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**Article**

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Livio Romano\*

# Understanding Structural Divergence in European Manufacturing

The heterogeneity among European manufacturing systems has widened in the last 15 years under the competitive pressure of new industrial powers within and outside the EU boundaries and as a result of the 2008 global recession. This paper describes this transformation, in terms of the sectoral composition and the geographical concentration of industrial activities. It also analyses how cross-country differences in export performance, in the dynamics of domestic demand and in the exposure to low-cost import competition have contributed to the divergence in fortunes in European manufacturing.

The European manufacturing system has undergone deep transformations in the last 15 years, in terms of sectoral composition and of the geographical dispersion of its industrial activities across countries. Such changes reflect the combined effects of three forces.

The first of these forces is increased economic integration within the EU, as a result of the single currency adoption in 1999 and of the Eastern enlargement in 2004, which has brought within the common market countries with solid manufacturing bases (in particular the Czech Republic and Poland).

The second force is the increased integration with China, initiated in 2001 with the accession to the WTO of the most populated country in the world. The Chinese shock has had a tremendous effect on the geography of global manufacturing: between 2000 and 2014, China's share of world manufacturing output grew from an initial 8.3% to 32.8%, while the share of the advanced economies shrunk from 72.4% to 43.7% over the same time period.<sup>1</sup>

These two discontinuities have affected the competitive landscape of European firms in two significant ways: first,

by reinforcing the existing sectoral competitive advantages/disadvantages of each country vis-à-vis their European and international partners, and second, by increasing the opportunities to offshore domestic production to exploit global value chain efficiency gains.

The third force that has shaped European manufacturing is the economic and financial crisis that began in 2008. On the one hand, exports have become not only a means by which to divert increasing volumes of production but, often, also the only way to survive for many firms, given the stagnation of domestic demand. On the other hand, financial markets have tightened their criteria for granting liquidity to the economy, thus increasing the demand for efficiency and transparency in firms' managerial practices. As a result, the competitive threshold under which firms can no longer survive has risen, inducing a reallocation of resources within and across industries.

Understanding how the national manufacturing systems have been affected by these macroeconomic shocks is fundamental in order to predict the long-run growth potential of EU countries and to design effective policies, because, as was rediscovered in recent years, manufacturing remains the backbone of the European economy.<sup>2</sup> This opinion is shared by the European Commission, which launched the plan "For a European Industrial Renaissance" in 2014.

The structural divergence in the European productive system is investigated in the following section, both in terms

\* The views expressed here are those of the author and are not meant to represent those of Confindustria. – I thank Alessandro Arrighetti, Roman Bertenrath, Michael Grömling, Michael Hüther, Luca Paolazzi, Fabrizio Traù and participants at the workshop "The Impact of the Great Recession on Manufacturing Firms", organised by the University of Parma in June 2016, for their valuable comments.

1 Centro Studi Confindustria: *Scenari Industriali*, No. 6, Rome 2015, p. 14.

2 For a comprehensive discussion and analysis of the role played by the European manufacturing sector in sustaining economic growth, see K. Lichtblau, J. Matthes, M. Fritsch, M. Grömling, B. Busch: *Manufacturing in Europe. A Growth Engine in the Global Economy*, Institut der deutschen Wirtschaft Köln, Cologne 2015, Institut der deutschen Wirtschaft Köln Consult; L. Romano: *Puntare sulla Manifattura per far Ripartire la Crescita*, Nota CSC No. 4, 2016.

Livio Romano, Confindustria, Rome, Italy.

**Table 1**  
**National shares of European manufacturing value added**

Country	in %, at current prices			Percentage point change	
	2000	2007	2013	2000-13	2007-13
Germany	26.3	26.0	29.0	2.7	2.4
Italy	13.7	13.0	11.2	-1.9	-1.8
France	12.7	11.2	11.1	-1.6	-0.1
United Kingdom	14.3	10.6	9.0	-5.3	-1.6
Spain	6.3	7.4	6.5	0.2	-0.8
Switzerland	3.1	3.4	4.9	1.8	1.5
Netherlands	3.7	3.8	3.6	-0.1	-0.2
Poland	1.8	2.6	3.4	1.6	0.8
Sweden	3.5	3.3	3.3	-0.1	0.1
Austria	2.4	2.6	2.8	0.4	0.1
Belgium	2.7	2.7	2.6	-0.1	-0.1
Czech Republic	1.0	1.6	1.8	0.9	0.2
Ireland	1.5	1.8	1.7	0.2	-0.1
Denmark	1.5	1.4	1.5	0.0	0.1
Finland	2.0	2.1	1.5	-0.5	-0.6
Romania	0.5	1.2	1.4	0.9	0.2
Portugal	1.2	1.1	1.0	-0.2	-0.1
Hungary	0.6	1.0	1.0	0.4	0.0
Greece	0.8	1.0	0.7	-0.1	-0.3
Slovakia	0.3	0.6	0.7	0.4	0.1

Note: Countries ranked according to their 2013 figures.

Source: Eurostat.

of the sectoral composition and the geographical concentration of industrial activities across European countries. The analysis then shifts to the forces underlying this transformation: differences in export performance, in the dynamics of domestic demand for manufacturing goods and in the exposure to low-cost import competition. Overall conclusions and policy implications are drawn in the final section.

## How European manufacturing has changed

### A three-speed manufacturing system

By looking at the change in the national shares of manufacturing value added between 2000 and 2013, a significant cross-country reshuffling can be observed (Table 1). The data shows in particular the rising importance of Eastern European countries as manufacturing producers, the strengthening of Germany and Switzerland as indus-

trial poles, and the loss of influence of other traditional manufacturing powers, particularly the UK and Italy. A three-speed manufacturing system has thus emerged in Europe.

Such change is only partially related to the recent economic and financial crisis that impacted the different regions of Europe quite asymmetrically in terms of the intensity and length of the recessions.

Germany and Switzerland increased their shares of the European manufacturing output throughout the entire period, even maintaining strong acceleration after 2007. Eastern European economies experienced an overall increase in their output weight, but their growth lost momentum in the more recent period. The UK, on the other hand, saw its share decline both before and after 2007.

However, for some countries, the crisis represented a structural break. This is the case for Italy, where 95% of the loss in its output share along the entire 13-year period is concentrated in the 2007-2013 period. The same applies to Spain, which in the same six years almost entirely dissipated the spectacular growth it had accumulated in the previous seven (the highest increase registered in Europe). For French manufacturing, on the other hand, the loss of its European manufacturing output share is largely concentrated in the pre-crisis period.

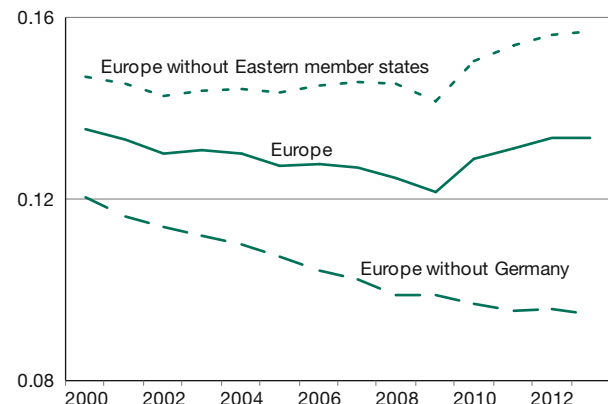
The rising importance of Eastern Europe within the continental manufacturing landscape is confirmed by the change in the Herfindahl index of geographical concentration of value added during the years under investigation (Figure 1). In fact, by comparing the actual trend with that obtained after subtracting the value generated by the Eastern manufacturing powers, one can observe that without their positive contribution, concentration would have remained almost constant up until the crisis, instead of steadily declining, and in 2013 concentration would have been significantly higher than it was in 2000, primarily as a result of the strengthening of the German leadership in manufacturing.

The concurrent development of Eastern Europe and Germany is by no means accidental. It reflects the increasing integration of the German manufacturing system with those of its Eastern neighbours, which has given birth to the so-called “Bazaar economy” model.<sup>3</sup> In fact, starting from the mid-1990s, a significant number of German multinationals, often mid-sized firms, have opened plants

<sup>3</sup> H-W. Sinn: The Pathological Export Boom and the Bazaar Effect. How to solve the German puzzle, CESifo Working Paper Series No. 1708, 2005.

**Figure 1**  
**Geographical concentration of European value added**

Herfindahl index of market concentration



Notes: All data based on current prices. "Europe" consists of the EU, Switzerland and Iceland.

Sources: Eurostat; Economic Research Department of Confindustria.

across the Eastern border, to exploit the manufacturing know-how embedded in these countries and their significantly lower costs of production.<sup>4</sup> In this way, a new generation of intermediate goods producers bred to serve primarily the German assemblers was allowed to develop and flourish in the last 15 years, while also benefiting from the European single market after the expansion of the EU into Eastern Europe in 2004.

### Sectoral specialisation has increased

The Krugman index of sectoral specialisation shows how the degree of differentiation among European manufacturing systems increased everywhere during the 2000-2013 period (Figure 2). Such differentiation processes in the structure of the national supply matrices have accelerated, for most countries, since the start of the crisis.

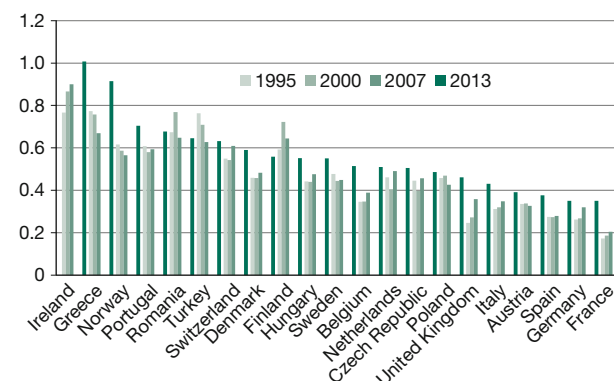
The increase in the degree of sectoral differentiation among manufacturing systems is often associated with an increase in the degree of sectoral concentration within them (Figure 3). This is true, in particular, for the six largest industrial powers, even if, in the case of Italy, the increase between 2000 and 2007 is negligible and the adjustment is almost entirely concentrated in the crisis years.

This finding is by no means trivial, because the two measures are conceptually different – the former capturing

4 For a recent historical overview of the manufacturing development of Eastern Europe in comparative perspective, see L. Romano, F. Traù: Il Ruolo delle Istituzioni nello Sviluppo Manifatturiero del Mondo Emergente. Tre "Modelli" di Intervento Pubblico negli Anni Successivi al Secondo Dopoguerra, in: Rivista di Storia Economica, Vol. 30, No. 2, 2014, pp. 121-160.

**Figure 2**  
**Relative specialisation of national manufacturing systems**

Krugman index of value added

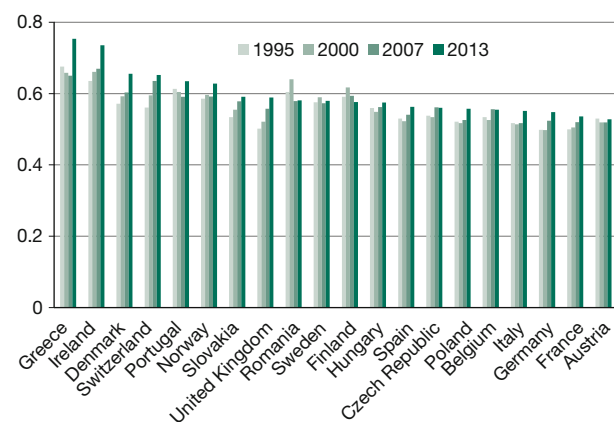


Note: Countries ranked according to 2013 figure. The benchmark value is the European average. The index varies between 0 and 2. All data based on current prices. Higher values imply higher sectoral differentiation relative to the benchmark.

Sources: IHS; Economic Research Department of Confindustria.

**Figure 3**  
**Absolute specialisation of national manufacturing systems**

Gini coefficient of value added



Note: Countries ranked according to 2013 figure. The index varies between 0 and 1. All data based on current prices. Higher values imply higher sectoral concentration of value added.

Sources: IHS; Economic Research Department of Confindustria.

specialisation of a system relative to the European benchmark, the latter capturing the absolute level of specialisation of such a system – and could, in principle, move in opposite directions.<sup>5</sup>

5 N. Palan: Measurement of Specialisation. The Choice of Indexes, FIW Working Papers No. 62, 2010.

However, the concurrence between the two dimensions of specialisation is consistent with the deeper economic integration shaping the whole process, through higher competitive pressure from abroad and bigger opportunities to exploit scale and agglomeration economies in a given location thanks to lower trade barriers. In particular, the forces of comparative advantage have pushed the concentration of value added (thus increasing specialisation in absolute terms) in each country towards those industries that were relatively more competitive in international markets (thus also increasing specialisation in relative terms). In this respect, the crisis, through its cleansing effect, can be seen as an additional force destabilising the pre-existing geography of production, especially in those countries/industries that were relatively less open to international competition before the negative economic shock occurred.<sup>6</sup>

### Shedding light on the forces shaping structural divergence in Europe

In what follows, the attention is focused on the divergent paths of structural change observed in the six largest European manufacturing systems. In particular, the impacts of international competition and of the change in domestic demand for Germany, Italy, France, the UK, Spain and Switzerland is discussed in detail.

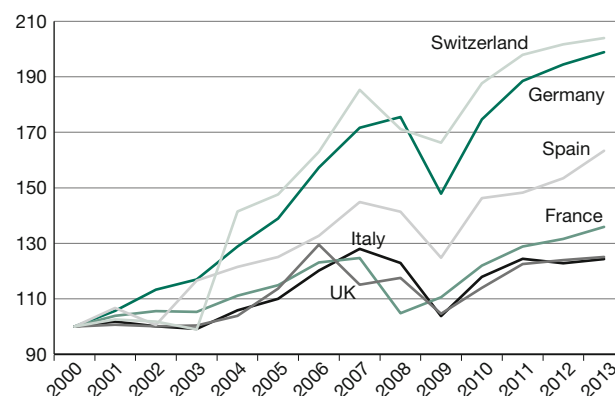
#### Export performance

The first explanation for the observed cross-country heterogeneity in the process of industrial development has to do with the ability of domestic manufacturing firms in each economy to exploit the growth potential offered by lower trade barriers, which enables greater foreign market penetration via exports. At the beginning of the period, the export share of total manufacturing output was already significant in all six countries under scrutiny, even if large differences existed. For example, in a small, open economy like Switzerland, the export share was around 56%, nine percentage points higher than the German and British figures and 16 points higher than the French one. The export propensity registered in Italy and Spain was much lower, around 32% and 30% respectively.<sup>7</sup>

Manufacturing export data reveals that between 2000 and 2013 volumes doubled in Germany (+98.9%) and Switzerland (+103.95), while they grew by 63.3% in Spain, by 35.9% in France, and by around 25% in Italy and the

**Figure 4**  
**Manufacturing exports, constant prices**

Index 2000=100



Source: IHS.

UK (Figure 4). The divergent trends can already be largely observed before 2008, even if the crisis has often amplified the cross-country differences. To a lesser extent, such differences are observed also when exports are measured at current prices, thus capturing not only the “quantity effect” but also the “quality upgrading effect” incorporated in the change in value.

Thus, the data unambiguously shows that the ability of German and Swiss manufacturing systems to successfully cope with the huge transformations in the European competitive landscape, compared to the difficulties encountered by the other European manufacturing powers, is at least partially the result of their outperformance in foreign markets.

There is no consensus in the literature regarding the reasons why export performance differs so widely across European countries. Different analyses attribute varying importance to product specialisation, geographical distribution of export markets and overall competitiveness, depending on the benchmark, on the level of sectoral disaggregation, and on the measure of export performance itself (absolute levels vs market shares, intensive margin vs total margin of trade).<sup>8</sup>

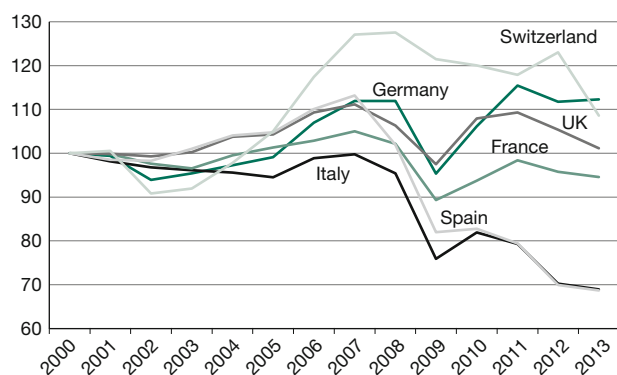
6 P. Krugman, A.J. Venables: Integration, Specialization, and Adjustment, in: *European Economic Review*, Vol. 40, No. 3-5, 1996, pp. 959-967.

7 Own calculations based on data from IHS: World Industry Service database.

8 Some recent examples include A. Proietti, M. Repole: Le Quote di Mercato dei Principali Paesi Europei: Aggiornamento e Articolazione della Constant-Market-Share-Analysis, in: ICE, *L'Italia nell'economia internazionale. Rapporto 2014-2015*, 2015, pp. 102-106; M. Dyadkova, G. Momchilov: Constant Market Shares Analysis Beyond the Intensive Margin of External Trade, *Bulgarian National Bank Discussion Paper No. 94*, 2014; European Commission: *Quarterly Report on the Euro Area*, No. 2, 2012, pp. 31-36. Specifically for Italy, see Centro Studi Confindustria: *Produzione e Commercio: Come Cambia la Globalizzazione. La Manifattura Italiana Riparte su Buone Basi*, in: *Scenari Industriali No. 6*, Rome 2015, pp. 66-69.

**Figure 5**  
**Apparent consumption of manufacturing goods, constant prices**

Index 2000=100



Source: IHS.

### Change in domestic demand

Despite the growth potential offered by global markets, fixed export costs create entry barriers that restrict trading opportunities, forcing some firms (especially smaller and less productive ones) to serve only domestic customers.<sup>9</sup> Moreover, even firms that enter foreign markets typically continue to rely on domestic sales for a large share of their total turnover: according to EFIGE data, in 2008 it was equal on average to around 35% in Italy, 30% in Germany and the UK, and 26% in Spain.<sup>10</sup>

This implies that a second explanation for the observed heterogeneity in the performance of national manufacturing systems has to be found in the simultaneous heterogeneity in the evolution of domestic demand in the different countries.

Data shows that even before the global recession, there were significant cross-country differences in the dynamics of apparent consumption of manufacturing goods (Figure 5). From 2000 to 2007, there was double-digit growth in Switzerland (+27.1%), Spain (+13.2%), Germany (+12.0%) and the UK (+11.2%); moderate expansion in France (+5.0%); and even slightly negative growth in Italy (-0.2%). Since 2007, years of debt consolidation and fiscal austerity in some EU countries have exacerbated the divergence: at one extreme, Spain and Italy lost respective-

9 M.J. Roberts, J.R. Tybout: The Decision to Export in Colombia: An Empirical Model of Entry with Sunk Costs, in: *The American Economic Review*, Vol. 87, No. 4, 1997, pp. 545-564; A.B. Bernard, J.B. Jensen: Exceptional exporter performance: cause, effect, or both?, in: *Journal of International Economics*, Vol. 47, No. 1, 1999, pp. 1-25.

10 Own calculations based on data from the EU-EFIGE/Bruegel-Unit Credit database, available at [www.bruegel.org](http://www.bruegel.org).

**Table 2**  
**Manufacturing imports, current prices**

	% growth 2000-2013	% import share of:					
		China		Eastern EU		Other OECDs	
		2000	2013	2000	2013	2000	2013
Germany	145.1	4.2	10.3	9.3	13.8	75.1	64.1
Italy	82.3	3.1	8.3	3.8	7.0	80.9	68.8
France	113.5	3.6	9.5	2.2	5.2	83.6	72.9
UK	68.8	5.0	10.7	1.4	5.3	78.5	71.5
Spain	92.3	3.3	9.2	1.4	5.1	85.4	69.6
Switzerland	297.8	1.8	4.0	1.5	2.3	88.5	80.5

Source: ComTrade.

ly around 39% and 31% of (apparent) domestic demand between 2007 and 2013; at the other extreme, Germany registered a slight rise over the same period.

### Import competition

Finally, the observed cross-country heterogeneity in the performance of national manufacturing systems could be driven by increased import competition that resulted in a substitution of domestic with foreign production. Indeed, the disaggregation by country of origin shows that imports have risen substantially in each of the six largest European manufacturing producers. This is true, in particular, for products made in China and in Eastern Europe, while the share of imports from other OECD countries has declined remarkably (Table 2).

Higher imports are not necessarily associated with lower domestic production in the same industries, though. When customers are segmented and served by different firms, importers and domestic producers could complement each other to supply the entire market. Intra-industry differentiation can be either horizontal (similar products with differentiated varieties), typically involving exchanges among countries with similar factor endowments to benefit from economies of scale by specialising in “niche” products, or vertical (products distinguished by quality and price), typically involving exchanges among countries with different factor endowments, particular skills of the workforce or fixed R&D costs.<sup>11</sup>

A way to test for the existence of a crowding-out effect of imports on domestic production is to estimate the elastic-

11 L. Fontagné, M. Freudenberg, G. Gaulier: Disentangling Horizontal and Vertical Intra-Industry Trade, CEPII Working Paper No. 10, 2005.



Table 3

**Regression results: Testing for a crowding-out effect of manufacturing imports**

Dependent variable: % change in manufacturing value added	Germany	Italy	France	UK	Spain	Switzerland
<b>2000-2007</b>						
% change in imports from China	0.027		0.027			
% change in imports from China*low-tech (dummy)		<b>-0.206</b>				
% change in imports from Eastern EU	0.054		0.051			0.057
% change in imports from Eastern EU*low-tech (dummy)	<b>-0.091</b>					
<b>2007-2013</b>						
% change in imports from China	0.260	<b>-0.270</b>			0.205	
% change in imports from China*low-tech (dummy)	<b>-0.251</b>		<b>-0.283</b>			
% change in imports from Eastern EU	0.133	<b>-0.471</b>				0.233
% change in imports from Eastern EU*low-tech (dummy)						

Note : Regressions isolate the cross-sectoral variation in imports for each European country. Controls: log of import and share of import of total domestic output at the beginning of each period. Only statistically significant estimates are reported (with p-value <10%). Only imports accounting for at least 0.5% of total domestic output at the beginning of each period are considered in the analysis. Sectoral disaggregation according to ISIC Rev. 3 at the four-digit level.

Sources : IHS; ComTrade data; Economic Research Department of Confindustria.

ity of manufacturing domestic value added to changes in imports, isolating cross-sectoral variations in imports. To account for the fact that competitive pressure might have affected industries asymmetrically depending on their technology intensity, the effect for low and medium-low tech can be estimated separately (Table 3).<sup>12</sup>

The hypothesis of a substitution of domestic production with (cheaper) imports finds some support in the data, but evidence is scattered both in space and time. The Italian manufacturing system appears to be the one which has suffered the most from low-cost import competition. In particular, before the crisis, higher imports from China in low and medium-low tech industries were associated with lower domestic value added in the same industries; during the crisis, the negative correlation is found for imports from both China and Eastern Europe, without significant differences based on the technological intensity of the industries.

During the crisis, the negative relationship between domestic production and imports from China is also found in France, although restricted to low and medium-low tech industries. Finally, for Germany there is some evidence of a substitution between domestic production and imports from Eastern Europe in the years before the crisis, again restricted to low and medium-low tech industries. No evi-

dence of a systematic crowding-out effect is found for the UK, Spain or Switzerland.

When regressing the change in domestic value added on the change in imports from the other Western European countries, the sign of the relationship is estimated to be either positive or not statistically significant (estimates not reported here, but available upon request). This is consistent with the hypothesis of complementarity among producers of the most advanced economies of Europe.

### Summary and conclusions

The heterogeneous fortunes of the manufacturing sectors in different European countries in the last 15 years have been due to the competitive pressure of new industrial powers from both within and outside the EU boundaries and are a consequence of the “new normal” competitive landscape induced by the global recession. Germany and Switzerland have shown strong resilience in the face of these shocks, while the other traditional manufacturing powers have lost ground.

Such divergence in performance is the combined result of: i) the different capacity of domestic firms to take advantage of lower trade barriers by increasing exports; ii) the different capacity of domestic firms to escape the increased (low-cost) import competition through investments in innovation; and iii) the different trends in domestic demand for manufacturing products that have affected the growth potential of producers serving primarily (or exclusively) the domestic market.

12 Disaggregation into 62 sectors according to ISIC Rev. 3 classification at the four-digit level. See OECD Directorate for Science, Technology and Industry: ISIC Rev. 3 Technology Intensity Definition, 7 July 2011.

The analysis, focused on the largest six manufacturing producers in Europe, has revealed three primary findings. First, the export channel has fuelled manufacturing activity everywhere, but with varying degrees of intensity, especially prior to the crisis. The highest levels of activity were achieved in Germany and Switzerland, while the lowest were seen in Italy, France and the UK.

Second, the Italian and Spanish manufacturing systems have suffered most from the adverse consequences of the crisis on the domestic demand for manufacturing products, followed at a distance by France and the UK. Germany, on the contrary, has rapidly recovered since the 2008-2009 drop. Moreover, before the crisis, growth in domestic demand was very weak in Italy and, to a lesser extent in France, while it was particularly high in Switzerland.

Third, evidence of a crowding-out effect induced by imports is scattered in space and time. Italy appears to be the country with the highest exposure to low-cost import competition, both before and during the crisis. In Germany and France, the effect is more limited, while no systematic negative correlation is found for the UK, Spain and Switzerland.

From a policy perspective, such heterogeneity in the observed dynamics and in the underlying causes calls for responses at the national and EU levels that are tailor-made to the specific challenges faced by each manufacturing system. No “one-size-fits-all” plan to re-launch manufacturing in Europe can be effective in such a scenario.

The most worrisome case in the European panorama is the Italian one, because the historical manufacturing sector of the country has been seriously undermined by the effects of an unprecedented economic crisis, which has exacerbated Italy’s pre-existing structural weaknesses (low export propensity and higher exposure to import competition from low-cost producers) and hampered its process of modernisation.<sup>13</sup> Indeed, since 2008, a significant share of its industrial base has fallen into a vicious circle: low domestic demand and credit rationing have lowered investments in innovation and made internationalisation strategies more difficult to attain. As a result, firms’ competitive positions have been weakened, causing a further drop in demand and credit rating reductions.

<sup>13</sup> The modest performance of the Italian manufacturing system at the aggregate level reveals significant heterogeneity across firms and sectors. A dual system had already emerged before the crisis: a (non-negligible) minority of Italian firms have changed business models to successfully compete in the new context of international hyper-competition, while the majority of them have opted for more conservative wait-and-see strategies. For an extensive analysis on this point, see A. Arrighetti, A. Ninni (eds.): *La Trasformazione Silenziosa. Cambiamento Strutturale e Strategie d’Impresa nell’Industria Italiana*, Collana di Economia Industria e Applicata, University of Parma, 2014.