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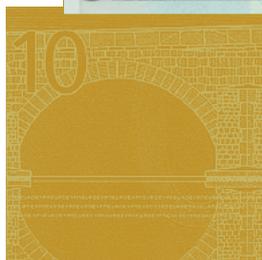
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# FISHING IN THE SAME POOL? EXPORT STRENGTHS AND COMPETITIVENESS OF CHINA AND CESEE IN THE EU-15 MARKET

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Julia Wörz and Christian Schitter



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## ABSTRACT

We investigate the impact of China as a global competitor on the trade performance of the ten Central, Eastern and Southeastern European EU Member States (CESEE-10) in the EU-15 market. The paper takes a comprehensive approach as we analyze export growth, export market shares, extensive and intensive margins and the dynamics in the number of joint trade links (Dynamic Trade Link Analysis) from 1995 to 2010. According to our findings, the most contested markets are those for capital goods and transport equipment. Overall, competition between CESEE-10 and China intensified as a result of their outstanding competitiveness and the continuous deepening of already existing trade relationships, while cutthroat competition has not materialized. While this suggests that the CESEE countries pursue a suitable export strategy, diversification of production toward promising new industries and markets remains essential, not least because the EU-15 market is projected to grow at a slower pace in the longer run.

**Keywords:** Competitiveness, trade shift-share analysis; Central, Eastern and Southeastern Europe, China

**JEL codes:** F14, F15, O57

## NON-TECHNICAL SUMMARY

Competitiveness in markets of advanced economies, such as the EU-15<sup>1</sup>, has always been an important issue, even in times of buoyant global trade growth. However, with world trade advancing at a slower pace, competitiveness becomes even more crucial for catching-up economies. Even though emerging markets are contributing ever more to global trade growth, the most advanced countries will, in the near future, continue to dominate world demand for traded goods. The subdued economic growth prospects for the latter will thus lead to an intensification of competition in advanced markets.

Between 1995 and 2010, China more than tripled its global market share. It became the world's number-one exporter in 2008 and has since maintained this position. In 2010, Chinese exports accounted for about 10% of total world imports and for 7.3% of EU-15 imports and hence overtook the market share held by the ten Central, Eastern and Southeastern European EU Member States<sup>2</sup> (CESEE-10) in Western Europe. This indicates fierce – and growing – competition between the CESEE countries and China.

In this study, we investigate the hypothesis that China's emergence as a trade competitor poses a threat to the export-oriented CESEE-10. Focusing on the period 1995–2010 and on the EU-15 as the export destination market, i.e. the 15 countries that joined the EU before 2004, we use a broad mix of methodologies to tackle the issue from several angles:

1. **Fishing in the same pool?** Do the export structures of the CESEE countries and of China center on the same product groups and destination countries, which would indicate fierce competition? Or are the export structures complementary, which would mean that both regions can expand within their niches? Do the CESEE countries and China have (revealed) comparative advantages in similar product groups?
2. **Signs of crowding out?** Are there signs that China's entry into the EU-15 market has crowded out CESEE competitors?
3. **Broadening of the export base 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)?
4. **Growth drivers within existing trade links?** Are the CESEE-10 and China backing the right horses, i.e. are exports following demand conditions and hence focused on the

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<sup>1</sup> Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom, i.e. the 15 EU countries that joined the EU before 2004.

<sup>2</sup> Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

most dynamic products and destinations? Or does export growth stem from supply potential, i.e. exporter-specific effects?

There is ample literature 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-10 region with China. Second, we zero in on a very detailed product level, which results in a highly differentiated picture of the two regions' competitive strengths and areas of direct competition. Third, instead of focusing on one single indicator, we use a variety of measures to assess a country's "ability to sell."

Overall, we show that competition in the EU-15 market has been intensifying, as China has increasingly been targeting its exports toward 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 the CESEE-10 still hold a monopoly position have become scarce. At the same time, hardly any trade links have been lost, which points against substantial crowding-out effects. Generally, the deepening of already existing trade relationships (intensive margin) has contributed most strongly to export growth in both regions, whereas the contribution of new trade links (extensive margin) has only been minor, with the notable exception of the one-off effect of EU enlargement in 2004. Both the CESEE-10 region and China managed to intensify existing trade linkages based on their strong competitiveness.

We find that China and the CESEE-10 are increasingly "fishing in the same pool" in the EU-15 market. However, we cannot confirm the widespread 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.

With respect to the recent global economic crisis, the regional and historical links between the CESEE-10 and the EU-15 may have had a cushioning effect, as the temporary trade collapse did not permanently sever trade relations, while, in the case of China, trade losses came from both lower trade volumes and the discontinuation of trade relationships with EU-15 countries.

Two conclusions can be drawn from our findings: First, both regions have an untapped potential in the EU-15 market. They could improve their competitive position further by responding more aptly to demand characteristics. Naturally, this implies shooting a moving target, since demand characteristics – in terms of both sectoral and geographical patterns – are subject to change over time. Carefully observing the changing patterns of demand is thus a necessary prerequisite for such a strategy. Second, the competitive position of both regions seems to be rather sustainable as it is based on exporter-specific characteristics and thus also subject to economic policy decisions within the respective countries.

# I INTRODUCTION

Over the last decades many emerging markets have been pursuing an export-led growth strategy as a source for their catching-up process, exporting primarily to industrialized countries. The success of this approach has been impressively demonstrated, since the early 1960s, by the “Asian tigers” – Hong Kong, Singapore, South Korea and Taiwan – and their immediate followers, the “tiger cub economies,” i.e. Indonesia, Malaysia, the Philippines and Thailand.

With the fall of the central planning system in the late 1980s and early 1990s, the Central, Eastern and Southeastern European (CESEE) countries embarked on a similar growth path, yet starting from rather different economic, sociodemographic and political grounds. They saw a radical shift in the economic, political, cultural and social paradigm. Exports were destined toward mature Western markets, as had been the case 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<sup>3</sup> countries more than doubled between 1995 and 2010 both at the global level and in the Western European (EU-15) market, reaching about 4% and 7%, respectively.<sup>4</sup>

China by contrast chose a highly controlled opening-up strategy aimed at preserving the central planning system, which resulted 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. In 2008, China even surpassed Germany and became the world’s number-one exporter. In the Western European market, China’s market share expanded even faster. Starting from a mere 1.8% in 1995, it reached 7.3% in 2010, having more than quadrupled, so that in 2010 the country overtook the CESEE region’s market share. It was hence among the most important exporters to the EU-15 in terms of market shares (including intra-EU-15 imports) besides Germany, France and the U.S.A.

These figures indicate fierce competition between the CESEE countries and China, especially in the European market. China and the CESEE region are the two most important importers to the EU-15 market (after Germany). The emergence of China as a trade competitor has thus often been said to pose a severe threat to the CESEE region, whose primary export destination is the European market. 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 with Chinese products may severely challenge the small countries in CESEE and restrain their export growth potential.

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<sup>3</sup> CESEE (or CESEE-10) refers to Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

<sup>4</sup> Total exports to the EU-15 include intra-EU-15 trade. The data are taken from the COMEXT database.

Competitiveness in markets of advanced economies, such as the EU-15, has always been an important issue, even in times of buoyant global trade growth. However, with world trade advancing at a slower pace, competitiveness becomes even more crucial for catching-up economies. Even though emerging markets are contributing ever more to global trade growth, the most advanced countries will, in the near future, continue to dominate world demand for traded goods. The subdued economic growth prospects for the latter will thus lead to an intensification of competition in advanced markets.

In this study, we investigate the hypothesis that China's emergence as a trade competitor poses a threat to the export-oriented CESEE region. Focusing on the EU-15 as the export destination market, i.e. the 15 countries that joined the EU before 2004,<sup>5</sup> we use a broad mix of methodologies to tackle the issue from several angles:

1. **Fishing in the same pool?** Do the export structures of the CESEE countries and of China center on the same product groups and destination countries, which would indicate fierce competition? Or are the export structures complementary, which would mean that both regions can expand within their niches? Do the CESEE countries and China have (revealed) comparative advantages in similar product groups?
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There is ample literature<sup>6</sup> 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 questions whether China's entry into the European market is a big threat to the CESEE countries, whether it has already led to crowding-out effects and whether the determinants of export growth differ

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<sup>5</sup> Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. This selection guarantees that there is no overlap between exporters (given that the CESEE-10 joined the EU in 2004 and 2007) and importers in Western Europe.

<sup>6</sup> For further research, see e.g. Amiti and Freund (2008), Imbs and Warziarg (2003), Benkovskis and Ramune (2010).

between the two regions. Second, we focus on the product level, which provides us with a highly differentiated picture of the two regions' competitive strengths and areas of direct competition. Third, we take a comprehensive approach in exploiting trade data to investigate the competitiveness of the CESEE-10 and China. Given the lack of a clear-cut definition of "competitiveness," we use a variety of measures of export performance to assess a country's "ability to sell".<sup>7</sup> This specifically comprises the thorough exploitation of Eurostat's COMEXT database at the 6-digit HS level<sup>8</sup> over the period 1995 to 2010. This database contains data on EU-15 imports from the rest of the world. When investigating the export performance of the CESEE countries and China, we actually use data on EU-15 imports 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.

It is also important to clarify at 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 the CESEE countries. Furthermore we cannot identify which CESEE exports to EU-15 countries are 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-10 export prospects. Instead, our analysis centers on the competition for market shares in 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, to 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.

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<sup>7</sup> As to output-related measures of competitiveness, real exchange rates could be used as an additional measure, such as in Manzur et al. (1999). Input measures (i.e. unit labor costs, productivity) are a common alternative to these output-based measures of competitiveness.

<sup>8</sup> The Harmonized System (HS) was developed by the World Customs Organization (WCO) to classify traded products.

## 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, they are more likely to “fish in the same pool.” In this case their export-based catching-up process may be constrained and only the most competitive supplier – in terms of quality and/or in terms of price – will ultimately survive. If, alternatively, the CESEE-10 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 1995 and 2010, the share of total exports going to Western Europe declined somewhat from 60% to 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, reaching 20% of total exports in 2010. As an export destination, China still plays a negligible role for the CESEE countries. Here, we should emphasize once more that the dataset 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 overall importance of China for the CESEE export market.

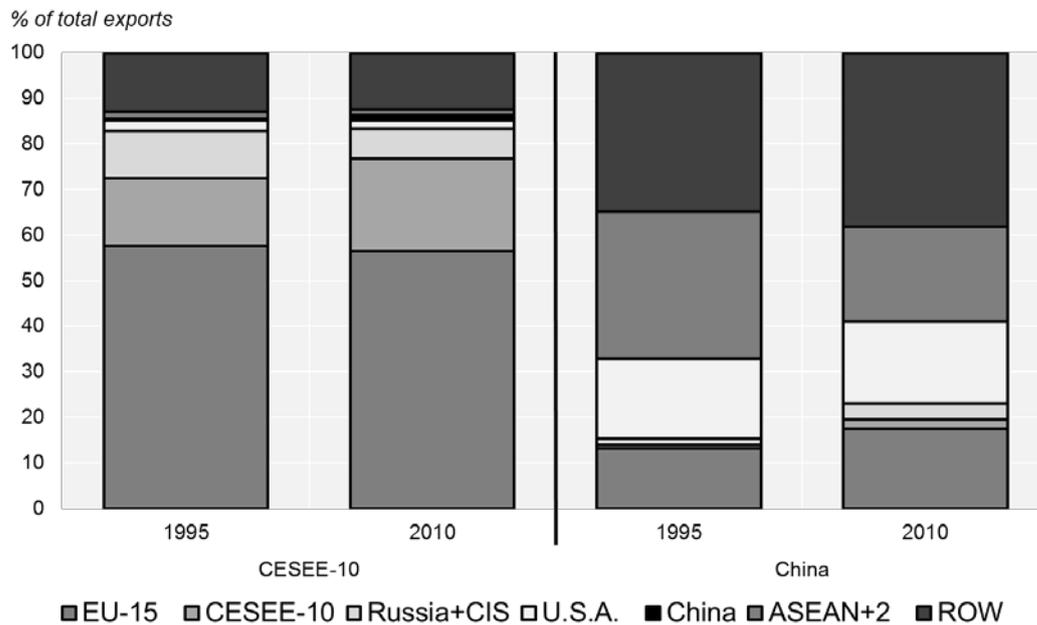
From 1995 to 2010, China’s export focus shifted from Asian countries to European economies and the rest of the world. The importance of the U.S.A. as an export destination remained roughly constant, but the EU became the most important export destination for Chinese products. The marked expansion of the share of exports going to the EU-15 market – together with the fact that CESEE exports to the EU-15 remained broadly stable – may be interpreted as an indication that China’s expansion in the European market implies rising competition for the CESEE region.

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<sup>9</sup>). Over the last 15 years, export expansion to the EU-15 was strongest by both regions in capital goods and transport equipment. Correspondingly, the relative share in their total export portfolio increased between 1995 and 2010. At the same time, exports of consumer goods and industrial supplies lost in relative importance. In 2010, the diversification of exports according to product categories was more balanced in the CESEE-10 than in China, where exports of capital goods dominated the product structure with a share of about 42%.

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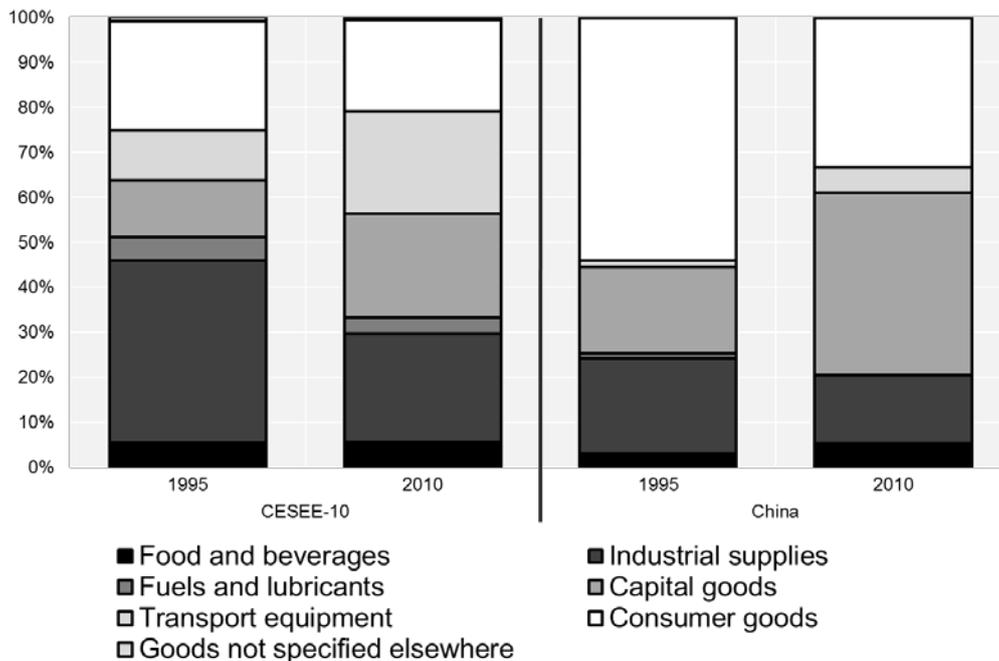
<sup>9</sup> The United Nations has classified international trade into seven “Broad Economic Categories (BEC)” according to end-use categories: (1) food and beverages, (2) industrial supplies not elsewhere specified, (3) fuels and lubricants, (4) capital goods, (5) transport equipment, (6) consumer goods not elsewhere specified and (7) goods not elsewhere specified.

**Chart 1: Regional composition of exports in the world market**



Source: UN Comtrade, authors' calculations. Note: ASEAN+2 includes Indonesia, Thailand, Malaysia, Cambodia, Brunei, Laos, Philippines, Myanmar, Singapore, Vietnam as well as Japan and Korea.

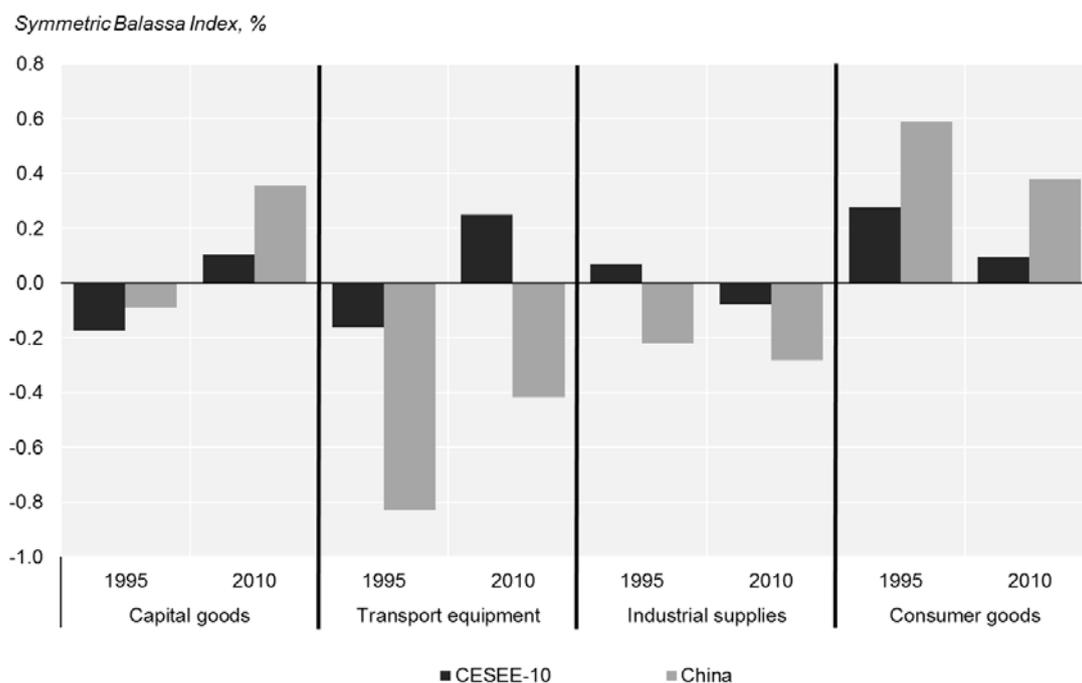
**Chart 2: Share of product category in total exports to the EU-15**



Source: COMEXT, authors' calculations.

An analysis of comparative advantages confirms that both the CESEE region and China expanded production especially in those product categories where they increased their comparative advantage between 1995 and 2010. While comparative advantages cannot be observed, they may be “revealed” from export market shares. If for example a specific exporter is overrepresented in a given export market in producing cars, one can conclude that producing cars is among the country’s strengths. The specific revealed comparative advantage (RCA) measure we use here is the revealed symmetric comparative advantage (RSCA) index following Fertő and Soós (2006)<sup>10</sup>. This index calculates the relative representation of a region’s exports compared with the average representation of all players in the EU-15 market in a specific product category.

**Chart 3: Index of revealed symmetric comparative advantage in selected BEC**



Source: COMEXT, authors' calculations.

The indices are given in chart 3 for the four most important BEC product categories. It is evident 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 the CESEE-10 developed a positive RSCA index in transport equipment as from 1998, which actually rose further even during the global financial crisis. The CESEE

<sup>10</sup> 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 an 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 unity (Dalum et al., 1998). For alternative measures of comparative advantage, see e.g. Bojneca and Fertő (2012).

region obviously managed to strengthen its competencies in this highly contested export category. In contrast, the Chinese RSCA index remained in negative territory despite a rising, but comparatively low export share. In light of the importance of transportation products within the CESEE export basket, this is an encouraging sign: 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 3<sup>11</sup> but also reveals interesting patterns. For example, both regions show increasing competitive strength in exporting machinery. By contrast, the RSCA clearly illustrates that CESEE lost its comparative advantage in exporting textiles and footwear to the EU-15 market from 1995 to 2010, whereas China gained competitiveness. This appears to be a market segment where the CESEE region lost the competitive battle against China. Over the entire period, China also proved to be very competitive in other manufacturing sectors, including toys, games and furniture. CESEE, however, has been catching up in these segments as shown by the slight increase of the RSCA index from 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 toward the EU-15 market and, compared with the CESEE-10, expands its exports in similar product classes. According to the RSCA index, the CESEE region was able to increase its competitiveness in diverse product categories, such as transport equipment, plastics, machinery and other manufacturing, at least from the early 2000s, and thus stood up to the Chinese competitors. By contrast, textiles and footwear appear to be a segment where CESEE 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.

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<sup>11</sup> The related data are available from the authors upon request.

### 3 SIGNS OF 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 caused concern that China may be crowding out CESEE exporters in the EU-15 market.

We investigate this question, using the information from highly disaggregated trade data at the 6-digit HS level over the period 1995 to 2010. The dataset allows us to identify the number of trade links where the CESEE region and China stand in direct competition in the EU-15 market – in other words, where they are fishing in the same pool. It also sheds light on lost trade links, which possibly indicate crowding-out effects. While the empirical analysis is carried out at the product level, we present the main results at a more aggregate level of product categories.

A trade link is defined as exports of a specific product  $x$  from a country  $y$  to an individual EU-15 country in the year  $t$ . Taking the example of CESEE exports of shoes to Austria over a given period, we 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 have started exporting shoes to Austria during the period (ENTRY) and CESEE may have stopped 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 accept only 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 are cut shortly after their creation.<sup>12</sup>

We then combine these pieces of information to observe “trade pairs,” which gives us 16 possible combinations. Thus, in a Dynamic Trade Link Analysis we analyze the joint developments of trade links maintained by a pair of exporters (the CESEE-10 and China) in third-party markets between two reference years. We are especially interested in those trade links, where:

- Both CESEE and China were active and stood in direct competition (ACTIVE-active),
- both regions had initially been active but one of them left the market, possibly because it was crowded out by its competitors (ACTIVE-exit and EXIT-active).
- only one of the regions was active at first but the other region entered the market during that period, which indicates intensified competition (ENTRY-active, ACTIVE-entry).

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<sup>12</sup> Besedeš and Prusa (2011) emphasize the importance of the survival of export links for trade integration. In fact, the short duration of newly established trade links is a particular 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.

In the extreme case, the new entrant may contribute to crowding out the incumbent (ENTRY-exit, EXIT-entry). This may be interpreted as evidence for cutthroat competition.

Chart 4 shows the six quantitatively most important of all 16 possible combinations of activity (ACTIVE, INACTIVE, ENTRY, EXIT) of the CESEE-10 and China in 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 China exported one specific product to one of the EU-15 countries. To put this into perspective, the fraction of products which were exported to any EU-15 country by at least one exporter (CESEE or China) rose from 71% in 1996 to 86% by 2009. Chart 4 presents all cases as percentages from this increasing basis. Different shades of grey indicate different combinations of activity, ranging from white (ACTIVE-active) to black (ENTRY-inactive). A critical issue, when using this data source (6-digit HS level), is the repeated revision of the HS classification, as this requires some data adjustment. During our 1995–2010 observation period, reclassifications occurred in 1996, 2002 and 2007, introducing breaks in the time series, with products being moved into other or new categories. Trade links may thus be classified as new without any underlying changes in actual trade links.<sup>13</sup> To avoid these spurious entry cases, we reclassify all products according to the initial classification (HS 1996, see annex 1 for details).<sup>14</sup> Furthermore, as the results show some interesting changes over time, we investigate three subperiods separately: 1996–2001, 2002–2006 and 2007–2009. Choosing these subperiod end dates ensures that activity types within subperiods are not affected by any of the above-mentioned HS reclassifications.

The first observation is that the fraction of products where both the CESEE region and China were continuously active (ACTIVE-active) is large (an average 52% over the entire period) and rose from 44% in the subperiod 1996–2001 to more than 60% in the last subperiod, which indicates strong and stiffening direct competition. This development is due to the CESEE-10 entering traditional Chinese domains (ENTRY-active, which gained importance over time) and China entering CESEE export domains (ACTIVE-entry, which lost importance over time).

Generally, we observe that the fraction of trade links where only CESEE exports to any one EU-15 country (ACTIVE-inactive) shrank over time (from 25% in the period 1996–2001 to 9% in the period 2007–2009, which averages out at 17% for the entire period). In the reverse scenario (INACTIVE-active), there was even a slight increase from 11% to 13%. This development indicates, on the one hand, that China entered traditional CESEE export markets. Today there are not many areas left in which China could become an additional competitor for CESEE. In

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<sup>13</sup> Detailed information on the reclassifications can be found in annex 1.

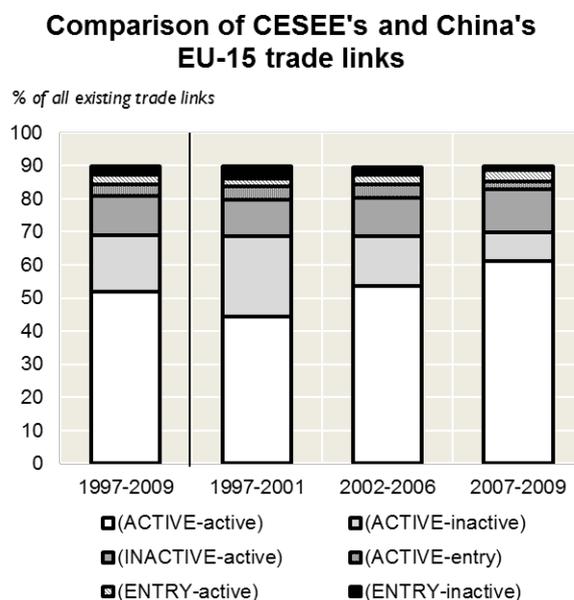
<sup>14</sup> Alternatively, we could have restricted the analysis to the product categories unaffected by any reclassification. However, since we consider newly created categories to be particularly interesting, we opted for reclassifying all products.

some of these areas, CESEE may have a particular comparative advantage, e.g. because EU-15 countries rather import agricultural products from CESEE than China. On the other hand, China increasingly explored new markets which CESEE had never served or stopped serving.

At the same time, the number of lost trade links (EXIT or exit, not shown in the chart) is generally very small, so that we do not observe clear signs of marked crowding-out effects. Entry into new markets appears to happen mostly on the basis of ability, thus intensifying competition. Signs of crowding-out by China are given by the number of cases in which CESEE exited a market while China was either active or entered. The fraction of these two combinations remained rather small on average, even though it rose from 1.9% to 2.8%. There are no notable differences between end-use categories, yet evidence for crowding-out by China is somewhat higher in the remainder category of “goods not specified elsewhere” and below average in food and beverages, fuels, and transport equipment. In contrast, the number of cases where CESEE crowded out China declined from 2.1% to 1.7%.

#### Chart 4: Trade links of the CESEE-10 and China with the EU-15

*fraction of trade links where CESEE (capital letters) and China (lower-case letters) were active or inactive throughout the respective period or where an entry into the product market occurred*



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 (see charts 5 and 6). In both product

categories, CESEE and China shared about 70% of trade links (ACTIVE-active) toward the end of the sample, which confirms the especially high and rising level of bilateral competition. Correspondingly, the trade links where CESEE had a monopoly position (ACTIVE-inactive) shrank rapidly. In the case of capital goods there were less than 4% of trade links where CESEE was active and China inactive.

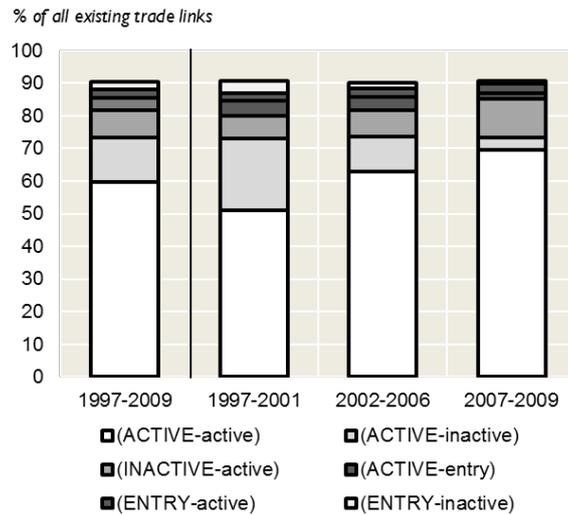
Interestingly, in these two product categories, the increase in trade links where China is the only supplier (INACTIVE-active) is much steeper than in chart 4. This increase is ascribable to both crowding-out by China as well as the country's entry into completely new markets. Both factors are about equally important.

Overall, charts 5 and 6 confirm the pattern of strong competition between the CESEE-10 and China, especially in the two selected product categories, but no pronounced crowding-out patterns are evident. In the remaining BEC categories (not shown here), mutual competition was 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).

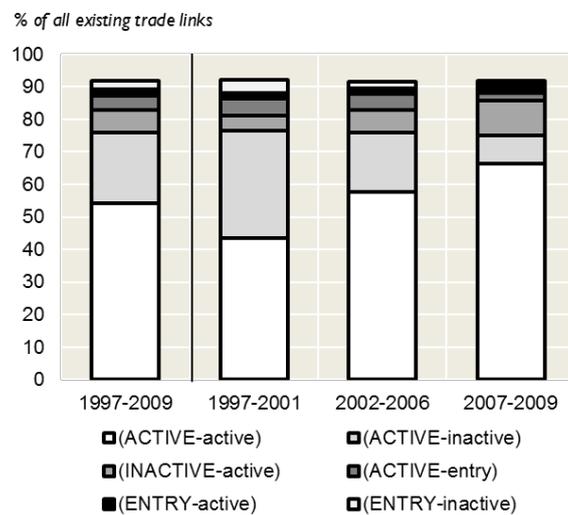
## Chart 5 and 6: Comparison of CESEE's and China's EU-15 trade links for selected product categories

*fraction of trade links where CESEE (capital letters) and China (lower-case letters) are active or inactive throughout the respective period or where an entry into the product market occurred*

### CESEE's and China's EU-15 trade of capital goods



### CESEE's and China's EU-15 trade of transport equipment



## 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 to look 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 by exporting 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 portfolio of products destined 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 margins to assess the competitive pressure and possible crowding-out effects. For this purpose we again use the highly disaggregated dataset 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 destined for 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.<sup>15</sup> It is thus a measure of export diversification within the EU-15 market. By definition the extensive and intensive margins sum up to one.

While many papers use a “comparative static approach” (e.g. Amiti and Freund, 2008; Evenett and Venables, 2002; Felbermayr and Kohler, 2006) and compare exports of two given years at the beginning and at the end of the sample, we follow the dynamic definition as proposed by

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<sup>15</sup> 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 on both products and countries, so that any new trade relationship increases the extensive margin. This is the approach followed in this paper.

Besedeš and Prusa (2011), i.e. we explicitly investigate the dynamics over the whole sample period.<sup>16</sup> 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 of 1996, 2002 and 2007 may cause problems for the calculation of the intensive and extensive margins, as products were moved into other or new categories. As a result, considerable activity might be observed in the extensive margin 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 U.S.A. When only those product codes are used that remained unchanged during the entire period, the share of the extensive margin shrinks to 2%.<sup>17</sup> We chose an intermediate approach, reclassifying all products to the 1996 revision of the HS classification by using the official conversion key.<sup>18</sup> Annex 1 provides details on the reclassification issue.

Chart 7 shows the contribution of the extensive margin to total export growth in the EU-15 market over the entire observation period as well as for two interesting subperiods covering the EU enlargement round of May 2004 and the global financial crisis. Chart 8 repeats the exercise for those BEC categories that turned out to be most contested in terms of mutual competition, namely capital goods (chart 8b) and transport equipment (chart 8c), as well as for food and beverages (chart 8a), industrial supplies (chart 8d) and consumer goods (chart 8e).

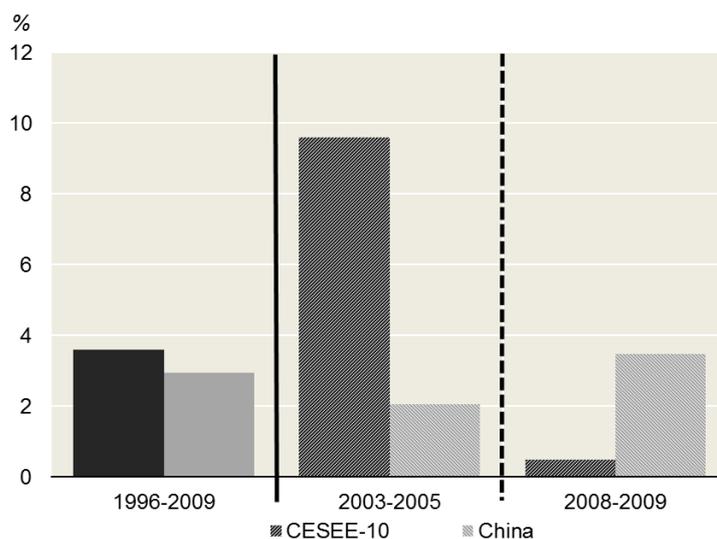
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<sup>16</sup> This naturally favors the intensive margin as the major contributor to trade growth since all trade relationships that survive beyond the second year are accounted for in the intensive margin.

<sup>17</sup> 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.

<sup>18</sup> 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 revealed that the reclassification cannot be ruled out as the reason for this observation. With regard to China, for example, about 70% of new trade links can be ascribed to problems with the reclassification.

**Chart 7: 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.<sup>19</sup> Studies about 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).<sup>20</sup> Imbs and Warziarg (2003) 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 for CESEE countries and China. Nevertheless, the intensification of traditional trade relationships rather than the exploration of new markets represents the major source of export growth in both regions. That this is also true for China weakens the claim that China has progressively been flooding new markets. Our result is in line with Amiti and Freund (2008). A possible explanation for the small weight of the extensive margin is that China's export diversification was accomplished early on. According to Cheptea et al. (2010), Chinese export product diversity was comparable with that of major industrial countries already in the

<sup>19</sup> Apart from differences in the 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 a small magnitude and furthermore face high failure rates, this yields higher estimates of the extensive margin.

<sup>20</sup> Evenett and Venables (2002) even find a central role of the extensive margin for growth in developing countries.

mid-1990s. This might explain the relatively small size of the extensive margin and its declining contribution to export growth over our sample period.

Interestingly, in our case the contribution of the extensive margin to total trade growth is slightly higher for the CESEE countries than for China. Decomposing the analysis by different BEC product categories yields some interesting insights into the structural reasons for this greater importance of the extensive margin in the CESEE-10 (chart 8; first section of each chart)<sup>21</sup>. The result stems from the stronger extensive margin in food and beverages, industrial supplies and consumer goods. Taken together, these three categories accounted for 70% of CESEE exports to the EU-15 in 1996. By 2010, their joint importance had fallen, but remained at roughly 50%. The larger extensive margin compared with China appears to be dominated by the specific event of the EU accession of eight countries in Central and Eastern Europe (CEE-8) in 2004, which led to an expansion of trade in industrial supplies mainly along the extensive margin. In contrast, the extensive margin of export growth of transport equipment is very small and negative for CESEE, which points to consolidation in the market. CESEE had already been very active in exporting transport equipment to the EU-15 before 1996, as shown by the high market share of this product category in its total exports (chart 2). Therefore, more trade relationships were lost than newly 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 transport equipment to the EU-15, starting from a low basis in 1996. Many new trade relationships were established until 2009, which allowed China to expand its market share in the EU-15 market for transport equipment. Similar developments – though much less pronounced – are observed for capital goods.

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<sup>21</sup> Chart 8 focuses on the four product categories most relevant for our analysis. The figures on food and beverages, fuels and lubricants as well as goods not specified elsewhere are available from the authors upon request.

## Chart 8: Average contribution of the extensive margin to export growth in selected product categories

Chart 8a: Food and beverages

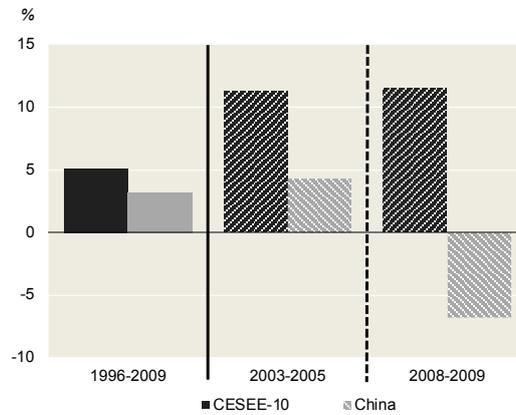


Chart 8b: Capital goods

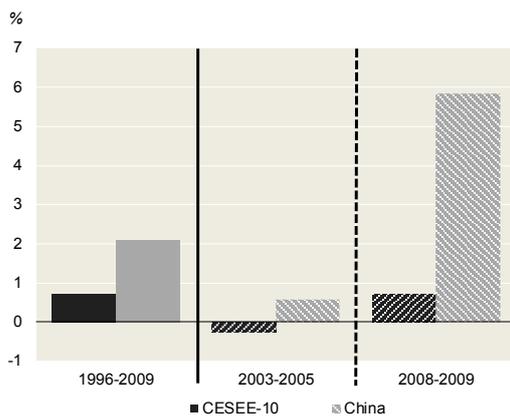


Chart 8c: Transport equipment

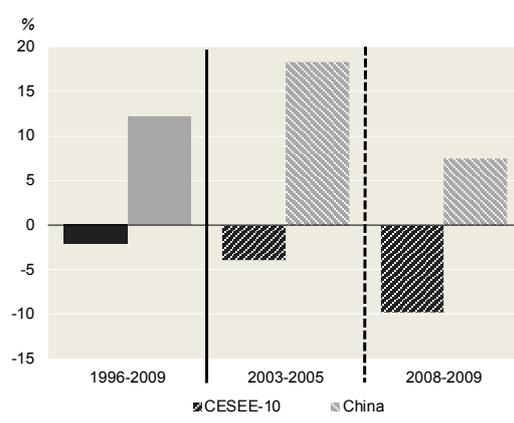


Chart 8d: Industrial supplies

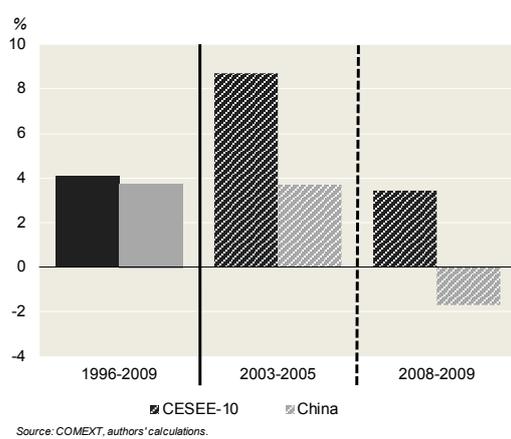
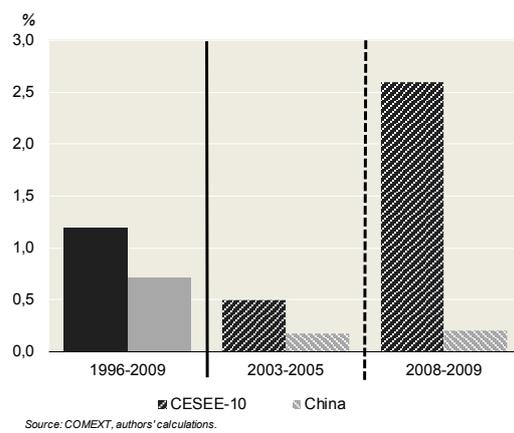


Chart 8e: Consumer goods



The two subperiods shown in the second and third sections of charts 7 and 8 provide interesting information about very specific events in the last decade. The second section shows the period around the 2004 Eastern enlargement of the EU. Then, the extensive margin, i.e. the exploration of new trade relationships, played an important role, reaching almost 10% on average over the period 2003–2005. Obviously, many new trade relationships were established right after EU accession. However, there are differences across product categories. While for CESEE the number of lost trade relationships exceeded that of new relationships in exporting transport equipment and capital goods (again indicated by the negative contribution of the extensive margin to export growth shown in chart 8), new trade relationships were reported in food items, industrial supplies and consumer goods. As trade between the CEE-8 countries and the EU had been tariff free as from 1998 as a result of the Europe Agreements, this boost in trade relationships relates to the elimination of remaining nontariff trade barriers, as well as to the liberalization of trade in agricultural products. Interestingly, export growth hardly increased right in 2004, which suggests that the newly formed trade relationships were initially of a small magnitude. Export growth in the CEE-8 only peaked in 2005/06 with the deepening of the newly established trade relationships<sup>22</sup>. In part, 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 2004 EU enlargement. However, differences across the product categories have to be considered. For example, China managed to further expand its exports of transport equipment – a traditional CESEE market – even during the time of accession of the CEE-8 countries to the EU as shown by China’s relatively large extensive margin for transport equipment equaling about 18% from 2003 to 2005 (chart 8).

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. At that time, a large *positive* contribution of the extensive margin to *negative* export growth would indicate that lost trade relationships dominated over newly formed trade relationships. For the CESEE countries, the contribution of the extensive margin was positive, but almost negligible. In other words, only few trade relationships were permanently lost, while market adjustment mainly took place along existing trade relationships. Similarly, the trade recovery proceeded along existing trade relationships, while hardly any new relationships were developed. The patterns 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 positive contribution of the extensive margin to the overall decline in exports in this period. In contrast,

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<sup>22</sup> The decomposition of export growth into extensive and intensive margins for each year is not shown in chart 9 but is available from the authors upon request. It is evident from chart A1 in annex 2 that the intensive margin in the CESEE countries reached its post-EU-accession peak only in 2006.

the negative contribution of the extensive margin to the decline in exports of transport equipment indicates that CESEE was able to create 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 compared with CESEE. Differences in trade patterns across product categories can be identified in chart 8.

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-8 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 transport equipment, which indicates a potential threat to CESEE's 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 had a cushioning effect in adverse economic circumstances.

## 5 DRIVERS OF INTENSIVE-MARGIN TRADE GROWTH

The analysis above suggests that competition between China and the CESEE-10 stiffened considerably over the past 15 years. However, we also observed that export growth came primarily from a deepening of existing trade linkages. In other words, the intensive margin of trade 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.

Intensive-margin growth is determined by four distinct contributions: a market growth effect, two structural effects and a competitiveness effect. The market growth effect is the average annual import growth of the EU-15 countries along the intensive margin, i.e. it reflects EU-15 import demand. The two structural – geographical and sectoral – effects 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 covers all other exporter-specific aspects that cause a deviation of trade growth from the average EU-15 import demand. Hence, it captures aspects of, for example, price competitiveness (exchange rate developments, unit labor costs, etc.), quality competitiveness and supply capacity.

We follow the econometric approach developed by Cheptea et al. (2010). Compared with 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. We calculate export growth by means of 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, we regress growth in each trade relationship on exporter (i), importer (j) and product (k) fixed effects by using weighted OLS (equation 2), whereby the weights are

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

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

Equation (2) captures the contributions of the export performance of individual exporters by means of 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 is captured by a product dummy  $D_k^t$ . We decompose annual growth in each year of the observation period. Reweighting 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 ( $d \ln X$ ), geographic structure ( $GEO_i$ ), product structure ( $SEC_i$ )<sup>23</sup> and the exporter's competitiveness ( $COMP_i$ ):<sup>24</sup>

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

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 few observations are noteworthy: The CESEE region and China both showed an above-average intensive-margin growth performance in 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 subperiods including the years 2009 and 2010, when import demand from the EU-15 actually fell on average.

<sup>23</sup> Products are classified by HS sections (2-digit codes) as in Chepeta et al. (2010), thus reflecting a fairly detailed sectoral structure.

<sup>24</sup> See Chepeta et al. (2010, pp. 19ff) for the details of this decomposition. We deviate slightly from them insofar as we calculate the effects including average EU-15 import growth 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: Decomposition of the intensive margin of total export growth***Annual average contributions to intensive-margin growth, 1996–2009*

		Demand side			Supply side
	Intensive-margin growth	Average EU-15 import growth	Geographical effect	Sectoral effect	Competitiveness effect
CESEE-10	<b>11.61</b>	5.55	-0.13	-1.00	7.25
China	<b>15.27</b>	5.55	0.01	-1.50	11.54
Intra-EU-15	<b>4.35</b>	5.55	0.00	-0.20	-1.20
ROW	<b>5.23</b>	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 of 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 annex 2 confirm this picture, providing annual data on the contributions of the four effects to intensive-margin growth in the CESEE-10 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 stems from changes in EU-15 import demand, which was subject to considerable fluctuations from 1995 to 2010.

Table 2 shows some differentiation between selected product groups. China clearly holds an unchallenged comparative advantage in textiles and also in metals. While the commodity structure contributes positively to export growth in textiles for both regions (measured by the sectoral effect), the geographical 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. However, the CESEE-10 have been catching up due to its strong competitiveness effect in this category. Geographical dispersion of exports of these goods plays only a small role in explaining individual growth performance.

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

<i>Annual average contributions to intensive-margin growth, 1996–2009</i>						
	<b>Intensive-margin growth</b>	Average EU-15 import growth	Geographical effect	Sectoral effect	Competitiveness effect	
<b>Textiles</b>						
CESEE-10	<b>2.9</b>	3.1	-0.7	4.9	-4.3	
China	<b>12.4</b>	3.1	-0.5	5.0	5.0	
<b>Metals</b>						
CESEE-10	<b>9.0</b>	6.0	3.6	0.7	-1.4	
China	<b>15.3</b>	6.0	2.9	-0.5	6.9	
<b>Chemicals</b>						
CESEE-10	9.6	7.9	3.6	4.4	-6.1	
China	13.2	7.9	3.4	4.6	-2.4	
<b>Machinery and vehicles</b>						
CESEE-10	15.9	4.4	0.6	-5.9	16.8	
China	22.1	4.4	0.5	-5.9	24.7	
<b>Electrical machinery and precision instruments</b>						
CESEE-10	16.3	5.6	0.7	4.8	15.7	
China	17.4	5.6	0.9	4.7	16.0	
<b>Other manufacturing</b>						
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 domains 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, the CESEE-10 were ahead of China at the beginning of the observation period. However, the competitiveness effect considerably gained in importance for explaining China's export growth in these products, reaching a level comparable with that registered by the CESEE-10 toward the end of the observation period. Both regions show a decrease in export growth rates with respect to machinery and vehicles, which resulted mostly from a decline in the competitiveness effect. In contrast, the 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.<sup>25</sup>

Overall, the CESEE-10 and China show an above-average export growth performance in the EU-15 market. In general, the contribution of the competitiveness effect to growth performance

<sup>25</sup> Detailed results for subperiods are available from the authors upon request.

is very strong and relatively stable in CESEE and China from 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 between the CESEE-10 and China, particularly in machinery and vehicles as well as electrical machinery and precision instruments and increasingly so in other manufacturing goods. The competitiveness effect rose in both exporting regions over the observation period.

## 6 SUMMARY AND CONCLUSIONS

Both China and the CESEE region have shown impressive export growth dynamics over the last two decades. While many papers have dealt with the trade patterns and comparative advantages of each region, the direct link between their export performance has not been studied thoroughly so far. We fill this gap by analyzing the impact the emergence of China as a global competitor has had on the trade performance of the ten CESEE EU Member States in 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 the 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 into factors related to demand and demand structures as opposed to exporter-specific factors which solely reflect competitiveness.

Overall, we show that competition in the EU-15 market has been intensifying as China increasingly targets its exports toward the European market. Our Dynamic Trade Link Analysis demonstrates that 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 have been lost, which points against substantial crowding-out effects. Generally, the 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) was only minor, 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, the rather successful performance of both regions in the EU-15 market is mainly ascribable to exporter-specific factors, while the development and structure of demand has played a minor role. Two conclusions can be drawn from this observation: First, both regions face an untapped potential in the EU-15 market. They could further improve their competitive position by responding more appropriately to demand characteristics. This naturally implies shooting a moving target, since demand characteristic – both in terms of sectoral and geographical patterns – are subject to change over time. Carefully observing such changing patterns of demand is thus a necessary prerequisite to this end. Second, the competitive positions of both regions appear to be sustainable as they are based on exporter-specific characteristics and thus also subject to economic policy decisions within these countries.

From 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. To date, the CESEE region has managed to stand up to the Chinese competitors in many important market segments, including vehicles, plastics and machinery. In some segments, such as clothing, footwear and transport equipment, China has surpassed the CESEE-10 in terms of competitiveness.

Overall, we find that China and CESEE are increasingly “fishing in the same pool” in the EU-15 market. However, we cannot confirm the common hypothesis that CESEE exporters have broadly been crowded out of the European market by Chinese counterparts, given the high level of competitiveness of both regions. Hence, further diversification of production toward promising industries and continuous quality improvements will be ever more crucial, especially in light of slower EU-15 market growth.

With respect to the recent global economic crisis, the regional and historical links between the CESEE-10 and the EU-15 may have had a cushioning effect as the temporary trade collapse did not cause permanent losses of trade relationships. In the case of China, trade losses came from both lower trade volumes and the discontinuation of trade relationships with EU-15 countries.

Thus, the CESEE countries still show a strong competitive position in the EU-15 market even though we clearly observe rising competitive pressure from China. As a word of caution, we have to emphasize that the choice of our dataset, i.e. the COMEXT database on trade going to and coming from European countries, – while allowing us to analyze trade flows between the 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 about the bilateral relationship between the two regions. Furthermore, we cannot identify the indirect effects resulting from the potential involvement of both China and CESEE in global value chains. For example, CESEE-10 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, beneficial indirect effects emanating from China’s economic growth for the CESEE region are presumably underestimated. Future research applying data taken from the World Input and Output Tables (WIOT), which contain information on inputs to domestic production, can take a different perspective in analyzing the complementary nature of trade in selected industries.

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## ANNEX I: DATA

The main data source of all calculations and charts in this paper is Eurostat's COMEXT database<sup>26</sup>. 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 (HS) standard, which is a classification of traded goods developed by the World Customs Organization (WCO). With this code, it is possible to differentiate between roughly 5,300 products. The fact that all data are maintained in a single central source guarantees a high level of accuracy and comparability, even at this detailed level. However, as the WCO revised the Harmonized System twice during our observation period (in 2002 and 2007), changes in the extensive margin may appear entirely for statistical reasons (if an already existing trading link is assigned to a newly created category). This indeterminacy refers only to the years of the reclassification, namely 2002 and 2007.

Therefore, in order to ensure comparability over the entire 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 provided by the WCO<sup>27</sup>. We identify four types of reclassification, namely (1) a category was reclassified as a new category in a 1:1 relation, (2) an existing category was split into several other categories in a 1:n relation, (3) several categories were combined to form one category in an n:1 relation and (4) several products were recategorized as several new ones in an n:n relation. 1:1 and 1:n relations are reclassified unambiguously, we call this a distinct reclassification. In contrast, 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 the product codes have been converted to the 1996 classification. In 2002, we only encountered minor problems in this respect as the reclassification entailed only small changes to the HS system in general. In 2007, however, major changes in the HS code took place, also with regard to categories of technical products and vehicles that account for a significant fraction of exports in our sample. Therefore, the spikes in the 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.

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<sup>26</sup> <http://epp.eurostat.ec.europa.eu/newxtweb/> (retrieved on December, 5, 2012).

<sup>27</sup> <http://unstats.un.org/unsd/cr/registry/default.asp?Lg=1> (retrieved on December, 5, 2012).

## ANNEX 2: DECOMPOSITION OF THE INTENSIVE MARGIN

Chart A1: Decomposition of growth in CESEE exports to the EU-15, 1996–2010

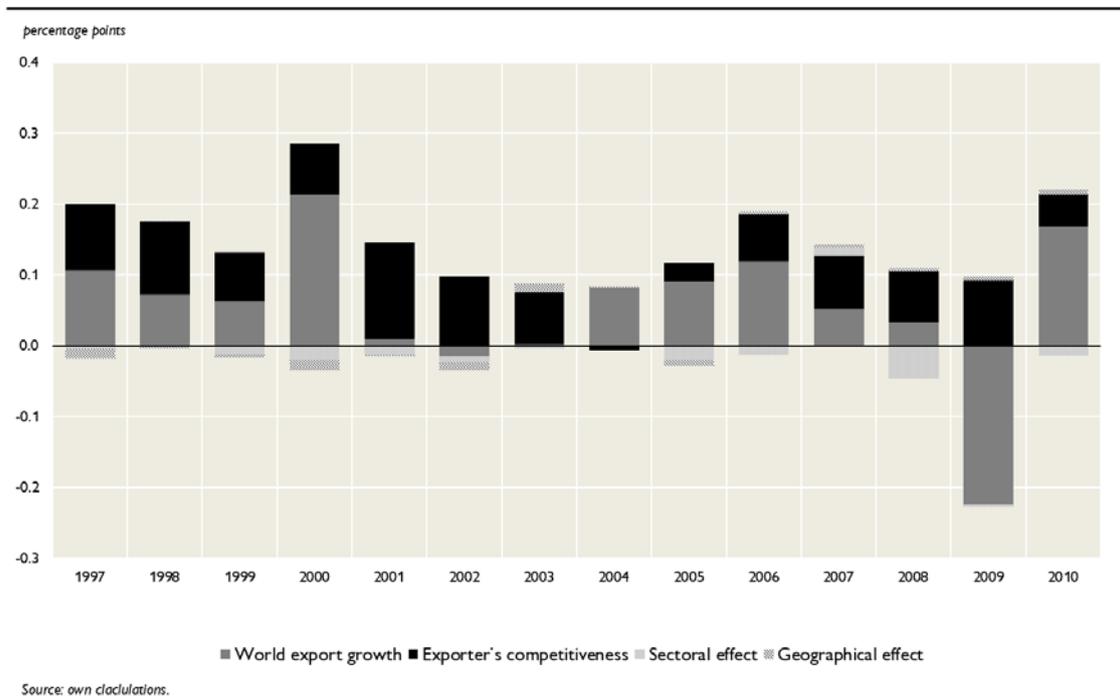


Chart A2: Decomposition of growth in Chinese exports to the EU-15, 1996–2010

