© SYMPHONYA Emerging Issues in Management, n. 2, 2013
symphonya.unimib.it

International Offshoring, Local Effects: An Inquiry on Italian Firms

Giancarlo Corò[*], *Marina Schenkel*[**], *Mario Volpe*[***]

Abstract

Does offshoring affect industrial productivity at local level? In order to reply to this question a set of equation have been estimated on a panel of Italian provinces in the period 1999-2010, using DOLS (Dynamic Ordinary Least Square) methodology for panel data.

The main results of the empirical analysis are: 1) offshoring has not damaged manufacturing employment: 2) offshoring has increased employment in services. The proposed explanation is that offshoring is associated with productivity growth, an indirect proof that the process was not pursued simply as a cost-reduction seeking strategy.

However short and long run effects may differ, and data shows that the process is still in its initial stage

Keywords: International Offshoring; Local Effects; Italian Affiliates Abroad; Global Competition

1. International Offshoring. Conceptual Framework and Research Questions

The main purpose of this article is to analyse the impacts of international offshoring at domestic base, intended here as the place where firms locate the property competences and where they should develop the business functions to control the value chain. According with a wide economic literature, offshoring processes occur when the firm has got a size and some strategic capabilities to capture the gain in global networks. So, offshoring is by definition associated to higher productivity, more innovation and, at end, upgrading processes. In this article we try to deepen these standpoints for Italian economy, facing two different questions related to offshoring processes: the first is to investigate the impacts of offshoring not just at firms level, but around it, that means the context where firm

[*] Associate Professor of Economics, University of Venice Ca' Foscari (corog@unive.it)

[**] Full Professor of Economics, University of Udine (marina.schenkel@uniud.it)

[***] Associate Professor of Economics, University of Venice Ca' Foscari, Department of Economics (mvolpe@unive.it)

Edited by: ISTEI – *University of Milan-Bicocca* ISSN: 1593-0319

Corò Giancarlo, Marina Schenkel, Volpe Mario (2013) International Offshoring, Local Effects: an Inquiry on Italian Firms, Symphonya. Emerging Issues in Management (symphonya.unimib.it), n. 2, pp. 1 – 13.

http://dx.doi.org/10.4468/2013.2.07coro.schenkel.volpe

gets its "industrial commons" (labor market, strategic suppliers, advanced services); the second question is to discriminate the types of offshoring, assuming that cost-seeking offshoring may be different from the strategic resource-seeking strategy of internationalization. As we will see, our analysis found a clear validation of this last hypothesis, specifically if we take in account the local context of the firm.

In this article are discussed the main characteristics and trends of the offshoring processes that have taken place in the Italian economy in the last decade and, overall, during the financial crisis. The research is based on various data sources, and overall the recent results of the Outward-FATS survey for the time period 2007-2011 (as collected by Istat and Eurostat)[1].

Following Reinert (2012), various types of firms internationalization can be distinguished. Starting from the lowest levels, there are firms who export through other firms acting as sales agents (Indirect Exporting) or complete the export transaction themselves. At an intermediate level there are a variety of non-equity contractual agreements, according to which firms license foreign firms to produce abroad, without (licensing) or with (franchising) conditions to ensure consistency and subcontracting. The three higher levels consist of international investment in the forms of Joint Venture, Mergers and Greenfield Investment.

According to the relevant literature at the corporate level (Barba Navaretti, Venables 2004; Castellani, Zanfei 2006; Brondoni 2008) and at the national and regional level (Castellani, Pieri 2010; Feenstra, Taylor 2012; Brondoni 2012) the effects of Foreign Direct Investment (FDI) and of offshoring on the domestic base could be the following: employment substitution, export substitution, economies of scale, research spill-overs, labor and Total Factors Productivity growth, skills upgrading and consequent wage increases, supply-chain upgrading, costs arbitrage. A fiscal effect, acting through transfer prices, could be added. These effects are summarized in Figure 1, where the variables investigated in the present work are highlighted.

Figure 1: *Domestic effects of Horizontal and Vertical FDI.*

	Horizontal	**Vertical**
Variable affected	**FDI**	**FDI**
Employment substitution	+ ≈	+ ≈
Export substitution	+ (-)	(-)
Economies of Scale	++	+
R&D spill-over	++	++
Labor & TF Productivity growth	++	++
Skill & wage up-grading	+	++
Supply-chain selection	+ (-)	+ (-)
Fiscal effects (transfer price)	+	+
Costs arbitrage	++	++

In the present article, in fact, the focus will be on productivity, employment and skill upgrading. While the effects on labor productivity and skill upgrading are expected to be positive, more uncertain are the effects on employment at home. The effect is also expected to vary according to the horizontal or vertical nature of the investment abroad.

Further research, of an empirical and theoretical nature, regards the disintegration of production through its international fragmentation (Arndt, Kierzkowski 2001), and the integration of trade considered as production network (Feenstra 1998, Hummels, Rapoport, Yi 1998).

Inside the Global Value Chains theory (Gereffi, Humphrey, Sturgeon 2005) a further stream of research introduces the theme of the transition from local to global value chains, analyzing the Italian Districts upgrading processes (Corò, Micelli 2007) and their effects on the home base .

Another recent approach warns about a longer term negative effect: the loss of Industrial commons, which can affect also innovation capabilities (Pisano, Shih 2009; Buciuni, Corò, Micelli 2013). This risk can induce re-shoring processes and is the origin of the so called "back to manufacturing" strategy in industrial developed countries (Berger 2013).

2. Offshoring by Italian Firms: Main Characteristics and Trends

2.1 Differential Characteristic of Italian Firms Affiliates Abroad.

In the following Table 1 some data on Italian affiliates abroad in the years 2007-2010 are presented, disaggregated between two macro-sectors (Industry and Services).

Table 1: *Characteristics of Italian Affiliates Abroad (2007-2011)*

Macro-sectors	Number of firms	Number of Employees	Turnover (Million of euros)	Revenue (Net of good and services. Million of euros)	Export (% of turnover)
	2007				
Industry	7,843	837,732	181,739	57,175	32.8
Services	12,207	583,337	207,157	….	11.2
Total	20,050	1,421,069	388,896	….	24.7
	2008				
Industry	7,745	853,976	189,618	63,092	39.7
Services	13,227	641,320	196,762	….	13.8
Total	20,972	1,495,296	386,380	….	26.4
	2009				
Industry	8,082	847,378	169,142	53,869	31.6
Services	13,181	661,853	208,641	….	12.1
Total	21,263	1,509,231	377,783	….	20.8
	2010				
Industry	8,324	914,978	213,798	64,126	43.3
Services	13,757	690,168	220,827	….	14.1
Total	22,081	1,605,146	434,625	….	28.5
	2011				
Industry	8,345	970,854	273.743	83,056	34.5
Services	13,337	726,503	235.908	….	19.3
Total	21,682	1,697,357	509.651	….	27.2
	Absolute Change from 2007 to 2011				
Industry	502	133.122	92.004	25.881	502
Services	1.130	143.166	28.751	….	1.130
Total	1.632	276.288	120.755	….	1.632

Source: Computation on Istat, "Struttura, performance e nuovi investimenti delle multinazionali italiane all'estero", www.istat.it

Industrial enterprises increase both in number (+ 6.4 %) and in employees (+ 15.9 %), but are outnumbered by Services enterprises both in levels and in percentage increases (+ 9.3 % number of firms and + 24.5 % employees). The turnover of Italian affiliates over domestic firms is significant, especially in the so called "Made-in-Italy sectors": in 2001 Apparel and Textile counts for 58.2%, in Leather Goods for 39.0% and in Furniture for 37.5%.

In the period analyzed, Turnover increases by 50.6% in industry, and 13.9 % in Services. It is also interesting to note that in 2007 Turnover was higher in services, but the reverse is true from 2010.

Consequently in Industry both Affiliates' Revenue and Export as percentage of Turnover are growing fast, except in the worse crisis year, i.e. 2009.

From this evidence is natural to argue that industrial enterprises have resorted to offshoring as a reaction to the current crisis, beginning in 2008. The same seems not to apply to Services enterprises, which seem to follow a positive, but more stable trend. This points to a difference in firms' strategies, i.e. in the goals pursued investing abroad by the firms in the two macro-sectors.

2.2 Location of Italian Affiliates

In the following Tables (2, 3 and 4) the location of Italian firms affiliates abroad is considered, for the year 2011. The Top Ten countries in employment abroad have been selected.

Table 2: *Location of Italian Companies Abroad in 2011. Top Ten Countries.*

Countries	Firms	Employees	Turnover (% over Total Firm Turnover)
United States	2.126	198.090	13.6
Brazill	596	131.004	7.0
Germany	1.490	122.689	11.6
Romania	3.283	116.123	1.4
China	840	106.714	2.4
France	1.762	91.163	11.0
Poland	647	88.529	2.9
Spain	1.326	76.946	10.5
UK	966	59.678	3.9
Argentina	215	39.547	1.7
Total of first 10 Countries over Total Firms	**61.1**	**60.7**	**65.9**

Source: Computation on Istat, "Struttura, performance e nuovi investimenti delle multinazionali italiane all'estero", (www.istat.it)

Considering the total aggregate, a rather heterogeneous group of countries is included, where almost all the continents and stages of development, from US to Argentina, are represented.

If we restrict our attention to Industrial firms (Table 2b) some remarkable changes appear, as the top position of Romania (which was third in the preceding ranking), together with the inclusion of Mexico and the exclusion of Argentina. Obviously

the reverse is true when Services are considered (Table 2c), where Mexico is excluded and Austria is included in the Top Ten countries.

Table 3: *Location of Italian Companies Abroad in 2011. Top Ten Countries. Industry*

Countries	Firms	Employees	Turnover (% over Total Firm Turnover)
Brazil	330	97.334	9.3
United States	755	94.046	18.6
Romania	1.495	86.244	1.8
China	514	72.014	2.8
France	543	51.826	7.5
Poland	314	51.163	4.1
Germany	398	49.852	6.4
Spain	434	35.562	13.9
Mexico	139	28.153	1.8
UK	286	28.043	4.6
Total of first 10 Countries over Total Firms	**62.4**	**61.2**	**70.8**

Source: Computation on Istat, "Struttura, performance e nuovi investimenti delle multinazionali italiane all'estero", (www.istat.it)

It has to be noted that if other characteristics are considered, as the number of firms or the percentage of Turnover originated abroad, a different ranking emerges. In particular the percentage of Turnover originated abroad is highest for affiliates in United States and Spain as far as industry is concerned, and Germany as far as services are concerned.

Table 4: *Location of Italian Companies Abroad in 2011. Top Ten Countries. Services*

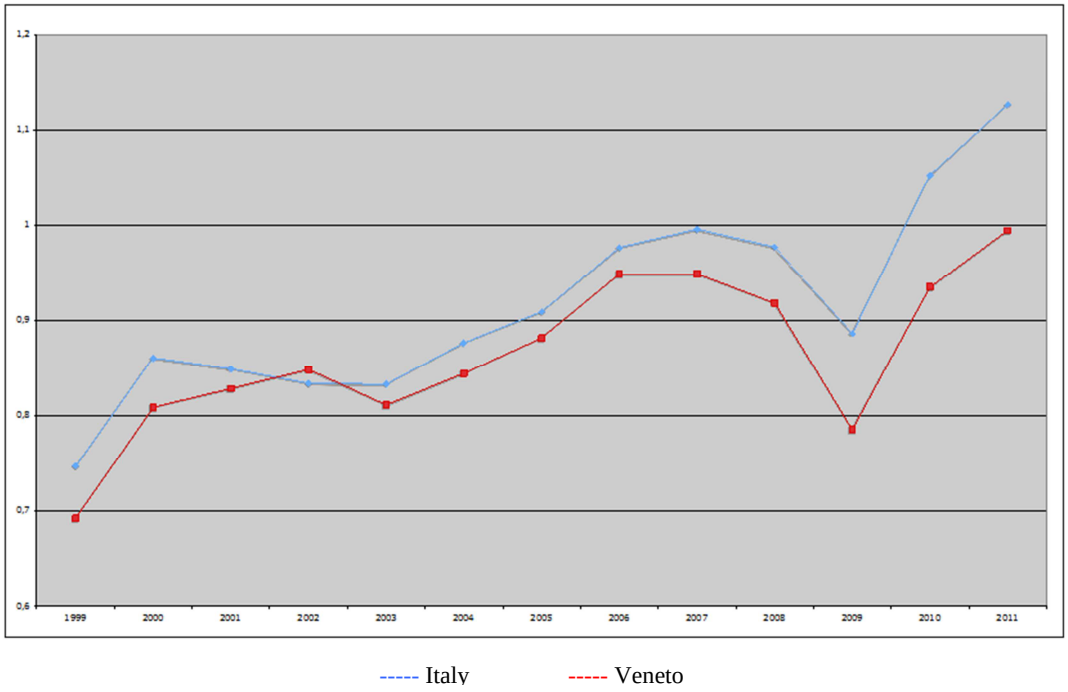
Countries	Firms	Employees	Turnover (% over Total Firm Turnover)
United States	1.371	104.044	7.8
Germany	1.092	72.837	17.6
Spain	892	41.384	6.5
France	1.219	39.337	15.0
Poland	333	37.366	1.5
China	326	34.700	1.9
Brazil	266	33.670	4.2
UK	680	31.635	3.1
Romania	1.788	29.879	0.9
Austria	269	22.774	3.8
Total of first 10 Countries over Total Firms	**61.8**	**61.6**	**62.4**

Source: Computation on Istat, "Struttura, performance e nuovi investimenti delle multinazionali italiane all'estero", (www.istat.it)

2.3. The Offshoring Dynamic

The features of offshoring dynamics already noted in the preceding section are confirmed examining an Offshoring index constructed as the percentage of inputs from abroad over output in the period 1999-2011. Except for the *annus horribilis* 2009, the same positive trend appears in Italy and in the Veneto region.

Figure 2*: Off-Shoring Index for Italy and Veneto Region 1999-2011.*



Source: Computation on Trade Statistics available from Istat, www.coeweb.it.

Offshoring is here computed and the share of imports of manufacturing good over value added in manufacturing. The strong specialization of Veneto in manufacturing explains the lower value of the index with respect to Italy; nevertheless, outsourcing plays a major role in both the economic systems, Italy and Veneto.

2.4. The Structure and the Goals of Offshoring

In the following Table 5 the ratio between the Italian export over the Italian affiliates abroad output is presented, disaggregated by industry. This ratio is a rough index of the relative importance of productive and commercial goals of offshoring. Leaving apart the case of petroleum, which is not easy to explain without more disaggregated product data, it is remarkable that the index is always greater than 1, except for Motor Vehicles and Non metallic products, indicating a prevalence of the Trade goals over the productive ones. To illustrate the heterogeneity in term of area of localization, we present the sectorial data for Asia. It has to be noticed that the ratio for Asia is always greater than 1, and greater than the world's ratio, except in the case of Textiles, Furniture and Basic metals. This seem to contradict the diffuse opinion that costs reduction is the main driver of offshoring towards East.

Table 5: *Italian Export over Italian Affiliates Abroad Output*

Sector	Asia	World		Sector	Asia	World
Food Products	4,2	1,8		Non metallic products	1,9	0,7
Textile	2,4	3,3		Basic Metals	2,5	2,7
Leather	11,9	8,7		Computers	5,2	3,8
Wood	7,5	2,0		Electrical equipments	1,7	1,6
Petroleum	49,4	56,5		Machinery	2,7	2,0
Chemicals	5,9	2,1		Motor vehicles	1,8	0,7
Pharmaceuticals	12,1	2,5		Transport equipments	2,1	2,2
Rubber and plastic	1,7	1,3		Furniture	4,0	4,7

Source: Computation on Istat, "Struttura, performance e nuovi investimenti delle multinazionali italiane all'estero", www.istat.it

3. Assessing the Local Effects of Offshoring Activities

In the following section the results will be presented and commented of some econometric estimations which have been carried on in order to gauge the impact of offshoring on crucial variables of the domestic economy, at the local level. As dependent variables Italian provinces productivity, employment and skill demand have been introduced.

3.1 Explaining Productivity

Does offshoring affect industrial productivity at local level? In order to reply to this question a set of equation have been estimated on a panel of Italian provinces in the period 1999-2010, using DOLS (Dynamic Ordinary Least Square) methodology for panel data. The data set of economic variables detailed at provincial level is available from Istat.

As it can be seen in Table 6, Offshoring, Manufacturing intensity (defined as the ratio between employment in manufacturing and total employment) and Productivity in services have a positive sign as explaining variables. The presence of an Industrial district to the province has a negative sign, a result which confirms other results on firms profitability obtained on microdata.

Table 6: *Explaining Labor Productivity in Italian Provinces 1999-2010.*

Dependent variable: labor productivity				
Variable	**Coefficient**	**Standard Error**	**Z**	**p-value**
Offshoring	7,116.45	1,968.93	3.614	0.0003 ***
Industry intensity	24,966.20	11,044.80	2.26	0.0238 **
Productivity in services	0.824926	0.0447811	18.42	8.86e-076 *
Value added in services	-0.010666	0.00953486	-1.119	0.2633
Skilled labor intensity	-8.21085	57.4874	-0.1428	0.8864
Industrial district dummy	-4,730.92	1,763.10	-2.683	0.0073 ***
Urban district dummy	-1,160.67	2,430.92	-0.4775	0.633

Source: our computations on data available in Istat (www.istat.it).

Restricting our attention to productivity in manufacturing, we can see from Table 7 that offshoring in Asia and East Europe has a positive effect, together with (again) productivity in Services. Dummies for geographical areas have a significant and positive effect as far as North and Center Provinces are concerned.

Table 7: *Explaining Manufacturing Labor Productivity in Italian Provinces 1999-2010.*

Dependent variable: labor productivity in manufacturing				
Variable	**Coefficient**	**Standard Error**	**Z**	**p-value**
Offshoring in Asia	-12,857.10	6,461.26	-1.990	0.0466 **
Offshoring in East Europe	-19,853.40	8,362.63	-2.374	0.0176 **
Change in manufacturing value added	-13,027.10	12,180.30	-1.07	0.24848
Change of productivity in services	0.949868	0.038215	24.86	2.23e-136 ***
Change in service value added	0.003161	0.011556	0.2735	0.7845
Change in skilled employment	-20.20	55.13	-0.3663	0.7141
North Italy dummy	7,672.91	2,026.73	3.786	0.0002 ***
Center Italy dummy	5,609.23	2,954.41	1.899	0.0576 *

Source: our computations on data available in Istat (www.istat.it).

3.2. Employment and Skills

Is offshoring reducing manufacturing employment in the local economy? And what about services? In the following Tables 8 and 9 the results of a panel estimation are presented where the dependent variables are employment in manufacturing and services in Italian provinces (1999-2011), as in the previous section.

Table 8: *Explaining Employment in Manufacturing in Italian Provinces 1999-2010.*

Dependent variable: employment in manufacturing				
Variable	**Coefficient**	**Standard Error**	**Z**	**p-value**
Manufacturing intensity	0.522149	0.0174429	29.93	6.94e-197 ***
Offshoring	0.00542577	0.0026239	2.068	0.0387 *
Change in manufacturing productivity	5.534210E-07	6.77228E-08	-8.172	3.04e-016 ***
Industrial district dummy	0.00939328	0.00318987	2.945	0.0032 ***
Urban district dummy	0.0130867	0.00317136	4.127	3.68e-05 ***

Source: our computations on data available in Istat (www.istat.it).

Table 9: *Explaining Employment in Services in Italian Provinces 1999-2010.*

Dependent variable: employment in services				
Variable	**Coefficient**	**Standard Error**	**Z**	**p-value**
Constant	0,373415	0.0747387	4.9963	<0.00001 ***
Offshoring in Asia	0.0116199	0.0192312	0.6042	0.5458
Offshoring in East Europe	0.0352865	0.0297628	1.1856	0.236
Change in value added in manufacturing	0.0301762	0.0699472	0.4314	0.6624
Change in labor productivity	-1.40352E-07	2.81816E-07	-0.498	0.61855
Change in service productivity	9.05E-07	3.53124E-07	2.5617	0.01052 **

Source: our computations on data available in Istat (www.istat.it).

As can be seen examining the two tables, employment in manufacturing has different determinants in comparison with employment in Services. This latter is influenced only by the productivity in services themselves, while employment in manufacturing, in addition to the productivity in manufacturing, is positively affected by the prevalence of the industry base (manufacturing intensity) and by offshoring. The dummies indicating a urban or district character are significant with a positive sign. This latter result is not in contrast with the negative sign obtained when labor productivity is the dependent variable. Is perfectly understandable that, above all in crisis years, phenomena of labor hoarding are more frequent in district areas than elsewhere. Employment in services, on the other hand, depends mainly on their own productivity, while offshoring is insignificant.

In order to further investigate the qualitative aspect of the labor market some Probit analysis on the demand for labor have been conducted, employing data from the Excelsior Survey on firms vacancies. The main result deriving from the Probit analysis on manufacturing demand of labor (Table 10) confirms the relevance of the manufacturing base in determining the performance of local economic systems (in our analysis, the Italian provinces).

Table 11: *Explaining Labor Demand in Manufacturing in Italian Provinces 2008-2011.*

Probit. Dependent variable: manufacturing demand of labor						
Variable	**Coefficient**	**Standard Error**	**Z**	**P>|z|**	**[95% Confidence Interval]**	
Dummy	0.0376146	0.1797592	0.21	0.834	-0.3147069	0.3899362
Offshoring	-0.2808543	0.3006984	-0.94	0.35	-0.8702123	0.3085037
Manufacturing Intensity	3.770377	1.752643	2.15	0.031	0.3352591	7.205494
Productivity in manufacturing	-2.72E-06	0.0000186	-0.15	0.884	-0.0000392	0.0000337
Constant	-0.4074867	0.864364	-0.47	0.637	-2.101575	1.286601

Source: our computation on data available in Istat (www.istat.it) and Excelsior (http://excelsior.unioncamere.net)

Outsourcing clearly changes the organization and the skills required by the involved firms. In Table 11 and 12 we summarize the main determinants for the explanations of high skilled labor demand and skill shortage (defined as the unmatched demand for skilled labor). Once again, manufacturing intensity is the key explaining variable, together with productivity in manufacturing itself.

Table 12: *Explaining High Skill Labor Demand in Italian Provinces 2008-2011.*

Probit. Dependent variable: high skill labor demand						
Variable	**Coefficient**	**Standard Error**	**Z**	**P>|z|**	**[95% Confidence Interval]**	
Offshore	-0.0073813	0.2466856	-0.03	0.976	-0.4908762	0.4908762
Manufacturing Intensity	*0.4398103*	*0.260222*	*1.69*	*0.091*	*-0.0702157*	*0.9498364*
Productivity in manufacturing	0.3626475	1.025733	0.35	0.724	-1.647753	2.373048
Productivity in services	-0.8531769	2.059159	-0.41	0.679	-4.889055	3.182701
Constant	0.435077	21.79191	0.07	0.947	-41.27629	44.14644

Source: our computation on data available in Istat (www.istat.it) and Excelsior (http://excelsior.unioncamere.net)

Table 13*: Explaining Skill Shortage in Italian Provinces 2008-2011.*

Probit. Dependent variable: skill shortage						
Variable	**Coefficient**	**Standard Error**	**Z**	**P>|z|**	**[95% Confidence Interval]**	
Offshore	-0.3089867	0.246626	-1.25	0.21	-0.7923648	0.1743914
Manufacture intensity	0.8784862	0.2752083	3.19	0.001	0.3390879	1.417885
Productivity in manufacturing	2.121488	1.060822	2.00	0.046	0.0423157	4.200661
Productivity in Services	-2.259835	2.187608	-1.03	0.302	-6.547468	2.027798
Constant	-2.48022	23.21169	-0.11	0.915	-47.97429	43.01385

Source: our computation on data available in Istat (www.istat.it) and Excelsior (http://excelsior.unioncamere.net)

4. Conclusive Remarks and Future Research

The main results of the empirical analysis are: 1) offshoring has not damaged manufacturing employment: 2) offshoring has increased employment in services. The proposed explanation is that offshoring is associated with productivity growth, an indirect proof that the process was not pursued simply as a cost-reduction seeking strategy.

However a caveat must be put forward: can offshoring threaten industrial commons, or, in other words, the industrial base reduction can endanger the stock of human capital and that "industrial atmosphere" which has been constructed after a long period of growth? Since manufacturing intensity explains employment resilience and skills up-grade, the provisional conclusion is that as long manufacturing is not reduced, offshoring can be beneficial. However short and long run effects may differ, and data shows that the process is still in its initial stage.

Our future research agenda will focus on industries specificities, also on the base of the Industrial Census (2011) data which have just been diffused by Istat.

The same type of analysis will be extended from Italian Nuts3-level to the European Nuts2 one.

Finally, another stream of research will address Global Value Chains account on trade data, in order to understand the extent of re-shoring processes which are on the way.

Bibliography

Arndt Sven W., Kierzkowski Henryk (Eds.). (2001) *Fragmentation: New Production Patterns in the World Economy*, Oxford University Press, Oxford.

Barba Navaretti Giorgio, Venables Anthony (2004) *Multinational Firms in the World Economy*, Princeton University Press.

Berger Suzanne (2013) *Making in America. From Innovation to Market*, The Mit Press, Cambridge, MA

Brondoni Silvio M.(2008) Market-Driven Management, Competitive Space and Global Networks, *Symphonya. Emerging Issues in Management, (symphonya.unimib.it)*, n. 1, pp. 14-27 http://dx.doi.org/10.4468/2008.1.02brondoni

Brondoni Silvio M. (2012) Innovation and Imitation: Corporate Strategies for Global Competition, *Symphonya. Emerging Issues in Management, (symphonya.unimib.it)*, n. 1, pp. 10-24 http://dx.doi.org/10.4468/2012.1.02brondoni

Buciuni Giulio, Corò Giancarlo, Micelli Stefano (2013) Rethinking the Role of Manufacturing in Global Value Chains, *Industrial and Corporate Change* (Advance Access published) December17, pp. 1-30, http://dx.doi.org/10.193/icc/dtt048

Castellani Davide, Pieri Fabio (2010) The Effect of Foreign Investments on European Regional Competitiveness, in: Giorgia Giovannetti, Paolo Guerrieri, Beniamino Quintieri *Business Services: the New Frontier of Competitiveness*, Rubettino, Soveria Mannelli.

Castellani Davide, Zanfei Antonello, Muendler Marc A. (2006) *Multinational firms, Innovation and Productivity*, Edward Elgar Cheltenham http://dx.doi.org/10.1430/8108

Corò Giancarlo, Micelli Stefano (2007) The Industrial Districts as Local Innovation Systems: Leader Firms and New Competitive Advantages in Italian Industry, *Review of the Economic Conditions in Italy*, 1, pp. 41.

Feenstra Robert C., Taylor Alan M.(2012) *International Economics*, Worth publisher, New York.

Feenstra Robert C. (1998) Integration of Trade and Disintegration of Production in the Global Economy, *Journal of Economic Perspectives*, 12, pp. 31-50.

Gereffi Gary, Humphrey John, Sturgeon Timothy (2005) The Governance of Global Value Chains, *Review of International Political Economy*, 1, pp.78-104.

Hummels David, Rapoport Dana, Yi Kei Mu (1998) Vertical Specialization and the Changing Nature of World Trade, *Federal Reserve Bank of New York Economic Policy Review*, 2, pp.79-99.

Pisano Gary P. , Shih Willy C. (2009) Restoring American Competitiveness, *Harvard Business Review*, 7-8, pp.114-125.

Notes

[1] Data utilized in the present work were provided by ISTAT, and refer to the Fats Outward Survey. Computations have been carried on at the Laboratorio per l'Analisi dei Dati ELEmentari of Istat and in compliance to norms on statistical secret and privacy protection. Results and opinions are in the responsibility of the authors and do not constitute official statistics. The analysis has been made without weights to report to the universe.