

Changes in Foreign Trade between Slovakia and Ukraine¹

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Abstract

Ukraine is a significant and strategic trade partner for the Slovak companies from the perspective of geographical and linguistic proximity and size of the market, its relative unsaturation and future consolidation of this market. The main aim of this paper is to characterise and clarify bilateral trade relationship, bilateral specialisation in trade and revealed comparative advantages (RCA), possibility of intra-industry trade using Grubel and Lloyd index (GL) along with the overall potential of trade between 2005-2015 and specifically for 2016. For this aim, we have used RCA₂ index, GL index as well as empirical analysis for identifying mentioned indexes. Since 2016, DCFTA has gone into force what we consider to be a major driver of changes in mutual foreign trade between Slovakia and Ukraine. There are possible scenarios for more intensive trade and economic cooperation between Slovakia and Ukraine what will be predominantly determined by the quality of political relations between EU and Ukraine.

Key words

foreign trade analysis, RCA, comparative advantage, Grubel and Lloyd index

JEL Classification: F13, F14, F23

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Introduction

Since Ukraine gained independence in 1991, its government has pursued foreign trade policy priorities with an increasing number of countries. The second largest country in Europe, Ukraine is an important trade bridge with the Caucasus. Its political and economic instability are the most important factors affecting its foreign trade performance. Moreover, the different culture in western Ukraine means that region is more oriented towards cooperation with western partners, making it a more promising region for trade with Slovak companies.

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Given the size of the Ukraine market (42.5 million consumers), its relative unsaturation (low FDI), its geographical and linguistic proximity, and future market consolidation, it is becoming more important for Slovak companies to penetrate the Ukrainian market. In contrast to Ukraine, Slovakia is an open economy heavily dependent on foreign trade. Its exports and imports account for more than 90% of GDP. Consequently foreign trade is substantially more important to the development of its economy than is the case in Ukraine.

According to Edwards (1993), for example, openness to foreign trade liberalization is essential in a country seeking to create the conditions to exploit its comparative advantages, and hence grow the wealth of the country. Firstly, it can more broadly exploit its comparative advantages in foreign trade and secondly, this generates product diversification, which ultimately ensures the public has access to a wider range of products. Despite the enormously destabilizing factors in Ukraine, its market still represents an unprecedented trade opportunity for Slovak companies in the region. On January 1st, 2016, the Deep and Comprehensive Free Trade Agreement (DCFTA) between the EU and Ukraine became operational. It replaced the Partnership and Cooperation Agreement and provides for comprehensive bilateral cooperation in many areas of common interest. Through this agreement, the two entities will open up their markets to each other's goods and services on the basis of obligatory trade rules – enhancing predictability – and EU values, such as those reflected in the concepts of competition, public procurement and intellectual property rights.

The main objective of this paper is to examine foreign trade between Ukraine and the Slovak Republic, looking at the revealed comparative advantage (RCA) and trade specializations of the two countries, and using empirical methods, such as sectoral comparative analyses and intra-industry trade analysis. The data for the analysis of foreign trade between Slovakia and Ukraine was obtained from statistics compiled by Unctadstat and the International Trade Center. The classification level of the commodity structure of foreign trade used is 1-digit and 3-digit SITC. The paper assesses the comparative advantages of the engagement and intra-industry trade between Slovakia and Ukraine, and explores, in part, any potential changes arising after the implementation of the DCFTA.

The paper is divided into three sections. The first section covers the methodology and examines the literature, which is similar to our research. The empirical findings are presented in the second section, and the last section contains the authors' conclusions.

1 Methodology of work

Do Slovak companies trade in products that have a sufficient comparative advantage that would enable penetration of the Ukrainian market? Are these advantages sufficient for them to be able to withstand foreign competition? We will try to answer these questions in this article. To achieve our objectives, we use various general theoretical methods (abstraction, analysis, synthesis, deduction and induction) as well as empirical methods such as revealed comparative advantage and country and commodity comparisons. Statistical methods, descriptive analysis, comparison and graphical displays are the main methods used to streamline the foreign trade data.

Comparative advantage theory is one of the oldest and most important concepts for explaining international trade, and was developed by D. Ricardo in 1817. Over time, neoclassical theories and models have replaced and elaborated these foreign trade models, especially Heckscher-Ohlin-Samuelson's model of comparative advantage (H-O-S), later (in the 1920s) expanded to include production factors and theorems, such as in Baláž et al., (2015). These models and theorems were also empirically verified. H. H. Liesner (1958) was the first to use revealed comparative advantage (RCA). The Balassa index is a better way of expressing comparative advantage. It uses a logarithm to obtain the import-export relationship to calculate the comparative advantage of a country's products. This enables us to identify the comparative advantages of the different sectors of the national economy. Using this analysis, we can quantify the extent to which an economy specializes in the manufacture of products with a sufficient comparative advantage and the extent to which they are subsequently placed on foreign markets through international trade. (Balassa, 1965)

New theories of international trade add a further dimension to comparative advantage in the form of comparative costs. P. Krugman (1986) described a country's typical intra-industry trade as based on that country's factor endowment identity, while the Heckscher-Ohlin theorem merely explored comparability or differences (Heckscher; Ohlin, 1991). The most famous test of the classic Ricardian model of comparative advantages is MacDougall's test comparing labour productivity and export performance. In the 1950s and 1960s neoclassical models and theorems of international trade and comparative advantage were extensively tested. One of the best known is Leontief's test of the H-O-S theorem, referred to as the Leontief paradox, which first rejects the H-O-S theorem but later explains it quite plausibly (Golub; Hsieh, 2000).

There are several ways of identifying revealed comparative advantage. The most common way of doing so is to use an RCA (Revealed Comparative Advantages) indicator, of which there are various modifications (Obadi; Korček, 2016). One is the Balassa RCA index – a ratio expressing the difference between the export and import of commodity groups and the sum of exports and imports of these commodity groups – which ultimately shows comparative export advantage and thus competitiveness (Balassa, 1965). This method is frequently used to investigate bilateral foreign trade.

$$RCA\ 1 = \frac{(x_{ij} - m_{ij})}{(x_{ij} + m_{ij})} \quad (1)$$

Note:

x_{ij} export of country j in commodity group i ;

m_{ij} import of country j in commodity group i .

For RCA1 apply:

$RCA1 = -1$ export there isn't ($x_{ij} = 0$),

$-1 < RCA1 < 0$ indicates comparative disadvantage,

$RCA1 = 0$ export = import ($x_{ij} = m_{ij}$),

$0 < RCA1 < 1$ indicates revealed comparative advantages,

$RCA1 = 1$ it indicates that there is no import. (Greenaway; Milner, 1993)

Products with an RCA indicator of higher than 0 have a comparative advantage. A commodity index of less than 0 indicates a comparative disadvantage (Vokorokosová, 2004), as it shows that commodity is exported at a rate lower than the reference group average. This variant of the index has been criticised for not taking into account a country's imports, which may cause problems where large economies are concerned (Greenaway; Milner, 1993). The Balassa index can be used to assess whether a country has a comparative advantage or disadvantage in a particular commodity. It can also be used to compare the advantages of different commodities within a country as well as the across other countries.

The second way of identifying comparative advantage is to use a logarithm calculating the share of exports and imports in a country's various goods categories compared to all countries.

$$RCA\ 2 = \ln \frac{x_{ij}}{m_{ij}} / \frac{X_j}{M_j} \quad (2)$$

Note:

x_{ij} the value of export i group products analysed the sector of country j ,
 m_{ij} the value of import of the country i products analysed sector of country j ,
 X_j the value of total exports of country j ,
 M_j the value of total imports into the country j ;

For RCA 2 apply:

$RCA\ 2 > 0$ suggesting that in the country exists exports of the commodity group revealed comparative advantage,

$RCA\ 2 < 0$ induces revealed comparative disadvantage in the commodity group.

The RCA1 and RCA2 indices provide sufficient information on changes in comparative advantage and if the data is available can be used to calculate the relative advantage. Coefficient RCA1 is an indicator used to evaluate changes in the net foreign trade performance of a commodity group. Conversely, RCA2 tells us whether a country has a comparative advantage or disadvantage in a certain commodity group, and, since it is more accurate, the extent to which this is the case. There are a number of modified versions of the original RCA index (Štěřbová 2013).

To provide more detail on comparative advantage, Hinloopen and Marrewijk (2001) divided the possible values of the index into four categories (a-d) determining its size and intensity:

$0 < RCA \leq 1$	no comparative advantage,
$1 < RCA \leq 2$	weak comparative advantage,
$2 < RCA \leq 4$	moderate comparative advantage,
$4 < RCA$	strong comparative advantage

Intra-industry trade has been studied in several works investigating and determining the consequences of the establishment of the European Economic Community for trade, (Dreze, 1961; Verdoorn, 1960 and Balassa, 1965). Researching the customs union,

J. Viner (1950) predicted there would be an increase in inter-industry trade specialisation. Balassa subsequently observed that adapting to European integration would be smoother than anticipated because it would involve less resource relocation across sectors (Kittová et al., 2016). These ideas prompted further research into the extent of intra-industry trade (IIT), which in turn stimulated research into how it could be measured. In 1971 and in 1975 Grubel and Lloyd published the first research on intra-industry trade that would lead to a generation of research on the empirical, theoretical and policy implications of IIT. Grubel and Lloyd first analysed the potential anomaly that a high proportion of a country's trade could consist of internal and external trade in the same group of products. This led to the development of an index indicating current import and export levels of similar products in selected countries. This trade flow, captured by the intra-industry trade GL index, is in similar or slightly different products and can be explained in different ways (Grubel; Lloyd, 1975). Grubel and Lloyd proposed a new formula that took a country's trade imbalance into account, known as adjusted GL index. Grubel and Lloyd suggested a correction for aggregate trade imbalance, as did some others (Aquino, 1978; Bergstrand, 1983). Some critics (Finger, 1975; Raymont, 1976) have argued that there is greater variability in factor ratios within than between (3-digit) industries at this level of aggregation. J. M. Finger insisted that this problem was so fundamental, it should be regarded as a statistical artefact. The indices were criticised in since the initial index did not take a country's trade imbalance into account. However, Greenaway and Milner (1983) expressed the view that the GL index would lead to greater confidence in indicators for trade in similar products than a specific aggregation system would.

Numerous studies (Havrylyshyn; Civan, 1983; Balassa; Bauwens, 1988) have followed on from Grubel and Lloyd's research finding that as a country industrialises, its trade structure becomes increasingly specialised. Intra-industry trade has been considered a measure of diversity, degree of specialization or even state of technical progress, and of the industry landscape. Hence this index has been used to measure a country's ability to cope with competition in a changing environment. Havrylyshyn and Kunzel (1997) have suggested that adaptability is a reason for recognising that intra-industry trade is a way of measuring competitiveness.

Furthermore the GL index is popular since it provides a breakdown which helps reconcile traditional trade theory explanations of net trade with new trade theory or overlapping trade. It measures intra-industry trade as a percentage of a country's trade, assuming that trade is balanced and therefore implying that exports and imports are equal. The intra-industry trade index for a product group or industry commodity k and countries is as follows:

$$GL_k^{ij} = 1 - \frac{|X_k^{ij} - M_k^{ij}|}{X_k^{ij} + M_k^{ij}} \quad (3)$$

Note:

X_k^{ij} - exports of commodities k to the country i and to the country j

M_k^{ij} – import of commodities k of the country j to country i

$<0;1>$ – interval of the result values

The index ranges from 0 to 1. If $GL_{ij} = 0$ the country is a net importer or exporter and there is no intra-industry trade. This means that the index covers only the export or import of good i . If $GL_{ij} = 1$ there is intra-industry trade between countries, meaning that domestic exporters exports as much of good i as is imported, where X_i denotes the export, and M_i the import of goods i . Values are between 0 and 1. Intra-industrial trade reflects the export and import of the same product groups outside the same sector. A higher value indicates a greater degree of specialization in intra-industry trade, however, a lower GL value indicates that foreign trade is closer to inter-industry trade (Egger et al., 2004). In our paper we use the GL index of intra-industry trade as a measure of how integrated foreign trade is between Slovakia and Ukraine because it reflects more than the macroeconomic data does and hence that facilitate the analysis of the impact of trade on productivity.

A number of scholars have used the trade complementarity indices (TCIs) introduced by Michaely (1996) to measure the extent to which two countries or "natural trading partners" have overlapping imports and exports:

$$c^{ij} = 100[1 - \sum_{k=1}^m |m_k^i - x_k^j| / 2] \quad (4)$$

Besides these main indicators of foreign trade, there are several basic indicators of bilateral exchange or foreign trade engagement such as overall openness, export diversification, real effective exchange rate (REER), terms of trade or income terms of trade.

2 Results and discussion

2.1 Foreign trade between Slovakia and Ukraine until 2015

Slovak-Ukrainian foreign trade relations are rooted in close historical trading relationships. However, Slovakia's share of foreign trade with Ukraine is less than 1.0 %. Ukraine is a large market with untapped trade and investment potential for Slovakia. Slovakia has adopted a very positive attitude to Ukraine's transformation. This is considered to be a powerful factor for further strengthening successful business cooperation between the two countries. Given the relative unsaturation and linguistic and geographic proximity of the Ukrainian market (Kittová et al., 2014), foreign trade cooperation is important to future market consolidation and the prospect of Ukraine's integration with the EU, not least because of the gradual penetration of the Ukrainian market by domestic and foreign companies.

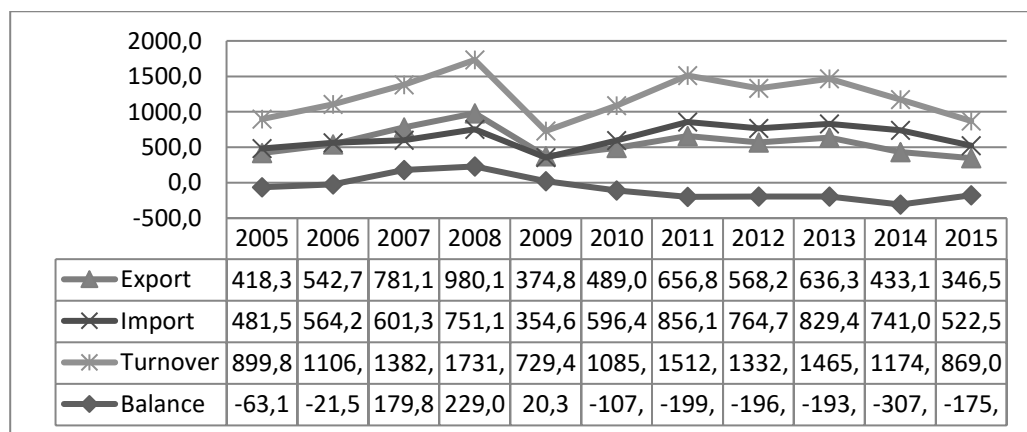
The Ukrainian market is important for Slovak businesses because of its proximity and size. There are considerable opportunities for Slovak companies to take full advantage of the economic reforms being implemented by the Ukrainian government. However, this depends on the reforms being implemented and the investment and business climate. Slovakia's experiences of the reform era beginning at the end of 1990 shows that Slovak companies and the authorities can support the transformation and integration processes in Ukraine.

Ukraine is a perspective business partner for Slovakia – in 2015, Ukraine ranked as its sixth most important import non-EU partner with a 0.71% share of foreign trade

revenue (after Russia, China, the Republic of Korea, Vietnam, Switzerland and Turkey). Despite being neighbours, Slovak exports to Ukraine accounted for 0.5% of all exports. In 2015 imports from Ukraine represented 0.93% of all imports, and Ukraine ranked 20th in 2015 (Butyter – Wachowska, 2015).

In terms of Ukraine-Slovak bilateral trade relations, Slovakia's relatively lower importance to Ukraine is reflected in the fact that it ranked 22nd out of more than two hundred business partners, with a 1.0% share of its foreign trade with non-EU countries, and ranking 14th among EU countries. In terms of exports from Ukraine to Slovakia, the Slovak market was its eighth most important EU market, 19th in 2015 with a 1.24% share of total exports. In terms of services exported to Slovakia, Ukraine ranked 40th with a 0.36% share that year. Ukraine imported more services from Slovakia than it exported, about 0.72% of all services imported, placing it in 22nd place. In 2015, Slovakia came 24th with a 0.78% share of all goods imported from Ukraine (MFA 2016).

Fig. 1 Foreign trade between Slovakia and the Ukraine in 2005 – 2015 (in mil. USD)



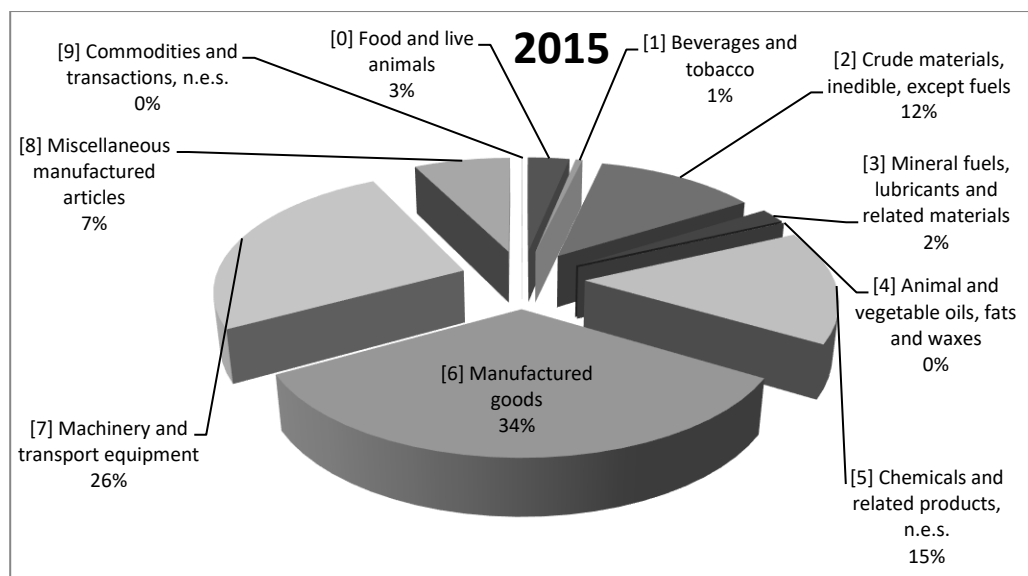
Source: processed by authors based on data from UNCTADSTAT 2016

In 2015, Slovak-Ukraine foreign trade in exported merchandise was worth 346.5 million USD (a 16% decline compared to 2014). Imports from Ukraine to Slovakia represented only 0.92% of all imports, and 522.5 million USD. Most of Slovakia's exports to Ukraine were long-term market products (iron, steel, paper and paper products, non-metallic mineral products, and textile and rubber products) and machinery and transport equipment (automobiles and electrical machinery). A detailed overview of the commodity structure of Slovak exports to Ukraine in 2015 in % is shown in Figure 2.

In 2015, goods exported from Slovakia to Ukraine had a total value of 346.5 million USD, which represents a decrease of 20 % on the previous year. The most exported SITC commodity class was Manufactured Goods (SITC 6) and exports in this category were worth 116 million USD and accounted for 34% of total exports to Ukraine. The goods exported most were iron and steel, worth 48 million USD (a decrease of 23.8%), paper, and paper products worth 27.4 million USD, textiles, yarn and related products worth 11.8 million USD, metal manufactures n.e.s. worth 11.4 million USD, non-metallic mineral products worth 8.8 million USD, and rubber manufactures, n.e.s. worth 5.8

million USD. Except SITC 9, all these product groups recorded a decrease on the previous year.

Fig. 2 Commodity structure of Slovak exports to Ukraine in 2015 according to nomenclature SITC (in %)



Source: processed by authors based on data from UNCTADSTAT 2016

The second most exported SITC commodity group to Ukraine was Machinery and Transport Equipment (SITC 7) worth 88.5 million USD and it had a share of 25%, a drop of 17.5 % compared to the previous year. The most exported products in this group were road vehicles worth 26.5 million USD. Third most exported commodity class were chemicals and related products, n.e.s. (SITC 5) with a total value of 53.10 million (in 2014 worth 66.8 million USD) with a share of 15.3 percent on total Slovak exports to Ukraine (plastics in primary forms 25.6 million USD, plastics in non-primary forms 7.9 million USD and essentials oils for perfume materials and cleaning preparations 5.3 million USD). The fourth most exported SITC commodity class in 2015 was Crude materials (SITC 2) with a share of 12 % (42.8 million USD). Within this group the most exported products were Crude fertilizers and crude minerals (38.5 million USD), hides, skins and firkins, raw with a value of 1.8 million USD and pulp and waste paper (1.6 million USD). Miscellaneous manufactured articles (SITC 8) worth 25.6 million USD, with a share of 7.4 %, followed closely behind, and then came Mineral fuels, lubricant and related materials (SITC 3), which declined by 52 % over the previous year and accounted for 2 % of total exports. Three product classes – Commodities and transactions, n.e.s. (SITC 9), Food and live animals (SITC 0), Beverages and Tobacco (SITC 1) – account for the 3.5 % share of all Slovak exports to Ukraine. Table 2 provides a more detailed overview of the commodity structure of foreign trade between Slovakia and Ukraine in 2005-2015.

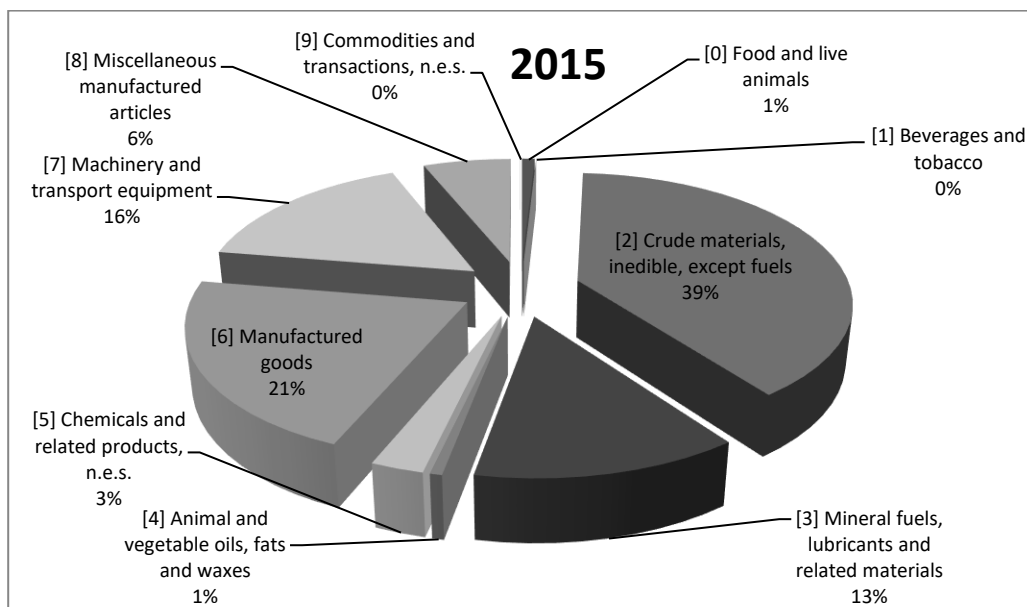
Imports to Slovakia from Ukraine from 2005 to 2015 were dominated by crude materials, inedible, except fuels; manufactured goods, machinery and transport equipment, as can be seen in Table 2. Figure 3 shows the commodity structure of imports from Ukraine to Slovakia in 2015 in %.

Tab. 2 Development of the commodity structure of the Slovak import from Ukraine according nomenclature SITC in period 2005-2015 (in mil. USD)

SITC	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
[0]	9.32	4.99	4.31	5.00	2.15	2.81	3.38	4.17	5.14	6.05	4.65
[1]	1.80	0.80	0.76	0.94	1.41	0.33	0.09	0.30	0.14	0.03	0.02
[2]	229.91	249.86	246.46	332.24	148.57	337.27	428.78	416.94	420.90	353.50	203.78
[3]	28.81	18.39	3.77	9.50	22.02	21.35	96.85	116.85	141.32	98.98	68.53
[4]	0.00	6.47	3.29	1.99	1.43	1.23	1.24	2.44	2.74	3.04	3.12
[5]	32.37	59.35	31.27	44.56	22.73	30.30	33.72	23.71	17.98	14.74	13.66
[6]	137.54	147.83	191.65	213.24	74.27	114.00	164.43	91.81	127.30	142.65	111.73
[7]	31.56	49.52	81.06	111.10	55.69	60.71	94.73	79.29	87.10	85.91	84.90
[8]	10.19	24.43	27.61	24.90	26.30	28.42	32.85	29.17	26.81	35.88	32.05
[9]	0.00	2.52	11.09	7.62	0.00	0.00	0.03	0.02	0.00	0.20	0.02
	481.50	564.16	601.27	751.09	354.57	596.42	856.10	764.70	829.43	740.98	522.46

Source: processed by authors based on data from UNCTADSTAT 2016

Fig. 3 Commodity structure of Slovak imports from Ukraine in 2015 according nomenclature SITC (in %)



Source: processed by authors based on data from UNCTADSTAT 2016

In 2015, goods imported from Ukraine to Slovakia had a value of 522.46 million USD, down on the previous year by 30 % (740.98 million USD). The SITC commodity class most imported from Ukraine to Slovakia was Crude materials, inedible, except fuels (SITC 2), representing 39 % of all imports to Slovakia, but this was down more than 42% on the previous year. The goods most imported in Crude materials, inedible, except fuels were: metalliferous ores and metal scrap, with these imports accounting for 34 %. The second most imported SITC commodity class was Market goods (SITC 6) with a total value of 111.73 million USD, representing 21.4 % of all Slovak imports to Ukraine and an annual decrease of almost 22 %. The largest items in this group of products were: iron and steel on 14 % and nonferrous metals with a 2.9 % share.

Ukraine is rich in mineral resources, and this is an important SITC export commodity. Mineral fuels, lubricants and related materials (SITC3) were the third most balanced class with a share of 13.1 %. In 2015 it decreased by 31 % on the previous year. The most exported items in this commodity class were Coal, coke and briquettes (43.7 million USD) and Gas, natural and manufactured (24.9 million USD). The fourth most exported SITC commodity class in 2015 was Machinery and transport equipment (SITC 7) with imports from Ukraine to Slovakia having an overall value of 84.90 million USD and a share of 16.2 %. The largest share of imports from Ukraine to Slovakia in this class of commodities was attributed to Electrical machinery, apparatus and appliances, n.e.s. with a value of 73.4 million USD, other industrial machinery and parts (3.9 million USD) and metal working machinery (2.9 million USD). Imports from Ukraine to Slovakia categorised as Miscellaneous manufactured articles (SITC 8) recorded a decrease of 10.6%, nearly 4 million USD, on the previous year. In 2015, this commodity class had a value of 32.05 million USD and its share was 6.13 % of all imports from Ukraine to Slovakia. Chemicals and related products, n.e.s. (SITC 5) recorded a value of 13.66 million USD and had a 3 % share and drop of 7.33 % on the previous year. Other commodity classes such as Food and live animals (SITC 0) and Beverages and Tobacco (SITC 1), Animal and vegetable oils, fats and waxes (SITC 4) and Commodities and transactions, n.e.s. (SITC 9) together represented only 2% (7.8 million USD) of imports from Ukraine to Slovakia in 2015.

From 2005 to 2008, foreign trade sales between Ukraine and Slovakia showed an annual increase of 25-30%. In 2008, the first signs of economic and financial crisis were in evidence but not fully reflected in 2009, which saw a decrease on the previous year of about one billion US dollars, but the trade balance was still active and constituted about 20.3 million USD. Since 2010, the trade balance has remained passive. In 2010, bilateral foreign trade with Ukraine accelerated and reached a turnover of 1.08 billion USD. In 2011, the foreign trade turnover began to increase significantly, reaching as high as 1.51 billion USD. Import volumes were worth 856 million USD and the export value was 656.8 million USD. Stressed by Kašťáková and Drieniková (2016), turnover showed a slight decrease, at 1.33 billion USD for 2012; imports accounted for 7.64 million USD and exports 5.68 million USD. In 2013, however, these recovered, with a turnover of 1.47 billion USD. Imports were worth 829.4 million USD and exports 636.3 million USD. In 2014, trade was affected by the Ukrainian conflict, which then developed into a crisis, and this is reflected in the decline in turnover to 1.17 billion USD. Table 1 gives a more detailed overview of the commodity structure of foreign trade between Slovakia and Ukraine in 2005-2015 using SITC nomenclature and showing Slovak exports to Ukraine in millions of dollars.

The trade in defence industry products deserves special attention. LOTN is a Slovak company specializing in the repair of military helicopters and it and other Slovak companies have tended to source spare parts (especially for helicopters overhaul) manufactured in Ukraine. However, the conflict in the Donbass region caused a serious shortage of supplies. According to statistics provided by the Slovak Ministry of Economy, despite a large NATO contract, Slovak companies imported military goods worth 528 210 EUR in 2016 only. Compared to 2015, this was a decline of more than 70%, which negatively impacted on Slovak repair and trade companies' re-exports worldwide.

Tab. 3 Development of the commodity structure of the Slovak exports to Ukraine according SITC nomenclature for period the 2005-2015 (in millions USD)

YEAR	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
SITC											
[0]	15.30	9.80	9.71	18.66	8.77	8.21	9.20	10.72	19.43	12.83	11.08
[1]	2.16	3.93	6.12	3.91	0.88	0.76	1.58	0.89	2.55	2.55	1.84
[2]	39.42	43.86	54.56	61.98	36.99	49.93	52.60	46.42	46.67	42.84	42.85
[3]	0.31	17.56	8.53	10.73	10.73	7.57	11.45	13.16	10.33	14.53	6.97
[4]	0.40	0.06	0.11	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.07
[5]	47.76	63.85	79.27	101.5	60.65	80.30	99.38	69.51	71.38	66.85	53.10
[6]	117.6	136.4	166.3	208.7	129.9	161.8	202.2	168.5	168.6	147.2	116.3
[7]	126.7	222.3	378.1	504.6	116.9	141.8	227.6	205.5	266.2	107.4	88.56
[8]	39.22	39.61	68.24	62.79	43.29	38.49	52.78	53.35	51.13	38.92	25.66
[9]	24.31	5.45	10.08	7.14	0.00	0.00	0.00	0.07	0.00	0.03	0.09
	412.8	542.6	781.0	980.0	374.8	488.9	656.8	568.1	636.3	433.1	346.5

Source: processed by authors based on data from UNCTADSTAT 2016

2.2 Post-DCFTA changes in foreign trade

A significant factor now affecting foreign trade between Slovakia and Ukraine is the DCFTA, which some have associated with the reasons for the conflict. The DCFTA was signed in April 2015 and entered into force on January 1st, 2016. It gives Ukraine free access to the EU's internal market by eliminating customs- and non-tariff barriers. Ukrainian manufacturers and traders can sell most of their products to European customers without having to paying tariffs (Syvanenko & Toropkov, 2015). It also encourages the liberalization of the investment regime as well as the harmonization of trade and investments, and includes the liberalization of trade in services. This agreement is an important step for the Ukrainian economy and gives it access to a sizeable market. Various scientific studies suggest the DCFTA should promote economic growth and growth in the volume of FDI in Ukraine.

Consequently, in 2016 trade revived with the foreign trade turnover between Slovakia and Ukraine growing by 4.56 % on the previous year, worth 908.95 million USD. Total exports from Slovakia to Ukraine in 2016 reached a value of 412.32 million USD. Compared to the previous year, Slovak exports grew by 19% despite the continual effect of the weaker hryvna. Total imports to Slovakia from Ukraine had a value of 496.6 million USD. Compared to the previous year, this was a slight fall of 5.1%. Slovak exports can

be seen to have stabilized and even returned to growth. The previous decline in exports was paradoxically partially eliminated as a result of the military conflict in Ukraine, because Slovakia made a commitment to help provide reverse gas flow to Ukraine in case Russia reduced supplies, and this contributed to the growth in Slovak exports to Ukraine. For 2017, it is forecasted to export as much as 9 bil. m³ of natural gas. Nevertheless, the effect was minor, since the lack of Slovak exports in commodity group 2711 (Petroleum gas and other gaseous hydrocarbons) in 2015 was simply replaced, with exports worth 27.7 million USD in 2016. Surprisingly, foreign trade denominated in the Russian ruble increased continually between 2012 and 2016. Therefore, the slowdown in trade has only been indirectly affected by currency issues.

In terms of sector dominance, in 2016, the most important goods exported from Slovakia to Ukraine were in groups 7 - Machinery and transport equipment worth 128.03 million USD (1.2% increase); 6 - Manufactured goods worth 124.7 million USD (7.2% increase); and 5 - Chemicals and related products worth 53.7 million USD (1.2% increase). Imports fell predominantly into commodity group 2 - Raw materials worth 181.76 million USD (-1.6% decrease); and into groups 6 - Market products worth 97.34 million USD (-14.8% decrease); and 7 - Machinery and transport equipment worth 89.18 million USD (12.1% increase). The most important commodities imported from Ukraine in 2016 within commodity group 2 were raw materials (cork and wood, crude fertilizers and raw minerals, metal ores and metal scrap); 6 - market products (iron and steel, non-ferrous metals, Cork and wood products except furniture, rubber products); and 7 - machinery and transport equipment (electrical equipment, apparatus and appliances, machinery and equipment, other industrial machinery and components, metal working machines, power generating machinery and equipment). Of these, energy commodities accounted for 80% of all imports. The above indicates that the volume of trade between Slovakia and Ukraine decreased in 2016 in most commodity groups. The overall declines in exports and imports were 27.46 % and 25.46 % respectively.

2.3 Comparative advantages of mutual foreign trade of Slovakia and Ukraine

A number of changes in the comparative advantages of foreign trade between Slovakia and Ukraine can be observed in 2005-2016. RCA₂ provides us with a more concise view of the comparative advantages of Slovak foreign trade with Ukraine and will reveal whether any commodity groups have a comparative advantage, and if so, to what extent. Our analysis revealed comparative advantages in Slovak-Ukrainian foreign trade in 2005-2016 as showed in table 4.

Tab. 4 Indicator of the revealed comparative advantage of foreign trade between Slovakia and Ukraine (calculated coefficient RCA₂ for the period 2005-2016)

YEAR	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SITC												
[0]	0.6	0.7	0.6	1.1	1.3		1.3	1.2	1.6	1.3	1.3	1.0
[1]	0.3	1.6	1.8	1.2	-0.6	1.0	3.1	1.4	3.2	4.9	4.6	5.5

[2]	-1.6	-1.7	-1.8	-1.9	-1.5	-1.7	-1.8	-1.9	-1.9	-1.6	-1.1	-1.8
[3]	-4.4	0.0	0.6	-0.1	-0.9	-0.8	-1.9	-1.9	-2.4	-1.4	-1.9	-0.3
[4]	N. A.	-6.9	-3.6	N. A.	-7.2	-8.1	N. A.	N. A.	-6.7	-8.7	-3.3	-2.9
[5]	0.5	0.1	0.7	0.6	0.8	1.2	1.3	1.4	1.6	2.0	1.8	1.1
[6]	0.0	0.0	-0.4	-0.3	0.4	0.5	0.5	0.9	0.5	0.6	0.5	0.5
[7]	1.5	1.5	1.3	1.2	0.6	1.0	1.1	1.2	1.4	0.8	0.5	0.5
[8]	1.5	0.5	0.6	0.7	0.4	0.5	0.7	0.9	0.9	0.6	0.2	0.3
[9]	N. A.	0.8	-0.4	-0.3	N. A.	-0.2	-2.4	1.3	-1.4	-1.3	2.2	2.1

Source: processed by authors based on data from UNCTADSTAT 2017

The RCA₂ results indicate asymmetry in the foreign trade between Slovakia and Ukraine, as can be seen in the table. This is a consequence of Slovak producers focusing on the export of products with a higher added value, unlike exporters in Ukraine. Slovakia has a revealed comparative disadvantage in almost all commodity classes in its trade with Ukraine. This applies to all SITC commodity classes with the exception of SITC 2 - Crude materials, inedible, except fuels; SITC 3 - Mineral fuels, lubricants and related materials and SITC 4 - Animal and vegetable oils, fats and waxes. Slovakia's comparative disadvantages over Ukraine can be explained by venture capital, obstacles to free trade, political instability, the complexity of doing business, and the levels of bureaucracy and corruption. Nonetheless Slovakia has a revealed comparative advantage in the following SITC commodity classes: SITC 0 - Food and live animals; SITC 1 - Beverages and tobacco; SITC 5 - Chemicals and related products, n.e.s.; SITC 6 - Manufactured goods; SITC 7 - Machinery and transport equipment; SITC 8 - Miscellaneous manufactured articles and since 2015 continually also within SITC 9 - Commodities and transactions, n.e.s. The RCA₂ Index shows that Slovakia's comparative trade advantage is concentrated in mutual trade in vehicles, live animals, base metals, and also in the export of iron and steel, rubber, grain mill products, sugar and sweets, and footwear.

2.4 Intra-industry trade between Slovakia and Ukraine

We used the Grubel-Lloyd index (GL index) to show intra-industry trade between Slovakia and Ukraine and changes from 2005 to 2016. In 2005-2016, the highest values were achieved in the following commodity classes SITC 6 - Manufactured goods and SITC 8 - Miscellaneous manufactured articles, with both countries having considerable trade in these goods. These groups were followed by group 7 - Machinery and transport equipment - its IIT index decreased by 41% in 2016 and SITC 0 - Food and live animals. However, after 2013, remarkably volatility was recorded in commodity group 1 - Beverages and tobacco - which stabilised at 0.30 for 2016 and impact of DCFTA is rather positive. Low IIT values were also identified in commodity groups 4 - Animal and vegetable oils, fats and waxes and 3 - Mineral fuels, lubricants and related materials. This was mainly because the trend was for these commodities to be exported from Ukraine to the Slovak Republic rather than vice versa. By contrast Slovakia exported more to Ukraine

than it imported in the following low IIT value commodity groups: SITC 2 - Crude materials; and 5 - Chemicals and related products. This SITC commodity class was followed by SITC7 - Transport machinery and equipment, which in 2016 had a GL index 41 % lower than in 2015. By contrast the index for commodity class 1 - Beverages and Tobacco was revived (from 0.03 up to 0.30). This can be explained by the fact that over 80 % of export duties on Ukrainian agricultural products were abolished.

The GL index for intra-industry trade in the following SITC commodity classes: SITC 3 - Mineral fuels, lubricants and related materials; SITC 9 - Commodities and transactions, n.e.s. and partially SITC 0 - Food and live animals was low because, although exports were high from Ukraine to Slovakia, the reverse was negligible. SITC2 commodity class - Crude materials, inedible, except fuels recorded an intra-industry trade that was lower. It is not surprising to find that more goods in this class were exported from Ukraine to Slovakia than imported. The GL index of intra-industry trade in SITC 4 commodity class (Animal and vegetable oils, fats and waxes) has not been present since 2009, what means that Ukraine was a net exporter to Slovakia in this commodity class. Table 4 shows changes in the value of the intra-industry foreign trade between Slovakia and Ukraine in 2005-2016.

Tab. 5 Values of intra-industry trade between the Slovak Republic and Ukraine (according to SITC Nomenclature between 2005 and 2016)

GLI	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
[0]	0.71	0.97	0.93	0.40	0.23	0.29	0.63	0.61	0.29	0.76	0.62	0.63
[1]	0.64	0.95	0.50	0.29	0.01	0.64	0.90	0.39	0.94	0.29	0.03	0.30
[2]	0.37	0.38	0.45	0.33	0.50	0.37	0.27	0.19	0.21	0.21	0.40	0.34
[3]	0.02	0.01	0.03	0.01	0.03	0.06	0.03	0.06	0.03	0.08	0.16	0.09
[4]	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
[5]	0.93	0.94	0.97	0.96	0.49	0.50	0.54	0.52	0.43	0.39	0.48	0.42
[6]	0.83	0.92	0.78	0.85	0.75	0.84	0.82	0.79	0.87	0.98	0.97	0.94
[7]	0.71	0.66	0.59	0.47	0.96	0.77	0.67	0.47	0.45	0.87	0.93	0.66
[8]	0.84	0.93	0.96	0.97	0.81	0.87	0.97	0.93	0.78	0.97	0.90	0.96
[9]	0.95	0.33	0.96	0.54	0.41	0.84	0.24	0.85	0.30	0.23	0.11	N. A.

Source: processed by authors based on data from UNCTADSTAT 2017

These GL index values reflect the existing intra-industry trade between Slovakia and Ukraine. The conclusion of the Association Agreement and DCFTA in 2014 led to Slovakia recording a minimal increase in foreign trade turnover with Ukraine because the DCFTA limits exports and imports to Ukraine within each class of product. Nonetheless, the countries still trade together in these commodity groups.

2.5 Complementarity index

The results of the complementarity index indicate that the potential for mutual trade between Slovak companies and Ukrainian companies is unique. The index reveals the extent to which Slovak exports match Ukrainian imports and vice versa.

Tab. 6 Complementarity index of Slovakia vs. Ukraine and Czech Republic

EXP UA - IMP SVK			IMP UA - EXP SVK		
2014	2015	2016	2014	2015	2016
67.28%	70.68%	70.97%	55.18%	57.02%	51.97%
EXP CZE - IMP SVK			IMP CZE - EXP SVK		
2014	2015	2016	2014	2015	2016
32.55%	31.07%	30.59%	39.11%	38.60%	37.83%

Source: processed by authors based on data from UNCTADSTAT 2017

As can be seen in the table, the complementarity index between Slovakia and Ukraine is even higher than that with another of Slovakia's neighbours and second biggest export market – the Czech Republic. Moreover, there is enormous potential for future trade since the value of the index has increased since the implementation of the DCFTA with Ukraine, hence the slight decrease with Czechia. Besides the product groups that have traditionally dominated Slovak exports, the greatest potential for Slovak companies can be identified in the commodity group of Medicines, Household equipment, Rubber products and Mechanical handling equipment. This opportunity will strongly depend on the stability of the Ukrainian market and on the future possible limitations stemming from the DCFTA implementation.

Conclusion

From 2005 to 2007 and from 2010 until the present day, the foreign trade balance between Slovakia and Ukraine indicated that Slovakia had a trade deficit. This was caused by the unfavourable economic situation in Ukraine, which meant that companies did not manufacture and then export goods, which would have had a high added value, but instead relied on obsolete technologies and focused on the production of goods with low added value. The overall macroeconomic situation in Ukraine has also had an effect, as is indicated in the deterioration in foreign trade between the two countries.

Slovakia has a revealed comparative disadvantage in almost all SITC commodity classes, except SITC 2, SITC 3, SITC 4 and SITC 9. However, Slovakia's revealed comparative disadvantage is largely a result of the active venture capital environment, obstacles to free trade, political instability, complexity of doing business and the levels of bureaucracy and corruption. Nonetheless Slovakia has a revealed comparative advantage in the SITC 0, SITC 1, SITC 5, SITC 6, SITC 7 and SITC 8 categories. A particularly

high proportion of exports from Slovakia to Ukraine was recorded in the Iron and Steel commodity group, followed by Salt, Sulphur, and so on.

In 2005-2015 – the period observed – the highest volumes traded were found in the SITC 6 and SITC 8 commodity classes, with both countries exhibiting significant reciprocal trade in these goods. The smallest volumes were found in SITC 0 - Food and live animals; SITC 3 - Mineral fuels, lubricant and related materials; and SITC 9 - Commodities and transactions, n.e.s. The results of our analysis of comparative advantage, intra-industry trade indicate that trade performance is weak. Nevertheless, this could be a good basis for both countries to assess their future economic and trade relations, as the complementarity index indicates enormous potential for Slovak companies, mainly in high-tech industries, and for Ukrainian companies from the agro-sector and industries with a cheap labour force. The DCFTA implemented on 1 January 2016 further boosts these areas. Slovakia has a more open market than Ukraine; however, Ukraine should see a positive change with the implementation of the DCFTA.

It is expected that the DCFTA will have a positive impact on agriculture, fisheries, forestry, textile and leather industries and many service sectors, but less so on the metallurgical industry, engineering, transport and the coal chemical industry, owing to the redistribution of production factors in the economy. There have been minor positive changes in energy cooperation between Ukraine and Slovakia, especially in developing renewable energy use, improving energy efficiency and market conditions, and modernising the natural gas transit system in Ukraine in cooperation with Slovakia (Baláž et al., 2011).

The implementation of the DCFTA has thus far only slightly affected foreign trade between the countries (an increase of 2%). Slovakia's major export commodity groups show a positive trend. Despite the negative growth trend in plastic products, Slovakia's comparative advantages are improving trade in higher added value products such as optical and photographic appliances. The prospects are also good for Slovak exporters of mineral fuels, oil and similar products, as evidenced by the fact that in 2016 export volumes of these products more than tripled. Our findings indicate that currency issues are a strong determinant of the foreign trade volume between the two countries. The increasingly weaker Ukrainian hryvna has led to a decline in the competitiveness of Slovak exports in Ukraine, but has had a positive effect on Ukrainian exports to Slovakia and this will continue until the political stabilisation of Ukraine. Therefore, we expect that prospects for Slovak exports in high-end production and gas shipments will be good, and that imports from Ukraine will continue to increase the volume of merchandise sensitive to labour input.

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