustment of inventories within GVCs (Bekes *et* al., 2011; Altomonte *et* al., 2012). Moreover, firms' position in GVCs appears to explain part of the performance gap between Italian and German firms during the recession (Accetturo, Giunta, 2016); *ii*) there is considerable heterogeneity of Italian firms involved in the GVCs; as the GVCs amplify the modes of firms' internationalisation, that results in large productivity differentials; *iii*) Italian firms' participation in GVCs is quite common, but participation per se does not guarantee good performance, which depends heavily on such firm-specific characteristics as the propensity to innovate, R&D investment, human capital, workers' training. Agostino *et* al. (2015) show that on average supplier firms are less productive than final firms; however, as the ability of supplier firms increases, their productivity shortfall diminishes, and in fact for those that succeed in both exporting and innovating, there is no statistically significant difference in productivity between suppliers and final firms.

1.2 *Aim and Outline of the Paper*

The main purpose of this paper is to update our knowledge concerning Italian firms' participation in GVCs. We evaluate the impact of participation in and po-

[3] Supplier firms (those that sell to other firms rather than the final market) have undergone a much more severe reduction in sales. And given their small size, the majority of Italian firms in fact operate as suppliers.

sitioning along GVCs on labour productivity in Italian manufacturing firms in the period following the "great recession", *i.e.* from 2009 to 2014.

We begin with an empirical investigation of a sample of more than 14,000 European industrial enterprises. We then focus on Italy, the core of our analysis, to highlight two main aspects. The first concerns the specific behaviour and performance of supplier firms, which produce for outsourcers and are therefore complementary to the international allocation of production within global networks (Giunta *et* al., 2012). This is one of only a few papers on the role of GVCs in determining labour productivity that explicitly consider this type of firm. Yet supplier firms constitute the bulk of the industrial structure in a number of countries, and Italy, as observed, is a case in point. Supplier firms are often described as suffering a productivity discount (Razzolini, Vannoni, 2011), although some researchers have noted the heterogeneous behaviour and performance of supplier firms (Accetturo *et* al., 2011; Agostino *et* al., 2015).

The second issue is the North-South divide in Italy, *i.e.* the performance gap between firms that are and are not part of GVCs, located in Southern and in Northern-Central Italy. The empirical evidence on this issue is scanty indeed. Both Giunta *et* al., (2012) and SVIMEZ (2016) report the low and relatively unqualified GVC participation of Southern firms; Cherubini, Los (2016) find that from 1995 to 2006 employment in GVC-participating firms increased in all regions of Italy, but much less in the South than in the rest of the country. Moreover, the GVCs in which Southern firms participate appear to be relatively slow-growing. Accetturo *et* al., (2016), analysing the impact of institutional quality on GVCs, document that firms located in regions with inefficient judicial systems (as is often the case in Southern Italy) are less likely to supply intermediate goods abroad.

Our source of data is 2010 EU-EFIGE dataset, gathering survey and balance-sheet information on industrial firms with 10 or more employees in seven European countries: Austria, France, Germany, Hungary, Italy, Spain and the United Kingdom, all of them showing a considerable involvement in GVCs.[4] Thanks to new balance-sheet data on the sample firms for 2011-2014, we make a novel con-

[4] The participation index (Koopman R. *et* al., 2011) is expressed as a percentage of gross exports and indicates the share of foreign inputs in exports (backward participation) and domestically produced inputs used in third countries' exports (forward participation). Among our seven countries, Hungary shows the highest backward participation (40% of gross exports), followed by Austria (around 30%), Germany (around 25%), France (20%), Spain (20%), and Italy (20%), while the United Kingdom exhibits the lowest backward participation index (around 15%).

tribution by analysing the post-crisis performance of the industrial firms covered by EFIGE's 2007-2009 survey.

The period under observation is of special interest in view of the severe shock produced by the financial crisis of 2008, which resulted in what some observers termed a "world trade collapse" (Baldwin, 2009). According to some recent works (Yi, 2009; Bems *et* al., 2010; Alessandria *et* al., 2011; Altomonte *et* al., 2012), GVCs played a leading role in transmitting the shocks in the wake of the crisis. Moreover, the following years registered a slowdown in world trade growth to about 3% a year in 2012-2015, compared with 7% in the pre-crisis decades from 1987 to 2007. It remains to be established whether this deceleration was driven by: *a)* compositional effects, such as a geographical shift in economic activity, from the advanced to the emerging economies, or possibly a shift towards less trade-intensive activities (Al Haschimi *et* al., 2016; Bussier *et* al., 2013; Constatinescu *et* al., 2016); *b)* structural effects relating to the "possibility that the structural transformation associated with the increasing geographical fragmentation of production is now nearly finished" (Ferrantino, Taglioni, 2014); *c)* the Chinese transition towards a more consumption-based economy; or *d)* protectionist measures inducing firms to rely mainly upon regional markets for sourcing and sales.

The remainder of the article is organised as follows. Section 2 assesses the degree of participation of European and Italian firms in GVCs, distinguishing among different modes of participation according to the number and kind of international activities undertaken. Section 3 treats our main theme, estimating the effect of GVCs on labour productivity. After presenting the econometric model and commenting on the general results, we conduct specific analyses on Italy, with particular reference to the North-South gap and to supplier firms. Section 4 summarizes the conclusions and outlines some policy implications.

2. - Participation in and Position Along GVCs

This section offers a preliminary evaluation of the involvement and positioning of Italian manufacturing firms in GVCs, in comparison with firms in other European countries. We also distinguish between firms operating in the Centre-North and the South of Italy (the so-called "Mezzogiorno").

To take account of the variety of modes of internationalisation associated with the operation of GVCs, we examine several possible modes of participation and their combinations: exports only, intermediate goods imports only, both exports

and imports (two-way trade), and international production. In particular, like Veugelers *et* al. (2013), we define "single", "dual" and "triple" modes of GVC participation. Single participation embraces pure importers of components/services, or pure exporters, or pure international producers (through FDI or international outsourcing). Dual mode comprises firms involved in any two of the foregoing modes (imports and exports, or imports plus international production, or exports and international production). Triple mode means the firms engaged in all three modes (imports, exports and international production). Finally, "zero" participation (the control group in our econometric analyses) encompasses firms that engage in no international activity: neither imports nor exports nor international production.[5] We classify firms in the various categories on the basis of qualitative information on the status of importer, exporter and international producer, as reported by the EFIGE survey.

2.1 *The International Comparison*

Table 1 shows the distribution of firms by country[6] (in the case of Italy, also with separate rows for Centre-North and South) and mode of participation in GVCs, distinguishing also among the different types of single, dual and triple participation. Germany has the largest share of firms not participating in any GVC (28.6%), followed closely by Spain. Conversely, Italy's involvement in GVCs is the strongest, practically on a par with France and "Others". On the other hand, Italian firms more frequently take part in GVCs with the least advanced participation mode (single), and in particular as pure exporters. More generally, in all countries the dual mode is the most common; in the majority of cases these firms are two-way traders. In this respect, Italy, France and Spain are

[5] This definition may overestimate firms' participation in GVCs. The EFIGE dataset cannot distinguish between exports of intermediate and final goods; likewise, we cannot establish whether an international producer is actually participating in a GVC (as when the firm produces intermediate goods that are subsequently exported for further processing) or, instead, has a totally self-contained foreign plant (all stages in production are performed within the plant), and the output is sold on local markets. Fortunately, this potential bias is limited because in our dataset it might concern 21% of the total sample at most (20.41% consisting of exporters and 0.24% of FDI-only firms, see Table 1).

[6] Only France, Germany, Italy and Spain are treated individually, while Britain, Austria and Hungary are grouped together as "Others". This is because on the one hand the productive structure of the UK, based on financial and knowledge-intensive business services, is quite different from that of France, Germany, Italy and Spain; and on the other, Hungary and Austria are much smaller economies, so that comparisons may not be particularly significant.

similar, while Germany has a somewhat smaller share of two-way traders (around 32%) and a higher percentage of firms that combine international production with importing or exporting (around 2.2%). The triple mode, the most complex, involves relatively few firms (6% in Italy, around 8% in Germany and France).

TABLE 1

MULTIPLE MODE INTERNATIONALIZATION BY COUNTRY

	Zero	Single			Dual			Triple	Total
		Imp	Exp	Prod	Exp-Imp	Imp-Prod	Exp-Prod		
FRANCE	21.36%	14.87%	12.24%	0.13%	41.94%	1.04%	0.20%	8.21%	**100%**
GERMANY	28.59%	5.96%	23.48%	0.20%	31.52%	0.48%	1.74%	8.04%	**100%**
ITALY	20.72%	5.10%	26.71%	0.23%	40.15%	0.10%	0.93%	6.06%	**100%**
CENTER-NORTH	*18.64%*	*4.78%*	*26.94%*	*0.15%*	*41.83%*	*0.08%*	*0.96%*	*6.62%*	***100%***
SOUTH	*34.07%*	*7.11%*	*25.25%*	*0.74%*	*29.41%*	*0.25%*	*0.74%*	*2.45%*	***100%***
SPAIN	27.19%	9.00%	19.77%	0.14%	39.94%	0.25%	0.35%	3.35%	**100%**
OTHERS	21.31%	8.64%	19.78%	0.47%	41.03%	0.87%	1.80%	6.10%	**100%**
TOTAL	**23.78%**	**8.71%**	**20.41%**	**0.24%**	**38.93%**	**0.55%**	**1.01%**	**6.38%**	**100%**

Authors' calculations on EFIGE data. SINGLE embraces pure importers of components/services, or pure exporters or pure international producers (through FDI or international outsourcing). DUAL comprises firms involved in any two of the foregoing modes (imports and exports, or imports plus international production, or exports and international production). TRIPLE means the firms engaged in all three modes (imports, exports and international production). OTHERS includes: Austria, Hungary and UK. IMP, EXP and PROD stand for importers, exporters and international producers, respectively. Total observations for Italy: 3,020.

As noted above, a firm's positioning along its GVC has significant impact. Indeed, being a supplier or a final firm may have important implications in itself and with regard to participation in and rewards from GVC. Tables 2*a* and 2*b* distinguish between "supplier firms", *i.e.* firms selling exclusively to other firms, and "final firms" *i.e.*, producers serving end markets. Table 2*a* shows that in Italy and France the majority of firms, internationalised or not, are suppliers (65% and 71% respectively), whereas in the other countries the incidence of suppliers is much lower, most notably in Germany (around 40%).

What is more, supplier and final market firms appear to differ very significantly in degree of involvement and mode of participation in GVCs. In all our sample countries (except Germany), and most especially in Italy, suppliers are more frequently confined to single national markets than final firms, and their participation modes are simpler. For example, dual and triple modes are much less common among suppliers than final firms in Italy and Spain, however in Germany no such a difference is found. In particular, this reflects the differing pres-

ence of two-way traders between final and supplier firms. Remarkably, while in Italy and Spain two-way traders account respectively for 38% and 36% of all suppliers (against 45% and 43% for final firms), in Germany the opposite holds: the share of suppliers consisting of two-way traders is higher.

Even when focusing on internationalised firms (Table 2*b*), suppliers – in single, dual, or triple mode – make up a substantial majority (around 63%) of GVC participants in Italy, but only 41% in Germany. In the latter country, more than 35% of internationalised firms are final firms participating with dual or triple modes, whereas in Italy the value is 24%. Conversely, suppliers integrated in GVCs with single mode are 27% in Italy against less than 18% in Germany. This is evidence that German and Italian firms perform different tasks, presumably associated with different rewards along the chain.

TABLE 2A

MULTIPLE MODE INTERNATIONALIZATION BY FIRMS' POSITIONING IN GVC

	Zero	Single			Dual			Triple	**Total**
		Imp	Exp	Prod	Exp-Imp	Imp-Prod	Exp-Prod		
Final Firms									
FRANCE	6.12%	4.14%	3.13%	0.03%	12.05%	0.20%	0.07%	2.83%	**28.57%**
GERMANY	18.26%	3.41%	13.49%	0.03%	18.19%	0.27%	1.06%	5.59%	**60.31%**
ITALY	5.73%	1.59%	8.61%	0.13%	15.79%	0.07%	0.40%	2.98%	**35.30%**
CENTER-NORTH	4.21%	1.23%	7.32%	0.07%	14.24%	0.03%	0.36%	2.72%	***30.17%***
SOUTH	1.52%	0.36%	1.29%	0.07%	1.56%	0.03%	0.03%	0.26%	***5.13%***
SPAIN	14.19%	4.80%	11.72%	0.07%	24.68%	0.14%	0.25%	2.12%	**57.98%**
OTHERS	10.48%	4.71%	10.78%	0.37%	23.56%	0.60%	1.40%	4.11%	**56.01%**
Supplier Firms									
	Zero	Single			Dual			Triple	**Total**
		Imp	Exp	Prod	Exp-Imp	Imp-Prod	Exp-Prod		
FRANCE	15.21%	10.73%	9.12%	0.10%	29.91%	0.84%	0.13%	5.38%	**71.43%**
GERMANY	10.32%	2.56%	9.98%	0.17%	13.32%	0.20%	0.68%	2.45%	**39.69%**
ITALY	14.97%	3.51%	18.11%	0.10%	24.37%	0.03%	0.53%	3.08%	**64.70%**
CENTER-NORTH	11.89%	2.91%	15.99%	0.07%	21.95%	0.03%	0.46%	3.01%	***56.32%***
SOUTH	3.08%	0.60%	2.12%	0.03%	2.42%	0.00%	0.07%	0.07%	***8.38%***
SPAIN	12.99%	4.20%	8.05%	0.07%	15.25%	0.11%	0.11%	1.24%	**42.02%**
OTHERS	10.81%	3.94%	8.98%	0.10%	17.49%	0.27%	0.40%	2.00%	**43.99%**

Authors' calculations on EFIGE data. SINGLE embraces pure importers of components/services or pure exporters or pure international producers (through FDI or international outsourcing). DUAL comprises firms involved in any two of the foregoing modes (imports and exports, or imports plus international production, or exports and international production). TRIPLE means the firms engaged in all three modes (imports, exports and international production). OTHERS includes: Austria, Hungary and UK. IMP, EXP and PROD stand for importers, exporters and international producers, respectively. Total observations for Italy: 3,020.

TABLE 2B

MULTIPLE MODE INTERNATIONALIZATION BY FIRMS' POSITIONING IN GVC
(excluding ZERO)

	Final Firms				Supplier Firms				Total
	Single	Dual	Triple	*Total*	Single	Dual	Triple	*Total*	
FRANCE	9.28%	15.65%	3.59%	***28.53%***	25.36%	39.26%	6.84%	***71.47%***	**100%**
GERMANY	23.71%	27.34%	7.82%	***58.87%***	17.80%	19.90%	3.44%	***41.13%***	**100%**
ITALY	13.03%	20.50%	3.76%	***37.29%***	27.39%	31.44%	3.88%	***62.71%***	**100%**
CENTER-NORTH	10.86%	18.46%	3.42%	***32.73%***	23.92%	28.31%	3.80%	***56.03%***	***89%***
SOUTH	2.17%	2.05%	0.33%	***4.55%***	3.47%	3.13%	0.08%	***6.68%***	***11%***
SPAIN	22.79%	34.43%	2.91%	***60.14%***	16.93%	21.24%	1.70%	***39.86%***	**100%**
OTHERS	20.14%	32.49%	5.22%	***57.85%***	16.54%	23.07%	2.54%	***42.15%***	**100%**

Authors' calculations on EFIGE data. SINGLE embraces pure importers of components/services or pure exporters or pure international producers (through FDI or international outsourcing). DUAL comprises firms involved in any two of the foregoing modes (imports and exports. or imports plus international production, or exports and international production). TRIPLE means the firms engaged in all three modes (imports, exports and international production). OTHERS includes: Austria, Hungary and UK. Total observations for Italy: 3,020.

2.2 *Focussing on Italy*

In accordance with previous literature (Bernard, Jensen, 1999; Melitz, 2003; Helpman *et* al., 2004), our data show a great heterogeneity among Italian industrial firms, in particular between suppliers and final firms. Table 3 (Panel A) displays some structural differences regarding labour productivity, participation in GVC, and some other variables[7] such as: SIZE, the percentage of small and medium-sized firms (under 250 employees); AGE, the percentage of firms more than 20 years old in 2008; GROUP and FOREGROUP, the percentage of firms belonging to a group and a foreign group, respectively; FORECOMP, the percentage of firms whose main competitors are located abroad; INNO and R&D, the percentage of firms carrying out product/process innovation or research activities respectively, and TRAIN, the percentage of employees involved in formal training programs. The comparison between final and suppliers highlights that the latter are on average less productive, smaller (precisely, the share of SMEs is higher), less integrated in business groups, more frequently closed to international trade and less inclined to undertaking R&D, innovation and workers' training.

[7] Two different measures of labour productivity are used, computed respectively as the *ratio* of total turnover (*PRODt*) and value added (*PRODv*) over the number of employees. The same set of variables is used in regressions of Section 3.

TABLE 3

ITALIAN FINAL AND SUPPLIER FIRMS. PRODUCTIVITY AND STRUCTURAL CHARACTERISTICS

Panel A	Zero	Single	Dual	Triple	Gvc #	Size	Age	Group	Fore-group	Fore-comp	R&D	Inno	Train
Final Firms	16.23%	29.27%	46.06%	8.44%	83.77%	89.77%	6.60%	21.67%	5.53%	9.47%	59.19%	27.67%	28.05%
Supplier Firms	23.13%	33.57%	38.54%	4.76%	76.87%	90.99%	6.50%	15.15%	3.22%	10.75%	52.71%	25.90%	22.52%

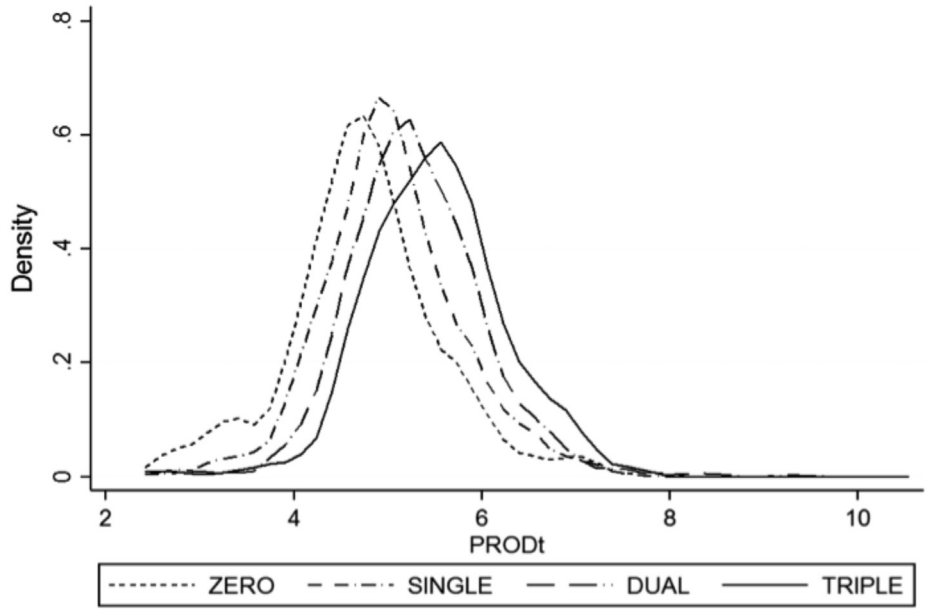
Panel B	**Final Firms**					**Supplier Firms**				
	Zero	Single	Dual	Triple	Total	Zero	Single	Dual	Triple	Total
PRODt[(a)]										
Average	219.6	225.5	318.3	325.8	**275.0**	150.4	192.3	243.1	311.1	**207.7**
Median	127.9	152.3	206.1	255.0	**181.3**	109.4	139.6	177.6	238.8	**151.4**
Observations	164	302	466	76	**1,008**	422	613	707	82	**1,824**
PRODv [(b)]										
Average	52.7	53.9	62.1	69.5	**58.7**	45.32	51.38	60.16	62.46	**53.88**
Median	46.4	46.5	54.7	60.8	**51.1**	41.44	46.76	53.88	56.61	**48.42**
Observations	163	297	460	74	**994**	415	602	700	80	**1,797**

Authors' calculations on EFIGE. All variables come from EU-EFIGE/Bruegel-UNICREDIT dataset. SINGLE embraces pure importers of components/services or pure exporters or pure international producers (through FDI or international outsourcing). DUAL comprises firms involved in any two of the foregoing modes (imports and exports, or imports plus international production, or exports and international production). TRIPLE means the firms engaged in all three modes (imports, exports and international production). #GVC is a dummy coded 1 if a firm is single, or dual, or triple mode. For the description of the others variables see Table 5. [(a)] Turnover on employees (average 2009-2014) [(b)] Added value on employees (average 2009-2014). Average and median values are in thousands of euro.

Concerning participation in GVC, Italian suppliers are more frequently integrated with single mode; less frequently with dual; in a very few cases with triple mode. Table 3 Panel B indicates that the more complex the participation mode in GVC, the more productive the firm. The hierarchy among the modes of participation in GVC is confirmed by Graphs 1 and 2, where Kernel density for each mode is depicted[8]. For both *PRODt* and *PRODv* measures of labour productivity, the curve relative to each category is located to the right of curves representing density of less complex participation modes.

GRAPH 1

PRODUCTIVITY AND MULTIPLE MODE INTERNATIONALISERS: *PRODt*



Source: Authors' elaboration on EFIGE data.

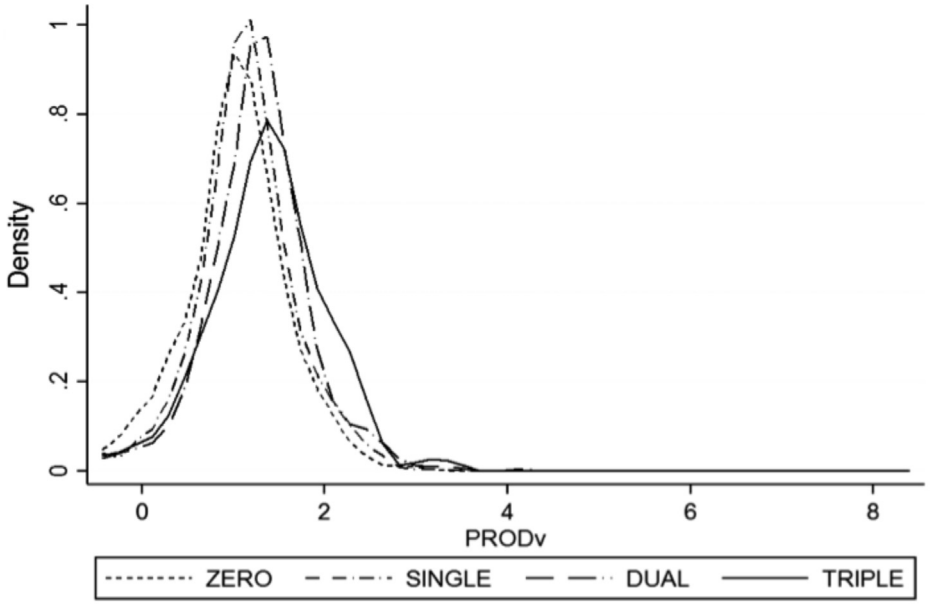
Moreover, the productivity gap between the two categories of firms (suppliers and final firms) varies with the mode of participation. Differences in average labour productivity rapidly shrink when moving from non-internationalized firms to simple and then to more complex modes[9]. In other words, data of Table 3

[8] The kernel density shows the probability of picking a firm with any given productivity level randomly drawing from triple, dual, single, or zero.

[9] This result is thoroughly consistent with the main findings of AGOSTINO M. *et* AL. (2015).

Graph 2

PRODUCTIVITY AND MULTIPLE MODE INTERNATIONALISERS: *PRODv*



Source: Authors' elaboration on Efige data.

show that the gain of joining a chain, and participating with more complex modes of integration, is larger for suppliers than final firms.

By Italian national standards, the condition of Southern industry is even worse. As shown in Table 1, the most striking difference lies in international opening: more than a third of all manufacturing firms in Southern Italy are closed to any sort of international trade. Considering only firms involved in GVCs (Table 2*b*), more than half of those in the South are characterised by the single mode, much higher than in Central-Northern Italy (39%) and the rest of Europe (35% in France, 39% in Spain, 41% in Germany, and 37% in the other countries). For the subset of suppliers, the numbers are worse: 37% of Southern firms are not involved in GVCs at all (Table 2*a*) and 52% of those involved participate only with the single mode (Table 2*b*).

Another point of interest is the share of internationalised final firms engaged in imports and that of pure export suppliers. From Table 2*a*, it can be calculated that in Southern Italy the percentage of final importer firms over the total number of internationalised firms is much lower than in Central-Northern Italy and in

all the other sample countries. Conversely, pure exporter suppliers account for a relatively very high share of all suppliers in GVC[10]. That is, Italy – and even more so Southern Italy – is characterised by a relatively smaller presence of final importers (pivotal firms that are usually large buyers and/or assemblers in the downstream stages), combined with a large presence of exporting suppliers (usually active in upstream and midstream stages). In sum, Southern firms are the least integrated into GVCs, and when they do participate they tend to be poorly positioned, thus preventing them from fully exploiting the opportunities of global market penetration.[11]

By looking at the industry disaggregation, Table 4 offers other significant insights into Italian involvement in GVCs. First, it confirms the overall high industry involvement in GVCs, with the partial exceptions of the rubber and plastic and food and tobacco sectors (with 26.5% and 23.5%, respectively, of non-participating firms). Second, it shows that the percentage of not internationalised firms is much higher for suppliers than for final firms in all sectors (except food). Third, the relatively modest GVC presence of final firms (35% on average compared with 65% for suppliers) in all sectors (except for Food and Tobacco) again spotlights a peculiar feature of Italian industry, namely the relative lack of large players occupying more secure and profitable positions and governing the chain.

[10] Final importers are the sum of final pure importers, two-way traders, importers producing abroad and triple mode firms (for Southern Italy 0.36% + 1.56% + 0.03% + 0.26%). Dividing by the total number of internationalised final firms (5.13% – 1.52%), it yields a share of 61% of importers over all internationalised final firms. This share amounts to 70% in Central-Northern Italy, 85% in France, 73% in Spain, 65% in Germany, and 72% in the other countries. The percentage of suppliers which are pure exporter can be calculated for Southern Italy as the *ratio* of suppliers only exporting (2.12%) to total internationalised suppliers (8.38% – 3.08%), which yields 40% against 36% in Central-Northern Italy, 16% in France, 28% in Spain, 34% in Germany, and 27% in the other countries.

[11] Consistent with these indications, SVIMEZ (2016) shows that Southern firms in GVCs tend to import relatively more standardised than customised intermediate goods and export relatively more to developing than to advanced countries.

Table 4

MULTIPLE MODE INTERNATIONALIZATION BY SECTOR (NACE 1.1): ITALY

	Final Firms					Supplier Firms					
Sector	Zero	Single	Dual	Triple	***Total***	Zero	Single	Dual	Triple	***Total***	**Total**
Food and Tobacco	13.45%	24.79%	22.69%	1.68%	***62.61%***	10.08%	13.87%	13.03%	0.42%	***37.39%***	**100%**
Textile	2.63%	5.97%	14.08%	7.40%	***30.07%***	14.32%	21.24%	28.16%	6.21%	***69.93%***	**100%**
Wood, paper, printing, furniture	4.42%	9.68%	10.95%	2.32%	***27.37%***	15.79%	27.79%	27.16%	1.89%	***72.63%***	**100%**
Chemical and pharmaceuticals	1.85%	8.33%	29.63%	2.78%	***42.59%***	5.56%	10.19%	36.11%	5.56%	***57.41%***	**100%**
Rubber and plastic	11.01%	8.63%	17.56%	0.60%	***37.80%***	15.48%	20.24%	23.81%	2.68%	***62.20%***	**100%**
Metal, machinery and equipment	4.03%	10.49%	14.42%	2.34%	***31.27%***	17.51%	24.63%	24.16%	2.43%	***68.73%***	**100%**
Electrical and optical equipment	6.62%	8.82%	22.43%	2.57%	***40.44%***	12.50%	18.01%	24.63%	4.41%	***59.56%***	**100%**
Transport equipment	5.00%	8.75%	16.25%	7.50%	***37.50%***	11.25%	11.25%	35.00%	5.00%	***62.50%***	**100%**
Total	**5.61%**	**10.38%**	**16.15%**	**2.97%**	**35.11%**	**14.92%**	**21.83%**	**25.03%**	**3.10%**	**64.89%**	**100%**

Authors' calculations on EFIGE data. SINGLE embraces pure importers of components/services or pure exporters or pure international producers (through FDI or international outsourcing). DUAL comprises firms involved in any two of the foregoing modes (imports and exports, or imports plus international production, or exports and international production). TRIPLE means the firms engaged in all three modes (imports, exports and international production).Total observations for Italy: 2,996.

Summing up, our descriptive analysis (Tables 1-4) documents the strong involvement of Italian industry in GVCs but also points out to some factors of weakness. Italy's participation is characterised by a very large share of supplier firms, that often operate in the less lucrative, intermediate stages of GVCs. Also, Italian firms, and particularly suppliers, participate in GVCs with the least advanced participation mode (single), frequently as pure exporters. Conversely, by comparison with the main European competitors, only a few Italian firms (around 6%) display the most advanced (triple) mode.

3. - The Empirical Inquiry

Here we set out the evidence of the importance of GVC participation in determining firms' productivity. In this econometric exercise, the dependent variable is labour productivity (measured either as value added or as total sales turnover per employee) and the vector of explanatory variables includes a number of controls and indicators of participation.

3.1 *Data and Estimation Methods*

We use micro-data from the EU-EFIGE Bruegel-UniCredit dataset, provided by the Belgian non-profit international association Bruegel. The dataset contains both survey and balance-sheet data on 14,759 firms with at least 10 employees operating in seven European countries: Austria, France, Germany, Hungary, Italy, Spain and the United Kingdom.[12] Although many of the qualitative and quantitative data from the EFIGE survey (conducted in 2010) refer to the triennium 2007-2009, almost all our explanatory variables are available for 2008 only. As a consequence, we cannot resort to dynamic panel data methods to account for unobserved heterogeneity between firms or possible simultaneity bias (that is, firms might select different types of GVC involvement depending on their level of productivity). The estimations therefore necessarily rely only on OLS methodology, so a strict causal interpretation of our results is precluded. On the other hand, thanks to the availability of balance-sheet data updated to 2014, we can observe and factor in the productivity performance of European manufacturing firms in the aftermath of the crisis by taking as the dependent variable average productivity in the years 2010-2014.

[12] For more details on the EFIGE dataset, see *http://bruegel.org/2012/10/the-eu-efigebruegel-unicredit/dataset/*

Our estimated equation is specified as follows:

$$(1)\quad PROD_i = \alpha + \beta_1 SINGLE_i + \beta_2 DUAL_i + \beta_3 TRIPLE_i + \beta_4 SUPPL_i + \phi \boldsymbol{X}_i + \sum_k \gamma_k IND_k + \sum_c \lambda_c C_c + \varepsilon_i$$

where the dependent variable is the log of average labour productivity for 2009-2014, computed as the *ratio* of either total turnover (*PRODt*) or value added (*PRODv*) to the number of employees. On the right hand side, SINGLE, DUAL, TRIPLE and SUPPL are our key regressors. The first three are dummies identifying the non-overlapping categories of GVC involvement defined above (ZERO being the control group). As in Section 2, our benchmark estimations classify firms in their respective categories on the basis of qualitative information on the status of importer, exporter and international producer as reported by the EFIGE survey. As a robustness check, we alternatively assign firms to each of our four participation modes according to the criterion of Veugelers *et* al. (2013), *i.e.* classifying «firms as internationally active only if their trade turnover (either turnover from imports of intermediate goods and services for domestic production, exports of domestic production or international production activities) is above the twenty-fifth percentile in their sector, or if their share of international activity (import, export or international production) over total turnover is above the twenty-fifth percentile» (Veugelers *et* al., 2013, p. 110). The SUPPL (suppliers) regressor designates firms whose entire turnover (100%) stems from produced-to-order goods. The control vector $\boldsymbol{X}$ contains a set of variables frequently used in the literature and previously discussed (Section 2): SIZE, AGE, GROUP, FOREGROUP, FORECOMP, INNO, R&D, and TRAIN. Finally, we also consider SIZE, as additional regressors industry dummies IND_k, controlling for unobserved heterogeneity at the industry level, and *Cc* are country specific effects, accounting for country unobservable heterogeneity. Table 5 provides a description of dependent and explanatory variables, together with some summary statistics, while Table 6 reports the correlation matrix.

TABLE 5

DESCRIPTION OF THE VARIABLES USED IN THE ESTIMATIONS AND THEIR MAIN SUMMARY STATISTICS

Variable	Description	Mean	Std. Dev.	Min	Max	Obs
PRODt	Turnover on employees (thousand Euros average 2009-2014)	4.866	0.791	2.515	10.437	9,507
PRODv	Added value on employees (thousand Euros average 2009-2014)	3.782	0.617	-0.362	8.327	9,826
ZERO	Dummy=1 if a firm is classified as inactive abroad in the EFIGE dataset (in 2008)	0.238	0.426	0	1	14,759
SINGLE	Dummy = 1 if a firm is pure importer of components/services or pure exporters or pure international producer (through FDI or international outsourcing), in 2008.	0.294	0.455	0	1	14,759
DUAL	Dummy = 1 if a firm is involved in two modes of international activity (import, export and international production), in 2008.	0.405	0.491	0	1	14,759
TRIPLE	Dummy = 1 if a firm is involved in all modes of international activity (import, export and international production), in 2008.	0.064	0.244	0	1	14,759
GVC	Dummy = 1 if a firm is single, or dual, or triple mode	0.762	0.426	0	1	14,759
SUPPL	Dummy = 1 (= 0) if share of total sales consisting in produced-to-order goods is 100% (0%)	0.525	0.499	0	1	14,755
SIZE	Dummy = 1 if a firm is small or medium-sized (under 250 employees)	0.712	0.453	0	1	14,759
AGE	Dummy = 1 if a firm is older than 20 years (in 2008)	0.577	0.494	0	1	14,759
GROUP	Dummy = 1 if firm belongs to a group (in 2008)	0.221	0.415	0	1	14,759
FOREGROUP	Dummy = 1 if firm belongs to a foreign group (in 2008)	0.088	0.284	0	1	14,759
FORECOMP	Dummy = 1 if the firm's main competitors are located abroad (in 2008)	0.141	0.348	0	1	14,751
R&D	Share of firm's turnover invested in R&D. average for 2007-2009.	0.511	0.500	0	1	14,755
INNO	Dummy = 1 if a firm carried out (in the three years 2007-2009) product or process innovation	0.282	0.450	0	1	14,759
TRAIN	Percentage of employees involved in formal training programs in 2008	44.35	49.68	0	100	14,759

Source: Authors' calculations on EGIFE data.
All variables come from EU-EGIFE/Bruegel-UNICREDIT dataset.

Table 6

CORRELATION MATRIX

	Zero	Single	Dual	Triple	Gvc	Supp	Size	Age	Group	Foregroup	Forecomp	R&D	Inno	Train
ZERO	1													
SINGLE	-0.360	1												
DUAL	-0.461	-0.532	1											
TRIPLE	-0.146	-0.168	-0.215	1										
GVC	-1.000	0.360	0.461	0.146	1									
SUPPL	0.018	0.026	-0.019	-0.041	-0.018	1								
SIZE	-0.020	0.027	0.026	-0.069	0.020	0.066	1							
AGE	-0.084	-0.020	0.059	0.064	0.084	-0.038	-0.004	1						
GROUP	-0.148	-0.093	0.134	0.162	0.148	-0.013	-0.032	0.013	1					
FOREGROUP	-0.145	-0.081	0.139	0.123	0.145	-0.028	-0.042	0.010	0.584	1				
FORECOMP	-0.140	-0.078	0.136	0.116	0.140	-0.008	-0.029	0.017	0.143	0.166	1			
R&D	-0.286	-0.062	0.231	0.151	0.286	-0.055	-0.028	0.059	0.136	0.080	0.139	1		
INNO	-0.163	-0.057	0.154	0.080	0.163	-0.046	-0.035	0.019	0.091	0.074	0.070	0.343	1	
TRAIN	-0.039	-0.033	0.039	0.051	0.039	-0.055	-0.031	0.006	0.121	0.106	0.037	0.137	0.120	1

Source: Authors' calculations on Efige data.
For the description of the variables see Table 5.

Equation *(1)* is estimated considering first all EFIGE countries (Austria, France, Germany, Hungary, Italy, Spain and Britain) and then Italy alone. To deepen our analysis, we re-estimate model (1) on the whole sample by replacing SINGLE, DUAL and TRIPLE with a simple GVC dummy that takes value 1 if a firm is internationally active (*i.e.* if any among SINGLE, DUAL and TRIPLE takes value 1). This allows us to include as an additional regressor the interaction term GVC*SUPPL (INTE1), which makes it possible to evaluate the productivity effect of being a GVC supplier. When the sample is restricted to Italian data, INTE2 is the interaction term between GVC and SOUTH, the latter being a dichotomous variable coded 1 for firms located in Southern Italy.

3.2 *Results*

Table 7 reports estimates for all our sample countries. Columns 1 and 2 show the results from estimating equation *(1)*, alternatively computing average labour productivity (our dependent variable) as either total turnover (*PRODt*) or value added (*PRODv*) per employee.

A preliminary look at the control variables shows that most have the expected sign and for the most part are statistically significant at the 1% level. Partial exceptions are SIZE and INNO, which in some cases are not significant.

Turning to our variables of interest, the coefficients of SINGLE, DUAL and TRIPLE are always positive and highly significant. It is worth noticing that the coefficient of TRIPLE is higher than that of DUAL, which in turn is higher than SINGLE. A possible implication is that the beneficial effect of GVC participation is enhanced when the firm is integrated into a GVC with a more complex mode of internationalisation. The tests reported at the bottom of Table 7 indicate that the increase in the magnitude of the impact is statistically significant: firms marked by all three modes of international integration have the highest level of labour productivity in our sample, followed by firms involved in two modes and then by those involved in just one. Moreover, in the first two columns of Table 7, the SUPPL parameter is negative and significant, corroborating the hypothesis of a productivity gap between suppliers and final firms.

In columns 3 and 4, we replace our three mode variables with a single GVC dummy, coded 1if a firm is SINGLE, or DUAL, or TRIPLE mode and 0 otherwise. The coefficient is positive and significant, and its magnitude is consistent with the range of the SINGLE, DUAL, TRIPLE parameters reported in columns 1 and 2.

Table 7

ESTIMATION RESULTS: ALL EFIGE COUNTRIES

	DEPENDENT VARIABLE:					
	PRODt 1	*PRODv 2*	*PRODt 3*	*PRODv 4*	*PRODt 5*	*PRODv 6*
SINGLE	0.243***	0.105***				
	0.000	*0.000*				
DUAL	0.383***	0.155***				
	0.000	*0.000*				
TRIPLE	0.543***	0.196***				
	0.000	*0.000*				
GVC			0.322***	0.133***	0.395***	0.156***
			0.000	*0.000*	*0.000*	*0.000*
SUPPL	-0.047***	-0.022*	-0.053***	-0.024**	0.044	0.008
	0.002	*0.057*	*0.000*	*0.039*	*0.149*	*0.751*
INTE1 (GVC*SUPPL)					-0.123***	-0.039
					0.000	*0.133*
SIZE	-0.065*	-0.030	-0.105***	-0.041	-0.103***	-0.041
	0.050	*0.238*	*0.001*	*0.101*	*0.001*	*0.105*
AGE	0.045***	0.046***	0.052***	0.049***	0.052***	0.049***
	0.002	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
GROUP	0.213***	0.067***	0.231***	0.073***	0.230***	0.073***
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
FOREGROUP	0.295***	0.195***	0.306***	0.199***	0.307***	0.200***
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
FORECOMP	0.012	0.051***	0.027	0.057***	0.027	0.057***
	0.580	*0.002*	*0.199*	*0.001*	*0.206*	*0.001*
R&D	0.023	0.040***	0.046***	0.048***	0.046***	0.048***
	0.136	*0.001*	*0.004*	*0.000*	*0.003*	*0.000*
INNO	0.001	0.007	0.008	0.009	0.006	0.009
	0.972	*0.603*	*0.642*	*0.471*	*0.699*	*0.487*
TRAIN	0.073***	0.059***	0.077***	0.060***	0.077***	0.060***
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Observations	9,192	9,555	9,192	9,555	9,192	9,555
Model test	177.9	142.97	185.3	152.59	177.9	146.33
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
test (SINGLE, DUAL)	70.62	14.29				
	0.000	*0.000*				
test (DUAL, TRIPLE)	23.84	2.81				
	0.000	*0.094*				
test (SUPPL, INTE1)					13.05	3.24
					0.000	*0.039*
test (GVC, INTE1)					170.56	48.22
					0.000	*0.000*

Source: Authors' calculations on Egife data.

For the description of the variables see Table 5. In columns 1 (2), 3 (4) and 5 (6) the dependent variable is the average labour productivity, in log, computed on turnover (added value) in the years 2009-2014. Superscripts ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively. The *p*-values of the tests are given in italics. The standard errors (not reported) are robust to heteroskedasticity and autocorrelation. Constant and country and sector dummies (NACE 1.1) always included but not reported.

In the last two columns of Table 7, we add the interaction term INTE1 between the dummies GVC and SUPPL. The coefficient of this variable is negative and individually significant in column 5. Although SUPPL loses significance, INTE1 is jointly significant with each of its constituent terms (GVC and SUPPL) in both columns, as is shown by the *F*-tests (the last rows). This allows us to evaluate the impact of participation in GVCs for suppliers alone (summing the coefficients of GVC and INTE): it is positive and significant, although lower than for final firms.

Table 8 reports the results of the regression for Italian manufacturing firms.

In the first four columns we replicate the analysis performed for the whole sample. The results are notably similar, confirming that in the Italian case too firms' involvement in GVCs is correlated with higher productivity, and that, as the mode of internationalisation becomes more complex, the productivity gain increases. Again, suppliers lag behind, and in most cases controls are statistically significant.

To evaluate possible geographical peculiarities, we include the additional dummy SOUTH, taking value 1 for firms located in Southern Italy. Its coefficient always has the expected negative sign (but is highly significant only for *PRODt* specifications). In columns 5 and 6, the dummies SOUTH and GVC are interacted in the term INTE2. Although not significant alone, INTE2 is positive and jointly significant with each of its constituent terms (SOUTH and GVC) in both columns, as indicated by the F-tests in the last rows. This result indicates that the productivity gap afflicting Southern firms is sharply attenuated when the firm is part of a GVC. Moreover, the impact of GVC participation turns out to be greater for firms in the South than for those operating in the Centre or North.

Tables 9 and 10 show that our results are robust to replication in which firms are assigned to the various internationalisation modes by the method of Veugelers *et* al., (2013). Indeed, for both the entire sample and the Italian subsample the results are substantially identical to those of Tables 7 and 8.

Table 8

ESTIMATION RESULTS: ITALY

	DEPENDENT VARIABLE:					
	PRODt 1	*PRODv 2*	*PRODt 3*	*PRODv 4*	*PRODt 5*	*PRODv 6*
SINGLE	0.261***	0.090***				
	0.000	*0.003*				
DUAL	0.476***	0.168***				
	0.000	*0.000*				
TRIPLE	0.707***	0.233***				
	0.000	*0.000*				
GVC			0.378***	0.132***	0.321***	0.067
			0.000	*0.000*	*0.000*	*0.194*
SOUTH	-0.061**	-0.004	-0.078***	-0.010	-0.143*	-0.085
	0.031	*0.853*	*0.006*	*0.672*	*0.053*	*0.123*
INTE2 (GVC*SOUTH)					0.080	0.092
					0.316	*0.125*
SUPPL	-0.197***	-0.158***	-0.217***	-0.165***	-0.219***	-0.166***
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
SIZE	0.008	-0.107*	-0.065	-0.130**	-0.067	-0.133**
	0.903	*0.078*	*0.318*	*0.027*	*0.298*	*0.024*
AGE	0.081***	0.064***	0.088***	0.067***	0.088***	0.066***
	0.003	*0.003*	*0.001*	*0.002*	*0.001*	*0.003*
GROUP	0.144***	0.023	0.174***	0.033	0.174***	0.033
	0.001	*0.568*	*0.000*	*0.412*	*0.000*	*0.411*
FOREGROUP	0.189***	0.226***	0.215***	0.235***	0.216***	0.236***
	0.009	*0.000*	*0.003*	*0.000*	*0.003*	*0.000*
FORECOMP	-0.121***	-0.023	-0.099**	-0.015	-0.099**	-0.015
	0.009	*0.552*	*0.034*	*0.699*	*0.034*	*0.702*
R&D	0.035	0.068***	0.066**	0.079***	0.066**	0.079***
	0.226	*0.004*	*0.025*	*0.001*	*0.025*	*0.001*
INNO	0.020	0.049*	0.027	0.051**	0.027	0.051**
	0.514	*0.056*	*0.387*	*0.047*	*0.379*	*0.044*
TRAIN	0.080***	0.040	0.092***	0.044*	0.091***	0.043*
	0.009	*0.107*	*0.003*	*0.075*	*0.003*	*0.084*
Observations	2,810	2,769	2,810	2,769	2,810	2,769
Model test	37.66	20.06	37.63	20.71	35.83	19.92
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
test (SINGLE, DUAL)	49.31	10.36				
	0.000	*0.001*				
test (DUAL, TRIPLE)	13.75	1.39				
	0.000	*0.238*				
test (SOUTH, INTE2)					13.33	10.46
					0.000	*0.000*
test (GVC, INTE2)					57.52	13.00
					0.000	*0.000*

Source: Authors' calculations on Egife data.

For the description of the variables see Table 5. In columns 1 (2), 3 (4) and 5 (6) the dependent variable is the average labour productivity, in log, computed on turnover (added value) in the years 2009-2014. Superscripts ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively. The *p*-values of the tests are given in italics. The standard errors (not reported) are robust to heteroskedasticity and autocorrelation. Constant and sector dummies (NACE 1.1) always included but not reported.

TABLE 9

ROBUSTENESS CHECK: ALL EFIGE COUNTRIES

	DEPENDENT VARIABLE:					
	PRODt 1	*PRODv 2*	*PRODt 3*	*PRODv 4*	*PRODt 5*	*PRODv 6*
SINGLE	0.243***	0.083***				
	0.000	*0.000*				
DUAL	0.414***	0.140***				
	0.000	*0.000*				
TRIPLE	0.473***	0.148***				
	0.000	*0.000*				
GVC			0.303***	0.102***	0.348***	0.131***
			0.000	*0.000*	*0.000*	*0.000*
SUPPL	-0.056***	-0.019	-0.060***	-0.020	0.007	0.024
	0.001	*0.161*	*0.001*	*0.139*	*0.843*	*0.428*
INTE1 (GVC*SUPPL)					-0.080**	-0.053
					0.047	*0.118*
SIZE	-0.045	-0.027	-0.075**	-0.035	-0.074**	-0.035
	0.183	*0.297*	*0.022*	*0.177*	*0.023*	*0.182*
AGE	0.011	0.042***	0.015	0.044***	0.015	0.044***
	0.510	*0.002*	*0.395*	*0.001*	*0.399*	*0.001*
GROUP	0.191***	0.059***	0.211***	0.065***	0.212***	0.065***
	0.000	*0.003*	*0.000*	*0.001*	*0.000*	*0.001*
FOREGROUP	0.275***	0.179***	0.294***	0.183***	0.294***	0.184***
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
FORECOMP	0.021	0.062***	0.042*	0.069***	0.041*	0.068***
	0.350	*0.001*	*0.066*	*0.000*	*0.069*	*0.000*
R&D	-0.018	0.027*	0.000	0.033**	0.001	0.033**
	0.316	*0.062*	*0.995*	*0.025*	*0.967*	*0.023*
INNO	-0.016	0.007	-0.009	0.010	-0.010	0.010
	0.366	*0.604*	*0.615*	*0.481*	*0.602*	*0.485*
TRAIN	0.055***	0.056***	0.060***	0.057***	0.059***	0.057***
	0.001	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*
Observations	6,366	6,741	6,366	6,741	6,366	6,741
Model test	117.0	90.1	121.3	96.8	116.3	92.9
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
test (SINGLE, DUAL)	72.56	13.60				
	0.000	*0.000*				
test (DUAL, TRIPLE)	1.93	0.06				
	0.165	*0.805*				
test (SUPPL, INTE1)					7.28	2.18
					0.001	*0.113*
test (GVC, INTE1)					111.16	18.60
					0.000	*0.000*

Source: Authors' calculations on EGIFE data.

For the description of the variables see Table 5. In columns 1 (2), 3 (4) and 5 (6) the dependent variable is the average labour productivity, in log, computed on turnover (added value) in the years 2009-2014. Superscripts ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively. The *p*-values of the tests are given in italics. The standard errors (not reported) are robust to heteroskedasticity and autocorrelation. Constant and country and sector dummies (NACE 1.1) always included but not reported.

Table 10

ROBUSTNESS CHECK: ITALY

	DEPENDENT VARIABLE:					
	PRODt 1	*PRODv 2*	*PRODt 3*	*PRODv 4*	*PRODt 5*	*PRODv 6*
SINGLE	0.281***	0.114***				
	0.000	*0.001*				
DUAL	0.499***	0.163***				
	0.000	*0.000*				
TRIPLE	0.600***	0.261***				
	0.000	*0.000*				
GVC			0.360	0.134	0.280***	0.073***
			0.000	*0.000*	*0.000*	*0.010*
SOUTH	-0.212***	-0.103**	-0.229***	-0.108**	-0.230***	-0.130**
	0.000	*0.041*	*0.000*	*0.032*	*0.000*	*0.015*
INTE2 (GVC*SOUTH)					0.048	0.089
					0.664	*0.468*
SUPPL	-0.052*	0.016	-0.063**	0.012	-0.051*	0.015
	0.092	*0.546*	*0.044*	*0.657*	*0.098*	*0.569*
SIZE	0.020	-0.099	-0.055	-0.128**	0.013	-0.110*
	0.772	*0.121*	*0.396*	*0.039*	*0.840*	*0.080*
AGE	0.050	0.063**	0.049	0.063**	0.063**	0.068**
	0.109	*0.018*	*0.118*	*0.016*	*0.046*	*0.010*
GROUP	0.137***	0.006	0.169***	0.019	0.157***	0.017
	0.005	*0.894*	*0.001*	*0.693*	*0.001*	*0.714*
FOREGROUP	0.148*	0.209***	0.145*	0.207***	0.160**	0.211***
	0.053	*0.002*	*0.056*	*0.002*	*0.035*	*0.001*
FORECOMP	-0.076*	0.023	-0.065	0.024	-0.066	0.026
	0.099	*0.557*	*0.167*	*0.543*	*0.154*	*0.498*
R&D	-0.013	0.053*	0.005	0.059**	-0.001	0.059**
	0.691	*0.057*	*0.889*	*0.036*	*0.982*	*0.037*
INNO	-0.018	0.027	-0.007	0.029	-0.016	0.027
	0.589	*0.350*	*0.831*	*0.320*	*0.640*	*0.353*
TRAIN	0.072**	0.043	0.079**	0.046	0.079**	0.047
	0.032	*0.135*	*0.019*	*0.106*	*0.020*	*0.101*
Observations	2,035	2,007	2,035	2,007	2,035	2,007
Model test	22.9	13.1	22.3	13.4	20.2	12.7
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
test (SINGLE, DUAL)	36.57	2.59				
	0.000	*0.108*				
test (DUAL, TRIPLE)	1.80	2.10				
	0.181	*0.148*				
test (SOUTH, INTE2)					8.12	3.04
					0.000	*0.048*
test (GVC, INTE2)					35.91	4.09
					0.000	*0.017*

Source: Authors' calculations on Egife data.

For the description of the variables see Table 5. In columns 1 (2), 3 (4) and 5 (6) the dependent variable is the average labour productivity, in log, computed on turnover (added value) in the years 2009-2014. Superscripts ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively. The *p*-values of the tests are given in italics. The standard errors (not reported) are robust to heteroskedasticity and autocorrelation. Constant and sector dummies (NACE 1.1) always included but not reported.

4. - Summary and Concluding Remarks

The global fragmentation of production and the expansion of GVCs have significantly changed both the nature of national comparative advantages ("It's not wine for cloth anymore", Grossman, Rossi-Hansberg, 2006) and the competitiveness of firms, which participate in the new international division of labour with different tasks (and different rewards). The "new normal" in the organization of production fully involves firms from developing and developed countries alike. The phenomenon is remarkable: the interconnectedness of economies has far-reaching consequences and carries major policy implications. Nevertheless, the serious lack of good statistical data at firm level has precluded comprehensive empirical studies. The result is that this remains an under-researched area, investigated only recently and by a relatively small number of studies.

In line with recent developments, we contribute to this strand of the literature by investigating the impact of Italian manufacturing firms' participation in and positioning along GVCs on their labour productivity in the period that followed the great recession, *i.e.* 2009-2014. Given the structural features of Italian industry, globalisation has been a major shock for Italian firms. Nevertheless, as various papers have observed, Italy's participation in GVCs is currently comparable to that of Germany and France, as gauged both by the share of foreign value added embodied in Italian exports and by the share of national value added embodied in partners' exports.

We have conducted an empirical inquiry using the EU-EFIGE dataset of 2010. Thanks to the availability of new balance-sheet data (for the years 2011-2014) for our sample firms, we can update existing knowledge in the empirical literature by analyzing the post-crisis performance of Italian firms involved in GVCs.

To take account of the diversity of modes associated with GVCs, we examine various modes of firms' participation in GVCs, corresponding to simpler or more complex international activities: exports only, intermediate goods imports only, exporting and importing both, and international production.

Our approach is new in two major respects that have tended to be neglected by empirical studies. First, on the assumption that a firm's positioning along the GVC is a relevant factor, we distinguish supplier firms, *i.e.* firms that sell 100% of their output to other firms, from firms that serve the end market. Supplier firms, the "dark" side of the international division of labour, usually depicted as suffering from a productivity discount (Razzolini, Vannoni, 2011), make up the bulk of the industrial structure in a number of countries – most notably Italy.

Second, we focus on the micro features of the Italian North-South divide, which emerges in the contrast between the performance of firms that are and are not inserted in GVCs located in the South and the Centre-North. The empirical evidence on this point is definitely scanty. Further inquiry is essential, given that the South has a third of Italy's population and a per capita income scarcely half that of the Center-North.

Our findings imply three main new conclusions. First, the participation of Italian firms in GVCs is the highest among the European countries we consider. However, this is good news only in part, inasmuch as: *i*) Italian firms more frequently take part with the least advanced mode (single), and in particular as pure exporters; *ii*) Italy's internationalised firms are overwhelmingly positioned as pure suppliers, unlike Germany's the majority of which are final firms. The low incidence of final firms highlights a salient feature of Italian industry generally, namely the lack of large key players – usually assemblers or buyers located in the downstream portion of the GVCs – that hold more secure and lucrative positions and govern the chain.

Second, turning to the international participation and positioning of Southern Italian firms, matters appear still worse. A third of them are not engaged in any kind of international activity and so depend solely upon domestic demand. Southern firms are accordingly the least well integrated into GVCs, and where they do participate they tend to be sub optimally positioned, preventing them from fully exploiting the opportunities of global market penetration. This finding is a matter of serious concern, in that GVC participation would appear to be a new and novel parameter characterising the historical North-South divide.

Third, our econometric investigation confirms the prevalent thesis of the literature, namely that GVC participation is associated with higher productivity. Furthermore, we find that productivity gains are ordered: the more advanced the firm's mode of GVC participation, the greater the productivity premium. This result is robust to different specifications of the model and is confirmed for Southern firms as well. The literature's prediction concerning GVC positioning also stands confirmed. Suppliers do suffer from a productivity gap compared with final market firms, but when participating in a GVC (typically, by producing for firms that operate abroad), they obtain a productivity premium comparable to that gained by final firms. This suggests a cumulative learning process associated with GVC participation.

Summing up, there can be no doubt that GVCs do offer significant opportunities to get a toehold in larger markets and engage in exchange with more ad-

vanced firms, including the multinationals, which often coordinate the chains. Yet the capacity to take advantage of this opportunity would appear to be limited for Italian industry in general and practically non-existent for many Southern manufacturers. At the two ends of the GVC spectrum, Italy has too many firms in the simple participation mode and too few in complex modes.

As the OECD has observed (OECD, 2007), the globalisation of value chains confronts economies with new challenges as well as opportunities and raises major policy challenges for the OECD countries. This is particularly true of Italy, whose external competitiveness seems to depend on the strong performance of a "happy few" suppliers and final firms (Mayer, Ottaviano, 2007), too few to trigger powerful productivity growth at aggregate level. In order to expand the extensive margins of the firms that can face the global markets, at least two complementary sets of policies are required. For SMEs, uncertainty and information asymmetries in export and import markets are serious obstacles, especially in relation to the complex modes of internationalisation. Hence, public policy needs to facilitate the flow of specific export-import information and foster the diffusion of knowledge about foreign markets. This should be complemented by financial and fiscal incentives for SMEs to cooperate – for example, through formalized networks of firms – which would help create the critical mass required to bear the sunk costs of penetrating foreign markets. In addition, both to facilitate SMEs' links to GVCs and to increase the number of major assembler and buyer firms operating in Italy, policies to attract foreign direct investment would be fruitful in the light of the role played by large firms and multinationals within GVCs. What is required if such measures are to have an adequate impact on the economic system is no secret, and the want of it has long been felt: an institutional arrangement guaranteeing sufficient resources and a medium-period timeframe; simple, certain rules for firms; and stable institutional interlocutors. Finally, good quality micro data are badly needed to support specific policy design and to permit the assessment of policies' effectiveness.

BIBLIOGRAPHY

Accetturo A. - Giunta A. (2016), «Value Chains and the Great Recession: Evidence from Italian and German Firms», Banca d'Italia, Questioni di Economia e Finanza, *Occasional Papers*, no. 304, Rome.

Accetturo A. - Giunta A. - Rossi S. (2012), «Being in a Global Value Chain: Hell or Heaven?», *VoxEu,* December 15.

Accetturo A. - Linarello A. - Petrella A. (2016), «Legal Enforcement and Global Value Chains: Micro-Evidence from Italian Manufacturing», in Banca d'Italia, *Global Value Chains: New Evidence and Implications,* Seminari e Convegni, no. 21, pp. 269-289.

Agostino M. - Giunta A. - Nugent J.B. - Scalera D. - Trivieri F. (2015), «The Importance of Being a Capable Supplier: Italian Industrial Firms in Global Value Chains», *International Small Business Journal*, vol. 33, no. 7, pp. 708-730.

Agostino M. - Giunta A. - Scalera D. - Trivieri F. (2016), «Imports, Productivity and Global Value Chains: A European Firm-Level Analysis», manuscript, downloadable from *http://www.etsg.org/ETSG2016/Papers/102.pdf*

Alessandria G. - Kaboski J.P. - Midrigan V. (2011), «US Trade and Inventory Dynamics», *American Economic Review*, vol. 101, no. 3, May, pp. 303-307.

Al-Haschimi A. - Gächter M. - Lodge D. - Steingress W. (2016), «The Great Normalisation of Global Trade», *VoxEu.org*, October 14.

Altomonte C. - Di Mauro F. - Ottaviano G. - Rungi A. - Vicard V. (2012), «Global Value Chains during the Great Trade Collapse. A Bullwhip Effect», European Central Bank, *Working Paper*, no. 1412.

Amador J. - Cabral S. (2015), «Global Value Chains, Labour Markets and Productivity», in Amador J. - di Mauro F. (eds)*, The Age of Global Value Chains: Maps and Policy Issues*, *VoxEU.org*, eBook, CEPR Press, pp. 108-120.

Amador J. - Cappariello R. - Stehrer R. (2015), «Foreign Value Added in Eurozone Exports», in Amador J. - di Mauro F. (eds), *The Age of Global Value Chains: Maps and Policy Issues*, *VoxEU.org*, eBook, CEPR Press, pp. 24-35.

Amador J. - di Mauro F. (2015), «The Age of Global Value Chains: Maps and Policy Issues», *VoxEU.org*, eBook, CEPR Press.

Baldwin J. - Yan B. (2014), «Global Value Chains and the Productivity of Canadian Manufacturing Firms», *Economic Analysis Research Paper Series*, Statistics Canada, Ministry of Industry.

Baldwin R. (2009), «The Great Trade Collapse: Causes, Consequences and Prospects», *VoxEU.org*.

Baldwin R. - Venables A. (2013), «Spiders and Snakes: Offshoring and Agglomeration in the Global Economy», *Journal of International Economics*, vol. 90, pp. 245-254.

Bekes G. - Halpern L. - Koren M. - Murakozy B. (2011), «Still Standing: How European Firms Weathered the Crisis», *The Third EFIGE Policy Report*, Blueprint, no. 15, Bruegel.

Bems R. - Johnson R.C. - Yi K.M. (2010), «The Role of Vertical Linkages in the Propagation of the Global Downturn of 2008», *IMF Economic Review*, vol. 58, no. 2, pp. 295-326.

Bernard A.B. - Jensen J.B (1999), «Exceptional Exporter Performance: Cause, Effect, or Both?», *Journal of International Economics*, vol. 47, no. 1, pp. 1-25.

Brancati E. - Brancati R. - Maresca A. (2015), *Global Value Chains, Innovation and Performance: Firm-Level Evidence from Italy*, mimeo.

Bussière M. - Callegari G. - Ghironi F. - Sestieri G. - Yamano N. (2013), «Estimating Trade Elasticities: Demand Composition and the Trade Collapse of 2008-2009», *American Economic Journal, Macroeconomica*, vol. 5, no. 3, pp. 118-151.

Cappariello R. - Felettigh A. (2015), «How Does Foreign Demand Activate Domestic Value Added? A Comparison among the Largest Euro-Area Economies», in Banca d'Italia, *Temi di Discussione*, no. 1001, reprinted in Banca d'Italia, *Global Value Chains: New Evidence and Implications*, Seminari e Convegni, no. 21, 2016, pp. 3-31.

Cherubini L. - Los B. (2016), «Regional Employment Patterns in a Globalizing World: A Tale of Four Italies», in Banca d'Italia, *Global Value Chains: New Evidence and Implications*, Seminari e Convegni, Banca d'Italia, Rome, no. 21, pp. 213-235.

Constantinescu C. - Mattoo A. - Ruta M. (2015), «Explaining the Global Trade Slowdown», *VoxEu.org*, January 18.

Costinot A. - Vogel J. - Wang S. (2013), «An Elementary Theory of Global Supply Chains», *Review of Economic Studies*, vol. 80, pp. 109-144.

De Backer K. - Miroudot S. (2014), «Mapping Global Value Chains», European Central Bank, *Working Paper Series*, May, no. 1677.

Dell'agostino L. - Nenci S. (2016), «Il modello di specializzazione della manifattura italiana alla luce dei nuovi dati in valore aggiunto», in Ice, *Rapporto Ice 2015-16. L'Italia nell'economia internazionale*, Roma.

De Loecker J. (2007), «Do Exports Generate Higher Productivity? Evidence from Slovenia», *Journal of International Economics*, vol. 73, pp. 69-98.

Ferrantino M. - Taglioni D. (2014), «Global Value Chains in the Current Trade Slowdown», *VoxEu.org*, April 6.

Formai S. - Vergara Caffarelli F. (2015), «Quantifying the Productivity Effects of Global Value Chains», Cambridge, *Working Paper in Economics*, no. 1564, reprinted in Banca d'Italia, *Global Value Chains: New Evidence and Implications*, Seminari e Convegni, no. 21, 2016, pp. 157-184.

Gereffi G. - Humphrey J. - Sturgeon T. (2005), «The Governance of Global Value Chains», *Review of International Political Economy*, vol. 12, no. 1, pp. 78-114.

Giannola A. - Petraglia C. - Scalera D. (2016), «Net Fiscal Flows and Interregional Redistribution in Italy: A Long-Run Perspective (1951-2010)», *Structural Change and Economic Dynamics*, vol. 39, pp. 1-16.

Giovannetti G. - Marvasi E. - Sanfilippo M. (2015), «Supply Chains and the Internationalization of SMEs: Evidence from Italy», *Small Business Economics*, vol. 44, pp. 845-865.

Giunta A. - Nifo A. - Scalera D. (2012*),«*Subcontracting in Italian Industry. Labour Division, Firm Growth and the North-South Divide», *Regional Studies*, vol. 46, no. 8, pp. 1067-1083.

Grossman G.M. - Rossi-Hansberg E. (2006), «Trading Tasks: A Simple Theory of Offshoring», MIT Press, *NBER Working Paper*, no. 12721.

Helpman E. - Melitz M. - Yeaple S. (2004), «Exports versus FDI with Heterogeneous Firms», *American Economic Review*, vol. 94, pp. 300-316.

Humphrey J. - Schmitz H. (2002), «How Does Insertion in Global Value Chains Affect Upgrading in Industrial Clusters?», *Regional Studies*, vol. 36, no. 9, pp. 1017-1027.

Kasahara H. - Lapham B. (2013), «Productivity and the Decision to Import and Export: Theory and Evidence», *Journal of International Economics*, vol. 89, no. 2, pp. 297-316.

Koopman R. - Powers W. - Wang Z. - Wei S. (2011), «Give Credit Where Credit is Due: Tracing Value-Added in Global Production Chains», *NBER Working Paper*, no. 16426.

Mayer T. - Ottaviano G. (2007), *The Happy Few: The Internationalisation of European Firms. New Facts Based on Firm-Level Evidence*, Blueprint, no. 3, Bruegel.

Mazzeo E. (2016), «L'internazionalizzazione commerciale delle imprese italiane», in Ice, *Rapporto Ice 2015-16. L'Italia nell'economia internazionale*, Rome.

Melitz M.J. (2003), «The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity», *Econometrica*, vol. 71, no. 6, pp. 1695-1725.

Miroudot S. - Ragoussis A. (2009), «Vertical Trade, Trade Costs and FDI», OECD Publishing, Paris, Trade Policy, *Working Papers*, no. 89.

Oecd (Organisation for Economic Cooperation and Development) (2007), *Structural Adjustment and Economic Performance*, OECD Publishing, Paris.

-.- (2012), *Mapping Global Value Chains*, OECD Publishing, Paris.

-.- (2015), *The Future of Productivity*, OECD Publishing, Paris.

Razzolini T. - Vannoni D. (2011), «Export Premia and Subcontracting Discount: Passive Strategies and Performance in Domestic and Foreign Markets», *World Economy*, vol. 34, no. 6, pp. 984-1013.

Svimez (2016), *Rapporto Svimez 2016 sull'economia del Mezzogiorno*, Il Mulino, Bologna.

Veugelers R. (2013)*, Manufacturing Europe's Future*, Bruegel Blueprint Series, Volume XXI.

Veugelers R. - Barbiero F. - Blanga-Gubbay M. (2013), «Meeting the Manufacturing Firms Involved in GVCs», in Veugelers R. (ed.), *Manufacturing Europe's future*, Bruegel Blueprint Series, vol. XXI, pp. 108-138.

Yi K.M. (2009), «The Collapse of Global Trade: The Role of Vertical Specialisation», in Baldwin R. - Evenett S. (eds), *The Collapse of Global Trade, Murky Protectionism, and the Crisis: Recommendations for the G20*, pp. 45-48, *VoxEU.org*.