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Policy Note

„The Central European Manufacturing Core: What is Driving Regional Production Sharing?“

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Abstract

There is evidence that Europe's manufacturing activity is increasingly concentrated in a Central European (CE) core which the IMF in a recent publication also refers to as the German-Central European supply chain. This CE manufacturing core is dominated by Germany and in addition comprises Austria and the four Visegrád countries (the Czech Republic, Slovakia, Hungary and Poland). The case of Austria is particularly interesting because it is neither the primary technology leader within the country group, nor is it an offshoring destination and therefore takes an intermediate position. This study provides further empirical evidence for the growing concentration of European industrial production in the CE manufacturing core and explores in detail the structure and development of the regional supply chains over the period 1995-2011. This includes an analysis of the impact of international production integration on the value added share of manufacturing in the economy. The econometric results point towards differentiated effects for the members of the CE manufacturing core and the remaining EU Member States. Focusing on value added generated by the manufacturing sector, the industries which build the backbone of this regional manufacturing cluster are identified. Finally, the report investigates which factors are conducive to the intensification of international production sharing. In line with the notion of a production-investment-services nexus, it is found that (inward) FDI in the manufacturing sector is associated with higher degrees of production integration. Again, the econometric evidence suggests that some of the factors explaining international production sharing, such as the level of export sophistication, have differentiated effects for the members of the CE manufacturing core as compared to the other EU countries.

Keywords: European manufacturing, production integration, global value chains, structural change

JEL-codes: F14, F15, L16

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The Central European Manufacturing Core: What is Driving Regional Production Sharing?

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Tu felix Austria collabora: How Austria's industry is gaining from international production sharing

Global value chains (GVCs) have become a main feature of the 21st century's world trade architecture and it is generally believed that they offer 'new prospects for growth, development and jobs' (OECD, WTO, UNCTAD, 2013). From a firm's perspective the participation in international production networks offers the possibility to benefit from technology dissemination within the network and skill upgrading (UNCTAD, 2013). At the European level, the integration of EU firms into global value chains has become a key priority in the European Commission's Industrial Policy Strategy launched in 2012 (European Commission, 2012) and updated in 2014 (European Commission, 2014a). It is clear that the Commission considers the participation of EU firms in global value chains as a tool to boost their competitiveness (European Commission, 2014b) and as a consequence that of European industry as a whole.

In a recent study of the Vienna Institute for International Economic Studies (wiiw) for the Federal Ministry of Science, Research and Economy, we have analysed the drivers of international production integration and its impacts on European industry focusing on the manufacturing sector (Stöllinger and Stehrer, 2014). The focus of the study is on the countries forming the 'Central European manufacturing core' (or CE manufacturing core for short) comprising Austria, Germany, the Czech Republic, Hungary, Poland and Slovakia. There is increasing evidence that Europe's manufacturing activity is increasingly concentrated in this Central European region as pointed out in a recent report by the IMF (2013). This report also argues that the CE manufacturing core is directly linked to the German-Central European supply chain which is successfully exporting manufacturing goods to the rest of the world. In our study we provide empirical evidence for the emergence of the CE manufacturing core and above all we present econometric evidence for the effect of global value chain participation on the development of the manufacturing sector in the CE manufacturing core and other EU Member States. We show that international production integration *can* indeed support the industrial sector but it is not the panacea for industrial competitiveness, growth and job creation that policy-makers have hoped for.

The emergence of the CE manufacturing core

A telling indicator for the competitiveness of a country's manufacturing sector are its value added exports, i.e. value added generated in a country which is finally absorbed abroad (see Johnson and Noguera, 2012). This indicator is superior to gross exports as it corrects for 'double counting' introduced by trade in intermediates and it is in this context preferred to production data because it does not suffer from the potential bias caused by large domestic markets. For our purposes it is advisable to look at the EU Member States' share in the total EU value added exports of the manufacturing sector. The picture that emerges from Table 1, which tracks the market shares in European value added exports over the period 1995-2011, is quite clear: The members of the CE manufacturing core gained export shares, while almost all other groups of EU Member States suffered more or less severe losses. Note that the 8.1 percentage points (p.p.) increase of the CE manufacturing core's market share in EU manufacturing value added exports is the result of market share gains in each and every member of that group.

Table 1: Shares in EU manufacturing value added exports by groups of Member States, 1995-2011

	1995	2000	2005	2008	2011	change 1995- 2011 (in p.p.)
CE manufacturing core	34.5%	33.8%	38.9%	41.6%	42.6%	8.1
<i>Germany</i>	29.0%	27.1%	29.8%	30.8%	31.4%	2.4
<i>Austria</i>	2.6%	2.8%	3.1%	3.2%	3.1%	0.5
<i>Czech Republic</i>	0.8%	1.1%	1.8%	2.3%	2.4%	1.6
<i>Hungary</i>	0.4%	0.8%	1.2%	1.4%	1.5%	1.1
<i>Poland</i>	1.3%	1.6%	2.3%	3.1%	3.2%	1.9
<i>Slovakia</i>	0.4%	0.4%	0.7%	1.0%	0.9%	0.5
Benelux	11.8%	9.8%	9.5%	9.4%	9.7%	-2.1
Nordic countries	8.7%	8.5%	7.8%	7.4%	6.9%	-1.8
France	12.0%	12.8%	11.3%	10.4%	9.5%	-2.5
Italy	11.8%	11.3%	10.7%	10.8%	10.5%	-1.3
United Kingdom	12.6%	13.1%	10.3%	8.9%	9.1%	-3.5
Southern EU	5.8%	6.6%	6.9%	6.9%	6.9%	1.1
Other EU-MS	2.7%	4.1%	4.5%	4.6%	4.7%	2.0

Note: Nordic countries = Denmark, Sweden, Finland; Southern EU = Spain, Portugal, Greece, Malta, Cyprus; Other EU-MS = Bulgaria, Romania, Latvia, Estonia, Lithuania and Ireland. Manufacturing industries based on NACE Rev. 1 industry classification.

Source: WIOD, wiiw calculations.

These dynamics in combination with the fact that the share in EU-wide manufacturing value added exports of the CE manufacturing core was already high in 1995 can be considered as strong evidence that manufacturing production is increasingly concentrated in the Central European region.

The impact of global value chain participation on manufacturing

Exploring the role of global value chains and international production sharing for this intra-European concentration of production and for the competitiveness of European industry, we investigated the relationship between the change of the value added share of manufacturing industries in EU Member States' GDP and the degree of participation in global value chains over the period 1995-2011. For measuring the integration in international supply chains it has become common to use the amount of foreign value added in a country's own exports (measuring backward production integration), on the one hand, and the value added of a country that is exported and enters the exports of the trading partners (measuring forward production integration), on the other hand. Both backward production integration and forward production integration are expressed as a share of gross exports to obtain the measure known as the global value chain (GVC) participation rate.

In case international production integration is supporting the competitiveness of the manufacturing sector, the GVC participation rate should be positively associated with the change in the manufacturing share, i.e. one would expect a less pronounced shift out of manufacturing in countries that are strongly engaged in international production sharing.

Table 2 presents the results from our regression of the GVC participation rate on manufacturing-related structural change. The regression controls for the effects of the initial manufacturing share and the initial GDP per capita as well as labour costs and the real exchange rate. The main interest is, however, with the GVC participation rate. The regression is also flexible enough to control for differentiated effects for the members of the CE manufacturing core (CORE) and the remaining EU Member States.

Table 2: The relationship between global value chain participation and changes in the manufacturing share, 1995-2011

Dependent variable: Δ manufacturing share	
	GVC participation
initial manufacturing share	-0.0221 (0.046)
initial GDP per capita	-0.0882* (0.051)
initial GDP per capita - sq	0.0044 (0.003)
GVC participation	-0.0353** (0.017)
GVC participation x CEMC	0.0608** (0.028)
CEMC	0.0074** (0.004)
Δ labour costs	0.0312 (0.020)
Δ real exchange rate	-0.0740** (0.035)
<hr/>	
F-test	6.28
R ²	0.292
R ² -adj	0.201
obs.	103

Note: Ordinary least square (OLS) regression including a constant and time fixed effects. Δ manufacturing share are 4-year differences. Specifications including interaction terms are estimated using centred values (with zero mean) of the variables forming the interaction terms. ***,** and * indicate statistical significance at the 1%, 5% and 10% level respectively. Standard errors in parentheses. CEMC = Central European manufacturing core.

Allowing for this differentiated effect turns out to be essential: the results suggest a negative effect of GVC participation on the manufacturing share of EU Member States in general. This structural shift out of manufacturing is explained by the fact that international production sharing may involve the offshoring of a part of the manufacturing activities that previously have been undertaken domestically. However, for the members of the CE manufacturing core this structural effect is positive, which can be seen from the fact that the (positive) coefficient of the interaction term (between the GVC participation and the CE manufacturing core dummy variable) in the regression is larger than the (negative) main effect of GVC participation.

This means that within the CE manufacturing core the negative structural effect from production integration mentioned above is more than compensated by the benefits from economic integration due to productivity gains and the attraction of additional value added activities in the manufacturing sector.

To assess the economic relevance it is useful to first note that the average rate of structural change is -1.1 p.p., i.e. the share of manufacturing declined on average by 1.1 p.p. Now, the positive coefficient of the CEMC dummy variable implies that for Austria and the other members of the CE manufacturing core, the rate of manufacturing-related structural change is 0.74 p.p. higher than in the other EU Member States. This implies that the shift out of manufacturing is, on average, much less pronounced.

With regard to the effect of international production integration, the result suggests that a 10 p.p. higher GVC participation rate accelerates the negative rate of structural change of the average EU Member States *not* belonging to the CE manufacturing core by 0.35 p.p. In contrast, for the members of the CE manufacturing core, a 10 p.p. higher GVC participation rate would support the manufacturing sector by slowing down the negative rate of structural change by 0.26 p.p. ($[-0.035 + 0.0608] \times 10$).

Another interesting result is that increases in labour costs in the manufacturing sector do not seem to hurt the development of the sector (the coefficient is even positive though statistically not significant).

Conclusions

European manufacturing production is increasingly concentrated in a Central European manufacturing core. Our quantitative results support the view that participation in global value chains is supportive of the manufacturing sector in this CE manufacturing core. Hence, Austria's industry as a member of this country group has been benefiting from international, and in particular from European, production integration. It needs to be stressed, however, that the structural impact of global supply chains is country-specific. Some countries see their manufacturing sector strengthened by this development, for others it accelerates the 'de-industrialisation' process as it has been the case for the majority of EU Member States outside the CE manufacturing core. Therefore the integration into supply chains must also be expected to have contributed to the concentration of manufacturing activities.

With regard to the European Commission's expectation that global value chains generally support the competitiveness of European industry, our results suggest that this expectation needs to be qualified. While integration in global value chains has been conducive to a highly productive CE manufacturing core and is supporting its members' competitiveness vis-à-vis third countries, for other parts of Europe it may be further accelerating the de-industrialisation process which is unlikely to spur growth and generate new jobs. To the extent that the manufacturing sector is supporting the convergence process of middle-income countries (Rodrik, 2013), these developments may run counter to the European cohesion objectives. In short, international production networks may imply a trade-off between efficiency and cohesion at the European level. With the European Commission becoming increasingly concerned with the external competitiveness of the Union, it may well be that the efficiency dimension will be given priority. The consequence of this will be a continued and unchecked agglomeration of industrial capacities in the CE core countries.

In view of this potential policy conflict, Austrian policy-makers can consider themselves lucky. Austrian manufacturing firms have successfully integrated into European supply chains with positive effects for industry as a whole. Therefore, the emergence of the European supply chain implies not really new challenges for Austrian economic policy but it certainly reinforces the current challenge of

remaining internationally competitive. In this context it seems advisable that Austria (as well as Europe as a whole) will take what Aiginger (2012) has called the “high road” to competitiveness as opposed to the “low road”. Our regression results are also in line with the claim that Austria is badly advised in trying to travel the ‘low road’ to competitiveness consisting of moderating wage increases and fostering irregular contracts (Aiginger, 2012). As was shown in Table 2, more moderate advances in manufacturing wages (labour costs) are not associated with the change in the manufacturing share questioning the role of low wages as an accelerator for industrial development in the EU as a whole.

The high road to manufacturing excellence and competitiveness implies sufficient investment in R&D and education in order to allow a sufficient number of firms to get to or to remain at the technological frontier. In the context of international production sharing, a particular feature of the Austrian (and German) education system, the dual system in initial vocational training (*Lehrlingsausbildung*) merits attention. Investment in skills and capabilities should start as early as possible in the working life of people. This attributes great importance to initial vocational training, i.e. the training of workers at the beginning of their professional career. Ideally, firms engage in the training of young people as it is the case in a dual system. This approach has several advantages. First of all, it increases the probability that the training is in line with the skills demanded in the economy. This is because expanding firms are more likely to take on apprentices. Secondly, in-company training is more practically orientated and in many cases also more specific. This latter aspect is important for highly specialised firms and firms producing in niches and industries with incremental technological progress.

In a high-wage country like Austria, a well-trained medium-skilled workforce can probably be considered the most important single locational advantage in manufacturing production. Firms may be tempted to offshore certain production activities in order to gain from the combination of their own knowledge and sophisticated production technology on the one hand and lower wages abroad on the other hand. However, if a large part of their knowledge and technological excellence is embodied in well-trained, highly specialised production workers, offshoring becomes a less attractive option. While the data on initial vocation training in Europa is too scarce in order to be tested empirically, it may well be that Austria’s dual system has significantly contributed to the successful participation in European supply chains that we find in the data. Hence, in order to avoid the negative consequences of international production integration – which as we have documented may very well materialise – Austria must be interested in maintaining and, where possible further improving, its initial vocational training system as part of its ‘industrial commons’ (Pisano and Shih, 2009).¹

¹ The industrial commons are a reference to the commons which is the land belonging to a (village) community as a whole and which could also be used by each member of the community (typically for grazing of animals). They can be described as the general stock of knowledge, competences and skills (often embodied in the workforce) and institutions (including supplier networks) relevant for modern manufacturing activities that can be shared and accessed by the manufacturing sector as a whole (Pisano and Shih, 2009).

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