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Fishing in the same pool: Export strengths and competitiveness of China and CESEE at the EU-15 Market

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We investigate the impact of the emergence of China as a global competitor on the trade performance of Central, Eastern and Southeastern European (CESEE) countries at the EU-15 market. The paper takes a comprehensive approach in terms of empirical methods and data. We analyze export growth, export market shares, extensive and intensive margins and the number of trade links, applying highly disaggregated data at the 6 digit HS level over the period 1995 – 2010. We show that the most contested markets are those for capital goods and transport equipment, product categories where both regions have gained market shares and comparative advantage. We show that the number of trade links at the product level where both regions are active has increased substantially, indicating intensified competition. At the same time hardly any trade links were lost, which points against cut-throat competition between CESEE and China. The decomposition of export growth along the extensive versus the intensive margin shows that in line with the literature, the deepening of already existing trade relationships (i.e. the intensive margin) contributed most strongly export growth in both regions, whereas the contribution of new trade links (i.e. the extensive margin) had only a minor contribution, apart from the instance of EU accession which boosted the extensive margin considerably. We further decompose intensive margin growth into demand related structural effects and a supplier related competitiveness effect. Both the CESEE region and China successfully intensified their trade linkages above all as a result of their outstanding competitiveness as shown by the econometric shift-share analysis. While this suggests that both regions pursue a able export strategy, further diversification of production towards promising new industries and markets will become increasingly crucial for both, especially in face of projected slower EU-15 market growth in the longer run.

JEL: F14, F15, O57

Keywords: competitiveness, trade, sectoral market shares, shift-share analysis, Central, Eastern and Southeastern Europe, China

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1 Introduction

Over the last decades many emerging markets have followed an export-led growth strategy as a source for their catching-up process, where the focus of export production is on the industrialized countries. The success of this approach was impressively demonstrated since the early 1960s by the "Asian tigers" – Hong Kong, Singapore, South Korea and Taiwan – and their immediate followers, the "Tiger club economies" – Indonesia, Malaysia, Philippines and Thailand.

With the fall of the central planning system in the late 1980s and early 1990s the Central, Eastern and South Eastern European (CESEE) countries embarked on such a growth path, yet starting from rather different economic, socio-demographic and political grounds. A radical shift in the economic, political, cultural and social paradigm occurred in these countries. Exports were destined towards mature Western markets just as during the East Asian growth miracle. Over the last two decades, trade growth by far outpaced domestic income growth. The market share of the CESEE countries more than doubled between 1995 and 2010, both at a global level and within the Western European market (EU-15), reaching about 4% and 7% respectively.

China by contrast chose a highly controlled opening up strategy aimed at preserving the central planning system and resulting in a dual economy. Between 1995 and 2010, China managed to more than triple its global market share. In 2010, Chinese exports accounted for about 10% of total world imports. Since 2008, China has even surpassed Germany and has become number 1 world exporter. At the Western European market China's market share expanded even faster. Starting from a minor level of 1.8% in 1995, the market share more than quadrupled, so that in 2010 the country overtook the CESEE region's market share.

These figures indicate fierce competition between CESEE countries and China, especially at the European market. The emergence of China as trade competitor is thus often claimed to be a severe threat for the CESEE region, for which the European market is the primary export destination. The claim is that China's trade expansion has or may partially come at the expense of trade growth in the CESEE countries. The flooding of the European market by Chinese products may severely challenge the small countries in CESEE and restrain their export growth potential.

The question of competitiveness in markets of advanced economies, such as the EU-15, was important even in times of outstanding global trade growth. However, it becomes even more crucial for catching-up economies in times of lower world trade growth. While an increasing contribution to global trade growth comes from emerging markets, world demand for traded goods will continue to be dominated by the most advanced countries in the near future. The subdued economic growth prospects for these countries will thus lead to an intensification of competition in those markets.

In this study we investigate the hypothesis that Chinas emergence as trade competitor is a threat for the export oriented CESEE region. Focusing on the EU-15 as the export destination market, i.e. the 15 EU members as of 1995,[2] we use a broad mix of methodologies to tackle the issue from several angles:

1. **Fishing in the same pool?** Is the export structure of the CESEE countries and China focused on the same product groups and destination countries, indicating fierce competition? Or are – alternatively – export structures of CESEE and China complementary so that both regions can expand within their niches? Do the CESEE countries and China have (revealed) comparative advantages in similar product groups?
2. **Signs for crowding out?** Are there signs that Chinas entry into the EU-15 market has crowded out CESEE competitors?
3. **Exploration versus intensification?** Is the main source of export growth of the CESEE countries and China the exploration of new trade relationships (extensive margin) or rather the intensification of existing trade links (intensive margin)?

[2] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom. This selection implies that we have no overlap between exporters including new member states in the CESEE region and importers in Western Europe.

4. **Growth drivers within the intensive margin?** Are CESEE and China backing the right horses, i.e. are exports following demand conditions and hence focused on the most dynamic products and destinations? Or is the source of export growth stemming from supply potential, i.e. related to exporter specific effects?

There is ample literature[3] on the characteristics of trade patterns, trade competitiveness and comparative advantages at the country level. The innovative contribution of our paper is, first, to directly compare the CESEE region with China. We specifically address the question whether China's entry to the European market is a big threat for the CESEE countries, whether it has already led to crowding out effects and whether there are differences in the determinants of export growth between the two regions. Second, we focus on the product level which gives us a highly differentiated picture about competitive strengths of the regions and the areas of direct competition. Third, we take a comprehensive approach in exploiting trade data to investigate the competitiveness of CESEE and China. Given the lack of a clear-cut definition of "competitiveness" we use a variety of measures of countries' export performance to assess a country's "ability to sell".[4] This specifically comprises the thorough exploitation of Eurostat's COMEXT database at the 6-digit HS level[5] over the period 1995 to 2010, which contains data on EU-15 imports from the rest of the world. When investigating the export performance of the CESEE countries and China we effectively use EU-15 import data from the two regions. The advantage of this mirror trade flow approach is that the data are fully comparable across countries, given that the reporting country is in each case an EU member state. Data collection is thus harmonized according to Eurostat methodological guidelines. The application of this database enables us to analyze the sectoral and regional composition of export volumes, the number of trade links and the sources of trade growth for more than 5.300 different products in the CESEE countries and China.

[3] For further research see e.g. Amiti and Freund (2008), Imbs and Warziarg (2003), Benkovskis and Ramune (2010).

[4] As concerns output related measures of competitiveness, real exchange rates could be used as an additional measure, such as in Manzur, Wong and Chee (1999). Input measures (i.e. unit labor costs, productivity) are a common alternative to these output based measures of competitiveness. Trabold (1995) and Sachverständigenrat (2004) outline further aspects of competitiveness, such as the ability to attract resources, the ability to grow and the ability to generate a constant or rising stream of income.

[5] The harmonized system (HS) was developed by the World Customs Organization (WCO) to classify traded products.

It is also important to clarify from the outset what we will not investigate in this paper. First, the COMEXT database does not allow us to evaluate the bilateral trade flows between China and CESEE countries and vice versa. Furthermore we cannot identify which CESEE exports to EU-15 countries are effectively production inputs for goods that are ultimately exported to China and vice versa. We can thus not investigate the direct benefits of the growing Chinese market for the CESEE export prospects. The focus of our analysis is instead on the competition for market shares at the EU-15 destination market. Second, we focus on the CESEE region as an aggregate throughout the paper. These aggregate results may mask a high level of heterogeneity within the region. The same applies, however, for the level of heterogeneity among Chinese regions.

Our study is structured as follows. In sections 2 to 5 we proceed along the four questions outlined above, analyzing them one by one. We investigate market shares, indices of revealed comparative advantage, the number of trade links, the extensive and intensive margins as well as the contributions of structural and competitiveness effects to the intensive margin at a disaggregated product level. Section 6 summarizes the evidence and concludes.

2 Fishing in the same pool?

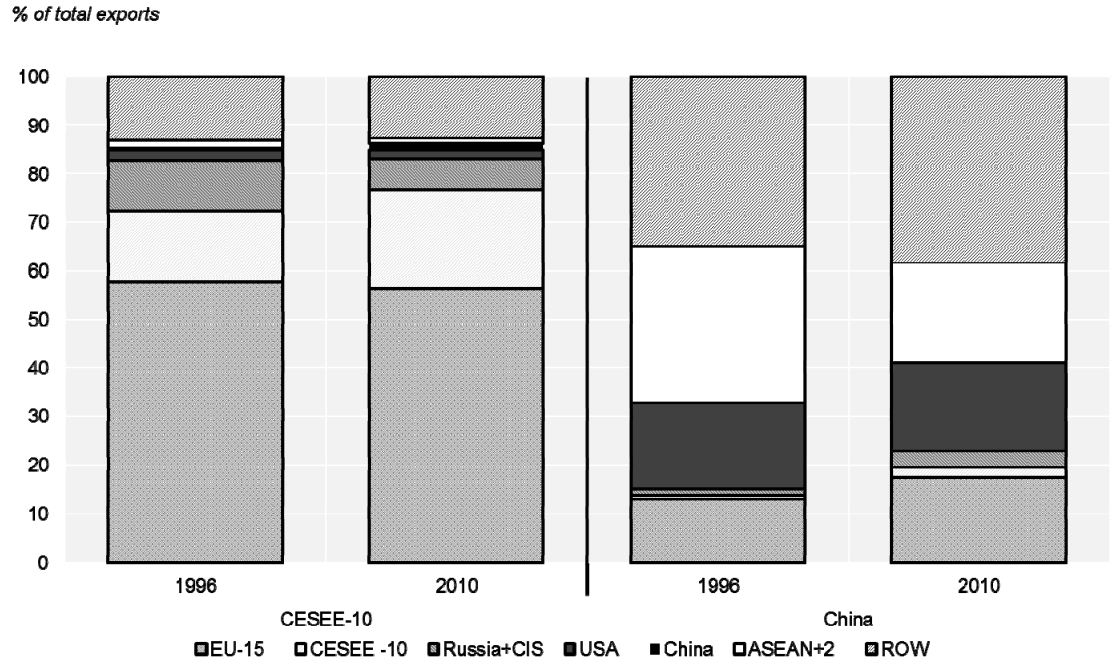
A first visual assessment is based on the export patterns of the CESEE region and China. If both regions are specialized in the same export destination markets and the same types of export products it is more likely that they are "fishing in the same pool". In this case their export-based catching-up process may be constrained and only the most competitive supplier – either in terms of quality and/or in terms of price – will ultimately survive. If, alternatively, CESEE and China are serving the EU market with complementary goods, they can easily rebalance their export exposure.

Chart 1 confirms the regional concentration of CESEE exports to the EU-15 countries. Between 1996 and 2010 the share of total exports going to Western Europe remained broadly stable at 57%. Trade among CESEE countries intensified in this period as the region recovered from the transformational shock, mostly at the expense of exports to Russia and the CIS countries. In 2010 it reached 20% of total exports. China still plays a negligible role as an export destination for CESEE countries. We should emphasize here once more that this data set does not give information about indirect trade flows to China in the form of inputs to e.g. German exports that

ultimately go to China. These numbers thus underestimate the total importance of China for the CESEE export market.

Chinas export focus shifted from Asian countries towards European economies and the rest of the world. The importance of the U.S. as export destination remained roughly constant while the European Union has become the most important export destination for Chinese products. The marked expansion of the share of exports going to the EU-15 market – together with the fact that the CESEE exports to the EU-15 remained broadly stable – may be interpreted as an indication that Chinas expansion at the European market is likely to imply rising competition for the CESEE region.

Chart 1: Regional composition of exports at the world market



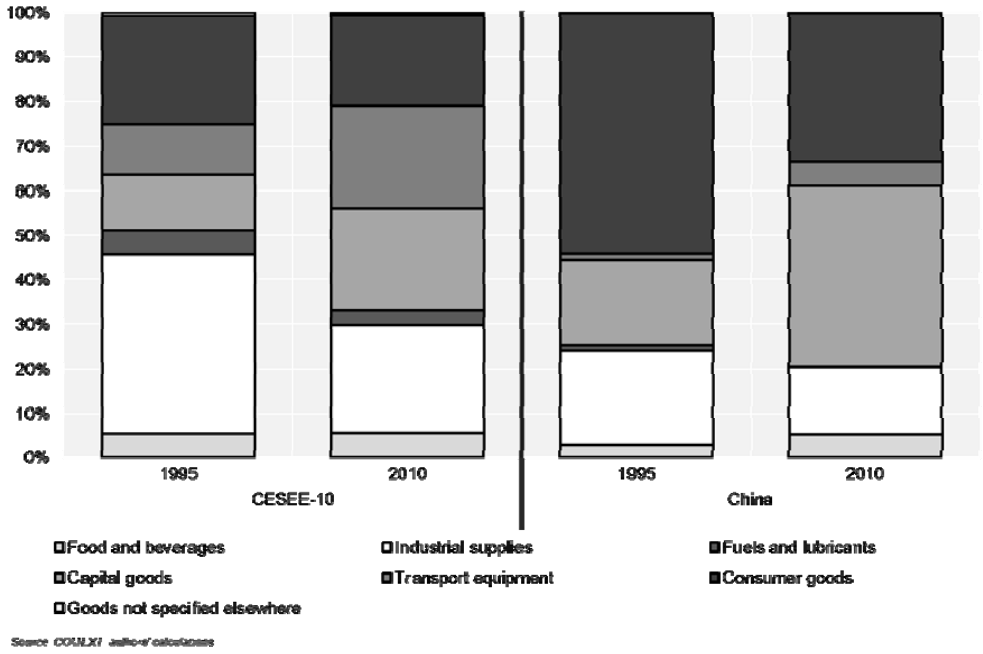
Source: UN Comtrade, authors' calculations.

But also in sectoral terms competition between the two regions is likely to have intensified. In Chart 2 total exports are decomposed according to end-use categories (BEC[6]). Over the last 15 years export expansion to the EU-15 was strongest by both regions in capital goods and transportation equipment. Correspondingly the

[6] The United Nations has classified international trade into seven "Broad Economic Categories (BEC)" according to end-use categories: (1) food and beverages, (2) industrial supplies not elsewhere specified, (3) fuels and lubricants, (4) capital goods, (5) transport equipment, (6) consumer goods not elsewhere specified and (7) goods not elsewhere specified.

relative share in their total export portfolio increased between 1995 and 2010. At the same time exports of consumer goods and industrial supplies lost relative importance within the respective export baskets of CESEE and China. In 2010, the diversification of exports according to product categories was more balanced in CESEE than in China, where exports of capital goods dominated the product structure with a share of about 42%.

Chart 3: Share of product category in total exports to the EU-15

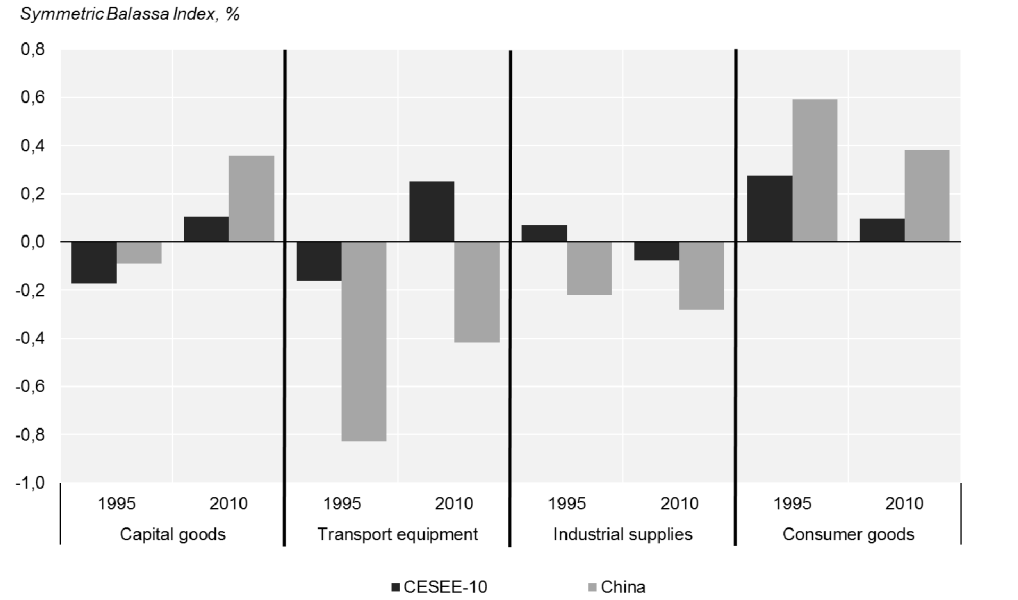


An analysis of comparative advantages confirms that both the CESEE region and China expanded production especially in those product categories where they have increased their comparative advantage between 1995 and 2010. While comparative advantages cannot be observed, they can be "revealed" from export market shares. If for example a specific exporter is over-represented on a certain export market in producing cars one can conclude that it is among the country's strengths to produce cars. The specific revealed comparative advantage (RCA) measure we use here is the revealed symmetric comparative advantage (RSCA) index following Fertö and Soós (2006)[7]. This index calculates the relative

[7] The original RCA measure is calculated as $RCA_{ki} = (X_{ki}/X_{ni})/(X_{kr}/X_{nr})$, where X_{ki} represents total exports of product k and region i, n refers to all products and r denotes all regions of the sample (see Vollrath, 1991). This index is asymmetric, as it varies from zero to one for product categories in which a region has a revealed comparative disadvantage and from one to infinity for product categories where countries have a RCA. The advantage of the $RSCA_{ki} = (RCA_{ki}-1)/(RCA_{ki}+1)$ is that values below unity have the same weight as changes above

representation of a region's exports compared to the average representation of all players in the EU-15 market in a specific product category.

Chart 4: Index of revealed symmetric comparative advantage in selected BEC



The indices are given in Chart 4 for the four most important product categories according to the BEC classification. It shows that both the CESEE region and China gained comparative advantage in exporting transport equipment and capital goods and lost in the other two categories. It is especially interesting to see that CESEE could develop a positive RSCA index in transportation equipment since 1998, which actually expanded further even during the global financial crisis. The CESEE region obviously successfully managed to strengthen its competencies in this highly contested export category, especially given the still negative Chinese RSCA index despite a rising, but comparatively low export share. In light of the importance of transportation products within the CESEE's export basket this is an encouraging sign that the region is standing up well to Chinese competitors.

Calculating RSCA indices based on a different product classification (at the 6-digit HS level) roughly confirms the results presented in Chart 4[8] but reveals further interesting patterns. For example both regions show increasing competitive strength

unity (Dalum, Laursen and Villumsen 1998). For alternative measures of comparative advantage see e.g. Bojneca and Fertö (2012).

[8] The related data are available upon request.

in exporting machinery. By contrast, the RSCA clearly shows that CESEE lost its comparative advantage in exporting textiles and footwear to the EU-15 market over 1995 to 2010, whereas China further gained competitiveness in these goods. This appears to be a market segment where the CESEE region lost the competitive battle against China. Over the entire perios, China has also been very competitive in other manufacturing, which among other goods includes toys, games and furniture, but CESEE is catching-up in these goods as shown by the slightly increasing RSCA index over 1995 to 2010.

Overall, the parallels in trade patterns confirm that CESEE and China are competing for the same product markets and that competition is intensifying. China increasingly targets its exports towards the EU-15 market and expands its exports in similar product classes compared to the CESEE region. The CESEE region could increase its competitiveness according to the RSCA index in diverse product categories, such as transportation equipment, plastics, machinery and other manufacturing, at least since the early 2000s and could successfully stand up to the Chinese competitors. By contrast textiles and footwear appears to be a segment where CESEE has lost competitiveness. In addition, a loss of comparative advantage in exporting consumer goods and industrial supplies went hand in hand with losses in export market shares for both regions.

3 Signs for crowding out?

The analysis so far has identified several product categories where the CESEE countries and China stand in direct competition. The impressive growth rates of Chinese exports in some export classes nourished concerns that China may be crowding out CESEE exporters at the EU-15 market.

We investigate this question exploiting the information from highly disaggregated trade data at the 6-digit HS level over the period 1995 to 2010. The data set allows us to identify the number of trade links where the CESEE region and China stand in direct competition at the EU-15 market, i.e. are fishing in the same pool. It also gives information about lost trade links, possibly indicating crowding out effects. While the empirical analysis is done at the product level we present the main results at a more aggregate level of product categroies.

A trade link is defined as exports of a specific product *x* from country *y* to an individual EU-15 country in year *t*. Taking the example of CESEE exports of shoes to Austria over a given period we can identify four possible patterns. CESEE may be an active shoe exporter to Austria throughout the period (ACTIVE), CESEE may not export shoes to Austria at all (INACTIVE), CESEE may only start exporting shoes to Austria during the period (ENTRY) and CESEE may stop serving the Austrian shoe market (EXIT). Similarly we observe the same options for China as a shoe exporter, denoting them with lower case letters (active, inactive, entry, exit). Generally we only accept those newly formed trade links as ENTRY cases that survive for at least two years thereafter. This correction is justified by the high number of trade links that get lost in early years. [9]

We then combine these pieces of information to observe "trade pairs" which gives us 16 possible combinations. We are especially interested in those trade links, where:

- Both CESEE and China are active, standing in direct competition (ACTIVE-active).
- Both regions were initially active but one of them left the market, possibly because it was crowded out by its competitors (ACTIVE-exit and EXIT-active).
- Initially only one of the regions is active but the other region enters the market during the period, indicating intensified competition (ENTRY-active, ACTIVE-entry). In the extreme case the new entrant may contribute to crowding out the incumbent (ENTRY-exit, EXIT-entry). This may be interpreted as evidence of cut-throat competition.

Chart 5 shows the six quantitatively most important of the 16 possible combinations of activity (ACTIVE, INACTIVE, ENTRY, EXIT) of CESEE and China at the EU-15 market. In each case we show the fraction of the specific combination in all trade links, where at least one of the exporters was active, i.e. where either CESEE or Chinese exported one specific good to one of the EU-15 countries. A critical issue when using this data source is the repeated revision of the HS classifications which requires some data adjustment. During our observation period these reclassifications occurred in 1996, in 2002 and in 2007. The reclassifications introduce breaks in the time series, with

[9] Besedeš and Prusa (2011) emphasize the importance of the survival of export links for trade integration. Actually the short duration of newly established trade links is a special weakness of developing countries and emerging economies: For some countries 70% of new export relationships fail within two years, while successful exporters have failure rates of half that size.

products being moved into other or new categories. Trade links may thus be classified as new without any underlying changes in actual trade links.[10] To avoid these spurious entry cases we investigate three subperiods separately: 1996 to 2001, 2002-2006 and 2007-2009. This ensures that activity types within subperiods are not affected by any of the reclassifications to the HS system.

The first observation is that the fraction of products were both the CESEE region and China are continuously active (ACTIVE-active, white bars) is large and has risen over time, from 44% in the period 1996-2001 to more than 60% in the last subperiod, indicating strong and strengthening direct competition. From the (ENTRY-active) and (ACTIVE-entry) bars we can read that this comes both from CESEE entering traditional Chinese domains and China entering CESEE export domains. Interestingly the former gained importance over time while the latter (Chinese entry in traditional CESEE domains) lost importance.

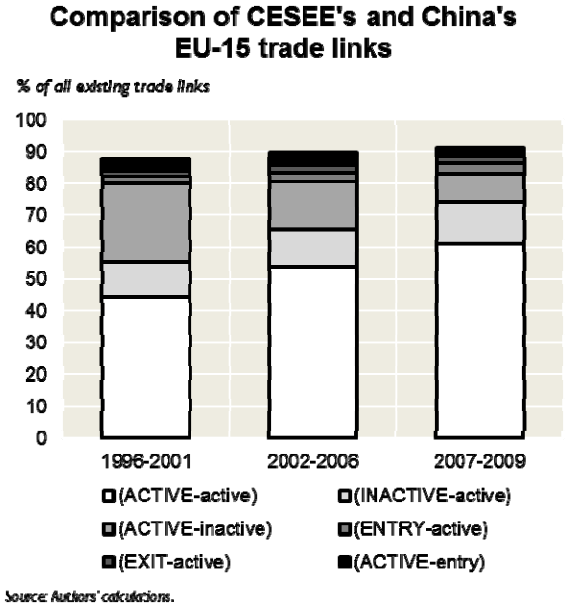
Generally we observe that the fraction of product links where CESEE is the only exporter (ACTIVE-inactive) is shrinking over time (from 25% in the period 1996-2001 to 9% in the period 2007-2009), while the (INACTIVE-active) bars actually even increased slightly (from 11% to 13%). This development indicates on the one hand that China has subsequently entered traditional CESEE export markets. Today there are not many areas left in which China could become an additional competitor for CESEE. In some of these cases the CESEE may have a particular comparative advantage, e.g. because the EU-15 rather imports agricultural products from CESEE than China. On the other hand, China has increasingly entered new markets where CESEE has not been an active exporter.

At the same time the number of lost trade links (EXIT or exit, not shown in the graph) is generally very small so that we cannot observe clear signs of marked crowding out effects[11]. Entry into new markets appears to happen mostly on a able basis, thus intensifying competition. But still the number of cases where CESEE left an export market and China was active increased over time from 1.6% to 2.5%.

[10] Detailed information on the reclassification can be found in the Appendix.

[11] We should emphasize here again that because of the reclassifications in 2001/02 and 2006/07 the bars are not directly comparable across time. The apparent huge shift from (ACTIVE-inactive) to (ACTIVE-active) from the first to the second subperiod may thus at least partly be due to reclassifications of products. This hypothesis is reinforced by the fact that the (ACTIVE-entry) bar in the first subperiod is much too small to explain all of the strong reduction of the (ACTIVE-inactive) bars.

Chart 5: Dynamics of CESEE's and China's trade links with EU-15fraction of trade links where CESEE (capital letters) and China (lower case letters) are active or inactive throughout the period or where they enter or exit the product market



Source: Authors' calculations.

In Section 2 we identified capital goods and transport equipment as the most contested product categories, given that both CESEE and China heavily expanded its export focus in these areas. We thus repeat the exercise for these product groups. In both product categories CESEE and China shared about 70% of trade links towards the end of the sample (ACTIVE-active), confirming the especially high and rising level of bilateral competition. Correspondingly the trade links where CESEE has monopoly position (ACTIVE-inactive) shrinks rapidly. In the case of capital goods there are less than 4% of trade links where CESEE is active, but China is not.

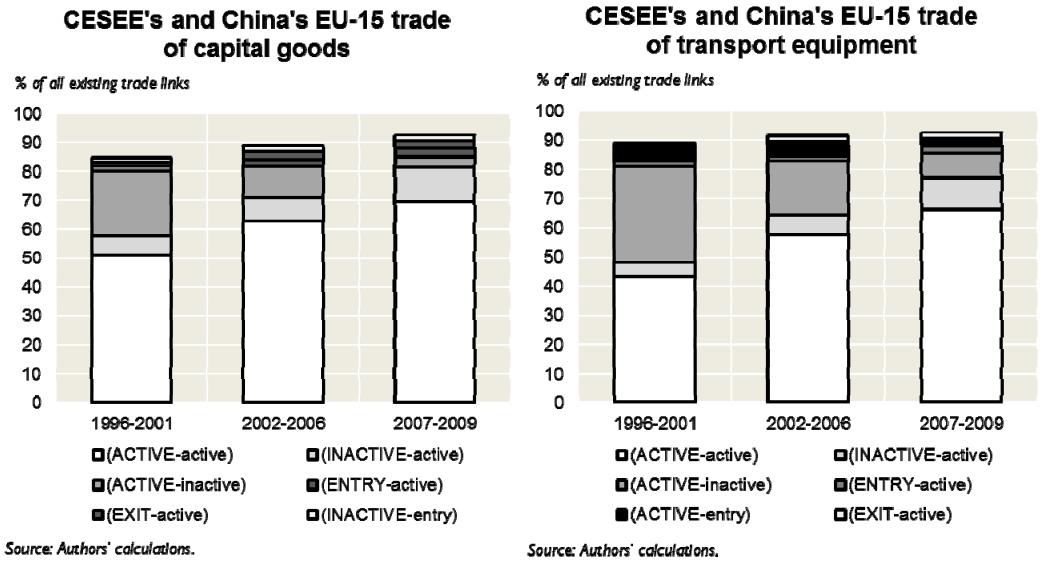
Interestingly the increase in the (INACTIVE-active) bars, i.e. those trade links where China is the only supplier, is much more pronounced than in Chart 5. Such an increase can on the one hand indicate crowding-out effects. Given the low number of (EXIT-active) cases this factor seems to be of small importance. The other possibility is that China enters markets which have previously been untapped by both regions. The latter appears to be the more important factor.

Overall the charts confirm the pattern of firm competition between CESEE and China, especially in capital goods and transportation equipment, but no pronounced crowding-out patterns. In the remaining BEC categories (not shown here) mutual competition is either much smaller (only about 45% of common trade

links for food and beverages and fuels and lubricants, about 55% for industrial supplies) or more stable over time (consumer goods with about 70% of common trade links).

Chart 6 and 7: Comparison of CESEE's and China's EU-15 trade links for selected product categories,

fraction of trade links where CESEE (capital letters) and China (lower case letters) are active or inactive throughout the period or where they enter or exit the product market



4 Exploration versus intensification?

Having reached the conclusion that there are no signs of broad-based crowding-out tendencies at the product level, we now decompose export growth to determine the sources of trade dynamics. This will allow us looking at the crowding out hypothesis from a different angle.

Export growth can arise from two margins of adjustment. On the one hand, countries can deepen trade within conventional trade relationships i.e. countries export more of the same products to the same export destinations. The part of export growth that emerges from this *intensification* of trade relationships is referred to as the "*intensive* margin" in the literature. Alternatively, countries can explore new markets, i.e. find new geographical export destinations for traditional export products or extend the product portfolio going to their existing trading partners or both. The part of export growth that emerges from the *extension* of the set of trade relationships is called the "*extensive* margin".

In this section we decompose export growth of the CESEE region and China into the extensive and intensive margin to assess the competitive pressure and possible crowding out effects. For this purpose we use once more the highly disaggregated data set on trade volumes at the 6-digit HS level over the period 1995-2010. We decompose export growth into three components:

- export growth along existing trade relationships,
- export growth arising from new trade relationships, i.e. from exporting traditional products to new destinations and/or from extending the product portfolio going to a given country,
- export losses due to the discontinuation of export relationships.

The intensive margin is then defined as the change in the value of existing trade relationships as a share of total export growth. The extensive margin is the difference between the value of newly started trade relationships and the value of discontinued trade relationships, again measured as a fraction of total export growth.[12] It is thus a measure for export diversification within the EU-15 market. By definition the extensive and intensive margin sum up to one.

While many papers in the literature use a "comparative static approach" (Amiti and Freund, 2008; Evenett and Venables, 2002; Felbermayr and Kohler, 2006; to name just a few) and compare exports of two given years in the beginning and the end of the sample, we follow here the dynamic definition as proposed by Besedeš and Prusa (2011), i.e. we explicitly investigate the dynamics over the whole sample period.[13] This does not only avoid the arbitrary choice of the time span but also allows us to investigate specific events such as the major EU enlargement round in 2004 or the global financial crisis.

Once again the HS reclassifications in 1996, 2002 and 2007 may cause problems for the calculation of the intensive and extensive margins, as products are moved into other or new categories. As a result, considerable activity in the extensive margin is

[12] In the earlier literature the level of disaggregation varies considerably. Amiti and Freund (2008) focus on the product level, so that expanding the set of export destinations for a specific export product would not affect the extensive margin, while exporting a new product for the first time would. By contrast Felbermayr and Kohler (2006) and Helpman et al. (2008) focus on the country level, so that only the exploration of entirely new export destinations changes the extensive margin. Evenett and Venables (2002) and Besedeš and Prusa (2011) finally focus both on products and countries, so that any new trade relationship increases the extensive margin. This is the approach also followed in this paper.

[13] This naturally favors the intensive margin as the major contribution to trade growth since all trade relationships that survive beyond the second year are accounted in the intensive margin.

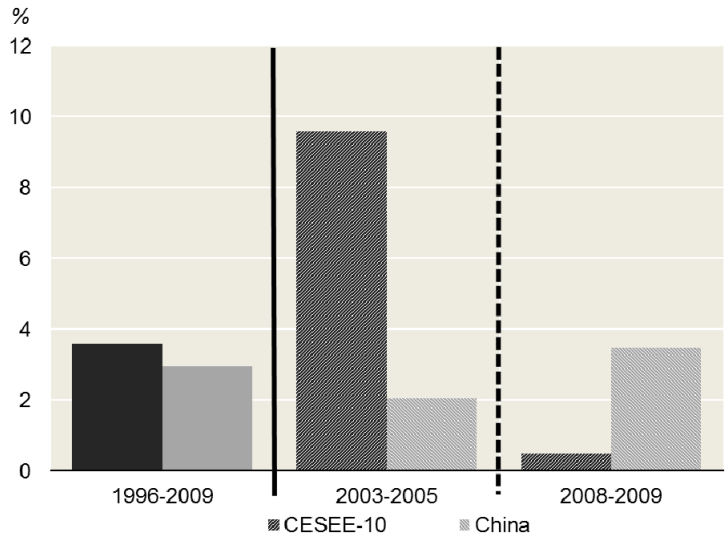
potentially observed without underlying changes in actual trade relationships. Using the raw data series, Amiti and Freund (2008) find that the extensive margin accounts for 25% of total export growth from China to the USA. When instead using only those product codes that continuously exist during the entire period and are thus not subject to reclassification, the share of the extensive margin shrinks down to 2%.[14] We have chosen an intermediate approach to this problem whereby we reclassify all products to the 1996 revision of the HS classification using the official conversion key.[15] The appendix provides more details on the reclassification issue.

Chart 8 shows the contribution of the extensive margin to total export growth to the EU-15 market over the entire sample as well as for two interesting subperiods, the period around the EU enlargement round in May 2004 and the global financial crisis. Charts 9 repeats the exercise for those BEC categories that turned out to be most contested in the bilateral competition of the CESEE region and China (capital goods (chart 9a) and transport equipment (chart 9b)) as well as for industrial supplies (chart 9c) and consumer goods (chart 9d).

[14] This can be interpreted as the lower bound of the extensive margin, as new product codes, which are now excluded, tend to refer to entirely new products, such as electronics, with generally high export growth.

[15] In spite of the data treatment according to the suggested conversion tables we still observe considerable spikes following the HS 2007 revision. A detailed analysis of the underlying reasons reveals that the reclassification cannot be ruled out as the reason for this observation. In China for example, about 70% of new trading links can be ascribed to problems with the reclassification.

Chart 8: Average contribution of the extensive margin to total export growth:



Source: COMEXT, authors' calculations.

A first observation is that the contribution of the extensive margin to export growth is very small and remains mostly below 5%. This finding is in line with several previous papers, although estimates of the extensive margin generally vary considerably due to methodological differences.[16] Studies on industrial countries tend to show smaller extensive margins as these countries have exploited the set of potential trade relationships to a greater extent (e.g. Besedeš and Prusa, 2011 and Cheptea et al., 2010).[17] Interestingly, in our case the contribution of the extensive margin is slightly higher for the CESEE countries than for China, both for the total sample and for most BEC categories. This result appears to be dominated by the specific event of the accession of eight countries in Central and Eastern Europe in 2004 (see below). Overall our results are in line with the existing literature using methodologies comparable to our paper.

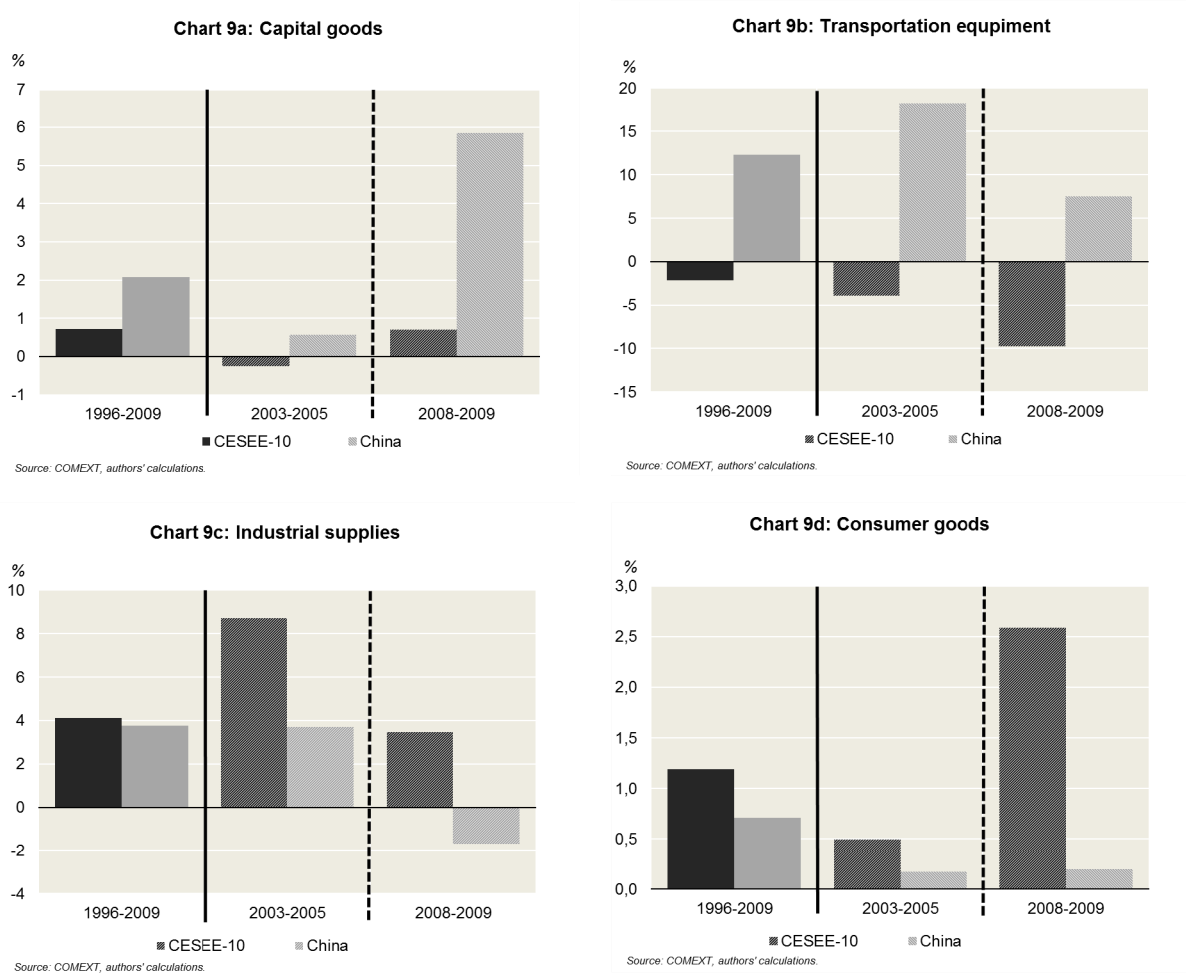
The major source of export growth is thus the intensification of traditional trade relationships rather than the exploration of new markets. This is also true for China,

[16] Apart from differences in disaggregation level and comparative static versus dynamic view on the data, the use of traded quantities versus trade values further adds variation to the calculation. Some papers (e.g. Besedeš and Prusa, 2011) calculate margins based on the number of trade relationships instead of the value of exports or focus exclusively on new trade relationships without subtracting vanishing trade relationships. Given that new trade relationships tend to be of small magnitude and furthermore face high failure rates this yields higher estimates for the extensive margin.

[17] Evenett and Venables (2002) even find a central role of the extensive margin for growth in developing countries.

thus weakening evidence that China is progressively flooding new markets. This result is in line with Amiti and Freund (2008), but nevertheless somewhat surprising. Imbs and Warziarg (2003) for example find that countries initially tend to diversify their production portfolio in the course of their catching-up process, while specialization only starts when they have reached a higher level of development. Within this logic we would expect the extensive margin to be an important source of export led catching-up processes of countries like China. A possible explanation for the small weight of the extensive margin is that Chinas export diversification was already accomplished early. According to Cheptea et al. (2010) the Chinese export product diversity was already comparable to that of major industrial countries in the mid 1990s. This can explain the relatively small size of the extensive margin and its declining contribution to export growth over the period of our sample. The results of the decomposition for different product categories (according to BEC classification) for the whole period are similar (Chart 9; first section of each graph). The only exception is the average contribution of the extensive margin to export growth of transportation equipment. First, it is very small and negative for CESEE indicating consolidation in the market. CESEE was already very active in exporting transportation equipment to the EU-15 before 1996 as shown by the high market share of this product category in its total exports (Chart 3). Therefore, more trade relationships got lost than new ones were created from 1996 to 2009. Second, China's contribution of the extensive margin to export growth exceeded 10%. This corresponds to the strong rise of Chinese exports of transportation equipment to the EU-15, starting from a low base in 1996. Many new trade relationships were established until 2009 which allowed China to expand its market share in the EU-15 market for transportation equipment.

Chart 9: Average contribution of the extensive margin to export growth in selected product categories



The two subperiods shown in the second and third section of chart 8 and 9 give interesting information about very specific events in the last decade. The second section of the chart shows the period around the Eastern enlargement of the EU in 2004. In this period the extensive margin, i.e. the exploration of new trade relationships, plays an important role, reaching almost 10% on average over the period 2003-05. Obviously many new trade relationships were established right after EU accession. However, there are differences across product categories. While CESEE the number of lost trade relationships exceeded those of new relationships in exporting transportation equipment and capital goods (again indicated by the negative contribution of the extensive margin to export growth shown in Chart 9), new trade relationships were gained in food items, industrial supplies and consumer goods. As trade between the CEE countries and the EU had been tariff-free since 1998 as a result of the Europe Agreements, this boost in trade relationships relates to

the elimination of remaining non-tariff trade barriers, as well as to the liberalization of trade of agricultural products. Interestingly export growth hardly increased immediately in 2004, suggesting that the newly formed trade relationships were initially of small magnitude. Export growth in CEEs only peaked in 2005/06 with the deepening of the newly established trade relationships. Partly this trade integration may have come at the expense of China, given the small contribution of the extensive margin to total export growth of China in the years following the EU enlargement. However, differences across the product categories have to be considered. For example, China could further expand its exports of transportation equipment, a traditional CESEE market, even during the time of accession of CESEE to the EU as shown by the relatively large Chinese extensive margin for transportation equipment accounting for about 18% from 2003-2005 (Chart 9).

The second interesting subperiod shown in the third section of chart 8 is the peak of the global financial crisis in 2008/09 when trade contracted sharply worldwide. In this period the extensive margin of the CESEE countries remains positive even though the contribution is almost negligible, indicating that market adjustment mainly took place along existing trade relationships while only some trade relationships got permanently lost. Similarly the trade recovery proceeded along existing trade relationships while hardly any new relationships were developed. Patterns for CESEE differ, however, substantially across BEC categories with a large number of lost trade relationships in exports of food items, industrial supplies and consumer goods, as indicated by the large contribution of the extensive margin to the overall decline in exports in this period. In contrast, the negative contribution of the extensive margin to the decline in exports of transportation equipment indicates that CESEE was able to create on net new trade relationships in this category during the crisis. For China, the severe downturn in exports during the crisis apparently implied a higher loss of trade relationships as compared to CESEE. Differences in trade patterns across product categories can be identified in Chart 9.

Overall it seems that most of China's trade expansion came in the form of a deepening of existing trade relationships, while only a small number of new trade relationships was formed each year. We also observed that the EU enlargement led to the creation of new trade relationships among the CEE countries and the EU-15, which may have partly come at the expense of China. However, this was not the case for trade relationships in transportation equipment indicating a potential threat

to CESEEs' traditional competitiveness in this product category. The temporary trade collapse caused by the global financial crisis implied only a minor permanent loss of trade relationships for the CESEE region, while for China trade losses resulted from both lower trade volumes and the discontinuation of trade relationships with EU-15 countries. The regional and historical links between the CESEE and the EU-15 appear to have served as a cushioning factor in adverse economic circumstances.

5 Drivers of intensive margin trade growth

The analysis above has suggested that competition between China and CESEE deepened considerably over the past 15 years. However, we have also observed that export growth came primarily from a deepening of existing trade linkages. In other words the intensive margin of trade has accounted for the largest contribution to trade integration. In this section we decompose intensive margin growth, i.e. the part of trade growth that originates from existing trade relationships, in order to assess whether the increase in exports was primarily demand or supply driven. This allows us to make a qualified judgment about each exporter's "competitiveness" as opposed to beneficial demand conditions.

The intensive margin growth is determined by four distinct contributions: the growth of the market, two structural effects and a competitiveness effect. The market growth effect is the average annual import growth of the EU-15 members along the intensive margin, i.e. it reflects EU-15 import demand. The two structural effects, the geographical and sectoral effect, are determined by the evolution of demand in the destination countries and product categories. Thus, the first three effects capture demand factors, while the competitiveness effect is supplier (i.e. exporter) related. The competitiveness effect captures all other exporter specific aspects that cause a deviation of trade growth from the average EU-15 import demand. Hence, it captures aspects of price competitiveness (exchange rate developments, unit labor costs, etc.), quality competitiveness, supply capacity and the like.

We follow the econometric approach developed by Cheptea, Fontagné and Zignago (2010). As compared to the traditional algebraic decomposition of trade growth (see, e.g. Buitelaar and van Kerkhoff, 2010) this approach is more robust and the results do not depend on the sequencing of decomposing into sectors and

countries. They calculate export growth by the Törnquist index of EU imports from each partner as given in equation (1) below:

$$d \ln X_i^t \approx \ln\left(\frac{X_i^t}{X_i^{t-1}}\right) \quad (1)$$

where $X_i^t = \sum_{jk} X_{ijk}$ and X_{ijk}^t are the imports of good *k*, exported by region *i* (CESEE and China) and imported by country *j* in the EU-15.

In a first step they regress the growth in each trade relationship on exporter (i), importer (j) and product (k) fixed effects using weighted OLS (equation 2), whereby the weights are calculated as the average of the respective weight in time t and t-1:

$$\omega_{ijk}^t = \tfrac{1}{2}\left(\frac{X_{ijk}^{t-1}}{X^{t-1}} + \frac{X_{ijk}^t}{X^t}\right)$$

$$\ln\left(\frac{X_{ijk}^t}{X_{ijk}^{t-1}}\right) = const^t + \sum_i \alpha_i^t D_i^t + \sum_j \gamma_j^t D_j^t + \sum_k \beta_k^t D_k^t + \varepsilon_{ijk}^t \quad (2)$$

Equation (2) captures the contributions of the export performance of individual exporters captured by an exporter dummy D_i^t, the geographic structure of exports within the EU (i.e. to which of the 15 member states the respective region is exporting, whereby each importing EU member state is captured by the importer dummy D_j^t) and the product structure captured by a product dummy D_k^t. This decomposition is done for annual growth in each year of the observation period. Re-weighting these terms, subtracting averages (in order to make the fixed effects independent of the omitted category in each dimension) and taking means over the whole period, we obtain the following decomposition of average annual export growth by exporter into the four contributions: total trade growth (*dlnX*), geographic structure (*GEO*i), product structure (SEC_i)[18] and the exporter's competitiveness ($COMP_i$),:[19]

$$d \ln X_i = d \ln X + GEO_i + SEC_i + COMP_i \quad (3)$$

[18] Products are classified by HS sections (2-digit codes) as in Cheptea, Fontagné and Zignago (2010) thus reflecting a fairly detailed sectoral structure.

[19] See Cheptea, Fontagné and Zignago (2010), pp. 19ff for the details of this decomposition. We deviate slightly from Cheptea, Fontagné and Zignago (2010) insofar as we calculate the effects including average import growth of the EU-15 and we use averages over the whole period rather than summing up over all years. Thus we obtain average annual growth rates which we find more meaningful for the interpretation.

Table 1 gives the results of this decomposition of EU-15 imports separately for imports originating from CESEE, China, other EU-15 countries and the Rest of the World (ROW). A couple of observations from these charts are worth noting: The CESEE region and China both showed an above average intensive margin growth performance on the EU-15 market. Successful exporters should at least beat the rate of market expansion (again measured in terms of existing products, to be consistent). Both regions fulfill this criterion over the period as a whole, but also in individual sub periods including the years 2009 and 2010, when import demand from the EU-15 actually fell on average.

Table 1: Decomposition of the intensive margin of total export growth,
annual average contributions to intensive margin growth from 1996 to 2009

		Demand-Side			Supply-Side
	Intensive margin growth	Average EU-15 import growth	Geographical effect	Sectoral effect	Competitiveness effect
CESEE-10	**11.61**	5.55	-0.13	-1.00	7.25
China	**15.27**	5.55	0.01	-1.50	11.54
EU15-INTRA	**4.35**	5.55	0.00	-0.20	-1.20
ROW	**5.23**	5.55	-0.02	0.57	-0.90

Source: COMEXT, Authors' calculations.

Also for both CESEE and China the competitiveness effect surpasses the effect of EU-15 import growth, while the effects from the structural composition with respect to both, products and destination countries within the EU-15, are negligible. The contribution of sectoral specialization is actually negative for both regions. The Charts in Appendix 2 confirm this picture providing annual data on the contributions of the four effects to intensive margin growth in the CESEE and China. They additionally show that the exporter specific effects are relatively stable over the observation period. Most of the variation in yearly growth rates stem from changes in EU-15 import demand which was subject to considerable fluctuations over 1995 to 2010.

Table 2 shows some differentiation between selected product groups. Clearly, China is the only region to hold a rather unchallenged comparative advantage in textiles and also in metals. While the commodity structure contributes positively to export growth in textiles for all regions (measured by the sectoral effect), the geographic dispersion of exports among the 15 EU member states is much more important for metals.

Similar to textiles and metals, China also shows the strongest intensive margin growth in "other manufacturing" which includes toys, games and furniture among other goods. However, CESEE has been catching-up due to its strong competitiveness effect in this category. Geographical dispersion of exports of these goods does only play a rather small role in explaining individual growth performance.

Table 2: Decomposition of the intensive margin of export growth for selected HS main sections

annual average contributions to intensive margin growth from 1996 to 2009

	Intensive margin growth	Average EU-15 import growth	Geographical effect	Sectoral effect	Competitiveness effect
Textiles					
CESEE-10	**2.9**	3.1	-0.7	4.9	-4.3
China	**12.4**	3.1	-0.5	5.0	5.0
Metals					
CESEE-10	**9.0**	6.0	3.6	0.7	-1.4
China	**15.3**	6.0	2.9	-0.5	6.9
Chemicals					
CESEE-10	**9.6**	7.9	3.6	4.4	-6.1
China	**13.2**	7.9	3.4	4.6	-2.4
Machinery and vehicles					
CESEE-10	**15.9**	4.4	0.6	-5.9	16.8
China	**22.1**	4.4	0.5	-5.9	24.7
Electrical machinery and precision instruments					
CESEE-10	**16.3**	5.6	0.7	4.8	15.7
China	**17.4**	5.6	0.9	4.7	16.0
Other manufacturing					
CESEE-10	**9.1**	2.6	-4.9	4.1	7.3
China	**13.1**	2.6	-2.9	3.8	9.8

Source: COMEXT, Authors' calculations.

Exports of machinery and vehicles as well as electrical machinery and precision instruments are clearly the domain where competition between the CESEE region and China appears to be very intense. Both regions are highly competitive in these sectors. In electrical machinery and precision instruments, CESEE countries were ahead of China at the beginning of the observation period however the competitiveness effect has gained considerably importance for explaining China's export growth in these products, reaching a level comparable to the one for CESEE countries towards the end of the observation period. Both regions show a decline in export growth rates (resulting mostly from a decline in the competitiveness effect) with respect to machinery and vehicles. In contrast, declining export growth rates in

electrical machinery and precision instruments in both regions are clearly a result of lower market growth in the EU-15. For these products, both regions show an increase in their competitive strength according to this decomposition.[20]

Overall CESEE and China show an above average export growth performance at the EU-15 market. In general, the contribution of the competitiveness effect to the growth performance is very strong and relatively stable in CESEE and China over 1996 to 2010. The decomposition of intensive margin growth further adds to explaining export developments according to product category. In line with our detailed trade relationship calculations above, competition is fierce among CESEE and China, particularly in machinery and vehicles, electrical machinery and precision instruments as well as increasingly in other manufacturing goods. In both exporting regions, the competitiveness effect has risen over the observation period.

5 Summary and Conclusions

Both China and the CESEE region have shown impressive export growth dynamics over the last two decades. While many papers have been written on the trade patterns and comparative advantages of each region, the direct link between their export performances has not been studied thoroughly so far. We fill this gap by analyzing the impact of the emergence of China as a global competitor on the trade performance of CESEE countries at the EU-15 market. More specifically we investigate whether China and the CESEE economies are "fishing in the same pool" because of similarities in their export structures. In the extreme case this may lead to crowding out of one of the competitors in specific market segments. We also investigate differences in both regions' export growth drivers by decomposing export growth of both regions into factors related to demand and demand structures as opposed to exporter specific factors which reflect pure competitiveness.

Overall we show that competition at the EU-15 market is intensifying as China increasingly targets its exports towards the European market. The number of trade links (exports of a specific product to a specific country) where both regions are active has increased substantially, while market segments where CESEE still holds a monopoly position have become scarce. At the same time hardly any trade links were lost, which points against substantial crowding-out effects. Generally the

[20] Detailed results for subperiods are available from the authors upon request.

deepening of already existing trade relationships (intensive margin) contributed most strongly to export growth in both regions, whereas the contribution of new trade links (extensive margin) had only a minor contribution, with the notable exception of the one-off effect of EU enlargement in 2004. Both the CESEE region and China could intensify existing trade linkages particularly due to their strong competitiveness, as shown by a shift-share analysis. Thus, mainly exporter-specific factors were responsible for the rather successful performance of both regions at the EU-15 market while the development and structure of demand played a minor role. Two conclusions can be drawn from this observation: First, both regions face an untapped potential at the EU-15 market. They could further improve their competitive position by responding more appropriately to demand characteristics. Certainly this implies shooting a moving target, since demand characteristic – both in terms of sectoral as well as geographical patterns – are subject to change over time. A careful observation of changing patterns of demand is thus a necessary prerequisite for such a strategy. Second, however, this suggests that the competitive position of both regions is rather sustainable as it is based on exporter-specific characteristics and thus also subject to economic policy decisions within these countries.

In a sectoral perspective, the most contested markets are those for capital goods and transport equipment, product categories where China and CESEE have gained both market share and competitive advantage. The CESEE region could so far stand up successfully to the Chinese competitors in many important market segments, including vehicles, plastics and machinery. In some segments, such as clothing, footwear and transportation equipment, China has surpassed CESEEs' competitiveness.

Overall we find that China and CESEE are increasingly "fishing in the same pool" on the EU-15 market. However we cannot confirm a common hypothesis that CESEE exports have broadly been crowded out of the European market by Chinese exporters, given the high level of competitiveness of both regions. A further diversification of production towards promising industries and constant quality improvements will become increasingly crucial, especially in face of slower EU-15 market growth.

With respect to the recent global economic crisis, the regional and historical links between the CESEE and the EU-15 may have been a cushioning factor as the temporary trade collapse did not cause permanent losses of trade relationships, while in the case of China trade losses came both from lower trade volumes and the discontinuation of trade relationships with EU-15 countries.

Thus, the CESEE countries still show a strong competitive position at the EU-15 market even though we clearly observe a rising competitive pressure from China. As a word of caution, we have to emphasize that the choice of our data set, i.e. the COMEXT database on trade going to and coming from European countries, - while allowing us to analyze trade flows between EU-15 and both exporters at the highly disaggregated product level - does not allow us to evaluate bilateral trade flows between China and CESEE countries directly. Hence, we cannot draw any conclusions on the bilateral relationship between the two regions. Furthermore, we cannot identify the indirect effects which are resulting from the potential involvement of both, China and CESEE in global value chains. For example CESEE exports to EU-15 countries that represent production inputs for goods which are assembled in the EU-15 but at the same time require additional inputs from China would establish a complementary relationship between the competitive strength of both regions which cannot be assessed by our analysis. Likewise, CESEE intermediate goods exports to EU-15 countries, which result in final goods exports to China cannot be identified from the data. Hence, the benefits of China's economic growth on the CESEE region is presumably underestimated.

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Data Appendix

The main data source of all calculations and charts in this paper is the COMEXT database[21] of Eurostat. All custom records of imports into the European Union are centrally collected in this database. We retrieved data at the detailed 6-digit level of the Harmonized System standard, which is a classification of traded goods developed by the World Customs Organization (WCO). With this code, it is possible to differentiate between about 5300 products. The fact that all data is maintained by a single central source guarantees a high level of accuracy and comparability, even on this detailed level. However, due to changes in the Harmonized System by the WCO during the observation period 1996 to 2010 in which we used this highly disaggregated data (namely in 2002 and 2007), changes in the extensive margin can appear because existing trading links were assigned to different categories. In cases where these new assignments refer to product categories that were not traded before between a specific country pair, the extensive margin would be increased by this reclassification although the good itself was already traded. This indeterminacy refers only to the years of the reclassification, namely 2002 and 2007.

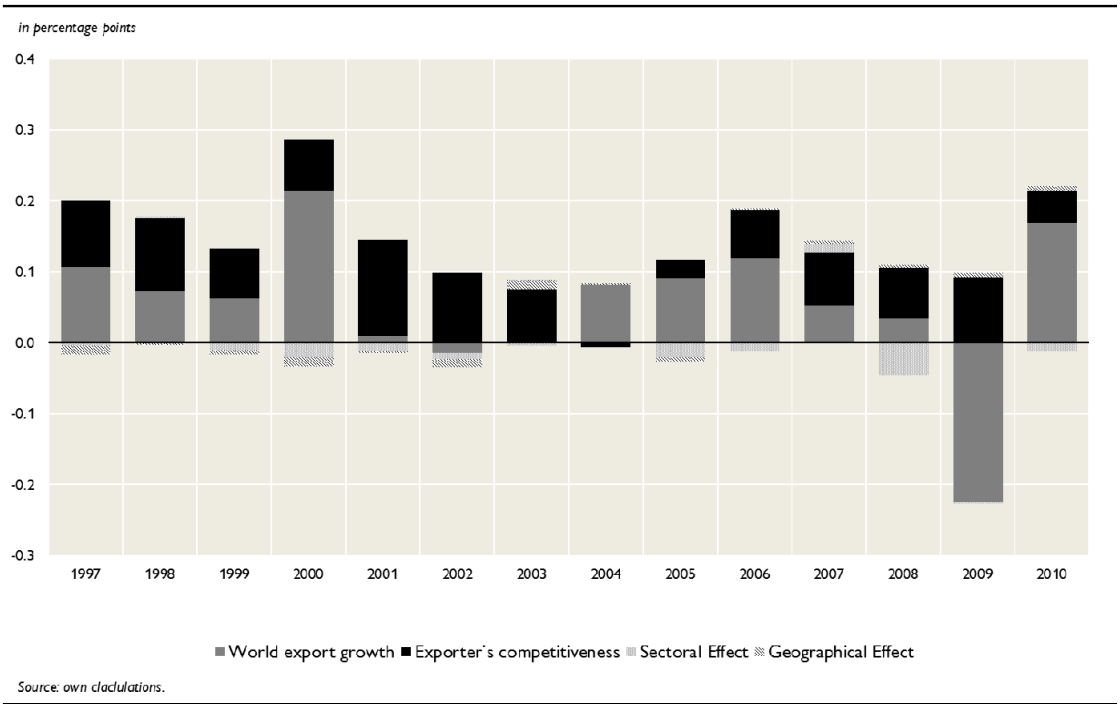
Therefore, to make the data comparable over the whole period, it is important to convert all categories to the nomenclature of a single year, in our case 1996. For this purpose, we use a reclassification table as provided by the WCO[22]. We can identify four types of reclassifications, namely (1) reclassifying an old category to a new one in a 1:1 relation, (2) splitting an existing category into several other categories in a 1:n relation, (3) combining several categories to one category in a n:1 relation and (4) re-categorizing several products to several new ones in a n:n relation. 1:1 and 1:n relations are reclassified unambiguously, we call this a distinct reclassification. n:1 and n:n relations are reclassified by the WCO according to the weighted importance of the original category in world trade and can therefore distort the real extensive margin in these years for the specific countries under observation, even after converting the product codes to the 1996 classification. In 2002, we only encountered minor problems in this respect as the reclassification only meant small changes to the HS system in general. In 2007 however, major changes in the HS code took place, including categories for technical products and vehicles that account for a significant fraction of exports in our sample. Therefore, the spikes in the

[21] http://epp.eurostat.ec.europa.eu/newxtweb/
[22] http://unstats.un.org/unsd/cr/registry/default.asp?Lg=1

extensive margin in these years call for closer attention. According to our analysis, the fall in the extensive margin for China in 2007 is largely related to the HS reclassification.

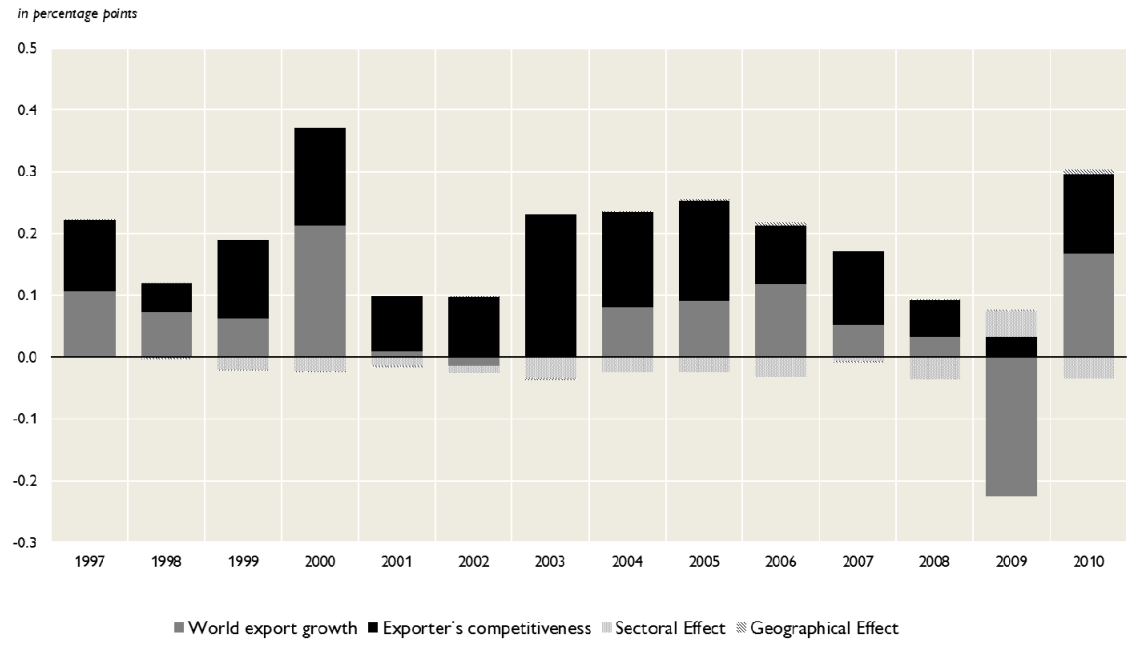
Appendix 2: Decomposition of the Intensive Margin

Chart A1: Decomposition of CESEE Export Growth to EU-15, 1996-2010



Source: own claclulations.

Chart A2: Decomposition of China's Export Growth to EU-15, 1996-2010



Source: own claclulations.