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IMBALANCE IN EU TRADE WITH SELECTED ASIAN ECONOMIES – A COMPARATIVE ANALYSIS BASED ON GROSS EXPORTS AND DOMESTIC VALUE-ADDED

The European Union has a chronic trade deficit with Asia, the majority of which is with certain countries in East and South-East Asia. This conclusion is based on traditional international trade statistics. However, the international fragmentation of production processes and the new method of measuring trade by value-added are now making trade analysis closer to reality, allowing for more accurate conclusions to be drawn.

This article's main aim is to analyze and evaluate the EU's trade imbalance with Asia and selected Asian economies, which is found in both traditional (gross) and new (value--added) international trade statistics. The analysis shows that the degree of trade imbalances concerning partners and groups of goods differs depending on the method of analysis. In the case of EU-Asian trade relations, imbalances do exist, but they generally show smaller deficits or surpluses when measured in value-added terms.

The availability of statistical data determined the time and geographical scope of the study. The analysis covers the EU28's trade with 15 Asian countries from 1995 to 2018, with a particular focus on China, Japan, and South Korea. The study applies a critical literature review, the descriptive-analytical method, and the method of inference based on statistical data obtained from international databases (Eurostat, OECD-WTO, and UNCTAD).

Keywords: trade imbalance, gross exports, value-added trade, European Union, Asia, Japan.

1. INTRODUCTION

An inherent feature of the European Union's trade with Asia is the persistently high and growing trade deficit. The trade balance between the partners is a result of the influence of numerous factors. The most significant are those related to the high cost advantage that characterizes Asian economies, their high development dynamics, offshoring processes, international corporations' activities, the deepening international fragmentation of production, and the development of trade in value-added.

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Among economists dealing with the problem of fragmentation of production and trade in value-added, there is a relatively high consensus that the factors influencing the increase in the scale of the phenomenon of the geographical division of production processes are identical to those influencing the development and structural changes of international trade (Amador, Cabral, 2016; Hillberry, 2011). First of all, two factors should be underlined: 1) technological progress and a decrease in transport and communication costs; 2) liberalization of trade and capital movements. However, other factors related to developing countries' political and economic transformations, international corporations' activities, and regional economic integration processes cannot be overlooked.

The development of the fragmentation of production and value-added trade had a significant impact on the structural changes in international trade, consisting mainly in the increase in the flows of parts and components, the development of intra-industry and intra-corporate trade, and the increase in services trade (Feenstra, 2010; Grossman, Rossi-Hansberg, 2008; Jones, Kierzkowski, 1990). Trade in value-added has also had a significant impact on the shaping of trade balances. Brum et al. (2019) proved that stronger participation in global value chains leads to a more balanced current account.

In order to fully estimate the real scale of trade imbalances, it is necessary to use the world input-output tables. Based on them, we can obtain more precise information about actual trade balances. The existing literature confirms high differences in the balances calculated in value-added terms in relation to classically calculated indicators. The traditional method involves a simple analysis of the difference in the value of exports and imports. In a method based on value-added terms, we need to calculate the difference between domestic value added contained in foreign final demand and foreign value added contained in domestic final demand by industry of origin of value-added.

Most of the work, however, relates to the U.S. trade with Asian countries, especially China. For example, Gao et al. (2018) indicate that the US deficit against China decreases by 50% after applying the value-added method. On the other hand, Sposi and Koech (2013) showed that the real U.S. deficit with China based on value-added was lower by 33% in 2009 and 25% on average after 2000. Johnson and Noguera (2012) and Zhang, Tang, and Zhan (2012) came to similar conclusions. Johnson and Noguera concluded that in 2004 the US-China imbalance was 30-40% smaller when measured in value-added. Xing and Detert (2010) presented calculations showing that the US trade deficit with China in only one product (iPhone) dropped from 1.9 USD billion to only 73.5 USD million in 2009 when measured in value-added terms. These calculations were repeated for iPhone X by Xing (2020). The author also showed that in 2015 the total US trade deficit with China measured in value-added was 56% of that calculated in traditional (gross) terms (Xing, 2020). Even more significant difference was noticed in the case of computers, electronics, and optical products, which are the most important category in Chinese exports to the US. Here, the US trade deficit in value added was 41% of that in gross value. Kuboniwa (2014) estimated that China's trade surplus with the US in 2010 was 18.8% lower in value-added terms than in gross terms, and in the case of the EU by as much as 46.2%.

As already mentioned, most of the literature on trade imbalances concerns US trade, mainly with China. Works covering the case of the European Union are far more scarce. One of them is that of Cingolani, Felice, and Tajoli (2015). The authors show a significant impact of fragmentation on the EU trade balance. The results confirmed that a country's involvement in international fragmentation of production affects its trade balances.

Another work concerning the EU's country (Poland) is that of Ambroziak (2017). The author showed that Poland revealed significant trade surpluses in gross terms with some individual countries (e.g., Germany, Denmark, or Hungary) while the trade balances were significantly lower in value-added terms. For those countries with which Poland had trade deficits in gross terms, in value-added terms, these deficits were lower (China, Russia, South Korea).

This article complements the relatively modest literature analyzing the European Union's trade imbalances with Asian partners. The main goal of the study is to analyze the trade imbalances of the European Union with selected Asian countries, carried out according to the traditional method of measuring trade (gross exports and imports) and the method based on value-added. Using these two alternative methods of analyzing trade flows will make the final effect of EU trade cooperation with selected Asian partners closer to reality. Trade imbalances measured using the conventional and unconventional methods can differ significantly, and this will have consequences, including for the commercial policy of partners. This will require further research on the topic.

The detailed analysis of the study covers:

1) shaping of the European Union's trade balances in geographical terms and defining the role of Asia in trade imbalances creation;
2) European Union's trade balances with selected Asian countries in classical and value-added terms;
3) trade balances of the European Union with China, Japan, and South Korea in commodity groups in the classical and value-added terms.

The availability of statistical data determined the time and geographical scope of the study. The analysis covers the EU28 trade with 15 Asian countries (Brunei Darussalam, Cambodia, China, Hong Kong, Indonesia, Japan, Laos, Malaysia, Myanmar, the Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam) in 1995–2018.

In order to achieve the aim of the study, the method of critical literature review, the descriptive-analytical method, and the method of inference based on statistical data obtained from international databases (Eurostat, OECD-WTO, and UNCTAD) were applied.

2. METHOD OF THE ANALYSIS

Koopman, Wang, and Wei (2014) developed the complete method of measuring the scale of production fragmentation and the related trade in value-added. They decomposed gross exports into domestic (DVA) and foreign value added (FVA) (Figure 1). The domestic value added was broken down into that consumed entirely abroad (including final goods and intermediate goods or re-exported to third countries by the first importer) and domestic value added, first exported but returned to the country. The foreign value added can be divided into that contained in the export of final and intermediate goods. The last category is double-counted exports, i.e., the same products (domestic and foreign) exported twice or more.

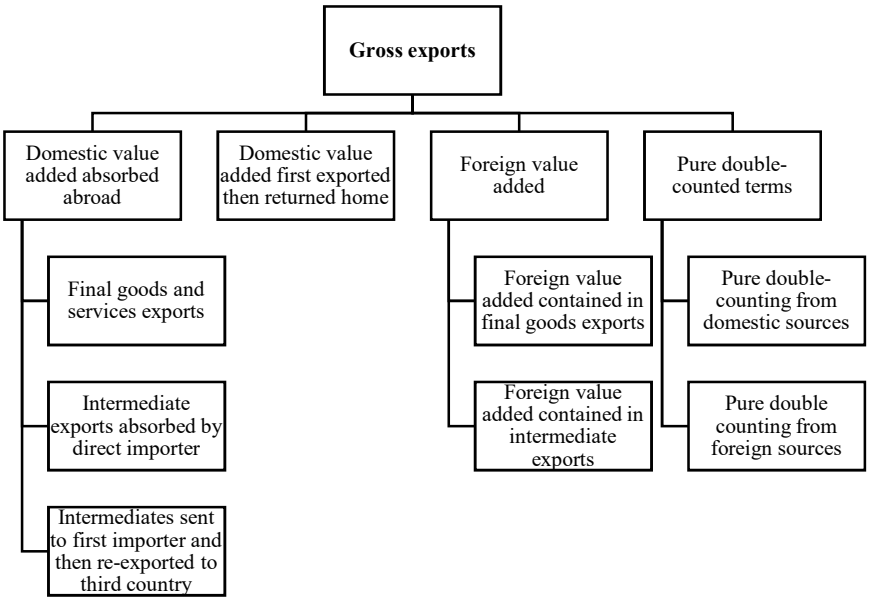

Figure 1. Gross export measurement method

Source: Adapted from (Inomata, 2017).

Country *A*'s net value added (*NVA*), and therefore the trade balance, is the difference between gross exports and imports and takes the form of equation (1).

$$NVA = (DVA + FVA) - (BVA+RVA+MVA) \quad (1)$$

Gross export is the sum of the direct and indirect domestic value added (*DVA*) that country *A* exports to other countries, and the foreign value added (*FVA*) consisting of previously imported foreign components, subassemblies, and raw materials used in the production process.

The value of net imports consists of three components: 1) bilateral value added (*BVA*), 2) re-imported value added (*RVA*), and 3) multilateral value added (*MVA*). Bilateral value-added is the import of country *A* products whose 100% added-value was created in country *B*. The re-imported value-added is imported by country *A* products whose final value consists of both country *B*'s added value and components from country *A*. Multilateral value-added means importing country *A* of products from country *B* to which components from country *C* were used.

In order to estimate the trade balance based on value-added terms (BALVAFD), we need to calculate the difference between domestic value added (DVA) contained in foreign final demand (FFD) and foreign value added (FVA) contained in domestic final demand by industry of origin of value-added (2).

$$BALVAFD=FFD\_DVA-DFD\_FVA \quad (2)$$

3. TRADE IMBALANCES OF THE EUROPEAN UNION

The external trade of the European Union in 2002–2019 showed a relatively high dynamics of growth. The group's exports increased from 885.3 EUR billion in 2002 to 2 EUR trillion in 2019. In the same period, imports increased from 936.9 EUR billion to 2.06 EUR trillion. As a result, from the perspective of the external trade balance, the EU28 showed an initial deficit of 51.6 EUR billion, only to record a negative trade balance of 20.6 EUR billion in 2019. As shown in Figure 2, the situation was not stable over time as conditions were changing substantially in the analyzed period. After the dot.com crisis, which took place at the beginning of the 21st century, the global economic situation has improved. It was also reflected in EU trade.

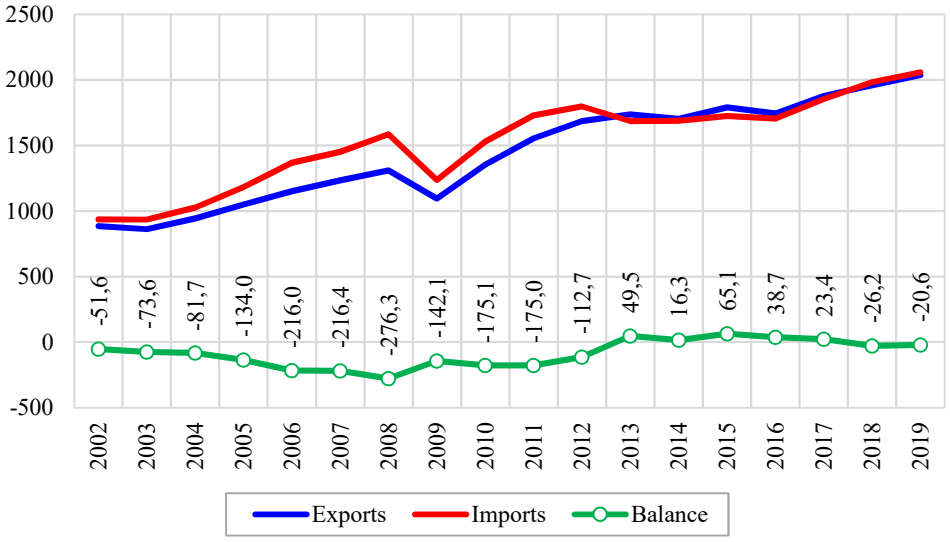

Figure 2. Extra-EU28 trade, 2002–2019, EUR billion

Source: Own preparation based on (Eurostat, 2021).

Until 2008, the value of exports increased by almost 48% (to 1.3 EUR trillion), but imports increased even more (by 69.2% to 1.6 EUR trillion). This meant a widening in the external trade deficit of the EU28 from 51.6 to 276.3 EUR billion. The collapse of international trade in 2009 also affected the European Union. This year, exports fell by over 16%, and imports by 22%. From 2010, the situation began to improve. After the initial dynamic increase in the value of trade turnover, the situation has stabilized since 2013. Until 2016, the values of exports and imports did not change rapidly. At the same time, the situation in the trade balance improved. In 2013, the EU28 even achieved a trade surplus of 49.5 EUR billion for the first time. On the one hand, the following years saw a relatively stable situation in the trade balance (ranging from -20.6 to +65.1 EUR billion), and on the other hand, a marked increase in turnover from 2016 to 2019.

Analyzing the data on the total trade balance of the EU28 in 2002–2019 (see Fig. 2), it would seem that the situation was relatively stable. Nevertheless, this overall result of EU

trade cooperation resulted from closer cooperation with only selected regions and countries. Figure 3 shows the value of EU28 trade with geographical regions.

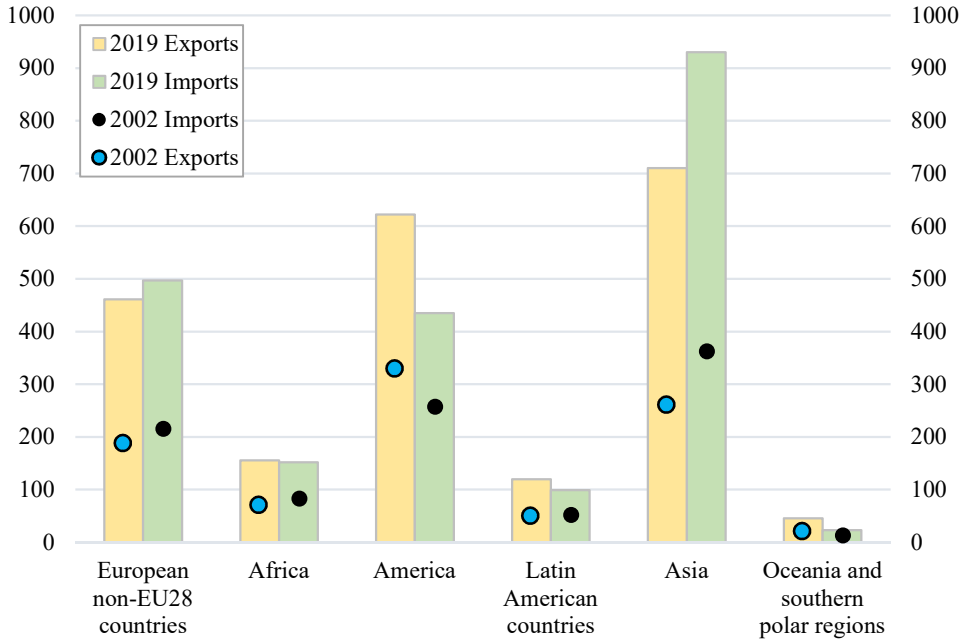

Figure 3. Extra-EU28 trade by geographical region, 2002 and 2019, EUR billion

Source: Own preparation based on (Eurostat, 2021).

The highest values, and thus shares in the EU's external exports and imports, belonged to Asia, America, and European non-EU28 countries. The remaining regions had much lower shares. The data in table 1 confirm these observations.

At the same time, it is worth pointing to the changes in the geographical structure of the EU28 trade in goods. In 2002, America was the most crucial export partner (35.8%), followed by Asia (28.3%) and non-EU member European countries (20.4%). In terms of import, these areas were also the most important, but the largest supply market was Asia (36.9%), followed by America (26.2%) and non-EU countries of Europe (21.9%). By 2019, the situation had changed so that Asia grew in importance and America lost out. However, other geographic areas were of importance similar to those in 2002. In 2019, Asia was already responsible for 43.5% of external EU28 imports and 33.6% of exports. The respective shares for America were 20.4 and 29.4%. Based on the above analysis, a clear conclusion can be drawn that the Asian region is becoming more and more significant in the European Union's trade, with a weakening position of America and stable for other areas.

Table 1. Share of extra-EU28 trade by geographical region, 2002 and 2019 (%)

	2002		2019	
	Exports	Imports	Exports	Imports
European non-EU28 countries	20.4%	21.9%	21.8%	23.3%
Africa	7.7%	8.4%	7.4%	7.1%
America	35.8%	26.2%	29.4%	20.4%
Latin American countries	5.5%	5.3%	5.7%	4.6%
Asia	28.3%	36.9%	33.6%	43.5%
Oceania and southern polar regions	2.3%	1.3%	2.1%	1.1%

Source: Own calculations based on (Eurostat, 2021).

Interesting conclusions from the point of view of the title of this study are brought by the analysis of the trade imbalance of the European Union with selected geographical regions. Figure 4 shows the value of the EU28 trade balance with partners in 2002–2019.

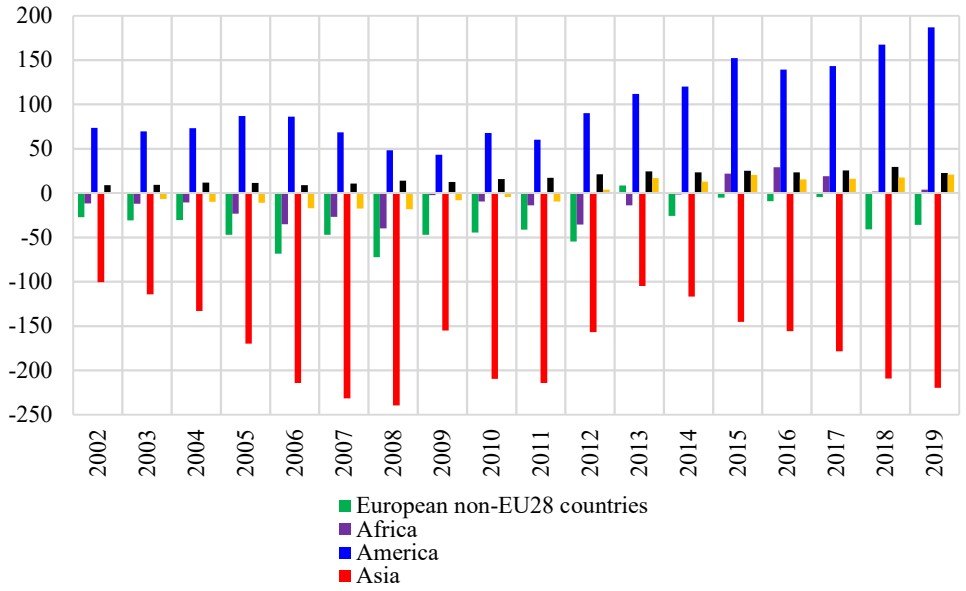

Figure 4. Extra-EU28 trade balance by geographical region, 2002-2019, EUR million

Source: Own preparation based on (Eurostat, 2021).

It turns out that the overall relative trade stability of the EU28 paradoxically resulted from high instability with specific partners, namely Asia and America. In 2002, the EU28 showed a deficit with Asia of 100.6 EUR billion and a surplus with America of 73.8 EUR billion. At the end of the analyzed period (2019), the deficit with Asia amounted to 219.8 EUR billion, and the surplus with America was 186.8 EUR billion. Surpluses and deficits with other countries were much lower in value, although in certain cases quite significant (e.g., deficits with European non-EU member states in 2005–2012). Due to Asia's large and growing importance in the European Union's trade and the most significant and

growing trade imbalance that the EU shows with this region, examining the EU28's external trade relations with Asia and selected Asian economies is necessary.

4. EU TRADE WITH ASIA

In the years 2000-2019, the European Union's trade turnover with Asia[3] grew dynamically. According to UNCTAD (2021), exports increased from 256.8 USD billion to 871.1 USD billion, while imports increased from 405.7 USD billion to 1.2 USD billion. At the same time, this meant an increase in the deficit from 148.9 USD billion to 362.8 USD billion. Of the five Asian sub-regions, only with West Asia, the EU showed a surplus (23.9 USD billion in 2000 and 33.2 USD billion in 2019). However, trade flows with the remaining four sub-regions generated a deficit for the European Union, and the share of these sub-regions was significantly diversified.

Table 2. Share of Asian subregions in EU28 trade deficit with Asia, 2000, 2010 and 2019 (%)

	2000	2010	2019
Central Asia	1.6%	3.1%	4.1%
Eastern Asia	73.9%	81.5%	69.0%
South-Eastern Asia	20.7%	11.1%	18.3%
Southern Asia	3.8%	4.3%	8.5%

The only sub-region with which the EU28 had a trade surplus was Western Asia. Therefore, the region is excluded from the table of deficit regions.

Source: Own calculations based on (UNCTAD, 2021).

According to Table 2, East Asia and, to a lesser extent, Southeast Asia had the highest share in the deficit generated in the EU28 trade with Asia. Together, these two areas accounted for between 86.5% and 97.3% of the deficit. Therefore, it is justified to focus attention on countries from these particular Asian sub-regions. It turns out that only selected Asian countries are responsible for such a large deficit. Figure 5 shows the trade balance of the EU28 with selected countries of East and South-East Asia. In 2019, China was the country that generated the most significant EU trade deficit with Asia –258.6 USD billion. In the following places, but with significantly lower deficit values, were Vietnam (38.1 billion), Japan (23.4 billion), Malaysia (14.8 billion), and Thailand (11.5 billion). On the other hand, the EU28 generated a surplus with Hong Kong (USD 21.3 billion) and Singapore (11.6 billion). However, these surpluses and the number of countries with which the EU had a positive trade balance were much lower than in the case of deficit countries.

[3] UNCTAD categorizes Asia broadly. In this approach, Asia comprises 50 countries classified into five sub-regions: Central Asia, Eastern Asia, South-Eastern Asia, Southern Asia, and Western Asia. For this reason, data for Asia according to the UNCTAD and Eurostat classification may differ.

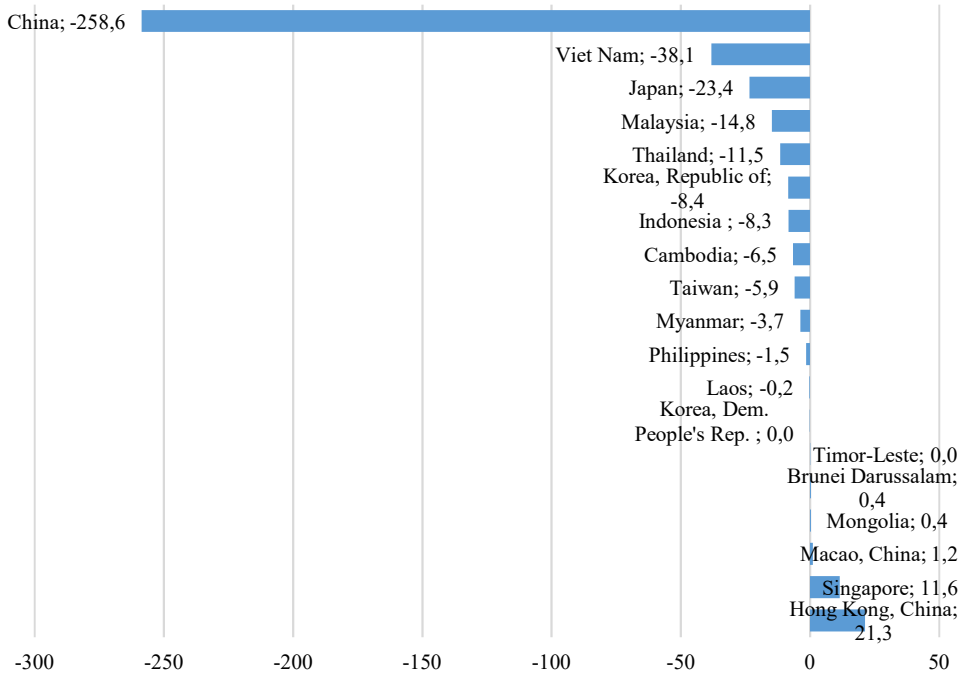

Figure 5. Extra-EU28 trade balance with East Asian and Southeast Asian countries, 2019, USD billion

Source: Own calculations based on (UNCTAD, 2021).

It is also worth emphasizing that the described situation resulted from the evolution of the EU's trade ties with Asian countries. In 2000, the situation was quite different because the five countries that generated the largest deficit for the EU were in the following order: Japan (56.8 USD billion deficit), China (49.8), Taiwan (15.1), South Korea (11.6), and Malaysia (9.7). Therefore, it is worth remembering that international trade is dynamic, and therefore its analysis should include changes over time.

To sum up, the European Union is seemingly showing a relatively stable situation in its overall external trade balance. Nevertheless, this situation is caused by the imbalances generated by individual partners at the regional and national levels. Therefore, in the following part of the study, we will focus on assessing the EU's trade ties with selected Asian countries in traditional (gross value) and new (value-added) terms.

5. THE EU-ASIA TRADE ANALYSIS BASED ON GROSS EXPORTS AND DOMESTIC VALUE ADDED

Trade balances

An alternative method of measuring trade based on the estimation of domestic and foreign value-added in gross exports allows determining the accurate trade balances of the European Union with selected Asian countries. The results of the calculations are included in Table 3. Based on the statistical data, we can formulate several conclusions.

Table 3. EU's trade balance with selected Asian countries in gross (GTB) and value-added (VATB) terms, USD million

		1995	2000	2005	2010	2015	2018
Japan	**VATB**	-6458.4	-20750.4	-16674.4	-16848.1	12166.7	23245.5
	GTB	-1885.5	-15978.9	-10483.8	-7157.3	14187.8	26509.9
South Korea	**VATB**	-1675	-5558.7	-12945.9	-18808.5	3407.5	7009.5
	GTB	-2866.9	-6259.1	-16375.8	-28753.9	15914.7	21382.9
Brunei Darussalam	**VATB**	698.2	311.8	122.3	240.6	604.9	460.4
	GTB	780.1	442.2	350.2	563.1	845.0	752.5
Cambodia	**VATB**	153.5	46.4	114.8	-288.1	-859.8	-1373.9
	GTB	166.0	-58.4	-113.2	-605.6	-1637.8	-2321.5
China	**VATB**	-824.1	-8769	-32594.4	-81862.6	-19094.3	-4742.3
	GTB	-2729.9	-11745.4	-49362.1	-109298	-32361.1	-22153.2
Indonesia	**VATB**	1164.4	-4471.8	-1755.6	-3639.6	2188.3	1729.3
	GTB	1104.5	-4928.5	-1668.8	-3478.7	1514.1	435.5
Hong Kong. China	**VATB**	2571.6	-673.5	-1269.5	420.5	5211.4	358.8
	GTB	1501	-1259.6	-962	-2291.7	1874.3	-6959.6
Laos	**VATB**	70.3	47.7	67.2	31.7	-21.9	6.3
	GTB	70.4	51.9	101.7	-15.2	-153.8	-66.7
Malaysia	**VATB**	685.9	-2660	-2823.6	-2395.1	3026.7	3126.3
	GTB	-723.6	-2861.3	-172.7	-383.9	4727.5	5046.3
Myanmar	**VATB**	722.7	368.7	-50.4	-236.1	97.1	-600.1
	GTB	704.3	433.4	79.2	-231.8	-484.9	-1149.6
Philippines	**VATB**	5705.6	160.2	-38.4	-1557.4	1758.8	3365.6
	GTB	6548.2	-176.4	-621.7	-2548.2	769.6	848.3
Singapore	**VATB**	-1526	-1786.6	-4924.3	-7445.4	-6258.3	-6562.7
	GTB	-1571.9	-840	-2465.3	-3470.7	268.8	1420.1
Taiwan	**VATB**	-271.4	-4987.6	-2666.6	-5470	-2500.2	-51.2
	GTB	-1419.3	-7418.9	-1253.6	-6237.6	3541.3	6063.8
Thailand	**VATB**	3238.3	-3687.1	-1718.8	-4334.3	-1883.2	-4108.1
	GTB	2416.2	-5580.1	-3819.1	-6803.5	-1853.1	-4877.5
Vietnam	**VATB**	1282.5	-815	-1211.1	-651.5	-2348.4	-3293
	GTB	1401.8	-1939.9	-3290.1	-3919.9	-8730.7	-10575.7

Source: Own preparation based on (OECD-WTO, 2021).

First of all, in all analyzed countries, the trade balances calculated according to the classical method based on gross exports and imports differed from the balances estimated with the value-added method. At the same time, the difference in the scale of trade imbalances, depending on the research method used, varied between countries. The most negligible differences were noticed in the case of Japan, Thailand, and Brunei Darussalam. At the same time, there were apparent differences in trade balances with China, Vietnam, Malaysia, South Korea, Cambodia, Hong Kong, Singapore, and Taiwan. An interesting case in the analyzed group of countries is South Korea. Until 2011, the differences in the trade balance calculated based on gross value and value-added were relatively small. However, since 2012, we can observe increasing differences in the values of trade balances depending on the adopted research method. It can be assumed that the increase was significantly influenced by flows of parts and components, which resulted from the preferential trade agreement between the EU and Korea, in operation since mid-2011. In

the case of Indonesia, in 2013 trade deficit calculated in value added terms changed into a surplus, and what is more since then it exceeds a trade balance in gross terms.

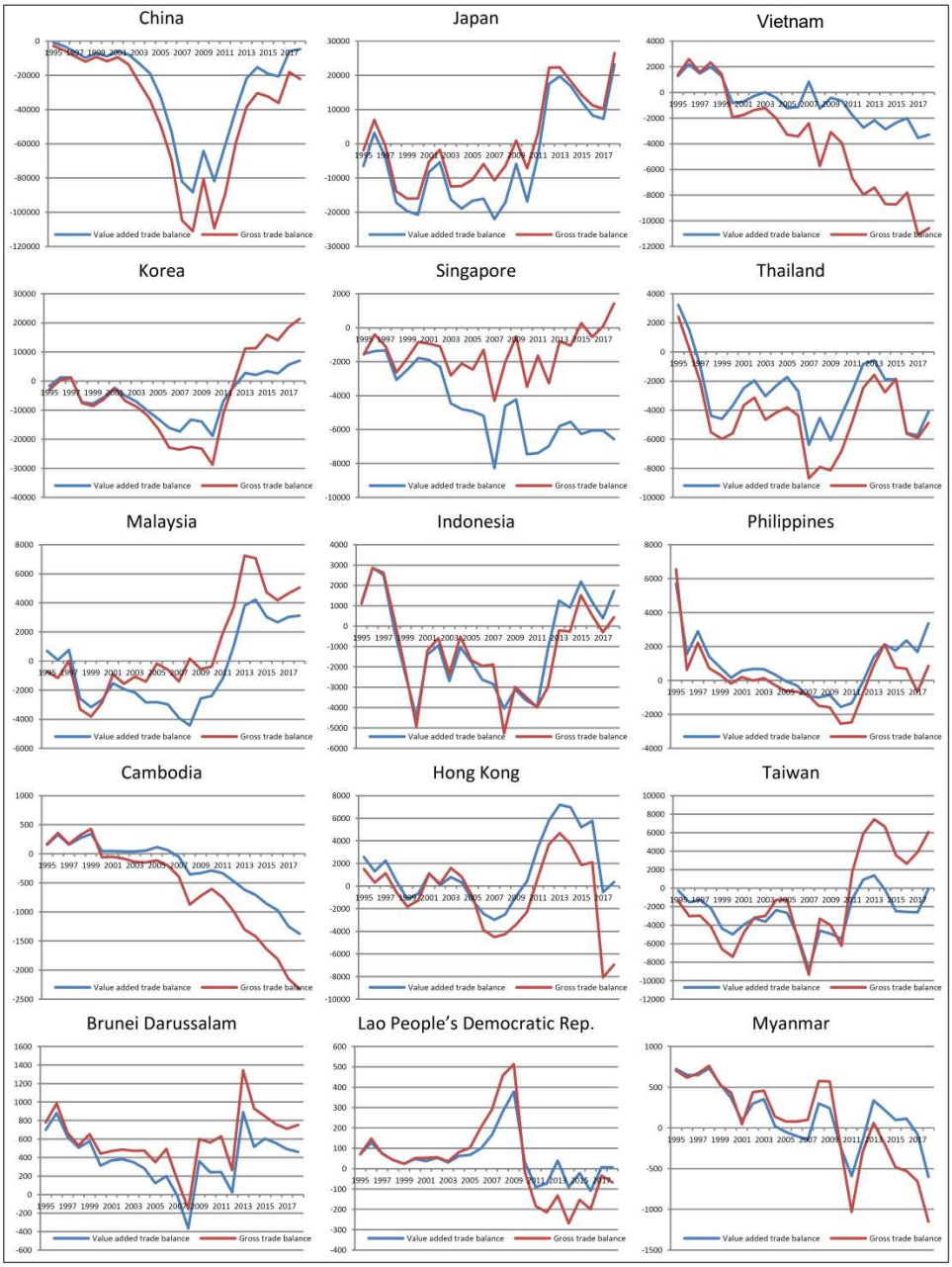

Figure 6. European Union's trade balance with selected Asian countries in gross (GTB) and value-added (VATB) terms, USD million

Source: see table 3.

Secondly, we can identify two groups of economies. The first one consists of countries where trade balances calculated on a value-added base show a lower scale of imbalance than those calculated traditionally. It includes countries where the EU shows a lower deficit (China, Vietnam, Cambodia, Thailand, and Myanmar, among others) and those with a lower trade surplus (Japan, South Korea, Malaysia, Brunei Darussalam). In the case of the Philippines, trade, as measured by value-added, between 2005 and 2011 was more balanced than trade based on gross value, but in general the trade balance fluctuated. The second group includes countries for which applying the value-added method causes an increase in trade imbalance. It includes mainly Singapore and Indonesia, and the Philippines after 2014.

Thirdly, the largest trade imbalance estimated on a value-added basis was characteristic for the European Union's trade with Japan (surplus of 26.5 USD billion in 2018), China (deficit of 22.2 USD billion), Vietnam (deficit 10.6 USD billion), South Korea (surplus of 7 USD billion), and Singapore (deficit of 6.6 USD billion). In trade with other countries in 2018, the trade imbalances did not exceed 5 USD billion.

Trade imbalance in product groups

The largest scale of the European Union's trade imbalance with Asia occurs in trade with China, Japan, and South Korea. Therefore, it is justified to indicate the main groups of products characterized by the highest deficits or surpluses according to gross and value-added methods (see table 4). The data analysis clearly shows that the main part of the trade deficit arises in the manufacturing sector. At the same time, in the exchange of agricultural products and raw materials, we can talk about a much smaller scale of the phenomenon.

Within the manufacturing, two groups of products with the most significant trade imbalance can be identified: 1) Computers, electronic and electrical equipment and 2) Transport equipment. In the first case, the European Union's trade with China, South Korea, and Japan is characterized by a high deficit calculated in gross value and value-added terms. However, it is worth noting that the deficits calculated based on value-added in the case of Japan are about 30% lower than in traditional terms, while in China, the deficit is almost four times lower (in 2018, the deficit of the EU with China in terms of value-added was at the level of 22 USD billion, and in gross terms 85.5 USD billion).

In the case of South Korea, the gross deficit until 2010 was, similarly to China and Japan, clearly higher than in terms of value-added. However, after 2011 there was a change in the trend – the deficit measured in gross terms decreased, and the deficit calculated in value-add terms increased. Currently, the deficit calculated according to value added method is higher than that calculated according to a traditional method (-9.5 USD billion vs. -6.8 USD billion in 2018).

The lower imbalance in value-added terms in relation to China and Japan is caused mainly because a significant part of the real deficit in this category occurs in relation to third countries such as Taiwan, Malaysia, Vietnam, but also the United States.

In the case of transport equipment, relationships are more complex. In trade with Japan and South Korea, the European Union shows a high deficit. It is higher when the basis for the calculations is data on the gross values of exports and imports. Applying the value-added method causes a significant decrease in the deficit, especially in trade with Korea. In 2018, the deficit of the EU in trade within transport equipment with Korea based on the traditional calculation method was 6.8 USD billion, and after the application of the value-added method, only 1.2 USD billion. The main reason for such high differences is the strong production ties between companies from the automotive industry. A significant part

of the value-added used in the production of Korean cars comes from the European Union countries, especially Germany, France, Italy, and the countries of Central Europe: Poland, the Czech Republic, Hungary, and Slovakia. Thus, the actual EU trade deficit against Japan and Korea is much lower.

The European Union has a high trade surplus with China in transport equipment, regardless of the calculation method. Nevertheless, when the calculation is based on data in value-added, the EU surplus is already more than twice as low. This results from high imports of parts and components from China, which go to European car manufacturers, then exported back to China.

Table 4. European Union trade balance with Japan, China, and Korea in gross (GTB) and value-added (VATB), USD million

		Japan			China			Korea		
		1995	2005	2018	1995	2005	2018	1995	2005	2018
Agriculture, forestry, and fishing	GTB	915.5	510.7	590.4	-94.5	-224.4	292.3	107.0	140.0	188.9
	VATB	1486	1003.8	1451.7	-1481.5	-5571	-14723.1	-29.7	92.9	253.1
Mining and quarrying	GTB	156.7	123.5	3 964.6	-198.3	-81.6	-991.9	62.9	204.2	2 399.9
	VATB	723.1	802.6	2756.4	-814.6	-6227.9	-6907.4	194.7	278.1	947.7
Manufacturing	GTB	-17 682.5	-18 332.3	13 769.6	-717.7	-49 782.5	-88 240.7	-5 647.1	-22 927.9	1 386.6
	VATB	-18079.5	-24839.3	-3616.8	675.4	-23443.5	-40131.8	-3094.9	-14893	-8864.4
Food products, beverages, and tobacco	GTB	4 496.8	5 820.8	6 588.2	-238.5	-1 667.3	6 370.1	399.6	905.5	2 086.9
	VATB	1556.4	2018.7	2221.9	-172.4	-1585.7	-677.9	128.3	344.2	634.8
Textiles, wearing apparel, leather, and related products	GTB	3 630.6	4 248.0	2 148.4	-4 088.0	-21 327.1	-45 918.4	-1 089.9	-321.5	1 699.4
	VATB	1543.5	1581	898.7	-1470.2	-8678.4	-16504.9	-633.9	-391.1	378.8
Wood and paper products; printing	GTB	745.7	1 446.1	1 711.9	79.7	-38.8	2 014.1	121.9	312.9	940.9
	VATB	238.7	182.1	529.2	111.2	-680.9	-1960.5	50.2	13.3	295
Chemicals and non-metallic mineral products	GTB	1 627.7	2 837.4	8 414.5	-1 187.8	-3 061.4	5 346.0	1 445.7	1 944.1	2 553.7
	VATB	179.6	122	3725.1	-666.9	-6106.4	-10374.2	-353.2	-2492.9	-1537.1
Primary metals and fabricated metal products	GTB	350.4	1 565.9	1 870.2	334.4	-1 877.0	-2 184.4	1 047.8	1 563.5	272.0
	VATB	-1400.6	-2243.6	-2370.4	857.2	-1335.4	-9852.8	217.3	-1256.6	-993.8
Computers, electronic and electrical equipment	GTB	-16 992.0	-17 243.5	-6 252.9	-539.0	-32 490.0	-85 517.9	-5 013.3	-14 086.9	-6 833.1
	VATB	-10956	-12244.5	-4366.2	-198.7	-8938.4	-21962.5	-2066.1	-7381.8	-9486.8
Machinery and equipment, net	GTB	-6 279.0	-6 339.7	-1 968.8	4 513.7	10 883.4	11 492.9	1 717.3	2 590.2	4 891.4
	VATB	-4186.4	-4420.8	-2923	1940.5	4328.6	8550.5	756.8	744.6	1973.8
Transport equipment	GTB	-7 974.8	-12 620.3	-4 697.1	1 415.0	4 037.2	42 456.5	-4 344.3	-16 204.0	-6 767.8
	VATB	-5361.2	-9549.8	-4308.5	294.9	87.8	16799.9	-1336.3	-4700.3	-1167.4
Other manufacturing; repair, and installation of machinery and equipment	GTB	2 712.0	1 953.1	5 955.3	-1 007.0	-4 241.5	-22 299.8	68.1	368.3	2 543.3
	VATB	306.4	-284.4	2976.3	-20.2	-534.7	-4149.6	142	227.7	1038.2

Source: Own preparations based on (OECD-WTO, 2021).

The trade imbalance of the European Union in relation to the analyzed economies in other commodity groups in the manufacturing sector is generally slight in scale. Still, we

can identify some specific cases of highly unbalanced trade. First of all, with China it occurs in trade in four product groups: 1) textiles, wearing apparel, leather, and related products; 2) other manufacturing; repair and installation of machinery and equipment; 3) machinery and equipment, n.e.c.; and 4) chemicals and non-metallic mineral products. The European Union has a high deficit measured in the traditional method in the first two groups of goods. However, balances based on value-added show a much smaller deficit. In the first case, it is almost three times, and in the second, it is more than five times lower. In the machinery and equipment, n.e.c., the European Union has a high surplus irrespective of the calculation method adopted. However, it is lower in calculations based on added value. Finally, the situation in the group of chemicals and non-metallic mineral products is worth noticing. The European Union showed a trade deficit with China for most of the analyzed period, which has turned into a slight surplus in recent years. However, the statistics based on the value-added clearly show that the surplus has not been reached, the trade balance is negative, and in 2018 it was -10.4 USD billion. A similar situation occurs in this commodity group also in trade with South Korea.

6. CONCLUSIONS

The European Union is an economy heavily involved in the development of international trade. The value of the trade turnover of this grouping is continuously growing, and the effect of trade cooperation is revealed in the external trade balance. In the years 2002–2019, the EU trade balance initially showed a growing deficit with the rest of the world (2002–2008), then a decreasing deficit (2009–2012), and since 2013 the balance has been relatively stable with alternating surpluses and deficits. This equilibrium, however, is apparent, as the final result of EU trade cooperation is the consequence of the compensation of trade balances with particular groups of partners. The European Union shows a high surplus with the Americas and a high deficit with Asia and with European non-EU member states. The EU's trade relations with Asia are particularly imbalanced. Between 2002 and 2019, the deficit on the EU side increased from 100.6 USD billion to 219.8 USD billion.

The conducted analysis showed that East Asia and South-East Asia were responsible for generating a surplus with the European Union within the broadly understood region of Asia. Moreover, only selected countries were responsible for the EU's trade imbalance with Asia within these sub-regions. On the one hand, China, followed by Vietnam, Japan, Malaysia, Thailand, South Korea, and Indonesia, created the growing trade deficit for the EU. On the other hand, the EU showed a relatively high surplus with Hong Kong and Singapore.

Nevertheless, presenting the European Union's trade imbalance with Asia solely through the prism of the traditional measurement method of international trade is not entirely legitimate. This method has several shortcomings, which do not allow for formulating unequivocal conclusions. First of all, it does not take into account foreign value added, which increases the value of exports and significantly affects the trade balance. It also does not allow for the proper identification of countries with which there are actual trade surpluses and deficits. An alternative method of measuring international trade (based on value-added) reflects the reality better. Therefore, the analysis and comparison of trade imbalances using both presented methods give a different view on the final effect of EU trade cooperation with Asia.

The use of the research method based on world input-output tables allows to estimate the actual trade balances of the European Union with selected Asian countries and to compare the obtained results with classically calculated values. The most significant differences in the scale of the trade imbalance occurred in trade with China, Vietnam, Malaysia, South Korea, Cambodia, Hong Kong, Singapore, and Taiwan. The value-added balances revealed a significantly lower deficit for China, Vietnam, and Cambodia, while Malaysia showed a lower surplus. Interesting cases are Hong Kong and Singapore. In 2018 the trade with Hong Kong revealed surplus in value added terms while deficit in gross terms. An opposite situation took place for the EU's trade balance with Singapore. A relatively small influence of the applied research method on trade imbalance occurred in trade with Japan, and Thailand.

The analysis of trade balances in the European Union's trade with China, Japan, and South Korea – the countries with the greatest trade imbalance – allows identifying industries where real deficits and surpluses arise. Two industries are responsible for the major part of the trade imbalance and the difference in the value of surpluses or deficits: 1) Computers, electronic and electrical equipment and 2) Transport equipment. There are trade deficits in the first group of products, but they are around 30% lower in value-added terms. In the second case, the European Union shows a deficit in relation to Japan and Korea, but it is also much lower in value-added terms, especially in the trade with Korea. In its exchange with China, the EU has a surplus, which decreases by 60% after using an alternative method of trade calculation.

The conclusions presented above put the trade relations of the European Union with Asian countries in a new light. Although trade imbalances do exist, they generally show smaller deficits or surpluses in most cases when measured in value-added. Therefore, if this method illustrates real trade balances better, assessing the overall deficit that the EU shows in its trade with Asia should be adjusted *in plus*.

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