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Decomposing a decade's growth of Central and Eastern Europe's trade

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After the breakdown of the central planning system, Central and East European countries (CEECs) took considerable effort in liberalising their economies leading to lasting changes in CEEC trade. As a result, between 1996 and 2004 almost all of these countries displayed very high growth rates of both exports and imports, exceeding OECD and Russian performance. These trade developments are described and interpreted in this note on a descriptive rather than an analytical basis. First, trade volumes by goods categories are examined to account for what kind of goods are the major trade growth drivers. In general, growth in exports and imports is mainly driven by goods used in production rather than consumer goods. Specifically for the Central and East European EU members (EU-8), export and import growth is mainly driven by capital goods and two-way trade in a special subgroup of intermediate goods, i.e., parts and accessories of capital goods. This result can be associated with increasing offshoring activities between the old EU member states and the new EU-8 countries. A closer look at EU-8 exports to and imports from Germany confirms this finding: EU-8 states tend to import parts and accessories of capital goods from Germany to produce and export parts and accessories of capital goods or final capital goods to Germany. Second, the effects of liberalisation on the variety versus the intensity of trade are described. Here as well, CEEC growth in trade at the extensive margin is driven by intermediate rather than consumer goods. Considering the import side this finding has important implications: While more consumer goods "only" have static welfare effects, a higher input variety might signal a change of the economy's state of technology.

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Introduction

In this note, an attempt is made to describe and interpret trade developments of Central and East European countries (i.e., the EU-8 and South-Eastern Europe, as defined in the notes to figure 1 below) against the background of recent advances in the literature on growth and international trade. The note is purely descriptive rather than analytical, and illustrates rather than tests hypothesised interdependences between reform, growth, and trade. In particular, I illustrate these interdependences by simple figures tracing trade developments over time, tacitly assuming reform effects to dominate the growth of trade. To go beyond the changes in aggregate trade I first compare growth contributions of different goods categories to changes in total trade, and explain the findings as deepening vertical specialization and offshoring across Europe. In the second part, I explore extensive *versus* intensive trade margins, i.e., changes in the set or variety of traded goods *versus* changing volumes of traded goods, again differentiating goods categories by use. I relate the empirical results to the literature on heterogeneous firms and trade and to technological change.

According to a standard gravity approach, trade is influenced by the incomes of trading partners and by bilateral as well as multilateral obstacles to trade. Liberalisation can thus be expected to have direct and indirect – *via* income — effects on trade. The impact of trade liberalisation resulting from policies or mutual agreements is usually analysed within a gravity framework by adding policy variables. In this vein, Baier and Bergstrand (2007) find that a free trade agreement may double bilateral trade after ten years.

CEEC trade liberalisation proceeded very quickly after the early nineties: most of these countries featured fully, or almost fully, liberalised foreign trade and payments regimes, as measured by the respective index of the European Bank for Reconstruction and Development, already by the mid nineties. At the same time, trade with the European Union, their evolving most important partner region, was liberalised by successive waves of Europe Agreements that came close to free trade agreement (Spies and Marques, 2006), culminating in full EU membership for the EU-8 in May 2004, and for Romania and Bulgaria by January 2007. Accordingly, the main difference influencing the trade developments of CEEC economies as compared to OECD – or the less boldly reforming former Soviet Union suc-

cessor states (Frensch and Nowak, 2003) – has in the recent past been the unparalleled liberalisation effort of the former.

Trade volumes by goods categories and the rise of offshoring

Figure 1 documents recent trade developments by regions. EU-8 shows the highest growth rates both in terms of exports and imports, South-Eastern Europe displays the second highest, with, however, import growth by far outstripping export growth. OECD economies as well as Russia show substantially lower trade growth (however, including fuels and lubricants, Russian export growth amounts to about 9 per cent, i.e., about twice as high as documented in Figure 1).

The growth contribution of an individual goods category indicates that trade growth which would prevail assuming trade of all other goods categories would have stayed constant. Consequently, the sum of all categories' trade contributions equals the growth rate of total trade. As figure 1 shows it is not consumer goods that drive trade growth in any region, but rather goods used in production. Particularly interesting are the comparatively very high contributions of capital goods, and of parts and accessories of capital goods, a special subset of intermediate products, to export and import growth rates of the EU-8 country group. This is a phenomenon, which may well be related to the current debate on *offshoring*.

Industrial production is done in sequential stages, in each of which some value is added to the product. Firms regularly allocate parts of the production chain across different plants, or outsource them to other firms. Once this occurs across international borders, offshoring implies that goods are produced in sequential stages in two or more countries, such that at least one country must use imported inputs in its stage of the production process, and some of the resulting output must be exported in some sort of vertical linkage. The key aspect of vertical linkages is thus the use of imported intermediate inputs in producing goods that are exported (Hummels et al., 2001). It is exactly for this purpose that I identify the special subset of intermediate goods used as inputs for capital goods, i.e. parts and accessories of capital goods: all countries in the sample are vertically linked in the sense that all of them both export and import parts and accessories of capital goods, while at the same time ex-

porting the final product, i.e., capital goods: accordingly, two-way trade in intermediate products *may* – while two-way trade in parts

and components certainly *does* – reflect offshoring activities

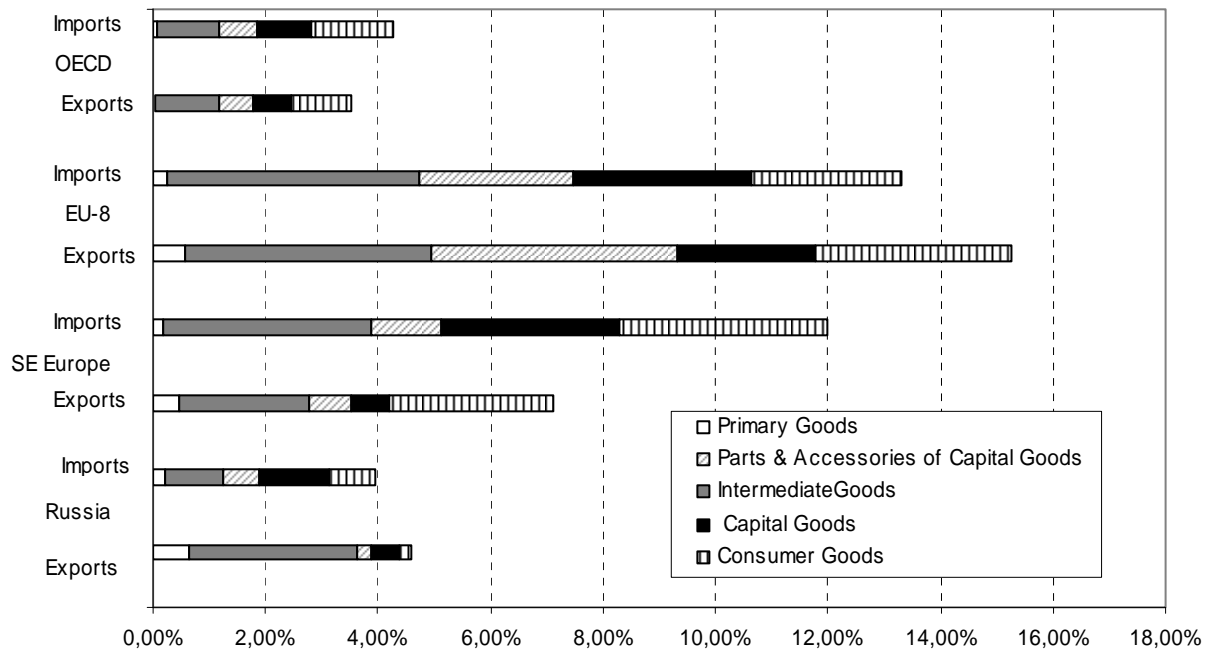


Figure 1: Average annual real rates of change of exports and imports, 1996–2004.

Notes: Data include all goods except fuels and lubricants; for more data background, see the appendix to Frensch and Gaucaite Wittich (2009). “Parts and accessories” are a subset of all intermediate goods. “Intermediate goods” in this and subsequent figures are therefore all intermediate goods other than parts and accessories. Regional rates of change represent the median for all countries in the region. Using the mean instead would not have qualitatively changed the results. Regions are defined as follows: OECD comprises the pre-1994 OECD countries in the database, i.e., Austria, Belgium and Luxembourg (treated as one country throughout), Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States; EU-8 is the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, and Slovenia; SE Europe covers Albania, Bulgaria, Croatia, Romania, Macedonia, and Yugoslavia. Russia, of course, is just Russia.

First of all, the existence of offshoring magnifies the trade effects of liberalisation. Yi (2003) shows that with symmetrically declining variable trade costs, the presence of vertical linkages has a magnifying effect on trade in a multilateral setting, which helps to account for the enormous growth in world trade over the past decades. Frensch (2009) identifies a unilateral complement to this trade magnifying effect by uncovering a substantially stronger than average impact of full institutional trade liberalisation – as measured by the EBRD – on imports of parts and accessories of capital goods.

Second, the fragmentation of the production process involves refining the allocation of production from the level of goods to the level of stages of production, or “tasks,” where assembling parts or components to a final prod-

uct is the final task not necessarily conceptually different from any other task. All this, however, involves costs of coordinating production over different stages at potentially different places in form of investment, communication, transport, or coordination costs, or “service link costs.” Firms will offshore tasks if cost reductions outweigh service link costs.

The implications – including the distributional effects – of this new paradigm of trading tasks rather than final products are discussed in Grossman and Rossi-Hansberg (2008). Assuming that firms are able to use their own technology whenever they opt to offshore parts of production, Grossman and Rossi-Hansberg demonstrate that costs of offshoring *versus* wage differences drive the international division of the production chain. Offshoring may be attractive, if some factors can be hired

more cheaply abroad than at home, but it also is costly, because remote performance of a task limits the opportunities for monitoring and coordinating workers.

Bridging the mostly semantic gap between “tasks” and “production in sequential stages,” when the costs of offshoring fall substantially the result should be an increasingly intense two-way trade in vertically linked products between countries with different wage levels. The most noticeable incidents of offshoring have so far been registered in East Asian trade (Kimura et al., 2007), as a consequence of fragmentation in Japanese production of machinery. But all the described features seem also particu-

larly relevant for East-West trade in Europe. The CEEC is a group of emerging industrialised economies, but still with comparatively low wages. Transition caused a substantial decline in transaction costs in East-West trade, at a time that coincided with a wave of offshoring in Western Europe. Accordingly, Frensch (2009) finds evidence that intra-EU25 trade in parts and components increasingly signals the existence of offshoring.

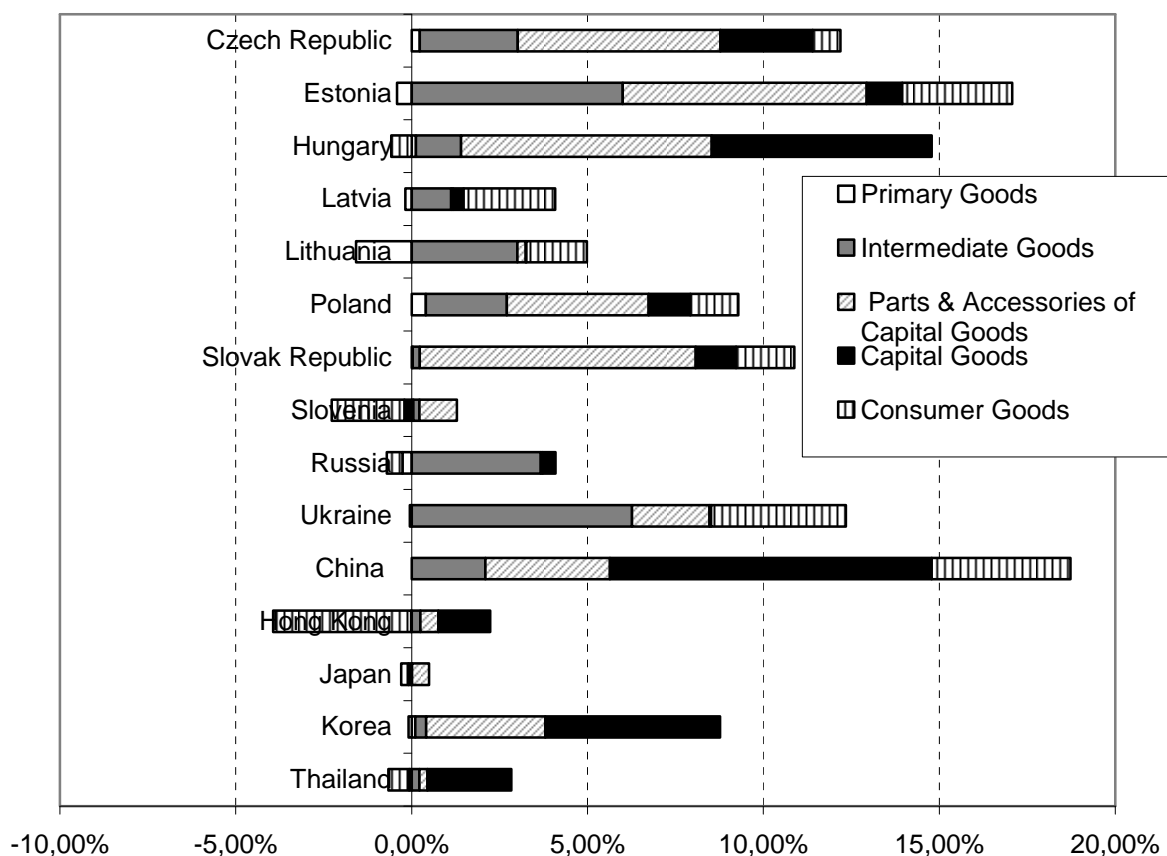


Figure 2: **Average annual real rates of change of exports to Germany, 1996–2004. Split into growth contributions of different goods categories**

Note: Negative bars have to be subtracted from positive bars to obtain total growth rates.

Accordingly, the very high contributions of parts and accessories of capital goods to the export and import growth rates of the EU-8 country group are an indication offshoring activities with old EU members. This picture is sharpened in Figure 2, which allows a closer look at export growth by exporter and goods

category specifically to the German market. The main contribution to export growth to Germany from the majority of EU-8 countries indeed comes from parts and accessories of capital goods (including transport equipment), i.e., from involvement in offshoring activities of firms especially in the Czech Republic, Esto-

nia, Hungary, Poland, and Slovakia. Also of interest in this respect is of course the development of Chinese – and to some extent also South Korean – exports to Germany over the same time: with 19 per cent, China's average annual real rate of export growth to Germany is the highest in our sample of countries between 1996 and 2004. While the contribution of parts and accessories is also important, the main driver of Chinese export growth to Germany is final capital goods, mostly as a result of assembly tasks offshored to China: China's involvement in offshoring has been deliberately

encouraged by a selective trade policy granting preferential tariff treatment to assembly (Lemoine and Ünal-Kesenci, 2004).

Growth rates of imports from Germany tend even to be higher than for exports, with considerable contributions from capital goods (see below). Figure 3 generally confirms the picture of a substantial two-way trade of the majority of EU-8 countries with Germany in parts and accessories, reflecting German firms' offshoring production tasks to these countries.

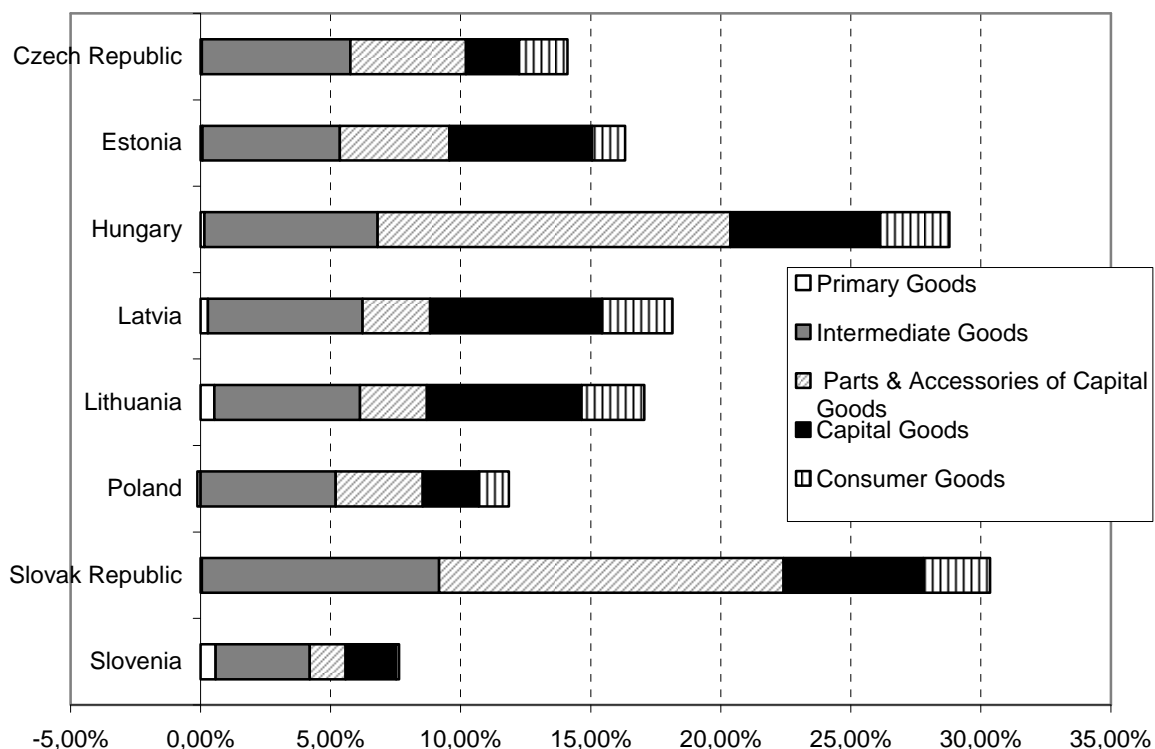


Figure 3: **Average annual real rates of change of EU-8 imports from Germany. Split into growth distribution of different goods categories, 1996-2004**

Note: No data available for East Asian countries.

The effect of liberalisation: variety versus intensity of trade

It is only quite recently that trade margins, i.e., trade variety *versus* intensity, have been studied empirically. From Hummels and Klenow (2005) we know that larger economies trade more than smaller economies, and that this holds for both margins of trade. I.e., larger economies trade both a larger basket of goods (i.e., they trade more along the *extensive margin*) and higher volumes per good (i.e., along the *intensive margin*). Liberalization can affect

both margins: the establishment of NAFTA had an impetus on respective countries' extensive margins of trade (Hillberry and McDaniel, 2002), and U.S. tariff liberalisation was found by Feenstra and Kee (2007) to increase the export variety from Mexico and China.

When differentiating goods by country of origin or destination, trade growth accordingly occurs when countries trade more of the same goods with old partners (deepening trade intensity along the intensive margin), or begin trading new goods and/or with new partners (widening trade variety along the extensive

margin). In Figure 4, the same trade growth rates already shown in Figure 1 are decomposed along the contributions of the extensive *versus* intensive margin: clearly, more trade growth usually also means more growth along both margins, with Russia once more being the exception from the rule: Russian export and import growth is higher than that of the OECD. However, Russia does not display a higher growth rate along the extensive margin, which would point to higher diversification of imports and/or exports; in fact, the variety of imports even shrinks.

As already argued above, the main feature distinguishing the experience of OECD versus CEEC economies has in the recent past been the unparalleled reform effort of the latter. Both

the own trade liberalisation as well as the one with the evolving major trading partner, the European Union, have had an enormous impetus on these countries' extensive and intensive margins of trade. For trade volumes, this effects has already been documented in Figure 1; according to Figure 4, there is, however, no systematic variation between country groups in trade growth contributions of the extensive margin, which lingers between 35 and 40 per cent (except for Russia), irrespective of the liberalisation effort. This may be due to the fact that liberalisation "on average" works both along the extensive and the intensive margins of trade.

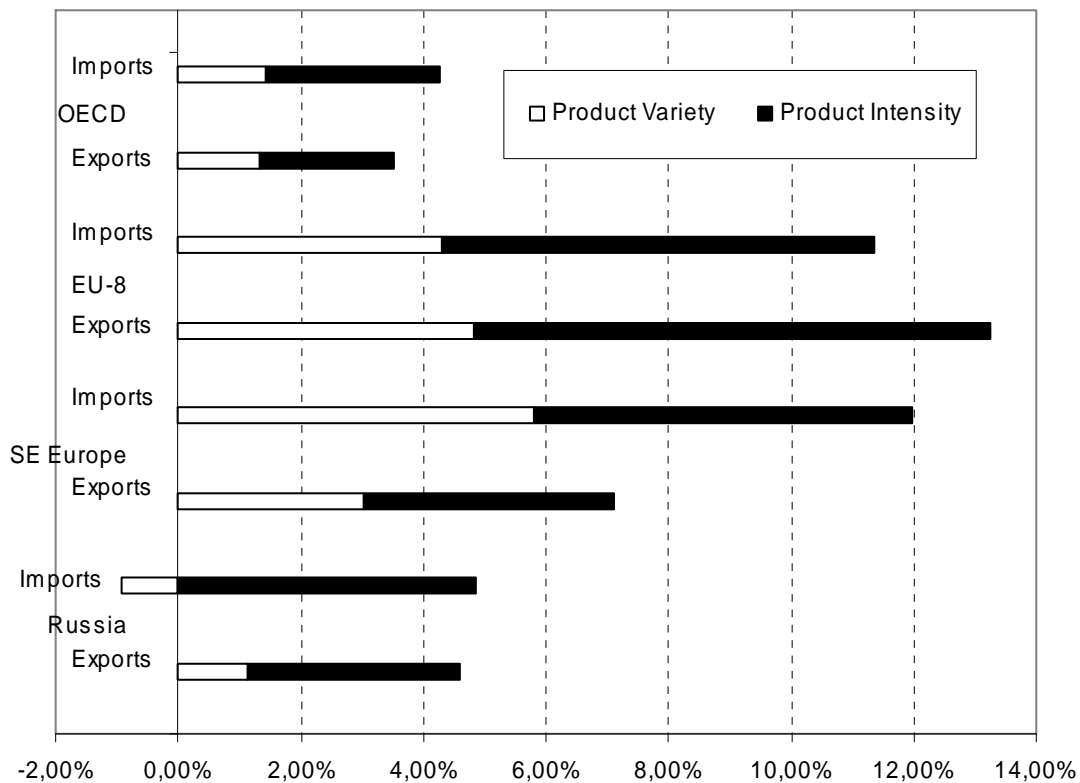


Figure 4: **Average annual real rates of change of exports and imports, 1996–2004. Split into variety and intensity contribution**

Note: Variety is defined as the number of goods differentiated by country of origin or destination. For this purpose, 55 individual countries are selected that generally account for 80–95 per cent of reported trade. Accordingly, intensity is real trade volume divided by variety.

Studying extensive *versus* intensive trade margins presupposes a theoretical model with product differentiation. Preserving the gravity structure of trade, recent theories (Melitz, 2003; Chaney, 2008) generalise Krugman's (1980) approach by combining firm heteroge-

neity in productivity with the introduction of fixed costs of exports, allowing to differentiate among exporting and non-exporting firms in terms of the profitability of incurring fixed export costs. As a first consequence, the existence of fixed costs of entering a market may

explain the positive relationship between a country's export or import variety and total income noted in Hummels and Klenow (2002 and 2005): as country sizes increase, firms of lower productivity find it profitable to incur fixed

export costs. Second, particularly in Chaney (2008) a higher elasticity of substitution between products lowers the effect of trade costs on the extensive margin of trade

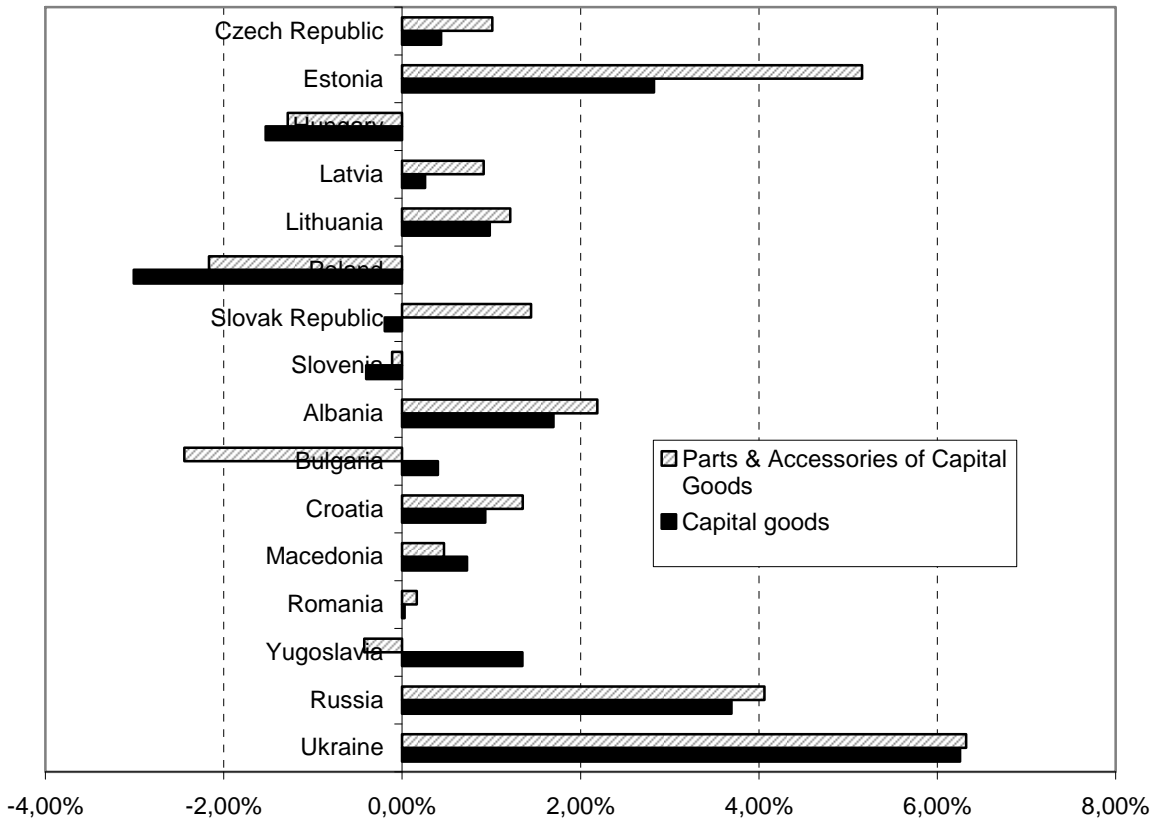


Figure 5: Average annual rates of change of import variety (relative to consumer goods), 1996-2004.

Note: Growth rates display import variety growth after subtracting the growth rate of the import variety of consumer goods.

flows.¹ Accordingly, this predicts that extensive import margin effects of a country's trade liberalization should – via lowering costs for rest of the world exporters – increase with decreasing substitutability among products.

Against this background, Frensch (2008) explores the impact of CEECs' recent institutional trade liberalisation on extensive *versus* intensive import margins. Differentiating goods categories by use enables to identify goods categories according to substitutability, as goods used in production are more comple-

mentary than consumer goods. Frensch (2008) indeed finds robust evidence of stronger extensive import margin effects of liberalization for low substitutability intermediate and capital goods compared to high substitutability consumer goods. Apart from thus supporting new models of heterogeneous firms and trade, this identifies an important channel for the link between reforms and growth in transition: more consumer goods variety entails welcome static welfare effects (Krugman, 1980); more input variety, however, may change the economy's state of technology since the state of technology is related to the variety of capital goods available for production (as proposed in Romer, 1990, and successfully tested in Frensch

¹ As – variable or fixed – barriers decrease, low productivity firms enter. When product differentiation is high, i.e., when the elasticity of substitution is low, less productive firms charging higher prices still capture relatively large market shares with a high impact on trade flows.

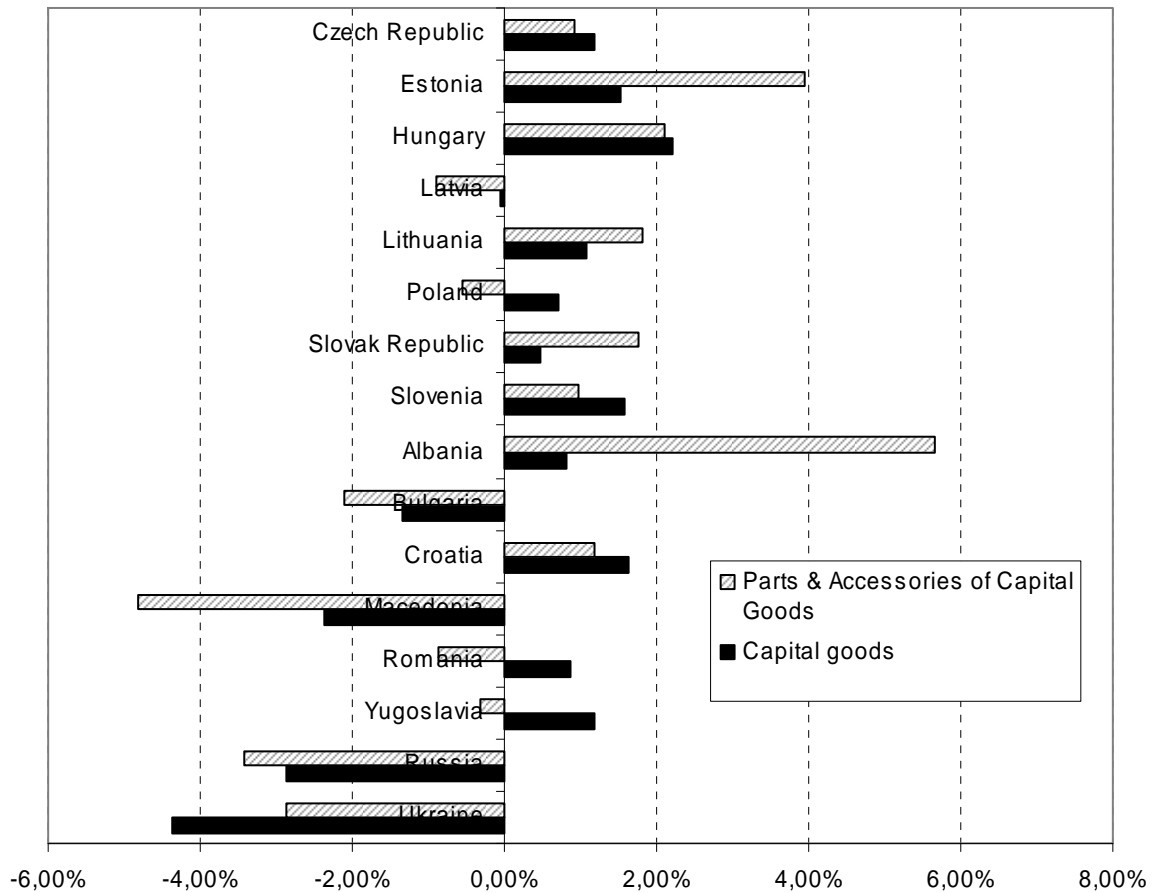


Figure 6: **Average annual rates of change of export variety (relative to consumer goods), 1996-2004.**

and Gaucaite Wittich, 2009) with consequent growth effects.² Thus, identifying substantial effects of European emerging economies' recent trade liberalisation on the extensive import margin of capital goods amounts to identifying an important channel for the well documented but usually superficially modeled link between reforms and growth in transition.

The dominance of trade liberalization upon extensive import margin developments of various goods categories over the past decade is illustrated in figure 5: with only very few exceptions, growth along the extensive margin of goods used in production has indeed been higher than that for consumer goods in CEECs' imports between 1996 and 2004.

Of course, one may also want to study liberalization effects on extensive export margin growth of various goods categories: given the geographical concentration of CEEC trade with the EU, CEEC exports are mainly exports to the EU, and thus constitute EU imports. Trade liberalization (both of CEECs as well of the EU vis-à-vis the CEECs) accordingly also touches on EU imports and should result in a similar pattern of varied extensive margin effects identifiable by goods categories. The illustration in figure 6 by and large confirms this expectation, especially when bearing in mind that EU liberalisation towards Russia and Ukraine was not at all on the same level as with the rest of the CEECs.

² Frensch and Gaucaite Wittich (2009) suggest that a trade-based measure of variety of available capital goods allowing for product differentiation by country of origin behaves as if it represented technology, and that there is conditional technological convergence among OECD economies and CEECs. Adopting new technology from abroad then involves capital goods imports along the extensive margin.

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