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### 1. INTRODUCTION

For its rather small size, Slovakia has a large automotive industry. According to the European Automobile Manufacturers' Association (<http://www.acea.be>), in a period it was the largest per capita car producer in the world. The automotive industry accounted for 17% of this country's total GDP in 2010, the vast majority of which was exported, see Automotive (2012). The Slovak economy is (and it was already then) strongly exposed to the car industry's world-wide fluctuations. Thus the decline of Slovak manufacturing production in 2009 was „led unsurprisingly by the car industry, which had previously been the growth motor”, see Hugh (2009).

With a high share of its economy being concentrated in some sectors (industries), and a no less strong concentration of its trade on other member states of the European Union, Slovakia is not alone among CEE new member states. The first – sectorial – kind of strong concentration holds for another six: the Czech Republic, Hungary, Latvia, Lithuania, Poland and Slovenia, i. e., for seven of the ten CEE new members. More specifically, in 2014 three Harmonised System (HS) two digit chapters had the highest weights in the exports of all of them (except Lithuania). These chapters (all making parts of mechanical engineering) were number 84 (nuclear reactors, boilers, machinery and mechanical appliances; below non-electrical machinery), 85 (electrical machinery and equipment and parts thereof; below electrical machinery) and 87 (vehicles other than railway or tramway rolling-stock, and parts

etc.; below vehicles). Strong geographic concentration of exports to the EU can be observed, besides Slovakia, in the Czech Republic, Poland, Hungary, Slovenia and Estonia. Both kinds of exports concentration entail a bigger or smaller impact of export successes/failures on the economy as a whole depending on the share of exports in the GDP. A high share of exports in GDP characterises Bulgaria, the Czech Republic, Estonia, Hungary, Lithuania, Slovakia and Slovenia.

*Table 1*

**Some characteristics of the 10 pre-2013 CEE new EU member states' exports of goods and inward foreign direct investments in 2014 (data in percent)**

Country	Share of intra-EU exports	Share of three largest HS 2 digits chapters	Exports/GDP	Stock of FDI in manufacturing industries/GDP
Slovakia	<b><u>83.3</u></b>	<b><u>57.8</u></b>	<b><u>86.6</u></b>	<b><u>19.0</u></b>
Czech Rep.	<b><u>82.1</u></b>	<b><u>54.9</u></b>	<b><u>84.6</u></b>	<b><u>21.3</u></b>
Hungary	<b><u>78.3</u></b>	<b><u>53.1</u></b>	<b><u>80.8</u></b>	15.9
Poland	77.4	35.0	39.5	14.7
Estonia	71.9	33.9	61.9	13.1
Romania	71.2	40.2	35.0	13.8
Slovenia	69.1	37.2	72.6	8.0
Latvia	68.2	22.3	45.6	5.4
Bulgaria	62.5	19.9	52.5	<b><u>16.6</u></b>
Lithuania	54.2	21.2	67.1	9.4

Source: own calculation on the basis of UN Comtrade and Eurostat

Looking back at the previous paragraph or at Table 1 (where in columns 2 to 5 the highest values are underlined and printed with bold-face), the reader can see that three countries have the highest values in all the three respects discussed above: the Czech Republic, Hungary and Slovakia. On this basis, they – below “our countries” – will be the subject of this article.

In the article, we are much more interested in the consequences of these particularities of our three countries than in their causes. However, a short treatment of the causes cannot be avoided here. The direct cause of all three particularities is the high level of foreign direct investment in manufacturing industries of these countries, see column 5 of Table 1. These investments have largely aimed at dragging the factors of production available in these countries into (primarily European) international value chains, see e. g. Cieřlik (1994). Both the high sectorial concentration of exports and their geographical concentration on the EU are obvious consequences of extensive participation of these countries in international value chains; the latter also contributes to the high share of exports in their GDP (but here the countries' small size also has a role). What has motivated foreign – mostly European – investors to carry out these investments? The countries' geographic closeness to Western Europe, and more concretely to the latter's two important manufacturing centres in Southern Germany and Northern Italy has certainly played an important role, as well as the availability of very useful labour force skills, technological capabilities, see e. g. Halpern (1995) and Winters – Wang (1994, p. 133). The rapid and basically successful transition to the market economy has also been significant, see Tintin (2013). We also have to underline the Czech Republic's, Hungary's and Slovakia's openness not only to trade but also the foreign ownership of domestic factories. The weakness of the latter kind of openness explains, e. g., why the otherwise rather similar Slovenia is not a fourth one complementing our three countries. Poland's "exclusion" from the group is based on its large size, which mostly explains its relatively limited dependence on its exports (its modest exports/GDP ratio). However, as Table 1 shows, all CEE new EU member states show some degree of similarity in (almost) all three respects (and also in the fourth one, i. e., in a significant level of FDI in their manufacturing industries) to our three.

Further in the article, like here, we often compare what we find in our three countries to trends and facts of other ones. In figures plotting time series, we restrict the number of countries to six CEE and nine non-CEE EU member countries. In other figures, we show the data of all (pre-2013, i. e., 27) EU member countries, once omitting one "outlier" that would overshadow differences among other countries. When introducing further countries gives useful information, figures also include the 13 non-EU member countries included in the WIOD database (see below).

Obviously, the outstanding role of international value chains in the exports of our countries complicates the concentration picture, requiring more thorough investigation. Namely,

- Since component parts and subassemblies add up to a high share of imports and exports in HS 84, 85 and 87 chapters, it is obvious that the own (national) value added content of our three countries' exports is far below 100 percent. And a fair treatment of export concentration has to take this into consideration, trying to measure exports of national value added, and the latter's geographical and sectorial concentration;
- Both geographical and sectorial export concentration, as measured on the basis of the above presented statistical data, leave out of consideration the final use (destination) of the products exported. Thus e. g., an engine exported from Hungary to Germany can be built into an Audi car and then exported to Japan. Thus the final demand purchasing the engine is Japanese, rather than German. Similarly, siderurgical products exported to France from the Czech Republic and built into atomic power stations, are subject to demand for atomic power stations, and can be considered as exports belonging to HS chapter 84, rather than 72 (iron and steel). This problem has to be dealt with.

I. e., analysing the geographical and sectorial distribution, concentration of exports is no simple task. Proposing changes in them is even more difficult. We know successful sectorial export diversification stories, see e. g. Carrère et al. (2009) but their starting point was always exports concentration on a few mineral or agricultural products. As concerns geographical diversification, a negative example was the Hungarian government's attempted "Opening to the East" in 2011-2014 (meaning increasing trade with a group of fast growing East European and Asian economies in order to reduce dependence from the EU market), a bad failure. Despite extensive activity of economic diplomacy and the deployment of all kinds of WTO-conform support, exports to that country group fell between 2010 and 2014, and the share of exports to the EU increased instead of falling. According to the government, without the "opening" efforts the eastward fall would have been even bigger<sup>1</sup>. That is, of course, possible. But we have to remark that Hungary was one of only seven EU member countries in whose exports the EU share increased between 2010 and 2014, and the other six – Bulgaria, Estonia, Finland, Latvia, Malta and Sweden – had significantly lower intra-EU export shares in 2010 than Hungary had. Thinking of the reasons for the failure of the „opening”, we have to keep in mind that those years were not a successful period of Hungarian economic development. In the average of 2010-14, according to Eurostat, gross fixed capital formation was only 20.1 percent of GDP, less by 3.4 percentage points than in 2005-9, and significantly

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<sup>1</sup> See. Szijjártó (2015).



less than in most other CEECs; the average annual GDP growth rate was a mere 1.2 percent. In periods of more investment activity, with concomitant renewal and faster growth of output, the conquest of new markets would certainly be easier.

The remainder of the article attempts to contribute to the investigation of these issues, and it is organised as follows. Section 2 analyses the literature of export concentration. Section 3 discusses some statistical issues and presents the WIOD database as a means for measuring the final geographical and sectorial distribution of exports. Section 4 analyses geographical, section 5 sectorial export concentration. Section 6 concludes.

## **2. LITERATURE**

In the literature, the issue of export concentration is mostly discussed from the point of view of a firm, rather than a country, putting accent on the efficiency of marketing costs and the like. Writings belonging to this strand usually find both positive and negative sides of both concentrated and dispersed export strategies, see e. g., Nigel Percy's book (Percy 1982), even though quite a few of them opt for one or the other alternative – e. g., Hammermesh et al. (1978) do not find concentrated export strategies attractive.

As concerns studies on the export concentration of countries, their starting point, with very few exceptions, is the unilateral economic structure of many less developed countries, with their exports concentrated on some mineral or agricultural products. Michaely (1958) finds that low level of economic development and high share of primary production in the GDP are the explanatory factors of export concentration. Not surprisingly, export concentration in this strand of the literature almost always has negative connotation. The most important conclusion of writings belonging here is that export concentration, because of instabilities of the too important main markets of the (less developed) countries concerned, causes export earnings volatility, see e. g. MacBean (1966), James (1980), Bejan (2006), Hamid (2008), and Samen, (2010). Further, some authors specify the terms of trade as an important mediator of export concentration's impact on export earnings volatility, see e. g. Jansen (2004). Concentration is treated almost exclusively as product (sectorial) concentration. (Differently from firm-level analyses, where the geographical aspect – market concentration versus market spreading – tends to be the basic issue.) Two articles (Haddad et al. 2013 and Kingston 1976) analyse geographical concentration, concluding that it has little or no impact on economic instability and growth.

Of course, the level of openness to trade influences the impact of export earnings volatility on general economic (in)stability of the countries concerned. According to Bejan's

(2006) research results, openness increases general economic (GDP) volatility but its impact disappears if export concentration is also included in the equation. Haddad et al. (2013) present an only slightly different picture: openness reduces instability if exports are diversified. Differently from all other authors, Cavallo (2008) finds that openness reduces instability, and export concentration has no impact on it.

On the basis of this literature, we could predict low export concentration for our three countries of which the Czech Republic and Slovakia are classified by the World Bank as high income countries, and Hungary is close to the income ceiling of the upper-middle income category. Besides this, according to Eurostat data, primary production (calculated as the sum of the value added of agriculture, forestry, fishing and non-manufacturing, non-construction industry) has a fairly low share in the production of their GDP: 7.8 percent in the Czech Republic, 6.4 and 7.3 in Hungary and Slovakia, respectively. These shares are not much higher than the 4.9 percent average of the EU's 27 member countries. Of course, we can disclose already on this point that our analysis has not found in the three countries export concentration of the level observable in some famous "monoculture" countries. But Slovakia's above mentioned difficulties of the year 2009 demonstrate that problems of too strong concentration do not start at such extremities.

The only author whose analysis of (sectorial) export concentration seems to reflect what we can observe in our three countries is Abedini (2013), p. 18 who finds that

"high-tech exports from the emerging exporters are driven mainly by these countries' FDI inflows, participation in the international production chain of high-tech goods, and export concentration, while the same exports from the established exporters are based on their industrial infrastructure, R&D efforts, institutional quality, and export diversification."

This author also emphasises the positive side of the export concentration characterising our countries. With FDI inflows and large-scale participation in international production networks, important production capacities of high tech and medium high-tech industries have been established in Central European countries (including the Czech Republic, Hungary and Slovakia). The positive side of this process includes the emergence of positive synergies among companies established in important fields of mechanical engineering in our countries.

One nowadays largely studied and discussed kind of such synergies is clustering, whose favourable consequences are manifold and important. In a cluster of companies, cooperation and competition work in parallel. According to Porter (1998), p. 1,

"A cluster ... is an alternative way of organizing the value chain. Compared with market transactions among dispersed and random buyers and sellers, the proximity of companies

and institutions in one location—and the repeated exchanges among them—fosters better coordination and trust.”

However, in our countries, we cannot really speak about clusters of non-electrical or electrical machinery or automotive industry. In these industries, both cooperation and competition among these countries’ firms are limited by the fact that they are largely subsidiaries controlled by their foreign parent companies. As such they do not really sell their products either on domestic or foreign markets. But even so, synergies among them are important. Their common needs stimulate new investments into the production of their inputs (component parts, subassemblies), as well as the formation of workers in the professions important for them. With all this, they also improve significantly the conditions for the entry of further (domestically and foreign owned) companies in their industries. Which means that the concentration (of exports and production) tends to entail further concentration. In general control theory, this process is called positive feedback.

Theoretically, the geographical concentration of exports may also entail advantages if concentration means some level of domination of the market concerned. Authors mentioned above who evaluate positively the market concentration strategies of firms would probably agree with this. However, our three countries are too small to dominate the European Union’s huge market, on which their exports are concentrated. In 2014, 2.3, 1.3 and 1.1 percent of EU 27 countries’s total (intra- and extra-EU) imports originated from the Czech Republic, Hungary and Slovakia, respectively. The corresponding shares for Germany, all three countries’ number one trade partner were 4.3, 2.4 and 1.5 percent. Within HS chapters 84, 85 and 87, all these shares were approximately twice as high<sup>2</sup>, i. e., still far from assuring some kind of dominant position.

### **3. THE WIOD DATABASE – MEASURING THE FINAL GEOGRAPHICAL AND SECTORIAL DISTRIBUTION OF EXPORTS**

The United Nations Comtrade foreign trade database, on which the above cited trade data is based – as well as national foreign trade data behind that database – has to be treated with some caution. The WIOD (World Input-Output Database) international research project ([http://www.wiod.org/new\\_site/home.htm](http://www.wiod.org/new_site/home.htm)), on the basis of a thorough analysis of a larger set of (national) statistical data, arrived to lots of corrections, e. g., to somewhat lower intra-

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<sup>2</sup> Imports in HS chapters 84, 85 and 87 from the Czech Republic, Hungary and Slovakia amounted to 4.2, 2.4 and 2.0 percent of total (intra- and extra-EU) such imports of the 27 EU member countries. The corresponding shares in German imports were 7.9, 5.1 and 3.0, respectively.

EU trade shares for our three (and most other) EU member countries. The fundamental source in this research was the national SUTs (supply and use tables). Trade statistics were also taken into consideration, but primarily the import, rather than the export side, i. e., export estimations were based on the “mirror” import data of trade partners. (Imports, entailing the payment of customs duties and taxes, are more thoroughly observed by national authorities than exports<sup>3</sup>). Besides goods trade, WIOD data also extends to trade in services but that is not a major source of its deviations from Comtrade data<sup>4</sup>.

According to WIOD calculations, which do not extend beyond 2011, 73.0, 66.4 and 77.1 percent of goods and services exports of the Czech Republic, Hungary and Slovakia, respectively, went to EU members in that year. Calculations based on United Nations Comtrade and Service Trade data would yield 82.4, 76.2 and 84.4 percent, respectively.

The corrections included in the WIOD database are significant, and below we use the corrected data, except in cases when presenting post-2011 data (which is, together with comparable data of previous years, always based on Comtrade) is necessary. (This remark substitutes for any citation of trade data sources below in the text).

However, WIOD also opens another, indeed more important, way to corrections – in this case not to crosschecking the data but to follow the countries’ exports to their final destinations, final destinations in two different senses. First, in geographical sense: in which countries do the products and services of some country serve for final use? Second, in sectorial sense: in the form of which sector’s (industry’s) products (services) will some country’s exported goods and services serve for final use (consumption or investment)?

E. g., Audi, Volkswagen, Skoda gearboxes produced in Slovakia and Opel (General Motors) engines produced in Hungary are exported to various European countries (primarily Germany) but then, having been built in to cars, they are sold in many countries of the world to final users. The output of these and many other products (and services) depends on the demand of those final users, rather than their direct importers. Thus, economic analysis has to try to identify those final users (user countries), in order to get to know how big share of our countries’ exports depends on which countries’ final demand (for consumption or

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<sup>3</sup> Differences between any country’s exports and its partners’ imports statistics are almost always significant and often huge. E. g., over 1980 to 1986, reported US exports to Canada ranged between \$6.7 to \$12.4 billion below totals shown in Canadian import statistics, implying that 20 to 30 percent of United States exports may have gone unreported, see Yeats (1995). Also see e. g. Hamanaka (2012). Differences are usually far from being restricted to the CIF – FOB gap. With technological development, traffic costs follow a diminishing trend, and nowadays the CIF – FOB gap could very rarely exceed 10 percent of the value of any goods traded. In 2008, its average was 5.3 percent in Czech, 3.6 in Hungarian, 3.4 in Slovak, 7.4 in Romanian, 6.0 in Polish exports to Australia, Brazil, Chile and the United States, see Sourdin – Pomfret (2012)..

<sup>4</sup> For a detailed description of the WIOD database, see Timmer (2012)

investment). The problem is further complicated by the fact that Slovak gearboxes and Hungarian engines include significant amounts of imported component parts because their producers, as participants of international value chains, not only export but also import component parts and subassemblies extensively. What really interests us is not the (final) geographical distribution of those products; it is rather the distribution of our countries' value added embedded in those products (and, in other cases, services). Below, for the sake of simplicity, we will mostly speak about value added export to a country instead of value added embedded in the products of final use in that country and, similarly and simply, about value added export in a given industry, rather than value added export embedded in the products for final use of that industry.

The WIOD database, a 1995–2011 series of world input–output tables (WIOTs) includes 40 countries' (of which 27 pre-2013 EU members') plus the Rest of the World's 35 economic sectors (i. e., 1435 x 1435 input–output tables), and also embraces final use data broken down by the 40 plus 1 countries and the 35 sectors and embraces yet value added (GDP) by countries (see [http://www.wiod.org/new\\_site/data.htm](http://www.wiod.org/new_site/data.htm)) . With all this, it has created a possibility to perform calculations yielding the indicators mentioned in the previous paragraph. The necessary calculations are based on the WIOTs' Leontief inverses<sup>5</sup>. Of course, in such calculations we always use a fundamental “proportionality” hypothesis. Namely, we assume that, e. g., if Germany exports three quarters of its vehicle industry products then this export will embrace (with some simplification, and of course in the form of component parts and subassemblies) three quarters of all vehicle industry products imported by Germany from any country, and also a share proportional (in a more complicated way, as implied by the Leontief inverse) of other products and services imported from any country and belonging to those sectors whose products and services are used as inputs in the German vehicle industry.

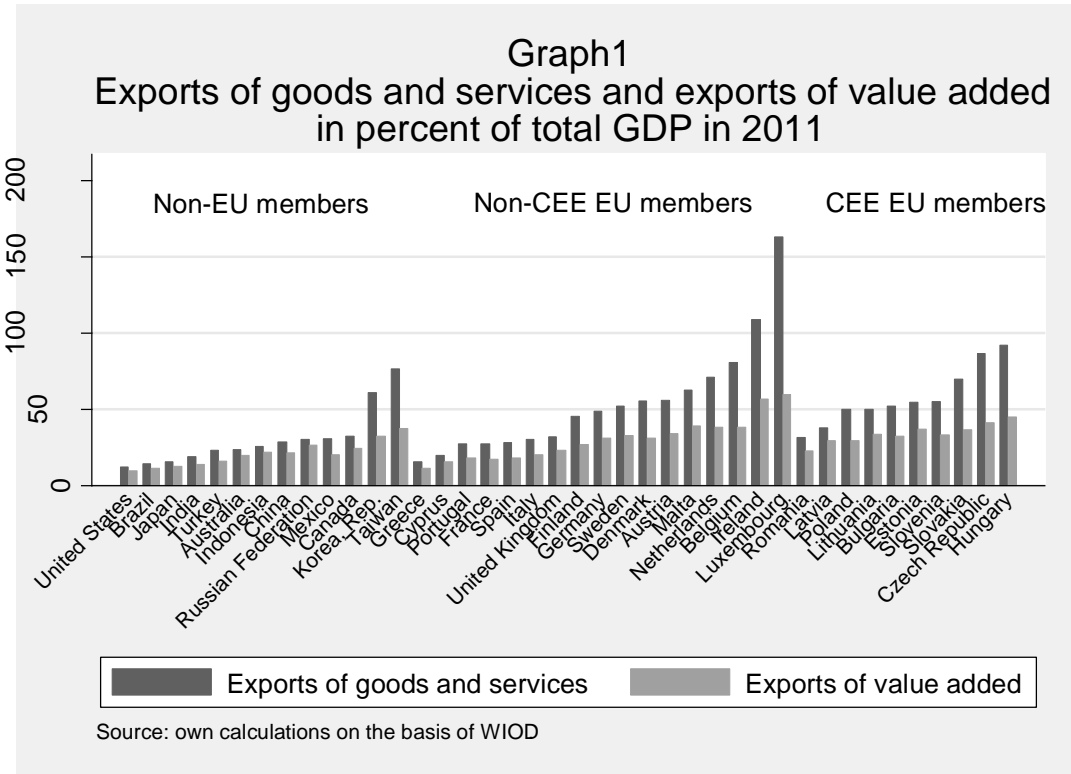
The calculations' two different versions yield both kinds of results required, as described above. We can calculate any country's value added exported to any other country or country group (serving for final use there). Or we can calculate any country's value added exports embedded in the final products of various economic sectors. E. g., the Czech value added content of the above mentioned Czech metallurgical products exported to France that are built into atomic power stations, appear here already as embedded in the products of non-electrical engineering industry, rather than metallurgy. The important message of this for an economist or for an actor of economic policy is that the dependence of the Czech economy on

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<sup>5</sup> On technical solutions for such calculations, Foster et al. (2013), Technical Appendix (pp. 41-4) is extremely helpful.

the world demand for cars is even higher (and approximately how much higher) than it is reflected by the 20 percent share of the vehicle industry in exports and manufacturing production.

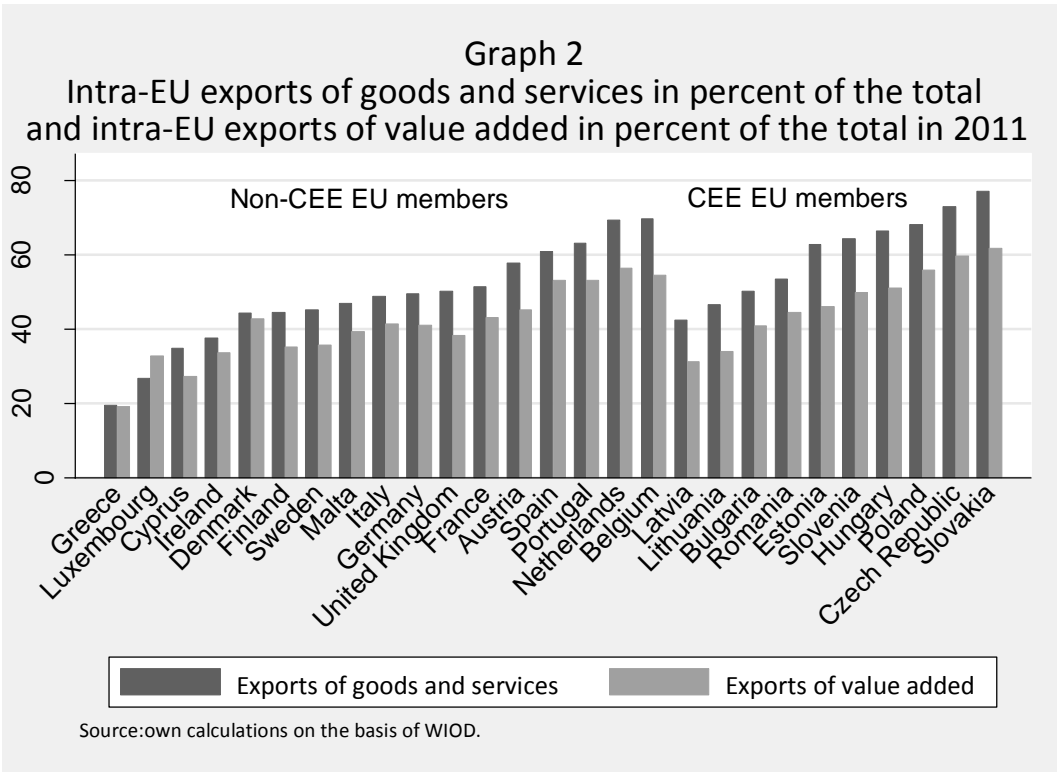
In Graph 1, we have plotted the 2011 exports of goods and services and exports of value added of the 40 WIOD countries (Central and Eastern European EU members, Non-CEE EU members and non-CEE EU members), in percent of their GDP. Our three countries' export share in GDP is among the highest. At the same time, the share of exported value added in their GDP is high but not that outstandingly high as compared to many other EU member and non-EU member countries. This difference stems from the extensive participation of our economies in international value chains (that entails exporting products of foreign factors of production en masse), and it suggests that we may also face surprises when examining their exports' (including their value added exports') geographical and sectorial breakdown.



**4. GEOGRAPHICAL CONCENTRATION: INTRA-EU VERSUS EXTRA-EU EXPORTS**

Graph 2 plots the intra-EU share of goods and services exports of the 27 EU member states. Even though these figures, in the light of the previous section, are not the best indicators of the strength of mutual dependence between each country and the whole of the Union, they

represent this phenomenon for the public opinion, including the economics profession. From them is usually drawn the conclusion that the basic issue of the geographical concentration of Czech, Hungarian and Slovak exports is their intra-EU trade. The high intra-EU share of exports causes two kinds of worries among economists and actors of economic policy. On the one hand, the EU is one of the slow-growth regions of the world economy. Consequently, there are worries that strong exposure to slowly growing demand in this community may be an important dampening factor of economic development in our countries. On the other hand, financial-economic disturbances, fluctuations in the EU may cause particularly severe problems with the strong export dependence on other EU countries.



Graph 2 combines the intra-EU shares of goods and services exports data with the intra-EU shares of value added exports in 2011, and the latter were lower than the former for all EU member countries (except for Greece and Luxembourg, two countries with very high share of service exports in the total). The basic explanation of this (almost) general rule is that the density of international value chains (entailing significant amounts of exports of the products of foreign factors of production) is higher within the EU than between EU members and outsiders. However, we can also observe in Graph 2 that the difference between the two shares was particularly high in our three countries' (but also the Slovene, Polish and Estonian) cases. The difference separating our countries from non-CEE EU members is visible even if we restrict the comparison to Belgium the Netherlands, Portugal and Austria.

In these four non-CEE countries, we see a relatively large discrepancy between the EU share of goods and services exports and that of value added exports – a 12.6 percentage points difference between the unweighted means 65.0 and 52.4 percent, respectively – but the similar difference for the Czech Republic, Hungary and Slovakia is bigger, 15.4 percent difference (between unweighted means amounting to 72.2 and 56.8 percent). Obviously, part of the explanation of these large discrepancies is that the products (and services) exported by our three countries to other EU member countries are extensively built in to products, which in turn are exported by those countries beyond the borders of the EU. In the field of vehicle industry products (HS chapter 87) this is supported by the high share of exports of component parts and subassemblies to the EU in total extra- and intra-EU exports of our countries within this HS chapter: in 2014, 46.3, 50.2 and 48.5 percent in the Czech Republic, Hungary and Slovakia, respectively. (This share was only higher in 6 other countries among EU 27, of which only Slovenia and Spain are “serious” exporters of vehicle industry products, with HS chapter 87 giving more than 10 percent of their goods exports). Unfortunately, similar figures cannot be calculated in the other two dominating HS two digit chapters: 84 and 85, non-electrical and electrical machinery. The reason is that in these chapters we cannot really separate final products from component parts and subassemblies. Almost all export products belonging to these chapters can become subassemblies of more complex equipment or equipment systems<sup>6</sup>.

When analysing the intra-EU share of our three countries’ exports of value added, we have to keep in mind that it does not really (directly) reflect the phenomenon that is in the centre of our attention. In the final analysis we are interested in the dependence of our countries’ GDP on intra-EU exports, rather than in the dependence of only their exports on the latter. And the dependence of the GDP on intra-EU trade results from the combination of two factors: besides the intra-EU share of exports; the other one is the share of value added exports in GDP. In our three countries cases, both indicators are far above EU averages. The combination of the two high values – plotted in Graph 3 as the combination of the data plotted in Graphs 1 and 2 – entails a rather high level of exposure of the Czech, Hungarian and Slovak GDP to the developments of final demand in the EU (even though this exposure is significantly smaller than it could be suggested by export statistics data cited above). In Table 2 we show this data only for the Czech Republic, Hungary and Slovakia, completed with some

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<sup>6</sup> OECD (2007) published an estimation on the share of outsourcing by car producers (70 to 75 percent). Similar estimations for the non-electrical and electrical machinery industries, to our knowledge, have never been attempted.



details: value added exports to six EU member countries playing particularly important role in the trade of our three countries

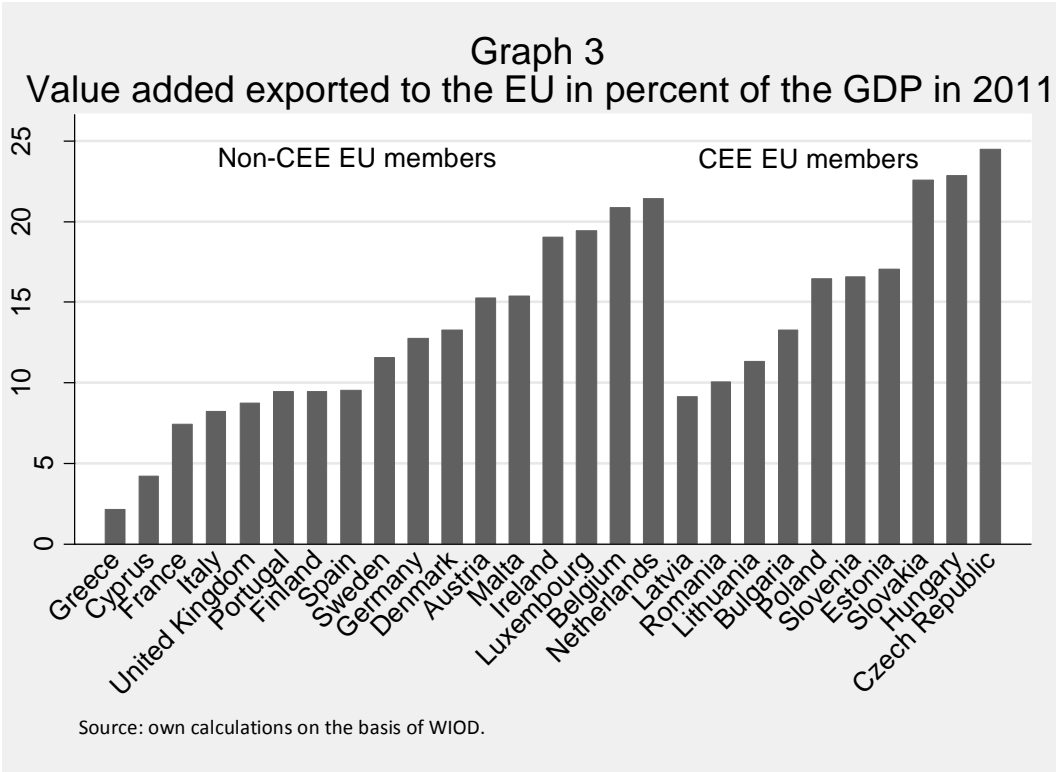


Table 2

**Value added exports by the three countries to the EU and to the six most important trade partners within the EU in 2014, in percent of the GDP**

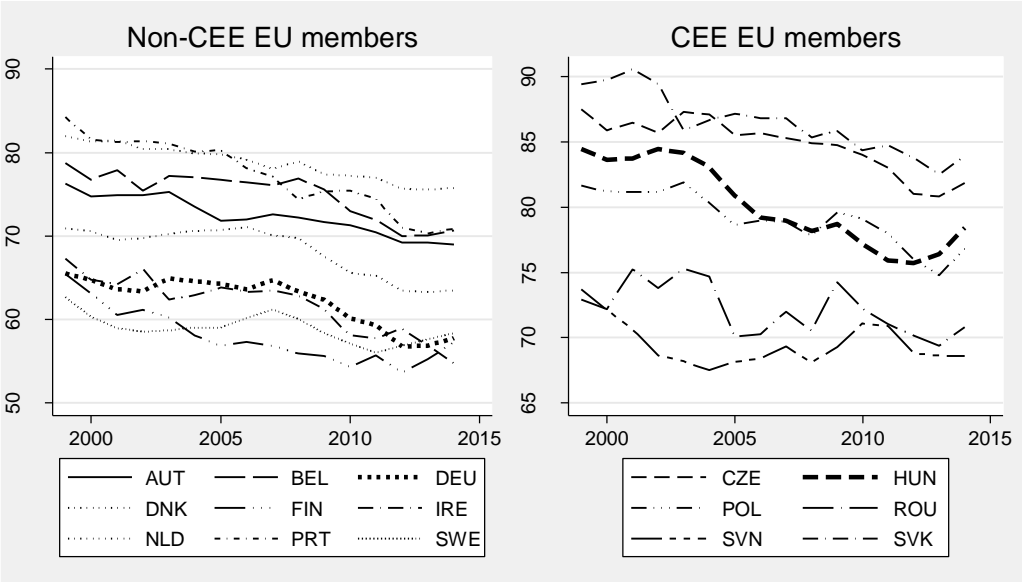
Country	EU27	DEU	FRA	GBR	ITA	AUT	POL	Six Σ
Czech Rep.	24.5	7.9	2.1	2.2	1.7	1.8	1.5	17.2
Hungary	22.8	6.2	2	1.9	2.1	1.7	1.1	15
Slovakia	22.6	5.4	2	1.7	2	1.6	1.4	14

Source: own calculation on the basis of WIOD.

Besides the level of exposure to EU partners’ demand for final use (in 2011), we are also interested in the trend followed by this level. However, without WIOTs we cannot calculate value added exports data for more recent years, and even usable service exports data are not available. Goods exports data (Graph 4) show diminishing trends of the intra-EU shares for our three countries. These trends are steeper than similar ones of the other three CEE EU member countries and no less steep than those of the selected nine non-CEE members. But an upturn can be observed at some countries – including Hungary – after 2010. (All the 27 member countries cannot be plotted in the Graph. Upturn – increasing share of intra-EU

exports – between 2010 and 2014 could be observed in Bulgaria, Estonia, Finland, Hungary, Latvia, Malta and Sweden; in the other 20, the diminution of the intra-EU share continued.)

**Graph 4**  
**Exports of goods and services to the EU**  
**in percent of total exports**



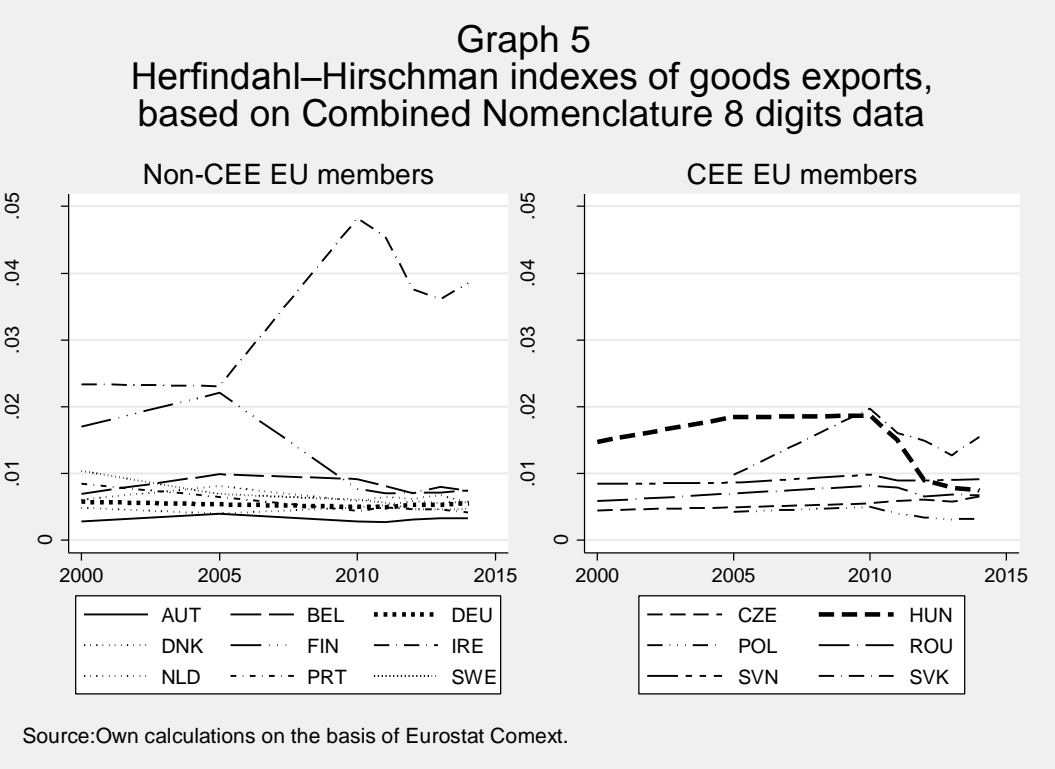
Source: own calculations on the basis of WIOD

The geographical distribution of value added exports may change differently from what happens with the exports of goods and services. E. g., between the averages of the ten years 2000 to 2009 and 2010-2011, the Czech intra- EU goods and services export share fell by 3.9 percentage points (from 76.7 to 72.8 percent) but the intra-EU share of value added exports fell by 6.0 percentage points (from 66.0 to 60.0), and a similar difference could be observed in Slovakia (the intra-EU share of goods and services exports dropped by 1.8 percentage points from 79.0 to 77.2 percent, while the intra-EU share of value added exports fell by 3.9 percentage points, from 66.1 to 62.2 percent). In Hungary, the difference between the two changes was negligible: the intra-EU share of goods and services exports dropped by 5.4 percentage points from 71.3 to 65.9 percent, while the intra-EU share of value added exports fell by 6.0 percentage points, from 56.7 to 50.7 percent.

**5.     SECTORIAL CONCENTRATION**

With respect to the sectorial distribution of exports, we examine concentration in the usual sense of this word. We had to choose the indicators that we use. Our choices were the share of the three largest industries and the Herfindahl–Hirschman index, i. e., the sum of the

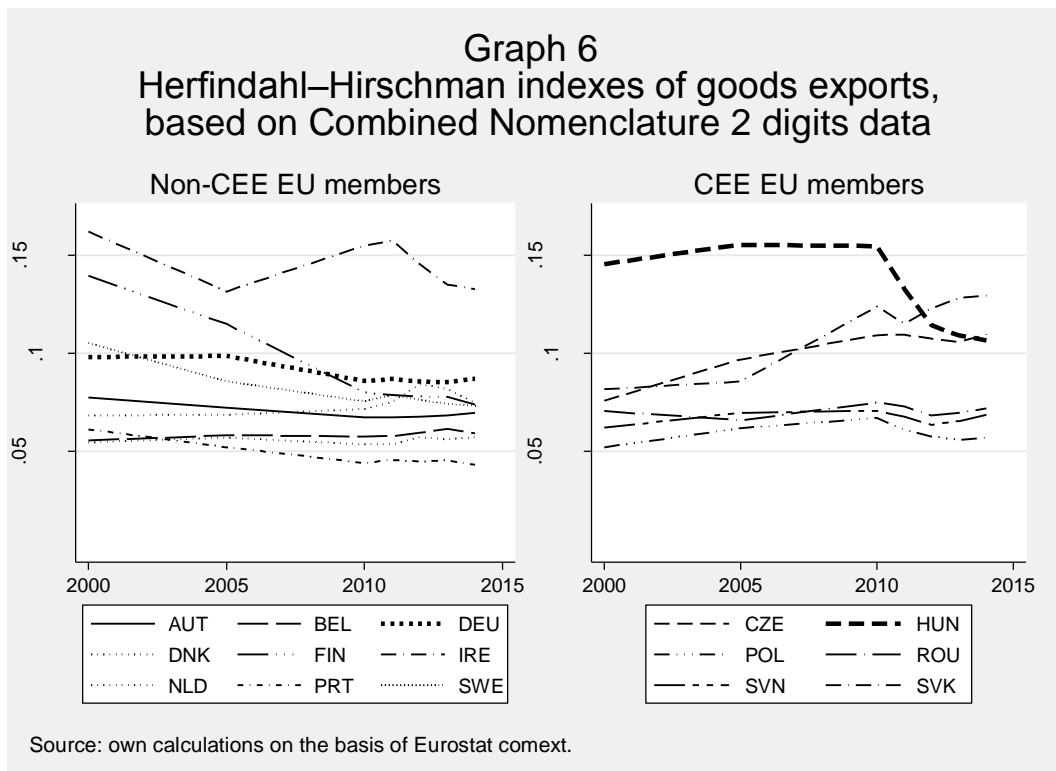
squares of the shares of the individual items expressed in fractions of the total. (The index's value is between 0 and 1; bigger value means higher concentration.) Most writings on concentration cited in this article use one of the two or both indicators.



We also had to choose the level of aggregation of the analysis. We opted for HS two digits chapters, for two reasons. First, as can be seen in Graph 5, in a significantly deeper (the European Union’s “Combined Nomenclature”, eight for all practical purposes, product-level) breakdown, differences among countries, particularly among CEE countries, almost disappear: in 2014, only Ireland and Slovakia differ really from the others. The other, more important reason why we avoid deeper disaggregation in this analysis is related to the actual root of our interest in exports concentration, namely, that a high level of export concentration may imply strong and dangerous exposure not only of exports but more importantly of the domestic economy to structural changes of demand. The basic reason behind this danger is the rigidity of production, marketing, etc., which can only slowly follow the changes of the structure of demand. Usually, this rigidity is stronger when adaptation to demand shifts between various industries, rather than within industries, is required. This means that concentration on the level of industries tends to be more dangerous than concentration on the product level.

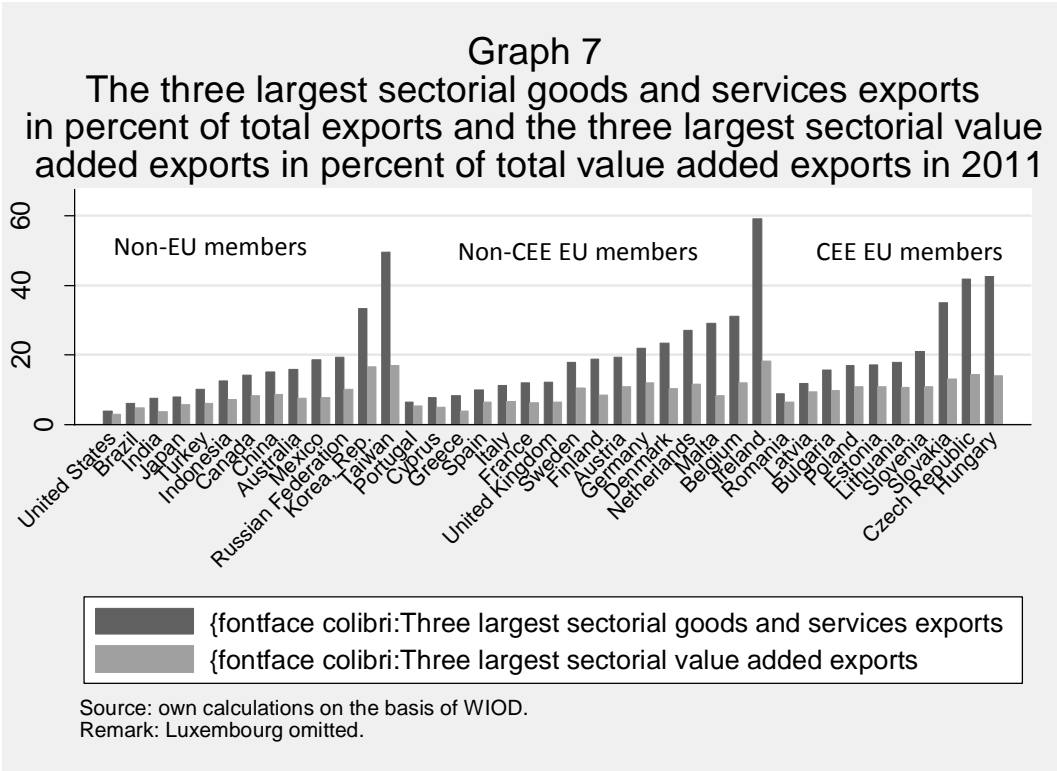
*Two examples having direct relevance for our article, on which we can demonstrate the relative ease of product-level structural adaptation to changes of demand, are the*

post-communist transformations of the Hungarian and Slovak automotive industry. In the 1970s, Hungary became a significant producer of various kinds of busses, exporting them en masse to the Soviet Union and other European communist countries. Various subassemblies to lorries and tractors were also produced in large quantities. At the same time, the Hungarian contribution to car production was limited to the output of some relatively simple component parts of Soviet Ladas. In the late 1980s, with the weakening of the Soviet and other traditional markets, bus production began to diminish. Until the mid-1990s, its more than 90 percent disappeared. But then already three previously important bus producing cities, Szentgotthárd, Győr and Székesfehérvár became significant sites of the passenger car industry. Of course, equipment used in those factories earlier in bus (and lorry or tractor subassembly) production became mostly useless, but the work force was largely employed (and some old buildings could also be used) in the reborn industry. On the development of the Hungarian automotive industry, see e. g. Havas (2000). The Slovak experience has been similar to the Hungarian one. An article of The Slovak Spectator quotes Vladimír Vaňo, head of CEE Research Competence Center of Sberbank Europe AG saying “(a)lthough Slovakia produced virtually no passenger cars twenty years ago, car manufacturers discovered that a labour force skilled in assembling military vehicles can be successfully used in the production of cars”, see Slovakia (2013).



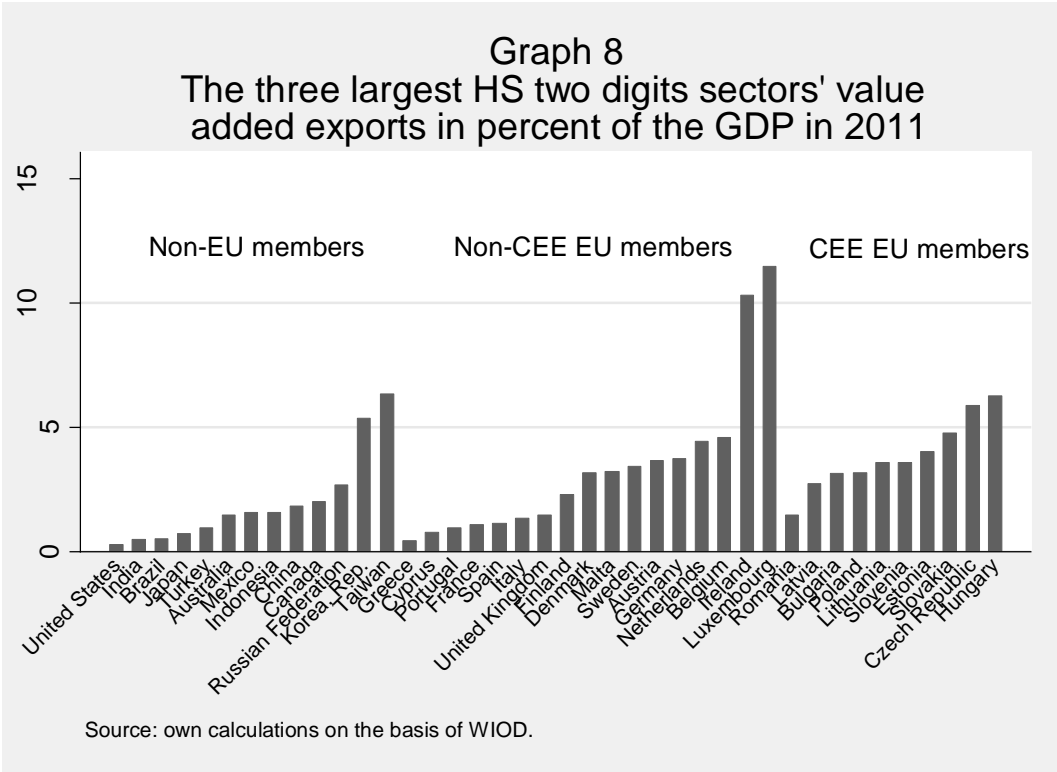
Graph 6 shows that the nine selected non-CEE EU member countries' level of concentration of goods exports, measured at the level of HS two digits aggregates, follows a (mostly slowly) diminishing trend. At the same time,CEE countries' export concentration level is upward trending; Hungary's downward jump from an excessively high level to a still very high one is an exception. Four countries have distinctly above average concentration level: Ireland, the Czech Republic, Hungary and Slovakia.

We can operate with industry-level concentration indicators in WIOD-based calculations, too. Of course, the difference in the number of industries – 97 in HS two digits and only 35 in WIOD – causes differences. However, it is favourable that two of the three dominant HS two digits export sectors of our countries, 84 and 85 (non-electric and electric machinery) also appear among the 35 WIOD industries, and the third one, chapter87, vehicles is only merged with other than road carriages (86, 88 and 89), chapters whose importance is relatively small in most European countries.



Graph 7 pictures exports concentration level of 2011 with the share of the three largest export sectors in total exports, both in exports of goods and services and in exports of value added. Not surprisingly, value added export shares are much lower than goods or services export shares – international value networks that entail exporting (and importing) the products of foreign factors of production in large amounts have the highest density in large

exporting sectors. And in terms of value added exports share of the three largest sectors, our three countries do not have outstanding positions. However, here again, like in the previous section analysing geographical export concentration, we have to recall that our basic question is the level of dependence of our countries' economy in general, i. e., of their GDP on their largest export industries, rather than the dependence of only their exports on the latter. Thus we have to combine their largest three export industries' (value added) shares in exports with their – rather high, see Graph 3 – shares of value added exports in GDP. The final outcome (Graph 8) shows (in international comparison) rather strong exposure of our countries to the international demand for the products of their most important export industries. In 2011, 5.9 percent of the Czech Republic's, 6.3 percent of Hungary's and 4.8 percent of Slovakia's GDP depended on the foreign demand for their three most important export industries' products.



**6. CONCLUSIONS**

**a. Research results**

We have examined the level of concentration of the exports of the Czech Republic, Hungary and Slovakia, and found that in international comparison it is rather high; this holds both for geographical and sectorial concentration. Sectorial concentration has both favourable and unfavourable consequences, albeit the favourable ones are largely related to clustering, which

is restricted by the typical ownership structure and specialisation and cooperation patterns prevailing in the relevant sectors (automotive, non-electrical and electrical engineering) of these countries. As for the geographical concentration of their exports, its potential advantage might be a dominant position in their main export market. However, the market, on which their exports are concentrated is the huge market of the European Union, thus they are far from being able to dominate it.

Starting from exports statistical data, we have stated that they show high sectorial concentration and high geographical concentration of the exports of our three countries. But this data is problematic. First, it has to be corrected, taking into consideration “mirror” import statistics of the partner countries and also national sources and uses tables (SUTs). Second, export data include re-exports of imported component parts, etc., imported and processed by domestic industries. I. e., export data includes value added by foreign factors of production, whereas we are more interested in the domestic value added content of exports.

With calculations based on the WIOD (World Input-Output) Database, we have estimated the domestic value added embedded in Czech, Hungarian and Slovak exports of products and services serving for final use (consumption or investment) in the EU and outside of the EU – in short, intra-EU and extra-EU value added exports. We have also estimated the distribution of the Czech, Hungarian and Slovak exported value added content of products and services of various industries, serving for final use anywhere in the world – in short, value added exports in various industries. On the basis of these results we could reconsider the level of geographical and sectorial concentration of exports of our three countries, and we have stated that the concentration in both respects remains high but it is not excessively high in international comparison. I. e., the dependence of the countries’ value added exports on intra-EU exports and on the value added exports embodied in products of mechanical engineering is not out-and-away strong.

However, the question in the centre of our interest is not really the dependence of only exports on the performance of the countries’ largest export industries or on their export performance with their most important trade partners. Our question really relates to the dependence of the countries’ GDP on the risks implied by the geographical and sectorial concentration of their exports. And this dependence is determined by the combination of the countries’ export concentration on the one hand and the share of their value added exports in their GDP – in other words, their economies’ openness measured in terms of trade of value added, on the export side. And the high level of openness of the Czech, Hungarian and Slovak economies entails that, in the final analysis, we have to state that, in international

comparison, the Czech Republic, Hungary and Slovakia are very strongly exposed of to the developments of international final (consumption and investment) demand for the products of their most important export industries, and to the developments of final demand in the EU. In order to avoid misunderstandings, we have to note that the level of concentration that we have observed is nevertheless far below the extreme values of some famous “monoculture” countries. E. g., Kuwait’s exports of mineral oils and oil products amounted to 94 percent of its total exports and 54 percent of its GDP in 2014<sup>7</sup>, obviously implying a much stronger exposure of its economy to its leading industry than the exposure of our three countries to their three leading industries. However, Russia, another country famously depending on the exports of some most important of its industries (again oil and oil products plus iron and steel, and aluminium) is, in terms of its GDP, less exposed to the possible instability of those exports than our three countries are exposed to their leading export sectors (see Graph 8) because Russia’s value added exports amount to a rather modest share of its GDP (see Graph 1).

#### **b. Conclusions for economic policies**

Our most important conclusion for economic policies is that before shaping the objectives, ways and means in the field of changing the geographical or sectorial composition of exports, authorities should thoroughly analyse the relevant facts and trends, including the geographical and sectorial distribution of value added exports.

In CEE countries, it has to be taken for self-evident and important that from value added exports a bigger share will be exported beyond the borders of the EU than from the exports of goods and services. Obviously, foreign investors (whose role is very important) mostly come from the EU, and they very often invest here into activities becoming parts of their international (basically European) value chains – mostly into the production of component parts or subassemblies to be further processed somewhere else in Europe but often serving for final use in other parts of the world.

The failure of the Hungarian government’s attempted “Opening to the East” after 2010 shows that changing the geographical distribution of a country’s exports is a rather difficult undertaking. It is far from obvious that government efforts aimed at such diversification alone can give significant success in sales on new export markets. The presence of other good conditions for economic growth can give the best chance for conquering new markets. Economic, education and research policies whose purpose is attracting investments in

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<sup>7</sup> The source of the data used in the calculation was <http://tradingeconomics.com>.



general and those into the most dynamic and innovative industries in particular may help exports to find rapidly growing markets.

Intervention in the sectorial distribution of exports might be easier but caution is warranted. As underlined above, strong industries of a country tend to attract further investments, including new investors into those sectors. Hindering such processes in any industry by any means would be rather problematic. With it, the exposure to the markets of that industry might be limited quantitatively but, at the same time, technological development and/or the adaptation to changes in demand may be thwarted, causing serious damages.

However, priorities in positive investment promotion policies might and should change in favour of non-overweight sectors. From the early 1990s on, our countries' governments have competed with other countries, rather successfully, for large automotive FDI projects with generous investment incentives and low taxes. On Slovakia's case see Pavlinek (2014). In Hungary, the prioritisation of investments into this sector continues even in our days, see e. g. a recent statement of the Minister of the Economy, Varga (2015a)<sup>8</sup>. Both governments might consider following the Czech Republic's example. In that country, because of fears from excessive economic dependence on manufacturing in general, and the automotive industry in particular, investment subsidies were restricted, already in 2009, on R&D and shared service centre operations, see Ernst & Young (2011). Research and innovation might be fomented in non-engineering high-tech industries (chemistry, pharmaceuticals, biotechnology etc.), and vocational training might also be strengthened in those fields.

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<sup>8</sup> However, in another speech the minister expressed his worries in relation with the high share of the vehicle industry in the Hungarian economy and with potential problems that a possible drop of the demand for cars might cause, underlining the need for the diversification of the economy's structure. See Varga (2015b).

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