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Heli Simola

Tracing trade interdependency between EU and East Asia



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Abstract

There have been two related trends shaping global trade during past couple of decades: the increasing role of international supply chains and the rise of China. Increased complexity in global trade has generated a need to construct more processed trade data — trade in value added — in order to deepen our understanding of trade relations between countries. In this article, we present a broad picture of trade in value added between the EU27 and East Asian countries. We find that East Asia is important as a final demand and supply chain export destination, especially for Northern European countries, while for CEE countries it is more important as an import source for both final demand and supply chain trade. Trade with East Asia is least important for Southern European countries. The production structure of an EU country seems to be one of the main factors explaining the importance of supply chain trade with East Asian countries. The data also indicate that supply chain trade could support the growth of domestic value added exports to the supply chain trade partner country as well as to other countries.

Keywords: Trade in value added, supply chains, EU, China, East Asia

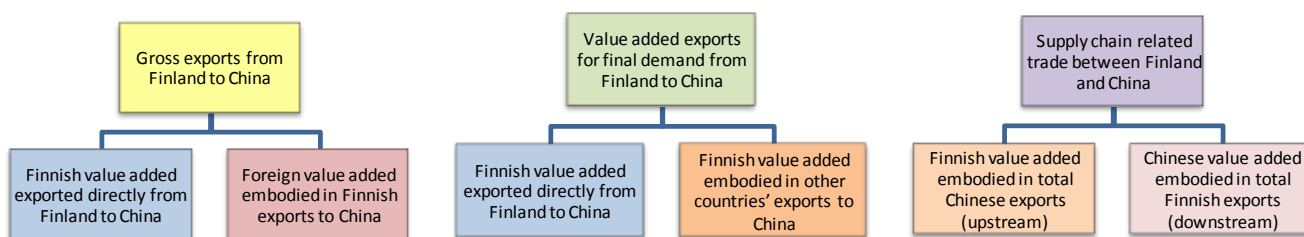
Introduction

In past couple of decades, the role of China has expanded greatly in the world economy, especially as regards international trade. A key factor in China's increasing importance has been its integration into international supply chains, which was spurred by its entry into the WTO in December 2001. As supply chain integration is particularly advanced in East Asia, the region has become increasingly important for international trade. Therefore it is interesting to examine the importance of the East Asia as well as China in particular for EU countries. Analyses based on traditional gross trade data compiled from customs statistics have been conducted many times before. However, in this article we examine the issue in light of recently published new-type trade data, which measures the flows of value added between countries.

In traditional gross trade statistics, each time a good or a service crosses an international border it is recorded as a trade flow. However, as the production chains today are dispersed across different countries, a product can cross borders numerous times during its production stages, which translates into disproportionately large gross trade, as the value of the same product may be recorded several times. UNCTAD (2013) has estimated that 28 % of global exports in 2010 were actually due to this kind of "double counting". From the point of view of economics, however, it is often important to know also at which point the added value is actually created. In recent years, several new databases have been constructed to deal with this issue by providing estimates of value added trade. In this article, we use the Trade in Value Added (TiVA) database compiled jointly by the OECD and WTO. The database is based on OECD input-output tables and gross trade statistics and provides estimates of industry level value added trade flows between countries from 1995 to 2009¹.

The aim of this article is to present a broad picture of value added trade between EU27 and East Asian countries. The issue is approached from the European point of view, so that all comparisons (exports, GDP) are made with respect to individual EU countries. We assess the significance of trade with China (including Hong Kong) and wider East Asia (Japan, South Korea and Taiwan) for individual EU countries (EU27 excluding Cyprus, Luxembourg and Malta due to their small size), and especially for Finland. As in previous studies, we examine three different export concepts (Figure 1).

Figure 1. Export concepts exemplified by Finnish exports to China (Finnish viewpoint)



Source: Modified on the basis of Baldwin & Gonzalez (2013) and Rahman & Zhao (2013).

Our first main heading is gross exports, which are the traditional export flows and include both domestic and foreign value added. Next comes value added exports for final demand, including final and intermediate goods that are used in the final demand of the destination country.

¹ OECD & WTO (2013)

They can be exported directly or as intermediates embodied in a third country's exports to the destination country. Thirdly, we list supply chain related trade, which consists of two parts: domestic value added used as intermediates in the exports of other countries (upstream supply chain trade) and foreign value added used as intermediates in domestic exports (downstream supply chain trade).

We examine first the final demand trade between the EU and East Asia, focusing on differences in the trade picture as based on gross and value added trade statistics. We also assess the dependence of the EU on imports from and exports to China and rest of the East Asia. Then we take a closer look at supply chain trade between the EU and East Asia. We try to depict the magnitude and significance of the supply chain trade, and finally we discuss briefly its causes and consequences for EU countries.

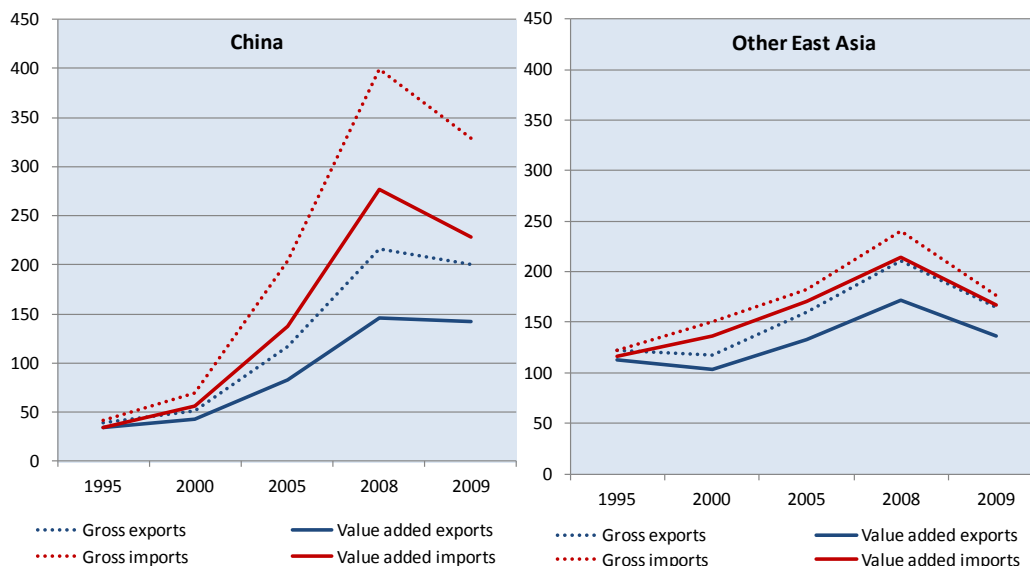
Final demand trade between the EU and East Asia

Gross trade flows larger than value added flows

To illustrate the differences between gross trade statistics and final demand based value added trade statistics we compare them briefly. In general, gross trade flows between the EU and East Asian countries are larger than value added trade flows, and the difference has grown in the past decade, as gross trade has grown faster than value added trade. The growth of trade and the difference between gross and value added trade are both much greater in EU's trade with China than in its trade with other East Asian countries (Figure 2).

In EU's trade with China, value added flows accounted for only about 70 % of gross flows in 2008. On average, the value of gross exports from individual EU countries to China grew 17 % a year in 1995-2008 while value added exports grew 15 % a year. For imports, the corresponding figures were both slightly over 20 %. Bilateral trade balance between the EU and China also looks quite different when measured with value added trade statistics. In 2008, EU's trade deficit with China was nearly 30 % or 50 billion USD smaller than gross trade figures show. In EU's trade with other East Asian countries, the difference between gross and value added trade is smaller and so is the impact on bilateral trade balance. In contrast to China, EU's trade deficit vis-à-vis the other East Asian countries is actually slightly larger in value added terms than in gross terms. This largely reflects the fact that EU gross imports from China include significant amounts of value added created in other East Asian countries.

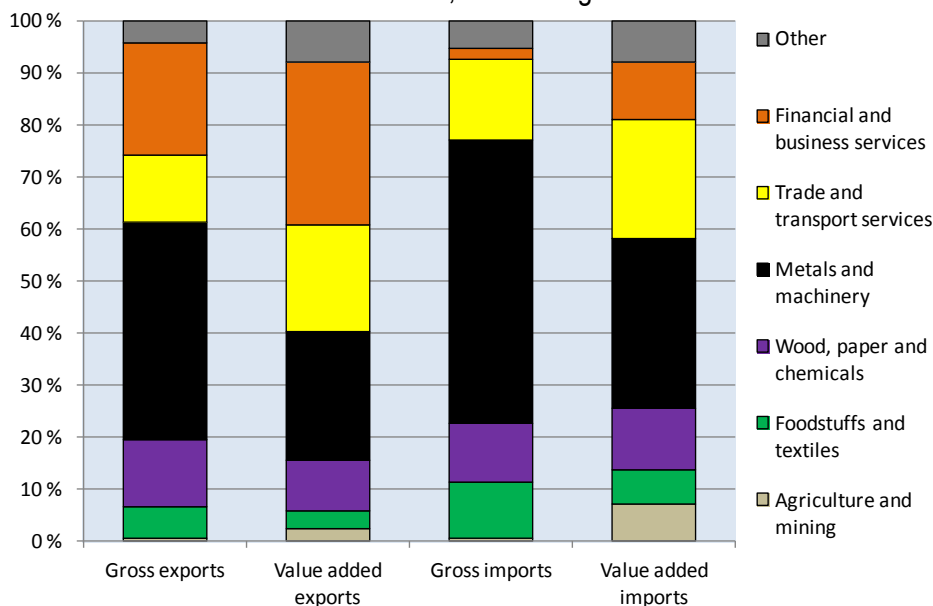
Figure 2. EU's gross trade and value added trade for final demand with China and other East Asian countries, 1995-2009, USD billion.



Source: OECD/WTO TiVA database.

Generally the shares of East Asian countries in EU's trade are similar in gross and value added terms. In the value added exports of individual EU countries, the average share of China was roughly 3 % and the combined share of other East Asian countries was 3.5 % in 2008. In EU's value added imports, the average share of China was 6 % in 2008 and share of other East Asian countries just below 5 %. The structure of trade, however, changes considerably if value added is used instead of gross trade statistics (Figure 3). In general, the share of services is larger and the share of manufacturing smaller in value added exports to East Asia. This is also the case for EU's imports from other East Asian countries and to some extent for imports from China. However, in value added imports from China the primary-sector share is also higher than in gross exports.

Figure 3. Structure of EU trade with East Asia in 2008, based on gross and value added final demand trade.



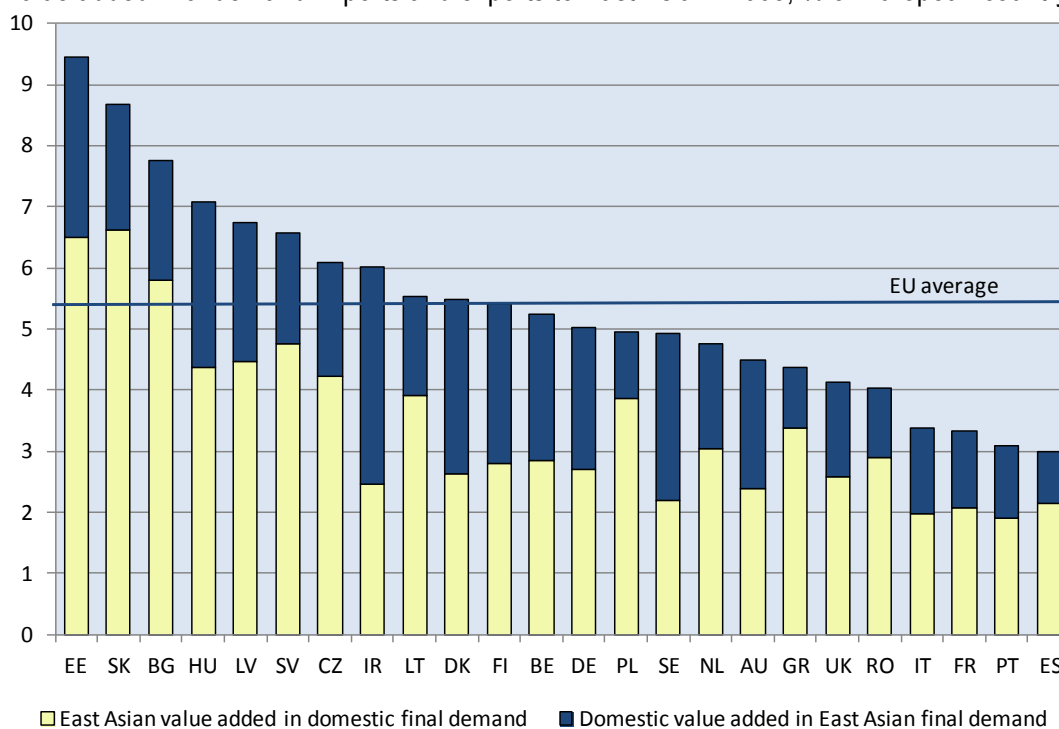
Source: OECD/WTO TiVA database.

Dependence of EU countries on East Asia

Final demand trade data can be used to evaluate the direct dependence of EU countries on East Asian countries. To evaluate supply dependence, we examine value added final demand imports from East Asia. This includes all the value added with final destination in the EU and which is imported to Europe either directly from East Asian countries or embodied in imports from other countries. As regards demand dependence, the evaluation is done in reverse by examining the East Asian imports of European value added. It takes into account the value added that is produced in EU countries and for which the final destination is in East Asia. One should bear in mind, however, that the underlying data are estimated, so that the results here should be taken as indicative. Moreover, the dependence estimates by definition exclude trade in value added that is used as an input for export production. Such trade, which is classified as the supply chain related trade, will be discussed later.

The supply dependence examination shows that, in general, the final demand of the EU countries relies largely on domestically produced value added. In 2008, the share of imported value added was on average 30 % of GDP. About half of that was from other EU27 countries, whereas value added originating in China accounted for an average of 2 % and other East Asian countries together for 1.5 % of GDP. For all EU countries, China was a slightly more important source for value added than were the other East Asian countries combined. The shares of China and other East Asian countries are generally larger for the EU's Central and Eastern European (CEE) countries than for the EU15, so that East Asia is a relatively more important supply source for the CEE countries. Slovakia, in particular, imports a large amount of East Asian value added, which accounts for nearly 7 % of its GDP. East Asia is the least important for Southern European countries, with the lowest share (2 %) recorded for Portugal (Figure 3). In nearly all EU countries, the largest share of East Asian value added is embodied in imports of the electrical equipment or in trade, hotel and restaurant services.

Figure 3. Value added final demand imports and exports to East Asia in 2008, % of European country's GDP



Source: Author's calculations based on TiVA database

As regards demand dependence, the value added produced in EU countries is also mainly directed to the domestic market, whereas exported value added was on average 30 % of GDP. Of that, slightly more than half was exported to other EU countries. On average, value added of only about 1 % of GDP was exported to both China and rest of the East Asia. However, for the majority of EU countries, the other East Asian countries combined were more important than China. As an export destination, East Asia is the most important for Northern European countries and for some CEE countries, where value added exports accounted for 2-3.5 % of their GDP, with Ireland topping the list (Figure 3). Exports to East Asian countries, which are the least important export destinations for Southern European countries, account for less than 1 % of GDP for Spain and Greece. By sector, EU's key exports to East Asia include business and transport services as well as electrical equipment and mechanical engineering goods.

Concerning final demand, East Asia is more important as an import source than as an export destination for most EU countries. For EU countries on average, value added imports for final demand from the whole of East Asia amounted to 3.4 % of GDP while corresponding exports to East Asia amounted to 2 % of GDP in 2008. Finland is not very different from the average EU country, as its corresponding shares are 2.8 % and 2.6 %. The numbers do not seem very impressive, but China's importance for Europe and Finland has increased rapidly in the past years. However, these figures should be considered only as direct dependencies, and it is noteworthy that they depict the aggregate level of the trade and are likely to hide significant sector-level differences among countries, which cannot be addressed with the data available. In addition, East Asia is important for EU countries as a supply chain trade partner, which we will discuss next.

Supply chain trade between the EU and East Asia

Supply chain trade with East Asia particularly important for Northern and Central Europe

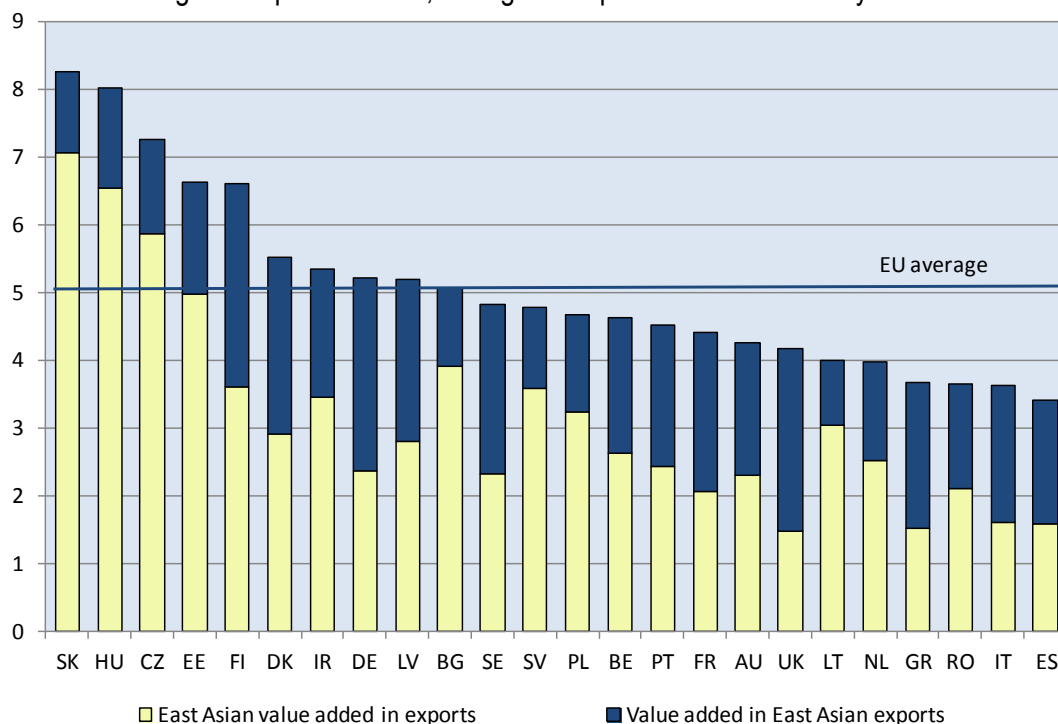
International supply chains have become increasingly important in international trade. In this study, supply chain trade includes trade flows between countries which are not intended for their own final use. By supply chain we refer to the total production chain of a good or service, including raw materials, components and services required in its production. However, we cannot distinguish between supply chains organized between different companies or within a single multinational company. We measure a country's supply chain trade as a share of its gross exports. Supply chain trade consists of two parts: the foreign value added within a country's gross exports (downstream supply chain trade) and the country's value added included in other countries' exports (upstream supply chain trade). In previous research, EU countries are found to have the highest participation rates in supply chain trade, with shares of over 60 % of their gross exports.²

In EU countries, foreign value added (downward supply chain trade) accounted on average for about a third of their gross exports in 2008. Of that fraction, other EU countries accounted for half (16 %-points) and China and the other East Asian countries for about 1.5 %-points and 2 %-points respectively. In general, East Asian countries are more important in downstream supply chain trade for the CEE countries, with the largest shares (7 %) in Slovakia's and Hungary's exports (Figure 4). In addition, the share is higher than average in some Northern European countries such

² UNCTAD (2013)

as Finland. The lowest shares are found in the exports of Southern European countries and the United Kingdom. For most of the EU countries the share of China is smaller than the combined share of the other East Asian countries. At sector level, the share of East Asian value added is generally highest in electrical equipment and transport equipment exports. The highest shares of East Asian value added are found in Slovak exports of electrical equipment (16 %) and transport equipment (11 %). For some countries, such as Austria and France, the share of Chinese value added is highest in the textile sector.

Figure 4. East Asian value added embodied in gross exports of EU countries and value added of EU countries embodied in East Asian gross exports in 2008, % of gross exports of the EU country.



Source: Author's calculations based on TiVA data.

Upstream supply chain trade - the European value added embodied in foreign exports - represented on average a fifth of the gross exports of individual EU countries in 2008. Of that share, the other EU countries accounted for about 10 %-points, and China and the other East Asian countries accounted for roughly 1 %-point each. The upstream supply chain trade with East Asia is most important for the Nordic countries and large European economies. The highest shares (3 %) are for Finland, Denmark and Germany. Upstream supply chain trade with East Asia is significantly less important, especially for most of the CEE countries. The majority of upstream supply chain trade from EU to China consists of services, especially business services, mainly relating to Chinese exports of electrical equipment, machinery and textiles. However, for many EU countries the sector structure is not heavily concentrated on services but instead rather diversified. As regards the other East Asian countries, the EU countries also supply them mainly with services related to exports of electric equipment, transport equipment and chemicals; but the role of services is not as dominant as in the trade with China.

Production structure largely defines supply chain trade

Supply chain trade with East Asia seems to be relatively important for Finland, as this country is more active in both upstream and downstream supply chain trade with East Asia than the average EU country. Most of the other EU countries are highly active only in a single part of the supply chain trade: EU15 countries in upstream and CEE countries in downstream supply chain trade. According to previous research, supply chain trade is largely determined by the key factors in traditional foreign trade: size of economies, their income levels and geographic distances between them. Large countries are usually more self-sufficient and engage relatively less in supply chain trade than small ones. Moreover, supply chain trade is often regionalized and inclined to diminish as geographic distance between countries grows.³

Production structure of countries is also important for shaping supply chain trade. In general, countries with similar production structures tend to engage in more bilateral supply chain trade. The characteristics of production also matter: supply chain trade is most prominent globally in electric equipment and transport equipment. These are also among the sectors with the longest production chains. Production structure and geographic distance may also interact: for products that are easier and cheaper to transport (e.g. electronic components), distance is a less important impeding factor for supply chain trade. In contrast, large and heavy components (e.g. for machinery and transport equipment) are more often transferred only domestically or to nearby countries.⁴

East Asian countries have specialized in manufacturing of electric equipment, and the sector has been very important for some EU countries such as Finland, where the huge mobile phone and network company Nokia is headquartered. It is the key industry in EU's supply chain trade with China, but not with the rest of East Asia. There is a statistically significant positive correlation of 0.4 between the share of electronic equipment exports and the share of Chinese value added in exports of European countries. Regarding other East Asian countries, however, there is no such correlation. China is also specialized in producing textiles, which is an important export sector for some Southern European countries. It seems, however, that these countries have not formed extensive supply chains with China, but instead the entire production chain has often been moved to China.

Another factor explaining the greater importance of East Asian supply chain trade for Finland could be distance. Since Finland is located somewhat on the periphery of Europe, the other EU countries could be relatively less important for Finland than for countries located in central Europe. Thus, Finland could use China and other East Asian countries as substitutes for CEE and EU15 countries, respectively. However, we did not find much support for this. We compared the involvement of individual EU15 countries in supply chain trade first with China and CEE and then with other EU15 countries and the rest of East Asia. In both cases, supply chain trade seems to be more complementary (albeit weakly) than substitutive. Thus supply chain trade with some countries seems to support engaging in it also with other countries. This could reflect the importance of multinational companies in supply chain trade, e.g. in the Finnish case Nokia, which had production and distribution of mobile phones in numerous different locations globally. It is indeed estimated that about one third of world trade is actually conducted within multinational companies⁵. Inside of Europe, distance does appear to play a role, however, with neighboring or nearby countries usually engaging relatively more intensively in supply chains with each other than with EU countries further away. This is the case e.g. for the Nordic and Baltic countries.

³ Baldwin & Lopez-Gonzalez(2013), Iossifov (2014), Rahman & Zhao (2013).

⁴ Ali-Yrkkö (2013), Newby (2013), OECD (2012), UNCTAD (2013).

⁵ Lanz & Miroudot (2011)

In order to examine the impact of downstream supply chain trade with East Asia, we split the gross export growth of EU countries into three parts: domestic value added, East Asian value added and other foreign country value added. It seems that for all countries except Slovakia the contribution of domestic value added to export growth has been larger than the contribution of foreign value added. However, even for Slovakia, East Asian countries accounted for a share of only 8 % of export growth in 1995-2008. Of EU15 countries, East Asia has been most important for Finland with a share of slightly over 3 % of export growth. It seems that the growth of downstream supply chain trade with East Asia is positively associated with the growth of a country's domestic value added exports to both East Asia and other countries. Similar evidence has been found in earlier research⁶, but the issue should be examined more thoroughly before drawing conclusions, as the positive relationship could be related e.g. to product structure of exports.

There is a strong positive correlation between the growth of upstream and downstream supply chain trade between EU and China. This may indicate that the upstream and downstream flows of supply chain trade are complementary and that they are to a large extent conducted within multinational companies, which have extended their production chains across countries. This is also compatible with the results of earlier research on employment effects of supply chain trade. There is evidence that increasing supply chain trade has shifted manufacturing jobs from Europe to China, but at the same time the number of service jobs has increased in Europe. Hence the total employment effect is quantitatively ambiguous, but job market polarization has increased.⁷

Conclusion

In this article, we have presented a general picture of trade relations between EU and East Asian countries based on value added trade. We found that traditional gross trade is larger than value added trade for final demand, especially for EU imports from East Asia. Still, East Asian countries are essential trading partners for many EU countries, also in value added trade. In general, trade with East Asia is more important for Northern Europe than for Southern Europe. For EU15 countries, East Asia is more important as a final demand and supply chain export destination, whereas for CEE countries it is more important as an import source for both final demand and supply chain trade. In final demand trade, Finland has behaved like an average EU country, but in supply chain trade it has been somewhat exceptional, as it has been engaged more than the average EU country in both upward and downward supply chain trade with East Asia. At the sector level, EU exports to East Asia and especially to China are mainly in business, transport and trade services; for imports, the focus is on manufactures related to electric equipment and trade services.

The countries' production structures seem to be one of the main factors explaining the importance of East Asian countries for EU supply chain trade. Especially China's importance in the downstream supply chain trade is positively associated with the share of electric equipment in the exports of the EU country. The data also indicate that the EU countries' engagement in supply chain trade with East Asia might be more of a complement than a substitute for supply chain trade with other EU countries. Preliminary examination of the impact of downstream supply chain trade with East Asia is compatible with results obtained in previous research: supply chain trade seems to support the growth of domestic value added exports to the supply chain trade partner country as well as to other countries. These findings are naturally only very tentative; but they certainly emphasize the need to deepen our understanding of the factors behind the trade between EU and East Asia, which is continually growing and becoming more complex.

⁶ Rahman & Zhao (2013), Timmer & al. (2013)

⁷ Ali-Yrkkö (2013), Timmer & al. (2013)

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