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Bright Past, Shady Future? Past and Potential Future Export Performance of CEE Countries in a Comparative Perspective

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Abstract

In this paper we examine the reasons behind the remarkable export performance of transition economies in the last two decades. Following Redding and Venables (2004, 2004a) and Fugazza (2004), we decompose export performance into the gains due to the advantageous access to foreign markets and export gains on the side of the internal supply capacity. We find that size of the economy, inward FDI penetration, most notably in the manufacturing sector, export unit values, denoting the structural changes of CEECs' exports, and the quality of institutions and infrastructure had significant positive impact on exporting country's supply capacity, while productivity had a negative impact. The latter is mostly due to unfavorable trends in ULC since the accession. Unlike in EU-15 and BRIC countries, the internal supply capacity is becoming decreasingly important as base of CEECs export performance. At the same time, trends in cost competitiveness are worsening relative to competing countries, while benefits of EU accession have been mostly exploited. This may compromise the CEECs' future export growth.

Content

1. Introduction

Economic wise, success in export markets and changes in exports structure are in the focus of the cohesion process of Central and Eastern European countries (CEECs) being the new member states of the EU. The remarkable upgrading of export performance has been one of the most outstanding features of the transition and EU integration processes of CEECs. Since the beginning of the 1990s, these countries have recorded an extremely high growth of exports in absolute and in relative terms, which has been accompanied by increasing market shares abroad, by the dominance of the EU-15 as the main market, and by considerable changes in the structure of exports in favor of goods with higher value added.

The literature dealing with CEEC's increasing export performance ranges from gravity models, upgraded gravity models, distinguishing between market access and supply capacity factors, shift-share analysis, analysis of (export) competitiveness and more or less comprehensive descriptive analysis of factors behind the growing export performance. By far the most common approach to the analysis of CEECs' export performance is gravity models. Gravity models suggest that the lifting of central planning restrictions on foreign trade, the transition to market economies, and the independence of new countries have led to an increase in and geographical restructuring of foreign trade along the lines of gravity theory. This means that foreign trade intensity in the CEECs increased to a great extent and the EU-15, as a large, near, and highly developed market, assumed the role of the predominant trading partner. In short, CEECs have gradually approached the "normal" level of trade with developed countries, especially the EU, but considerable differences exist among individual countries.[1]

Upgraded gravity models distinguish between market access and supply capacity factors of CEECs export performance. They claim that market access has been more important than supply capacity for growing export performance of CEEC, but market access cannot explain inter country differences in export performance. These differences are explained by internal supply capacity factors of individual countries, where a stable institutional setup, structural reforms, and targeted FDI are in the forefront (Redding and Venables, 2004, 2004a; Fugazza, 2004; Damijan, Rojec and Ferjančič, 2011). The results of shift-share analysis method point in the same direction. The method, which decomposes the overall increase in exports into general demand component, structural effect component and competitiveness effect component, shows that CEECs improved their competitive position in EU-15 compared to non-EU competitors due to preferential trade arrangements, but even more due to improved supply capacity, i.e. by raising their competitiveness against the other non-member states exporters to the EU-15 (Havlik, Landesmann and Stehrer, 2001). Within this context low labour costs have been quite important, especially in the early stage of transition (Havlik, 2000). Kaminski, Wang and Winters (1996b) create a synthetic index of export performance in which they consider three broad sets of determinants, i.e. initial, pre-transition conditions, changes in access to Western markets, and finally, policy stances as reflected in the reform process. They consider the speed and scope of the reform process as being the main determinant of transition countries' export performance.

[1] See Collins and Rodrik, 1991; Havrylyshyn and Pritchett, 1991; Rosati, 1992; Hamilton and Winters, 1992; Baldwin, 1994; Kaminski, Wang and Winters, 1996a; Jakab, Kovacs and Oszlay, 2001; Havrylyshyn and Al-Atrash, 1998; Egger, 2003; Fidrmuc and Fidrmuc, 2003; Bussiere, Fidrmuc and Schnatz, 2005.

Another synthetic indicator of CEECs competitiveness has been developed by Zinnes, Eilat and Sachs (2001). It is composed of seven sub-indicators, the most important from the point of view of export performance being the one on openness. The indicator of openness puts supply capacity factors in the forefront as it 'seeks to capture the ease in which economic activity can take advantage of the foreign sector for markets, know-how, competition, financing, investment, sources of inputs, and other components linking its markets and firms to the global economy (Zinnes, Eliat and Sachs, 2001: 325). As expected, as far as synthetic indicator of competitiveness as well as the openness sub-indicator is concerned, the CEECs ranked one to eight among analyzed 25 transition countries.

The objective of this paper is to examine the determinants of the transition economies' export performance. The empirical approach is based on the spatial model of economic activity with CES demand structure (Fujita, Krugman, Venables, 1999), which was previously employed by Redding and Venables (2004, 2004a), Fugazza (2004), and Damijan, Rojec and Ferjančič (2011). This estimation strategy allows us to distinguish between what Redding and Venables (2003) term "market access" and "supply capacity" determinants of export performance. Our approach to identification follows in two steps: firstly, we assess the contribution of market access against that of supply capacity improvement of CEEC countries and compare it to other relevant country groups, and secondly, we assess the importance of individual factors determining capacity to supply exports. Following the gravity model estimation framework, we use a regression based decomposition method (Fields, 2004) to determine the relative shares of market access and supply capacity components to export performance. Factors determining the supply capacity are numerous, but so far their impact on CEECs' export performance has not been fully assessed in the literature. In analyzing the supply capacity factors, we broaden the concepts outlined by Redding and Venables (2004, 2004a) and Fugazza (2004) by including in the model the impact of broader set of supply capacity determinants, such as structural changes as proxied by unit values of exports and imports, productivity growth, measured by GDP per capita, price competitiveness, inward and outward foreign direct investment (FDI), infrastructure quality, institutional setting, impact of the global economic crisis.

There are several contributions of the paper. First, the model takes into account a broader set of explanatory variables of supply capacity than previous studies. Second, CEECs' export performance is put in comparative perspective with EU15, other transition countries and emerging economies. And third, this is the first paper on CEECs' export performance that spans beyond 2004, i.e. beyond the time of EU accession and also allowing a look into both the pre-crisis and crisis periods.

The paper is structured as follows. Section two examines the determinants of the transition economies' growing export performance as put forward by the literature. Section three presents data and descriptive statistics. In section four, the methodology is described, section five estimates the effect of supply capacity and foreign market access on export performance, while section six presents the results on the impact of individual explanatory variables on supply capacity and foreign market access. Section seven concludes.

2. Determinants of transition economies export performance

In examining the determinants of the impressive growth of CEECs' export performance, we follow the approaches of Redding and Venables (2004, 2004a) and Fugazza (2004). Redding and Venables and, on their work, Fugazza and Damijan, Rojec and Ferjančič (2011) developed a model of trade

that uses gravity techniques to estimate to what extent the export growth of a country is due to changed access to foreign markets and to what extent it is due to changes in the internal supply capacity of the exporting country. This is essentially a standard new trade theory model based on product differentiation derived from a constant elasticity of substitution demand structure. Market access segment, i.e. access to foreign markets is disaggregated to particular regional groupings. Countries at the center of (or at least near to) a fast growing region experience favorable foreign market access (Fugazza, 2004; Damijan, Rojec and Ferjančič, 2011). Particularly positive for foreign market access may be regional economic integration (Redding and Venables, 2004). The internal supply capacity is regressed on variables such as GDP, population, internal transport costs, and one or two institutional variables (real exchange rate fluctuations, risk of expropriation, labor-market characteristics, EBRD transition indices). The institutional variable may be of particular importance in the case of CEECs, which have gone through an overwhelming transformation process from socialist to a market economy, and may still have some implementation gap as far as institutional framework is concerned. The results of Redding and Venables (2003, 2004), and Fugazza (2004) suggest that market access has been more important than supply capacity for the increasing export performance of the CEECs. In Redding and Venables (2004), growth in foreign market access was a much more important source of export growth than supply capacity growth. The main component of foreign market access growth was Western Europe (i.e., the EU). Nevertheless, the actual level of trade of Eastern Europe is lower than one would expect given good market access and better-than-average internal geography and institutions. This level is due to CEECs that are faced with supply capacity constraints. The results of Fugazza (2004) are more ambiguous. In the first phase of transition (1988-95), foreign market access was much more important for the export growth of the CEEC than supply capacity growth, whereas the situation in 1992-99 was quite the opposite. Thus, the beginning of the transition was characterized by the opening of the markets in the EU and elsewhere, whereas the supply capacity was not able to exploit the new opportunities. In the case of Damijan, Rojec and Ferjančič (2011), EU market access has also been of great importance for export performance of CEECs but does not explain the differences between countries. These differences are explained by internal supply capacity factors, where a stable institutional setup, structural reforms, and targeted FDI are in the forefront.

Apart from the fundamentals of gravity theory, the literature puts forward six factors that deserve special attention when analyzing the CEEC's export performance, i.e. improved access of CEECs to EU markets, structural changes in CEECs' exports, increased levels of productivity in CEECs, imports, inward FDI, quality of infrastructure and institutional setting. Improved access of CEECs to EU markets

2.1. Improved access of CEECs to EU markets

Most of the increasing importance of the EU-15 as the main market for transition economies' exports is explained by gravity theory, that is, by the below-`normal' level of pre-transition trade with the EU-15. The size, proximity, and development level of the EU-15 represent an extremely strong gravity force for CEEC exports. In addition, the EU accession process has provided these countries with preferential access to EU-15 markets. How important has this institutional factor been? The literature suggests that preferential market access, especially the Europe Agreements, provides the transition economies with a competitive edge over suppliers from other countries and has clearly been important for increasing the volume of CEEC trade but has not been directly responsible for much of the growth of their exports (Kaminski, 1994; Kaminski, Wang, and Winters, 1996b; Crespo and Fontoura, 2007). Europe Agreements retained a number of restrictions (delays

in liberalizing imports of sensitive products, tight rules of origin, continuing threats of antidumping and the virtual exclusion of agriculture), which were removed only gradually in the process of EU accession. The actual accession of CEECs to the EU in 2004, however, has not brought about any further increases of CEECs' integration in the EU-15 markets. In fact, the share of EU-15 in total CEECs' exports has been decreasing since the beginning of the century (Table 1). It, thus, seems that market access effect of EU accession process has been exhausted much before actual accession. Still, Table 1 shows that EU-15 markets are much more important for CEECs than for EU-15 themselves. The importance of EU-15 markets is not decreasing only for CEECs but even faster for EU-15 reflecting faster growth of non-EU markets in the last decade or so.

Table 1. Share of EU-15 markets in total exports of CEECs and EU-15 in 2000-2011, in %

	CEECs*	EU-15*
2000	78,5	69,7
2001	78,2	69,6
2002	77,4	69,5
2003	77,1	69,9
2004	76,7	69,4
2005	75,1	68,6
2006	73,2	69,0
2007	74,0	68,5
2008	72,4	67,7
2009	73,9	66,7
2010	72,6	65,2
2011	72,0	63,6

Source: Eurostat,
http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tet00037

** Unweighted average.*

2.2. Structural changes in CEECs' exports.

Since the beginning of the transition process, the export structure of the CEECs' economies has undergone significant changes in terms of increasing shares of medium- and high-tech manufactures and the corresponding decreases in the shares of resource intensive, labour intensive and low-tech manufactures (see Table 2). The export structures of the CEECs show a tendency of gradual convergence with the export structures of the EU-15 both at inter and intra-sectoral (quality upgrading) levels (Crespo and Fontoura, 2007).

Of course, structural change in itself does not necessarily lead to increase of competitiveness, i.e. an increased share of high-technology products in exports is not per se an indicator of higher export competitiveness. What matters is the quality of properties of economic activity, i.e. the quality of structural changes in transition countries' exports (Szalavetz, 2005). Still, extensive literature on the structural changes in CEEC exports tends to claim that structural upgrading of exports positively contributed to their export performance. Firstly, export growth of CEEC has been based on products that were not exported in the pre-transition era and on 'traditional' export items that have been substantially upgraded or differentiated. Secondly, (export) restructuring has been characterized by positive specialization patterns between and within industries, and accompanied by quality upgrading as indicated by increased value added per employee, increased unit values and more engagement in medium and high quality segments of industries. Thirdly, the share of vertical and horizontal intra-industry trade with the EU has also increased (see Aturupane, Djankov and Hoekman, 1997; Hoekman and Djankov, 1996; Kaminski and Ng, 2001; Havlik, Landesman and

Stehrer, 2001; Soss, 2002; Dulleck, Foster, Stehrer and Woerz, 2004; Crespo and Fontoura, 2007; Havlik, Leitner and Stehrer, 2008).

Table 2. Structure of merchandise exports by factor intensity* of CEECs and EU-15 in 1995-2010, in %**

		1995***	2000	2005	2010
Resource intensive	EU-15	19,8	18.0	17.8	20.7
	CEECs	28,2	20.7	19.2	20.6
Labour intensive	EU-15	11,8	10.1	8.6	7.9
	CEECs	19,7	18.5	14.0	10.2
Low-tech	EU-15	7,9	6.6	6.6	6.7
	CEECs	14,1	10.5	10.6	9.0
Medium-tech	EU-15	30,1	29.8	29.8	28.0
	CEECs	21,4	30.1	33.3	33.4
High-tech	EU-15	24,5	29.4	28.5	27.7
	CEECs	14,6	18.1	18.2	23.3

Source: Handbook of Statistics 2007–2008 (United Nations), 2007; United Nations Commodity Trade Statistics Database, 2011; calculations by IMAD.

*Notes: * The classification of products into individual groups is based on the UN methodology (Trade and Development Report, 2002). The classification does not include all products and therefore the sum of the five product groups does not necessarily equal 100%; ** Including Cyprus and Malta; *** For 1995, CEECs do not include Bulgaria and Romania.*

Table 3. Structure of merchandise exports by factor intensity* of CEECs in 2010, in %

	Resource intensive	Labour intensive	Low-tech	Medium-tech	High-tech
Czech Republic	12,5	8,9	9,6	40,2	23,8
Estonia	37,9	10,9	9,4	20,1	14,8
Latvia	46,1	8,7	11,7	13,0	15,2
Lithuania	47,0	12,3	6,0	14,8	17,2
Hungary	13,8	5,1	4,2	33,5	37,2
Poland	23,7	12,4	10,4	32,6	19,3
Slovakia	14,8	8,7	12,2	37,6	25,0
Bulgaria	49,0	14,5	6,3	14,5	12,1
Romania	21,5	15,6	10,6	34,1	15,3
Slovenia	17,5	11,0	8,6	39,6	20,3

Source: Handbook of Statistics 2007–2008 (United Nations), 2007; United Nations Commodity Trade Statistics Database, 2011; own calculations.

*Note: * The classification of products into individual groups is based on the UN methodology (Trade and Development Report, 2002). The classification does not include all products and therefore the sum of the five product groups does not necessarily equal 100%.*

Within the remarkable structural changes of CEECs' export structure there are, however, big differences among individual CEECs, between the most developed (Czech Republic, Hungary, Poland, Slovakia, Slovenia) and other transition countries can be observed, the former having much higher shares of medium and high tech products (see Table 3). Dulleck, Foster, Stehrer and Woerz (2004) tackle the issue of export specialization and quality upgrading of CEECs by distinguishing among three dimensions of exports. The first dimension reefers to shifts in export structure from low to high technology industries, the second dimension identifies shifts inside industries from low to high quality segments, and the third dimension looks at quality improvements inside quality segments within industries. If countries specialize in low technology industries, or in low-quality segments within industries, or if they experience negative trends in unit values or unit value ratios they find themselves in a 'low-quality trap'. While five Central European countries Czech Republic,

Hungary, Poland, Slovakia, Slovenia) appear to have been successful in substantial quality upgrading of their export structure according to all three dimensions, some aspects of a 'low-quality trap' can be found for the Baltics, Bulgaria and Romania. Increased levels of productivity in CEECs

2.3. Increased levels of productivity in CEECs

According to Bernard and Jensen (1998), productivity (measured by value added per employee) growth is an important determinant of export growth; they claim that productivity gains from 1987-1992 accounted for about 10% of overall U.S. export growth in 1987-1994. There is no econometric analysis assessing the impact of productivity growth on CEEC's export performance but the fact is that productivity growth of CEEC has been remarkable since the beginning of transition and since 1995, has also been much faster than in the EU-15. Havlik (2005) and Parteka (2009) in fact report on a much faster productivity growth in CEECs as compared to EU-15 in the period from 1990 to 2005. Table 4 confirms a strong productivity catching-up process of CEECs with EU-15 countries also for the period after accession. Thus, CEECs' labour productivity per person employed increased from 46.4% of EU-27 level in 1995 to 57.6% in 2004 and 66.5% in 2011. The respective numbers for labour productivity per hour worked are 43.4%, 51.8% and 61.1%. There are considerable differences among individual CEECs but all of them show strong productivity catching-up process.

Table 4. Labor productivity per person employed and per hour worked in CEECs in 1995-2011, Index EU27=100

	Per person employed[1]			Per hour worked[2]		
	1995	2004	2011	1995	2004	2011
Bulgaria	31,5	34,8	43,5	32	35,1	43,5
Czech Republic	64,4	73,1	73,5	59,9	67,2	68,4
Estonia	34,1	57,7	67,6	:	48,6	58,1
Latvia	33,3	45,9	62,2	:	36,6	52,6
Lithuania	36,2	53,9	64,6	36,2	50	57,4
Hungary	55	67,1	72	47,5	56,6	60,1
Poland	46	61,9	68,9	38,3	49,9	55,7
Romania	:	34,6	51,1	:	31,5	:
Slovenia	66,7	81,6	80,9	:	78,9	80,4
Slovakia	50,2	65,8	80,2	46,4	63,5	73,9
CEECs-10, unweighted average	46,4	57,6	66,5	43,4	51,8	61,1

Source: Eurostat,
http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tec00116;
http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tec00117

1/ GDP in purchasing power standards and the number of persons employed

2/ GDP in purchasing power standards and the hours actually worked in the economy

The impact of productivity on export performance is more often measured by wage or cost competitiveness expressed by unit labour costs (ULC), i.e. the ratio of the labour costs to the labour productivity. Thus Carlin, Glyn and Van Reenen (2001) study the relationship between export market shares and relative ULC in OECD countries. They claim that relative ULC (calculated from exchange rate, wages and labour productivity) have important effects on export market shares, that sensitivity to labour costs is lower in high tech industries and higher in industries that are subject to increasing product market competition. In their analysis of the determinants of CEECs' export performance, Damijan, Rojec and Ferjančič (2011) also find that decreasing unit labour costs

(ULC) significantly contributed to increased export performance of CEECs in 1994-2004. In this context it is important to note that trends in real ULC of CEECs since their accession to the EU have not been really favourable, i.e. they have not improved their wage competitiveness vis-a-vis the EU-15 countries (see Table 5).

Table 5. Trends in real unit labor costs of CEECs in 1009-2011, Index, 2005 =100

	1995	2000	2004	2005	2006	2007	2008	2009	2010	2011
Bulgaria	113,5	105,9	101,7	100	96,5	96,6	100,1	108,2	111,2	107,1
Czech Republic	92,5	95,8	100,4	100	99,9	99,2	100,6	101,1	102,1	103,1
Estonia	116,7	103,4	102,1	100	100,3	105,4	114,1	116,9	109,2	106,1
Latvia	107,9	102,5	95,5	100	104,6	110,7	118,3	110,3	101,8	98,6
Lithuania	93,5	99,6	100,6	100	103,3	101,4	102	104,4	94,9	89,9
Hungary	104,7	100,5	99,8	100	98,6	99,4	98,5	97,9	91,9	92,3
Poland	117,5	114,9	102,4	100	97,5	96,3	100,4	99	98,8	97,5
Romania	:	122,6	91,9	100	94,9	96,3	102,7	101,4	103,2	97,1
Slovenia	111,6	102,2	100,2	100	99	97,5	99,4	105	106,4	106
Slovakia	99,1	104,9	98,5	100	98,8	98,1	99,7	107,8	105,9	103,5
CEECs-10, unweighted average	106,3	105,2	99,3	100,0	99,3	100,1	103,6	105,2	102,5	100,1
EU-15, unweighted average	104,1	101,1	100,2	100,0	98,7	98,5	100,7	104,5	101,9	100,3

Source: Eurostat,
http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsieb070

1/ Real unit labour costs compares remuneration (compensation per employee in current prices) and productivity (gross domestic product (GDP) in current prices per employment)

The fact that in the whole period of 1995-2011, and especially since the accession, CEECs exhibit much better trends in terms of productivity catching-up than in terms of real ULC is a mirror picture of their restructuring towards higher value added products. From the point of view of their export performance this means the stagnation of wage (cost) competitiveness may be accompanied by advances in their export unit values. In fact Benkovskis and Wörz (2012), analyzing export competitiveness of CEECs in 2004-2007, claim that CEECs in fact experienced a loss in price competitiveness and increase of unit values of their exports for more than in their competitors. Benkovskis and Wörz (2012) further claim that average quality of their goods increased for more than their export prices, indicating improvements in non-price competitiveness. Due to issues with data coverage, we resort to using gross domestic product per capita as a measure of productivity.

Imports have become an increasingly important determinant of export performance. Beltramello, De Backer and Moussiegt (2012) show that due to growing production fragmentation within global value chains, imports of intermediate goods represent a (large) part of country's exports. In this way imports of intermediates increasingly determine the export competitiveness of countries in final products and simply looking at the evolution of exports may misrepresent the international competitive position of a country.

2.4. The role of FDI in the growing export performance of CEECs

The importance of FDI for the transition economies' exports is very high and increasing. Foreign subsidiaries are responsible for the majority of exports in most of the transition economies, especially for exports in high- and medium-high-tech industries. This is to a major degree related to the participation of foreign subsidiaries in global supply chains, the latter being responsible for an

increasing part of global trade (see Baldwin, 2012, Rahman and Zhao, 2013). Foreign subsidiaries also show much faster restructuring towards high- and medium-high-tech exports and much higher export propensity than domestic enterprises (Damijan and Rojec, 2007). The analyses claiming positive impact of inward FDI on transition countries' export performance are numerous. In their analysis of the determinants of CEECs' export performance, Damijan, Rojec and Ferjančič (2011) find that CEECs with higher levels of accumulated FDI do exhibit a much larger growth of exports what points towards the dynamic aspect of FDI, that is, that FDI does foster manufacturing restructuring and create the economic potential for future export growth, directly, via superior export performance of foreign subsidiaries and, indirectly, via knowledge spillovers from foreign subsidiaries to indigenous firms, especially via backward linkages with local suppliers, making them more competitive (see, for instance, Görg and Greenaway, 2004). For Filatotchev, Stephan and Jindra (2008) foreign investors' ownership and control over strategic decisions in foreign subsidiaries are positively associated with exporting, while Caetano and Galego (2007) find significant relationship between FDI and transition countries' intra industry trade. Christodoulakis and Sarantides (2011) argue that size and composition of FDI is the crucial factor in shaping productivity and, thus, affecting competitiveness and external position of an economy. They claim that in this regard northern EU countries are much better off than southern EU countries. Gu, Awokuse and Yuan (2008) say that FDI flows into China have statistically significant and positive effects on its exports. In its analysis of developing countries' trade, UNCTAD (2005: 61) finds that FDI is likely to affect export performance positively, as positive and significant relationship between export performance and FDI contribution to capital formation is found at all levels of export performance. However, there appears to be a U-shaped relationship between export performance and FDI; they relate closely at early stages of export development, but the relationship becomes weaker as export development advances, only to become stronger again at later stages of export development.

In spite of the remarkable contribution of FDI to the export performance of the CEECs, the causal relationship between export propensity and strategic foreign ownership remains ambiguous. It seems that most of the superior export propensity of foreign subsidiaries is explained by factors other than the nationality of ownership, with multinationality[2] of the firm being a very important one (Pfaffermayr and Bellak, 2000; Rojec, Damijan and Majcen, 2004). In estimating the effects of FDI in CEECs exports, Kutan and Vukšić (2007) separate the effects of FDI into supply capacity-increasing effects, when FDI inflows increase the host country's production capacity and consequently export supply potential, and FDI-specific effects arising from MNEs' knowledge and technology, better information about export markets, or better contact to the supply chain of the parent firm than do local firms. Their results indicate that, for all countries in their sample, FDI has increased domestic supply-capacity and hence exports, while FDI-specific effects on exports are observed only in the new member states of the European Union.

Quality of infrastructure is another variable regularly used in gravity models to explain export performance. As the quality and price of transportation services is of crucial importance for exporters, positive impact of the access to and quality of domestic transport (physical as well as information and communication) infrastructure on country's export performance is self evident and

2 The fact that a firm operates within a multinational firm network be it as a foreign subsidiary or a parent company gives it some advantage over domestic firms not part of a multinational network.

generally recognized by the authors dealing with the subject (see, for instance, Bougheas, Demetriades and Morgenroth, 1999; Limao and Venables, 2001; Francois and Manchin, 2006; UNCTAD, 2005). According to Portugal-Perez and Wilson (2010), marginal effect of infrastructure improvement on exports decreases with per capita income while that of information and communication technology increases.

For the quality of infrastructure we use World Development Indicators database as proposed by Francois and Manchin (2006).[3] A full description of the infrastructure indicators used in our model is provided in the Appendix.

2.5. Institutional setting

In their seminal work on the role of institutions in economic development, Rodrik, Subramanian, and Trebbi (2004) find that institutional quality has a positive and significant effect on (trade) integration. Adequacy and quality of institutional setting is one of the most frequently analyzed issues related to export performance. The uncontested conclusion is that institutions matter for trade, i.e. have positive impact on country's export. Within gravity models, a great variety of institutional aspects have been tested, depending on a particular objective, from complex indicators of institutional setting such as World Bank Governance Index (Meon and Sekkat, 2006; Kaufmann, Kraay and Mastruzzi, 2009) or Economic Freedom of the World Index (Francois and Manchin, 2006; Depken and Sonora, 2005), to (a combination of) various aspects of business environment and labor market regulations (Fugazza 2004; Iwanow, 2008, Freund and Bolaky, 2004; Portugal-Perez and Wilson, 2010; LiPuma, Newbert and Doh, 2011; UNCTAD, 2005), protection of property rights, risk of expropriation or contract enforcement (Redding and Venables 2004, Fugazza 2004; Araujo, Mion and Ornelas, 2009; Iwanow, 2008; Ranjay and Lee, 2003; UNCTAD, 2005) and real exchange rate as a measure of macroeconomic environment (Fugazza 2004). Institutional quality does not seem to have the same importance for all exporters and exports' segments. Thus, according to UNCTAD (2005) institutions matter more at a higher level of export performance as production becomes more and more capital intensive making better protection of property rights essential, according to Anderson and Marcoullier (2002) the impact of institutions is larger in the case of differentiated goods' exports, LiPuma, Newbert and Doh (2001) claim that institutional quality is more important to increasing export performance of new and small firms compared with large and established firms, and Iwanow (2008) says that importance of institutions for export performance raises with complexity of the industry. Levchenko (2004) goes even a step further by suggesting that differences in institutional quality themselves can be a source of comparative advantage.

In the case of transition countries, which have gone through an overwhelming change in the entire socioeconomic system and the building of institutions, one would ideally use a complex measure of the reform process as an indicator of the development of the institutional setting. The most commonly used indicator of reform progress is the European Bank for Reconstruction and Development (EBRD) transition index. In 1990-2010, CEECs increased their overall EBRD transition index from only 1.36 (the minimum being 1) to 3.69 (calculated from EBRD Transition Indicators by

[3] They include the following data the percentage of paved roads out of total roads, the number of fixed and mobile telephone subscribers (per 1000 people), the number of telephone mainlines (per 1,000 people), on telephone mainlines in largest city (per 1,000 people), telephone mainlines per employee, mobile phones (per 1,000 people), and freight of air transport (million tons per km).

Country), which is near to the level of an 'ideal' advanced market economy, 4.3. The existing literature on the subject (Havrylyshyn and Al-Atrash, 1998; Kaminski, 1993; Kaminski, Wang, and Winters, 1996b; Damijan et al, 2011) is pretty straightforward, stating that the speed and scope of transition reforms have been crucial to the growth of export performance. This means that the more ambitious CEEC in terms of ongoing structural reforms and the building of a stable institutional setup are more successful in fostering export growth. Since EBRD Transition Indices are available only for transition countries, while we also have other countries in our analysis, they cannot be used in this exercise. Instead we use the Institutional quality database (Kunčič, 2012) as it incorporates the widest array of indicators of institutional quality, separately for legal, political and economic institutions, the three being of crucial importance for CEECs. A more detailed description of the institutional indicators used in our model is provided in the Appendix.

Real exchange rate, which reflects the underlying relative movement of prices at home and abroad, is another institutions related variable measuring the macroeconomic environment in the country, which is regularly used in gravity models. No doubt, real exchange rate fluctuations, which indicate export price competitiveness, is an important determinant of export performance (see, for instance, Fugazza, 2004; Havlik, 2000; Damijan, Rojec and Ferjančič, 2011; Bernard and Jensen, 1998; Fischer, 2007; Bayoumi, Harmsen and Turunen, 2011), especially so for commodities and manufactured products that are labor intensive (typically weak export performers), while less so for capital intensive and differentiated products (typically good export performers) (UNCTAD, 2005; Fugazza, 2004). In the latter case non-price competitiveness is more important. Data and descriptive statistics

3. Data and descriptive statistics

The primary source of data used in this paper is the UNCTAD trade database. We use information on the complete matrix of aggregate bilateral trade flows (imports and export in current US dollars) for 62 countries in the period between 1995 and 2011. The included countries can be grouped into the following: EU countries[4] , CEEC, CIS countries[5] , South-Eastern Europe[6] , Asia[7] , NAFTA [8] , BRIC[9] , Latin countries[10] , Australia and New Zealand and South Africa. Additionally, we also take advantage of information on trade disaggregated at the product-group level according to degree of manufacturing into: (i) labor-intensive and resource-based manufactures, (ii) manufactures with low skill and technology intensity, (iii) manufactures with medium skill and technology intensity, and (iv) manufactures with high skill and technology intensity[11] . Finally, we also use information on

4 Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, France, Finland, Germany, Greece, Great Britain, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Luxemburg, Portugal, Poland, Spain, Sweden, Slovenia, Slovakia, and Romania.

5 Belorussia, Ukraine, and Kazakhstan.

6 Albania, Bosnia and Herzegovina, Serbia, Montenegro, Croatia, Macedonia.

7 Thailand, Hong Kong, Macao, Singapore, Malaysia, Indonesia, Philippines, Taiwan and South Korea.

8 United States, Canada and Mexico.

9 Brazil, Russia, India, and China

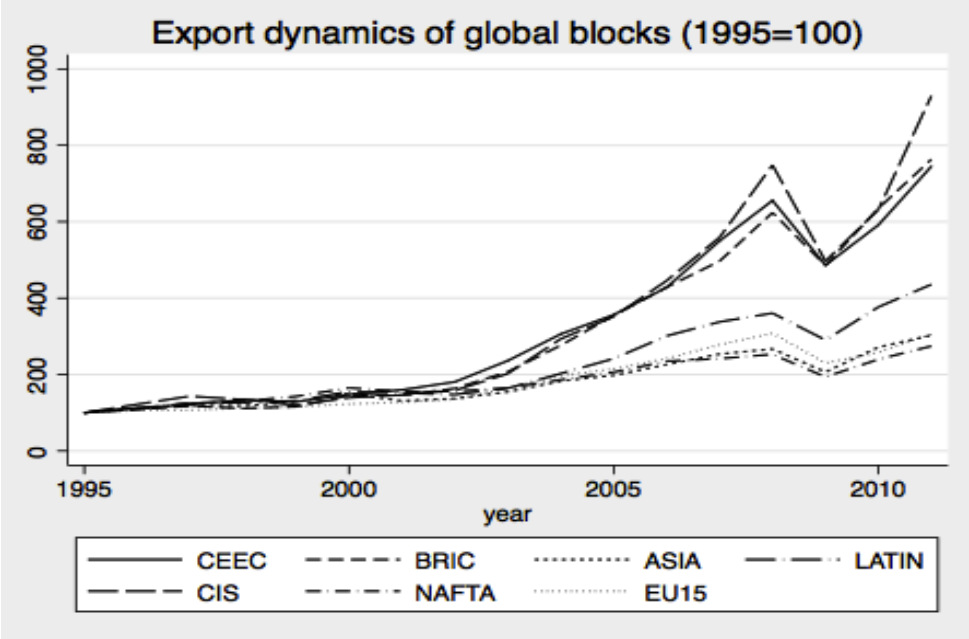
10 Argentina and Chile.

11 Details on the classification of products into product groups are available in Appendix 1 to Chapter 3 of UNCTAD's Trade and Development Report 2002.

unit value (import and export) and terms of trade indices available for the countries of interest. It is worth noting that there are no instances of missing trade between in the period of observations between the 62 countries of interest. UNCTAD is also the source for information on inward and outward FDI shares in gross domestic products.

Trade data has been supplemented using information on geographical factors from CEPII's Geodist database (Mayer and Zignano, 2011), which first and foremost provides information on geographical distance between countries (unweighted or weighted with city-level information to account for population density), their contiguity, whether they share a common language (official language or whether at least 9 percent of the population in both countries speaks a common language), whether they share a common colonial past or are currently in a colonial relationship or where formerly one country. Lastly, we employ information on economic activity (GDP, price indices), population size and development indicators (infrastructure) from the World Bank's World Development Indicators database. A full description of the development indicators used is provided in the Appendix. Trade values and GDP are deflated using US GDP deflator, with year 2000 serving as a base year. Finally, we use information on the quality of institutions from the Institutional quality database (Kunčič, 2012). Some basic characteristics of the dataset are presented in Figures 1, 2, and Table 1.

Figure 1. Export growth index (1995=100) for global trading blocks between 1995 and 2011



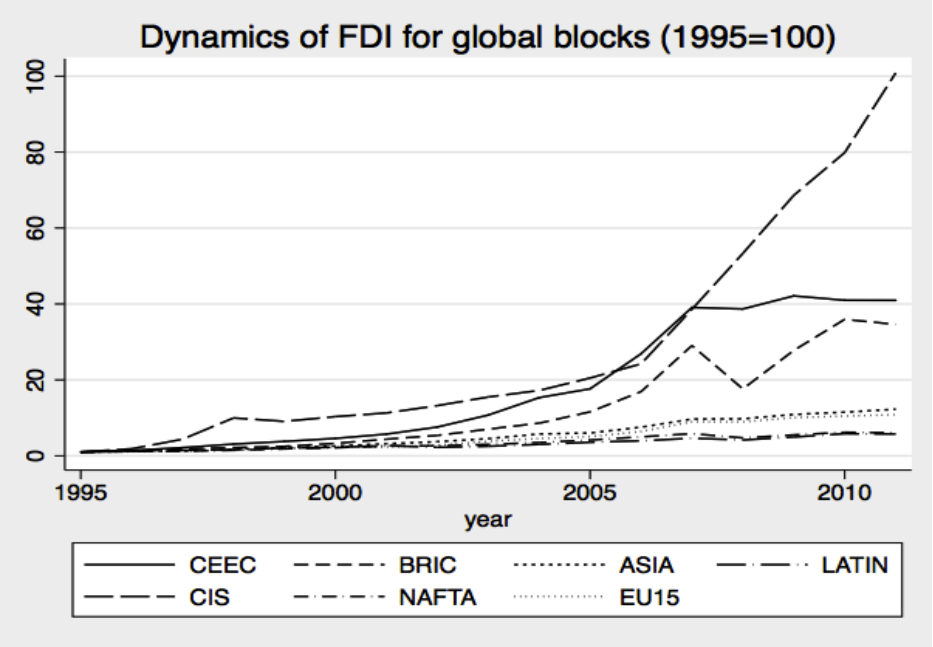
Source: UNCTAD

The two most pronounced features of Figure 1 are, firstly, the clearly observable effect of the 2008-2009 financial and economic crisis on world trade flows and, secondly, the markable differences between faster growing economies of BRIC, CIS and CEEC compared with the slower progress countries of EU15, NAFTA, Latin America and other Asian countries. A look at the evolution of foreign direct investment (FDI) inflows into the main trading blocks is presented in Figure 2. Similarly as with trade data, it is revealed that the fastest growth in FDI was achieved by countries of the former Soviet Union[12] (CIS), CEECs and the four members of BRIC. Given the observed

[12] CIS does not include Russia, which appears as a member of BRIC.

advantages of emerging economies in terms of both their exporting performance and their success in attracting FDI, it is likely that these two features are related.

Figure 2. FDI stock index global comparison of trading blocks between 1995 and 2011



Source: UNCTAD

Table 6. Descriptive statistics infrastructural endowment in 2007 (median values)

region	Internet subscribers (%)	share of mobile phone users (%)	share of ICT exports (%)	Motor vehicles per 100 people	road density
Asia	4.9	87.6	33.7	136	103
BRIC	3.7	52.6	1.4	197	37
CEECs	13.9	110.8	4.8	452	125.5
CIS	1.7	79.6	0.4	170	24
EU15	18.7	115.6	4.7	544	137
Latin	6.6	83.9	0.3	246	14.5
NAFTA	26.6	91.4	5.1	562	93
SEE6	3.3	107.4	1.1	226	51

Source: World development indicators.

Road density is measured by kms of road per 100 sq. km of land area

Finally, Table 6 presents some of the more revealing features of the World Development Indicators. In our analysis we will confront data on export performance with origin and destination country characteristics. An important determinant of the overall capacity to export is also the state of the country's infrastructure a snapshot of which is presented in Table 6.

A comparison of median values of some of the infrastructural indicators reveals that the EU 15, NAFTA and CEECs enjoy a substantial advantage in terms of both the ICT infrastructure as well as transport infrastructure. Only in terms of the actual share of ICT products in the export value are the Asian countries in the forefront with a striking advantage.

4. Methodology

The goal of this section is to shed light on the causes of the observed divergent export performances of the world's key trading regions with the special focus on the role played by external and internal geography. The estimation framework employed in this paper is based on the identification strategy proposed by Redding and Venables (2004), where, based on a model of world trade with CES demand, multiple production locations and iceberg transport costs, trade is decomposed into export-country characteristics, import-country characteristics and the between-country information (i.e. geographical distance). Redding and Venables use a very general specification of the gravity equation by using only source- and destination-country indicator variables instead of the information on the respective income and other country characteristics. This enables the importing-country dummy to also capture other features of the market capacity such as the manufacturing price index and control for what Anderson and van Wincoop (2003) term "multilateral resistance".

4.1. Estimating Export Performance

Total export growth can be decomposed into supply capacity and foreign market access growth. Following the approach of Redding and Venables (2004, 2004a) and Fugazza (2004), we estimate a gravity model equation where the dependent variable is total manufacturing exports (logarithmic) from country *i* to country *j* and the dependent variables are bilateral distance (logarithmic), an indicator of the existence of a common border, exporter-country dummies, and importer-partner dummies:

$$\ln X_{ij} = a + b_j Partner_j + g_i Country_i + d_1 Dist_{ij} + d_2 Bord_{ij} + u_{ij} \quad (1)$$

Bilateral distance $Dist_{ij}$ and the border dummy $Bord_{ij}$ are assumed to capture geographical bilateral trade costs. Exporters' and importers' fixed effects, $Country_i$ and $Partner_j$, respectively, are introduced in order to control for supplier capacity and market capacity. These terms can also serve as a control for institutions and policy-related bilateral trade costs.

The model is estimated for 63 countries (described above) at the level of the aggregate trade flows of these countries with their most important trading partners from all over the world. The data set spans the period 1995-2011, which creates a balanced panel for 16 years.

4.2. Accounting for Supply Capacity and Foreign Market Access

Calculation of a country's own supply capacity and its foreign market access follows directly from the gravity model (1). Here, an exporter's country dummy indicates the country's own scope of supply capacity, while the scope of foreign market access is determined by the partner country's effect weighted by the distance and by the border. Therefore, following Redding and Venables (2004), in the second step, the estimates obtained in the first stage of the analysis (estimates of model (1)) are used to construct supply capacity and foreign market access series. The supply capacity estimate for country *i* (SC_i) is given by the exponential of the exporter country dummy times its coefficient:

(2) $$SC_i = \exp(\hat{g}_i Country_i)$$

while the estimate of foreign market access (FMA_i) is given by

(3) $$FMA_i = \sum_{i \neq j} \exp\left(\hat{b}_j Partner_j\right) * Dist_{ij}^{\hat{d}_1} * \exp\left(\hat{d}_2 Bord_{ij}\right)$$

The estimates of supply capacity (2) and foreign market access (3) allow us to decompose the sources of export growth over the last decade and help us to analyze over time the contribution of both the supply capacity and the foreign market access to the export performance of each individual CEEC.

4.3. Decomposition of the dependent variable into contributions made by the explanatory variables

Fields (2003) suggests a regression-based procedure of assigning weights to various independent variables in explaining a dependent variable. This procedure constitutes a "decomposition" in the sense that the variance is broken down into a number of components such that the whole is equal to the sum of its parts.

Following (Fields, 2004), a standard regression equation is considered:

(4) $$Y_i = \hat{b}_0 - \sum_{k=1}^{K} \hat{b}_k X_{ik} + \hat{e}_i, \qquad i = 1, \ldots, n$$

where $\hat{b}_k$ are the coefficient estimates, K is the number of independent variables, ε_i is the estimated error term.

Decomposition analysis assigns explanatory power to the several independent variables so that a) holds other things equal, b) decomposes so that the contribution of several independent variables sum to the contribution of the overall model. Given the regression equation (4), let $s(X_k)$ denote the share of the variance of Y that is attributable to the k'th explanatory factor and let R^2 be the fraction of the variance that is explained by all of the X's taken together. Then, it can be shown that the variance of Y can be decomposed as (Fields, 2004)

(5) $$\mathrm{var}(Y) = \sum_{k=1}^{K} \mathrm{cov}(\hat{b}_k X_k, Y) + \mathrm{cov}(\hat{e}, Y)$$

dividing by $var(Y)$ gives

(6) $$100\% = \sum_{k=1}^{K} s(X_k) + s(\hat{e})$$

where each "s-weight" $s(X_k)$ is given by

(7) $$s(X_k) = \frac{\mathrm{cov}(\hat{b}_k X_k, Y)}{\mathrm{var}(Y)}$$

and the weight associated with the residual is given by

(8) $$s(\hat{e}) = \frac{\text{cov}(\hat{e}, Y)}{\text{var}(Y)}$$

If the error term is ignored, the remaining s-weights sum to R^2

(9) $$\sum_{k=1}^{K} s(X_k) = \frac{\sum_{k=1}^{K} \text{cov}(\hat{b}_k X_k, Y)}{\text{var}(Y)} = R^2$$

Finally, expressing the $s(X_k)$'s in terms of their percentage contribution to R^2, we obtain the "p-weights"

(10) $$p(X_k) \circ \frac{s(X_k)}{R^2}$$

such that the p(X_{k})'s sum to 100%. The weights just derived take the variance as the measure of dispersion of Y, but other measures such as coefficient of variation, Gini coefficient, Theil index, and Atkinson index could be employed.

4.4. Factor analysis of the regressors

We use a wide variety of variables describing different aspects of countries' infrastructure (ICT, transport), institutional and technological development and given that they often describe different aspects of the same country feature including all of them as regressors would not be sensible. In addition to the impact on the precision of the estimation due to the larger number of regressors, some of the variables may also display high rates of colinearity.

It is for those reasons that we choose to employ factor analysis, which reveals the underlying patterns of relationships within groups of variables. Factors enable us to employ condensed information in our regression of interest. In factor analysis, the factors are formed to maximize their explanation of the variable set (Hair et al. 1995). As our variables of interest are highly correlated within each of the groups of related variables (ICT infrastructure, road and rail infrastructure, other transport infrastructure, institutions), this makes them particularly good candidates for factor analysis. For the purpose of analyzing the determinants of export supply capacity and market access, we condense world development indicators and information on institutional quality into four factors:

- ICT infrastructure (Share of internet users, Share of ICT products in exports, Share of ICT products in imports, Share of mobile phones, number of public internet servers, number of telephone lines);
- Road and rail infrastructure (Railroad lines, Quantity of goods transported by rail, Number of passengers transported by rail, Road density, Road network, Quantity of goods transported by road, Number of cars per kilometer);
- Other transport infrastructure (Quantity of goods transported by air, Container port traffic, Port quality, Liner shipping connectivity);
- Quality of institutions (Quality of legal institutions, Quality of political institutions, Quality of economic institutions)

All factors are obtained separately for country of origin and destination country.

Table 7. Bilateral trade equation estimaton 1995-2011 individual years

VARIABLES	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
distance	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	0.000)	0.000)	(0.000)	(0.000)	(0.000)	(0.000)
contiguity	2.110***	2.092***	2.041***	1.977***	1.982***	1.983***	1.952***	1.919***	1.882***	1.858***	1.837***	1.835***	1.809***	1.826***	1.839***	1.827***	1.847***
	(0.160)	(0.151)	(0.148)	(0.143)	(0.145)	(0.141)	(0.141)	(0.137)	(0.135)	(0.135)	(0.134)	(0.139)	0.142)	(0.140)	(0.142)	(0.138)	(0.141)
cis	2.381***	2.297***	2.185***	2.205***	2.089***	2.124***	2.371***	2.151***	2.109***	1.891***	1.700***	1.941***	1.110***	1.044***	1.863***	1.744***	1.613***
	(0.546)	(0.443)	(0.443)	(0.415)	(0.414)	(0.389)	(0.378)	(0.372)	(0.409)	(0.416)	(0.382)	(0.410)	0.423)	(0.390)	(0.352)	(0.359)	(0.407)
asia	-0.671***	-0.757***	-0.691***	-0.499**	-0.471***	-0.484***	-0.594***	-0.623***	-0.308*	-0.198	-0.309*	-0.332*	-0.473**	0.281*	0.264	0.341*	0.256
	(0.207)	(0.217)	(0.190)	(0.207)	(0.178)	(0.187)	(0.194)	(0.222)	(0.177)	(0.156)	(0.177)	(0.176)	0.218)	(0.168)	(0.193)	(0.190)	(0.186)
latin	-0.432	-0.628	-0.588	-0.627	-0.489	-0.341	-0.384	-0.308	-0.227	-0.229	-0.470	-0.343	-0.310	-0.457	-0.401	-0.417	-0.637
	(0.469)	(0.414)	(0.423)	(0.391)	(0.389)	(0.372)	(0.367)	(0.358)	(0.357)	(0.414)	(0.381)	(0.408)	0.413)	(0.391)	0.396)	0.404)	0.402)
ceec	1.270***	1.167***	1.194***	1.196***	1.347***	1.322***	1.118***	1.115***	1.148***	1.163***	1.103***	1.052***	1.086***	1.073***	1.125***	1.101***	1.001***
	(0.182)	(0.175)	(0.172)	(0.167)	(0.162)	(0.160)	(0.155)	(0.155)	(0.146)	(0.143)	(0.142)	(0.143)	(0.138)	(0.136)	(0.131)	(0.131)	(0.133)
see6	1.809**	1.779**	1.756**	1.780**	1.656**	1.853***	2.201***	2.197***	2.427***	2.731***	1.950***	2.128***	2.244***	2.067***	1.630***	2.035***	1.935***
	(0.807)	(0.774)	(0.758)	(0.766)	(0.656)	(0.653)	(0.548)	(0.600)	(0.594)	(0.601)	(0.613)	(0.707)	(0.741)	(0.698)	(0.661)	(0.765)	(0.763)
nafta	0.352	0.011	-0.082	-0.188	0.215	0.027	0.069	-0.051	-0.040	0.047	-0.016	0.019	0.126	0.116	0.283	0.273	0.227
	(0.308)	(0.234)	(0.268)	(0.194)	(0.290)	(0.305)	(0.257)	(0.249)	(0.218)	(0.236)	(0.210)	(0.219)	(0.198)	(0.208)	(0.262)	(0.273)	(0.278)
eu15	-0.353***	-0.336***	-0.332***	-0.488***	-0.536***	-0.593***	-0.582***	-0.589***	-0.542***	-0.447***	0.380***	0.465***	0.556***	0.413***	0.433***	0.407***	0.400***
	(0.121)	(0.116)	(0.112)	(0.109)	(0.107)	(0.103)	(0.103)	(0.099)	(0.101)	(0.101)	(0.099)	(0.099)	(0.100)	(0.097)	(0.094)	(0.093)	(0.093)
eu27	-0.094	-0.014	-0.003	0.035	0.054	0.061	-0.087	0.009	0.043	-0.035	-0.125	0.051	0.058	0.017	-0.002	-0.041	0.024
	(0.129)	(0.121)	(0.118)	(0.117)	(0.115)	(0.113)	(0.111)	(0.110)	(0.111)	(0.110)	(0.109)	(0.113)	(0.117)	(0.109)	(0.107)	(0.108)	(0.109)
Home dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Partner dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3,131	3,196	3,211	3,218	3,248	3,261	3,271	3,264	3,281	3,281	3,280	3,287	3,292	3,286	3,287	3,293	3,287
R-squared	0.985	0.986	0.987	0.987	0.987	0.988	0.988	0.988	0.989	0.989	0.990	0.989	0.989	0.990	0.990	0.990	0.991

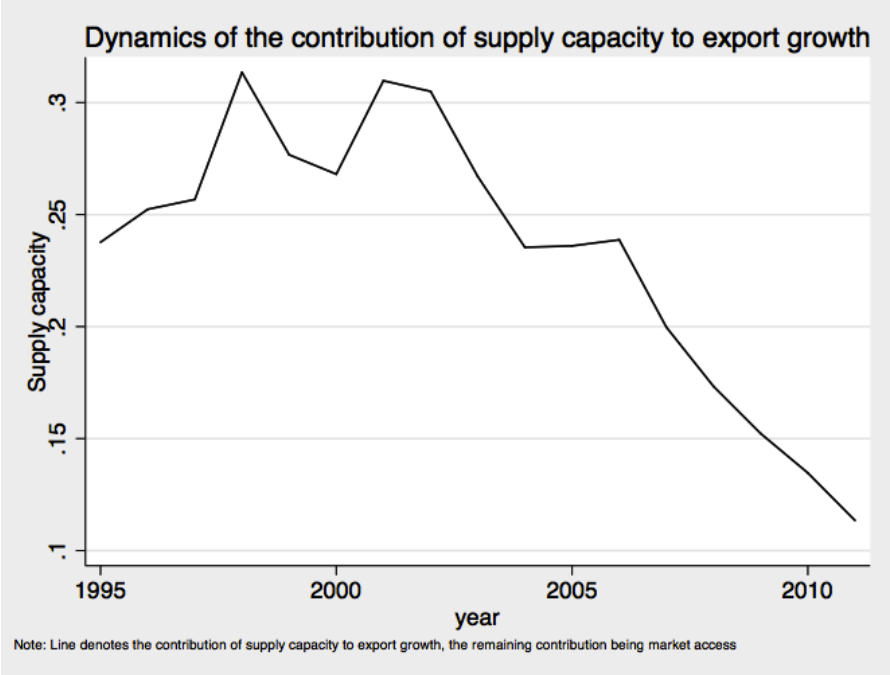
*Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

5. Estimation of the effect of supply capacity and foreign-market access

We first present results of bilateral trade regressions (1) done on an annual basis for each of the years between 1995 and 2011. Each of the regressions includes a full set of home and partner country dummy variables as well as distance between capital cities weighted by the capital's share of economic activity and border as well as broader regional-block dummies.

Based on results of Table 7 we calculate the contributions of supply capacity (SC_i) and foreign-market access (*FMAi*) to growth of total exports and use the estimated values of these two components to determine the regression-based decomposition of export performance as suggested by Fields (2004). Ultimately, we plot the estimated contribution of supply capacity throughout the period, with foreign-market access representing the remaining share.[13]

Figure 3. Regression-based decomposition: Contribution of supply capacity to export growth of CEEC countries exports (in share of total)



As can be seen from Figure 3, there is substantial volatility in the estimated contribution of supply capacity to overall exports. In order to smooth out the effects of the cycles, we perform the same set of regressions using three year averages of exports for any given year[14]:

$$\overline{export}_{it} = \frac{export_{it} + export_{it+1} + export_{it+2}}{3} \quad (11)$$

[13] The combined contributions of SC and FMA by design make up the total (100%).

14 Note that by adopting the moving average, we loose the last two years in the sample (2010, 2011), but as Figure 4 shows these two years do not deviate from the trend.

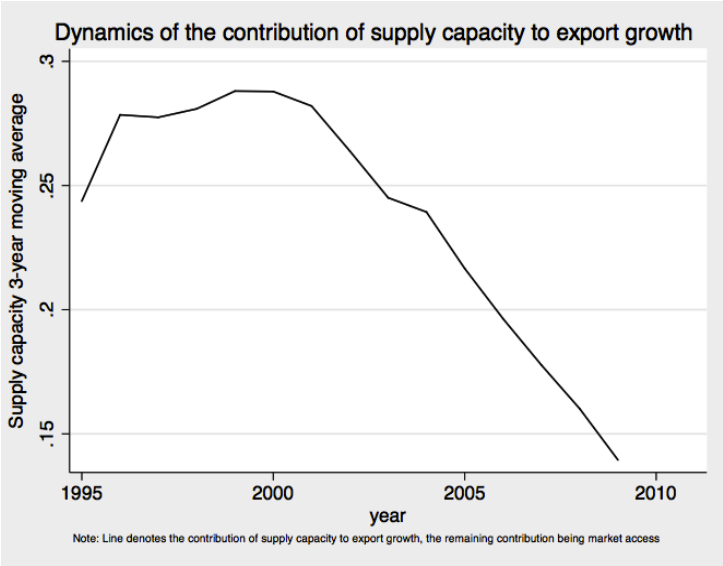
Table 8. Bilateral trade equation estimaton

variables	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
distance	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
contiguity	2.084***	2.017***	1.983***	1.963***	1.946***	1.948***	1.917***	1.882***	1.850***	1.834***	1.825***	1.819***	1.815***	1.816***	1.821***
	(0.145)	(0.139)	(0.137)	(0.134)	(0.134)	(0.133)	(0.131)	(0.130)	(0.130)	(0.131)	(0.133)	(0.136)	(0.136)	(0.135)	(0.137)
cis	2.017***	2.034***	2.008***	1.953***	1.943***	1.958***	1.937***	1.785***	1.708***	1.606***	1.715***	1.814***	1.784***	1.732***	1.534***
	(0.431)	(0.402)	(0.397)	(0.367)	(0.337)	(0.337)	(0.355)	(0.377)	(0.384)	(0.380)	(0.370)	(0.364)	(0.353)	(0.344)	(0.384)
asia	-0.390**	-0.424***	-0.373**	-0.353**	-0.435***	-0.549***	-0.409**	-0.216	-0.143	-0.218	-0.245	-0.291*	-0.208	-0.155	-0.144
	(0.159)	(0.164)	(0.157)	(0.168)	(0.168)	(0.195)	(0.184)	(0.158)	(0.147)	(0.148)	(0.154)	(0.164)	(0.162)	(0.154)	(0.160)
latin	-0.566	-0.541	-0.508	-0.485	-0.464	-0.308	-0.241	-0.197	-0.284	-0.347	-0.372	-0.383	-0.410	-0.425	-0.459
	(0.383)	(0.376)	(0.374)	(0.356)	(0.343)	(0.345)	(0.342)	(0.362)	(0.365)	(0.378)	(0.385)	(0.389)	(0.383)	(0.384)	(0.388)
ceec	1.090***	1.075***	1.149***	1.206***	1.191***	1.101***	1.066***	1.097***	1.075***	1.072***	1.087***	1.072***	1.097***	1.095***	1.058***
	(0.166)	(0.162)	(0.158)	(0.154)	(0.150)	(0.151)	(0.145)	(0.142)	(0.138)	(0.138)	(0.136)	(0.133)	(0.130)	(0.129)	(0.129)
see6	1.669**	1.756**	1.766***	1.727***	1.886***	1.982***	2.178***	2.392***	2.664***	2.891***	3.021***	3.053***	2.933***	2.892***	2.866***
	(0.730)	(0.745)	(0.646)	(0.606)	(0.564)	(0.582)	(0.561)	(0.574)	(0.584)	(0.635)	(0.674)	(0.693)	(0.681)	(0.705)	(0.731)
nafta	0.064	-0.041	0.008	0.029	0.070	0.063	0.052	0.024	0.007	-0.003	0.071	0.110	0.200	0.249	0.282
	(0.234)	(0.219)	(0.230)	(0.245)	(0.257)	(0.260)	(0.231)	(0.227)	(0.208)	(0.219)	(0.212)	(0.210)	(0.223)	(0.248)	(0.267)
eu15	-0.228**	-0.274***	-0.369***	-0.474***	-0.488***	-0.507***	-0.487***	-0.451***	-0.419***	-0.411***	-0.425***	-0.429***	-0.416***	-0.374***	-0.382***
	(0.109)	(0.105)	(0.102)	(0.099)	(0.097)	(0.095)	(0.096)	(0.095)	(0.095)	(0.093)	(0.093)	(0.092)	(0.091)	(0.090)	(0.090)
eu27	0.024	-0.018	0.019	0.039	-0.004	0.003	-0.004	0.024	-0.014	-0.024	-0.011	0.026	0.026	-0.017	0.005
	(.113)	(0.110)	(0.107)	(0.106)	(0.104)	(0.103)	(0.104)	(0.103)	(0.102)	(0.101)	(0.101)	(0.103)	(0.101)	(0.102)	(0.104)
Home dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Partner dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Obs.	3,092	3,156	3,182	3,190	3,216	3,176	3,134	3,196	3,264	3,265	3,271	3,275	3,274	3,276	3,276
R-squared	0.989	0.989	0.990	0.990	0.990	0.990	0.990	0.991	0.991	0.991	0.992	0.991	0.992	0.992	0.991

*Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Estimates of (1) on three-year moving average of exports are reported in Table 8 below, while the evolution of accompanying regression-based decomposition into two main factors is depicted in Figure 4.

Figure 4. Regression-based decomposition: Contribution of supply capacity to export growth for CEECs' exports (in share of total) (3-year average)



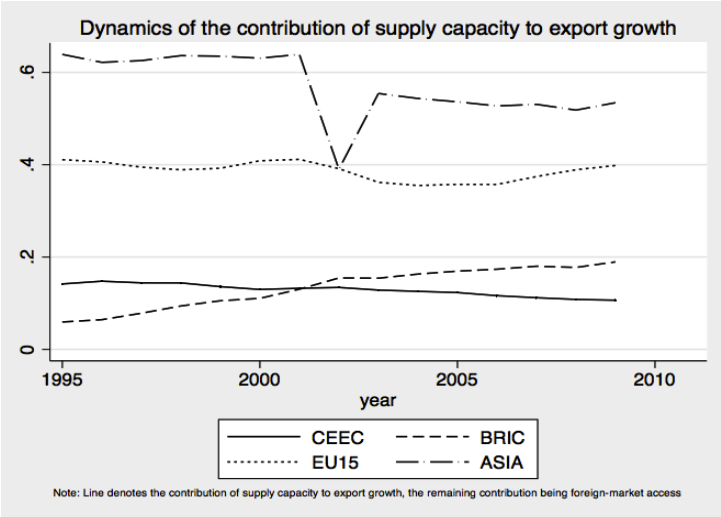
Source: UNCTAD and own calculations

Both Figure 3 and 4 reveal that the contribution of supply capacity to the country's export performance has been decreasing steadily since the high of year 2000. During this period the decrease has almost reached 20 percentage points. Interestingly, the financial and economic crisis of 2008/2009 did not have a significant impact on the observed trajectory. Naturally, this implies that the contribution of foreign market access to exporting performance has been experiencing a corresponding increase.

We decompose the above supply capacity's contribution further to account for the possible differences between global trading blocks as well as the probable differences between the product groups. Firstly, we present the dynamics of the contribution of supply capacity to exports by trading block (group of countries).

Regional decomposition of export performance indicates large differences between the four groups of countries. Supply capacity matters most for Asian countries and least for CEEC and EU 15 countries. Approximately 50% of export performance of Asian countries (Asian tigers, China excluded) is determined by supply capacity, with the number closer to 10% for the CEECs. Importantly, the contribution of *SC* is decreasing over time for all blocs apart from the EU15. In addition, the Asian countries' contribution of supply capacity experienced a pronounced drop in 2002, returning to a slightly lower share in 2003. Comparison of CEECs with other fast growing exporting groups of countries shows that CEECs export performance growth in the last 15 years has been much less based on improved supply capacity than in other countries. This is not a good sign for the future as it indicates that CEECs may begin to lose their export competitiveness. There is not much more room for improving foreign market access component, as benefits of the EU accession have been already exploited.

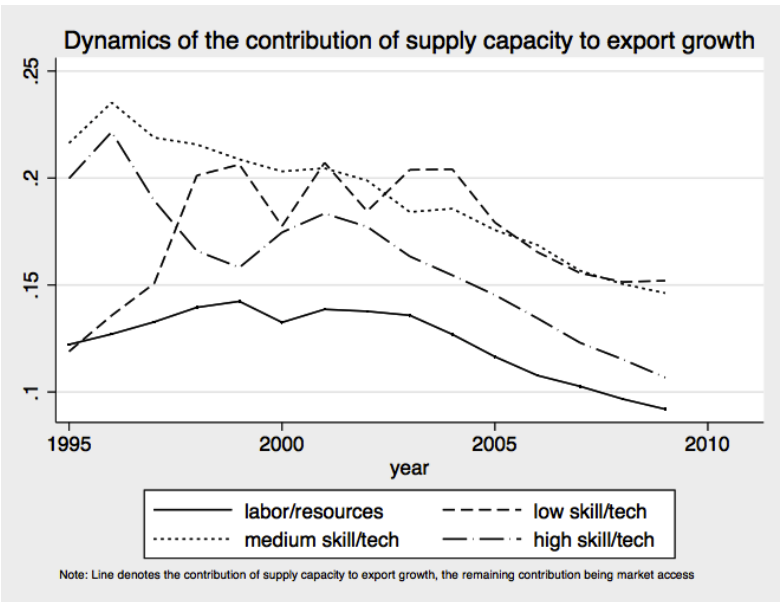
Figure 5. Regression-based decomposition: Contribution of supply capacity to export growth for country groups with fastest growing exports (in share of total) (3-year average)



Source: UNCTAD and own calculations

Finally, we take a look at the dynamics of *SC* contribution across the four product groups. Figure 6 depicts the dynamics of the contribution of export supply capacity for CEECs' exports split between (i) labor intensive/resource intensive products, (ii) less skill/technology intensive products, (iii) medium skill/technology intensive products, and (iv) high skill/technology intensive products. Significantly, the contribution of SC is decreasing for three of the four groups of products, most evidently for high skill products. Only low skill/technology products do not experience an overall decline, although the share of SC has been falling since 2004. Lowest level of supply capacity's contribution is found for labor/resource-based products in CEE countries' exports. All these further reinforces the above view that CEECs may have serious problems with the growth of their export performance in the future.

Figure 6. Regression-based decomposition: Contribution of supply capacity to export growth of CEECs for product groups with fastest growing exports (in share of total) (3-year average)



Source: UNCTAD and own calculations

In order to be able to pinpoint the factors impacting this trend we estimate the determinants of supply capacity and foreign market access.

6. Results

In this section we present results of the analysis of export performance determinants. In order to gain a deeper understanding of the dynamics of the capacity to supply exports and access to foreign markets, we estimate the impact of a number of country characteristics on its ability to supply exporting markets. For this purpose we run separate regressions on the estimated "supply capacity" (*SC*) and "foreign market access" (*FMA*) variables.

(12) $$SC_{it} = f(GDP_{it}^{origin}, GDPpc_{it}^{origin}, IMP_{it}, FDI_{it}, UV_{it}, \Delta ER, crisis_{t}, X_{it}, \varepsilon_{it})$$

(13) $$FMA_{it} = f(GDP_{it}^{dest}, GDPpc_{it}^{dest}, IMP_{it}, FDI_{it}, UV_{it}, \Delta ER, crisis_{t}, X_{it}, \varepsilon_{it})$$

where GDP_{it} represents the logarithm of gross domestic product (in constant US dollars) for both the exporting and destination countries. Aggregate country income allows us to control for both supply (country of origin) and demand conditions (destination country. $GDPpc_{it}$ is the logarithm of gross domestic product per capita (in constant US dollars) in both of the trading partners, measuring the similarities/differences in level of development and/or average productivity. IMP_{it} represents the log of imports of the exporting country from the destination country. Imports serve to capture an added aspect of the nature of the trade relationship between the country pair. FDI_{it} stands for the percentage share of inward FDI stock in GDP as well as the percentage share of outward FDI stock in GDP. While a high share of inward FDI may indicate that the country is a particularly advantageous location for (export-oriented) production, high share of outward FDI may imply that local firms are using FDI for increasing own exports to host countries and/or are offshoring parts of their production process to other markets. We control for the price competitiveness of a country by including both the export and import unit values (UV_{it}), in constant dollars). Export unit values may also indicate structural upgrading of exports. ΔER indicates the change in the bilateral exchange rate (cross rate)[15]. $crisis_t$ is defined as "1" in the two official years of the global financial and economic crisis (2008 and 2009) and "0" otherwise. The inclusion of the crisis variable is merited by the possibility that the crisis represents a break in the aggregate trade trends and may have caused a similar break in measures of exporting performance. X_{it} stands for a group of infrastructural and institutional indicators that we condensed into four factors. Due to issues with data availability we only employ three of the four factors (ICT infrastructure, road- and rail-transport infrastructure and institutional quality) for the origin (equation 12) and destination (equation 13) countries. In order to control for any possible residual effects of the EU expansion in 2004, we introduce a dummy variable for the period after 2004 for CEE countries.[16] Finally, we also control for time and origin country fixed effects[17]. ε_{it} is and i.i.d. error term.

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[15] All exchange rates are given in the form of a direct quotation (i.e. value of one unit of local currency measured in foreign currency). This implies that a decrease in the exchange rate (depreciation) should lead to increased exports.

[16] Given the asymmetric nature of the Association Agreements the CEE countries signed with the EU, the EU opened up to CEEC imports substantially earlier than 2004. In 2004 the CEE countries removed all of their trade barriers with the EU.

[17] In the benchmark ordinary least squares regression we also control for the destination country fixed effects, while the fixed effects regression bases on country pairs as the unit of observation.

The benchmark estimations of (12 and 13) are presented in Table 9. We use seemingly unrelated regression to simultaneously estimate both versions of estimation equation. The reason for this is that the two equations (one for *SC* and one for *FMA*) are not unrelated and are hence very likely to have correlated errors. An assumption implicit in separate OLS estimations (i.e. that contemporaneous errors of the two equations are uncorrelated) likely does not hold in this case due to the explicit connection between SC and FMA. More likely the error correlation is of the form:

(14) $$cov(\varepsilon_{1t}, \varepsilon_{2t}) = \sigma_{12}$$

an estimation that takes explicit account of the error correlation will increase the precision of the parameter estimates via a two-step procedure accounting for the error structure in the second step GLS estimation. The significance of the Breusch-Pagan test of error independence confirms the appropriateness of the choice of estimator.

Columns 1 and 2 of Table 9 present estimates of the regressions on the logarithm of SC and logarithm of FMA, respectively. Columns 3 and 4 present estimates on the logarithm of supply capacity and foreign market access on a subsample of Central and Eastern-European countries. In columns 5 and 6 we additionally control for the share of manufacturing industries in 2007 inward and outward FDI stocks in CEECs.

Predictably, Table 9 reveals that there are substantial differences in the impact of country characteristics between supply capacity and foreign-market access. In line with expectations, GDP of the exporting country ($ln(GDP)^{o}_{t-1}$) positively impacts the measured supply capacity of the economy, while the destination country size does not significantly effect the foreign market access. The level of development/productivity level ($ln(GDPpc)^{o}_{t-1}$) of the exporting country positively impacts the supply capacity in the complete sample indicating that more productive countries rely more heavily on SC in their export performance. The effect is not as strong in the CEEC subsample (and even significantly negative for one specificatio). Given the fact that trends in real ULC of CEECs since their accession to the EU have not been favorable, i.e. they have not improved their wage competitiveness vis-a-vis the EU-15 countries, this is in line with expectations. Both the shares of inward and outward FDI in GDP positively impact the capacity to supply foreign markets with exports, while they, by and large, have a negative effect on foreign market access. The latter tends to indicate considerable importance of market-access type of inward as well as outward FDI. Since it is predominantly the manufacturing FDI which impacts export performance, it expectedly turns out that the effect of the share of manufacturing in inward FDI stock is highly significantly positive on CEECs supply capacity. The fact that the share of manufacturing FDI also has a significant and positive impact of CEECs' foreign market access seems to point to efficiency-seeking type of inward FDI which are highly export oriented. In line with expectations, the unit value of export prices has a positive and significant effect on the supply capacity, which is in line with positive structural changes in CEECs' exports, while import prices (higher import unit values) negatively affect the price competitiveness of the exporting economy. As expected, currency depreciation only seems to impact foreign market access and the effect appears ambiguous. While there is a strong positive effect of the origin country institutions on supply capacity, the institutions in the receiving country play no role in determining FMA. In addition, while ICT infrastructure has a positive effect on SC only in case of the full sample, the effect of rail and road infrastructure of the exporting country appears to be ambiguous. Finally, there is evidence in support of the positive effect of EU accession

on the capacity to supply exports, but the crisis of 2008-2009 has a much stronger negative effect on both the capacity to supply exports as well as the demand by foreign markets.

Table 9. Seemingly unrelated regression estimates of the SC and FMA determinants between 1995 and 2011 for all countries and for the CEEC subsample

VARIABLES	(1) SC (ALL)	(2) FMA (ALL)	(3) SC (CEEC)	(4) FMA (CEEC)	(5) SC (CEEC)	(6) FMA (CEEC)
$\ln(GDP)^{o}_{t-1}$	0.935***		0.578*		1.149***	
	(0.108)		(0.321)		(0.071)	
$\ln(GDPpc)^{o}_{t-1}$	0.220**		-0.263		-0.387***	
	(0.095)		(0.300)		(0.070)	
$\ln(GDP)^{d}_{t-1}$		0.000		0.000		-0.005***
		(0.000)		(0.000)		(0.002)
$\ln(GDPpc)^{d}_{t-1}$		-0.000		0.000		0.005
		(0.000)		(0.000)		(0.004)
$\ln(imports)_{t-1}$	0.000	-0.000	0.002	-0.000**	0.002	0.004***
	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.001)
distance	0.000	-0.000*	0.000	-0.000**	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
contiguity	0.007	-0.000	0.005	-0.000	0.001	-0.001
	(0.006)	(0.000)	(0.010)	(0.000)	(0.011)	(0.004)
common lang (official)	0.008	-0.000	0.000	0.000	0.000	0.000
	(0.017)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
common lang (ethnic)	-0.013	0.000	-0.002	0.000	-0.033	0.011
	(0.015)	(0.001)	(0.032)	(0.001)	(0.037)	(0.013)
inward FDI share $_{t-1}$	-0.000	-0.000***	0.001	-0.000***	0.002***	-0.001***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
outward FDI share $_{t-1}$	0.001***	0.000***	0.004	-0.000*	0.010***	-0.006***
	(0.000)	(0.000)	(0.003)	(0.000)	(0.003)	(0.000)
Δ exchange rate $_{t}$	-0.016	-0.003***	0.031	0.002**	0.054	-0.072***
	(0.026)	(0.001)	(0.052)	(0.001)	(0.058)	(0.021)
unit value $^{exp}_{t-1}$	0.001***	-0.000*	0.008***	0.000***	0.013***	0.001***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
unit value $^{imp}_{t-1}$	-0.005***	-0.000***	-0.011***	-0.001***	-0.017***	-0.000
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
institutions $^{o}_{t-1}$	0.516***		0.428***		0.603***	
	(0.026)		(0.047)		(0.046)	
institutions $^{d}_{t-1}$		0.000		-0.000		-0.003
		(0.000)		(0.000)		(0.006)
ICT infrastructure $^{o}_{t-1}$	0.023		0.294***		0.118**	
	(0.021)		(0.056)		(0.048)	
ICT infrastructure $^{d}_{t-1}$		-0.000*		-0.000		-0.006
		(0.000)		(0.000)		(0.004)
road and rail infrastructure $^{o}_{t-1}$	-0.123		1.897*		-2.464***	
	(0.100)		(1.052)		(0.564)	
road and rail infrastructure $^{d}_{t-1}$		-0.000		0.000		0.004
		(0.000)		(0.000)		(0.005)
inward FDI (man. share)					3.845***	0.275***
					(0.237)	(0.033)
outward FDI (man. share)					0.163	-0.028
					(0.117)	(0.025)
Crisis	-0.128***	-0.001***	-0.132***	-0.001***	-0.094***	-0.017***
	(0.008)	(0.000)	(0.019)	(0.000)	(0.019)	(0.006)
EU accession dummy	0.132***	-0.005***	0.072***	-0.002***	0.113***	-0.007
	(0.013)	(0.000)	(0.019)	(0.000)	(0.020)	(0.005)
Constant	-20.004***	0.000	0.000	5.988***	-15.786***	5.940***
	(1.732)	(0.000)	(0.000)	(0.004)	(1.019)	(0.086)
time	NO	NO	NO	NO	NO	NO
export country dummies	YES	YES	YES	YES	NO	NO
Observations	1,619	1,619	598	598	598	598
R-squared	0.998	0.999	0.995	0.999	0.994	0.589
Breusch-Pagan χ^2 (1)		36.42***		113.90***		9.34***

*Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Even after controlling for a substantial number of measurable country characteristics in our specifications, we are unlikely to have captured all of the measurable and unmeasurable factors that help determine exporting performance. In order to mitigate the issue of omitted variables, we

next estimate (12) and (13) with the fixed effects (within estimator), allowing us to control for all time-invariant country-pair specific effects. These results are presented in Table 10, where, as before, columns 1 and 2 show estimated coefficients for the whole sample, while columns 3 and 4 display estimates for the CEECs.[18]

Table 10. Fixed effects estimates of SC and FMA determinants for the full sample and the CEEC subsample 1995-2011

	(1)	(2)	(3)	(4)
VARIABLES	SC	FMA	SC (CEEC)	FMA (CEEC)
$\ln(GDP)^{o}_{t-1}$	1.169***		0.721***	
	(0.083)		(0.231)	
$\ln(GDP)^{d}_{t-1}$		0.007		-0.190
		(0.074)		(0.194)
$\ln(GDPpc)^{o}_{t-1}$	0.001		0.001	
	(0.003)		(0.005)	
$\ln(GDPpc)^{d}_{t-1}$		-0.004		-0.005
		(0.003)		(0.005)
$\ln(imports)_{t-1}$	0.001	-0.000*	0.004**	-0.000
	(0.001)	(0.000)	(0.002)	(0.000)
inward FDI share $_{t-1}$	-0.000	-0.000	0.002***	-0.000***
	(0.000)	(0.000)	(0.001)	(0.000)
outward FDI share $_{t-1}$	0.001***	-0.000	0.003*	-0.000**
	(0.000)	(0.000)	(0.002)	(0.000)
Unit value $^{exp}_{t-1}$	0.001***	-0.000***	0.008***	0.000***
	(0.000)	(0.000)	(0.001)	(0.000)
Unit value $^{imp}_{t-1}$	-0.005***	-0.000***	-0.014***	-0.000***
	(0.000)	(0.000)	(0.001)	(0.000)
Δ exchange rate $_{t}$	0.040*	0.001	0.036	0.004***
	(0.023)	(0.001)	(0.032)	(0.001)
Institutions $^{o}_{t-1}$	0.463***		0.236***	
	(0.021)		(0.039)	
Institutions $^{d}_{t-1}$		-0.003***		-0.004***
		(0.001)		(0.001)
ICT infrastructure $^{o}_{t-1}$	0.104***		0.505***	
	(0.015)		(0.054)	
ICT infrastructure $^{d}_{t-1}$		0.001		-0.002**
		(0.001)		(0.001)
road and rail infrastructure $^{o}_{t-1}$	-0.038		1.085*	
	(0.053)		(0.564)	
road and rail infrastructure $^{d}_{t-1}$		-0.005**		-0.006
		(0.002)		(0.004)
crisis dummy	-0.143***	-0.000	-0.138***	-0.001***
	(0.005)	(0.000)	(0.009)	(0.000)
EU accession dummy	0.100***	-0.007***	0.000	-0.001***
	(0.013)	(0.000)	(0.018)	(0.000)
Constant	-22.950***	5.964***	-6.999***	6.179***
	(1.361)	(0.051)	(2.149)	(0.077)
Export country dummies	YES	YES	YES	YES
Observations	4,329	4,242	1,637	681
Number of pair_id	1,294	1,282	396	208
R2 within	0.580	0.569	0.610	0.958
R2 between	0.867	0.139	0.863	0.0195

*Robust standard errors in parentheses. ** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Once we control for country-pair fixed effects, the estimates remain in line with the benchmark results established by SC regression. The effect of exporting country size (as measured by logarithm

[18] It bares noting that all time invariant variables (distance, common language etc.) are no longer included in the specification as they are already controlled for with the FE estimator.

of GDP) on supply capacity remains strongly positive in case of the complete sample as well as in the case of CEECs. Productivity or level of development (measured by logarithm of GDP per capita) of the exporting country has no significant impact on the supply capacity. The shares of inward and outward FDI in GDP also remain broadly in line with those established in Table 9. by exhibiting positive impact on the supply capacity. Export (import) unit values have a significant positive (negative) impact on both supply capacity and foreign market access. Generally, both institutions and infrastructure of exporting country positively impact its supply capacity, the effects being quantitatively very relevant. Another key feature of the data is that institutional and infrastructural characteristics of the destination country has no or small negative effect on foreign market access. Finally, it appears that the crisis has had some impact on the trajectories of both supply capacity and foreign market access curves as the coefficient of the crisis dummy is negative and significant for supply capacity in the complete and CEECs sample. Interestingly, the impact of crises on foreign market access seems to be only smaller.

Table 11. Fixed effects estimates of SC determinants by product group for CEECs

VARIABLES	labour resource	low skill/tech	medium skill/tech	high skill
ln(GDP) $^{o}_{t-1}$	1.382***	1.162***	1.005***	1.034***
	(0.274)	(0.224)	(0.213)	(0.224)
ln(GDPpc) $^{o}_{t-1}$	-1.112***	-0.853***	-0.667***	-0.754***
	(0.234)	(0.201)	(0.184)	(0.193)
ln(import) $_{t-1}$	0.002	0.004***	0.001	0.001
	(0.001)	(0.002)	(0.002)	(0.002)
inward FDI share $_{t-1}$	0.009***	0.008***	0.008***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)
outward FDI share $_{t-1}$	-0.003	-0.005*	0.000	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Unit value $^{exp}_{t-1}$	0.003***	0.003***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Unit value $^{imp}_{t-1}$	-0.006***	-0.006***	-0.007***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Δ exchange rate $_{t}$	-0.187***	-0.171***	-0.199***	-0.198***
	(0.036)	(0.036)	(0.036)	(0.035)
Institutions $^{o}_{t-1}$	0.175***	0.155***	0.106***	0.169***
	(0.041)	(0.042)	(0.040)	(0.041)
ICT infrastructure $^{o}_{t-1}$	0.534***	0.473***	0.510***	0.509***
	(0.055)	(0.049)	(0.051)	(0.052)
Road and rail infrastructure $^{o}_{t-1}$	-0.494	0.094	-0.826	-0.849
	(0.636)	(0.643)	(0.629)	(0.619)
crisis dummy	-0.222***	-0.206***	-0.211***	-0.208***
	(0.008)	(0.007)	(0.007)	(0.007)
EU accession	-0.071***	-0.046***	-0.077***	-0.056***
	(0.017)	(0.017)	(0.016)	(0.017)
Constant	-3.322	-3.652	-4.266*	-3.066
	(2.640)	(2.376)	(2.422)	(2.460)
Country dummies	YES	YES	YES	YES
Observations	1,661	1,642	1,620	1,653
Number of pair_id	400	399	400	400
R2 within	0.651	0.630	0.626	0.641
R2 between	0.853	0.855	0.898	0.885

*Robust standard errors in parentheses. ** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Given that the above results are based on aggregate trade data, they mask some crucial composition effects. Namely, trade by different industries and in different products may be governed by diverse processes that cannot be accounted for by estimation of aggregate trade functions. It may be that products with lower value added depend more crucially on the size of the market and place a different emphasis on the quality of institutions and/or infrastructure than the

products at the other end of the spectrum. In order to investigate whether compositional effects are driving some of our results, we take explicit account of trade in different product groups in Table 11. We do so by estimating equation (12) separately for the four product groups (following UNCTAD's definition). In this case we only look at the impact of regressors on supply capacity in all four columns for CEEC countries only.

The results shown in Table 11 do not reveal discernible qualitative differences between product groups. The size of the economy significantly and positively impacts a country's supply capacity for all product groups. On the other hand, average productivity (level of development) of exporting economy, measured by GDP per capita, has a significant and negative impact on its supply capacity. As already noted, this is an expected result and is a consequence of decreasing cost competitiveness (measured by ULC) of CEECs. The negative impact of GDP per capita seems to gradually decrease with increasing technological intensity of product groups, indicating that cost competitiveness is of greater importance in lower technology product groups. Significant negative impact of EU accession on the supply capacity primarily captures the overall negative trend of supply capacity. As far as the significance and direction of the effect of other variables is concerned, they are very much in line with results presented in Tables 9 and 10. There are only slight to moderate quantitative differences between the four product groups, but these are not reflected at all in direction or significance of the coefficients.

7. Conclusions

The paper examines the determinants of the impressive growth of CEECs' export performance in a comparative perspective with other groups of countries. Based on the relevant theoretical concepts, we follow the approaches of Redding and Venables (2004, 2004a), Fugazza (2004), and Damijan, Rojec and Ferjančič (2011), and distinguish between foreign market access and the supply capacity determinants of export performance. We build an econometric model to assess the determinants of export performance in two steps: first, we assess the contribution of foreign market access against that of supply capacity improvement, and second, we assess the importance of individual factors determining the foreign market access and supply capacity. We also look at the effect of EU accession and current financial and economic crisis on CEECs export performance growth.

The contribution of supply capacity to the CEECs' export performance has been decreasing steadily since the high of year 2000 and in 2011 contributed less than five percent to CEECs' export performance, the remaining being accounted by foreign market access. Interestingly, the financial and economic crisis of 2008-2009 didn't have a significant impact on this trend. It seems that along with the ongoing EU accession, the contribution of foreign market access component to CEECs' exports has been gaining in importance. Thus, export performance of CEECs' in the last decade or so has been predominantly due to their better position in the EU market, while the contribution of CEECs' supply capacity has been decreasing. The situation in other groups of countries, which exhibited the highest export growth in the last 15 years (BRIC, Asia, EU-15) show much higher and stagnating contribution of supply capacity to their export performance. This is not a good sign for the future as it indicates that CEECs may be beginning to lose their export competitiveness.

In assessing the importance of individual factors determining the foreign market access and supply capacity standard variables of the gravity estimation were taken into consideration, such as size and proximity of the markets, and additionally include those factors that have been recognized by

the literature as relevant determinants of foreign market access and supply capacity, i.e. productivity growth, importance of inward and outward FDI structural changes as indicated by unit values of exports and imports, infrastructure quality, institutional setting, EU accession and economic crisis. We find that the following results for CEECs.

The exporting country size (as measured by logarithm of GDP) has a positive impact on its supply capacity. Productivity of the exporting country negatively impacts the supply capacity of CEECs. Given the fact that trends in real ULC of CEECs since their accession to the EU have not been at all favorable, i.e. they have not improved their wage competitiveness vis-a-vis the EU-15 countries, this is in line with expectations. Inward FDI penetration has a positive impact on CEECs' export performance, with the size of the impact depending to a major extent on the share of FDI into manufacturing sectors. Export unit values, denoting the structural changes of CEECs' exports, have a significant positive impact on CEECs' supply capacity.

Distinguishing between different product groups --labor and resource-based products, low skill/tech products, medium skill/tech products, high skill products -- does not reveal any quantitative differences as far as the determinants of supply capacity are concerned. The negative impact of the average productivity level seems to gradually decrease with increasing technological intensity of product groups. We see the latter finding as an indication of the higher importance of cost competitiveness in lower technology product groups. In general the only differences between the four product groups appear to be quantitative, as the sign or significance of the coefficients appear very robust to changes in product's technological intensity.

The distinctive contributions of the paper are: (i) the model takes into account a broader set of explanatory variables of supply capacity than previous studies; (ii) CEECs' export performance is put in comparative perspective with other transition countries and emerging economies; (iii) this is the first paper on CEECs' export performance that spans beyond 2004, i.e. beyond the time of EU accession and, thus, enables distinguishing between pre- and post-EU accession period, as well as between pre-crisis and crisis period.

All in all, the future of CEECs' export growth seems to be at jeopardy because the internal supply capacity is less and less important base of their export performance, trends in cost competitiveness are worse than in competing countries, benefits of EU accession have been mostly exploited, and economic recession continues to be a bigger problem for European than for other countries.

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Appendix

Data description

Data on the quality of infrastructure comes from the World Development Indicators database (World Bank), which gathers data on a variety of country indicators for 211 economies starting in 1960. We consider the following indicators of the quality of infrastructure, which we split into four groups of indicators ((i) sea transport infrastructure, (ii) road and rail transport infrastructure, (iii) air transport infrastructure (iv) information and communication infrastructure.

Table 12. WDI variable definition

variable	definition
(i) sea-transport infrastructure	
containers	Container port traffic. Port container traffic measures the flow of containers from land to sea transport modes, and vice versa, in twenty-foot equivalent units (TEUs). Data refer to coastal shipping as well as international journeys. Transshipment traffic is counted as two lifts at the intermediate port (once to off-load and again as an outbound lift) and includes empty units.
liner_connect	Liner shipping connectivity index. The Liner Shipping Connectivity Index captures how well countries are connected to global shipping networks. It is computed by UNCTAD based on five components of the maritime transport sector: number of ships, their container-carrying capacity, maximum vessel size, number of services, and number of companies that deploy container ships in a country's ports. For each component a country's value is divided by the maximum value of each component in 2004, the five components are averaged for each country, and the average is divided by the maximum average for 2004 and multiplied by 100. The index generates a value of 100 for the country with the highest average index in 2004.
port_quality	Quality of port infrastructure, WEF (1=extremely underdeveloped to 7=well developed and efficient by international standards). The Quality of Port Infrastructure measures business executives' perception of their country's port facilities. Data are from the World Economic Forum's Executive Opinion Survey, conducted for 30 years in collaboration with 150 partner institutes. Respondents in landlocked countries were asked how accessible are port facilities (1 = extremely inaccessible; 7 = extremely accessible).
(ii) road- and rail-transport infrastructure	
cars	Passenger cars (per 1,000 people). Passenger cars refer to road motor vehicles, other than two-wheelers, intended for the carriage of passengers and designed to seat no more than nine people (including the driver).
rail_lines	Rail lines (total route-km). Rail lines are the length of railway route available for train service, irrespective of the number of parallel tracks.
rail_goods	Railways, goods transported (million ton-km). Goods transported by railway are the volume of goods transported by railway, measured in metric tons times kilometers traveled.
rail_passengers	Railways, passengers carried (million passenger-km). Passengers carried by railway are the number of passengers transported by rail times kilometers traveled.
road_density	Road density (km of road per 100 sq. km of land area). Road density is the ratio of the length of the country's total road network to the country's land area.
road_goods	Roads, goods transported (million ton-km). Goods transported by road are the volume of goods transported by road vehicles, measured in millions of metric tons times kilometers traveled.
road_passengers	Roads, passengers carried (million passenger-km). Passengers carried by road are the number of passengers transported by road times kilometers traveled.
share_paved	Roads, paved (% of total roads). Paved roads are those surfaced with crushed stone (macadam) and hydrocarbon binder or bituminized agents, with concrete, or with cobblestones, as a percentage of all the country's roads, measured in length.
road_network	Roads, total network (km). Total road network includes motorways, highways, and main or national roads, secondary or regional roads, and all other roads in a country.
vehicles_km	Vehicles (per km of road). Vehicles per kilometer of road include cars, buses, and freight vehicles but do not include two-wheelers.
(iii) air-transport infrastructure	
air_trans	Air transport, freight (million ton-km)
air_trans_pass	Air transport, passengers carried
(iv) information and communication infrastructure	
int_sh	Internet users per 100 people (Internet users are people with access to the worldwide

	network)
int_subsc	Fixed broadband Internet subscribers (per 100 people). Fixed broadband Internet subscribers are the numberof broadband subscribers with a digital subscriber line, cable modem, or other high-speed technology.
mobile_sh	Mobile cellular subscriptions (per 100 people). Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service using cellular technology, which provide access to the public switched telephone network
no_servers	Secure Internet servers (per 1 million people).
tel_lines	Telephone lines (per 100 people)

Data on the quality of institutions comes from the Institutional quality database by A. Kunčič (2012). Please see https://sites.google.com/site/aljazkuncic/research for details on the construction of the dataset.

Table 13. Institutional quality variable definition

variable	description
Economic institutions	the average value of economic indicators (e.g. Index of economic freedom (Financial Freedom, Freedom from corruption), Regulatory quality, Freedom of the press: Economic environment, Business Freedom, EFW index,...)
Legal institutions	the average value of elegal indicators (e.g. Index of Economic freedom (Property rights), Freedom of the press: (Legal environment), EFW index: Legal structure and Security of property rights,...)
Political institutions	the average value of political indicators (e.g. Freedom in the World: Poltical rights, Checks and balances, Corruption, Democratic accountability,...)