TOWARDS THE FACTORS INFLUENCING THE VOLUME OF INTERNATIONAL TRADE IN SERVICES IN EASTERN EUROPE

Abstract. The article discusses the impact of total employment, average wage in the economy and total value added on the volume of export on services and vice versa in the Eastern European countries – Ukraine, Slovakia, Romania and Poland. Author believes that there is a positive correlation between the volume of export in services and abovementioned variables and that it can be described by a linear regression. On the basis of the macroeconomic data for 2010-2020, researcher created a model that assesses these hypotheses.

Keywords: international trade in services, Eastern Europe, macroeconomic modelling, labour market, export of services, average wage, employment.

Introduction. Current international trade environment is highly dependent on the global value chains due to the fragmentation on international production [1]. It is crucial for emerging economies to be included into value chains in order to expect a continuous growth of the economy in the long-term future. The quantitative measure of the inclusion to the global global value chain is the volume of export from the country. That is why it appears to be crucial for the emerging economies to target above-average rates of growth of international trade to save a spot in the international trade environment.

International markets developed gradually - from the beginning of business internationalization in early 1960s through internationalization boom in 1990s to current state of globalization [2]. Early stage enterprises were prone to develop themselves in own market before entering another one at the beginning [3]; the current state of international business shows that modern small and medium sized enterprises seek internationalisation possibilities from the establishment [4].
Exporting enterprises in the second half of XX century were the ones that reached a high level of concentration in their own market or had significant competitive advantages before entering the foreign one; contemporary enterprise is free to open international markets by themselves through export of goods or – even to a greater extent – services without limitation or even reaching a certain level of competitive advantage. that is what made the volume of international trade one of the main indicators of economic development not only the national enterprises but the economy overall. [5]

Countries of the Eastern European region experienced a shift from export of goods to export of services in recent 10 years. The volume of the shift varies by country. According to the data of the International Trade Center [6], export of services from Slovakia reached 10.4% of the total export from the country in 2020 compared to 8.4% in 2011. Romanian export of services accounts for 27.6% of total export in 2020 a massive shift compared to 16.2% in 2011. Poland raised the percentage of export of services 20.9% in 2020 going up from 17.5 and 2011. This shift may be described as one of the consequences of deindustrialization [7] as well as a signal for development of internal market within the country. However, this transition hasn't fully happened to the Ukrainian economy. The structure of export remains the same as ten years ago.

Still, the exposure of international trade is limited to the influence on enterprise itself, but not the well being of population. Therefore, there is a bridge between the value added and international trade and the well being of people. This bridge is labor market that acts as a mediator between the enterprise and the individual. A range of statistics acquired by the great majority of countries through administrative sources and label force surveys includes (but not limited to) the wage level and employment. No surprise that those two parameters are considered as main drivers of well-being within the country.

Approach. In the following study we try to investigate the factors that influence the amount of international trade namely export of services in Ukraine and neighboring countries, namely Poland, Slovakia, and Romania. Due to peculiarities of the statistical of the observation of some parameters and the ease of acquisition
of data about the employment and wages, there was made a decision to examine the role of change in wage level and level of employment, as well as the amount of value added created in the country on the export of services. The researcher believes that embeddedness into the global value chains of the future can and should be conducted through the trade in services as well as agrees with the statement that there could be a correlation between the amount of services trade and well being described by employment and average cost salary. [8]

**Hypotheses.** Thus, the hypotheses are as follows:

1. There is a positive correlation between the level of employment and wage on the amount of export;
2. There is a positive and significant correlation between the growth of value added and growth of export of services;
3. The development of the export of services in the above mentioned countries can be described by a linear function.

The second hypotheses is also a limitation for our research.

**Methodology.** For the purpose of creating a model we used a various data sources starting from UN and World Bank data and national statistical offices. The observed period is 2010-2020, although due to unavailability of the data it could have been shortened in order to ensure that all the data points are available for each of the observed countries. In order to ensure comparability of the data the same methodology was applied across the range of countries. For the data on employment the methodology of the national labor force survey was used. The value added is based on the calculation of the GDP according to the SNA 2008 methodology from the sources that include national statistical offices and UN database. Average gross monthly salary is acquired from administrative sources of the national statistical offices and the data reported by the above mentioned authorities to the International Labor Organization (ILO). The values in national currency are converted to US dollar using the mean annual exchange rate as reported by UNCTAD. As a result of data research the following data matrix was created (see Table 1).

For the purpose of modeling, the whole region is viewed as a single territory so that all the data points are combined and listed with the use of the same approach.
The ‘Year’ parameter doesn't influence the model and is stated for information purposes.

**Modelling.** The assumption of the research states that the model can be described by the linear regression:

\[ y = a_1 x_1 + a_2 x_2 + a_3 x_3 + b + \varepsilon \]

where \( y \) – volume of the total export of services;

\( x_1 \) – total gross value added;

\( x_2 \) – average gross wage in the economy;

\( x_3 \) – total employment;

\( a_n \) – linear coefficients;

\( b \) – free term;

\( \varepsilon \) – stochastic error term.

The researcher conducted a multicollinearity test to define the applicability of the data to the model through examination of correlation between all the parameters of the model (see Table 2).

**Table 1**

Export of services, gross value added, average gross monthly wage and employment in selected countries for 2010-2020

| Country | Year | Volume of the total export of services | Total gross value added | Average gross wage in the economy | Total employment |
|---------|------|----------------------------------------|-------------------------|-----------------------------------|------------------|
|         |      | Millions USD                           | Millions USD            | USD                               | Thousands        |
| Ukraine | 2012 | 22,089.00                              | 151,803.85              | 380.55                            | 19,261.40        |
| Ukraine | 2013 | 22,613.00                              | 160,617.04              | 410.61                            | 19,314.20        |
| Ukraine | 2014 | 14,884.00                              | 116,325.28              | 292.77                            | 18,073.30        |
| Ukraine | 2015 | 12,442.00                              | 77,336.25               | 192.04                            | 16,443.20        |
| Ukraine | 2016 | 12,448.00                              | 79,182.87               | 202.85                            | 16,276.90        |
| Ukraine | 2017 | 14,243.00                              | 94,732.42               | 267.09                            | 16,156.40        |
| Ukraine | 2018 | 15,836.00                              | 110,960.86              | 325.90                            | 16,360.90        |
| Ukraine | 2019 | 17,465.00                              | 132,433.82              | 406.14                            | 16,578.30        |
| Ukraine | 2020 | 15,509.00                              | 133,440.59              | 429.98                            | 15,915.30        |
| Slovakia| 2010 | 6,410.51                               | 81,869.64               | 1,106.97                          | 2,317.49         |
| Slovakia| 2011 | 7,275.93                               | 89,333.46               | 1,190.12                          | 2,315.31         |
| Slovakia| 2012 | 7,768.81                               | 85,909.99               | 1,140.89                          | 2,328.96         |
| Slovakia| 2013 | 9,200.67                               | 89,460.21               | 1,211.24                          | 2,329.25         |
| Slovakia| 2014 | 9,062.10                               | 91,476.72               | 1,281.34                          | 2,363.05         |
As a result of the test, no multicollinearity was found, as the only significant correlation was found between the value added and export which are variable and resulting value. There were no other correlations above 0.7 or below -0.7 which is a sign of the absence of the multicollinearity.

Table 2

Correlation matrix for the list of selected parameters

|          | Export  | Value added | Wage      | Employment |
|----------|---------|-------------|-----------|------------|
| Export   | 1.0000  | 0.9565      | 0.3201    | 0.5923     |
| Value added | 1.0000 | 0.3637      | 0.5587    | -0.4940    |
| Wage     |        | 1.0000      | -0.9682   |             |
| Employment |        |             |           | 1.0000     |

Source: own calculation.
Linear model is built with the use of the method of least squares. The calculations are made using Excel. The results are as follows:

\[ a_1 = 0.0838 \]
\[ a_2 = 8.9157 \]
\[ a_3 = 0.8263 \]
\[ b = -10,624.374 \]

In order to ensure the legitimacy of the results the researcher derived the value \( r^2 \) (coefficient of determination) and conducted F-test. The results show that the coefficient of determination is 0.9256, which stands for a very high determination. F-test confirmed the legitimacy of the model as \( F_{fact} > F_{critical} \) (157.69 > 2.02).

As a result, the model describing the influence of value added, average wage in the economy and employment on the volume of export (and vice versa) is formed in the following way:

\[ y = 0.0838 \times x_1 + 8.9157 \times x_2 + 0.8263 \times x_3 - 10,624.374 + \varepsilon \]

This model shows the positive impact of all the aforementioned factors on the volume of export of services. This also means, within the different frame of interpretation, that \( \Delta \) Export of services has a positive impact on \( \Delta \) Value added, \( \Delta \) Employment and \( \Delta \) Average wage in the economy. This impact is indirect, as it intermediates by the enterprises’ production.

**Conclusions.** As a result of modelling, all the three hypotheses were proven – there is positive correlation between wages and employment and volume of export of services; the impact of the value added was proven to be the highest; results of the coefficient of determination and F-test show that linear function is legit for the given parameters.

The model can be used in order to determine the values that are missing for the Eastern European region. Due to the discrepancies in the dissemination calendars, periodic lack of data on the production (as it is revealed significantly later than the data on employment, wages and export in our scope of countries) it may act as an instrument for creation of estimates for immediate business decisions.

The future research might be concerned with broadening the model in order to
enrich it with more ad-hoc-available and frequently-disseminated data to improve the business possibility to assess emerging markets of the Eastern Europe region faster and more precisely.

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