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Analysis of macroeconomic development of Latin American countries

Abstract. To understand the current trends in the economic policy of Latin American countries, such as Mexico, Chile and Ecuador, the authors present and analyse selected economic indicators and statistical data. The authors have considered the changes in the main macroeconomic indicators of the countries with both the highest and the lowest level of economic development. The article contains a correlation analysis of the dependence of GDP of individual countries, such as Argentina, Brazil, Mexico, Ecuador, Paraguay and Bolivia, on the price of copper and oil. It is concluded that the economies of individual countries depend mainly from prices on raw materials which is to be gradually changed in order to reach socio-economic stabilisation in the region.

Keywords: Latin America; Argentina; Brazil; Mexico; Ecuador; Paraguay; Bolivia; Economy; Public Debt; Export-Import; GDP; Oil

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Аналіз макроекономічного розвитку країн Латинської Америки

Анотація. У статті проаналізовано показники економічного зростання країн Латинської Америки, а саме: Мексики, Чилі, Еквадору. Розглянуто динаміку основних макроекономічних показників країн як із найбільш, так і найменш високим рівнем економічного розвитку. Проведено кореляційний аналіз залежності ВВП окремих країн (Аргентина, Бразилія, Мексика, Еквадор, Парагвай, Болівія) від цін на мідь і нафту. Зроблено висновок про те, що економіка країн Латинської Америки залежить від експортних цін на сировину, що має негативний вплив на соціально-економічну ситуацію в нинішніх умовах.

Ключові слова: Латинська Америка; Аргентина; Бразилія; Мексика; Еквадор; Парагвай; Болівія; економіка; державний борг; експорт-імпорт; ВВП; нафта.

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Анализ макроекономического развития стран Латинской Америки

Аннотация. В статье проанализированы показатели экономического роста стран Латинской Америки, а именно: Мексики, Чили, Эквадора. Рассмотрена динамика основных макроекономических показателей как с наиболее, так и наименее высоким уровнем экономического развития. Проведен корреляционный анализ зависимости ВВП отдельных стран (Аргентина, Бразилия, Мексика, Эквадор, Парагвай, Боливия) от цен на медь и на нефть. вывод о том, что отдельных стран зависит от экспортных цен на сырье, что оказывает негативное влияние на социально-экономическую ситуацию в нынешних условиях.

Ключевые слова: Америка; Аргентина; Бразилия; Мексика; Эквадор; Парагвай; Боливия; экономика; долг; экспорт-импорт; ВВП; нефть.

1. Introduction. Latin America is the only region of the developing world which is currently demonstrating GDP growth rates below the world average. Latin American countries suffered maximum losses from the next global shocks. They have increased geo-economic risks. To conduct effective cooperation with the countries of Latin America, it is necessary to know both general and specific trends in their macroeconomic development. These countries are not fully represented in international cooperation. Therefore, it is necessary to search for common ground and tools for effective interaction.

Latin America is undergoing serious changes. On the one hand, the countries of the region deviate from the old standards of economic policy and behaviour on the international scene. On the other hand, the nature of external influence changes. Traditionally, the United States has dominated in the region; now the presence of other world powers is increasing, thereby expanding the field of activity for political manoeuvre.

Despite the difference in the macroeconomic indicators of those countries, it can be said that Latin America has a large and still not fully disclosed resource potential, although it traditionally occupies a peripheral position in the world economy and politics.

In the article, we have chosen the period of 2012-2015 for the analysis of the macroeconomic development of the above-mentioned countries, since this stage is new for us, and it is possible to visually and in real time see the changes in the development of the designated states. In addition, having sufficient statistical data, one can create an objective picture of the analysis of macroeconomic development in Latin America.

2. Brief Literature Review. Among the basic publications on the subject, we can note works by domestic specialists, such as V. M. Davydov (2016) [1]; L. L. Klochkovsky (2014) [2]; L. V. Bychkova, V. M. Kuzmina, and A. V. Pereverzev (2016) [3].

Domestic and Western researchers are actively looking into the methodology of studying macroeconomic development of individual countries by using a single instrument. K. E. Petrov (2009) [4]; C. Borio (2014); W. F. Basset, M. B. Chosak, J. C. Driscoll, and E. Zakrajsek (2014) [6] are among them.

The issues of production growth and macroeconomic risks have been studied by A. Chudik, K. Mohaddes, M. H. Pesaran, and M. Raissi (2016) [7]; A. Baum (2016); C. Checherita-Westphal and P. Rother (2013) [8], and L. Bocola (2016) [9].

The concept of convergent development of the country was proposed, tested and statistically proved by Pablo M. Pincheira (2014) in thirteen regions of Latin America [10].

A number of authors have created general scientific papers that reflect not only the macroeconomic trends in the countries in the context of globalisation, like Radomir Bohac (2016) [11], but also with reference to the macroeconomic development of Latin America as in the Economic Commission for Latin America And the Caribbean (ECLAC, or CEPAL) publications [12] and numerous works of P. Yakovlev (2016; 2017) [13].

It is necessary to note the scientific contribution of foreign researchers to the study of individual countries. Thus, the determinants and other issues of the economic development of Mexico are reflected in the study by Fernando Sanchez Lopez and Jose Nabor Marcelo (2016) [14], Moreno-Brid, Juan Carlos and Jaime Ros Bosch (2010) [15] and McKinsey & Company (2014) [16].

The socio-economic development of Ecuador is described in the works by Banco Mundial (2014) [17] and the collective work by ACDemocracia - UNFPA (2009-2014) [18].

3. The purpose of this scientific research is to analyse individual macroeconomic indicators of the development of Latin America countries based on the example of Argentina, Brazil, Mexico, Ecuador, Paraguay and Bolivia in order to determine the dependence of the abovementioned countries' GDP on individual indicators by applying factor analysis.

4. Results. According to the revealed trends in the macroeco-

nomical development of individual countries, it is possible to predict their further paths of economic development in the structure of the Latin American Integration Association (LAIA, or Spanish ALADI - Asociacion Latinoamericana de Integracion).

The Latin American Integration Association includes 13 countries which can be divided into the groups according to their level of economic development. Argentina, Brazil and Mexico have a more advanced level of development; Venezuela, Colombia, Peru with the middle level of development; Uruguay and Chile that correspond to the lower level of development, and less developed countries among which are Bolivia, Paraguay and Ecuador. Let us consider the basic macroeconomic indicators of the countries representing the most and the least developed groups.

A comparative analysis of the developed countries (Table 1) shows that nominal GDP has decreased in Brazil and Mexico, whereas public debt has risen.

Virtually, all the countries are experiencing a decline in industrial production. The unemployment rate is rising in Argentina and Brazil, which characterises the economy of the studied countries unfavourably with regard to the growth of social tension.

Let us construct indicators of dynamics of the chosen countries. The results are shown in Table 2.

The analysis of Table 2 shows that the growth rate of industrial production has significantly decreased in all the three countries. In Argentina, in 2015 the growth rate of industrial production was 11.1% of the 2013 level.

The main industries in Argentina are engineering, metallurgy, oil refining, petrochemical and woodworking. In Brazil - oil refining and chemical industry, transport engineering and ferrous metallurgy, mining and energy. In Mexico - mining, engineering and medical engineering, automotive, information technology and electronics [20].

A preliminary analysis of the macroeconomic indicators of the countries shows that the highly developed LAIA countries affected the global economic crisis quite strongly. Consequently, their economies largely depend on such a factor as the price of oil.

Let us consider the main indicators of the least developed LAIA countries. The numerical values are given in Table 3.

It can be noted that public debt is quite high in all countries of the Latin American region. However, the less developed countries are significantly less than the more highly developed ones.

For the countries whose macroeconomic indicators are given in Table 3, the balance of imports and exports is negative. In 2015, the volume of imports exceeded the volume of exports in all the countries.

We give the dynamics of these countries in Table 4.

Unlike the more developed countries, this group of countries has shown a fairly sharp increase in public debt over the past 3 years, e.g. Ecuador's debt grew by 40.3%, and a significant decrease in exports (38.7% in Paraguay exports). As in the more developed countries of the region, these countries have experienced a significant decline in the growth rate of industrial production [21-22]. This so far means that these countries are less affected by the fall in the price of oil.

We have performed a correlation analysis between the nominal GDP size of the selected countries and the price of oil and copper. The results of the calculations are given in Table 5.

The main actor in the Latin American copper market is Chile. As for the rest of the countries, excluding Brazil, the dependence of their size of GDP on the price of copper is not significant.

Tab. 1: Macroeconomic indicators of Argentina, Brazil and Mexico in 2013-2015

Indicators	Argentina			Brazil			Mexico		
	2013	2014	2015	2013	2014	2015	2013	2014	2015
The nominal GDP	484.6	536.2	578.7	2190	2244	1800	1327.0	1296.0	1161.0
GDP size by PPP	771.0	927.4	964.3	2422	3073	3166	1845.0	2143.0	2220.0
Industrial production growth rates	2.7	-2.1	0.3	3.0	-1.5	-5.0	3.5	3.8	3.3
Unemployment rate	7.1	7.3	7.6	5.4	4.8	6.4	4.9	4.8	4.5
Population	42.6	43.0	43.4	201	202.7	204.3	116.2	120.3	121.7
Export volume	91.5	67.4	66.0	242.0	225.1	189.1	380.7	398.3	430.9
Import volume	70.5	65.3	60.6	239.6	229.2	174.2	381.6	400.4	434.8
Public debt, % of GDP	39.5	42.7	45.8	56.7	58.9	67.3	38.0	42.1	45.2

Source: [12]

5. Conclusions. Our study has proved that correlation coefficients between the size of the nominal GDP and the prices of oil and copper for Brazil is quite high. According to the Table 2, the growth rates of industrial production declined most significantly for the country. This suggests that the world economic crisis has hit the country's economy the most.

The close dependence of the size of GDP on the price of oil shows the correlation coefficient for Mexico. However, in addition to the extractive industry, the export of information technology occupies the structure of industrial production (according to this index, Mexico occupies the third place in the world). Therefore, the growth rates of its industrial production did not decrease as much as in other countries.

In addition, it can be noted that Brazil, Mexico, Colombia and Venezuela are quite large oil-producing countries. This once again confirms the dependence of the economies of these countries on the emerging world oil prices. A similar strong correlation between GDP and the price of oil is typical for many other countries, e.g. Norway, Canada, Australia, and Russia. And all these countries, as well as Brazil and Mexico, are concerned about the level of oil prices and forecasting the countries' long-term development situation. Eliot's theory allows us to answer many questions concerning such addiction, but it is important for these countries to understand and predict their further course of economic development, gradually reducing the level of dependence on the price of oil.

Forecasting further macroeconomic development of the countries of Latin America, especially of those dependent on the price for oil, it is necessary to remember the following:

- power industry is the basis of any sound economy. Countries that do not have control over oil fields are less economically stable: they are usually highly dependent on hydrocarbon supplies from abroad.
- oil production is a very high-tech production, and Brazil and Mexico are one of the few countries in the world that seek to develop their own technologies for oil production.

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Tab. 2: Dynamics of macroeconomic indicators of Argentina, Brazil and Mexico in 2015 (with 2013 as a base year)

Indicators	Argentina			Brazil			Mexico		
	Absolute increase	Growth rate	Change	Absolute increase	Growth rate	Change	Absolute increase	Growth rate	Change
The nominal GDP	94.1	119.4	19.4	-390	82.2	-17.8	-166	87.5	-12.5
GDP size by PPP	193.3	125.1	25.1	744	130.7	30.7	375	120.3	20.3
Industrial production growth rates	-2.4	11.1	-88.9	-8	-166.7	-266.7	-0.2	94.3	-5.7
Unemployment rate	0.5	107.0	7.0	1	118.5	18.5	-0.4	91.8	-8.2
Population	0.8	101.9	1.9	3.3	101.6	1.6	5.5	104.7	4.7
Export volume	-25.5	72.1	-27.9	-52.9	78.1	-21.9	50.2	113.2	13.2
Import volume	-9.9	86.0	-14.0	-65.4	72.7	-27.3	53.2	113.9	13.9
Public debt, % of GDP	6.3	115.9	15.9	10.6	118.7	18.7	7.2	118.9	18.9

Source: [12]

Tab. 3: Macroeconomic indicators of Ecuador, Paraguay and Bolivia in 2013-2015

Indicators	Bolivia			Paraguay			Ecuador		
	2013	2014	2015	2013	2014	2015	2013	2014	2015
The nominal GDP	9.8	4.1	5.5	0.6	1.3	29.1	91.4	100.5	98.9
GDP size by PPP	58.3	70.4	73.9	45.9	57.9	60.2	157.6	182.0	181.8
Industrial production growth rates	5.6	6.0	3.6	5.6	3.6	5.0	3.1	0	-1.0
Unemployment rate	7.4	7.3	7.4	7.5	5.5	5.5	4.7	4.3	4.8
Population	10.5	10.6	10.8	6.6	6.7	6.8	15.4	15.7	15.9
Export volume	11.5	12.2	9.6	13.7	9.7	8.4	25.7	26.6	18.4
Import volume	9.3	9.9	10.4	11.9	11.3	9.6	26.3	26.7	20.9
Public debt, % of GDP	35.6	35.8	37.5	15.3	17.8	19.9	23.1	27.7	32.4

Source: [12]

Tab. 4: Dynamics of macroeconomic indicators of Bolivia, Paraguay and Ecuador in 2015 (with 2013 as a base year)

Indicators	Bolivia			Paraguay			Ecuador		
	Absolute increase	Growth rate	Change	Absolute increase	Growth rate	Change	Absolute increase	Growth rate	Change
The nominal GDP	5.7	119.1	19.1	-1.5	95.1	-4.9	7.5	108.2	8.2
GDP size by PPP	15.6	126.8	26.8	14.3	131.2	31.2	24.2	115.4	15.4
Industrial production growth rates	-2	64.3	-35.7	-0.6	89.3	-10.7	-4.1	-32.3	-132.3
Unemployment rate	0	100	0	-2	73.3	-26.7	0.1	102.1	2.1
Population	0.3	102.9	2.9	0.2	103.0	3.0	0.5	103.2	3.2
Export volume	-1.9	83.5	-16.5	-5.3	61.3	-38.7	-7.3	71.6	-28.4
Import volume	1.1	111.8	11.8	-2.3	80.7	-19.3	-5.4	79.5	-20.5
Public debt, % of GDP	1.9	105.3	5.3	4.6	130.1	30.1	9.3	140.3	40.3

Source: [12]

Tab. 5: Values of correlation coefficients between the nominal GDP size of and the price of oil and copper in the Latin American countries

Country	Coefficient of correlation with the price of oil	Coefficient of correlation with the price of copper
Argentina	0.319	0.054
Brazil	0.745	0.583
Mexico	0.673	0.292
Bolivia	0.267	-0.023
Paraguay	0.252	0.150
Ecuador	0.473	-0.069

Source: Calculated by the authors

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