

# Assessment of Comparative Efficiency Based on Integral Index of Reforms: Evidence from Transcaucasian Republics

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## Abstract

The main purpose of the research is to develop a new methodology, that will allow to create an Integral Index of Reforms, quantitatively assess various reforms that have been implemented for 2012-2017 in 66 countries of the world. In the article with the help of the Integral Index of Reforms, that contains 20 partial indexes, reforms in different areas have been measured. The Integral Index of Reforms was constructed based on principle component analysis; contribution of sub-indexes was defined through panel data regression. Based on this methodology various reforms have been assessed and analysed for 2012-2017 in three Transcaucasian Republics: Armenia, Georgia and Azerbaijan.

**Keywords:** reform, comparative efficiency, integral index of reforms, Armenia, Georgia, Azerbaijan

**JEL classification:** E66, E61, F01, O10

## Introduction

Indexes are more widespread and essential tools in the process of assessment and analysis of social-economic situations at both macro and micro levels of economies. With the help of indexes, the changes in the national economy are completely and partially (by branches) characterized and the role of each factor is analysed in the process of the formation of economic indices.

Governments of different countries face new challenges related to the changes of the world economic system, and in order to overcome them appropriate reforms are developed and implemented. In order to assess those reforms quantitatively, various indexes are developed by different international and non-governmental organizations.

However, some indexes are controversial. The rankings are subjective and sometimes are based on ideological "motives", but experimental data is not always relevant to the practical situation. The scores are widely used in economic analysis, basically due to the lack of alternative research. It witnesses that the indexes that describe the global economy and reforms in countries should be accepted with their disadvantages.

The governments of different countries, based on the opportunities to develop and fulfil their strategic, long-term, short-term projects, implement political, economic, social and other reforms. During that period, several issues arise, particularly: how effective, interconnected, and reasonable are those integral reforms? What kind of comparative efficiency do they provide compared to other countries? In order to overcome the challenges related to the solution of the above-mentioned problems, as well as to develop and implement appropriate programs of reforms, it is getting vital to assess implemented various reforms.

As an alternative to the assessment of the reforms implemented in countries, it is required to create complex and integral indexes that will include various reforms in economic, social, environmental and other areas. In this regard, indexes, that are created by different international and non-governmental organizations, express quantitative and qualitative features of integral reforms implemented in different fields. However, the analysis of the results of the assessments with the help of above-mentioned indexes reveal the methodological disadvantages of the indicators that indexes contain. The shortcomings of the methodologies of the indexes are observed while revealing inconsistencies both between different indexes and analysing the methodology of the creation of each index. Choosing the sources of collecting information for some indexes is also problematic.

In this context it is getting vital to develop a new methodology that will exclude such shortcomings and create an integral index that will contain as much indexes as possible. It will give an opportunity to assess various reforms implemented in different directions. On this purpose, the following assumption has been made that the results of various reforms are accurately expressed in different partial indexes developed by international and non-governmental organizations.

Krupka and Provaznikova (2014), Amin et al. (2015), Davoyan et al. (2016), Davoyan and Sahakyan (2013) partially solved above mentioned problems by using different econometric models.

## Methodology

In our research we have tried to create an Integral Index of Reforms that will assess the results of various reforms through 20 partial indexes for 2012-2017 in 66 countries of the world. In order to create the Integral Index of Reforms it is used principle component analysis Stock and Watson (1989). Integral Index of Reforms is a weighted sum of first five factors out of estimated twenty factors. The index is calculated according to equation 1. Weight of each factor is defined as a ratio of its own variance to the sum of variances of all five factors.

$$IIR_t = \sum_{i=1}^5 w_i F_{it} \quad (1)$$

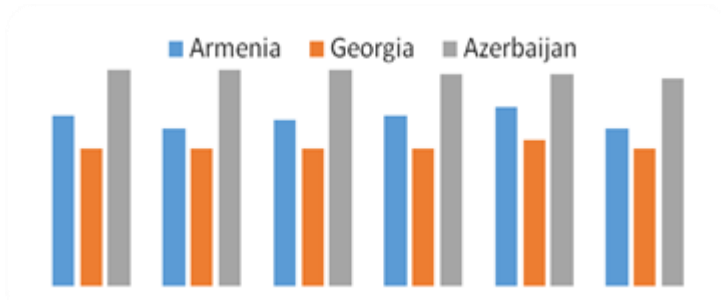
Where  $IIR_t$  -is an Integral Index of Reforms,  $F_{it}$  - is a factor and  $w_i$  -each factor's weight.

## Results

As a result, we can see the ranks and scores by the Integral Index of Reforms for three Transcaucasian Republics among 66 countries (see Figure 1, 2).

Figure 1

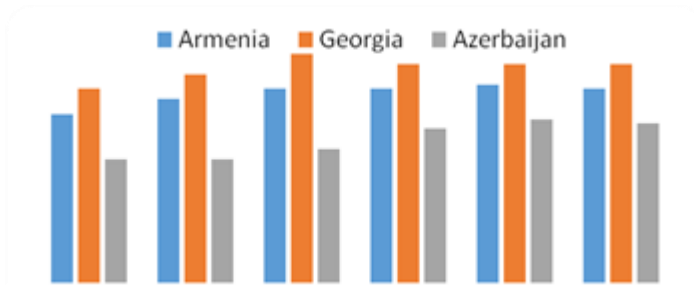
The Ranks of Armenia, Georgia and Azerbaijan by the Integral Index of Reforms for 2012-2017



Source: Authors' work

Figure 2

The Scores of Armenia, Georgia and Azerbaijan by the Integral Index of Reforms for 2012-2017



Source: Authors' work

As we can see in figure 1 and 2, according to the Integral Index of Reforms among three countries, Georgia was in the first place in 2017 (33rd place among 66 countries with 4.4 points in 2017), Armenia was ranked 2nd (38th place among 66 countries with 3.9 points) and Azerbaijan was the last (50th place among 66 countries with 3.2 points). In order to measure the contributions of each partial index in the Integral Index of Reforms, a panel data analysis was applied using different economic indexes that comprehensively describe the economic development of 66 countries for 2012-2017. The results of the panel data analysis were presented by the examples of three Transcaucasian Republics: Armenia, Georgia and Azerbaijan.

## Armenia

Table 1  
Armenian Macroeconomic Indicators: 2017

Population(mln)	3
GDPin the world's GDP (%)	0.02
GDP per capita (US \$)	3,861.0
10-year average annual economic growth (%)	2.3
Unemployment (%)	18.2
GDP deflator (%)	2.23
Net outflow of FDI (% of GDP)	0.19
Net inflow of FDI (% of GDP)	2.16

Source: International Monetary Fund (2018)

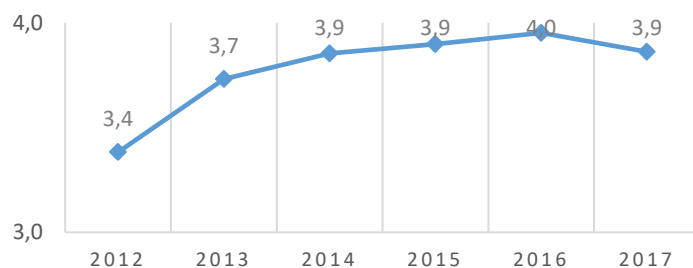
Figure 3  
Physical Map of Armenia



Source: Maphill (N/A)

Thus, Armenia has dynamically moved up in rankings for 2012-2017. The score (ranging from 0 to 10) was increased from 3.4 points in 2012 up to 3.9 in 2017 (see Figure 4).

Figure 4  
The Dynamic of the Integral Index of Reforms for Armenia, 2012-2017

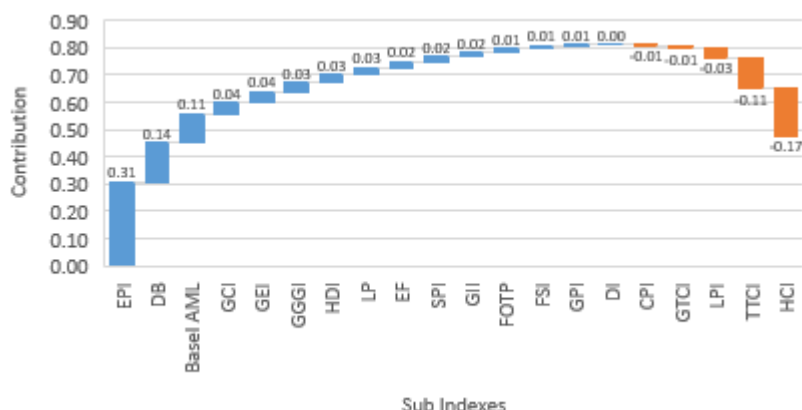


Source: Authors' work

As a result, the increase of the score by 0.5 points was mainly due to the reforms in some areas of RA: environmental performance (EPI), business activity (DB), anti-money laundering and terrorism financing (Basel AML), which completely neutralized negative changes in human development (HCI) and travel and tourism competitiveness (TTCI) (see Figure 5).

Figure 5

Armenia: Decomposition of Change in Integral Index of Reforms, 2012-2017



Source: Authors' work

It should be mentioned, that in parallel with the increase of the index, the rank of Armenia has also been improved among 66 countries (see Table 2). Particularly, if in 2012 Armenia was ranked 41st among 66 countries, in 2017 due to the improvements in a number of spheres, Armenia made progress and was ranked 38th.

Table 2

The Dynamic of the Integral Index of Reforms for Armenia

Years	The rank (among 66 countries)	The score (0-10)
2012	41	3.4
2013	38	3.7
2014	40	3.9
2015	41	3.9
2016	43	4.0
2017	38	3.9

Source: Authors' work

## Georgia

Table 3

Georgian Macroeconomic Indicators: 2017

Population(mln)	3.7
GDP in the world's GDP (%)	0.03
GDP per capita (US \$)	4,098.6
10-year average annual economic growth (%)	3.6
Unemployment (%)	11.6
GDP deflator (%)	6.09
Net outflow of FDI (% of GDP)	1.35
Net inflow of FDI (% of GDP)	12.13

Source: International Monetary Fund (2018)

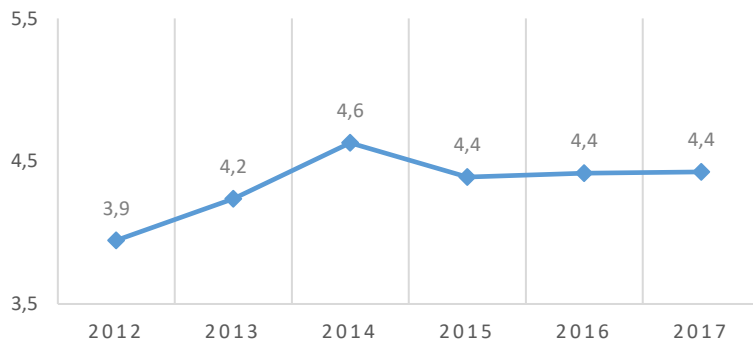
Figure 6  
Physical Map of Georgia



Source: Maphill (N/A)

The score of the Integral Index of Reforms for Georgia has dynamically increased for 2012-2017, from 3.9 points in 2012 up to 4.4 points in 2017 (see Figure 7).

Figure 7  
The Dynamic of the Integral Index of Reforms for Georgia, 2012-2014

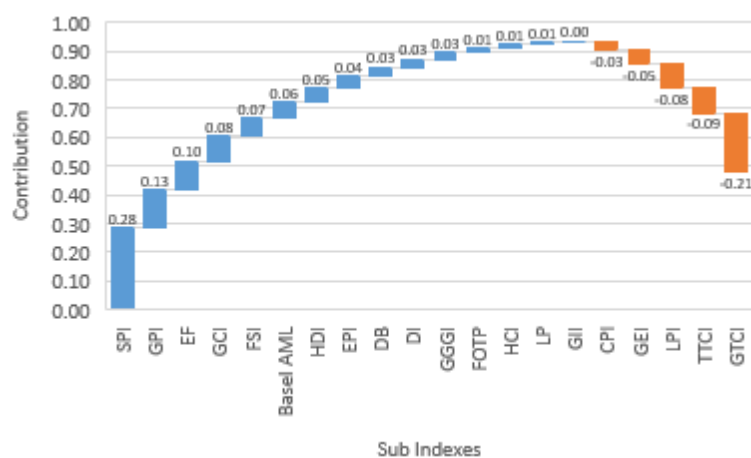


Source: Authors' work

As a result, the increase of the score by 0.5 points was mainly due to the reforms in social progress (SP), peacekeeping (GP) and economic freedom (EF) in Georgia, which completely neutralized negative changes in global talent competitiveness (GTCl), travel and tourism competitiveness (TTCI) and logistics performance (LPI) (see Figure 8).

Figure 8

Georgia: Decomposition of Change in Integral Index of Reforms, 2012-2017



Source: Authors' work

Although the score of the Integral Index of Reforms has increased, however Georgia remains the same position (33rd) among 66 countries (see Table 4).

Table 4

The Dynamic of the Integral Index of Reforms for Georgia

Years	The rank(among 66 countries)	The score (0-10)
2012	33	3.9
2013	33	4.2
2014	33	4.6
2015	33	4.4
2016	35	4.4
2017	33	4.4

Source: Authors' work

## Azerbaijan

Table 5

Azerbaijan Macroeconomic Indicators: 2017

Population(mln)	9.8
GDPin the world's GDP (%)	0.14
GDP per capita (US \$)	4,140.7
10-year average annual economic growth (%)	3.0
Unemployment (%)	5.0
GDP deflator (%)	15.95
Net outflow of FDI (% of GDP)	6.29
Net inflow of FDI (% of GDP)	7.03

Source: International Monetary Fund (2018)

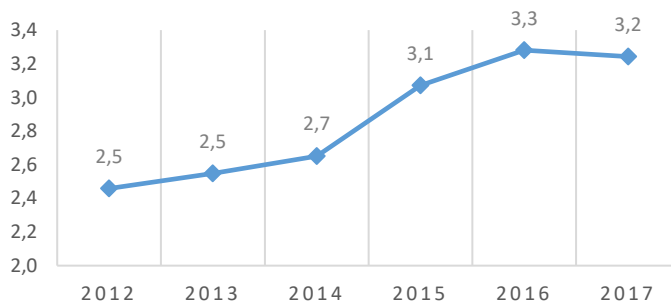
Figure 9  
Physical Map of Azerbaijan



Source: Maphill (N/A)

The performance of Azerbaijan by the Integral Index of Reforms for has dynamically improved for 2012-2017 from 2.5 points in 2012 up to 3.2 points in 2017 (see Figure 10).

Figure 10  
The Dynamic of the Integral Index of Reforms for Azerbaijan, 2012-2017

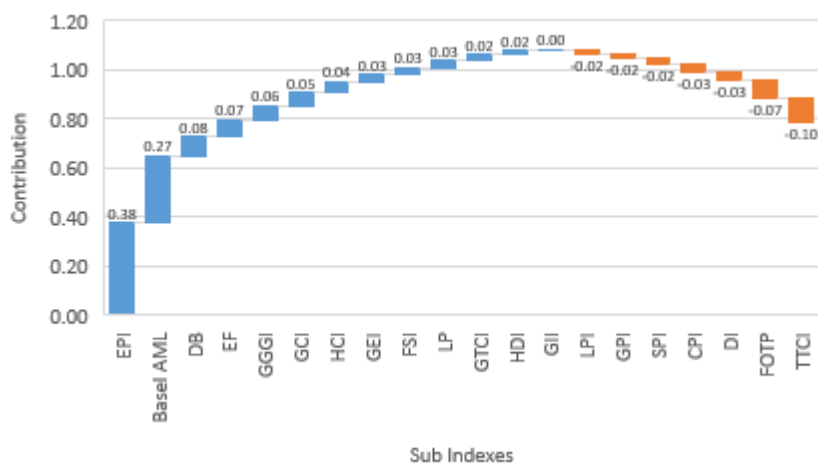


Source: Authors' work

As a result, the increase of the score of the Integral Index of reforms for Azerbaijan by 0.5 points was mainly related to the improvements in some fields: environmental performance (EPI), anti-money laundering and terrorism financing (Basel AML) and business activity (DB), which has completely neutralized negative contributions of travel and tourism competitiveness (TTCI) and press freedom deterioration (FOTP) (see Figure 11).



Figure 11  
Azerbaijan: Decomposition of Change in Integral Index of Reforms, 2012-2017



Source: Authors' work

Although the score of the Integral Index of Reforms for Azerbaijan has increased, however, its rank was dropped among 66 countries (see Table 6).

Particularly, if in 2012 Azerbaijan was ranked 52nd among 66 countries in 2017 its position was 50th, due to the relatively slow pace of reforms.

Table 6  
The Dynamic of the Integral Index of Reforms for Azerbaijan

Years	The rank(among 66 countries)	The score (0-10)
2012	52	2.5
2013	52	2.5
2014	52	2.7
2015	51	3.1
2016	51	3.3
2017	50	3.2

Source: Authors' work

Thus, the results witness that from both scientific and theoretical perspectives the governments of three Transcaucasian countries, while developing and implementing reforms country, should be more ambitious and able to increase the comparative efficiency of the above-mentioned reforms (in order not to restrict socio-economic development of the country). And the development-oriented reforms should be implemented at least with the same pace of growth as it was implemented for the observed period.

## Discussion

In our research we have arisen following questions and tried to find their solutions:

1. Partial Indexes are relatively less correlated with each other. In order to solve this problem, we have tried to include indexes that assess reforms in different areas.
2. The Increase in the number of partial indexes: whether the increase in the number of partial indexes cause the increase of the accuracy of the assessment of the comparative efficiency of each country. According to our

point of view it depends on the scale of each partial index in the Integral Index of Reforms.

3. Although 20 partial indexes contain indicators that are close to each other from economic perspectives, but in our point of view, they are neutralizing each other.
4. Considering the fact that the changes of the rank of each country have different social-economic significance, for example, the change of the rank by one place for developed countries (such as Germany, Switzerland and so on) is not equivalent to the same change for developing countries. Therefore, we have suggested to apply adjusting coefficients that will eliminate those methodological shortcomings.

## Conclusion

To sum up, in our research with the help of the Integral Index of Reforms we have assessed and analysed institutional systems of three Transcaucasian economies: Armenia, Georgia and Azerbaijan.

It is essential to mention that as a result of our research our conclusions witness that we can make suggestions to the authorities of the observed countries regarding which partial indexes positively and which one negatively impact the performance of the country for 2012-2017. It will help countries to develop and implement more purposeful reforms with high efficiency.

The Integral Index of Reforms that we have developed does not have the same disadvantages, that is typical to indexes that are developed and widely used by various international and non-governmental organizations and allows to reflect the results of reforms appropriately.

Another vital outcome of our research is revealing the opportunities and threatens of reforms of social-economic development in different countries, developing strategies that will effectively use opportunities and neutralize threatens.

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