Consequences of the integration to the Eurasian Economic Union: methodology of statistical evaluation and first results

Abstract. The study represents an assessment of socio-economic integration consequences within the framework of the Eurasian Economic Union (EEU) for the participating countries - Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia. The authors implemented a personally developed approach of integral efficiency evaluation based on the calculation of the coefficients of state social and economic development indicators of growth as a main method for such assessment. These indicators allow us to characterise the following segments: national welfare, inflation, investment activity, labour market and the level of poverty, and the condition of the main economic sectors. The authors determined that Russia is the only export-oriented member of the Eurasian Economic Union (EEU). The worst consequences of integration in the cross-border trade sphere are observed in Belarus. For the analysed countries (excluding Kyrgyzstan), the first year of the existence of the EEU can be characterised as a period of economic recession (2015). According to the comparison of integral rates for the periods of 2005-2014 and 2015-2017, it was defined that the integration had a positive economic effect in the short term. By now, all the five participating countries have achieved the same level of social and economic development as in the pre-crisis period (2012-2013). In terms of the EEU membership, the calculated economic growth expands from 3% in Kyrgyzstan (by the integral index) up to 30% in the Republic of Belarus. Russia has also significantly strengthened its position (the growth rate of the index in 2015-17 was 25%).

Keywords: EEU; Integral Rate; Socio-economic Development; Economic Indicators; International Integration

JEL Classification: F15; F36; F43; C43

Acknowledgments: The article was prepared with the support of the Russian Foundation for Basic Research (RFBR); project No. 18-010-00527 (2017).

DOI: https://doi.org/10.21003/ea.V170-01
позитивный вплив. На данном этапе членство в ЕАЭС оценивается в 3% по Киргизии (за интеграционным индексом до 30% по Республике Беларусь. Российская Федерация также снизила свой показатель (темп роста индекса в 2015–2017 годах составил 25%).

Ключевые слова: ЕАЭС; интегральная оценка; социально-экономический рост; индикаторы экономики; межнародная интеграция.

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Последствия интеграции в ЕАЭС: методика статистической оценки и первые результаты

Аннотация. Исследование посвящено оценке социально-экономических последствий интеграции в рамках ЕАЭС для стран-участниц: Армении, Беларуси, Казахстана, Кыргызстана и России. В качестве методики исследования использован авторский подход к интегральной оценке эффективности, основанный на расчете коэффициентов роста индикаторов социально-экономического развития государств. Указанные индикаторы позволяют охарактеризовать следующие макроэкономические категории: национальное благосостояние, инфляция, инвестиционную активность, рынок труда, уровень бедности, а также состояние основных отраслей экономики. Авторами статьи определено, что Российская Федерация является единственным экспортно-ориентированным членом ЕАЭС. Самые худшие последствия от интеграции отмечены в Республике Беларусь. Первый год существования ЕАЭС характеризуется для анализируемых стран (за периодом Кыргызстана) как период экономического спада (2015 год). В результате сопоставления интегральных оценок за периоды 2005–2014 гг. и 2015–2017 гг. определено, что в краткосрочном периоде интеграция в ЕАЭС принесла положительный экономический эффект. На данный момент всем 5 странам-участницам удалось достичь уровня социально-экономического развития, отмеченного в докризисные 2012–2013 гг. Экономический рост за время членства в ЕАЭС определен от 3% в Киргизии (по интегральному индексу), до 30% в Республике Беларусь. Российская Федерация также существенно упрочила свое положение (темп роста индекса в 2015–2017 гг. составил 25%).

Ключевые слова: ЕАЭС; интегральная оценка; социально-экономическое развитие; индикаторы экономики, международная интеграция.

1. Introduction

Integration unions have a significant impact on the national economies of their members. However, the results from membership in international unions are not always positive (Stiglitz, 2010) [1]. Given the relatively low competitiveness of national economic and financial systems, openness leads to the vulnerability of some sectors of the economy (Colacito and Mariano, 2010) [2].

The establishment of the Eurasian Economic Union has become a logical result of the strengthening of international relations of the Customs Union. On the one hand, the fruitful cooperation of the EEU member countries, both on the political and economic arena, for quite a long time (more than 25 years) allows predicting high potential results of such integration [3]. On the other hand, existing barriers, primarily of economic nature, can affect national competitiveness adversely [4]. For instance, it is important to note the fact that the economic basis of the EEA member countries has significant impact on the main factor of the competitiveness of domestic products - pricing (the Russian platform is based on private business, while the Belarusian one is based on public administration).

Moreover, there is a need to expand the EEU internal market, primarily due to the growing number of union participants [5]. However, this provision is very controversial, for example, regarding the integration of Kyrgyzstan with its very low population solvency, and a large number of economic problems at the state level. In this regard, the assessment of the consequences of integration at the first stage of the formation of the EEU is very relevant. In addition, an analysis of economic results in the EEU member countries is required not only in the period of its operating (2015–2017), but also in the previous years. The period of 2005–2014 was used to determine the trend. This defines the purpose of the scientific research, which is to assess the socio-economic impact of the establishment of the EEU on the participating countries.

2. Brief Literature Review

Scientists from around the world assess the consequences of economic integration from different sides [6]. From the standpoint of this study, the methodology of such assessment is of the greatest interest, since it is almost impossible to analyse the efficiency of integration with a high level of probability within the framework of the existence of the EEU of one year. The Eurasian Economic Union itself was created only in 2015.

In the study dedicated to the consequences of China integration and to technological changes in the multi-country Ricardian–Heckscher–Olin quantitative model, conducted by American scientists (Julian di Giovanni, Andrei A. Levchenko, Jing Zhang, 2014) attracts a great interest [7]. The authors used a scenario approach that consists of two alternative growth option evaluations: «balanced», in which China’s productivity grows at the same speed in each sector of the economy, and «unbalanced», in which the comparatively undeveloped sectors of the Chinese economy develop much faster than the average productivity by countries of the world. A completely different approach based on the use of nonparametric criteria was used to assess the integration of China into the world in a similar study (Adao, Costinot, Donaldson, 2017) [8]. P. Fabrizio and V. Kvadrini (Fabrizi, Quadlini, 2018) analysed the impact of international integration on financial crises of the participating countries using imitation mathematical modeling [9]. The results obtained by the authors show that international unions are the least susceptible to financial crises, but if such a crisis occurs, all members of the union suffer from the negative impact.

Some studies are devoted to the assessment of economic integration, take into account the political influence. A. Sapir (2011) shows, by the example of the European Union, the impact of the policy on the euro-dollar exchange rate, and, as a consequence, the economic situation within the integration union [10].
T. P. Aldohina uses an integrated approach to assess the effectiveness of integration processes (on the example of the EEU). In the study, she offers a system of statistical indicators that allow making a comprehensive assessment of the socio-economic consequences for the EEU member countries [11].

The article of M. Zos-Kior, I. Kuksa, Iu. Samoilyk, M. Storoška is dedicated to the study of the integral evaluation of the globalisation consequences [12]. As a basic category of evaluation, the authors use the integral development index created by the Swiss Economic Institute. The main difference between the proposed integral index and the authors’ methodology is that rank coefficients are used to calculate the main macroeconomic indicators. However, this approach does not allow us to assess minor economic trends due to low ranks sensitivity. Moreover, the rank-based approach is focused on spatial assessment (by countries), while the coefficient approach allows to study changes in dynamics separately for each EEU member. This fact determines the scientific novelty of this study.

3. Research Methodology

As the basic study methodology, the statistical methods for dynamic series analysis of the EEU members’ cross-border trade indicators were used. To assess the impact of integration processes in the Eurasian economic space, the authors applied an integrated approach based on the calculation of the aggregate indicator of economic growth. Seventeen indicators characterising the EEU countries were selected as indicators of economic growth. These indicators reflect the following segments (Figure 1):

1. National welfare, represented in the form of the gross domestic product of each EEU member.
2. Inflation. The approach of inflation estimation through the consumer price index.
3. Investment activity. This aspect is evaluated through the volume of investment in the fixed capital and, among other things, it characterises the investment attractiveness of national economies for foreign partners (including the EEU members).
4. Labour market and poverty level. This segment allows to assess the impact of EEU membership on the aggregate level of wages (as on one of the elements of state competitiveness), as well as the degree of social inequality and population stratification by income level.
5. Condition of the main economy branches. The sphere of material production (agriculture and industry), as well as construction (this branch is an indicator of the financial condition of any county and this area is most sensitive to crisis) and transport are chosen as priority sectors [13-15].

Transport has a significant impact on internal and external logistics. Therefore, it increases business attractiveness [16-18], both in terms of the availability of manufactured goods for consumers and the increase of the turnover rate for producers.

The identity of the methodologies used to calculate corresponding indicators is an obligatory statistical condition in order to conduct an intercountry analysis. In this regard, data relating to the seventeen indicators studied for the period of 2005-2016 was taken from the official EEC (Eurasian Economic Commission) website in a comparable form. The only exception was made for the average monthly nominal wage in the Republic of Armenia. Starting from 2013, the National Statistical Committee of Armenia included mandatory social insurance payments, as well as military salaries in the indicator.

In this connection, closing of the dynamic series of this indicator through the conversion factor determined by the data of 2012 (1) was calculated:

\[ K = \frac{d_{2012-0}}{d_{2012-1}}, \]  

where:

- \( K \) - the coefficient of dynamic series closure;
- \( d_{2012-0} \) - the average nominal wage in 2012 according to the calculation methodology of 2013;
- \( d_{2012-1} \) - the average nominal wage in 2012 according to the calculation methodology of 2012.

The indicators of 2017 are taken from the official websites of the national statistical committees of the EEU countries with the verification of their calculation methodology according to the EEC data.

The next step in determining the integral index of economic development is the calculation of the growth coefficients for the relevant indicators. Since comparison of different quality characteristics is impossible, there occurs an objective need for their transformation into a comparable form. The authors used the coefficient approach, in connection with the fact that it allows not only to bring the data in a comparable form but also to determine the main economic trends (growth or decline). In the context of the implementation of this methodology, it is necessary to take into account that the selected economic indicators have a multidirectional effect (some act as indicators of growth, others act as recession). Thus, for growth indicators, the coefficients should be calculated as a ratio of the indicator values in the reporting year to the base one, calculations for the indicators of decline should be inverse.

Among the selected indicators, only four reveal the destructive nature of the changes. They are the poverty level, %; the coefficient of funds; the Gini index and the consumer price index, in % to December of the previous year.

Fig. 1: System of state social and economic development indicators

Source: Compiled by the authors
As a result, the final stage of the analysis is the calculation of the socio-economic development integral indicator as the arithmetic mean of seventeen individual coefficients (2):

\[ I = \frac{k_1 + k_2 + \ldots + k_{17}}{17}, \]  

where:
- \( k_i \) - the individual growth factor for the \( i \)-th indicator;
- \( n \) - the number of selected indicators (17 in the authors’ study).

4. Results

To assess the direction of the foreign trade policy of the EEU countries (either exports or imports), we determined the trade balance for each participating country (Table 1).

The analysis showed that only the Russian Federation among the EEU countries is an export-oriented member (exports exceed imports consistently in 2015-2017). The Russian trade balance grew by 11% in 2017, as compared to 2016. At the same time, the trend of the cross-border trade with those states that are not EEU member countries is not determined in Russia. On the one hand, the trade balance remains positive despite the difficult economic and political situation. On the other hand, it has declined by 22% over the three-year period. The reduction in the balance of foreign trade is not secured by the same reduction in domestic trade.

Armenia and Kyrgyzstan are importing countries both in foreign and domestic trade during the analysed period. Belarus sharply lost its positions, especially in 2016, when the trade balance of the country became negative. At the same time, Kazakhstan managed to consolidate its positions. The trade balance in the country increased by 22% for 3 years, and the same indicator for the 1st quarter of 2018 also confirms the tendency towards growth. It is worth noting that these indicators of cross-border trade balance of the EEU countries were achieved even during growth of aggregate turnover (Table 1).

To assess the impact of integration in the Eurasian Economic Area, we analysed the integral indicator of the socio-economic development of participating countries. The indicators (by EEU members) of the development of the main manufacturing industries for the period between 2005 to 2017 are represented in Table 3. The growth coefficients calculated on the basis of the indicators are shown in Table 4.

### Tab. 1: External and mutual trade balance of the EEU countries (export-import), USD million

|                | 2015 | 2016 | 2017 | January-March 2018 | 2017 to 2015, % |
|----------------|------|------|------|-------------------|-----------------|
| External trade (excluding the EEU) |      |      |      |                   |                 |
| Armenia        | -991 | -766 | -1,188 | -316              | 120             |
| Belarus        | 2,565 | 80   | 1,098 | 973               | 43              |
| Kazakhstan     | 21,479 | 17,294 | 26,161 | 8062             | 122             |
| Kyrgyzstan     | -1016 | -1,249 | -1,408 | -574             | 134             |
| Russia         | 146,270 | 91,957 | 114,714 | 44,107          | 78              |
| **Internal trade (within the EEU)** |      |      |      |                   |                 |
| Armenia        | -733 | -669 | -792 | -206              | 103             |
| Belarus        | -9,200 | -3,986 | -6,125 | -2,035           | 99              |
| Kazakhstan     | -6,091 | -5,933 | -7,123 | -1,530           | 117             |
| Kyrgyzstan     | -1,655 | -1,179 | -1,282 | -243             | 77              |
| Russia         | 14,640 | 12,310 | 16,220 | 4,535            | 111             |

Source: Calculated by the authors based on [19]

### Tab. 2: Growth rates of exports and imports volume by EEU member countries

|                | 2017 to 2015 | 2017 to 2016 | Import total | 2017 to 2015 | 2017 to 2016 |
|----------------|--------------|--------------|-------------|--------------|--------------|
| Armenia        | 1.4          | 1.2          | Armenia     | 1.3          | 1.3          |
| Belarus        | 1.0          | 1.3          | Belarus     | 1.1          | 1.2          |
| Kazakhstan     | 1.1          | 1.3          | Kazakhstan  | 0.9          | 1.1          |
| Kyrgyzstan     | 1.1          | 1.1          | Kyrgyzstan  | 1.3          | 1.1          |
| Russia         | 1.0          | 1.2          | Russia      | 1.2          | 1.2          |

Source: Calculated by the authors based on [19]

### Tab. 3: Initial data for the integral indicator of socio-economic development calculation (example of the Russian Federation)

|                | Production of agricultural products per capita, USD million | The volume of agricultural production, million tonnes | Indices of industrial production, % | The volume of completed constructions, million square meters | Commissioning of housing, million square meters | Total investments in fixed capital, USD million | Investments in fixed capital, USD million | Average monthly nominal wage, % | Coefficient of funds | The Gini index | Consumer price index, % | Freight turnover for all modes of transport, million ton-km | Number of motor vehicles per 1,000 residents | Index of physical GDP volume, % |
|----------------|-----------------------------------------------------------|----------------------------------------------------|-----------------------------------|-----------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------|------------------------------------------|-----------------|-----------------|------------------------|---------------------------------------------------|------------------------------------------------|--------------------------|
| 2005           | 340                                                       | 48,830                                             | 105                                | 108                                                        | 62,032                                        | 44                                            | 890                                                                      | 127,591                                  | 303            | 113            | 18                 | 15                                                               | 0.409                                              | 473                      | 106                                    |
| 2006           | 404                                                       | 57,785                                             | 106                                | 108                                                        | 86,492                                        | 51                                            | 1,217                                                                    | 174,026                                  | 391            | 113            | 15                 | 16                                                               | 0.415                                              | 490                      | 103                                    |
| 2007           | 529                                                       | 75,542                                             | 107                                | 111                                                        | 128,796                                       | 61                                            | 1,839                                                                    | 262,660                                  | 532            | 117            | 13                 | 17                                                               | 0.422                                              | 492                      | 109                                    |
| 2008           | 695                                                       | 99,194                                             | 101                                | 101                                                        | 182,511                                       | 64                                            | 2,480                                                                    | 353,955                                  | 697            | 112            | 13                 | 17                                                               | 0.421                                              | 493                      | 105                                    |
| 2009           | 556                                                       | 79,419                                             | 89                                 | 89                                                         | 126,209                                       | 60                                            | 1,763                                                                    | 251,768                                  | 588            | 97             | 9            | 17                                                               | 0.421                                              | 446                      | 94          |
| 2010           | 597                                                       | 85,244                                             | 107                                | 111                                                        | 146,709                                       | 58                                            | 2,110                                                                    | 301,452                                  | 690            | 105            | 13                 | 17                                                               | 0.421                                              | 472                      | 94          |
| 2011           | 777                                                       | 111,141                                            | 105                                | 108                                                        | 175,138                                       | 62                                            | 2,630                                                                    | 376,002                                  | 796            | 103            | 16                 | 16                                                               | 0.417                                              | 475                      | 104         |
| 2012           | 750                                                       | 107,531                                            | 103                                | 103                                                        | 183,911                                       | 66                                            | 2,829                                                                    | 405,088                                  | 857            | 108            | 11               | 16                                                               | 0.420                                              | 506                      | 104         |
| 2013           | 807                                                       | 115,873                                            | 100                                | 101                                                        | 189,174                                       | 70                                            | 2,948.8                                                                  | 422,698                                  | 936            | 105            | 11               | 16                                                               | 0.419                                              | 508                      | 102         |
| 2014           | 778                                                       | 113,750                                            | 103                                | 103                                                        | 161,317                                       | 84                                            | 2,548.6                                                                  | 366,148                                  | 856            | 101            | 11               | 16                                                               | 0.416                                              | 514                      | 101         |
| 2015           | 582                                                       | 85,158                                             | 99                                 | 99                                                         | 115,569                                       | 85                                            | 1,566.3                                                                  | 229,100                                  | 561            | 91             | 9            | 13                                                               | 0.413                                              | 509                      | 93          |
| 2016           | 561                                                       | 82,298                                             | 101                                | 101                                                        | 107,686                                       | 80                                            | 1,504.4                                                                  | 220,461                                  | 549            | 101            | 13               | 16                                                               | 0.412                                              | 505                      | 102         |
| 2017           | 655                                                       | 96,931                                             | 113                                | 110                                                        | 129,366                                       | 79                                            | 1,642                                                                    | 273,732                                  | 671            | 104            | 13               | 16                                                               | 0.412                                              | 549                      | 102         |

Source: Calculated by the authors based on [19]
The integrated indicators for each EEU member country were determined based on the growth coefficients of the main indicators of socio-economic development (Table 5).

The analysis has shown that the first years of the EEU existence may be characterised as a period of economic recession (2015-2016) for all the member countries, but Kyrgyzstan. The Russian Federation (the integrated index - 0.87) and the Republic of Belarus (the integrated index - 0.84) incurred the most significant losses in 2015. At the same time, it is impossible to link negative tendencies to the EEU membership only. The decline in the integral of socio-economic development is the result of the multiplicative impact of integration processes, economic and administrative sanctions against the Russian Federation, political tension and instability (Figure 2).

The periodization of socio-economic development Table 5: integral indicators of socio-economic development of the EEU countries

| Russia | Armenia | Belarus | Kazakhstan | Kyrgyzstan |
|--------|---------|---------|------------|------------|
| 2006   | 1.14    | 1.22    | 1.14       | 1.16       | 1.14       |
| 2007   | 1.19    | 1.21    | 1.12       | 1.15       | 1.19       |
| 2008   | 1.13    | 1.11    | 1.17       | 1.11       | 1.23       |
| 2009   | 0.88    | 0.86    | 0.95       | 1.00       | 0.99       |
| 2010   | 1.08    | 1.07    | 1.13       | 1.05       | 0.99       |
| 2011   | 1.11    | 1.04    | 0.90       | 1.13       | 1.12       |
| 2012   | 1.04    | 0.98    | 1.11       | 1.07       | 1.06       |
| 2013   | 1.03    | 0.98    | 1.09       | 1.08       | 1.07       |
| 2014   | 0.98    | 1.02    | 1.02       | 0.99       | 1.05       |
| 2015   | 0.87    | 0.94    | 0.84       | 0.96       | 1.01       |
| 2016   | 0.99    | 0.95    | 0.92       | 0.92       | 1.03       |
| 2017   | 1.09    | 1.05    | 1.09       | 1.09       | 1.04       |

Fig. 2: Periodization of socio-economic indicators of the EEU countries

Source: Calculated by the authors based on [19]
the level of the Eurasian Economic Union as a whole and individual participants in particular. The approbation of the integral indicator revealed economic recession in the EEU countries in 2005-2015, yet their integration led to first positive results in the short term. These results are associated with the increase in indicators of socio-economic growth in Russia, Kazakhstan, Belarus, Armenia and Kyrgyzstan.

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Received 20.05.2017

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With deep respect,
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Tikhonova, A., Mehnikova, N., & Lukacs, E. / Economic Annals-XXI (2018), 1703-4, 4-9