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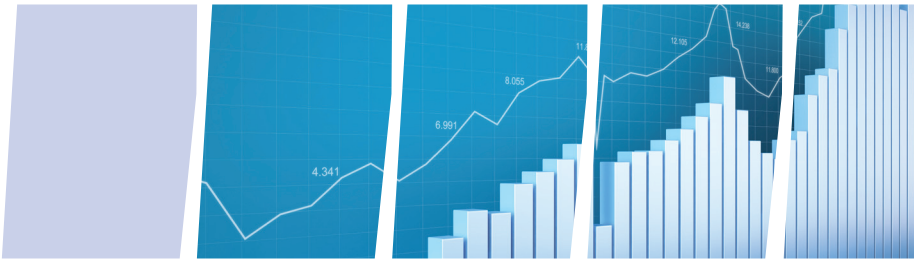

Competitiveness of the European economy

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1. The concept of 'competitiveness' used in this study

There is no commonly accepted way to measure the "competitiveness" of a country or larger region with the claim by Krugman that this could be a "dangerous obsession" still being valid (Krugman, 1994). One of the definitions or measures of competitiveness which the present analysis will focus on are various indicators of export performance.

Export performance as measured at the level of a country or its industries is always an aggregate of the export activities of the companies which operate from its territory. Krugman claims that 'only firms compete, not countries'; however the notion that a 'country's competitiveness' is important has stubbornly continued to be a dominant theme shaping economic policy (at the country or EU level)[1].

We shall argue that 'competitiveness' as a concept makes sense at the country level in the following way:

- To evaluate whether a country encounters or evades a 'structural current accounts constraint' i.e. whether a country's economic growth path is constrained by its trade balance. As is well-known deficits on the trade balance have to be financed from external sources and hence a sustained current account deficit (of which the trade balance is the most prominent component) would encounter an external financing constrained. Thus while countries can afford – depending also on external circumstances – to run deficits in their trade balances over a considerable number of years, they cannot do so indefinitely. Hence the aim of 'competitiveness' must be to avoid a situation in which the trade balance constitutes a constraint on growth. A severe form of this constraint – as recently experienced by a number of Southern EU economies – is that the trade balance constraint forces an adjustment process which drives economies into serious recessions.
- What about the focus on exports? In an environment in which the possibilities to impose import restrictions have been severely restricted or have disappeared altogether, as is the case for EU economies relative to each other but also to a high degree towards international imports, the focus on avoiding a 'current accounts constraint' must lie on export performance.
- The additional element is of course the constraint on currency devaluation which disappears in a currency union altogether but is of limited use also in other European economies tightly linked to the Eurozone through financial markets integration. In such a case export performance and its longer-term determinants again are a crucial factor in longer-term growth performance.

Hence, this study puts export performance at the center of the analysis and in this context we shall emphasise the following:

[1] See e.g. the annually produced 'Competitiveness Reports' produced by the European Commission; see European Commission: http://ec.europa.eu/enterprise/policies/industrial-competitiveness/competitiveness-analysis/european-competitiveness-report/index_en.htm

- In line with recent advances in the analysis of 'trade-in-value added' we shall calculate all our indicators from both gross export and value-added (in exports) data so that a comparison can be made.
- We shall concentrate on manufacturing trade but also look at services trade, in particular that of exports of business services. We shall leave out other exports such as exports of primary goods and energy as the determinants of these differ from those of manufacturing and business services trade and policy considerations are also quite different.
- a special focus of the analysis will be the situation of the lower- and medium-income economies in the European Union: competitiveness problems of 'Europe's South' has been a focus in the recent discussion of the Euro-zone crisis. We shall focus on export performance across Europe's lower- and medium-income economies (we shall use the term 'Europe's Periphery' for these) as a whole (i.e. also including new member states of Central and Eastern Europe) and point to the very differentiated developments that can be detected amongst these.
- we shall, however, also point to the heterogeneity amongst the four large EU economies: France, Germany, Italy and the United Kingdom regarding their developments in export specialization and export performance. The differentiation amongst these economies is also strong and points to further problem areas in Europe's development.

Let us explore these issues in a bit more detail:

First on the importance of the analysis of 'trade in value added' (see e.g. Stehrer, 2013, and Foster-McGregor and Stehrer, 2013): the usually used measures of a country's export performance are distorted by the fact that production has become more and more internationally fragmented implying that trade in intermediates and value added embodied in these intermediate flows have to be taken into account. Using gross trade statistics therefore has become less informative and leads to biased estimates of important indicators such as trade openness, patterns of revealed comparative advantages, etc. The report therefore points out how the international integration of production has affected performances of countries and industries and their role in these global value chains. The importance of vertical integration and international production fragmentation will be highlighted and the analysis will point to the difference which the inclusion of international production integration makes to competitiveness measures.

The WIOD database (see Dietzenbacher et al, 2013, Timmer, 2012, for further details) provides the database from which indicators of competitiveness will be generated, explictly taking account of 'trade in value-added' analysis and international production integration. The WIOD database combines detailed information on national production activities and international trade, taken from official statistics. Starting from supply and use tables, which captures how much of each of 59 products is produced and used by each of 35 industries (according to NACE Rev. 1 and CPA), it provides a world input-output table providing information on international linkages of production processes and structures of final goods trade across 35 industries and 40 countries over the

period 1995 to 2011. The countries covered include all EU-27 Member States and 13 other major countries[2] plus an estimate for the rest of the world (RoW).

The other point covered in the analysis will be the increased role of services for the trade performance of advanced economies. Not only have services become more 'tradable' in that they account for a higher share of international trade and advanced economies show signs of increased specialisation in advanced tradable services (business services in particular), but services also provide an increased share in the gross value of exports produced. One can speak of an increased 'tertiarisation/servitization of trade' (see Vandermerwe, S. and J. Rada, 1988), which proceeds through a number of channels (more direct tradability, indirect service contributions to manufacturing exports, imported services directly and indirectly contributing to export activity).

Given the importance of services, we shall calculate our measures of competitiveness always with regard to total trade (i.e. encompassing all exports). Thus when we speak of a country's world market shares or RCA values we shall always look at a particular sector's role in the context of overall exports.

We shall also check whether in any of the indicators (export structure, world market shares, RCAs, etc.) the calculations in gross output or in value added terms makes a difference. This allows us to address the question to which extent the widespread calculations in gross output / gross export terms provides a distorting picture of actual trade performance and also to tackle the issue to which extent international production integration (but also domestic input-output interrelationships) affect countries' export performance. The importance of external and domestic sectoral interrelationships will also be taken into account in our econometric analysis of determinants of competitiveness indicators carried out in section 4 of this paper.

An important further focus of this paper will be to analyse carefully the differentiation regarding competitiveness indicators and specialisation which has been taking place in the European economy. We shall distinguish *five different groups of economies*: the **OMS-North** which comprises the higher income economies of the EU, the **OMS-South** comprising Greece, Portugal and Spain, the **NMS-Central** comprising five of the Central-Eastern new member countries (Czech Republic, Hungary, Poland, Slovakia, Slovenia), a **NMS-SEE** group (comprising Bulgaria, Romania, Cyprus and Malta) and the **Baltic countries** (Estonia, Latvia, Lithuania). These groupings indicate that we are particularly interested in the differentiation amongst the lower- and medium-income economies (comprising OMS-South, NMS-Central, NMS-SEE, Baltics) as the competitiveness problems of this part of Europe have been under-emphasised in studies so far.

Nonetheless we shall also point to important differentiation in competitiveness and specialisation patterns amongst the countries of the OMS-North group as this differentiation also points to additional competitiveness problems in the EU. In this regard we shall particularly look at the differentiated developments amongst the 4 large OMS economies (Germany, France, Italy, United

[2] The other 13 major countries are Australia, Brazil, Canada, China, India, Indonesia, Japan, South South Korea, Mexico, Russia, Turkey, Taiwan and the US.

Kingdom) as competitiveness of the EU as a whole depends very strongly on the performance of these large advanced EU economies.

Let us highlight some of the main results which emerge from this study:

› There is an increasingly central position of Germany (and a linked group of Central European economies) in EU manufacturing exports – particularly with regard to extra-EU manufacturing exports. Germany plays an even more dominant role in MHT (medium-/high-technology) industries for the EU as a whole (see Appendix Table A.1.1 for the classification of industries into groups).

› Other advanced European economies decline in their position for European manufacturing exports, but some strengthen their position in business services (particularly the UK).

› There is strong differentiation amongst low- and medium-income EU economies: NMS-Central moves strongly away from OMS-South especially as an important location of manufacturing production within cross-border European production networks; there is also a strong effect of the recent economic crisis on the OMS-South position.

› In terms of global trade and specialisation the EU-27 continues to occupy a very important position and longer-term developments (prior to the recent crisis) look rather favourable relative to the US and Japan, both regarding manufacturing (also in MHT industries) as well as with regard to business services. The crisis has affected the EU's position in global trade, but this is mainly due to a fall in the weight of intra-EU trade in global trade (given the disastrous growth performance of the European economy during the crisis period) while its share in extra-EU27 trade remained quite robust.

› Global and intra-regional production networks are particularly visible in the case of South Korea and NMS-Central. In China's case there seems to be a trend towards more national vertical integration.

› Are there strong differences when analysing competitiveness and specialisation indicators from gross export or from value added figures? With regard to the competitiveness and specialisation indicators chosen in this study, the calculations of the various measures do – in most instances – not show very strongly differentiated results. The reason is – in our opinion - that there is still a major incompleteness in the way the current methodology of 'trade-in-value-added' analysis captures potential differences in input-output structures which characterise export activity in an economy as compared to production for the domestic market. The available studies (including the WIOD dataset on which we rely in this study) do not differentiate between input-output relationships which characterise these two different types of activities (i.e. production for exports and for the domestic market).

› The econometric results concerning the determinants of export performance and export specialisation of EU economies showed the following:

- productivity is an important determinant for competitiveness (with respect to a wide variety of competitiveness indicators) of both manufacturing and services' exports;
- the share of high-skilled labour in an industry's labour force supports export growth in manufacturing;
- business services linkages to manufacturing are beneficial and amongst these particularly links to business services supplied from foreign sources i.e. through imports;
- the share of foreign value added in an industry's gross export value supports export growth but not necessarily the comparative advantage position of that industry;
- as regards competitiveness of tradable services of EU industries, we also find that foreign business services links to exports are an important positive determinant, while domestic business services show a negative impact. Thus sourcing through imports (or international integration through imported services linkages) makes an important contribution to competitiveness. However, if we isolate financial intermediation services and other business services from tradable services in general (which include e.g. a variety of transport services) also strong domestic business services linkages have a positive impact on export growth and comparative advantage positions of these tradable services.

Policy implications which emerge from this study are the following:

- The period of analysis (1995 to 2011) was characterized by strongly changing patterns of specialization and changing market shares both within Europe as well as globally. Amongst advanced economies there is a general move towards services both in production and export structures. Germany and related (through cross-border production linkages) countries moderated this trend significantly for the EU as a whole. Hence there is also strong evidence of deepening intra-EU specialization. This is not only true for the groups of the advanced countries (with the UK and Germany being polar examples of intra-EU specialization on business services and manufacturing respectively) but also amongst the lower- to medium income countries of Europe with NMS-Central following Germany with a strong manufacturing orientation and most others (especially OMS-South, but also NMS-SEE and Baltics) showing a very reduced role of manufacturing both in output and export specialization.
- Such changes in specialization are per se not a problem; however they become problematic if they lead to a 'structural current accounts' problem which results from persistent 'external disequilibria' positions within the EU. Such disequilibria point towards too weak exporting capacities in certain groups of countries within the EU. Developments in the wake of the recent crisis have shown that 'structural current accounts problems' can push countries into extended periods of negative or very low growth and adjustment processes might be very lengthy and painful.
- The policy conclusion in this regard is that a strong attention towards sufficient and competitive export capacities is a must for all countries within the European Union. Such capacities can be in services activities or in manufacturing (the European Union does not have major primary products exporters) – and indeed different EU countries have specialized in different directions in this respect. Business services are an especially fast

growing area of international trade and countries can gain strong international positions in these. However, the evidence is that such positions are usually occupied by very advanced, high income economies with long, historical traditions in such activities (such as the UK, the US, Hongkong, etc.). Lower and medium-income economies will find it very difficult to develop a sufficiently strong export performance in such advanced services activities to compensate for a neglect of manufacturing capacities. Hence our analysis would suggest a major problem in some of the EU low-/medium-income economies with a small and weakening manufacturing sector. To some extent this is also true for some advanced EU economies such as France.

- The analysis of inter-industry relationships and also of cross-border production interdependencies suggests furthermore that the indirect contribution of services activities to exports are important, but they happen in the majority of cases via exports of manufactured goods. Manufacturing thus provides a 'carrier function' for services to contribute to a country's export performance. This provides another important reason to not neglect manufacturing exports.
- Finally the analysis shows a very strong recent tendency for manufacturing activity (and thus EU exports) to be concentrated in a so-called 'Central European Manufacturing Core' (comprising German, Austtria and the NMS-Central in our analysis). These agglomeration trends might provide another reason to worry about longer-term problems with regard to 'structural current account problems' in parts of Europe's periphery. Industrial and regional policies will have to be mobilized in a more effective manner to tackle this problem.

2. The structure of the European economy in international comparison

We start here with an analysis of the evolution of economic structures in the EU and other advanced economies (USA, Japan, South Korea) and also look at intra-EU differentiation concerning 'tradable sectors' as these are the sectors relevant for international competitiveness. Amongst 'tradables' we shall focus on manufacturing and services (and within that mostly on business services, the fastest growing segment of traded services) and ignore primary products and sectors such as energy.

The first issue we address is structural change in EU economies, i.e. the changing positions of manufacturing and services in the overall economy. We also look at sub-groups within the manufacturing and tradable services sectors.

Table 1 / Share of manufacturing, in % of GDP

	1995	2000	2007	2009	2011
EU-27[3]	20,1	19,5	17,1	14,7	15,8
USA	15,5	14,3	12,2	11,4	12,3
Japan	22,6	21,2	20,8	17,3	18,6
South Korea[4]	27,2	28,6	27,6	27,8	31,1
	1995	2000	2007	2009	2011
OMS-North	20,2	19,6	17,2	14,7	15,8
OMS-South	18,0	17,3	14,0	12,4	12,8
NMS-Central	22,5	21,5	21,7	20,0	20,9
NMS-SEE	22,7	20,2	21,2	20,5	20,7
Baltics	20,1	17,2	15,8	13,9	13,9
	1995	2000	2007	2009	2011
Germany	22,6	22,9	23,8	19,1	22,4
France	14,2	16,0	12,5	10,6	10,1
Italy	22,2	21,0	19,0	16,1	16,6
United Kingdom	20,9	17,2	12,1	10,9	11,7

Source: WIOD; wiiw calculations.

Over the period 1995 to 2011 (the time span covered by the WIOD database) we observe a general decline of the share of the manufacturing sector in advanced economies, with the share of manufacturing in GDP declining by about 4ppts in the EU-27 and in Japan, and in the US by about 3ppts but starting there from an overall lower level ((15.5% compared to 20.1% and 22.6% in the EU and Japan respectively). South Korea was – over this period – still a country with a rising manufacturing share.

As regards within EU differentiation, we observe over this period a rather dramatic decline of the share of the manufacturing sector in the OMS-South (by 5.2ppts) and the Baltics (by about 6ppts) and much milder declines by NMS-Central (only 1.6ppts) and NMS-SEE (2ppts). Hence the decline

[3] EU-27 rather than EU-28 as Croatia has not been a member of the EU over the period of analysis of this paper.

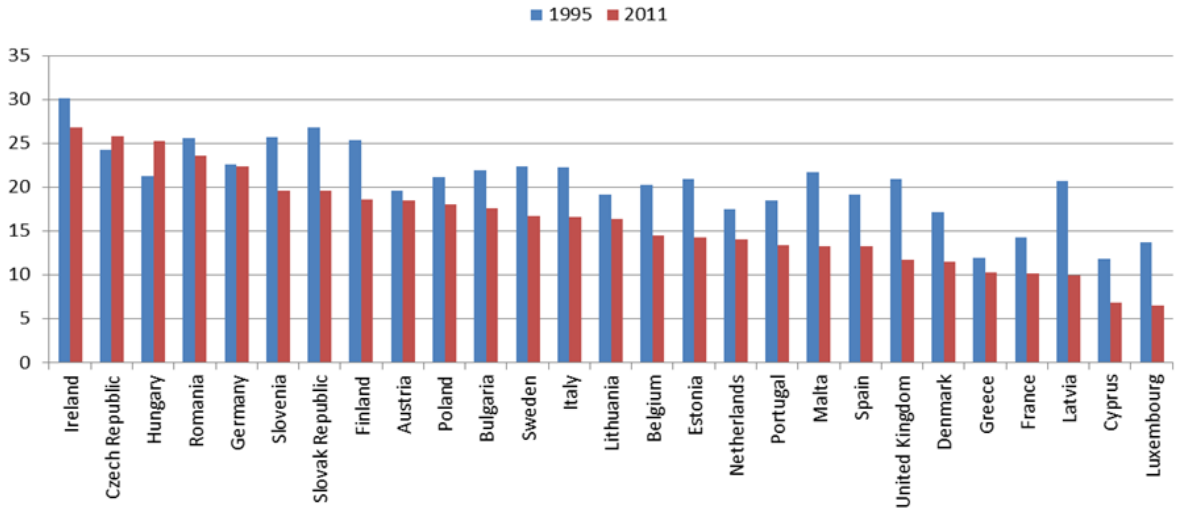
[4] In some of the figures in this report we shall use 'Korea' but refer always to South Korea.

of manufacturing in GDP in OMS-South (and the Baltics) was even greater than in the higher income countries OMS-North.

Looking at the differentiation amongst the large advanced EU economies, we can see a rather special position of Germany holding the share of manufacturing over the period at about 22.5%, while there was a dramatic decline of manufacturing in the UK (from 21% in 1995 to 11.7% in 2011) and milder but still substantial declines in France and Italy (by about 4ppts and 5.5ppts respectively). Notice that France ends up with an even lower share of manufacturing in GDP than the UK.

Fig. 1 shows the wide spread of the share of manufacturing across the entire range of EU economies in 1995 and 2011 (economies ranked by the share of manufacturing in 2011). We can see that the manufacturing share remains relatively high in Ireland, followed by a group which we shall call the ***'Central European manufacturing Core'*** (or CE-Core) comprising Germany, Austria and the range of Central-Eastern European economies (NMS-Central) as well as Bulgaria and Romania and finally Finland and Sweden (both lost substantial shares over this period but the manufacturing share remains relatively high).

Figure 1 / Share of manufacturing in EU member states, in % of GDP



Let us then move to the other important tradable sector, namely the **business services sector**. Table 2 shows the share of business services in GDP.

We see an increased role of business services in all advanced economies over this period: The increase is significantly higher in the US than in the EU-27 and much more so than in Japan and in South Korea. The relative and deepening specialisation of the US – which will further emerge from the international trade figures in section 3 – towards business services comes out clearly.

Amongst the advanced EU economies, the United Kingdom (with business services accounting for 25.5% of GDP in 2011) exceeds the share in the US by about 2.5ppts, and again the shift towards these tradable services (by about 9ppts over the period 1995 to 2011) exceeds by far that in the other larger EU economies (where the share has increased by 2.5 to 3.2ppts). Annex Table A.2 shows the changing role of the business services sector across the whole range of EU economies.

Coming to the differentiation within the EU, we observe that the lower-/medium-income economies have a generally lower share of business services than the OMS-North, but that NMS-Central shows an increased role of business services together with – as shown above - a strong position of manufacturing. **More worrying is the situation in countries where a weakened manufacturing sector is not compensated by a sufficiently strengthened alternative tradable sector such as business services** which accounts for the fastest growing component of international trade in services.

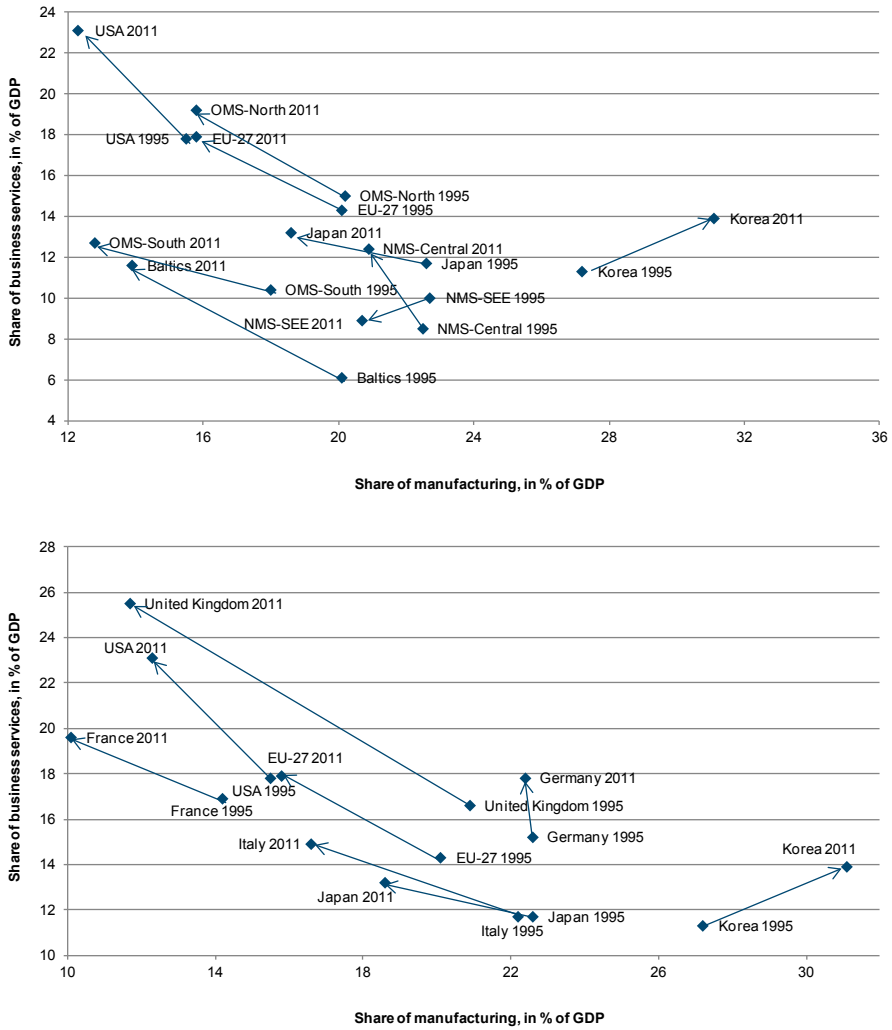
Table 2 / Share of business services, in % of GDP

	1995	2000	2007	2009	2011
EU-27	14,3	15,9	17,6	18,1	17,9
USA	17,8	21,1	22,2	22,6	23,1
Japan	11,7	12,9	14,3	13,4	13,2
South Korea	11,3	11,7	13,7	13,8	13,9
	1995	2000	2007	2009	2011
OMS-North	15,0	16,8	18,8	19,3	19,2
OMS-South	10,4	11,2	12,8	14,0	12,7
NMS-Central	8,5	11,2	12,5	12,6	12,4
NMS-SEE	10,0	8,4	8,2	9,0	8,9
Baltics	6,1	7,8	11,0	11,6	11,6
	1995	2000	2007	2009	2011
Germany	15,2	16,4	17,2	18,3	17,8
France	16,9	18,4	19,0	19,1	19,6
Italy	11,7	13,4	14,2	14,9	14,9
United Kingdom	16,6	19,0	24,6	25,7	25,5

Source: WIOD; wiiw calculations.

Fig. 2 shows the movements of both manufacturing and business services shares between 1995 and 2011 on one graph. The top panel compares the different groups of EU economies with the US, Japan and South Korea, while the bottom panel looks at the comparative performance of Germany, France, Italy, and the United Kingdom in comparison with the other advanced industrial economies. We can see the rather dramatic shifts away from manufacturing and towards business services particularly in the UK and the US, but also in the other advanced economies, with Germany and South Korea being exceptions where manufacturing retains a very strong position. The other point we shall keep emphasising (top panel) is the difference in structural change between NMS-Central and OMS-South: in the latter a very strong move away from manufacturing took place (which is also the case in the Baltics) while in the NMS-Central the position of manufacturing remains strong. This differentiation of patterns amongst the EU's lower- and medium-income economies will be further emphasised in section 3.

Figure 2 / Share of business services and share of manufacturing, in % of GDP 1995-2011



Source: WIOD; wiiw calculations.

Next we want to look at the subdivision of business services activities into financial intermediation services and other business related services. Roughly one can say, that amongst business services, financial intermediation accounts for about one third and other business related services to two thirds (see Table 3). Overall, we see over the period 1995 to 2001 a decline of the relative share of financial intermediation and an increased role of other business services across all economies. Given that, we want to point to two particular features: one is that the EU27 as a whole shows a stronger presence of other business related services (rather than financial intermediation) within its business services sector compared to the US and the other advanced economies. Second, we see especially in the course of the build-up towards the financial crisis, a much stronger presence of financial services in the OMS-South and in the NMS-SEE economies than in the NMS-Central. This points towards a distinctly stronger financial services presence in some of the low-/medium-

income EU economies within the services sector than in others. More detailed information about the financial services, other business related services break-down across the entire range of EU economies can be obtained from Annex Table A.3.

Table 3 / Share of detailed categories within business services, in %

	Financial Intermediation					Business related services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	35,6	31,0	31,8	32,4	31,2	64,4	69,0	68,2	67,6	68,8
USA	40,8	40,2	39,2	40,4	39,8	59,2	59,8	60,8	59,6	60,2
Japan	51,2	43,9	42,4	39,3	39,3	48,8	56,1	57,6	60,7	60,7
South Korea	53,6	49,5	50,9	49,0	50,4	46,4	50,5	49,1	51,0	49,6
	Financial Intermediation					Business related services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	34,4	29,7	30,4	30,6	30,1	65,6	70,3	69,6	69,4	69,9
OMS-South	47,5	44,2	43,2	46,7	39,6	52,5	55,8	56,8	53,3	60,4
NMS-Central	40,1	37,3	36,9	33,9	36,1	59,9	62,7	63,1	66,1	63,9
NMS-SEE	69,9	56,0	39,8	41,0	40,6	30,1	44,0	60,2	59,0	59,4
Baltics	49,5	44,5	40,3	32,3	32,1	50,5	55,5	59,7	67,7	67,9
	Financial Intermediation					Business related services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	30,3	25,6	23,0	23,2	24,2	69,7	74,4	77,0	76,8	75,8
France	27,4	28,0	24,6	26,5	26,9	72,6	72,0	75,4	73,5	73,1
Italy	40,1	34,9	37,0	36,2	36,4	59,9	65,1	63,0	63,8	63,6
United Kingdom	38,6	27,7	35,2	35,2	31,4	61,4	72,3	64,8	64,8	68,6

Source: WIOD; wiiw calculations.

Let us now return to manufacturing and analyse the break-down into three categories: low-tech industries (LT), medium-low tech industries (MT) and medium-high and high-tech industries (MHT) [5]. Although a further sub-division of especially the MHT group would be desirable, the WIOD database which we use to analyse the issue of 'trade-in-value-added' does not allow this further sub-division. In order to be consistent throughout this paper, we therefore also adopt this grouping into three sub-groups of manufacturing in this section. The other *caveat* is to emphasize that such classifications are very rough and do not take account of further important differentiations within these sectors such as that certain countries specialise within e.g. MHT sectors on assembly operations, low tech stages of production and tasks and other countries on high-tech and R&D intensive stages and tasks. This is important to keep in mind when using such classifications for cross-country comparisons and usually other indicators of 'vertical differentiation' within industries (such as relative unit-values; see, e.g., Fontagné et al., 1998; Fontagné and Freudenberg, 2001; Fontagné et al., 2006) are used to complement the analysis. In any case, for countries at similar levels of technological development, inter-country comparisons based on such rough classifications can nonetheless be insightful (see Table 4 below).

We see that over the period 1995 to 2011 the EU-27 underwent a more significant change in industry composition than the US or Japan (but significantly less than South Korea): the share of low tech dropped by 4.5ppts (in the US by 3.5ppts), while the share of MHT increased by 3.3ppts

[5] See Table A.1.1. in the Annex for the industry classification into these industry groups.

(in the US by 1.8ppts). There was thus a convergence with the US in this respect although the US still shows a slightly higher share of the MHT industries.

Interesting is the dramatic divergence amongst the advanced major EU economies: Germany has increased dramatically the share of MHT industries (from 51.5% in 1995 to 59.1% in 2011 which accounts for a much higher share of MHT industries in total manufacturing than the US and even exceeds that in South Korea! See also Figure 3). The other issue to point out is the still relatively high share of LT industries within manufacturing in Italy and the UK (34.6% and 36.2% respectively in 2011 as compared to 29.2% in the EU-27 as a whole). All the other major European economies lag also very much behind Germany in the share of MHT industries within manufacturing. In Annex Table A.4 we can see the entire spectrum of EU economies in this respect: a small group of EU economies shows a share of MHT industries which are more in line with Germany, amongst which Ireland, Sweden and Hungary; remember however the above *caveat* regarding intra-industry specialisation (on assembly or R&D-intensive tasks) when countries at different technological levels are considered. The most dramatic increases in the share of MHT industries over the period 1995 to 2011 took place in the Central-European Manufacturing Core (comprising Germany, Austria and the NMS-Central) together with Sweden and Finland.

Table 4 / Share of industry groups in % of manufacturing GDP

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	33,7	32,8	30,0	31,8	29,2	24,3	23,9	25,7	24,3	25,6	42,0	43,3	44,3	43,9	45,3
USA	32,7	31,8	28,2	29,9	28,2	22,3	21,9	26,0	23,1	25,0	45,0	46,3	45,7	47,0	46,8
Japan	28,2	28,0	22,9	27,1	27,1	28,2	27,1	29,2	29,8	29,8	43,5	44,9	48,0	43,1	43,1
South Korea	24,7	22,2	15,1	15,8	13,7	25,0	23,5	27,4	26,2	27,5	50,3	54,4	57,5	58,0	58,8
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	32,3	31,5	28,5	29,9	27,1	24,0	23,3	24,7	23,3	24,7	43,8	45,1	46,7	46,8	48,2
OMS-South	42,9	40,4	37,3	41,0	40,2	27,0	28,6	31,2	28,7	29,1	30,1	31,0	31,5	30,3	30,7
NMS-Central	40,9	38,0	31,3	33,1	30,9	28,0	27,0	29,9	28,4	30,5	31,1	35,0	38,7	38,5	38,6
NMS-SEE	50,9	53,5	48,2	47,3	47,3	22,6	22,2	24,6	25,6	25,5	26,5	24,2	27,3	27,2	27,2
Baltics	67,3	64,1	53,5	55,9	55,8	14,0	17,5	24,4	20,4	20,4	18,7	18,3	22,2	23,7	23,7
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
France	32,2	31,0	30,6	31,5	29,5	25,3	26,2	28,3	26,1	29,6	42,5	42,8	41,1	42,4	40,9
Germany	25,1	23,9	19,3	19,3	16,9	23,4	22,9	22,5	22,6	24,1	51,5	53,2	58,2	58,1	59,1
Italy	38,3	36,8	33,2	37,1	34,6	27,9	27,2	30,0	25,5	28,1	33,8	36,1	36,8	37,4	37,4
United Kingdom	36,0	37,1	37,5	37,5	36,2	22,2	20,6	22,1	22,1	22,6	41,8	42,3	40,4	40,4	41,2

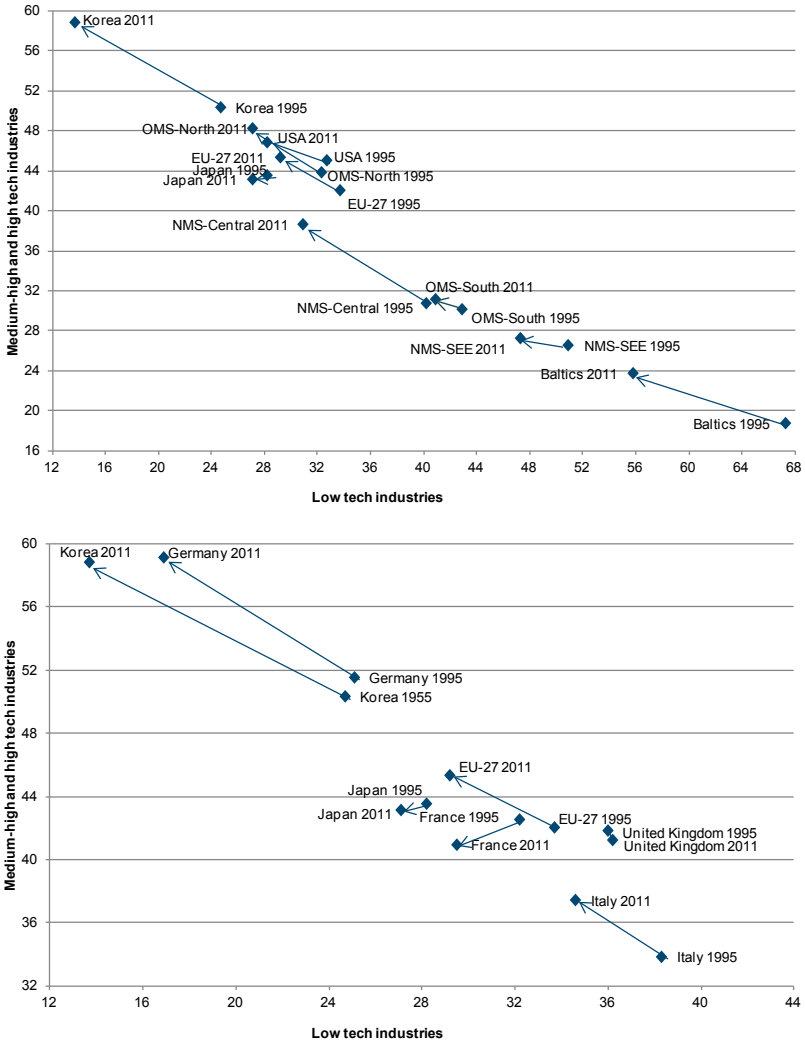
Source: WIOD; wiiw calculations.

Finally, we see quite a bit of differentiation amongst the low-/medium-income economies regarding structural shifts within manufacturing over the period 1995 to 2011: the NMS-Central group sticks out with the most dramatic decline of the share of LT industries (decline of 10.0ppts!!) and an increase in the share of MHT industries (by 7.5ppts), while the shifts in the NMS-SEE and the OMS-South are much more modest (between 0.5 and 2ppts). There is a more

significant shift in the Baltics, but the share of LT industries remains very high there, as is also the case in the NMS-SEE.

The shifts in within manufacturing shares of MHT industries and LT industries over the period 1995 to 2011 are depicted in Fig. 3.

Figure 3 / Shares of MHT, and LT industries in total manufacturing GDP (in %), 1995 and 2011



Source: WIOD; wiiw calculations

Summing up: there is an astonishingly strong position and improvement of the EU Central manufacturing core in the composition of its manufacturing industries (together with Finland and Sweden), rather lacklustre performances of the other major advanced EU economies. There is also a significant differentiation amongst the low-/medium-income economies of Europe with some showing significant upward changes in the composition of manufacturing (NMS-Central), others much less significant shifts and still a strong specialisation in LT industries.

Finally, we want to point to the increased role of business services (BS) accounting for manufacturing gross output (through input-output linkages). Table 5 shows the cost share of business services in the value of gross output of manufacturing and Appendix Table A.6 the differentiated role of BS in the three groups of manufacturing (LT, MT, MHT).

From Table 5 we can observe that there was a convergence between the EU-27 and the US in the increased role of business services in manufacturing output (see also the decline of this role during the financial crisis 2009-2011). In any case, both the EU-27 and the US show a significantly stronger role of business services inputs in manufacturing production than does Japan and South Korea (where the cost shares either increased only marginally or even declined). Further, the business services input into manufacturing seems to be particularly high in France amongst the major advanced economies, and in the OMS-South amongst the low-/medium-income EU economies. The more detailed information contained in Appendix Table A.5 confirms this picture of inter-country differentiation and, in general, one can say that the cost shares of business services tend to be higher in the MHT industries than in the MT industries and, interestingly, higher in the LT industries than in the MT industries. The explanation of this lies in the fact that in the LT industries the share of inputs from other manufacturing industries is lower than in the MT industries and thus labour costs and service inputs account for a higher share.

Let us sum up the main results obtained in this section:

- Generally there is a process of 'deindustrialisation' across all Western advanced economies measured in the share of manufacturing in GDP.
- However, the exception in Europe is Germany where the share of manufacturing is rather stable.
- Furthermore, amongst the low- and medium-income EU economies, the NMS-Central European economies (which together with Germany and Austria form the 'Central European manufacturing core') show a strong and sustained presence of manufacturing production, while the OMS-South economies and the Baltics went through a dramatic process of deindustrialization.
- As regards the share of business services, there is generally an upward trend, with the US and the UK showing a very strong specialization in this area (the share of business services almost double that in Japan and in South Korea).
- The share of financial services within the overall business services group increased strongly in the OMS-South and the NMS-SEE particularly before the start of the crisis reflecting the strong role of banks in the 'bubble period' on the one hand and, on the other hand, relative weaknesses in the other important segments of tradable business services.
- We also emphasized the very strong position of Germany in the area of MHT industries accounting – together with the other countries belonging to the Central European manufacturing core – for most of the shifts in the EU towards MHT industries. On the other side, there were relatively disappointing records of the other major advanced EU economies (UK, France, Italy) and amongst the low-/medium-income economies of the

OMS-South group as regards shifts towards the group of more technology-intensive (MHT) industries over the period 1995 to 2011. Hence the evidence suggests a strong and increased dependence of manufacturing in general and of HMT industrial production in particular on the Central European manufacturing core.

- Finally, we pointed towards the increased role of business services as input providers to manufacturing industries, which is particularly the case for MHT industries.

Table 5 / Cost share of business services in manufacturing gross output in %
Share of business services (BS) used in manufacturing, in % of gross output

	1995	2000	2007	2009	2011
EU-27	7,7	8,4	8,4	9,3	8,8
USA	8,3	9,4	9,4	9,7	9,0
Japan	4,3	5,0	5,0	5,6	5,3
South Korea	5,1	4,6	4,5	4,3	4,2
	1995	2000	2007	2009	2011
OMS-North	8,0	8,9	9,1	10,1	9,5
OMS-South	6,2	6,2	6,6	7,9	7,4
NMS-Central	4,4	5,1	4,9	5,2	5,0
NMS-SEE	5,8	4,7	4,6	4,8	4,8
Baltics	1,7	2,2	3,4	3,4	3,4
	1995	2000	2007	2009	2011
Germany	8,6	8,9	8,8	9,8	8,9
France	11,0	10,7	12,0	13,1	12,9
Italy	5,3	6,6	7,0	7,4	7,2
United Kingdom	7,1	8,2	7,3	7,9	7,4

Source: WIOD; wiiw calculations.

3. International trade performance

In this section the emphasis is on analysing the evolution of trade performance of the EU and groups of members therein. The analysis here is in relation to a wide range of competing economies (other advanced economies, but also emerging economies). We shall discuss the following indicators:

› Shares in global exports: including and excluding intra-EU27 trade and calculated from gross export and export value added data.

› Shares of industry groups (LT, MT, MHT) in total manufacturing exports, again calculated from both gross export and value added data

› Revealed comparative advantages indicators (RCA) of industry groupings – again calculated from gross export data and from value added exports data

› Domestic vs. foreign contributions to value added exports

› Contribution of Business Services in Manufacturing Exports – subdivided by domestically supplied business services and foreign supplied business services

All the above is available for trade flows including and excluding intra-EU27 trade.

We start with an analysis of developments in **global market shares** (including and excluding intra-EU-27 trade flows).

In the following calculations we shall be looking at shares in global world trade including all components of world trade, i.e. including trade in manufacturing as well as in services both of which will be shown explicitly in the following tables; but global trade will also include other trade flows such as those in primary products; these will not be shown in our tables and graphs. Similarly, only some countries or country groups will be shown explicitly in the tables and graphs while total global trade does indeed include exports from all countries in the world.

We start with pointing to some differences when world market shares are calculated from gross export values or from value-added (in exports) data: tables 6 and 7 show the shares of different countries or country groups in total global exports in manufacturing and services, once including intra-EU27 trade (Table 6) and once excluding intra-EU27 trade (Table 7). While the calculations in Tables 6 and 7 are from value added in exports data, in the Annex Tables A.6 and A.7 the calculations of these shares are from gross exports.

Let us start with a first observation: When we add up the market shares of all the countries/country groups contained in Table A.6 and in Table 6 for a particular year, say 2011, we find that the group of countries depicted in the tables account for about 65.5% of total global trade (63.4% if measured in value added terms), out of which 50.3% is their share of manufacturing exports in total trade (46.4% in value added terms) and 15.2% (resp. 17.1%) the share of global exports accounted for by their services exports. The difference when measured in gross exports compared to in value added terms shows that the depicted group of countries account somewhat less in value added terms than in gross exports (which means that they together rely more on imported primary and intermediate inputs than the rest of the world in its exports of manufacturing and services). Furthermore, the difference between manufacturing and services in this regard shows that services are less dependent (for this group of economies) on imported intermediate imports than is manufacturing.

Tables 6 and 7 / Shares in global exports: including and excluding intra-EU27 trade and calculated from export value added data (see Annex tables A.6 and A.7 for calculations from gross export).

Next, the performance of the EU-27 relative to other major trading countries. Comparator countries included in Tables 6 and 7 and following tables are other advanced economies, the USA, Japan and South Korea, and the two giant emerging economies China and India (see also Fig. 4). What we see here is the well-known decline of the shares of the advanced Western economies' manufacturing exports in global trade and the dramatic improvement of the share in manufacturing exports from China and from a much lower position from India – China more than tripling its share, India doubling it over the period 1995 to 2011. Developments do not differ very much whether we look at export shares in terms of gross exports or in value added terms.

Table 6 / World market export shares: share of exports in total global exports (in %)

	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	32.79	27.66	26.77	25.03	22.67	7.98	8.11	9.95	10.40	8.74
USA	9.34	10.08	6.66	6.83	6.45	5.40	5.74	4.67	4.64	4.31
Japan	8.36	6.93	4.50	4.10	4.12	1.79	1.76	1.29	1.21	1.23
South Korea	1.96	2.03	2.07	2.03	2.19	0.54	0.56	0.46	0.43	0.45
China	2.53	3.25	7.37	8.59	9.71	0.40	0.85	1.40	1.56	1.84
India	0.63	0.79	1.01	1.12	1.21	0.12	0.15	0.53	0.41	0.51
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	29.66	24.64	22.72	20.93	18.93	6.99	6.93	8.22	8.52	7.15
OMS-South	1.88	1.71	1.78	1.77	1.59	0.49	0.65	0.90	0.93	0.76
NMS-Central	1.01	1.09	1.88	1.94	1.81	0.36	0.38	0.55	0.62	0.54
NMS-SEE	0.18	0.15	0.27	0.28	0.24	0.10	0.11	0.19	0.22	0.18
Baltics	0.05	0.07	0.12	0.11	0.10	0.04	0.05	0.10	0.11	0.10
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
France	4.57	3.86	3.25	3.16	2.71	1.09	0.81	0.72	0.76	0.67
Germany	9.37	7.58	8.20	7.44	6.94	1.16	1.12	1.39	1.54	1.22
Italy	3.90	3.24	3.04	2.78	2.49	0.79	0.67	0.70	0.67	0.58
United Kingdom	3.91	3.61	2.54	2.20	1.99	1.19	1.65	2.24	2.01	1.70
Germ sh in EU27	28.58	27.41	30.64	29.74	30.63	14.48	13.83	13.92	14.80	13.98
CE-Core sh in EU27	36.84	35.60	41.49	41.44	42.43	27.20	24.73	24.57	26.79	25.95

Source: WIOD; wiiw calculations.

Table 7 / World market export shares: share of exports in total global exports (in %) - extra EU27 trade only

	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	16.57	13.51	13.54	12.92	11.49	5.63	5.65	6.52	6.92	6.88
USA	12.59	12.94	8.61	8.67	7.82	7.27	7.36	6.03	5.89	5.23
Japan	11.26	8.90	5.80	5.20	5.00	2.41	2.26	1.66	1.54	1.49
South Korea	2.64	2.60	2.68	2.58	2.66	0.73	0.72	0.60	0.54	0.54
China	3.40	4.17	9.52	10.90	11.78	0.54	1.09	1.81	1.98	2.23
India	0.85	1.01	1.30	1.42	1.47	0.16	0.20	0.69	0.53	0.62
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	15.39	12.51	12.06	11.40	10.12	4.98	4.87	5.48	5.80	5.72
OMS-South	0.76	0.63	0.74	0.78	0.69	0.30	0.44	0.57	0.59	0.55
NMS-Central	0.30	0.27	0.57	0.57	0.54	0.23	0.19	0.27	0.29	0.37
NMS-SEE	0.10	0.07	0.12	0.13	0.10	0.09	0.10	0.13	0.15	0.16
Baltics	0.03	0.02	0.04	0.05	0.04	0.03	0.04	0.08	0.09	0.09
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
France	2.41	1.87	1.71	1.83	1.47	1.02	0.72	0.45	0.58	0.60
Germany	5.28	4.03	4.59	4.26	4.00	0.66	0.81	1.07	1.23	1.13
Italy	2.24	1.82	1.80	1.71	1.49	0.65	0.49	0.43	0.44	0.47
United Kingdom	2.42	2.20	1.58	1.37	1.18	0.91	1.20	1.33	1.22	1.07
Germ sh in EU27	31.89	29.84	33.88	32.93	34.80	11.79	14.32	16.44	17.79	16.44
CE-Core sh in EU27	35.94	34.40	40.25	39.39	41.66	19.73	20.64	24.87	26.38	26.45

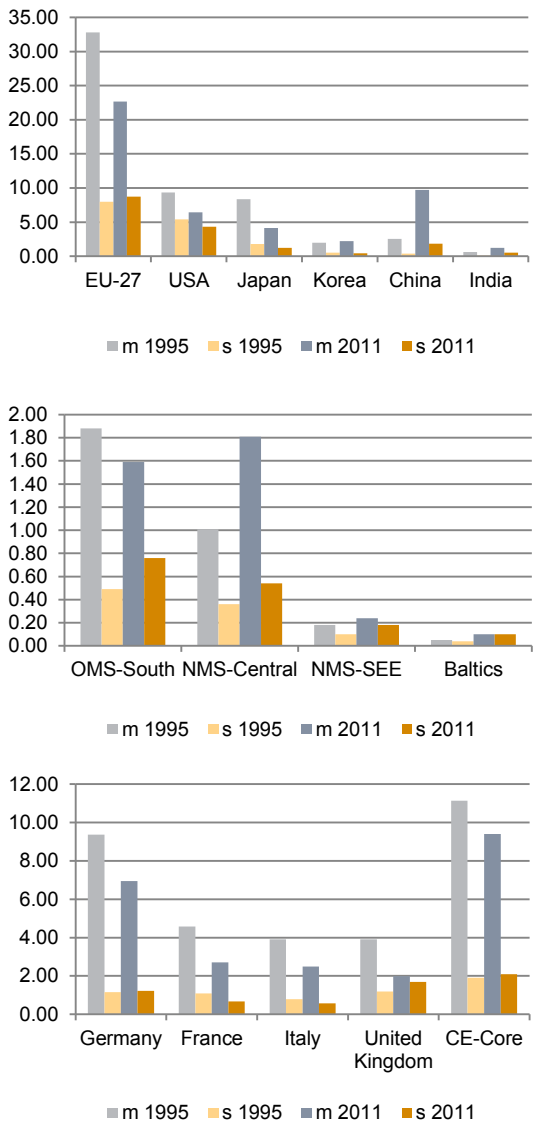
Source: WIOD; wiiw calculations.

The other issue we see is that while the EU-27 show increasing shares in global trade flows as regards services exports (both in total global trade as well as excluding intra-EU27 trade) this is not the case for the USA and Japan which both lose trade shares in global services exports (see

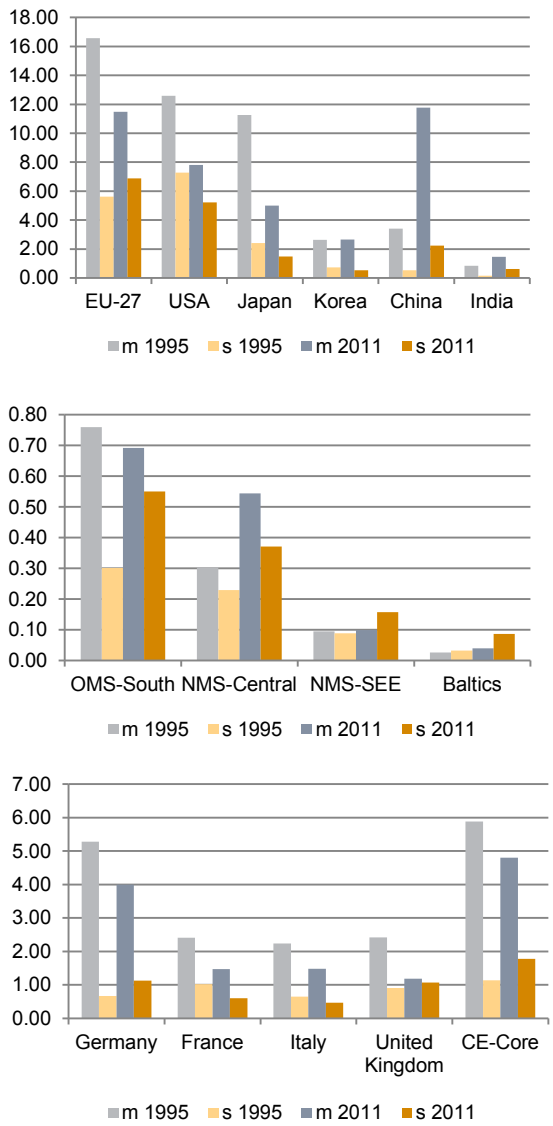
also Figure 5 below). There is, however, a sharp decline in EU's shares in exports of services during the crisis period from 2009 to 2011. However, this is almost entirely due to a decline in intra-EU27 trade flows, as it hardly features in extra-EU27 global trade flows (in fact the USA loses more over these years than does the EU27).

Figure 4 / Shares in global exports

Shares in global exports (%)



Shares in global exports excluding intra-EU27(%)



Note: m stands for manufacturing, s for services

As regards the differentiation amongst the EU's low- and medium-income economies we see rather strikingly differentiated patterns: the OMS-South economies experience a decline or stagnation in their shares of manufacturing exports in global trade (see also the sharp drop over the crisis period) while the NMS-Central nearly double their shares in manufacturing exports. The

situation is somewhat different whether one looks at gross export shares or shares in exports measured in value added terms: in the former case the gains of NMS-Central are larger than in the latter case, which reveals the position of these Central-Eastern economies in the European supply chains so that the import content of their exports is rather high.

Interestingly the picture with regard to the differentiation amongst EU's low- and medium-income economies is rather different when we look at global shares in services exports: here we see a rather strong increase by OMS-South which exceeds the increase of NMS-Central. This points to a specialisation of OMS-South towards services trade – some would say a premature servitization/tertiarisation – while NMS-Central show a strengthening position in manufacturing exports. We can also observe a shock effect of the crisis on OMS-South services export shares over the period 2009-2011 when its share in global services exports declined rather dramatically.

Let us now consider the shares in global exports **excluding intra-EU27 trade** (Tables 7 and Annex table A.7) we see the following. The EU-27 (in 2011) is still the dominant global exporter both in manufacturing as well as in services when measured in gross export terms: EU-27 accounted for 13.54% of global manufacturing exports in 2011 (as against 17.9 % in 1995), while China's share increased from 3.41% in 1995 to 11.91% in 2011. In value added terms, according to calculations from the WIOD project, China's share in manufacturing global exports exceeded in 2011 that of the EU-27 in extra-EU27 trade (11.78% China as against 11,49% for the EU-27), but we have to be careful in this comparison for two reasons.

Firstly, excluding intra-EU trade from the analysis, means that one excludes asymmetrically intra-regional trade flows in the EU but one does not do the same with e.g. intra-East Asian trade flows or intra-NAFTA trade flows. So world market share analysis of global market shares excluding intra-EU flows but keeping all other regional trade flows in, leads to somewhat biased results against the EU. But, of course, in any analysis of trade flows there are some biases, e.g. the US being one big integrated country so that intra-(US)states trade flows are not considered if one adopts the alternative comparison of global market shares which includes intra-EU trade flows (as in Table 6).

Secondly, the current methodology underlying the WIOD dataset has – for data reasons – some serious shortcomings: the WIOD dataset uses national input-output tables (or rather 'supply' and 'use' tables) to calculate the direct and indirect uses of inputs produced domestically vs. inputs supplied by importers. From this information the direct and indirect contribution of domestic and foreign suppliers to export value added is being calculated. What the WIOD database could not capture, however, is the possible – and likely – differences of 'sourcing' of inputs by the exporting firms as compared to firms which mainly produce for the domestic market. We know from other types of analyses based on firm level data (see e.g. Altomonte et al, 2012) that import intensities are quite different for exporting firms than for firms mostly supplying the domestic market. For China, specifically, the difference of import intensities in the export processing zones and domestic production overall are another striking example. These differences are ignored in the

current state of trade-in-value added analysis and this leads to an incomplete – even somewhat distorted – assessment of where value-added in trade originates.

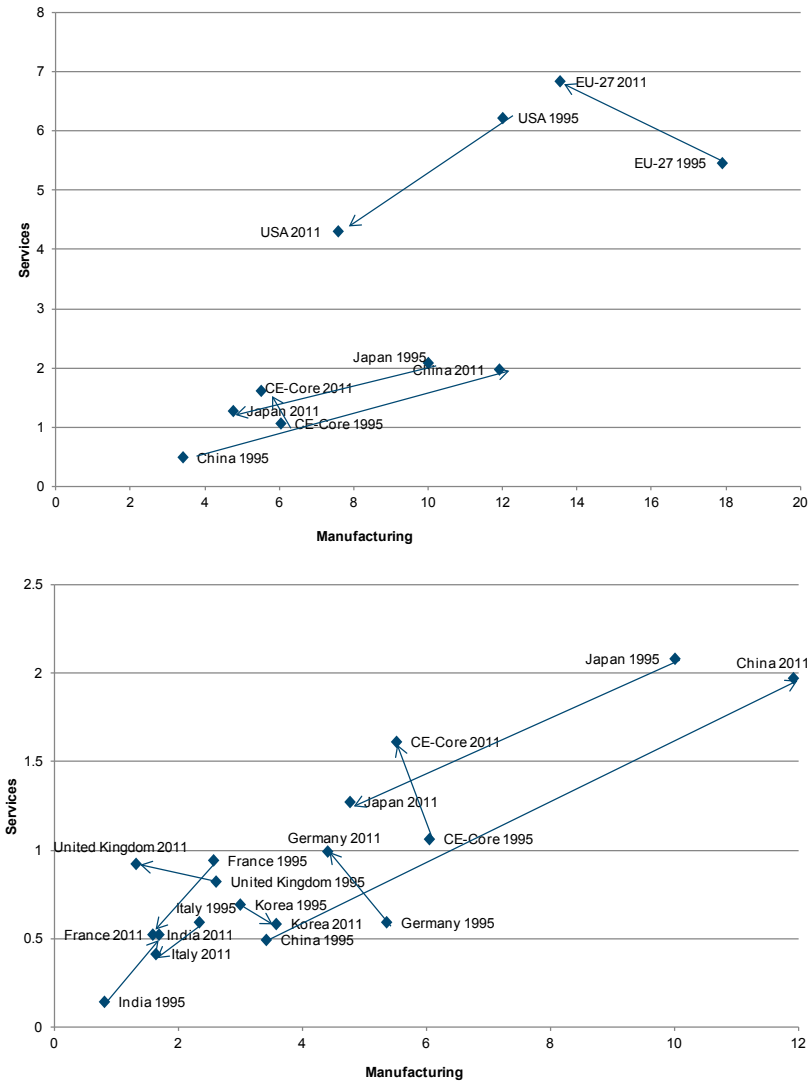
Excluding intra-EU27 trade flows, the EU-27 share in world exports of manufacturing is lower in value added terms than in gross exports terms; this is however not the case for services exports. This shows the greater importance of international production linkages in European manufacturing compared to other countries/regions of the world, while in services domestic vertically integrated production and cross-border intra-EU trade integration is rather high.[6]

Tables 7 (and Table A.7 in the Annex) also reveal the strengthened position of Germany especially in extra-EU27 trade of the EU as a whole: while in 1995 Germany had a share in global exports (measured in value-added; see Table 7) excluding intra-EU27 trade of 5.28% (EU27 as a whole 16.57%), in 2011 Germany's share was 4% (to EU27's 11.49%); in value added terms Germany's share in total EU's global trade shares (excluding intra-EU27 trade) increased by 3.5ppts. In order to further capture the role of Germany in EU's manufacturing we have defined the ***Central European Manufacturing Core***, (identified in Tables 6 and 7 and Figures 4 and 5 as CE-Core) consisting of Germany, Austria and NMS-Central, all strongly connected through cross-border production networks with Germany (see also Stoellinger, 2014). We can perceive a significantly strengthened position of this Central European Manufacturing Core in terms of its contribution to EU-27 exports: while in 1995 the EU-manufacturing core accounted for 34% of extra-EU exports (35% in value added terms), in 2011 it accounted for 41% (42% in value added) of extra-EU exports; see bottom rows in Tables 6 and 7. This is a measure of the increase of the EU's dependence on the CE-Core for its position in global extra-EU manufacturing trade shares.

Figure 5 summarizes the big shifts in extra-EU trade shares both in manufacturing and in services over the 1995 to 2011 period.

[6] A more precise analysis would distinguish between a quantity effect and a price effect accounting for inter-country differences in the ratios of value-added to gross exports; the quantity effect would measure the difference in quantity of intermediates to output (using a common set of prices across countries) and the price effect would show inter-country differences in the price ratios (intermediates to output). As such detailed price data are not available in the WIOD database, we cannot show these two effects separately.

Figure 5 / World market export shares: share of exports in total global exports (in %) - extra EU27 trade only



Let us now move to the structure of exports in terms of the low-tech (LT), medium-tech (MT), and medium-/high-tech (HT) distinction already used in section 2 (see also Annex Table A.1.1 for the classifications of these industry groupings).

Shares of industry groups (LT, MT, MHT) in total manufacturing exports, calculated from value added data are in Table 8 (and see Annex Table A.8 for calculations from gross exports data).

Table 8 shows that, in terms of export structure of the manufacturing sector, Germany amongst the advanced EU economies and CE-Central amongst the low-/medium-income economies are much more specialised in the medium-/high-tech spectrum of export industries. Germany alone, amongst the major advanced EU economies thus shows a similarly high share of MHT industries in

its export structure as do the advanced Asian economies Japan and South Korea. Of course, this type of analysis would have to be complemented by the study of within industry vertical differentiation (e.g. identifying different quality segments in which different producers operate); for lack of space we shall not report on such a complementary type of analysis in this paper (see e.g. the recent study by Cheptea et al, 2013[7]). In particular, in a comparison of trade structures across economies with different levels of technological development (such as in the comparison of the EU economies with China) such analysis of intra-industry 'vertical differentiation' is important as specialisation in different 'quality segments', 'tasks', 'production stages' within industries is very relevant in this case.

Table 8 / Share of exports in total exports, by industry group (%),calculated from value-added exports

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	15.26	12.63	10.72	11.39	10.49	10.49	8.97	9.66	8.93	9.42	33.04	32.11	28.06	27.68	26.56
USA	10.87	9.34	8.02	8.87	8.28	6.18	6.08	7.03	7.50	8.94	37.36	39.81	33.95	34.18	31.21
Japan	3.38	2.92	2.28	2.63	2.34	12.60	10.51	12.31	14.91	14.51	60.98	59.37	50.96	48.97	46.80
Korea	14.11	10.11	3.68	3.39	2.88	7.46	6.95	8.08	7.89	7.69	37.32	37.67	41.78	40.43	38.93
China	32.95	24.83	17.81	19.03	17.99	12.51	11.02	8.78	8.27	8.62	21.53	26.71	35.25	39.59	37.79
India	40.13	36.79	23.09	22.70	19.71	12.55	10.99	10.36	9.19	10.48	13.89	14.81	13.36	19.35	19.35
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
CGROUP	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	14.94	12.37	10.60	11.15	10.25	10.33	8.90	9.58	8.77	9.22	34.30	33.64	29.53	28.93	27.84
OMS-South	18.33	14.73	12.17	13.92	12.86	10.93	9.38	10.25	10.17	11.12	27.88	24.56	21.90	22.19	21.09
NMS-Central	17.03	13.33	9.87	11.00	10.22	13.74	9.64	9.90	9.55	10.09	17.41	20.68	22.33	23.68	21.91
NMS-SEE	16.65	14.61	12.03	11.79	11.81	11.88	10.12	10.90	9.40	9.43	12.94	11.55	13.62	16.05	16.22
Baltics	22.77	20.74	17.37	16.13	16.11	4.41	5.62	7.10	6.34	6.35	8.01	7.85	8.79	9.49	9.48
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
France	15.32	13.07	12.53	13.22	12.18	9.77	8.50	9.45	8.55	8.71	35.73	37.84	35.45	36.28	33.29
Germany	11.47	10.33	9.36	10.46	9.05	12.05	10.55	11.07	10.80	11.35	48.74	45.52	40.69	39.79	39.52
Italy	21.87	20.11	16.01	17.44	15.93	12.78	11.83	13.30	12.40	12.76	31.21	32.19	30.29	31.94	29.12
United Kingdom	11.54	8.59	7.69	7.82	7.78	9.17	7.75	8.01	7.09	7.88	36.73	35.01	24.96	25.04	23.61

Source: WIOD; wiiw calculations.

We complement the above type of analysis by showing calculations with a simple 'revealed comparative advantage' (RCA) indicator defined as:

$$RCA_{ijt} = \frac{\frac{EXP_{ijt}}{EXP_{jt}}}{\frac{EXP_{it}}{EXP_{t}}} - 1$$

where RCA_{ijt} refers to the revealed comparative advantage of an industry i of country j, EXP_{ijt} to the exports (in gross value terms or in value added terms) industry i of country j and EXP_{it} to global exports of that industry. Similarly, EXP_{jt} and EXP_{t} refer, respectively, to total exports of country j and total global exports.

[7] Cheptea et al (2013; pp. 27-30) find that EU exporters have increased their intra-industry specialisation in the top-quality segment (characterised by high unit values) significantly more than the US and Japan. They estimate that the EU27 now export about 40% of its exports in the top unit-value range of products.

Hence, the indicator compares the position of an industry in a particular country's export basket compared to that industry's position in global exports. A number -0.25, for example, would mean that a particular industry would be represented 25% less in a country's overall exports than it would be in global exports.

The information presented in Table 9 and the presentation of the shifts in RCA's in Figures 6 and 7 show rather dramatic changes in comparative advantage structures at the global level with regard to manufacturing and services (Figure 6) and manufacturing and business services (Figure 7).

Table 9 / RCAs-calculated from value-added exports (total exports)

	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	0,09	0,10	0,09	0,07	0,09	-0,09	-0,03	0,11	0,16	0,17
USA	-0,14	-0,08	-0,11	-0,09	-0,09	0,70	0,58	0,71	0,62	0,70
Japan	0,17	0,19	0,22	0,23	0,23	-0,14	-0,10	-0,04	-0,05	0,02
South Korea	0,11	0,16	0,28	0,32	0,33	0,05	-0,03	-0,21	-0,28	-0,25
China	0,14	0,13	0,29	0,32	0,32	-0,39	-0,11	-0,33	-0,37	-0,31
India	0,06	0,09	-0,07	0,07	0,01	-0,30	-0,35	0,35	0,03	0,19
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	0,10	0,11	0,10	0,08	0,10	-0,11	-0,06	0,09	0,15	0,16
OMS-South	0,04	0,01	-0,01	-0,02	0,02	-0,07	0,16	0,37	0,35	0,37
NMS-Central	-0,07	0,03	0,14	0,12	0,14	0,14	0,07	-0,09	-0,06	-0,04
NMS-SEE	-0,16	-0,19	-0,13	-0,17	-0,17	0,55	0,68	0,66	0,66	0,77
Baltics	-0,26	-0,21	-0,22	-0,26	-0,25	0,79	0,79	0,81	0,89	1,01
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	0,25	0,27	0,31	0,28	0,32	-0,47	-0,43	-0,39	-0,31	-0,35
France	0,08	0,17	0,23	0,22	0,22	-0,12	-0,26	-0,25	-0,23	-0,16
Italy	0,16	0,21	0,25	0,25	0,27	-0,19	-0,24	-0,22	-0,21	-0,18
United Kingdom	0,02	-0,06	-0,22	-0,22	-0,20	0,06	0,30	0,89	0,87	0,90

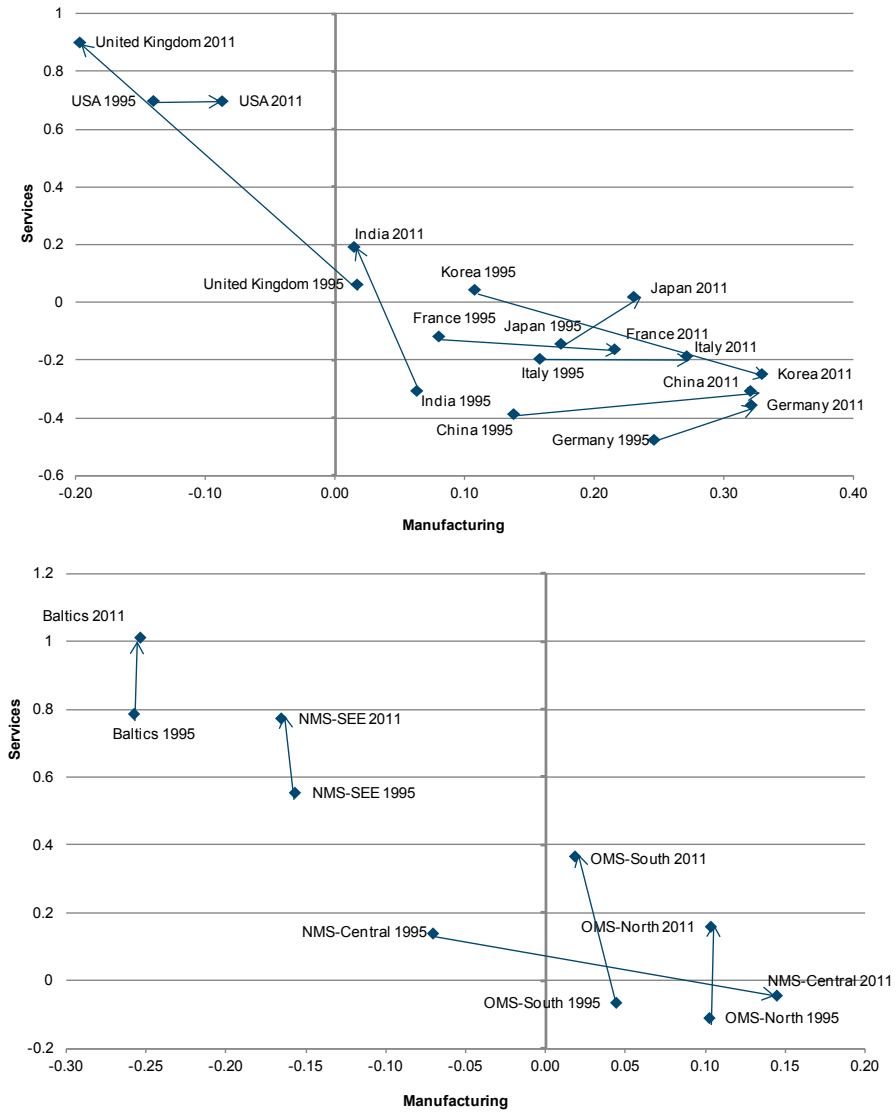
Source: WIOD; wiiw calculations.

The following are the main positions of countries/country groups and shifts over time regarding their RCAs:

- China, South Korea and Germany have similar RCA values in manufacturing in 2011 (all of them about 32-33 ppts. higher shares of exports of manufacturing in total exports than is the case in global shares; over the period 1995 to 2011, the shifts in strengthening this position was the strongest in South Korea and China.
- The UK had a dramatic further shift in the direction of further export specialisation in services exports and even more so in business services: in the former case the RCA value reached a value of 0.90 in 2011 – which means that in UK exports services are 90ppts more represented than in global exports (in the US the value is 70ppts) – up from 6ppts in 1995; and in business services the RCA value reaches 2.41 in 2011 – which means exports in business services in total UK exports exceeds its share in global exports by 241ppts - up from 91ppts in 1995 (in the US the figures were 85ppts in 1995 and 112ppts in 2011).

- Other countries which had significant increases in services RCAs were India, OMS-South and NMS-SEE and the Baltics in business services.
- As against this the NMS-Central have moved further in the direction of strong specialisation in manufacturing exports.

Figure 6 / Revealed Comparative Advantage (RCA), Manufacturing and Services, 1995 and 2011

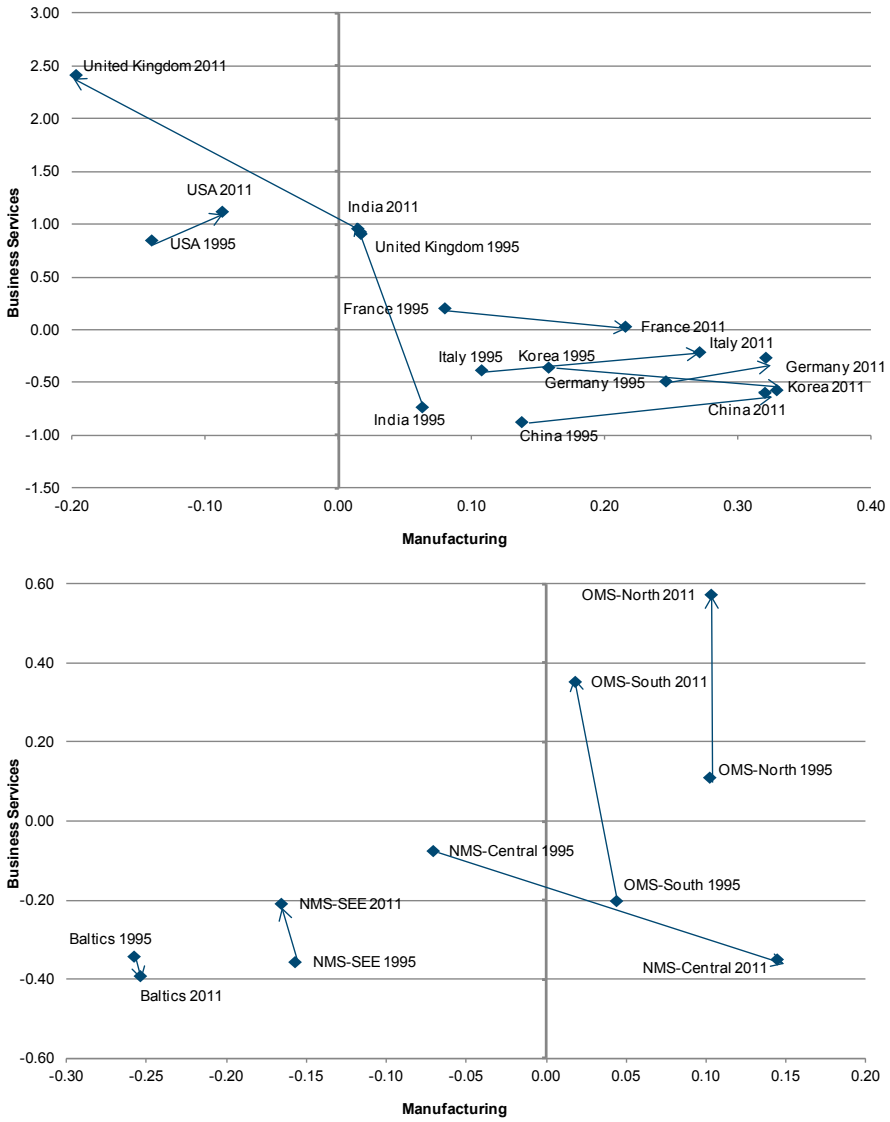


Source: WIOD; wiiw calculations.

- Both France and Italy show sizeable increases in their manufacturing RCAs. Between 1995 and 2011, the manufacturing RCA of France increased from initially 0.08 to 0.22 which indicates that while in 1995, French manufacturing exports were 8ppts more represented in total French exports than in total global exports, in 2011, French manufacturing exports were 22ppts more represented in total French exports than in total global exports. For

Italy, the increase in manufacturing RCA is less pronounced: between 1995 and 2011, the manufacturing RCA of Italy increased from initially 0.16 to 0.27, emphasizing that in 1995 Italian manufacturing exports were 16ppts more represented in total Italian exports than in total global exports while in 2011, Italian manufacturing exports were already 27ppts more represented in total Italian exports than in total global exports. However these developments should be seen in the context of the significantly stronger overall percentage declines in French and Italian market shares than e.g. German shares (see earlier tables 6 and 7).

Figure 7 / Revealed Comparative Advantage (RCA), Manufacturing and Business Services, 1995 and 2011



Source: WIOD; wiiw calculations.

Table 10 / RCA- calculated from value-added exports (total), manufacturing industry groups

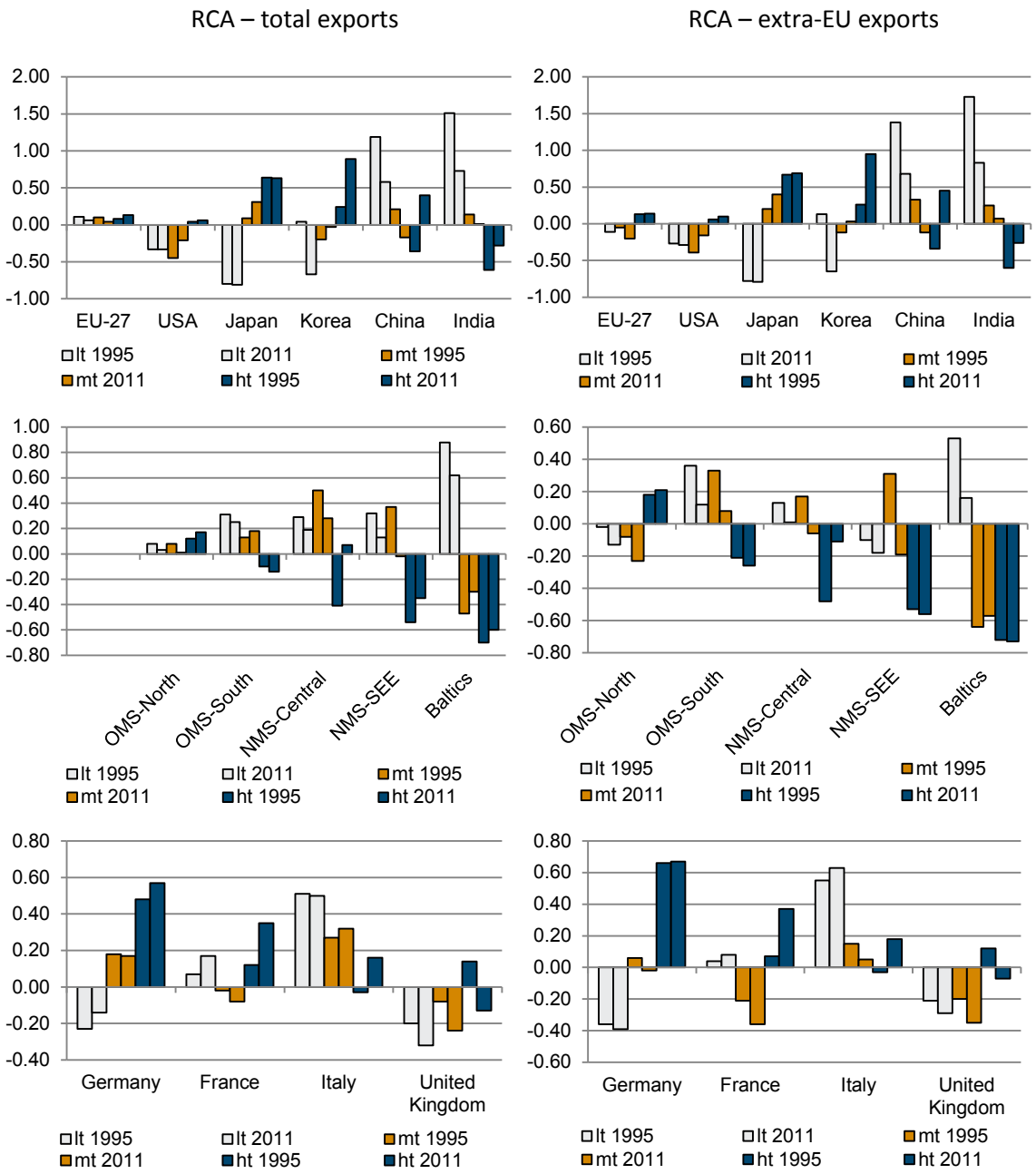
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	0,11	0,10	0,09	0,05	0,06	0,10	0,10	0,02	0,01	0,04	0,08	0,09	0,12	0,10	0,13
USA	-0,33	-0,33	-0,34	-0,34	-0,33	-0,45	-0,39	-0,40	-0,31	-0,21	0,04	0,11	0,09	0,10	0,06
Japan	-0,80	-0,80	-0,81	-0,80	-0,81	0,09	0,02	0,07	0,40	0,31	0,64	0,61	0,68	0,61	0,63
South Korea	0,04	-0,08	-0,60	-0,64	-0,67	-0,20	-0,12	-0,09	0,02	-0,03	0,24	0,33	0,77	0,83	0,89
China	1,19	0,91	0,68	0,55	0,58	0,21	0,19	-0,14	-0,17	-0,17	-0,36	-0,20	0,30	0,39	0,40
India	1,51	1,75	1,08	0,95	0,73	0,14	0,15	-0,03	-0,03	0,01	-0,61	-0,57	-0,53	-0,28	-0,28
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	0,08	0,07	0,06	0,02	0,03	0,08	0,08	-0,01	-0,02	0,01	0,12	0,14	0,16	0,14	0,17
OMS-South	0,31	0,30	0,22	0,22	0,25	0,13	0,16	0,07	0,09	0,18	-0,10	-0,15	-0,14	-0,16	-0,14
NMS-Central	0,29	0,34	0,20	0,15	0,19	0,50	0,36	0,25	0,23	0,28	-0,41	-0,19	0,07	0,07	0,07
NMS-SEE	0,32	0,39	0,29	0,08	0,13	0,37	0,35	0,21	0,06	-0,02	-0,54	-0,57	-0,43	-0,36	-0,35
Baltics	0,88	1,05	0,85	0,54	0,62	-0,47	-0,22	-0,22	-0,25	-0,30	-0,70	-0,70	-0,63	-0,61	-0,60
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	-0,23	-0,15	-0,09	-0,09	-0,14	0,18	0,21	0,11	0,15	0,17	0,48	0,46	0,55	0,48	0,57
France	0,07	0,10	0,21	0,15	0,17	-0,02	0,00	-0,05	-0,09	-0,08	0,12	0,25	0,35	0,36	0,35
Italy	0,51	0,62	0,52	0,46	0,50	0,27	0,33	0,31	0,28	0,32	-0,03	0,01	0,13	0,16	0,16
United Kingdom	-0,20	-0,32	-0,33	-0,37	-0,32	-0,08	-0,15	-0,28	-0,29	-0,24	0,14	0,07	-0,15	-0,12	-0,13

Source: WIOD; wiiw calculations.

Coming to a discussion of RCA indicators for the sub-groups of manufacturing industries in Table 10 (and Figures 8 and 9) we can see e.g. while Germany has 57ppts stronger representation of MHT manufacturing in its exports compared to their values in global exports (measured in value added terms; see Table A.10 for calculations from gross exports), France has a higher representation of MHT industries of only 35ppts and Italy only 16ppts more than is the case in overall global exports (although both these two economies experienced a strong shift in export specialisation towards MHT industries over the period 1995-2011). If we compare Europe's low -/medium-income economies: the OMS-South countries have an underrepresentation of MHT industries of 14ppts while the NMS-Central a higher representation of this industry group of 7ppts compared to their representation in overall global exports. Differences in levels of development are also clearly visible with the NMS-SEE having a lower representation of -35ppts and the Baltics of -60ppts. All the above figures refer to 2011.

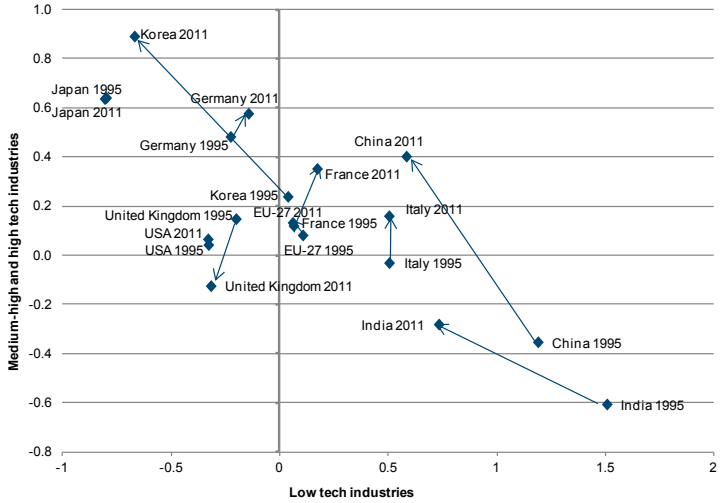
We now move to discuss some features regarding the EU's position in services trade, and the role which services play indirectly in manufacturing exports. Again, we shall point to intra-EU differentiation with respect to services export performance and specialisation.

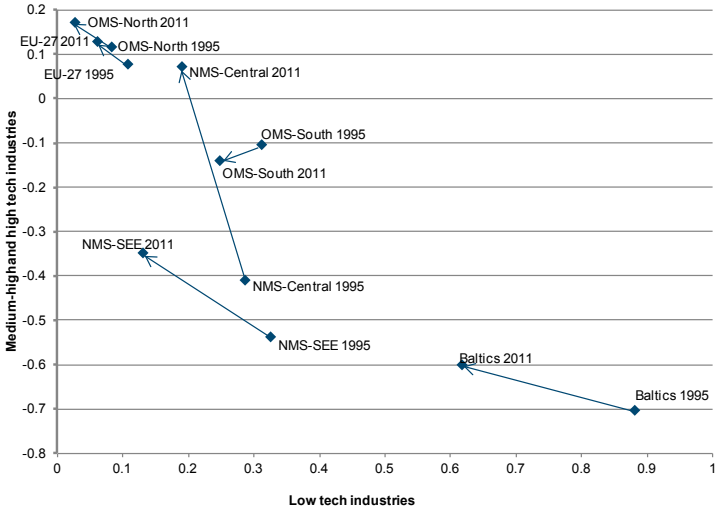
Figure 8 / Revealed Comparative Advantage (RCA) of manufacturing industry groups, from value-added exports, 1995 and 2011



Note: lt stands for low tech industries; mt for medium low tech industries; MHT for medium high and high tech industries; see Annex Table A.1.1 for detailed industry classification

Figure 9 / Revealed Comparative Advantage (RCA) from value-added exports (total), by industry group 1995-2011





Source: WIOD; wiiw calculations.

Table 11 (calculated from value added export figures; Annex Table A.11 calculated from gross export values) shows the breakdown of services exports by types. What is being calculated is the share which a particular service industry has in that country's total exports. A number of features are interesting:

- There is strong growth of business services in the shares of all advanced economies' (with the exception of South Korea) exports over the period 1995 to 2011; this is also the case for OMS-South and NMS-SEE but not for NMS-Central and also strikingly the case for India where business services account now for about 15% of exports (14% in value added terms) in 2011.

- Amongst the advanced economies, we can see that the US has a much higher share of business services in its exports (about 16% or 17% depending on whether measured in value added or gross export terms) as compared to the EU27 (with 9% or 11% respectively). Japan's and South Korea's shares are much lower. Amongst the advanced EU economies we can clearly see the outlier position of the UK with a share of business services in overall exports of 24% or 26% (again depending on whether calculated from value added or gross export figures), with relatively low shares in Germany and Italy (about 5%) and somewhat higher figures for France (about 7%).
- The other feature which is visible is the important position which transport services play in some of Europe's low-/medium-income economies' exports: in the OMS-South, the NMS-SEE and the Baltics. Communications services (call centres in Romania) also play a significant role in NMS-SEE's exports.

Finally, we want to point to the importance of domestically produced vs foreign value added in export activity: Table 12 shows the domestically produced value added (as a share of total value added exports) and Table 13 shows the imported value added (again as a share of that country's overall value added exports). Annex Tables A.12 and A.13 show the equivalent figures when we look at exports excluding intra-EU27 trade.

What we see is the following: take the case of MHT manufacturing industries and compare the EU-27 and the USA. In this case 26.6% of total EU-27 export value added was produced domestically by medium-/high-tech manufacturing industries and 14.8% was added through foreign value added imports. In the USA the contribution of foreign value added imports was significantly smaller (7.1% from foreign imports as against 31.2% from domestic production). What is quite striking is the dramatic fall in Japan (although still high) of domestically produced value added by MHT industries from 60.1% in 1995 to 46.8% in 2011. In the South Korean case, the contribution of value added supplied through imports in the MHT industries increased dramatically: from 13% in 1995 to 22.9%. These are all features of the impact of increased international production integration.

Another striking example are the Central European economies (NMS-Central): the share of foreign supplied value added in the MHT industries (as a share of total exports of this group of countries) increased from 8.3% in 1995 to 23.4% in 2011 while the domestic share increased only from 17.4% to 21.9%. This is clear evidence of the importance of cross-border production networks for that group of countries' increased role of MHT industries in overall export activity. Looking at it from the German angle, we can also see that the domestically produced value added produced in MHT industries (as a share of total German exports) was a very high 48.7% in 1995 and declined to 39.5% in 2011, while the foreign supplied value added for these industries increased from 10.9% in 1995 to 17% in 2011. This is clear evidence for production relocation.

In Annex Tables A.14 and A.15 we can see the direct and indirect contribution of service industries – split into domestically supplied in A.14 and foreign supplied in A.15 – to overall value added exports of a country or country group. As already expected, the domestic contribution to overall

value added exports of business services is very high in the UK, the US and India; for the Baltics, the NMS-SEE and the OMS-South, transport services contribute significantly – directly and indirectly – to overall value added exports.

We shall now move on to report on some econometric analysis regarding the determinants of the various competitiveness indicators (exports and RCA indicators) for EU economies using the detailed sectoral information contained in the WIOD data-set.

Table 11 / Share of industries in total value-added exports (%), service industries

	Business services					Transport					Communication					Distribution, etc.				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	5,59	7,41	9,04	10,05	9,02	4,75	4,50	4,54	4,99	4,49	0,46	0,59	0,67	0,74	0,66	3,03	2,98	3,41	3,77	3,40
USA	11,19	12,12	15,67	18,18	16,24	6,58	6,41	6,06	5,58	5,05	1,42	1,18	1,13	1,09	0,94	11,51	11,24	10,55	8,32	8,83
Japan	2,00	2,51	2,47	2,53	2,49	7,03	7,00	6,68	7,26	6,82	0,10	0,09	0,06	0,06	0,06	7,25	8,72	9,51	9,75	9,56
South Korea	3,14	1,99	2,54	2,40	2,30	7,27	7,01	4,75	4,05	3,61	0,34	0,20	0,20	0,19	0,18	4,90	5,19	4,05	3,80	3,61
China	0,70	2,32	2,69	2,83	2,84	5,33	3,56	3,45	3,58	3,52	0,43	0,47	0,47	0,48	0,49	3,89	9,90	5,09	5,19	5,25
India	1,59	4,86	16,23	12,44	13,81	2,73	1,89	1,76	1,38	1,52	0,09	0,06	0,49	0,37	0,41	8,32	5,47	6,30	4,72	5,22
	Business services					Transport					Communication					Distribution, etc.				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	5,75	7,74	9,78	10,90	9,75	4,49	4,07	3,98	4,36	3,96	0,41	0,57	0,67	0,74	0,66	2,89	2,80	3,22	3,51	3,16
OMS-South	4,19	6,42	8,24	9,18	8,65	6,98	8,26	10,04	10,77	9,21	0,84	0,65	0,73	0,78	0,70	2,70	2,86	2,90	3,13	2,68
NMS-Central	4,60	3,84	3,28	3,89	3,47	5,93	5,37	3,95	4,54	4,03	0,94	0,81	0,39	0,46	0,40	5,24	4,63	4,33	4,95	4,47
NMS-SEE	3,04	3,44	4,53	5,10	5,14	9,15	10,18	8,98	9,88	9,89	0,84	1,10	1,97	2,16	2,18	9,11	10,05	9,86	11,18	11,14
Baltics	2,99	2,34	3,38	3,77	3,77	12,46	12,84	13,14	14,53	14,43	0,69	0,79	0,80	0,83	0,83	8,35	9,17	10,14	11,33	11,28
	Business services					Transport					Communication					Distribution, etc.				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	2,84	4,21	4,71	5,79	4,81	3,27	3,22	3,37	4,09	3,43	0,38	0,25	0,31	0,37	0,31	2,31	2,09	1,83	2,25	1,88
France	6,49	6,03	6,30	6,92	6,63	4,88	4,01	4,52	4,98	4,88	0,14	0,35	0,64	0,70	0,66	1,39	1,84	1,01	1,10	1,04
Italy	3,49	3,79	5,33	5,77	5,17	4,43	3,45	3,01	3,22	2,78	0,12	0,45	0,53	0,56	0,49	5,24	5,60	4,67	5,28	4,82
United Kingdom	10,33	15,96	25,02	26,15	24,11	4,07	3,75	4,15	4,00	3,60	0,53	0,74	1,19	1,11	1,01	1,92	2,46	4,69	4,34	3,96

Source: WIOD; wiiw calculations.

Table 12 / Domestic contributions to value added exports, by manufacturing industry group (%)

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	15,26	12,63	10,72	11,39	10,49	10,49	8,97	9,66	8,93	9,42	33,04	32,11	28,06	27,68	26,56
USA	10,87	9,34	8,02	8,87	8,28	6,18	6,08	7,03	7,50	8,94	37,36	39,81	33,95	34,18	31,21
Japan	3,38	2,92	2,28	2,63	2,34	12,60	10,51	12,31	14,91	14,51	60,98	59,37	50,96	48,97	46,80
South Korea	14,11	10,11	3,68	3,39	2,88	7,46	6,95	8,08	7,89	7,69	37,32	37,67	41,78	40,43	38,93
China	32,95	24,83	17,81	19,03	17,99	12,51	11,02	8,78	8,27	8,62	21,53	26,71	35,25	39,59	37,79
India	40,13	36,79	23,09	22,70	19,71	12,55	10,99	10,36	9,19	10,48	13,89	14,81	13,36	19,35	19,35

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
CGROUP	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	14,94	12,37	10,60	11,15	10,25	10,33	8,90	9,58	8,77	9,22	34,30	33,64	29,53	28,93	27,84
OMS-South	18,33	14,73	12,17	13,92	12,86	10,93	9,38	10,25	10,17	11,12	27,88	24,56	21,90	22,19	21,09
NMS-Central	17,03	13,33	9,87	11,00	10,22	13,74	9,64	9,90	9,55	10,09	17,41	20,68	22,33	23,68	21,91
NMS-SEE	16,65	14,61	12,03	11,79	11,81	11,88	10,12	10,90	9,40	9,43	12,94	11,55	13,62	16,05	16,22
Baltics	22,77	20,74	17,37	16,13	16,11	4,41	5,62	7,10	6,34	6,35	8,01	7,85	8,79	9,49	9,48

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	11,47	10,33	9,36	10,46	9,05	12,05	10,55	11,07	10,80	11,35	48,74	45,52	40,69	39,79	39,52
France	15,32	13,07	12,53	13,22	12,18	9,77	8,50	9,45	8,55	8,71	35,73	37,84	35,45	36,28	33,29
Italy	21,87	20,11	16,01	17,44	15,93	12,78	11,83	13,30	12,40	12,76	31,21	32,19	30,29	31,94	29,12
UK	11,54	8,59	7,69	7,82	7,78	9,17	7,75	8,01	7,09	7,88	36,73	35,01	24,96	25,04	23,61

Source: WIOD; wiiw calculations.

Table 13 / Foreign contributions to value added exports, by manufacturing industry group (%)

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	4,35	4,06	3,81	3,79	4,02	4,03	4,47	6,65	5,39	7,52	11,43	14,41	14,72	13,25	14,83
USA	1,14	1,05	1,12	1,09	1,29	1,02	1,16	2,20	2,23	3,91	6,05	6,92	7,53	6,09	7,09
Japan	0,22	0,22	0,32	0,30	0,34	1,26	1,29	3,76	3,76	5,26	4,07	5,72	9,22	7,64	9,22
South Korea	4,51	3,20	1,22	1,24	1,24	4,03	6,01	8,73	9,25	12,36	13,13	17,39	20,67	22,97	22,86
China	6,35	4,69	3,34	2,67	2,95	2,31	2,34	2,93	2,17	2,94	5,51	8,10	16,33	12,82	13,93
India	4,70	5,67	9,23	13,92	11,22	2,25	3,96	4,35	2,70	3,55	2,34	3,52	4,32	4,64	4,70

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	4,27	3,88	3,67	3,72	3,94	3,90	4,25	6,36	5,21	7,31	11,64	14,30	14,05	12,81	14,40
OMS-South	4,63	4,52	3,69	3,47	3,81	3,79	5,28	7,75	6,27	9,33	10,80	13,33	12,68	9,79	11,09
NMS-Central	5,15	5,74	4,64	4,41	4,70	6,89	6,52	7,92	5,99	8,07	8,28	19,15	24,91	21,93	23,41
NMS-SEE	6,08	6,41	5,18	4,47	4,50	7,28	8,12	10,73	6,55	6,48	9,45	10,09	9,39	8,67	8,65
Baltics	11,66	11,43	9,18	6,98	7,03	4,36	7,04	7,77	8,98	9,06	5,46	8,55	6,87	6,78	6,85

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	2,35	2,61	2,87	3,05	3,08	2,95	3,63	5,91	4,41	5,31	10,94	14,63	16,16	14,32	17,02
France	3,05	2,93	2,96	2,90	3,27	2,87	3,63	5,36	4,29	5,49	11,29	15,61	16,07	14,74	17,27
Italy	4,57	4,61	4,14	3,64	4,36	3,69	4,39	7,21	5,96	8,65	8,87	10,06	11,61	9,70	11,84
UK	2,57	1,65	1,59	1,70	1,81	2,51	2,06	3,32	3,16	5,17	12,04	12,41	9,33	9,76	10,53

Source: WIOD; wiiw calculations.

4. Productivity, domestic vs. international linkages and external competitiveness

The following econometric analysis uses the World Input-Output Database (WIOD) which is based on the NACE Rev.1 industry classification and covers the time horizon from 1995 to 2011 (see Dietzenbacher et al., 2013; Timmer, 2012 for further details). However, to identify longer-term determinants of 'competitiveness' and to avoid any crisis-related distortions, the ensuing empirical analysis studies the period between 1995 and 2007. Moreover, it focuses on the group of EU-27 Member Countries (no data were available for Croatia when WIOD was constructed). WIOD is complemented by the EUKLEMS database to extract data on the ICT capital share. The focus in the first part of the analysis is on the manufacturing sector in the EU-27; due to its particularities, the coke, refined petroleum and nuclear fuel industry (NACE-23) is excluded from the analysis.[8] Moreover, the analysis also splits the overall manufacturing sector into three sub-groups, differentiated by their technology-intensity into medium-high and high-technology industries (MHT), medium technology industries (MT) and low-technology industries (LT), to shed light on differences in the role of particular determinants on export performance in these sub-samples. Finally, we shall also report on results with respect to tradable services.

The ensuing analysis draws on trade theories which have traditionally been used to explain trade patterns. For instance, it accounts for the importance of relative factor endowments as advocated by the traditional Heckscher-Ohlin model which posits that countries specialise in the production and export of products in which they have a comparative advantage brought about by the relative abundance of a particular input factor. However, in accordance with the extension of the neo-factor proportions theory which emerged in response to the 'Leontief Paradox', the labour force is treated as heterogeneous as defined by its skill-composition in terms of high-, medium- and low-skilled labour shares. In this respect, Landesmann et al. (2009) for instance demonstrate for a sample of EU economies that a higher share of both high- and medium-skilled labour is conducive to export growth of industries. Moreover, they point at a stronger effect for high-skilled workers than for medium-skilled workers. Furthermore, it takes account of the Ricardian tradition which argues that cross-country differences in technology/labour productivity determine comparative cost advantages and trade patterns. In this respect, several empirical studies have pointed at a negative relationship between external industrial competitiveness and labour costs (e.g. Liu and Shu, 2003) or unit labour cost (ULC) (determined by both the cost of labour and labour productivity) (e.g. Ito and Shimizu, 2013; Guerrieri and Cafferelli, 2012; Landesmann et al., 2009). Furthermore, as for instance suggested by Carlin et al. (1999), given different short-term effects, individual components of ULC should be analysed separately instead of the overall ULC in short-run analysis of determinants of export. Hence, the ensuing analysis uses the component parts of ULC (labour costs and productivity) to shed light on their individual roles for industrial competitiveness. Moreover, the analysis also accounts for phenomena which have become more

[8] Previous analyses we undertook which used WIOD data showed that results were quite sensitive to the inclusion of this particular industry. In particular, the coke, refined petroleum and nuclear fuel industry (NACE-23) stands out in many respects, for instance, in terms of a very high degree of vertical specialization, the high energy-intensity, extremely high labour productivities in some countries like Ireland, excessive capital coefficients etc. Hence, this industry is excluded to avoid distorted results.

recent defining factors of the international landscape like the growing 'servitization'[9] of manufacturing or the acceleration of global production sharing. For instance, there is evidence that strong backward linkages of manufacturing industries with services industries are associated with significantly better export performance of manufacturing industries but that, differentiated by sourcing strategy, domestic backward linkages are statistically less relevant than foreign ones (see e.g. Wolfmayr, 2012). Furthermore, empirical evidence also emphasises that the proliferation of global production sharing – referred to as production fragmentation - is an important determinant of export performance (see e.g. Guerrieri and Caffarelli, 2012; Vogiatzoglou, 2012). Guerrieri and Caffarelli (2012) study the role of trade fragmentation and openness for the export performance of EU-27 Member States between 2000 and 2009 and find that a country which moves from the first to the last quartile of the fragmentation distribution (i.e. from little or no to highly fragmented production) would experience an increase in its export share by 0.17 percentage points.

Methodologically, a step-wise procedure is pursued to account for the potential sensitivity of results to the inclusion of particular control variables which (i) either show non-negligible correlation with other control variables (like in the case of log labour compensation per employee which shows non-negligible correlation with log labour productivity)[10] or which (ii) have strong missing data issues which affect the reliability and comparability of results (like in the case of the ICT-capital share for which no data are available for Bulgaria, Cyprus, Estonia, Greece, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania and Slovakia or only few data are available for Belgium and Slovenia).

Against that backdrop, the following econometric specification (in its fullest form) is estimated to shed light on determinants of export performance:

$$ExpPerfInd_{ijt} = \alpha_0 + \beta_1 LnLabProd_{ijt} + \beta_2 SH_HS_{ijt} + \beta_3 SH_MS_{ijt} + \beta_4 BS - linkages_{ijt} + \beta_5 SH_FVAiX_{ijt} + \beta_6 LnLabCompPE_{ijt} + \beta_7 CapCoeff_{ijt} + \beta_8 SH_ICT_{ijt} + \varphi_i + \vartheta_j + \epsilon_{ijt} \quad (1)$$

where $ExpPerfInd_{ijt}$ refers to one of the following four alternative export performance indicators: (i) log gross exports, (ii) log domestic value-added in exports, (iii) revealed comparative advantage (RCA)-gross exports based and (iv) revealed comparative advantage (RCA)-domestic value-added in exports based of industry i in country j at time t. The former two concepts refer to overall export levels, either measured in gross terms as total export volumes or in terms of domestic value-added in exports to account for the potentially distortive effect of measuring export performance in gross terms in the context of growing international production fragmentation. The latter two concepts are measures for the relative export competitiveness, which compare the position of an industry in a country's export basket relative to that industry's position in global exports. RCAs are calculated on the basis of economy-wide exports (as reported

[9] 'Servitization' is a term coined by Vandermerewe and Rada (1988) and refers to the increased service component in goods production. See also Fontagne et al. (2014).

[10] See the correlation matrix reported in Annex Table A.15.

in section 3 of this report). $LnLabProd_{ijt}$ refers to the log of labour productivity, value-added based in 1995 prices, while SH_HS_{ijt} and SH_MS_{ijt} refer to the shares of high-skilled and medium-skilled labour in total employment, respectively, with the share of low-skilled labour as reference group. $BS - linkages_{ijt}$ captures the extent of backward linkages of manufacturing sectors with service sectors, measured by the gross output multiplier (as defined in standard Input-Output Analysis) which shows the direct and indirect effects of a change in final demand in manufacturing on output in the respective services categories. For the ensuing analysis, the focus is on business services linkage effects, with business services comprising renting services of machinery and equipment without operator etc., computer and related services, research and development services and other business services, all subsumed under category 71t74 in WIOD according to NACE Rev.1 and financial services (NACE-J). Since producers can source business services inputs from both domestic as well as foreign services providers, this linkage indicator is further differentiated by sourcing strategy and split up into (i) business service linkages which are sourced domestically and (ii) business service linkages which are sourced from abroad. Moreover, SH_FVAiX_{ijt} is a measure for the degree of vertical specialisation of industry i in country j at time t, defined as the share of foreign value-added in exports in total exports (for technical details see Foster-McGregor and Stehrer, 2013). Furthermore, $CapCoeff_{ijt}$ denotes the capital coefficient, defined as the share of capital stock in GO (in %), $LnLabCompPE_{ijt}$ refers to the log of labour compensation per employee (in continuous PPP) as a measure for input cost competitiveness. Hence, as suggested by Carlin et al. (1999), both component parts of ULC (i.e. $LnLabProd_{ijt}$ and $LnLabCompPE_{ijt}$) are included separately to also identify their individual, and potentially different, roles for export performance.[11] SH_ICT_{ijt} denotes the share of ICT capital in terms of ICT capital compensation (as share in total compensation). Finally, φ_i and ϑ_j are country and industry fixed effects to control for time-invariant country and industry characteristics while ϵ_{ijt} refers to the error term.

Results of the econometric analysis for the manufacturing sector are presented in Table 14 and Table 15 below. Table 14 reports results when total business-service linkages is used as one of the control variables while Table 15 reports results when total business-service linkages are split up into domestic and foreign business-service linkages. However, due to strong multicollinearity issues, the measure for vertical specialisation had to be dropped from the list of control variables in that case. In addition, the analysis also accounts for the strong heterogeneity across manufacturing industries and the differences in determinants of export performance that may arise as a result. Hence, the overall sample is split into (i) medium-high and high-technology (MHT) industries, (ii) medium technology (MT) industries and (iii) low-technology (LT) industries.[12] (results are reported in Annex Tables A.17 to A.19[13]) Generally, results are presented in a step-wise procedure: the first columns per concept of export performance analysed (i.e. columns (1), (4), (7) and (10)) report results for the base specification while the second columns (i.e. columns

[11] The overall effect of ULC can also be calculated as follows: the coefficient of $LnLabCompPE_{ijt}$ minus the coefficient of $LnLabProd_{ijt}$.

[12] See Annex Table A.1.1 for the list of industries included in each sub-sample.

[13] See Annex Table A.16 for summary statistics by groups of industries.

(2), (5), (8) and (11)) also include log labour compensation per employee which shows non-negligible correlation with log labour productivity which could affect results. Finally, the third columns (i.e. columns (3), (6), (9) and (12)) report results once ICT-capital shares are included and - as a result of missing data - the number of observations drops significantly which means that these results refer to a much smaller number of countries, leaving out most of the lower-, medium-income EU economies.

Results in the first two columns of each of the four different concepts of export performance analysed in Table 14 emphasise that irrespective of indicator of export performance considered, manufacturing industries with higher labour productivity are characterised by significantly better export performance. In particular, the results emphasise that a 1 percent increase in labour productivity is associated with around 0.6 percent higher export levels (either in terms of gross exports or domestic value-added in exports) and between 0.4 and 0.8 percentage points higher RCAs. Moreover, Annex Tables A.17 to A.19 highlight that this finding holds, irrespective of technology-intensity of the industry considered. However, the size of the coefficients differ across sub-samples and tend to be largest for MT industries with respect to export levels but largest for LT industries with respect to RCAs[14].

Furthermore, the human capital mix is found to matter for the export performance of manufacturing industries. In particular, the level of exports (both in terms of gross exports and domestic value-added in exports) is significantly higher in more skill-intensive industries. However, results highlight that the share of the highly skilled matters more since export levels are significantly higher in response to increases in high-skilled labour shares than to medium-skilled labour shares. In particular, results show that a 1 percentage point increase in the high-skilled labour share (relative to the low-skilled labour share) is associated with an around 2 percent increase in exports while an increase in the medium-skilled labour share is associated with only a 1 percent increase in exports. Moreover, the role of the human capital mix for export levels differs across manufacturing sub-groups. In particular, more skill-intensive MT and LT industries show significantly higher export levels while for MHT industries, export levels and skill composition show no significant relationship.

However, a different picture emerges for RCAs as indicators of export performance: Manufacturing industries with both higher shares of high-skilled or medium-skilled labour are characterised by significantly lower comparative advantages in exports. This finding can be interpreted as follows: for the econometric analysis, given the focus on EU export performance, only RCAs of EU industries have been used as dependent variables while those of non-EU competitor industries have been left out. The negative sign on the high-skill (and medium-skill labour) shares shows that for EU producers, a higher share of the higher skilled does not necessarily increase its RCA per se. What is missing in the analysis is the relative skill content of EU exports relative to that of non-EU producers as we did not have the skill variable readily available at the industry level for the non-EU exporters. Thus it is conceivable that EU producers are

[14] Labour productivity might matter less in MHT industries where product quality (not captured by standard labour productivity measures) might be more important.

particularly challenged in higher skill industries, so that a higher share of skilled workers in an EU industry does not necessarily show up in an improvement in its comparative advantage position. As long as information skill intensities of EU industries are not also set in relation to non-EU producers, the interpretation of the results for the skill variable should keep this caveat in mind, especially as regards the analysis of RCA indicators.[15]

Our results consistently demonstrate that strong backward business service linkages of manufacturing sectors are conducive to their export performance, irrespective of the particular indicator considered. However, results demonstrate that the role of backward business service linkages differs across sub-samples considered. In particular, a significant positive relationship emerges for the group of MHT and LT industries while no significant relationship exists for MLT industries.

Moreover, we also find evidence that industries with deeper vertical specialisation are characterised by better export performance, particularly in terms of gross exports and domestic value-added in exports. Specifically, coefficients suggest that a 1 percentage point increase in the share of foreign value-added in exports is associated with an increase in gross exports of around 4 percent and an increase in domestic value-added in exports of around 2 percent. This also holds for the three sub-samples considered. The size of the coefficients, however, suggest that the effect is strongest in MHT industries, where a 1 percentage point increase in the share of foreign value-added in exports is associated with an increase in gross exports of around 5 percent and an increase in domestic value-added in exports of around 4 percent. On the contrary, the degree of vertical specialisation is statistically insignificant for gross export-based RCAs but shows up negative and significant for value-added based RCAs. We find here, however, an interesting difference for the case of MHT industries where higher vertical specialisation shows a positive and significant relationship to both types of RCAs. We interpret this as evidence that task differentiation and hence global value chain fragmentation and task specialisation is important for RCAs in MHT industries while for lower tech industries higher vertical specialisation (and thus higher foreign value added input into exports) might show a general competitive weakness of the industry.

Furthermore, for the sample as a whole, except for the third columns in each set of results, we fail to find any significant relationship between an industry's export performance and its capital coefficient. However, the third columns per set of results - which suffer from serious missing data issues - show that for the set of countries covered, manufacturing industries with higher capital coefficients are characterised by significantly lower export performance. This finding suggests that in the EU, comparative advantages are not in capital-intensive manufacturing industries. However, the size of the coefficient suggests that the effect is rather small. In particular, an increase in the capital coefficient by 1 percentage point is associated with only 0.2 percent lower exports and 0.3 percentage points lower RCAs. A more differentiated picture emerges once different sub-groups of manufacturing industries are considered. For instance, we find consistent

[15] In fact, as robustness check, the analysis was repeated without skill variables and shows qualitatively similar results. To conserve space, results are, however, not presented here but are available upon request.

evidence that a higher capital coefficient is associated with significantly better export performance in MT industries. On the contrary, the capital coefficient plays a limited role in MHT and LT industries: results for the limited set of countries covered (i.e. every third column in each set of results) highlight that a higher capital coefficient is associated with significantly better export performance in MHT industries but significantly worse export performance in LT industries. And with regard to RCAs, results are again mixed. While in LT industries higher capital coefficients are associated with significantly higher RCAs, MT industries show the opposite, suggesting that in MT industries higher capital coefficients do not lead to improved RCAs, rather the contrary.

Our results also consistently show that high labour compensation costs are obstructive to export performance of manufacturing industries as industries characterised by high labour compensation per employee are found to have significantly lower export levels (both in terms of gross exports and domestic value-added in exports) as well as lower RCAs. Hence, cost-competitiveness is decisive for export performance. Particularly, in line with previous studies, we find that industries with high labour costs – i.e. costs which make up a large portion of overall costs and therefore strongly determine prices - tend to be less competitive internationally and therefore to export less. In particular, coefficients suggest that a one percent increase in the log of labour cost per employee is associated with around 0.2 percent lower exports and a deterioration of the revealed comparative advantage of 0.7 percentage points. However, the role of labour costs differs by technology-intensity of industries analysed. For instance, while a similar obstructive effect of high labour compensation costs on export levels is observable in the group of LT industries, the opposite holds for both MT and MHT industries. Both groups of industries are characterised by significantly higher export levels in the face of high labour compensation costs. This finding suggests that cost-competitiveness is the decisive determinant of export levels in LT industries while export levels of MT and MHT industries are more strongly determined by non-cost factors like e.g. quality and/or reputation of the product, quality and scope of after-sale services etc. On the contrary, labour costs play a strong obstructive role in determining the international export competitiveness of industries: both MHT and LT industries with higher labour compensation costs also tend to be characterised by significantly lower export competitiveness, as captured by both RCA measures.

Finally, our results also emphasise that manufacturing industries with higher ICT-capital shares are characterised by significantly lower export levels, both in terms of gross exports as well as domestic value-added in exports (see results reported in the third columns of results for each concept of export competitiveness). This finding suggests that manufacturing industries of those EU-countries for which information on ICT-capital shares are available are not specialised in ICT.[16] However, the size of the coefficient is rather small and suggests that a 1 percentage point increase in the ICT-capital share is associated with 0.3 percent lower exports. On the contrary, the ICT-capital share is statistically irrelevant for both RCA measures. A closer look at MHT, MT and LT industries, however, suggests that ICT capital plays a different role in the three sub-samples analysed. Specifically, the negative relationship between export levels and ICT-capital share only

[16] In fact, since the early 1980s, Europe has increasingly been lagging behind the USA in terms of ICT-capital investments.

emerges for MHT industries, which suggests that MHT industries in the limited group of EU countries considered are not specialised in ICT. Furthermore, our findings point to a differentiated role of ICT capital for export competitiveness, as captured by the two measures of RCA. Our results show that while a high share of ICT capital in MHT industries is associated with significantly lower RCA, the opposite holds for MT industries. This seems to suggest that while European MHT industries do not specialise in ICT, European MT industries, on the other hand, do improve their competitiveness with ICT capital investment.

In addition, once total backward business service linkages are split up by sourcing strategy into domestic and foreign business service linkages, results reported in Table 15 highlight that except for domestic business service linkages in the case of gross exports, both strong domestic and foreign business service linkages are associated with better export performance, irrespective of the indicator of export performance used. Hence, manufacturing industries with both strong domestic or foreign business service linkages are characterised by significantly better export performance. As for the remaining control variables, findings remain qualitatively unchanged except for the role of labour compensation per employee for the levels of exports or of domestic value-added in exports which becomes insignificant. However, the role of strong domestic and foreign backward business service linkages differs strongly across groups of industries. For instance, in MHT industries, export performance is significantly better in the presence of strong foreign business service linkages, irrespective of the indicator analysed. On the contrary, strong domestic business service linkages are associated with significantly lower export levels and RCAs (particularly those based on gross exports). In MT industries, on the other hand, the opposite is observable. While strong domestic business service linkages are associated with higher RCAs, strong foreign business service linkages have the opposite effect on both export performance and competitiveness. In the group of LT industries, however, both types of business service linkages have a consistent an positive effect on export performance.

A similar analysis was also conducted for tradable services industries, comprising business services, transport, and communications services (see Table 16). In this analysis, the labour productivity variable and the capital coefficient were left out because of well-known measurement problems of productivity levels and capital stocks in services industries. Furthermore, like before, due to strong multicollinearity issues, the indicator for vertical specialisation was also dropped from the list of control variables, to avoid biased results. In general, the focus of this analysis is on the role of forward linkages of services producers with manufacturing industries for the export performance of tradable services industries. Additionally, it shows how export performance is related to strong domestic and foreign forward linkages in the two business-services industries separately, namely NACE 71t74 comprising renting services of machinery and equipment, computer and related services, research and development services and other business services, and NACE-J, referring to financial intermediation.

The results contained in Table 16 show an overall negative impact of domestic businesses service linkages on export levels and RCAs of tradable services, but a positive role of foreign supplies of business services - both directly and indirectly – for exports. This finding suggests that the

particular sourcing strategy matters for the export performance of tradable services industries: while strong foreign forward business-service linkages are conducive to export performance of tradable services industries, strong domestic forward business-service linkages tend to be obstructive to their export performance. However, results also demonstrate that strong domestic forward business-service linkages are not obstructive to all tradable services industries alike. In particular, the positive sign of the interaction term between domestic forward business-service linkages and the two business service industries individually indicate that both business services industries actually benefit from strong domestic forward business-service linkages in terms of both higher export levels and RCAs.

As regards the remaining determinants of export performance, Table 16 shows that similar to findings for the manufacturing sector as a whole (see Table 15), the level of exports (both in terms of gross exports and domestic value-added in exports) is significantly higher in more skill-intensive tradable services industries.

Likewise, tradable services industries with higher ICT-capital shares are characterised by significantly lower export levels (both in terms of gross exports as well as domestic value-added in exports) and RCAs, which again highlights that competition in ICT-intensive services areas is particularly fierce at the global level and that the EU-countries - for which information on ICT-capital shares are available - are not particularly competitive with regard to ICT investment.

However, in contrast to findings for the overall manufacturing sector, export levels are significantly higher in tradable services industries characterised by higher labour compensation costs. This suggests that export levels in tradable services industries are less strongly determined by labour costs which, in turn, allows exporters to more strongly indulge in rent-sharing and to pay higher wages to their employees and/or to emphasise an upgrading of the skill mix (which involves paying higher wages).

Table 14 / Determinants of export competitiveness in manufacturing: 1995-2007

	Log exports			Log domestic value-added in exports			RCA - export based			RCA - domestic value-added in exports based		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log labour productivity (VA-based)	0.574***	0.644***	0.713***	0.569***	0.636***	0.697***	0.401***	0.734***	0.903***	0.426***	0.762***	0.927***
	(17.54)	(14.24)	(12.03)	(17.39)	(14.07)	(11.78)	(7.80)	(10.38)	(11.63)	(8.26)	(10.75)	(11.46)
Share high-skilled labour	0.018***	0.022***	0.011**	0.019***	0.023***	0.012**	-0.039***	-0.024***	-0.032***	-0.033***	-0.018**	-0.030***
	(3.58)	(4.06)	(2.10)	(3.80)	(4.24)	(2.22)	(-4.89)	(-2.85)	(-4.57)	(-4.14)	(-2.11)	(-4.14)
Share medium-skilled labour	0.006	0.007*	0.011**	0.006	0.007	0.012**	-0.019***	-0.012*	-0.005	-0.015**	-0.008	-0.002
	(1.36)	(1.68)	(2.40)	(1.34)	(1.64)	(2.43)	(-2.80)	(-1.78)	(-0.76)	(-2.15)	(-1.13)	(-0.32)
BS-linkages, total	4.033***	4.017***	3.336***	4.119***	4.104***	3.414***	4.661***	4.586***	3.405***	4.524***	4.448***	3.033***
	(10.67)	(10.63)	(8.20)	(10.90)	(10.86)	(8.40)	(7.84)	(7.75)	(6.39)	(7.60)	(7.51)	(5.46)
Share foreign value added in exports	0.038***	0.039***	0.031***	0.021***	0.022***	0.014***	-0.001	0.002	0.003	-0.015***	-0.012***	-0.012***
	(16.80)	(16.95)	(10.11)	(9.28)	(9.46)	(4.65)	(-0.19)	(0.53)	(0.83)	(-4.15)	(-3.42)	(-2.79)
Capital coefficient	0.000	0.001	-0.002***	0.000	0.001	-0.002***	-0.001	0.000	-0.003**	-0.001	0.000	-0.002**
	(0.61)	(1.13)	(-2.65)	(0.78)	(1.27)	(-2.61)	(-1.44)	(0.23)	(-2.31)	(-1.51)	(0.17)	(-2.07)
Log labour cost per employee		-0.150**	-0.213**		-0.144**	-0.196*		-0.716***	-0.534***		-0.723***	-0.419***
		(-2.24)	(-2.01)		(-2.14)	(-1.86)		(-6.81)	(-3.86)		(-6.88)	(-2.90)
ICT-capital share			-0.003**			-0.003**			-0.002			-0.001
			(-2.43)			(-2.41)			(-0.86)			(-0.71)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.277***	4.375***	4.560***	4.402***	4.495***	4.654***	-0.320	0.143	-1.176**	-0.401	0.067	-1.456***
	(13.53)	(13.71)	(12.04)	(13.92)	(14.09)	(12.30)	(-0.64)	(0.29)	(-2.37)	(-0.80)	(0.13)	(-2.81)
No of obs.	4,357	4,357	2,509	4,357	4,357	2,509	4,357	4,357	2,509	4,357	4,357	2,509
Adjusted R^2	0.866	0.867	0.862	0.871	0.871	0.867	0.214	0.222	0.281	0.231	0.239	0.28

Note: t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1; RCAs are calculated relative to the total economy.

Table 15 / Determinants of export competitiveness in manufacturing: 1995-2007 (total BS-linkages split up into domestic and foreign BS-linkages)

	Log exports			Log domestic value-added in exports			RCA - export based			RCA - domestic value-added in exports based		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log labour productivity (VA-based)	0.538***	0.515***	0.591***	0.542***	0.554***	0.631***	0.382***	0.710***	0.879***	0.415***	0.780***	0.961***
	(16.09)	(11.10)	(9.79)	(16.38)	(12.07)	(10.56)	(7.35)	(9.90)	(11.22)	(7.96)	(10.84)	(11.75)
Share high-skilled labour	0.021***	0.020***	0.009*	0.020***	0.020***	0.010*	-0.043***	-0.026***	-0.033***	-0.039***	-0.020**	-0.030***
	(4.09)	(3.68)	(1.66)	(3.84)	(3.77)	(1.83)	(-5.34)	(-3.12)	(-4.70)	(-4.80)	(-2.39)	(-4.14)
Share medium-skilled labour	0.010**	0.010**	0.016***	0.008*	0.008*	0.014***	-0.020***	-0.013*	-0.004	-0.017**	-0.009	-0.003
	(2.38)	(2.23)	(3.39)	(1.87)	(1.90)	(2.98)	(-2.90)	(-1.83)	(-0.60)	(-2.51)	(-1.33)	(-0.53)
Domestic BS-linkages	-0.380	-0.401	0.717	1.099**	1.110**	1.739***	3.184***	3.484***	2.605***	4.373***	4.707***	3.437***
	(-0.71)	(-0.74)	(1.17)	(2.07)	(2.09)	(2.88)	(3.82)	(4.19)	(3.29)	(5.22)	(5.64)	(4.16)
Foreign BS-linkages	11.614***	11.649***	7.561***	9.114***	9.096***	5.885***	6.684***	6.189***	4.445***	4.166***	3.616***	2.097**
	(17.90)	(17.90)	(11.55)	(14.21)	(14.14)	(9.09)	(6.63)	(6.15)	(5.24)	(4.12)	(3.58)	(2.37)
Capital coefficient	-0.001	-0.001	-0.004***	0.000	0.000	-0.003***	-0.001	0.000	-0.003**	-0.001	0.001	-0.002
	(-1.47)	(-1.59)	(-4.56)	(-0.26)	(-0.18)	(-3.35)	(-1.24)	(0.23)	(-2.38)	(-0.78)	(0.83)	(-1.44)
Log labour cost per employee		0.049	0.049		-0.025	-0.068		-0.692***	-0.498***		-0.769***	-0.508***
		(0.72)	(0.47)		(-0.37)	(-0.66)		(-6.61)	(-3.65)		(-7.31)	(-3.57)
ICT-capital share			-0.004***			-0.004***			-0.002			-0.001
			(-3.05)			(-2.67)			(-0.88)			(-0.49)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.961***	4.931***	4.599***	4.842***	4.857***	4.674***	-0.165	0.256	-1.169**	-0.466	0.002	-1.468***
	(15.39)	(15.17)	(12.02)	(15.19)	(15.11)	(12.35)	(-0.33)	(0.51)	(-2.36)	(-0.93)	0.00	(-2.83)
No of obs.	4,357	4,357	2,509	4,357	4,357	2,509	4,357	4,357	2,509	4,357	4,357	2,509
Adjusted R^2	0.863	0.863	0.859	0.871	0.871	0.867	0.215	0.222	0.282	0.227	0.237	0.278

Note: t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1, RCAs are calculated relative to the total economy.

Table 16 / Determinants of export competitiveness in tradable services*: 1995-2007 (interactive dummies for financial intermediation and other business services industries)

	Log exports			Log domestic value-added in exports			RCA - export based			RCA - domestic value-added in exports based		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Share high-skilled labor	0.039***	0.029***	0.026***	0.039***	0.030***	0.026***	-0.025**	-0.029**	0.016***	-0,014	-0,018	0.017***
	(8,13)	(6,07)	(5,32)	(8,17)	(6,22)	(5,29)	(-2.27)	(-2.56)	(3,55)	(-1.29)	(-1.61)	(3,52)
Share medium-skilled labor	0.022***	0.019***	0.027***	0.022***	0.019***	0.028***	0,005	0,004	0.020***	0,011	0,010	0.023***
	(7,23)	(6,09)	(8,00)	(7,36)	(6,30)	(8,17)	(0,77)	(0,51)	(6,26)	(1,64)	(1,42)	(6,78)
Domestic BS-linkages	-6.198***	-6.725***	-3.548***	-5.435***	-5.913***	-3.516***	-17.128***	-17.395***	-4.434***	-14.579***	-14.743***	-4.527***
	(-12.46)	(-13.64)	(-3.97)	(-11.05)	(-12.09)	(-3.91)	(-14.94)	(-14.92)	(-5.17)	(-13.16)	(-13.10)	(-5.00)
Foreign BS-linkages	3.352***	2.923***	14.006***	-0,045	-0,501	12.384***	14.964***	15.240***	14.672***	7.175***	7.130***	14.151***
	(4,52)	(3,90)	(8,87)	(-0.06)	(-0.67)	(7,80)	(8,75)	(8,61)	(9,68)	(4,34)	(4,17)	(8,85)
71t74	-3.196***	-2.425***	3.130***	-3.516***	-2.801***	3.199***	-0,378	-0,161	2.183***	-2,204	-1,975	2.413***
	(-3.95)	(-3.04)	(4,84)	(-4.40)	(-3.54)	(4,92)	(-0.20)	(-0.09)	(3,52)	(-1.22)	(-1.08)	(3,68)
Financial Intermediation (J)	-2.903***	-2.251***	0,482	-2.985***	-2.383***	0,562	0,128	0,618	1.295***	-0,915	-0,503	1.548***
	(-5.23)	(-4.07)	(0,97)	(-5.44)	(-4.34)	(1,13)	(0,10)	(0,47)	(2,72)	(-0.74)	(-0.40)	(3,09)
71t74*domestic-BS-linkages	8.049***	8.130***	1.994**	7.671***	7.737***	1.900**	15.010***	15.158***	2.148***	14.032***	14.081***	2.045**
	(10,92)	(11,22)	(2,40)	(10,53)	(10,77)	(2,27)	(8,84)	(8,85)	(2,69)	(8,55)	(8,52)	(2,43)
J*domestic-BS-linkages	6.916***	6.859***	2.460***	6.319***	6.254***	2.368***	13.909***	13.807***	2.437***	12.415***	12.257***	2.259***
	(12,05)	(12,10)	(3,09)	(11,13)	(11,13)	(2,96)	(10,51)	(10,31)	(3,19)	(9,71)	(9,48)	(2,80)
71t74*foreign-BS-linkages	7.331***	7.158***	-3.879***	8.351***	8.209***	-3.145***	5.038**	4.800**	-5.110***	6.425***	6.316***	-4.759***
	(7,20)	(7,14)	(-3.32)	(8,30)	(8,26)	(-2.68)	(2,15)	(2,03)	(-4.55)	(2,83)	(2,76)	(-4.02)
J*foreign-BS-linkages	3.365***	3.652***	-2.313*	5.150***	5.460***	-1,375	14.613***	14.409***	-2.194*	12.747***	12.785***	-1,225
	(4,90)	(5,30)	(-1.93)	(7,58)	(8,00)	(-1.14)	(9,23)	(8,85)	(-1.90)	(8,33)	(8,13)	(-1.01)
Share foreign value added in exports												
Ln labor cost per employee (ppp95)		0.661***	1.358***		0.623***	1.364***		0,159	-0,174		0,202	-0,118
		(10,70)	(11,60)		(10,16)	(11,59)		(1,09)	(-1.55)		(1,43)	(-0.99)
ICT-capital share			-0.007***			-0.007***			-0.003*			-0.002*
			(-4.92)			(-4.89)			(-1.90)			(-1.75)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	No	No	No	No	No	No	No	No	No	No
Constant	5.655***	3.614***	-0,008	5.531***	3.603***	-0,153	1.295**	0,866	-0,449	1.130*	0,519	-0,747
	(21,24)	(10,96)	(-0.02)	(21,01)	(11,03)	(-0.31)	(2,11)	(1,11)	(-0.95)	(1,91)	(0,69)	(-1.51)
No of obs.	2.451	2.416	579	2.451	2.416	579	2.451	2.416	579	2.451	2.416	579
Adjusted R^2	0,751	0,757	0,936	0,762	0,766	0,935	0,437	0,438	0,716	0,346	0,347	0,706

t-statistics in parentheses,*** p<0.01, ** p<0.05, * p<0.1

5. Summary

In this paper we have used the WIOD database as it allows the compilation of competitiveness indicators on a value-added basis; we could compare such calculations with those calculated on the basis of gross trade flows. The following are the main results obtained by our analysis:

› We found an increasingly central position of Germany (and of a linked group of Central European economies comprising Austria and some of the Central-Eastern European economies – we used the term 'Central European manufacturing Core' to characterize this group) in manufacturing exports – particularly extra-EU manufacturing exports. This group has a particular dominance in EU production and trade of MHT (medium-/high-technology) industries.

› Other advanced European economies decline in their position for European manufacturing exports, but some have strengthened significantly their position in business services (particularly UK). Problematic is the position of those economies which neither develop a strong position in manufacturing nor move towards a strong position in advanced tradable services (particularly business services).

› There is a strong differentiation amongst low- and medium-income EU economies which reveals a persistent problem of segments in this group: NMS-Central moves strongly away from OMS-South especially as the former became an important location of manufacturing production within cross-border European production networks; this is much less the case for NMS-SEE and the Baltics. The already weak position of OMS-South has furthermore been weakened in the course of the recent economic crisis.

› In terms of global trade and specialisation the EU-27 as a whole continues to occupy an important position and longer-term developments (prior to the recent crisis) look rather favourable relative to the US and Japan, both regarding manufacturing (also in MHT industries) as well as with regard to business services. The crisis has affected EU's position in global trade, but this is mainly due to a fall in the weight of intra-EU trade in global trade (given the disastrous growth performance of the European economy during the crisis period) while its share in extra-EU27 trade remained quite robust.

› Global and intra-regional production networks are visible in the case of South Korea and NMS-Central. In China's case there seems to be a trend towards more national vertical integration.

› Which are the main differences when analysing competitiveness and specialisation indicators from gross export or from value added figures? With regard to the competitiveness and specialisation indicators chosen in this study, the calculations of the various measures do – in most instances – not show very strongly differentiated results. The reason is – in our opinion - that there is still a major incompleteness in the way the current methodology of 'trade-in-value-added' analysis captures potential differences in input-output structures which characterise export activity in an economy as compared to production for the domestic market. The available studies (including the WIOD dataset on which we rely in this study) do not differentiate

between input-output relationships which characterise these two different types of activities (i.e. production for exports and for the domestic market).

› The econometric analysis undertaken in section 4 examined the determinants of export performance and export specialisation of EU economies. The results show the following:

- productivity is an important determinant for competitiveness (with respect to a wide variety of competitiveness indicators) of both manufacturing and services' exports
- the share of high-skilled labour in an industry's labour force supports export growth in manufacturing
- business services linkages to manufacturing are beneficial and amongst these particularly links to business services supplied from foreign sources i.e. through imports
- the share of foreign value added in an industry's gross export value supports export growth but not necessarily the comparative advantage position of that industry
- as regards competitiveness of tradable services of EU industries, the focus was on the role of forward linkages of service producers with manufacturing industries for the export performance of tradable services industries. Hence, apart from direct exports of tradable services, the value added contribution of service activities to overall exports also importantly takes place via inputs of services (directly and indirectly) into manufacturing production and exports. What we find is that foreign business services' links to exports are an important positive determinant, while domestic business services show a negative impact. Thus sourcing through imports (or international integration through imported services linkages) makes an important contribution to competitiveness. However, if we isolate financial intermediation services and other business services from tradable services in general (which include e.g. a variety of transport services) also strong domestic business services linkages have a positive impact on overall export growth and comparative advantage positions of these tradable services.

As regards policy conclusions from this study, we want to mention the following:

- As expected, human skill (and hence appropriate training and educational levels) contribute importantly to export competitiveness.
- The linkages between business services and manufacturing – and thereby particularly the foreign sourcing of business services) contributes positively to export competitiveness of both manufacturing and (domestic) business services.
- Manufacturing provides an important 'carrier function' for services' contributions to value-added exports.
- We found dramatic shifts in global market shares and also in RCAs amongst the major global traders (countries and country groups): in general there is a shift in advanced economies towards services exports and a loss in manufacturing market shares to emerging economies. However the EU27 has not lost as much manufacturing shares as have the US and Japan, while gaining even more in business services global shares than these economies. The relatively solid manufacturing position of the EU is however mostly

due to the strong position of the CE Manufacturing Core (Germany and countries strongly linked to Germany's manufacturing production via cross-border production networks).

- This strong tendency towards agglomeration of manufacturing activity and of exporting capacity in the CE-Core has been and can continue be a source of longer-term current account problems specifically of lower- and medium income (LMI) European economies which do not manage to link up to this potent CE manufacturing integrated production network. We see here an important challenge for national and EU-wide structural, industrial and regional policies. While advanced Western European economies might be able to compensate for a weakness in manufacturing by building up a strong comparative advantage position in advanced business services – as the UK has done – this option is much less available for LMI economies.

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Appendix

Table A.1.1 / List of NACE-categories

NACE	Description	Group
AtB	Agriculture, Hunting, Forestry and Fishing	Agriculture etc.
C	Mining and Quarrying	Mining and utilities
15t16	Food, Beverages and Tobacco	Low tech
17t18	Textiles and Textile Products	Low tech
19	Leather, Leather and Footwear	Low tech
20	Wood and Products of Wood and Cork	Low tech
21t22	Pulp, Paper, Paper , Printing and Publishing	Low tech
23	Coke, Refined Petroleum and Nuclear Fuel	Medium-low tech
24	Chemicals and Chemical Products	Medium-high and high tech
25	Rubber and Plastics	Medium-low tech
26	Other Non-Metallic Mineral	Medium-low tech
27t28	Basic Metals and Fabricated Metal	Medium-low tech
29	Machinery, Nec	Medium-high and high tech
30t33	Electrical and Optical Equipment	Medium-high and high tech
34t35	Transport Equipment	Medium-high and high tech
36t37	Manufacturing, Nec; Recycling	Low tech
50	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	Non tradable market services
51	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	Non tradable market services
52	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	Non tradable market services
60	Inland Transport	Transport
61	Water Transport	Transport
62	Air Transport	Transport
63	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	Transport
64	Post and Telecommunications	Communication
70	Real Estate Activities	Non tradable market services
71t74	Renting of M&Eq and Other Business Activities	Business services
E	Electricity, Gas and Water Supply	Mining and utilities
F	Construction	Construction
H	Hotels and Restaurants	Non tradable market services
J	Financial Intermediation	Business services
L	Public Admin and Defence; Compulsory Social Security	Non-market services
M	Education	Non-market services
N	Health and Social Work	Non-market services
O	Other Community, Social and Personal Services	Non tradable market services
P	Private Households with Employed Persons	Non tradable market services

Note: The classification of manufacturing industries into low tech (LT), medium-low tech (MT) and medium-high and high tech (HT) is based on OECD (2011).

Table A.1 / Share of manufacturing in EU member states, in % of GDP

	1995	2000	2007	2009	2011
Ireland	30.2	32.7	21.8	24.2	26.8
Czech Republic	24.3	26.8	26.5	23.5	25.8
Hungary	21.3	23.0	22.2	20.4	25.3
Romania	25.6	23.4	23.6	23.6	23.6
Germany	22.6	22.9	23.8	19.1	22.4
Slovenia	25.7	25.8	23.4	19.6	19.6
Slovak Republic	26.8	24.7	23.8	19.6	19.6
Finland	25.4	26.5	24.2	18.2	18.6
Austria	19.6	20.6	20.4	17.7	18.5
Poland	21.1	18.5	18.9	18.6	18.1
Bulgaria	22.0	17.8	19.7	17.6	17.6
Sweden	22.4	22.0	19.6	15.5	16.7
Italy	22.2	21.0	19.0	16.1	16.6
Lithuania	19.1	19.3	18.6	16.4	16.4
Belgium	20.3	19.3	16.3	14.0	14.5
Estonia	21.0	17.7	16.7	14.3	14.3
Netherlands	17.4	15.6	14.1	12.6	14.1
Portugal	18.4	17.1	14.6	13.4	13.4
Malta	21.7	22.4	15.8	13.3	13.3
Spain	19.2	18.6	15.0	12.7	13.2
United Kingdom	20.9	17.2	12.1	10.9	11.7
Denmark	17.1	16.2	14.1	12.9	11.5
Greece	12.0	11.1	9.2	10.3	10.3
France	14.2	16.0	12.5	10.6	10.1
Latvia	20.7	13.7	11.4	9.9	9.9
Cyprus	11.8	9.9	7.4	6.8	6.8
Luxembourg	13.7	11.3	9.1	6.5	6.5

Note: Ranked by share in 2011
Source: WIOD; wiiw calculations.

Table A.2 / Share of business services in member states, in % of GDP

	1995	2000	2007	2009	2011
Luxembourg	28.7	33.4	39.1	38.6	38.6
United Kingdom	16.6	19.0	24.6	25.7	25.5
Ireland	13.6	15.9	22.7	21.8	21.8
Netherlands	16.7	18.9	19.6	21.5	20.7
Belgium	15.7	18.0	19.4	20.4	20.5
France	16.9	18.4	19.0	19.1	19.6
Germany	15.2	16.4	17.2	18.3	17.8
Sweden	11.8	15.0	16.2	16.9	16.8
Malta	9.8	11.9	13.2	15.8	15.8
Denmark	11.8	12.5	14.7	16.3	15.7
Slovenia	11.9	12.3	14.5	15.3	15.3
Portugal	12.4	12.9	15.1	15.3	15.3
Italy	11.7	13.4	14.2	14.9	14.9
Latvia	8.8	10.3	12.9	14.9	14.9
Austria	11.8	13.2	15.0	14.7	14.8
Cyprus	9.9	12.6	13.7	14.7	14.7
Hungary	11.6	12.2	14.2	15.5	14.0
Estonia	7.0	9.2	13.1	14.0	14.0
Czech Republic	9.6	9.6	12.0	13.6	14.0
Spain	10.5	11.3	13.4	14.9	13.0
Finland	9.4	10.8	11.8	12.7	12.7
Slovak Republic	9.3	8.9	11.4	12.7	12.7
Poland	6.4	11.7	12.1	11.1	11.0
Bulgaria	10.4	5.9	8.7	9.1	9.1
Greece	7.8	9.3	8.4	8.9	8.9
Lithuania	3.7	5.3	8.5	8.2	8.2
Romania	9.8	7.9	7.2	7.7	7.7

Source: WIOD; wiiw calculations.

Table A.3 / Share of detailed categories within business services, in %

	Financial Intermediation					Business related services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Austria	48.6	42.4	37.0	32.7	33.4	51.4	57.6	63.0	67.3	66.6
Belgium	41.2	33.5	28.7	29.4	30.0	58.8	66.5	71.3	70.6	70.0
Bulgaria	75.2	50.9	63.9	63.9	63.9	24.8	49.1	36.1	36.1	36.1
Cyprus	54.4	61.2	57.2	55.7	55.7	45.6	38.8	42.8	44.3	44.3
Czech Republic	33.4	29.5	31.4	35.9	39.4	66.6	70.5	68.6	64.1	60.6
Germany	30.3	25.6	23.0	23.2	24.2	69.7	74.4	77.0	76.8	75.8
Denmark	44.1	37.7	38.6	39.8	39.1	55.9	62.3	61.4	60.2	60.9
Spain	46.1	40.8	39.5	44.2	34.8	53.9	59.2	60.5	55.8	65.2
Estonia	31.4	43.9	32.1	24.6	24.6	68.6	56.1	67.9	75.4	75.4
Finland	47.1	41.3	27.4	24.9	23.7	52.9	58.7	72.6	75.1	76.3
France	27.4	28.0	24.6	26.5	26.9	72.6	72.0	75.4	73.5	73.1
United Kingdom	38.6	27.7	35.2	35.2	31.4	61.4	72.3	64.8	64.8	68.6
Greece	52.7	59.4	61.3	60.9	60.9	47.3	40.6	38.7	39.1	39.1
Hungary	36.9	30.5	30.5	30.8	30.7	63.1	69.5	69.5	69.2	69.3
Ireland	59.5	45.8	47.1	45.1	40.0	40.5	54.2	52.9	54.9	60.0
Italy	40.1	34.9	37.0	36.2	36.4	59.9	65.1	63.0	63.8	63.6
Lithuania	56.1	40.6	38.8	27.6	27.6	43.9	59.4	61.2	72.4	72.4
Luxembourg	76.9	74.9	71.8	67.4	67.4	23.1	25.1	28.2	32.6	32.6
Latvia	56.6	47.9	47.9	41.2	41.2	43.4	52.1	52.1	58.8	58.8
Malta	41.7	49.7	31.7	34.4	34.4	58.3	50.3	68.3	65.6	65.6
Netherlands	37.8	32.1	30.1	34.9	38.1	62.2	67.9	69.9	65.1	61.9
Poland	40.0	42.2	43.3	34.6	37.6	60.0	57.8	56.7	65.4	62.4
Portugal	50.4	47.4	51.0	51.0	51.0	49.6	52.6	49.0	49.0	49.0
Romania	74.2	56.1	29.8	30.4	30.4	25.8	43.9	70.2	69.6	69.6
Slovak Republic	61.3	26.9	31.0	32.1	32.1	38.7	73.1	69.0	67.9	67.9
Slovenia	46.6	38.3	31.8	32.9	32.9	53.4	61.7	68.2	67.1	67.1
Sweden	38.5	29.6	24.1	26.6	23.8	61.5	70.4	75.9	73.4	76.2

Source: WIOD; wiiw calculations.

Table A.4 / Manufacturing specialisation in EU member states

	Low tech industries		Medium-low tech industries		Medium-high and high tech industries		Percentage point changes in shares		
	1995	2011	1995	2011	1995	2011	Low tech	Medium-low	Medium-high and high
Ireland	35.7	33.8	11.3	5.9	53.1	60.2	-1.9	-5.3	7.2
Germany	25.1	16.9	23.4	24.1	51.5	59.1	-8.2	0.6	7.6
Hungary	37.6	17.9	29.1	23.3	33.3	58.8	-19.7	-5.8	25.5
Sweden	33.4	25.1	20.5	21.3	46.0	53.7	-8.4	0.7	7.6
Denmark	41.0	32.7	20.1	20.1	38.9	47.2	-8.4	0.0	8.3
Malta	48.8	41.0	13.4	12.5	37.8	46.5	-7.8	-0.8	8.7
Czech Republic	36.8	25.1	32.3	30.2	31.0	44.8	-11.7	-2.1	13.8
Slovenia	42.1	28.3	24.2	27.5	33.7	44.2	-13.8	3.3	10.5
Austria	37.6	27.5	27.9	28.3	34.5	44.2	-10.1	0.5	9.7
Finland	46.9	33.5	18.3	22.8	34.8	43.7	-13.4	4.5	8.9
Belgium	31.3	26.6	26.7	32.1	42.0	41.3	-4.7	5.4	-0.7
United Kingdom	36.0	36.2	22.2	22.6	41.8	41.2	0.2	0.4	-0.6
France	32.2	29.5	25.3	29.6	42.5	40.9	-2.7	4.3	-1.6
Netherlands	41.7	41.8	20.6	18.4	37.7	39.8	0.2	-2.3	2.1
Italy	38.3	34.6	27.9	28.1	33.8	37.4	-3.7	0.1	3.6
Slovak Republic	34.9	30.6	32.3	32.8	32.8	36.7	-4.3	0.5	3.9
Spain	38.3	36.4	28.5	29.8	33.3	33.8	-1.9	1.4	0.5
Romania	48.7	48.0	22.5	23.9	28.8	28.1	-0.7	1.4	-0.7
Estonia	63.9	50.2	12.6	22.7	23.5	27.2	-13.8	10.1	3.7
Poland	44.8	39.7	25.5	33.3	29.7	27.0	-5.1	7.9	-2.8
Portugal	55.5	47.6	23.1	26.1	21.4	26.3	-7.9	3.0	4.9
Lithuania	65.6	55.4	14.7	20.7	19.7	23.9	-10.2	6.0	4.3
Bulgaria	52.3	42.6	25.8	34.4	22.0	23.0	-9.7	8.6	1.0
Latvia	72.0	63.0	14.2	17.5	13.8	19.5	-9.0	3.3	5.6
Luxembourg	25.9	25.7	55.2	55.3	18.9	19.1	-0.3	0.1	0.1
Greece	61.1	57.2	21.1	27.3	17.8	15.5	-3.9	6.2	-2.3
Cyprus	68.3	56.0	21.9	31.3	9.8	12.7	-12.3	9.4	2.9

Source: WIOD; wiiw calculations.

Table A.5 / Cost share of business services in broad manufacturing industries, in %

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	6,8	7,8	8,5	9,2	9,1	6,7	6,6	6,1	7,0	6,5	9,0	9,9	9,7	10,8	10,2
USA	8,0	9,4	9,9	10,3	9,6	5,5	6,0	5,5	5,9	4,9	9,9	10,9	11,7	11,6	11,3
Japan	4,2	4,7	5,6	5,7	5,5	3,8	4,2	3,8	4,2	3,7	4,7	5,5	5,6	6,6	6,3
South Korea	4,9	4,3	4,8	4,4	4,7	4,6	3,9	3,4	3,4	3,0	5,6	5,1	5,0	4,9	4,8
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	7,2	8,3	9,2	10,0	9,9	6,9	6,9	6,6	7,5	7,0	9,2	10,3	10,4	11,5	10,9
OMS-South	5,4	6,1	7,3	8,5	8,1	6,0	5,3	5,1	6,2	5,5	7,6	7,1	7,2	8,9	8,5
NMS-Central	4,2	5,1	5,3	5,4	5,5	3,7	4,2	4,1	4,5	4,3	5,3	5,8	5,0	5,5	5,2
NMS-SEE	5,2	4,3	4,4	4,4	4,4	5,2	4,0	4,2	4,7	4,7	7,7	6,1	5,4	5,8	5,8
Baltics	1,6	2,4	3,5	3,8	3,7	1,7	1,5	2,6	2,1	2,1	1,9	2,4	4,2	4,2	4,1
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	8,81	8,83	9,67	10,90	10,12	7,53	6,95	6,59	7,74	7,18	8,93	9,74	9,38	10,32	9,35
France	9,30	10,90	12,65	13,59	13,89	9,16	8,38	8,83	10,44	9,84	12,99	11,81	13,42	14,35	14,62
Italy	4,24	5,50	6,34	6,73	6,69	5,45	6,93	6,66	7,06	6,52	6,29	7,50	7,84	8,45	8,22
United Kingdom	6,6	8,3	7,9	8,5	8,3	6,3	6,4	5,2	5,4	4,9	7,8	9,0	8,1	8,8	8,3

Source: WIOD; wiiw calculations.

Table A.6 / World market export shares calculated from gross exports: shares in total global exports (in %)

	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	35.46	30.71	30.16	28.20	26.71	7.56	7.70	9.12	9.94	8.25
USA	8.70	9.14	6.04	6.22	6.08	4.51	4.64	3.66	3.73	3.44
Japan	7.25	5.93	4.01	3.70	3.82	1.51	1.45	1.05	1.01	1.02
South Korea	2.17	2.34	2.42	2.57	2.86	0.50	0.53	0.45	0.44	0.46
China	2.47	3.14	7.46	8.33	9.55	0.36	0.74	1.20	1.34	1.58
India	0.58	0.74	1.03	1.22	1.27	0.10	0.13	0.44	0.35	0.42
	Manufacturing					Services				
CGROUP	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	31.97	26.99	25.01	23.21	21.95	6.62	6.55	7.55	8.20	6.79
OMS-South	2.04	1.96	2.04	1.93	1.83	0.45	0.62	0.80	0.84	0.68
NMS-Central	1.17	1.45	2.63	2.58	2.53	0.36	0.37	0.51	0.59	0.52
NMS-SEE	0.22	0.20	0.34	0.33	0.27	0.09	0.11	0.17	0.20	0.17
Baltics	0.07	0.10	0.15	0.15	0.13	0.04	0.05	0.09	0.10	0.09
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
France	4.74	4.12	3.43	3.34	3.01	0.98	0.71	0.60	0.65	0.57
Germany	9.28	7.75	8.56	7.75	7.43	1.00	0.97	1.16	1.32	1.04
Italy	3.98	3.27	3.13	2.80	2.68	0.71	0.59	0.59	0.58	0.49
United Kingdom	4.10	3.69	2.54	2.31	2.16	1.05	1.41	1.81	1.68	1.40
Germ sh in EU27	26.18	25.24	28.38	27.49	27.83	13.30	12.58	12.74	13.31	12.59
CE-Core sh in EU27	31.88	32.57	40.13	39.61	40.33	22.83	21.18	21.80	22.72	22.43

Source: WIOD; wiiw calculations.

Table A.7 / World market export shares – calculated from gross exports: shares of in total global exports (in %) - extra EU27 trade only

	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	17.90	15.02	15.26	14.57	13.54	5.45	5.45	6.33	6.93	6.83
USA	12.00	12.03	7.96	8.06	7.58	6.21	6.11	4.83	4.84	4.30
Japan	10.00	7.80	5.29	4.80	4.76	2.08	1.91	1.39	1.31	1.27
South Korea	2.99	3.08	3.19	3.33	3.57	0.69	0.69	0.59	0.57	0.58
China	3.41	4.13	9.84	10.81	11.91	0.49	0.97	1.59	1.74	1.97
India	0.80	0.98	1.36	1.58	1.58	0.14	0.17	0.58	0.45	0.52
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	16.57	13.78	13.33	12.69	11.75	4.81	4.67	5.35	5.86	5.72
OMS-South	0.82	0.73	0.89	0.89	0.84	0.29	0.45	0.53	0.56	0.52
NMS-Central	0.35	0.37	0.82	0.77	0.78	0.23	0.19	0.25	0.28	0.36
NMS-SEE	0.12	0.10	0.17	0.16	0.12	0.09	0.10	0.12	0.14	0.15
Baltics	0.03	0.03	0.05	0.07	0.05	0.03	0.04	0.08	0.08	0.08
	Manufacturing					Services				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
France	2.56	2.04	1.84	1.98	1.68	0.94	0.65	0.39	0.51	0.52
Germany	5.35	4.22	4.88	4.53	4.40	0.59	0.72	0.92	1.09	0.99
Italy	2.33	1.87	1.89	1.76	1.63	0.59	0.44	0.37	0.39	0.41
United Kingdom	2.60	2.31	1.61	1.47	1.31	0.82	1.05	1.11	1.05	0.92
Germ sh in EU27	29.89	28.10	32.00	31.07	32.50	10.85	13.17	14.58	15.72	14.55
CE-Core sh in EU27	34.88	34.01	40.34	39.19	41.25	19.28	20.00	23.12	24.41	24.63

Source: WIOD; wiiw calculations.

Table A.8 / Share of exports in total exports, by industry group (%)

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	19,61	16,69	14,53	15,18	14,52	14,52	13,44	16,31	14,32	16,94	44,47	46,52	42,78	40,93	41,40
USA	12,01	10,39	9,15	9,96	9,57	7,20	7,25	9,24	9,73	12,85	43,42	46,73	41,48	40,27	38,30
Japan	3,60	3,14	2,60	2,93	2,69	13,86	11,80	16,07	18,67	19,77	65,05	65,09	60,18	56,61	56,03
South Korea	18,62	13,31	4,90	4,63	4,12	11,49	12,97	16,81	17,14	20,05	50,45	55,07	62,45	63,40	61,79
China	39,30	29,52	21,15	21,70	20,94	14,82	13,36	11,71	10,44	11,55	27,04	34,80	51,58	52,40	51,73
India	44,83	42,46	32,32	36,62	30,93	14,79	14,95	14,71	11,89	14,03	16,23	18,33	17,68	24,00	24,05
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	19,21	16,25	14,28	14,87	14,19	14,23	13,15	15,94	13,97	16,53	45,93	47,94	43,58	41,74	42,25
OMS-South	22,96	19,26	15,86	17,39	16,67	14,72	14,66	18,00	16,44	20,46	38,68	37,89	34,58	31,98	32,18
NMS-Central	22,17	19,08	14,51	15,41	14,92	20,64	16,16	17,82	15,53	18,16	25,69	39,83	47,24	45,62	45,32
NMS-SEE	22,73	21,02	17,21	16,26	16,31	19,16	18,24	21,62	15,95	15,91	22,39	21,64	23,02	24,72	24,87
Baltics	34,43	32,17	26,55	23,11	23,14	8,76	12,66	14,88	15,32	15,41	13,47	16,40	15,66	16,28	16,33
	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	13,82	12,93	12,23	13,51	12,13	14,99	14,18	16,99	15,22	16,66	59,68	60,15	56,86	54,11	56,54
France	18,38	16,01	15,49	16,12	15,44	12,65	12,13	14,82	12,84	14,20	47,01	53,45	51,52	51,02	50,56
Italy	26,44	24,72	20,15	21,08	20,28	16,47	16,23	20,51	18,36	21,41	40,08	42,24	41,90	41,64	40,96
United Kingdom	14,10	10,24	9,28	9,52	9,60	11,68	9,81	11,32	10,25	13,04	48,77	47,42	34,29	34,80	34,14

Source: WIOD; wiiw calculations.

Table A.9 / Revealed Comparative Advantage (RCA)-export-based (total), by industry group

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	0,08	0,07	0,06	0,01	0,02	0,11	0,12	0,06	0,03	0,10	0,06	0,07	0,07	0,07	0,09
USA	-0,34	-0,34	-0,33	-0,33	-0,33	-0,45	-0,40	-0,40	-0,30	-0,17	0,04	0,08	0,04	0,05	0,01
Japan	-0,80	-0,80	-0,81	-0,80	-0,81	0,06	-0,02	0,04	0,35	0,28	0,56	0,50	0,51	0,47	0,47
South Korea	0,03	-0,15	-0,64	-0,69	-0,71	-0,12	0,08	0,09	0,24	0,30	0,21	0,27	0,57	0,65	0,63
China	1,17	0,89	0,54	0,45	0,47	0,13	0,11	-0,24	-0,25	-0,25	-0,35	-0,20	0,30	0,36	0,36
India	1,48	1,71	1,36	1,45	1,17	0,13	0,25	-0,05	-0,14	-0,09	-0,61	-0,58	-0,56	-0,37	-0,37

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	0,06	0,04	0,04	-0,01	0,00	0,09	0,10	0,03	0,01	0,07	0,10	0,10	0,09	0,09	0,11
OMS-South	0,27	0,23	0,16	0,16	0,17	0,12	0,22	0,16	0,19	0,32	-0,07	-0,13	-0,13	-0,17	-0,15
NMS-Central	0,23	0,22	0,06	0,03	0,05	0,58	0,35	0,15	0,12	0,17	-0,39	-0,08	0,19	0,19	0,19
NMS-SEE	0,26	0,34	0,26	0,09	0,14	0,46	0,52	0,40	0,15	0,03	-0,46	-0,50	-0,42	-0,36	-0,35
Baltics	0,90	1,06	0,94	0,54	0,62	-0,33	0,06	-0,04	0,10	0,00	-0,68	-0,62	-0,61	-0,58	-0,57

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	-0,24	-0,17	-0,11	-0,10	-0,15	0,15	0,18	0,10	0,10	0,08	0,43	0,39	0,43	0,41	0,49
France	0,02	0,02	0,13	0,08	0,08	-0,03	0,01	-0,04	-0,07	-0,08	0,12	0,23	0,29	0,33	0,33
Italy	0,46	0,58	0,47	0,41	0,42	0,26	0,35	0,33	0,32	0,39	-0,04	-0,03	0,05	0,08	0,08
United Kingdom	-0,22	-0,35	-0,32	-0,36	-0,33	-0,11	-0,18	-0,27	-0,26	-0,16	0,17	0,09	-0,14	-0,09	-0,10

Source: WIOD; wiiw calculations.

Table A10 / Share of exports in total exports (%), service industries – calculated from gross exports data

	Business services					Transport					Communication					Distribution, etc.				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	6,33	8,74	10,86	12,23	11,05	5,92	6,03	6,21	6,86	6,22	0,51	0,71	0,80	0,88	0,79	3,46	3,44	4,00	4,42	4,03
USA	11,47	12,49	16,32	18,89	16,94	6,98	6,93	6,90	6,12	5,77	1,47	1,23	1,19	1,15	1,00	11,77	11,53	10,94	8,54	9,26
Japan	2,03	2,56	2,56	2,62	2,59	7,56	7,91	8,13	8,47	8,29	0,10	0,09	0,06	0,06	0,06	7,41	8,94	9,91	10,07	9,96
Korea	3,41	2,16	2,78	2,64	2,57	8,77	9,30	7,62	6,97	6,42	0,37	0,23	0,24	0,23	0,22	5,27	5,71	4,54	4,31	4,20
China	0,81	2,68	3,24	3,23	3,31	5,92	4,01	4,17	4,16	4,25	0,47	0,54	0,53	0,53	0,54	4,26	10,84	5,58	5,57	5,70
India	1,68	5,16	17,85	13,37	14,80	3,04	2,26	2,22	1,66	1,84	0,09	0,06	0,55	0,41	0,45	8,77	5,91	6,99	5,23	5,80
	Business services					Transport					Communication					Distribution, etc.				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	6,52	9,17	11,82	13,37	12,04	5,61	5,42	5,51	6,13	5,61	0,45	0,68	0,80	0,88	0,80	3,29	3,22	3,76	4,12	3,75
OMS-South	4,53	7,13	9,17	10,05	9,59	8,32	11,26	13,17	13,73	11,86	0,90	0,74	0,84	0,88	0,79	2,92	3,21	3,28	3,47	3,00
NMS-Central	5,53	4,67	3,95	4,62	4,18	7,30	7,17	5,31	5,98	5,43	1,10	0,97	0,47	0,53	0,48	6,40	5,74	5,31	6,02	5,52
NMS-SEE	3,42	3,95	5,60	6,16	6,20	12,16	14,18	11,99	12,92	12,84	0,98	1,28	2,32	2,51	2,52	10,68	12,04	11,91	13,32	13,29
Baltics	3,59	2,74	3,99	4,31	4,31	17,90	17,68	18,04	18,60	18,52	0,77	0,86	0,95	0,95	0,95	9,97	10,57	11,70	12,81	12,75
	Business services					Transport					Communication					Distribution, etc.				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	2,95	4,51	5,05	6,16	5,15	3,66	3,77	4,15	4,97	4,22	0,40	0,28	0,35	0,42	0,35	2,45	2,28	2,02	2,45	2,07
France	6,91	6,50	6,80	7,42	7,17	5,83	4,94	5,47	5,94	5,73	0,15	0,38	0,70	0,76	0,73	1,50	2,02	1,11	1,20	1,15
Italy	3,73	4,08	5,83	6,22	5,64	5,06	4,07	3,66	3,83	3,43	0,13	0,50	0,60	0,62	0,55	5,72	6,20	5,31	5,91	5,51
United Kingdom	11,02	17,23	26,91	28,19	26,03	4,57	4,31	4,75	4,59	4,16	0,60	0,87	1,39	1,30	1,19	2,13	2,70	5,20	4,83	4,42

Table A.11 / Domestic contributions to value added exports (%), by manufacturing industry groups

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	13,05	10,95	9,19	9,29	8,59	8,42	6,96	8,17	7,67	6,99	34,95	33,08	28,90	28,71	26,75
USA	10,87	9,34	8,02	8,87	8,28	6,18	6,08	7,03	7,50	8,94	37,36	39,81	33,95	34,18	31,21
Japan	3,38	2,92	2,28	2,63	2,34	12,60	10,51	12,31	14,91	14,51	60,98	59,37	50,96	48,97	46,80
South Korea	14,11	10,11	3,68	3,39	2,88	7,46	6,95	8,08	7,89	7,69	37,32	37,67	41,78	40,43	38,93
China	32,95	24,83	17,81	19,03	17,99	12,51	11,02	8,78	8,27	8,62	21,53	26,71	35,25	39,59	37,79
India	40,13	36,79	23,09	22,70	19,71	12,55	10,99	10,36	9,19	10,48	13,89	14,81	13,36	19,35	19,35

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	12,77	10,87	9,13	9,04	8,37	8,19	6,82	8,03	7,38	6,78	36,36	34,81	30,57	30,42	28,41
OMS-South	17,87	13,03	10,22	11,74	10,99	11,85	9,29	9,51	10,57	9,56	24,67	18,91	18,64	18,56	17,73
NMS-Central	14,15	10,67	8,83	9,97	8,71	10,00	6,41	8,55	8,61	7,37	15,36	19,15	21,29	21,08	18,65
NMS-SEE	10,61	6,64	7,75	8,95	8,34	10,57	8,54	11,05	9,93	7,48	13,18	9,52	11,56	12,28	10,82
Baltics	18,00	13,53	12,32	12,33	11,71	2,87	3,59	4,70	4,78	3,95	7,80	6,58	5,61	6,30	6,56

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	8,79	7,59	7,01	7,10	6,19	9,86	8,20	9,39	9,35	8,96	53,72	48,26	42,47	41,76	41,18
France	13,90	12,73	12,23	11,52	10,82	7,20	6,35	7,75	6,73	5,78	34,03	34,93	36,67	37,54	33,32
Italy	20,86	21,07	16,79	17,32	16,58	10,53	9,85	11,95	11,10	9,69	31,06	30,99	30,72	32,90	29,26
United Kingdom	10,63	8,22	7,15	7,01	7,66	7,33	5,95	7,34	6,55	6,42	35,49	35,04	27,50	27,20	24,58

Source: WIOD; wiiw calculations.

Table A.12 / Foreign contributions to value added exports (%), by manufacturing industry groups

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	3,37	3,22	3,07	2,89	3,10	2,85	3,06	5,60	4,49	5,20	11,00	13,81	13,91	12,56	13,86
USA	1,14	1,05	1,12	1,09	1,29	1,02	1,16	2,20	2,23	3,91	6,05	6,92	7,53	6,09	7,09
Japan	0,22	0,22	0,32	0,30	0,34	1,26	1,29	3,76	3,76	5,26	4,07	5,72	9,22	7,64	9,22
South Korea	4,51	3,20	1,22	1,24	1,24	4,03	6,01	8,73	9,25	12,36	13,13	17,39	20,67	22,97	22,86
China	6,35	4,69	3,34	2,67	2,95	2,31	2,34	2,93	2,17	2,94	5,51	8,10	16,33	12,82	13,93
India	4,70	5,67	9,23	13,92	11,22	2,25	3,96	4,35	2,70	3,55	2,34	3,52	4,32	4,64	4,70

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	3,29	3,14	2,98	2,79	3,00	2,69	2,83	5,17	4,11	4,82	11,29	14,04	13,75	12,67	14,03
OMS-South	4,15	3,85	3,07	2,89	3,30	3,90	5,39	9,19	7,73	9,65	8,52	9,25	10,23	7,71	8,92
NMS-Central	4,27	4,33	4,14	4,12	4,08	4,78	3,89	6,38	5,07	5,58	6,81	17,97	23,87	19,70	19,80
NMS-SEE	3,43	2,62	3,45	3,43	3,24	7,49	7,33	12,34	7,83	5,62	8,89	11,42	8,94	7,25	6,39
Baltics	8,47	7,01	6,46	5,41	5,16	3,00	4,13	5,64	8,02	5,88	4,56	4,28	4,39	4,77	4,80

	Low tech industries					Medium-low tech industries					Medium-high and high tech industries				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	1,82	1,93	2,15	2,04	2,06	2,38	2,73	5,03	3,83	4,19	11,97	15,37	16,68	14,80	17,55
France	2,76	2,86	2,91	2,54	2,89	2,12	2,75	4,68	3,45	3,79	10,66	14,11	16,20	15,25	17,27
Italy	4,37	4,86	4,34	3,60	4,52	2,94	3,68	7,03	5,83	6,90	8,73	9,58	11,54	9,86	11,73
United Kingdom	2,34	1,57	1,46	1,50	1,75	1,99	1,53	2,99	2,80	3,75	11,60	12,41	10,35	10,61	11,28

Source: WIOD; wiiw calculations.

Table A.13 / Domestic contributions to value added exports, by service industries (%) extra-EU27

	Business services					Transport				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	7,16	9,73	10,65	11,57	12,13	7,21	6,73	6,20	6,94	7,12
USA	11,19	12,12	15,67	18,18	16,24	6,58	6,41	6,06	5,58	5,05
Japan	2,00	2,51	2,47	2,53	2,49	7,03	7,00	6,68	7,26	6,82
South Korea	3,14	1,99	2,54	2,40	2,30	7,27	7,01	4,75	4,05	3,61
China	0,70	2,32	2,69	2,83	2,84	5,33	3,56	3,45	3,58	3,52
India	1,59	4,86	16,23	12,44	13,81	2,73	1,89	1,76	1,38	1,52
	Business services					Transport				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	7,48	10,13	11,34	12,38	12,93	6,60	5,89	5,44	6,05	6,10
OMS-South	2,95	6,09	7,93	7,99	8,71	12,41	16,18	15,05	16,90	16,51
NMS-Central	6,26	8,16	4,88	5,42	6,47	14,71	8,24	5,34	6,45	8,33
NMS-SEE	1,32	2,41	4,62	5,64	7,03	16,07	17,66	9,51	9,95	13,96
Baltics	1,26	1,65	3,22	2,87	3,69	17,61	20,45	17,87	17,47	20,26
	Business services					Transport				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
Germany	2,52	5,06	6,15	7,09	7,18	3,88	4,93	4,73	6,23	5,59
France	11,06	9,94	6,93	8,12	9,44	8,05	6,82	6,00	7,16	8,17
Italy	4,45	4,82	4,91	4,60	6,59	6,80	4,03	2,87	3,64	3,66
United Kingdom	11,53	18,08	21,82	23,49	21,88	5,22	4,66	6,17	6,32	6,12

Source: WIOD; wiiw calculations.

Table A.14 / Foreign contributions to value added exports, by service industries (%) extra-EU27

	Business services					Transport				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
EU-27	0.84	1.44	2.83	3.01	3.29	1.86	2.39	2.57	2.77	2.79
USA	0.28	0.37	0.65	0.71	0.71	0.40	0.52	0.84	0.54	0.72
Japan	0.03	0.05	0.08	0.09	0.11	0.53	0.91	1.45	1.20	1.47
Korea	0.28	0.17	0.25	0.25	0.27	1.49	2.29	2.87	2.91	2.81
China	0.11	0.36	0.55	0.41	0.47	0.59	0.45	0.72	0.57	0.73
India	0.09	0.30	1.62	0.93	0.99	0.31	0.37	0.46	0.28	0.32
	Business services					Transport				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
OMS-North	0.86	1.49	3.13	3.36	3.66	1.74	2.04	2.39	2.62	2.59
OMS-South	0.27	0.61	0.95	0.79	0.94	2.54	6.56	5.04	4.94	4.87
NMS-Central	1.42	1.81	0.99	1.02	1.30	3.28	3.00	1.84	1.96	2.74
NMS-SEE	0.18	0.39	1.10	1.21	1.46	5.01	6.76	3.07	3.28	4.25
Baltics	0.22	0.27	0.58	0.40	0.53	6.79	5.71	6.46	4.76	5.44
	Business services					Transport				
	1995	2000	2007	2009	2011	1995	2000	2007	2009	2011
France	0.72	0.76	0.54	0.58	0.75	1.67	1.63	1.32	1.44	1.36
Germany	0.10	0.38	0.43	0.44	0.52	0.45	0.83	1.15	1.37	1.30
Italy	0.29	0.37	0.51	0.38	0.57	0.99	0.76	0.64	0.71	0.88
United Kingdom	0.74	1.42	1.68	1.89	1.80	0.65	0.72	0.95	0.99	0.98

Source: WIOD; wiiw calculations.

Table A.15 / Correlation matrix – manufacturing sector

	Log labour productivity	Share high-skilled labour	Share medium-skilled labour	BS-linkages, total	Share foreign value-added in exports	Capital coefficient	Log labour cost per employee
Log labour productivity	1						
Share high-skilled labour	0.397	1					
Share medium-skilled labour	0.053	0.103	1				
BS-linkages, total	0.552	0.189	-0.061	1			
Share foreign value-added in exports	-0.036	-0.090	0.168	0.109	1		
Capital coefficient	-0.286	-0.226	-0.082	-0.250	-0.110	1	
Log labour cost per employee	0.867	0.456	-0.050	0.576	-0.156	-0.191	1

Table A.16 / Summary statistics, by group of industries

	Total manufacturing					MHT					MT					LT				
Variables	Obs	Mean	St.Dev.	Min	Max	Obs	Mean	St.Dev.	Min	Max	Obs	Mean	St.Dev.	Min	Max	Obs	Mean	St.Dev.	Min	Max
Log exports	4357	7.28	2.04	-1.24	12.62	1329	8.00	2.20	0.02	12.62	1014	7.18	1.87	2.01	11.97	2014	6.85	1.88	-1.24	11.01
Log domestic value-added in exports	4357	6.87	2.08	-1.69	12.24	1329	7.52	2.25	-0.47	12.24	1014	6.76	1.92	1.49	11.54	2014	6.50	1.93	-1.69	10.77
RCA-export based	4357	0.19	1.32	-1.00	18.78	1329	-0.18	0.56	-1.00	2.23	1014	0.22	0.61	-0.93	2.62	2014	0.42	1.80	-0.99	18.78
RCA-domestic value-added in exports based	4357	0.20	1.34	-1.00	17.47	1329	-0.20	0.55	-1.00	2.80	1014	0.22	0.65	-0.93	2.92	2014	0.46	1.81	-1.00	17.47
Log labour productivity	4357	3.56	0.70	0.18	6.41	1329	3.82	0.71	1.29	6.41	1014	3.65	0.52	1.47	4.83	2014	3.35	0.70	0.18	5.41
Share high-skilled labour	4357	13.31	7.09	2.00	32.38	1329	13.29	7.10	2.00	32.38	1014	13.34	7.03	2.00	32.38	2014	13.30	7.13	2.00	32.38
Share medium-skilled labour	4357	51.41	21.48	8.22	88.44	1329	51.57	21.58	8.22	88.44	1014	51.25	21.42	8.22	88.44	2014	51.39	21.46	8.22	88.44
BS-linkages, total	4357	0.19	0.06	0.05	0.58	1329	0.20	0.06	0.05	0.55	1014	0.17	0.05	0.06	0.33	2014	0.18	0.05	0.06	0.58
Domestic BS-linkages	4357	0.10	0.05	0.01	0.31	1329	0.10	0.05	0.01	0.31	1014	0.09	0.04	0.01	0.24	2014	0.10	0.05	0.02	0.30
Foreign BS-linkages	4357	0.09	0.04	0.02	0.45	1329	0.10	0.04	0.03	0.42	1014	0.08	0.03	0.02	0.24	2014	0.08	0.04	0.02	0.45
Share foreign value-added in exports	4357	32.31	10.79	10.22	70.75	1329	36.85	10.64	16.27	70.75	1014	33.28	10.94	10.93	64.81	2014	28.82	9.52	10.22	65.66
Capital coefficient	4357	61.20	24.68	9.15	395.01	1329	52.51	22.58	9.43	209.51	1014	69.25	22.46	21.04	158.73	2014	62.87	25.35	9.15	395.01
Log labour cost per employee	4357	3.14	0.64	0.82	4.57	1329	3.31	0.62	1.54	4.57	1014	3.21	0.57	1.60	4.16	2014	2.99	0.66	0.82	4.49
ICT-capital share	2509	12.44	11.98	1.17	100.00	772	15.36	14.00	1.17	100.00	579	8.43	5.49	1.19	51.75	1158	12.49	12.32	1.28	100.00

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Table A.17 / Determinants of export competitiveness in MHT industries: 1995-2007

	Log exports			Log domestic value-added in exports			RCA - export based			RCA - domestic value-added in exports based		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log labour productivity (VA-based)	0.754***	0.681***	0.879***	0.754***	0.679***	0.869***	0.298***	0.453***	0.678***	0.339***	0.481***	0.701***
	(16.73)	(11.99)	(12.40)	(16.75)	(11.96)	(12.30)	(9.45)	(11.56)	(10.30)	(11.17)	(12.70)	(10.86)
Share high-skilled labour	0.008	0.004	-0.012*	0.010	0.006	-0.012*	-0.040***	-0.031***	-0.045***	-0.034***	-0.026***	-0.044***
	(1.24)	(0.64)	(-1.77)	(1.48)	(0.85)	(-1.66)	(-8.47)	(-6.56)	(-6.93)	(-7.52)	(-5.71)	(-6.94)
Share medium-skilled labour	0.010*	0.008	0.003	0.010*	0.008	0.003	-0.009**	-0.006	-0.002	-0.005	-0.003	0.001
	(1.77)	(1.49)	(0.48)	(1.79)	(1.51)	(0.53)	(-2.29)	(-1.49)	(-0.32)	(-1.45)	(-0.68)	(0.14)
BS-linkages, total	2.733***	2.651***	3.903***	2.742***	2.656***	3.938***	1.992***	2.169***	3.409***	2.150***	2.311***	3.444***
	(6.34)	(6.13)	(7.92)	(6.36)	(6.15)	(8.02)	(6.61)	(7.27)	(7.45)	(7.39)	(8.02)	(7.68)
Share foreign value added in exports	0.054***	0.053***	0.051***	0.036***	0.035***	0.033***	0.017***	0.019***	0.022***	0.006***	0.008***	0.006
	(20.05)	(19.44)	(13.27)	(13.33)	(12.79)	(8.56)	(9.18)	(10.29)	(6.28)	(3.21)	(4.24)	(1.62)
Capital coefficient	0.001	0.001	0.006***	0.002*	0.001	0.006***	-0.002***	-0.002**	0.001	-0.002***	-0.001	0.001
	(1.55)	(1.05)	(4.53)	(1.74)	(1.22)	(4.61)	(-3.80)	(-2.32)	(0.56)	(-2.73)	(-1.34)	(0.65)
Log labour cost per employee		0.186**	0.072		0.193**	0.096		-0.400***	-0.376***		-0.365***	-0.189
		(2.08)	(0.51)		(2.16)	(0.68)		(-6.48)	(-2.86)		(-6.11)	(-1.47)
ICT-capital share			-0.010***			-0.010***			-0.006***			-0.005***
			(-6.01)			(-5.97)			(-3.73)			(-3.45)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	2.430***	2.242***	2.568***	2.581***	2.385***	2.671***	-1.078***	-0.673**	-1.821***	-1.287***	-0.917***	-2.321***
	(5.69)	(5.14)	(5.01)	(6.05)	(5.47)	(5.23)	(-3.61)	(-2.24)	(-3.83)	(-4.46)	(-3.16)	(-4.98)
No of obs.	1,329	1,329	772	1,329	1,329	772	1,329	1,329	772	1,329	1,329	772
Adjusted R^2	0.945	0.945	0.903	0.947	0.947	0.913	0.582	0.595	0.502	0.594	0.605	0.518

Note: t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1; RCAs are calculated relative to the total economy.

Table A.18 / Determinants of export competitiveness in MT industries: 1995-2007

	Log exports			Log domestic value-added in exports			RCA - export based			RCA - domestic value-added in exports based		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log labour productivity (VA-based)	1.103***	0.880***	0.954***	1.106***	0.888***	0.957***	0.366***	0.380***	0.848***	0.430***	0.447***	0.840***
	(20.21)	(10.96)	(9.03)	(20.27)	(11.06)	(9.08)	(7.17)	(5.02)	(6.99)	(8.32)	(5.84)	(6.43)
Share high-skilled labour	0.037***	0.030***	0.011*	0.038***	0.031***	0.012**	-0.014**	-0.014**	-0.015**	-0.009	-0.008	-0.018**
	(5.57)	(4.35)	(1.81)	(5.75)	(4.55)	(1.97)	(-2.27)	(-2.11)	(-2.10)	(-1.42)	(-1.28)	(-2.38)
Share medium-skilled labour	0.013**	0.009*	0.017***	0.013**	0.009*	0.017***	-0.015***	-0.015***	0.011**	-0.008	-0.007	0.013**
	(2.43)	(1.75)	(3.52)	(2.43)	(1.77)	(3.55)	(-3.07)	(-2.98)	(1.97)	(-1.55)	(-1.47)	(2.12)
BS-linkages, total	-1.089	-1.089	-1.443**	-1.025	-1.024	-1.457**	-0.959	-0.959	-0.783	-1.055	-1.055	-0.818
	(-1.52)	(-1.53)	(-2.21)	(-1.43)	(-1.44)	(-2.23)	(-1.43)	(-1.43)	(-1.04)	(-1.55)	(-1.55)	(-1.01)
Share foreign value added in exports	0.029***	0.027***	0.030***	0.012***	0.010***	0.014***	-0.005	-0.005	0.008*	-0.018***	-0.017***	-0.005
	(8.30)	(7.62)	(6.75)	(3.47)	(2.83)	(3.15)	(-1.53)	(-1.46)	(1.67)	(-5.28)	(-5.16)	(-0.93)
Capital coefficient	0.003***	0.002**	0.004***	0.003***	0.002**	0.004***	0.000	0.001	0.002*	0.001	0.001	0.002
	(2.67)	(2.02)	(2.99)	(2.82)	(2.18)	(3.14)	(0.53)	(0.56)	(1.77)	(1.08)	(1.11)	(1.36)
Log labour cost per employee		0.398***	0.365**		0.389***	0.366**		-0.025	-0.607***		-0.031	-0.331*
		(3.76)	(2.27)		(3.67)	(2.29)		(-0.25)	(-3.30)		(-0.30)	(-1.67)
ICT-capital share			0.000			0.000			0.012***			0.011***
			(-0.07)			(-0.11)			(3.38)			(2.87)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.060***	0.898**	0.145	1.143***	0.986**	0.203	0.563	0.573	-1.473***	0.074	0.086	-2.145***
	(2.63)	(2.23)	(0.35)	(2.83)	(2.45)	(0.48)	(1.49)	(1.51)	(-3.06)	(0.19)	(0.22)	(-4.13)
No of obs.	1,014	1,014	579	1,014	1,014	579	1,014	1,014	579	1,014	1,014	579
Adjusted R^2	0.95	0.95	0.96	0.953	0.953	0.962	0.587	0.586	0.725	0.632	0.632	0.715

Note: t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1; RCAs are calculated relative to the total economy.

Table A.19 / Determinants of export competitiveness in LT industries: 1995-2007

	Log exports			Log domestic value-added in exports			RCA - export based			RCA - domestic value-added in exports based		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log labour productivity (VA-based)	0.259***	0.509***	0.547***	0.257***	0.503***	0.543***	0.397***	1.118***	1.168***	0.410***	1.152***	1.193***
	(5.05)	(6.93)	(4.65)	(5.00)	(6.85)	(4.62)	(4.08)	(8.09)	(7.22)	(4.20)	(8.31)	(7.02)
Share high-skilled labour	0.019**	0.028***	0.030***	0.019**	0.029***	0.030***	-0.055***	-0.028*	-0.009	-0.048***	-0.021	-0.006
	(2.31)	(3.36)	(3.19)	(2.38)	(3.41)	(3.20)	(-3.53)	(-1.79)	(-0.66)	(-3.10)	(-1.32)	(-0.45)
Share medium-skilled labour	0.007	0.012*	0.022**	0.007	0.012*	0.022***	-0.025*	-0.011	0.005	-0.021	-0.006	0.007
	(1.07)	(1.77)	(2.57)	(1.05)	(1.74)	(2.59)	(-1.92)	(-0.83)	(0.43)	(-1.61)	(-0.49)	(0.57)
BS-linkages, total	4.550***	4.524***	2.762***	4.595***	4.570***	2.751***	8.485***	8.411***	4.158***	7.823***	7.747***	3.048***
	(6.98)	(6.98)	(3.62)	(7.05)	(7.04)	(3.61)	(6.86)	(6.89)	(3.97)	(6.31)	(6.33)	(2.77)
Share foreign value added in exports	0.035***	0.037***	0.028***	0.019***	0.021***	0.013**	0.002	0.009	0.011	-0.014*	-0.007	-0.002
	(8.34)	(8.90)	(4.82)	(4.54)	(5.10)	(2.17)	(0.20)	(1.09)	(1.43)	(-1.77)	(-0.87)	(-0.21)
Capital coefficient	-0.001	0.001	-0.009***	-0.001	0.001	-0.009***	0.000	0.004**	-0.009***	-0.001	0.003*	-0.009***
	(-0.76)	(0.85)	(-5.74)	(-0.73)	(0.86)	(-5.79)	(-0.27)	(2.15)	(-4.30)	(-0.61)	(1.89)	(-4.13)
Log labour cost per employee		-0.494***	-0.610***		-0.487***	-0.595***		-1.424***	-1.375***		-1.465***	-1.282***
		(-4.74)	(-3.02)		(-4.67)	(-2.95)		(-7.26)	(-4.96)		(-7.45)	(-4.40)
ICT-capital share			-0.001			-0.001			-0.003			-0.003
			(-0.36)			(-0.36)			(-1.07)			(-1.07)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	5.406***	5.587***	6.466***	5.517***	5.696***	6.518***	-0.694	-0.171	0.006	-0.549	-0.011	-0.049
	(10.75)	(11.14)	(9.45)	(10.97)	(11.35)	(9.53)	(-0.73)	(-0.18)	(0.01)	(-0.57)	(-0.01)	(-0.05)
No of obs.	2,014	2,014	1,158	2,014	2,014	1,158	2,014	2,014	1,158	2,014	2,014	1,158
Adjusted R^2	0.815	0.817	0.78	0.824	0.826	0.795	0.275	0.294	0.336	0.281	0.301	0.327

Note: t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1; RCAs are calculated relative to the total economy.

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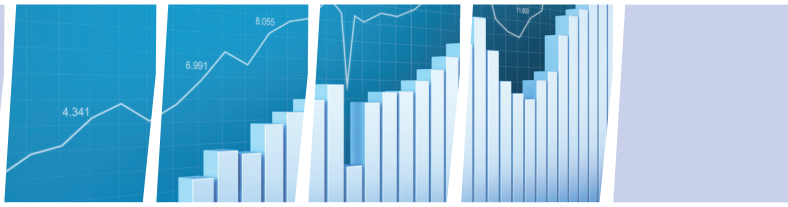

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