Comparative Economic Research, Volume 21, Number 1, 2018
10.2478/cer–2018–0001

BARTOSZ MICHALSKI*

EU-Korea FTA and Its Impact on V4 Economies. A Comparative Analysis of Trade Sophistication and Intra-Industry Trade

Abstract

This paper investigates selected short- and mid-term effects in trade in goods between the Visegrad countries (V4: the Czech Republic, Hungary, Poland and the Slovak Republic) and the Republic of Korea under the framework of the Free Trade Agreement between the European Union and the Republic of Korea. This Agreement is described in the "Trade for All" (2015: 9) strategy as the most ambitious trade deal ever implemented by the EU. The primary purpose of our analysis is to identify, compare, and evaluate the evolution of the technological sophistication of bilateral exports and imports. Another dimension of the paper concentrates on the developments within intra-industry trade. Moreover, these objectives are approached taking into account the context of the South Korean direct investment inflow to the V4. The evaluation of technological sophistication is based on UNCTAD's methodology, while the intensity of intra-industry trade is measured by the GL-index and identification of its subcategories (horizontal and vertical trade). The analysis covers the timespan 2001–2015. The novelty of the paper lies in the fact that the study of South Korean-V4 trade relations has not so far been carried out from this perspective. Thus this paper investigates interesting phenomena identified in the trade between the Republic of Korea (ROK) and V4 economies. The main findings imply an impact of South Korean direct investments on trade. This is represented by the trade deficit of the V4 with ROK and the structure of bilateral trade in terms of its technological sophistication. South Korean investments might also have had positive consequences for the evolution of IIT, particularly in the machinery sector. The political interpretation indicates that they may strengthen common threats associated with the middle-income trap, particularly the technological gap and the emphasis placed on lower costs of production.

* Ph.D., University of Wrocław, Institute of International Studies, e-mail: bartosz.michalski@uwr.edu.pl

Keywords: *V4 economies, Republic of Korea, free trade agreement, technological sophistication, intra-industry trade.*

JEL: *F12, F14, F15, O33*

1. Introduction

The proliferation of regional trade agreements (RTAs) within the world economy has become one of the unique processes shaping the legal framework and context of contemporary political and economic relations. What's more, continental integration (accession of new members from the same geographical region) has reached its natural limitations, so from the beginning of the 21st century the process has been gravitating ever more strongly towards cross-regional trade agreements (cf. WTO 2011, p. 58). Looking for more distant trading partners requires, in turn, the political necessity and willingness to form coalitions of countries sharing a similar position to justify an in-depth integration which goes beyond typical trade issues and the WTO-plus agenda. As seen from the perspective of the expected global order, this strategic race towards preferential trade agreements, known as 'the domino effect' (Baldwin 1993), brings about so-called competitive liberalisation, which is profoundly transforming the international trading regime and turning it into a bowl of spaghetti (Bhagwati 1995; see also Baldwin 2006). Regionalism, compared to the WTO framework, becomes an attractive alternative as it helps save time and administrative resources when negotiating complicated provisions bilaterally or plurilaterally. Another advantage lies in the more significant flexibility of the process itself and the agenda of rules covered by the deal (free trade agreements plus; FTA+). Trading superpowers make use of this strategic opportunity to establish a negotiation agenda for bilateral talks and to prioritise specific areas over others, according to their national interests. This, in turn, may determine the evolution of trade regionalism and the future of the World Trade Organisation.

Against this background, the (so-called)[1] free trade agreement between the European Union and the Republic of Korea (henceforth EUKORFTA 2010) is worth

[1] Our skepticism is based on the fact that contemporary free trade agreements usually consist of more than 1000 pages, including additional protocols, exclusions, exemptions and trade-related issues, which is not necessarily supportive of an effective liberalisation understood as removal of barriers to trade. Barriers do still exist, they just change their administrative nature. Brown (2011, p. 301) indicates that this is a major innovation, and the first time that an EU trade agreement explicitly addresses specific sectoral non-tariff barriers. This, in, turn, can be the reason why the deal was crucial for interests of multinational corporations. The EU-Korea FTA has been welcomed by most of the business organizations in Korea and Europe, including the powerful Bun-

a more in-depth analysis and multidimensional research aimed at identification of its (in)direct rationales and consequences.

This paper consists of six sections. After a brief introduction, Section 2 offers an overview of the literature covering EU-South Korean relations. Section 3 explains the methodological approach applied in this study, while the subsequent two sections refer to the presentation and interpretation of our calculations concerning the technological sophistication of bilateral trade relations and the evolution of intra-industry trade between the V4 economies and the Republic of Korea (hereafter 'ROK' or 'Korea', meaning only South Korea unless otherwise indicated). The last section offers conclusions.

2. EU-South Korean relations and the European Union-Republic of Korea Free Trade Agreement in the literature

The trade accord between the European Union and the Republic of Korea (EUKORFTA 2010) was signed on the 6th of October 2010, which closed the negotiation process started in May 2007. The deal came into force on the 1st of July 2011, and its full implementation – 99.9% value of bilateral trade is to be liberalised, while excluding several groups of tariff lines, mainly agricultural goods – is due to occur following a 20-year transition period (see WTO 2012, pp. 10–13; Brown 2011, pp. 297–298; European Commission 2011, p. 4; Mazur 2012, pp. 40–42; Cho 2013, pp. 21–25).

From the Korean standpoint (see WTO 2012a, p. 1), signing the agreement with the European Union was the result of implementing a strategy aimed at being a strong supporter of the WTO multilateral trading system and an active participant in the current Doha Development Agenda negotiations. Moreover, ROK was actively pursuing an FTA policy, because it believed that FTAs could be compatible with, and even supplementary to, the WTO. At the same time, the Korean government's activities were aimed at using the EUKORFTA as an instrument for ROK to emerge as "the FTA Hub for East Asia", linking Europe and the USA with East Asia (Park, Yoon 2010, p. 178). According to Horng (2012, p. 320), the EUKORFTA was also meant to be crucial for promoting the development of Korea as a knowledge- and innovation-based economy through regulatory reform. The same author highlights other relevant issues: its contribution to fostering incoming FDI and structural adjustments; Korea's transformation into an FTA hub in Northeast Asia, with the goal of building a 'free trade network'; and also fit-

desverband der Deutschen Industrie (BDI) (The Federation of German Industries), which is an association of associations (Das 2012, p. 6).

ting Korea's vision of a 'Global Korea' with a greater presence in the international community.

As far as political benefits are concerned, Kelly (2012, p. 114) indicates that the EUKORFTA was supposed to markedly raise Korea's prestige as a mature actor, beyond the Korean peninsular 'ghetto', and open a small door for the promotion of Korean cultural products to the West. It offers, however, little national security value to Korea, taking into account the context of a regular existential threat from the Democratic People's Republic of Korea (North Korea) as well as the rise of China, the suspicion of lurking Japanese revisionism, and the possible decline of the role of the United States in the region.

The economic and political motivations of the EU are intimately related to the implementation of the strategy *Global Europe: Competing in the world* (2006). This document highlights the importance of strengthening the European economy's competitiveness through openness to trade and new international markets, especially among emerging economies. The European Union has thus defined its vital role in promoting rapid and complex trade liberalisation through bilateral, new generation, free trade agreements. However, as Park and Yoon (2010, p. 182) put it, South Korean elites showed a relatively low recognition of the EU as a 'global power and global agenda-setter', even though the European Community was perceived as the symbol of 'economic integration and community', and Korea was impressed by the achievement of the single currency.

What's more, the European Union's strategy aimed at deeper integration schemes within the framework of future bilateral free trade agreements seems to be delayed. It emulates the experiences of EFTA member states, which were striving earlier to conclude trade accords with non-European partners. Hayden and Woolcock (2009, p. 9) put it plainly – that recent preferential trade agreements with Asian partners such as Korea, ASEAN and India were driven by a desire to strengthen the European Union's presence in the Asian region. As one may observe (cf. WTO 2017), the EU has often fallen behind not only EFTA but also the United States, New Zealand, Australia, Chile or Mexico. Hence, the question is not whether, but when and how fast, a proper recognition of emerging Asia will give rise to launching and completing trade negotiations and to enhancing the competitive position of European businesses in Asian markets.

The trade deal between the European Union and ROK belongs to the most comprehensive, 'new generation' type agreements ever closed, and serves as a benchmark for other countries. Kim (2013, pp. 25–26) claims that deeper cooperation in a variety of development assistance activities[2] could help contribute to overcoming 'aid fatigue', as well as improve the understanding of the Asian economic and

[2] The same author highlights the relevant fact that the European Community was the originator of the Generalised System of Preferences (GSP) for developing countries in the early 1970s, and Korea was one of the beneficiaries of the program in the early years of its economic development (Kim 2013, p. 27).

cultural environment, which would expand the EU's involvement with like-minded countries in Asia. This is in line with the observations provided by Cherry (2012, pp. 263–264), who nevertheless argued that the EUKORFTA could not and would not resolve the social, cultural and institutional issues that were acting as hindrances or barriers to doing business in Korea, nor would it narrow the cultural gap between Europeans and Koreans. Instead, these factors may slow down its implementation and weaken its effectiveness. The reason for this is the phenomenon of 'mismatched globalisation', which she claims still exists in Korea and is likely to persist for some time to come.

The EUKORFTA is the first free trade agreement which had to be approved by the European Parliament, as its ratification process began after the Lisbon Treaty had come into force. With regard to trade policy, the Lisbon Treaty gives the European Parliament the same degree of legislative power as that held by the Council of the European Union, and requires the European Parliament's assent to all related international agreements (Horng 2012: 305). "Thus the Global Europe Strategy is targeted at the progressive market opening as a policy instrument ensuring productivity gains, growth and job creation. (…) the EU has shown stronger interests in reducing non-tariff barriers (NTBs), securing access to resources, and properly addressing new areas of growth, such as intellectual property rights, services, investment, public procurement and competition" (Kim 2011, p. 13).

The motives behind the EUKORFTA are also examined in the research of Mazur (2012, pp. 38–40), who highlighted the context of strategic rivalry between European and US corporations. Other rationales referred to an expected increase in foreign direct investments, pressure for deeper liberalisation of trade in services, and the necessity to diversify South Korean FTA partners in the context of ever-growing competition from Chinese and Japanese companies (see Das 2012, pp. 2–4; Cho 2013, pp. 18–19). Also, the ageing of Korean society was considered as a factor posing a challenge to Korea's national competitiveness.

As far as trade in goods is concerned, forecasts showed prospects for dynamic growth of bilateral exports in machinery, electronics and motor vehicles (see Mazur 2012, p. 42; Horng 2012, pp. 317–320). Zolin, Andreosso-O'Callaghan (2013, p. 131) also shed light on the high degree of complementarity existing between the EU and Korea in office machinery and telecommunications equipment, pharmaceutical products, general industrial machinery, as well as scientific instruments.

Empirical analyses of the trade effects of the EUKORFTA were undertaken in the research of Lakatos and Nilsson (2017), who focused on possible anticipatory effects and the econometric measurement of impulses for EU and Korean exports (extensive and intensive margins). They assumed that the accord will also serve as additional insurance and enhance the predictability and stability of the trade policy environment in the two markets. Their analysis showed that products benefit from the reduction in trade policy uncertainty as the FTA eliminates the 'binding

overhang', i.e. the gap between applied and bound tariffs, which in fact is the case for many of the duty-free tariff lines in Korea (Lakatos, Nilsson 2017, p. 194).

Comprehensive research covering the economic relations between the Central European economies and Korea was also conducted in 2015 as a joint project of the University of Economics in Prague, Corvinus University in Budapest, Częstochowa University of Technology, and Pusan National University, supported by the International Visegrad Fund. Sankot and Hnát (2015, pp. 31–60) provide an extensive study based on three-digit SITC trade data covering the evolution of comparative advantages of V4 economies in the period 2003–2013. Having used different indicators, the authors conclude that all the V4 countries have in common an overall prevalence of SITC 7 products (machinery and transport equipment) in their most exported articles, which is mainly due to their dependence on the foreign direct inflow and their position in global value chains.

Grančay (2015, pp. 61–75) examined trade relations between the V4 economies and the ROK (1995–2013) while focusing on the commodity structure, comparative advantages, concentration indices, and advanced export quality indicators. The author highlights the relevance of South Korean direct investment projects for the structure of bilateral trade streams and stresses the necessity of advancing research through the application of data at a higher level of disaggregation. Nam (2015, pp. 77–96) presents the issue of investment attractiveness of V4 countries, providing a lot of informative observations on the nature of factors and incentives, supplemented with an econometric model, impacting South Korean business projects in Central Europe. Dudáš (2015, pp. 120–129) examines the historical developments of South Korean FDI in V4 economies, paying particular attention to the automotive and the high-tech electronics industry. Endrődi-Kovács, Kutasi and Stukovszky (2015, pp. 131–154) focus on the identification of dominant investment motives when exploring rationales for economic activity in V4 countries. Finally, Magasházi, Szijártó and Tétényi (2015, pp. 156–177) provide a comprehensive case study of Samsung's investments in the electronic sector in Central Europe over the last 25 years, with a particular focus on Hungary, in order to exemplify the characteristics of integration within a global value chain and its consequences.

3. Methodological remarks and the purpose of our research

We believe that an examination of trade cooperation and its effects should preferably not be restricted solely to the perspective of international economics. This is why in the previous section we have provided an overview of studies and research results anchored also in the field of the international political economy (IPE). So the core of our analysis is based on selected economic indicators, while the in-

terpretation of our results, conclusions and policy recommendations are of political nature. They are linked with the world-system analysis, a heterodox Marxian approach to understanding global patterns of power and domination and interpreting the modern world as a social system driven by market exchange (Babones 2015, pp. 1–2; cf. Babones 2012; Smith, El-Anis and Farrands 2013; Cohn 2016).

Having in mind the results of the other studies briefly presented in the previous section, the primary purpose of this paper is aimed at identification of the trade deficit/surplus and technological sophistication of bilateral exports and imports between V4 and ROK at the HS 4-digit disaggregation level. We aim to provide a comparative analysis of the leading developments, evaluate them, and seek to determine what their causes could be. Another dimension of our study concentrates on the evolution of the intra-industry trade at the HS 6-digit disaggregation level. Our study covers the timespan 2001–2015.

In its technical dimension, the study covers product clusters classified as primary, resource- and labour-intensive, low-tech, mid-tech and high-tech, according to the methodological approach of the United Nations Conference on Trade and Development (UNCTAD, 2012). The primary data come from the database of the International Trade Centre (Trade Map 2017) at the 2-, 4- and 6-digit disaggregation levels, covering the period 2001–2015. Because UNCTAD's methodology is founded on the Standardised International Trade Classification (SITC, 3-digit disaggregation level of trade data) we have converted this approach into one consistent with the Harmonised System (HS; 4-digit disaggregation level).

When embarking on the study of the intensity of the intra-industry trade (IIT), we have applied the concept of Grubel and Lloyd (1975). The reason for calculating the value of GL-indices was an identification of the shares of horizontal (HIIT), vertical low-quality (VIIT-LQ) and vertical high-quality (VIIT-HQ) intra-industry trade. The condition to be fulfilled follows the method provided by Greenaway, Hine and Milner (1994, 1995), which is based on the assumption that the unit value reflects – or to be more exact approximates – the quality of a given commodity. Hence, the HIIT occurs when the difference between the average unit value of a product being the object of both exports and well as imports does not exceed more than ± 15%. Therefore VIIT-LQ and VIIT-HQ streams are identified when the difference in average unit values of exported and imported goods of the same cluster is either below or above 15%. However, an essential drawback of this approach is brought about by the nature of trade statistics available in USD. They fail to capture the volatility of exchange rates of national currencies in particular years covered by the research. What's more, for transparency sectoral calculations of GL-indices were then arbitrarily limited only to the HS 2-digit groups with an average share of country's exports and imports to/from South Korea between 2011–2015 exceeding 5.0%.

4. Technological sophistication of V4-ROK trade

The Korean economy remains more competitive through its R&D competencies, ability to innovate, and the internalisation of its technological progress. Chaebols and its subsidiaries forming global value chains through trade relations and inflows of foreign direct investment have been sustaining their technological dominance on the structurally weaker markets of V4 countries[3]. They have also preserved their competitive potential, i.e. their modern technology together with lower production costs and easy access to West European consumers. These appear essential for the expansion on the markets of highly developed economies, especially taking into account their aspirations to redefine their global and regional production networks to sustain and increase their market shares in an enlarged Europe (for more, see Hwang, Lee and Kawai 2008). This observation is in line with that provided by Éltető and Szunomár (2015), who claim that trade between the Visegrád region and East Asia is largely influenced by multinational companies in global value chains, and that these networks have increasingly strongly interlinked the two regions in the past years. What's more, additional in-depth insights are presented by Szunomár and McCaleb (2016), who determined that South Korean investments are focused in the electronic and automotive industries as well as in chemical industry (cf. and see again Dudáš 2015). Kaliszuk (2016) investigates entry strategies and motives of investment and claims that most Korean investments have gone into hi-tech industries, fuelling qualitative changes in the Polish-Korean trade.

Against this background, we expect that Korean direct investments in the respective V4 countries might have had an impact on the structure of bilateral trade relations between the V4 and ROK. It is also justified to assume that industrial projects launched in the Czech Republic, Hungary, Poland and the Slovak Republic supported the positive change of technological sophistication of their exports. This means more mid-tech and high-tech goods in their trade with their European partners.

All Central European economies covered by our study used to face the same structural challenges in trade relations with ROK, which were mainly a severe trade deficit. This is the consequence of the increasing values of bilateral exports and imports. As far as the technological sophistication of bilateral exports between V4 and ROK is concerned (see Tables 1–8 in the statistical annex), Hungary is the only case where the structure was evolving in a positive direction (see Table 3). The share of primary products was reduced significantly, while the shares of mid-tech and high-tech goods[4] started to improve. All this happened on the eve of Hunga-

[3] Interesting remarks on the investment attractiveness of V4 are provided by Dorożyński and Kuna-Marszałek (2016).

[4] However, the success story of Hungary in high-tech goods, especially between 2007–2011 was achieved because of mobile phones made by Nokia. In the mentioned period they account-

ry's membership in the EU, and the tendency continued to develop throughout all subsequent years. However, it did not help eliminate the overall negative trade balance with ROK, although Hungary is again the only country among V4 which achieved a slight surplus in mid-tech goods in 2015.

In the case of the exports from the Czech Republic, Poland and the Slovak Republic to ROK (see Tables 1, 5 and 7), it is not possible to identify any particular positive transformations brought about by their membership in the European Union (2004), nor any which could be the consequence of the economic crisis of 2008/2009, nor the enforcement of the EUKORFTA. The shares of high-tech goods were either consistently dropping or staying at the same low level, while the EUKORFTA itself seems to have sustained the tendency toward increasing shares of mid-tech goods. This was achieved mainly through the application of foreign/South Korean technologies and exports of machinery intermediates and parts and accessories of motor vehicles (except for the Slovak Republic, where the average share of motor cars/vehicles designed for the transportation of persons in the period 2011–2015 was 29.9%).

At the same time, all imports from ROK to the V4 (see Tables 2, 4, 6 and 8) were highly dominated by mid-tech and high-tech goods (over 80% and more).

A more detailed insight into the trade data (cf. Trade Map 2017) allows us to also identify the product clusters which have contributed most to the trade deficit, as well as to recognise those where a surplus was recorded. This part of the analysis was limited to the period 2011–2015 (average value of the deficit/surplus in brackets), as the top of the list used to be relatively stable. In the Czech-South Korean trade, the negative results were sustained due to mid-tech and high-tech clusters: parts and accessories of motor vehicles (904.2 m USD), parts and accessories of computers and office machines (127.4 m USD) and electric appliances for telephones (127.1 m USD). A surplus was achieved in other toys (81.5 m USD), microscopes/diffraction apparatuses (42.2 m USD) and shavers and hair clippers (20.0 m USD).

The Hungarian deficit can to be put down to parts suitable for use with televisions (619.5 m USD), electronic integrated circuits and microassemblies (139.3 m USD) and electric transformers (94.4 m USD), while the most substantial surplus was achieved in parts and accessories of motor vehicles (39.9 m USD), diesel engines (28.7 m USD)[5] and meat from swine (16.8 m USD).

As far as the Polish case is concerned, the pattern of the trade deficit with ROK remains quite similar. The dominant deficit categories were parts suitable for use with televisions (1045.9 m USD), liquid crystal devices, other optical appliances (479.2 m USD) and electronic integrated circuits and microassemblies (191.2 m

ed for 10–12% of the total Hungarian exports. The company ceased its production and relocated it to Asia (Michalski 2016, p. 40).

[5] Surging from a very low level, which is the reason for the Hungarian surplus in trade with ROK in mid-tech goods in 2015.

USD), while a surplus was achieved in diesel engines (101.1 m USD), machinery parts (33.8 m USD), and meat from swine (22.9 m USD).

Last, but not least, the Slovak deficit clusters were: liquid crystal devices, lasers, other optical appliances (1306.9 m USD), parts and accessories of motor vehicles (815.0 m USD) and electric appliances for telephones (712.5 m USD). The surpluses were rather small and brought about by: tubes, pipes and hollow profiles (1.7 m USD), gas/liquid/electricity supply/production meters (1.1 m USD) and vegetable alkaloids, their salts, ethers, esters and other derivatives (1.0 m USD).

Generally speaking, the deficit categories used to serve for production purposes within the South Korean industrial projects (FDI) located in V4 countries (motor vehicles, electronic appliances), while the dominant surplus clusters were the result of foreign investments exploiting the lower costs of labour and production as well as indigenous advantages of the V4 economies.

5. The evolution of the V4-ROK intra-industry trade

The last part of the analysis covers developments in the intra-industry trade between the V4 countries and ROK. The results computed for all exports and imports remain low (see Table 9), and none of the GL-indices of the Czech Republic, Hungary, Poland and the Slovak Republic were higher than 10%. What's more, the values were volatile in the period covered, so it is impossible to identify any direct impact of either EU membership, or the enforcement of the EUKORFTA. This means that the nature of trade cooperation between V4 and ROK concentrates on the inter-industry relations and that the goods produced/assembled by South Korean companies located in V4 countries are supposed to be marketed within the European Union.

However, some interesting tendencies can be observed when narrowing down the perspective of our analysis to the sectoral level, specifically focusing on those where South Korean investments are particularly dominant: machinery, electrical and electronic products, motor vehicles, their parts and accessories (HS 84, HS 85 and HS 87 respectively). As mentioned in the methodological section, calculations were made for industries (HS 2-digit groups) with an average share of country's exports and imports to and from ROK between 2011–2015 exceeding 5.0% (see Tables 10–13).[6] Our task was to find out whether their structure of IIT has been

[6] For the Czech Republic these are HS 84 (average share of exports and imports 24.5% and 20.1%), HS 85 (14.6% and 22.7%) and HS 90 (10.2% and 5.0%); for Hungary HS 84 (26.8% and 8.4%) and HS 85 (19.7% and 72.8%); for Poland HS 84 (40.4% and 9.7%) and HS 85 (9.0% and 45.7%); and for the Slovak Republic HS 84 (15.7% and 17.0%), HS 85 (15.8% and 29.7%), HS 87 (40.6% and 15.2%) and HS 90 (6.0% and 26.4%).

enhanced, which would be represented in moving towards horizontal (HIIT) and vertical-high quality (VIIT-HQ) subcategories.

The sector with the most intensive and simultaneously growing IIT is the machinery industry (HS 84). However, this kind of positive transformation does not have much impact on the share of vertical-high quality IIT. The dominant subcategory in the period covered concerned products classified in the group of VIIT-LQ, which can be put down to the technological gap between the Czech Republic, Hungary, Poland and the ROK. This also means that the primary reason for South Korean investments in Central Europe was to take advantage of lower costs and the satisfactory level of labour efficiency. These two are considered typical of countries facing the challenge of the middle-income trap.

What seems promising is that recent developments have been evolving towards specific areas of specialisation in particular products exported from these three countries to ROK which were classified as VIIT-HQ. These included vacuum pumps from the Czech Republic, compression-ignition internal combustion piston engines diesel and semi-diesel from Hungary, and parts of pulley tackles and hoists from Poland.

Against this backdrop, the Slovak case remains unique, because none of the sectors relevant for trade relations with ROK has improved and sustained the level of IIT intensity in the long run. As far as the motor vehicle industry is concerned, a substantial growth of the IIT intensity was recorded between 2003–2006, which was the preparatory stage for the South Korean investments in this sector (Hyundai, Kia). This corresponds to the previous observation that the strategic goal of South Korean companies was to find an attractive location in the enlarged EU for their business operations to expand on West European markets.

6. Conclusions and policy recommendations

The EUKORFTA, as the most comprehensive trade deal ever signed by the European Union, best serves the interests of the most competitive economies and their companies. This is why global business requires solutions which could become a global benchmark for further trade negotiations. The V4 countries do not have sufficient economic and political leverage to influence the key provisions of such an agreement.

In light of the obtained results, our main conclusion is that the V4 countries remain somewhat passive players, and will continue te remain so as long as they will be highly dependent on the effects brought about by foreign direct investments. The existing technological gap to some extent provides a political rationales aimed at enhancing investment incentives, especially in mid-tech and high-tech sectors.

It can be assumed that the EUKORFTA was supposed to attract more South Korean companies to V4 economies by offering them prospects of relatively cheaper production of advanced goods to boost their market shares across the whole European Union. From the V4 standpoint, South Korean FDI projects may be seen as a potential external factor helping them gain access to modern knowledge and business solutions.

However, as far as recorded trade effects are concerned, there is not much room for optimism as the Czech, Hungarian, Polish and Slovak trade is profoundly shaped by international companies. The innovative indigenous potential of V4 economies remains relatively weak, so even if there are cases of success on the South Korean market, their business scale and economic impact is hardly recognisable. What the V4 countries need in the context of new generation FTAs and further global challenges are economic flagships capable of competing in industries supplying mid-tech and high-tech goods.

Unfortunately, it is a kind of vicious circle when attracting foreign knowledge, because its owners may be not interested in the creation of potential market rivals, so any beliefs in unique relationships ought to be abandoned. The political and economic debate should thus focus on the strategic issue of how to copy someone else's economic success while recognising entirely different contexts for complex reforms and modernisation, and which areas of contemporary specialisation should be prioritised.

References

Babones S.J. (2012), *Position and mobility in the contemporary world-economy: A structuralist perspective*, [in:] Babones S.J., Chase-Dunn Ch. (eds.), *Routledge Handbook of World-System Analysis*, Routledge, Oxford.

Babones S.J. (2015), *What is world-systems analysis? Distinguishing theory from perspective*, 'Thesis Eleven', No. 127 (1).

Baldwin R. (1993), *A Domino Theory of Regionalism*, NBER Working Paper No. 4465, Cambridge.

Baldwin R. (2006), *Multilateralising Regionalism: Spaghetti Bowls as Building Blocs on the Path to Global Free Trade*, 'World Economy', No. 29 (11).

Bhagwati J. (1995), *US Trade Policy: The Infatuation with FTAs*, Discussion Paper Series No. 726, Columbia University.

Brown C.M. (2011), *The European Union and Regional Trade Agreements: A Case Study of the EU-Korea FTA*, [in:] Herrmann C., Terhechte J.P. (eds.) *European Yearbook of International Economic Law 2011, European Yearbook of International Economic Law 2*, Springer-Verlag, Berlin-Heidelberg.

Cherry J. (2012), *Upgrading the 'software': The EU–Korea Free Trade Agreement and sociocultural barriers to trade and investment*, 'The Pacific Review', No. 25 (2).

Cho C.-S. (2013), *Korea – EU FTA: a blueprint for co-prosperity*, [in:] Marx, A. et al. (eds.), *EU-Korea Relations in a Changing World, A Joint Project by Leuven Centre for Global Governance Studies (KU Leuven)*, Graduate School of International Studies (Seoul National University).

Cohn T.H. (2016*), Global Political Economy. Theory and Practice*, 6th ed., New York: Routledge.

Das D.K. (2012), *The EU-Korea Free Trade Agreement: Making of a "Deep" Free Trade Agreement*, 'Global Economy Journal', No. 12 (1).

Dorożyński T., Kuna-Marszałek A. (2016), *Investment Attractiveness. The Case of the Visegrad Group Countries*, 'Comparative Economic Research', No. 19 (1).

Dudáš T. (2015), *Korean investments in V4 countries: Past, present and trends for the future*, [in:] Grešš, M., Grančay, M. (eds.), *Mutual Relations between the Republic of Korea and V4 Countries in Trade and Investment*, Vydavateľstvo EKONÓM, Bratislava.

Éltető A., Szunomár Á. (2015), *Ties of the Visegrad Countries with East Asia. Trade and Investment*, Centre for Economic and Regional Studies HAS Institute of World Economics, Working Paper No. 214, August.

Endrődi-Kovács V., Kutasi G., Stukovszky T. (2015), *Korean investments in V4 car, electronic and banking sector*, [in:] Grešš, M., Grančay, M. (eds.), *Mutual Relations between the Republic of Korea and V4 Countries in Trade and Investment*, Vydavateľstvo EKONÓM, Bratislava.

EUKORFTA (2010), Free Trade Agreement between the European Union and its Member States, of the one part, and the Republic of Korea, of the other part, Official Journal L 127, 14/05/2011, http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1399390040762&uri=CELEX:22011A0514(01), accessed on: 15.11.2016.

European Commission (2011), The EU-Korea Free Trade Agreement in practice, Publications Office of the European Union, Luxembourg.

Global Europe: Competing in the world (2006), Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions of 4 October 2006, COM(2006) 567 final.

Grančay M. (2015), *Korean trade with the Visegrad countries: past, present and trends for the future*, [in:] Grešš M., Grančay M. (eds.), *Mutual Relations between the Republic of Korea and V4 Countries in Trade and Investment*, Vydavateľstvo EKONÓM, Bratislava.

Greenaway D., Hine R., Milner C. (1994), *Country Specific Factors and the Pattern of Horizontal and Vertical Intra-Industry Trade in the UK*, 'Weltwirtschaftliches Archiv', No. 130 (1).

Greenaway D., Hine R., Milner C. (1995), *Vertical and Horizontal Intra-Industry Trade: A Cross-Industry Analysis for the United Kingdom*, 'The Economic Journal', No. 105 (433).

Grubel H.G, Lloyd P.J. (1975), *Intra-Industry Trade. The Theory and Measurement of International Trade in Differentiated Products*, Macmillan, London.

Heydon K., Woolcock S. (2009), *The Rise of Bilateralism: Comparing American, European and Asian Approaches to Preferential Trade Agreements*, United Nations University Press, Tokyo, New York, Paris.

Horng D.-C. (2012), *Reshaping the EU's FTA Policy in a Globalizing Economy: The Case of the EU-Korea FTA*, 'Journal of World Trade', No. 46 (2).

Hwang K.-S, Lee J.-W., Kawai N. (2008), *Japanese and Korean Foreign Direct Investment in Central and Eastern Europe: The Strategies and Economic Activities*, 'Journal of Korea Trade' Vol. 12.

Kaliszuk E. (2016), *Chinese and South Korean investment in Poland: a comparative study*, 'Transnational Corporations Review', No. 8 (1).

Kelly R. (2012), *Korea–European Union relations: beyond the FTA?*, 'International Relations of the Asia-Pacific', No. 12.

Kim C.-O. (2011), *New Developments in EU's External Trade Policy and Implications for Asia-Europe Relations*, 'Journal of East Asian Economic Integration', No. 15 (4).

Kim H. (2013), *Korea and the European Union: a changing landscape*, [in:] Youngs, R. (ed.), *A New Context for EU-Korean Relations*, FRIDE and the Korea Foundation.

Lakatos C., Nilsson L. (2017), *The EU-Korea FTA: anticipation, trade policy uncertainty and impact*, 'Review of World Economics', No. 153 (1).

Magasházi A., Szijártó N., Tétényi A. (2015), *Integrated in global value chains by Korean-V4 participation*, [in:] Grešš, M., Grančay, M. (eds.), *Mutual Relations between the Republic of Korea and V4 Countries in Trade and Investment*, Vydavateľstvo EKONÓM, Bratislava.

Mazur G. (2012), *The European Union-South Korea Free Trade Agreement. A New Model of Trade and Economic Cooperation between Developed Countries*, [in:] Skulski P. (ed.), *Innovation as a Factor of the Development of the Asia-Pacific Region*, Research Papers of Wrocław University of Economics, No. 257.

Michalski B. (2016), *The Comparative Analysis of Mid-Tech and High-Tech Trade of the Visegrad Countries and the German Impact*, 'Unia Europejska.pl', No. 4 (239).

Nam S.-H. (2015*), Attractiveness of the Visegrád region for trade and investment development: the Korean perspective*, [in:] Grešš M., Grančay M. (eds.), *Mutual Relations between the Republic of Korea and V4 Countries in Trade and Investment*, Vydavateľstvo EKONÓM, Bratislava.

Park S.-H., Yoon S.-W. (2010), *EU perceptions through the FTA lens: main results of interviews among the Korean "elites"*, 'Asia Europe Journal', No. 8 (2).

Sankot O., Hnát P. (2015), *Comparative advantage of V4 countries: Trends and changes between 2003 and 2013*, [in:] Grešš M., Grančay M. (eds.), *Mutual Relations between the Republic of Korea and V4 Countries in Trade and Investment*, Vydavateľstvo EKONÓM, Bratislava.

Smith R., El-Anis I., Farrands C. (2013), *International Political Economy in the 21st Century. Contemporary Issues and Analyses*, Routledge, New York.

Szunomár Á., McCaleb A. (2016), *Comparing Chinese, Japanese and South Korean FDI in Central and Eastern Europe: macroeconomic versus institutional factors*, [in:] Wardęga J. (ed.), *China-Central and Eastern Europe cross-cultural dialogue: society, business, education in transition*, Jagiellonian University Press, Cracow.

Trade for All. Towards a more responsible trade and investment policy (2015), Publications Office of the European Union Luxembourg.

Trade Map (2017), http://www.trademap.org, accessed on: 14.03.2017.

UNCTAD (2012), http://unctadstat.unctad.org/UnctadStatMetadata/Classifications/Methodology-&Classifications.html, accessed on: 26.10.2012.

WTO (2011), World Trade Report 2011. The WTO and Preferential Trade Agreements: From Co-existence to Coherence, Geneva.

WTO (2012a), Consideration of the Free Trade Agreement between the European Union and the Republic of Korea. Goods and Services, WT/REG296/M/1, 5 July.

WTO (2012b), Factual Presentation, Free Trade Agreement between the European Union and the Republic of Korea (Goods and Services), Report by the Secretariat. Revision, WT/REG296/1/Rev.1, 31 August.

WTO (2017), http://rtais.wto.org, accessed on: 30.03.2017.

Zolin M.B., Andreosso-O'Callaghan B. (2013), *The Korea-EU FTA: New Prospects for and Patterns of Agricultural and Agrifood Trade?*, 'Journal of Global Policy and Governance', No. 1 (2).

Statistical annex

Table 1. Technological sophistication of the Czech exports to the Republic of Korea, selected years (shares in %)

	2001	2003	2005	2007	2009	2011	2013	2015
unclassified	0.5	1.1	0.5	0.3	0.7	0.7	0.5	1.1
primary products	1.5	2.2	5.9	3.9	3.5	9.2	6.3	6.0
resource- and labour-intensive	8.6	18.8	8.1	12.8	17.2	17.3	24.2	16.2
low-tech	3.4	15.8	19.1	14.3	14.1	11.9	10.7	10.6
mid-tech	43.7	42.9	51.6	55.4	49.7	43.4	39.7	43.6
high-tech	42.4	19.1	14.9	13.3	14.9	17.6	18.5	22.5

Source: own calculations based on (Trade Map 2017).

Table 2. Technological sophistication of the Czech imports from the Republic of Korea, selected years (shares in %)

	2001	2003	2005	2007	2009	2011	2013	2015
unclassified	1.6	0.6	0.5	0.3	0.3	0.2	0.2	0.2
primary products	2.7	1.8	2.2	1.1	0.9	0.7	0.7	0.7
resource- and labour-intensive	9.1	4.6	4.3	2.2	2.7	2.1	2.6	2.7
low-tech	4.2	2.4	2.0	7.2	8.9	7.8	8.2	9.6
mid-tech	28.2	30.3	37.3	33.3	39.7	54.1	51.1	58.6
high-tech	54.2	60.2	53.6	55.9	47.5	35.2	37.2	28.3

Source: own calculations based on (Trade Map 2017).

Table 3. Technological sophistication of the Hungarian exports to the Republic of Korea, selected years (shares in %)

	2001	2003	2005	2007	2009	2011	2013	2015
unclassified	0.4	0.5	0.5	0.4	0.7	0.0	0.3	0.2
primary products	63.9	36.3	17.6	13.1	11.8	10.5	6.5	2.4
resource- and labour-intensive	2.2	1.3	2.8	2.7	1.1	2.4	9.4	3.8
low-tech	1.0	1.3	1.1	0.4	0.8	1.1	3.6	2.5
mid-tech	22.8	26.9	24.2	52.0	48.1	48.9	51.0	75.6
high-tech	9.8	33.7	54.0	31.4	37.6	37.1	29.2	15.5

Source: own calculations based on (Trade Map 2017).

Table 4. Technological sophistication of the Hungarian imports from the Republic of Korea, selected years (shares in %)

	2001	2003	2005	2007	2009	2011	2013	2015
unclassified	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.1
primary products	0.5	0.4	0.2	0.2	0.1	0.3	0.4	0.5
resource- and labour-intensive	4.3	2.2	1.8	0.8	0.4	0.6	2.1	2.4
low-tech	1.7	2.2	1.4	3.1	1.6	2.9	4.3	5.0
mid-tech	35.5	27.1	39.1	17.0	15.9	18.6	28.0	21.9
high-tech	57.7	67.8	57.3	78.8	81.9	77.5	65.1	70.0

Source: own calculations based on (Trade Map 2017).

Table 5. Technological sophistication of the Polish exports to the Republic of Korea, selected years (shares in %)

	2001	2003	2005	2007	2009	2011	2013	2015
unclassified	0.0	0.0	0.2	0.1	0.2	0.0	0.2	0.5
primary products	19.6	7.0	19.2	13.7	6.9	24.5	6.1	6.4
resource- and labour-intensive	2.4	9.5	4.0	10.6	6.7	13.0	4.2	17.4
low-tech	2.2	14.5	8.1	9.3	11.1	9.8	19.2	16.2
mid-tech	20.2	56.6	57.9	56.6	63.2	39.9	59.9	38.0
high-tech	55.6	12.4	10.6	9.7	12.0	12.9	10.4	21.4

Source: own calculations based on (Trade Map 2017).

Table 6. Technological sophistication of the Polish imports from the Republic of Korea, selected years (shares in %)

	2001	2003	2005	2007	2009	2011	2013	2015
unclassified	1.0	0.7	0.4	0.2	0.1	0.1	0.2	0.4
primary products	2.0	2.4	1.2	0.7	0.4	1.2	1.4	2.1
resource- and labour-intensive	19.0	16.3	5.7	2.2	2.7	2.5	2.6	3.1
low-tech	1.7	2.9	5.0	5.6	5.8	11.5	9.7	9.6
mid-tech	33.8	33.4	26.7	25.5	21.5	19.7	23.2	33.1
high-tech	42.6	44.2	60.9	65.9	69.4	64.9	62.8	51.7

Source: own calculations based on (Trade Map 2017).

Table 7. Technological sophistication of the Slovak exports to the Republic of Korea, selected years (shares in %)

	2001	2003	2005	2007	2009	2011	2013	2015
unclassified	0.3	1.7	0.2	0.1	0.1	0.1	0.6	0.3
primary products	0.3	1.0	0.3	3.4	0.8	0.3	0.3	1.0
resource- and labour-intensive	3.2	13.9	2.4	2.9	4.0	2.5	5.0	5.1
low-tech	14.3	11.3	9.5	5.6	1.8	2.0	3.3	4.9
mid-tech	6.1	28.4	41.1	54.6	59.7	58.4	74.9	74.3
high-tech	75.8	43.6	46.6	33.4	33.6	36.8	16.0	14.4

Source: own calculations based on (Trade Map 2017).

Table 8. Technological sophistication of the Slovak imports from the Republic of Korea, selected years (shares in %)

	2001	2003	2005	2007	2009	2011	2013	2015
unclassified	1.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0
primary products	1.2	0.5	0.2	0.1	0.0	0.1	0.1	0.2
resource- and labour-intensive	17.1	5.9	1.2	1.1	0.5	0.5	0.8	0.9
low-tech	3.9	2.4	3.0	3.1	4.3	5.6	5.7	8.8
mid-tech	34.1	35.3	28.0	39.8	23.0	45.6	34.5	51.1
high-tech	42.2	55.8	67.5	55.9	72.1	48.2	59.0	39.0

Source: own calculations based on (Trade Map 2017).

Table 9. Overall GL-indices (%) of the Czech Republic, Hungary, Poland and the Slovak Republic in trade with the Republic of Korea, selected years

	2001	2003	2005	2007	2009	2011	2013	2015
CZ	4.8	1.9	2.3	3.8	5.2	5.5	7.7	8.1
HU	1.2	1.7	7.1	5.5	4.3	7.2	9.1	7.1
PL	3.8	4.5	1.8	3.7	3.3	2.7	4.2	6.7
SK	1.0	3.8	2.6	2.3	2.6	3.7	1.7	2.4

Source: own calculations based on (Trade Map 2017).

Table 10. Selected sectoral GL-indices (%) of the Czech Republic in trade with the Republic of Korea, selected years

	2001	2003	2005	2007	2009	2011	2013	2015
HS 84 GL-index	8.6	3.0	2.6	4.9	7.3	7.7	14.2	15.5
HIIT	0.0	0.0	0.1	0.0	0.3	0.1	0.4	0.8
VIIT-LQ	5.8	2.6	2.3	3.3	5.8	5.6	10.6	9.8
VIIT-HQ	2.7	0.4	0.2	1.5	1.2	1.9	3.1	4.9
HS 85 GL-index	2.7	0.6	1.8	3.0	2.6	3.4	6.1	7.9
HIIT	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.9
VIIT-LQ	2.4	0.6	1.7	2.8	1.5	2.5	5.1	5.2
VIIT-HQ	0.2	0.0	0.0	0.1	1.1	0.8	1.0	1.8

	2001	2003	2005	2007	2009	2011	2013	2015
HS 90 GL-index	2.3	3.7	2.7	8.8	6.9	5.6	5.8	6.7
HIIT	0.0	0.0	0.0	1.7	0.0	0.0	0.0	2.3
VIIT-LQ	1.9	3.2	1.9	5.8	6.0	2.4	1.6	2.3
VIIT-HQ	0.1	0.3	0.7	0.4	0.9	3.2	4.1	2.1

Source: own calculations based on (Trade Map 2017).

Table 11. Selected sectoral GL-indices (%) of Hungary in trade with the Republic of Korea, selected years

	2001	2003	2005	2007	2009	2011	2013	2015
HS 84 GL-index	0.8	3.3	10.0	12.5	13.4	11.5	23.3	13.5
HIIT	0.0	0.1	1.4	2.1	0.3	2.9	6.2	0.2
VIIT-LQ	0.8	2.6	5.3	6.8	9.7	5.3	14.1	5.7
VIIT-HQ	0.0	0.7	3.2	3.6	3.4	3.3	2.8	7.5
HS 85 GL-index	1.0	1.6	8.2	4.1	3.7	7.1	3.8	4.7
HIIT	0.1	0.0	3.7	1.8	0.3	3.7	2.0	2.7
VIIT-LQ	0.8	1.5	2.9	0.5	3.2	2.8	1.1	1.2
VIIT-HQ	0.0	0.1	1.5	1.7	0.1	0.6	0.6	0.8

Source: own calculations based on (Trade Map 2017).

Table 12. Selected sectoral GL-indices (%) of Poland in trade with the Republic of Korea, selected years

	2001	2003	2005	2007	2009	2011	2013	2015
HS 84 GL-index	2.9	7.2	3.4	7.5	8.0	5.3	7.4	20.2
HIIT	0.0	0.3	0.3	0.2	0.9	0.1	0.1	2.5
VIIT-LQ	2.7	6.1	3.0	6.5	4.7	4.0	4.1	9.2
VIIT-HQ	0.1	0.8	0.2	0.8	2.3	1.2	3.2	8.5
HS 85 GL-index	11.6	5.1	1.3	2.2	2.1	2.9	3.5	5.2
HIIT	0.0	0.0	0.0	0.1	0.0	1.9	0.2	0.0
VIIT-LQ	10.1	4.3	1.2	0.7	0.8	0.6	3.0	4.1
VIIT-HQ	1.5	0.9	0.0	1.4	1.3	0.4	0.2	1.0

Source: own calculations based on (Trade Map 2017).

Table 13. Selected sectoral GL-indices (%) of the Slovak Republic in trade with the Republic of Korea, selected years

	2001	2003	2005	2007	2009	2011	2013	2015
HS 84 GL-index	4.3	1.3	0.9	6.5	3.9	2.0	2.6	3.9
HIIT	0.1	0.0	0.2	0.8	0.0	0.4	0.0	0.4
VIIT-LQ	3.9	1.1	0.7	4.3	3.3	1.5	2.4	2.8
VIIT-HQ	0.0	0.1	0.0	1.4	0.6	0.2	0.1	0.6
HS 85 GL-index	0.2	1.2	1.5	1.1	2.0	6.6	1.4	2.0
HIIT	0.0	0.0	1.1	0.9	0.1	0.7	0.1	0.0

	2001	2003	2005	2007	2009	2011	2013	2015
VIIT-LQ	0.2	1.2	0.2	0.2	0.2	2.5	1.0	1.2
VIIT-HQ	0.0	0.1	0.2	0.0	1.7	3.4	0.3	0.7
HS 87 GL-index	0.2	23.5	18.6	3.7	8.8	5.1	1.9	2.3
HIIT	0.0	0.0	0.0	0.3	1.5	0.7	0.1	0.0
VIIT-LQ	0.2	16.6	13.4	2.4	2.4	2.7	0.8	1.1
VIIT-HQ	0.0	7.0	5.2	1.0	4.8	1.7	1.1	1.2
HS 90 GL-index	0.2	0.1	1.3	1.1	0.7	0.8	0.5	1.1
HIIT	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0
VIIT-LQ	0.1	0.1	0.3	0.5	0.2	0.7	0.0	0.1
VIIT-HQ	0.0	0.0	1.0	0.6	0.5	0.0	0.0	1.0

Source: own calculations based on (Trade Map 2017).

Streszczenie

UMOWA HANDLOWA UNIA EUROPEJSKA-REPUBLIKA KOREI I JEJ WPŁYW NA GOSPODARKI KRAJÓW V4. ANALIZA PORÓWNAWCZA ZAAWANSOWANIA TECHNOLOGICZNEGO ORAZ HANDLU WEWNĄTRZGAŁĘZIOWEGO

Artykuł poświęcony jest zbadaniu krótko- i średniookresowych efektów w handlu towarowym między krajami Grupy Wyszehradzkiej (V4: Republika Czeska, Węgry, Polska, Słowacja) a Republiką Korei (Koreą Południową) w ramach umowy o wolnym handlu między Unią Europejską a Republiką Korei. W strategii „Trade for All" to porozumienie określono mianem najambitniejszej umowy handlowej kiedykolwiek zawartej i wdrożonej przez UE. Głównym celem analizy jest zidentyfikowanie, porównanie oraz ocena zachodzących zmian w zaawansowaniu technologicznym dwustronnych strumieni eksportu i importu oraz w obrębie struktury handlu wewnątrzgałęziowego. Szerszym kontekstem badań jest ponadto napływ koreańskich inwestycji zagranicznych do krajów V4. Analiza technologicznego zaawansowania oparta jest na podejściu metodologicznym Konferencji Narodów Zjednoczonych ds. Handlu i Rozwoju, podczas gdy intensywność wymiany wewnątrzgałęziowej jest mierzona indeksem Grubela-Lloyda wraz z określeniem jej kategorii składowych (handlu poziomego i pionowego). Badaniem objęto okres 2001–2015. Nowatorskość opracowania wynika z faktu, że jak dotąd badania nad stosunkami handlowymi między Koreą Południową a krajami V4 nie zostały przeprowadzone w ten sposób. Wnioski sugerują wpływ południowokoreańskich inwestycji bezpośrednich na handel, co znajduje swoje odzwierciedlenie w deficycie handlowym oraz strukturze dwustronnej wymiany w ujęciu jej zaawansowania technologicznego. Inwestycje te mogły mieć także pozytywne skutki dla ewolucji wymiany wewnątrzgałęziowej, zwłaszcza w obrębie przemysłu maszynowego. Polityczna interpretacja wskazuje, że mogą one wzmacniać zagrożenia typowe dla pułapki średniego dochodu, zwłaszcza lukę technologiczną oraz nacisk na niskie koszty produkcji.

***Słowa kluczowe**: gospodarki krajów V4, Republika Korei, umowa o wolnym handlu, zaawansowanie technologiczne, handel wewnątrzgałęziowy.*