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INDICATORS FOR IDENTIFICATION OF DANGEROUS IMBALANCE IN AN EMERGING TYPE ECONOMY

The article considers the problem of formalizing internal and external factors (indicators) of macroeconomic imbalances, and analyzes their influence on the likelihood of crisis in the emerging economies. The main purpose of the article is to monitor the economic condition and identify and choose the potential predictors of dangerous economic imbalances for the group of countries (Estonia, Latvia, Ukraine, Armenia), that are similar in terms of emergent properties. To identify this group of countries among 57 countries, the authors have used cluster analysis. With the use of the modern mathematical economic methods (panel data model, concept of exchange market pressure, signal approach) the type of binary regression model was chosen (by minimizing noise to signal ratio), and the models where the dependent variable is a binary response, were developed (in particular, probit-model). Those models reflect the dependence of the likelihood of financial crisis on a number of economic indicators. The authors propose various approaches for detecting the indicators of dangerous economic imbalances. Those approaches provide a modeling tool for the quantitative analysis of macroeconomic policies in terms of the prevention of negative trends in the economic development in Ukraine and other partner countries, which are characterized by similar levels of emerging economies. The results of the identification and estimation of the levels of economic imbalances in Ukraine (in accordance with the criteria proposed in the article) show the presence of certain imbalances and the economic instability during 2003–2012 (and substantial sectoral imbalances in 2013). The authors have calculated a high (up to the level of 91%) likelihood of a financial crisis in Ukraine for the negative (inertial-risk) scenario. The results of the investigation may be used by officials, civil servants (those involved in determining this country's macroeconomic policies, economic management and forecasting the future economic performance) as a tool for the timely identification of threatening macroeconomic imbalances as a means to detect and prevent a crisis.

Keywords: indicators of dangerous economic imbalances; financial crisis; emerging economies; panel data model; concept of exchange market pressure; signal approach; binary regression model

J E L : C14; C33; E61; P00

Among the most important risks, which, under modern conditions, are characterized by catastrophic consequences, are threatening economic imbalances [1] that may lead to declining economic dynamics, volatility of financial markets, lowering of the standards of living and spread of the crisis. A large number of outstanding economists, in particular



B. Bernanke, L. Salahitdinova, I. Deniz, and L. Levyen, prove that it is exactly the global and regional economic imbalances that became factors in the spread of the global financial crisis of 2008-2009.

Economic imbalances are deviations of economic dynamics from sustainable trajectory (equilibrium) development arising from the impact of both economic (financial, investment, social, etc.) and political factors, which ultimately lead to local or global disparities. Availability of threatening economic imbalances in the global economic system demonstrates the need for their timely identification and prevention of adverse effects.

The world practice uses different approaches to the identification of economic imbalances, but one can highlight certain indicators that are most often found in all models, namely the ratios: of public debt to GDP, of budget deficit to GDP, and of trade balance to GDP. For quantitative analysis of imbalances levels, it is also advisable to assess the following indicators: in the real sector - consumer price index, producer price index, growth rate and the GDP deflator; in the public sector: revenues and expenditures, the deficit (surplus) of consolidated and state budget; in the monetary sector - weighted average interest rates on loans and deposits, inflation, exchange rate, foreign currency reserves, public debt; in the foreign sector - current account of the balance of payments, exchange rate, foreign debt and so on.

And the external factors are: revival of the global crisis, shock changes in energy prices, the degree of financial stability and access to financial resources, geopolitical situation, international political relations, global supply and demand, inter-country trade barriers, natural disasters, environment etc [2, 3].

The indicators of economic imbalances will be considered those economic indicators, whose change or move beyond their established limits indicates an increase or decrease in the probability of a crisis. In this case, the threshold values are defined as quantitative parameters describing the permissible level of security of an economic system. The calculated indices of the above mentioned parameters are compared with their "threshold" values and thus characterize the critical economic imbalances. Evaluations of economic imbalances are foundations for prudent macroeconomic policies in the unstable economic situation both for developed and emerging markets.

Thus, indicators for the identification of economic imbalances in the G-20 countries were identified at Paris summit (19-20 February 2011), while their selection, as stated in [1, 4] was made within the following areas: (1) public finances and the state budget (i.e. government debt) were chosen to define internal imbalances; (2) the balance of payments (i.e. current account) was chosen to define external imbalances. The dangerous imbalances include: (a) public debt and fiscal deficits, debt and savings of the private sector, (b) the external imbalance composed of trade balance, transfers and flows of capital, with regard to the impact of exchange rate policy, monetary credit policy and so on.

As regards the measurement of marginal values of selected indicators (potential precursors of threatening economic imbalances), in Washington (USA, April 15, 2011), it was decided that all the G20 countries should be monitored with the use of the following approaches [1, 4, 5].

The first (structural) approach is based on economic models inherent in a particular country. Analysis of the economy of a G20 country is based on the consideration of this country's specific characteristics, such as: development dynamics, level of the production of consumer goods, demographic condition, oil and so on.

The second (statistical) approach analyzes the economic condition of a G20 country based on historical trends.



The third (statistical) approach involves comparing the current value of the indicator for the economy of the country concerned with the value, which is the average for a group of countries at the same level of economic development (countries selected from G20).

The fourth (statistical) approach consists in comparing the current value of the indicator for the economy of the country concerned with a control value, which is the average for all G20 countries.

The above mentioned statistical approaches are based on data for 1990-2004, because this period precedes the considerable growth of external imbalances. Besides, for the period from 1990 to 2010, reference values are calculated to be used as a supplement and a medium term forecast is made to be compared with the values obtained from the above four approaches.

For further evaluation, those G20 countries are selected whose indicators of economic imbalances greatly deviate from the indicative values, at least in two of the above approaches and two of the three sectors (foreign, financial, private). According to [1], requirements as to the moderate level of economic imbalances (imbalances should not exceed the indicative values) are set those G20 countries, which produce at least 5% of the total G20 GDP. These economies are treated as systemic, because of the high probability of crisis transmission from them to the rest of the world. According to representatives of the G20, such an approach will "take into account the greater potential impact of major economies."

As a result of the application of the above mentioned monitoring system for the G20 economies, it was determined that, to assess the stability of the imbalances, we should choose seven systemic economies, namely [1]: (1) China (high level of private sector savings surplus and current account balance); (2) France (high deficit of the current account and public debt); (3) Germany (high government debt and surplus on the current account balance), (4) India (high private sector savings and fiscal deficits), (5) Japan (high public debt and private sector savings), (6) United States (considerable fiscal deficit and deficit of the current account of the balance of payments), and (7) UK (low private sector savings and high public debt).

A detailed study of the problem of economic imbalances is extremely important for timely warning of crises and negative trends of economic development. In recent decades, economic imbalances and external shocks have been particularly characteristic for developing economies and emerging markets, because their economies are "... less diversified, have lower savings rate, and less developed national financial systems" [1, 6]. Besides, those markets are largely open, and the existing mechanisms that should mitigate the impact of the factors of economic instability and block their distribution channels, are not enough efficient and need further development. The feasibility of quantitative analysis exactly of emerging markets¹ is also due to the strengthening of their role in the modern world economic system [7].

In scientific studies on Ukrainian economy, some researchers recognize Ukraine as an *emerging market economy* [8, 9], while others call it a marginal market (*frontier market*) [10, 11], which is treated as a kind of emerging market.

¹ Emerging type economies are those developing economies, which are characterized by a large effective area, high economic growth rates, instable overall political situation, and volatility of foreign economic activities. From the investigation provided in [12], one can conclude about the presence, in Ukraine, of characteristics and capabilities for the inclusion in this group.



To determine Ukraine’s place among the 57 countries in terms of emerging market [12], we performed a segmentation of the countries into homogeneous groups based on cluster analysis as of late 2009. We considered three versions of clusterization.

In the *first variant*, we proposed the following classification criteria: index of political instability, GDP per capita, index of ease of doing business, investment risk, economic growth, global innovation index, and the country’s area. As a result, we obtained a dendrogram (Fig. 1), where, by the above mentioned categories, a group of countries was selected, which are similar to Ukraine in terms of emerging-market features.

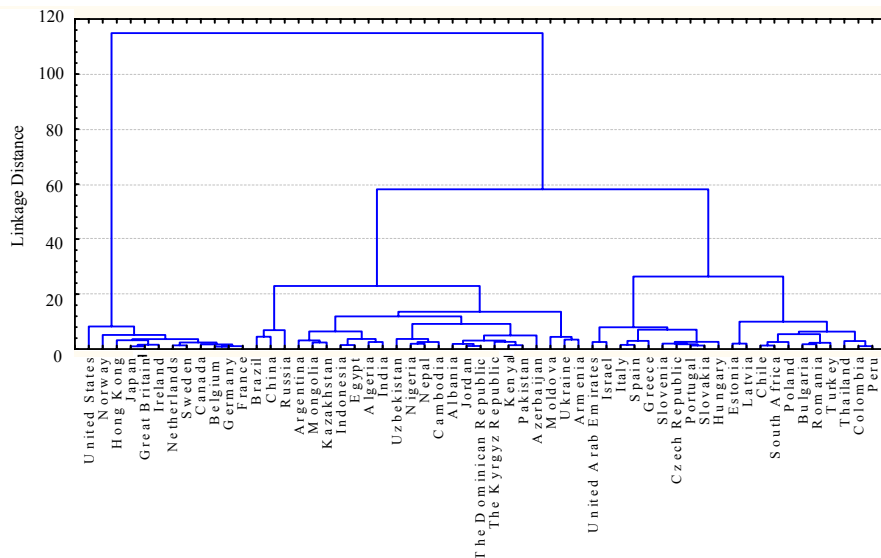


Fig. 1 Clusterization of the countries by main characteristics of emerging markets

Source: author’s calculations.

In the *second variant*, the country’s area was excluded from the list of criteria. And, after the cluster analysis, we obtained a dendrogram (Figure 2), where, in Ukraine’s group, were Estonia, Latvia, and Armenia.

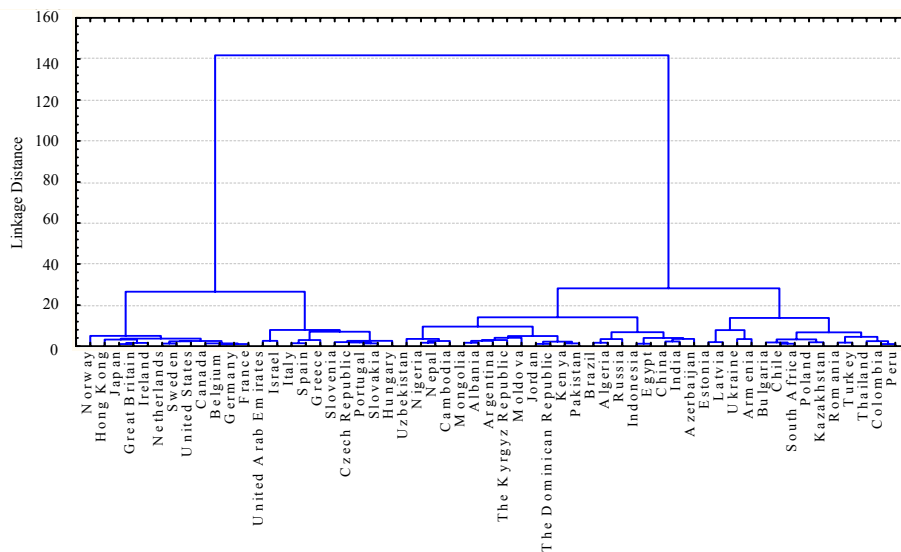




Fig. 2 Clusterization of the countries by main characteristics of emerging markets (less country's area)

Source: author's calculations.

In the third variant, the country's area was replaced by a synthetic indicator of "effective" area (GDP per 1 sq. km). In this case, the cluster analysis produces a dendrogram (Fig. 3), where in Ukraine's group again are Estonia, Latvia, and Armenia.

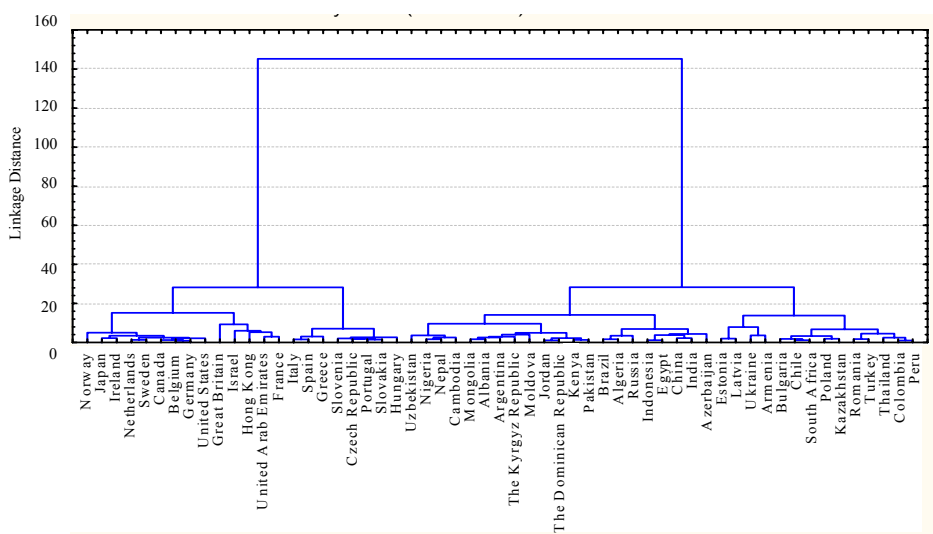


Fig. 3 Clusterization of the countries by characteristics of emerging markets (including "effective" area)

Source: author's calculations

From the experimental results obtained, it follows that, in the second and third variants, Ukraine may be placed in the group of countries, where Estonia and Latvia, by FTSE² classification, have characteristics of developed emerging markets (*advanced emerging markets*), and, in the first variant, in the group of countries where Moldova and Armenia are classified as *secondary emerging markets*.

Overall, based on the results of our cluster analysis, Ukraine has a potential for formal admission to the relevant group of countries with emerging type economies (e.g., the group of marginal markets (*frontier markets*)), although the identified potential in Ukraine will probably fail to realize in the next future due to the extremely complex conditions primarily caused by the economic situation of political tension and social unrest in the country and, according to FTSE, a noticeable lag in the development of the national stock market [13].

It is exactly for the group of countries consisting of Ukraine, Latvia, Estonia, and Armenia which, by the results of the clustering are characterized by similar levels of emerging economy, that we made selection and evaluation of the indicators identifying dangerous economic imbalances. The analysis of these indicators can be considered as a possible scenario of the early warning of negative trends in the domestic economy.

Emphasis should be placed on the complexity of the task of selecting the indicators, which are potential precursors of threatening economic imbalances, and evaluating their marginal values, as suggested in foreign and domestic scientific literature [1, 3, 4, 7, 14-

² Financial Time Stock Exchange.



21], which shows the advisability of the solution of this problem for a certain country from a selected group of homogeneous countries because of their difference by: geographic location, historical evolution, area, provision of resources, degree of integration in the global trade, level of economic development, economic structure, etc., using special methods of quantitative analysis, including econometric models of panel data.

As stated in [22], the criteria of model estimates based on panel data (i.e., using crisis episodes in other countries) should take into account the specifics of national economies and the corresponding dynamics of the indicators of financial stability before the crisis in different countries.

In this study, the selection of indicators identifying dangerous economic imbalances and their limit values is carried out for the group of the above mentioned countries by building models of longitudinal data, allowing, first, realizing the number of observations by combining different time samples; and secondly, conducting inter-country comparisons and identifying the key lessons of the crisis.

Regarding the choice of indicators, which are potential precursors of threatening economic imbalances in the group of analyzed countries (Ukraine, Latvia, Estonia, and Armenia), we adapted the approach proposed in [23]. In particular, given the fact that, in the study of the channels of crisis transmission, dependent variable Y is binary, that is, takes the values 1 or 0, to solve the problem of selecting the indicators of threatening economic imbalances, one should use a regression model with binary output indicators (e.g., *probit*- or *logit*-model), which reflects the dependence of the probability of the onset of a financial crisis on a number of economic indicators.

Given that the choice of indicators in the study was carried out for a group of countries with emphasis on longitudinal (panel) binary models, the general form of a binary type model for panel data is as follows:

$$y_{it}^* = \beta' x_{it} + \varepsilon_{it} \quad (1)$$

$$y_{it} = \begin{cases} 0, & \text{if } y_{it}^* \leq 0 \\ 1, & \text{if } y_{it}^* > 0 \end{cases}$$

where: y_{it} – is the probability of the onset of a financial crisis; $t = 1, \dots, T$ – years, $i = 1, \dots, n$ – countries, x_{it} – exogenous changes (indicators of economic imbalances), and ε_{it} – a random variable.

The information base for the evaluation of the model parameters have been formed from annual data by International Financial Statistics of the IMF for 1999-2012. The indicators are ratios of nominal or index indicators.

The necessary conditions for constructing models with binary indicators are: (1) formalization of the binary dependent variable, i.e. assigning it to one of the two values: 0 or 1; (2) determining the exogenous variables to be included in the model, and (3) choice of the type of the binary model based on the criterion of minimization of "noise/signal"³ relations.

To meet the *first condition*, we propose to determine the dependent variable y based on the index of exchange market pressure (IEMR), which shows the changes in the exchange rate resulting from the lack of activity of the central bank in terms of interventions on the exchange market or raising the interest rates to protect the currency's stability [24]. In one our study we present Ukraine's *IEMR* as the weighted average index of the change in the

³ Under "noise", we will understand an erroneous (unproductive) signal, and under "signal" – a correct (productive) signal about crisis onset [22].



relationship between the NBU's official exchange rate, forex reserves and average rates of all the tools.

As a result of the model calculations [23], for Ukraine's economy, the crisis years can be considered the years 1999 and 2008, which approximates to the corresponding retrospective. For the remaining countries (Estonia, Armenia), that participated in the study, the identification of crisis periods is based on [25], which produced the following results: the crisis year in Armenia can be considered the year 2009; in Estonia – the years 1999, and 2008-2009; and in Latvia - 2009 and 2010.

In accordance with *the second condition*, for selected group of countries, the indicators - potential precursors of threatening economic imbalances were determined as a result of a dynamic analysis of the following statistical data: (1) balance of the real sector (GDP); (2) monetary review; (3) state budget; and (4) balance of payments.

In this paper, model type (1) is considered, on the one hand, as a general model for longitudinal data (*pooled model*), i.e. a regression model for a longitudinal data set, and, on the other hand, as a panel data model with one-dimensional error component (model with fixed and random effects). From the models considered and on the basis of specific tests (F-test and Hausman test), we selected the best specification for a longitudinal data model whose components are considered as indicators - potential predictors of the occurrence of threatening economic imbalances in the group of countries considered, particularly in Ukraine, Armenia, Estonia, and Latvia in terms of key macro-balances and are defined as exogenous variables of Model 1.

So the first to construct was the model of longitudinal data with a common intersection (*pooled model*). To select the best combinations of indicators, we analyzed the one-, two-, three-, and four-factor probit-models for longitudinal (panel) data. The equations were selected as a result of the presence of the closest linear relation between the dependent binary variable Y and the independent variables, i.e. the largest value of McFadden statistics (*McFadden R^2 statistics*), which is analogous to R^2 for linear regression.

Another requirement for the selection of the model lies in the presence of significant explanatory variable, i.e. z-statistic value for this variable had to stay outside the critical region (for the number of degrees of freedom $k = 52$)⁴. In our study, the level of statistical significance α (i.e., the probability of making an error of the first kind) was selected at 10%. In addition, the equations included only those variables between which there was no close relationship (correlation coefficient was less than 0.7).

According to *the third condition*, the type of binary choice model is defined either by the function or standard normal distribution (probit-model) or that of logistic distribution (logit-model). Given the fact that, in practice, there is no strict rule for the choice of a particular model, it is theoretically difficult to choose between logistics and normal distribution. And, as for the samples with little distribution of explanatory variables, the qualitative conclusions obtained using probit- and logit-models coincide, in our study, only longitudinal (panel) probit-models were constructed. The implementation of the method was carried out using an econometric application "*E-Views 6.0*" and the set of statistical applications "*StataSE*".

To select the best of the constructed multi-factor models, we used the methodology of signal approach [16], which provides for the calculation of the following indicators: the number of quarters when correct signals were given about the crisis onset (A); the number of quarters when the indicator gave a wrong signal or noise (B), the number of quarters when there was no crisis signal and the crisis was present (C), and the number of quarters, when no crisis signal was given and the crisis was absent (D).

⁴ The critical values of z-statistics at the level of significance: *** 1% (2.676), ** 5% (2.008) * 10% (1.674).



The use of data relative to A, B, C, D, made it possible to rank the indicators in accordance with their ability to predict the onset of economic crisis. To do this, the following indicators were calculated: $A / (A + C)$ - the ratio of correctly predicted crises to the total number of crisis episodes; $B / (B + D)$ - the ratio of wrongly predicted crises to the total number of crisis episodes; $(B / (B + D)) / (A / (A + C))$ – noise indicator; $A / (A + B)$ – conditional probability of crisis, that is the probability of financial instability onset if signal is given; $(A + C) / (A + B + C + D)$ - unconditional probability of crisis, i.e. the ratio of crisis periods to total number of observations; and $(A / (A + B) - (A + C) / (A + B + C + D))$ - the difference between conditional and unconditional crisis probabilities.

According to the methodology of signal approach, when choosing the best model, the following criteria can be applied (or one of them in case of similarity of the obtained results): (1) the conditional probability should exceed the absolute probability; (2) the ratio «noise / signal" should be much less than one but greater than zero. These criteria were used to select the best from the two-, three-, and four-factor models (further increasing the number of factors would have led to a breach of the requirement $(n \geq 3 \cdot k)$ for the ratio between the number of factors (k) and the number of observations (n) for the period of 1999-2011).

So, assuming that threatening imbalances are the direct cause of the crisis, but also using the concept of index pressure on the currency market, the class of econometric models of longitudinal binary type [23] and signal approach [17], we have concluded that the most adequate for the purposes of prediction, in our study, is the four-factor (panel) probit-model with the following ratios of indicators defined as its elements (x_{jit}):

(1) GDP growth (%) to the growth rate of the money supply and quasi-money (x_{1it}); (2) forex reserves (including gold in US dollars) to exports of goods and services (current prices in US dollars) (x_{2it}); (3) credit to private sector (relative to previous year) to inflation (CPI, %) (x_{3it}); and (4) loans secured by banking sector (current prices, US dollars) to GDP (current prices, US dollars) (x_{4it}).⁵

The linear form for this model is:

$$x_{jit}^T \beta = 2,44 - 3,12 \cdot x_{1it} + 0,9 \cdot x_{2it} - 1,87 \cdot x_{3it} + 1,82 \cdot x_{4it} \quad (2)$$

where: x_{jit} is value of j^{th} factor for i^{th} country during t^{th} period of time $\left(j = \overline{1,4}, i = \overline{1,4}, t = \overline{1,13} \right)$, and $\beta = (\beta_0, \beta_1, \dots, \beta_4)^T$ – vector of model parameters estimated by maximum likelihood.

The method of assessment of the marginal values of the indicators of economic imbalances, which is shown in the article, consists in adapting and testing the corresponding G20 methodology for selected emerging-type economies [1, 4, 5], for which purpose, first, the average values of selected parameters for the calculation of economic indicators of threatening imbalances were calculated (for the period of 2000-2004), and

⁵ Indicators are selected in accordance with the approach described in [26].



then their limit values (respectively *max* and *min*) were evaluated using the formula: indicator's average value $\pm 2 \cdot$ standard error (Table 1).

Table 1

Limit values of indicators - potential predictors of negative trends (model 2) of emerging-type economies for the cluster group that includes Ukraine

Country	Ratios of indicators							
	x_{1it}		x_{2it}		x_{3it}		x_{4it}	
	min	max	min	max	min	max	min	Max
Armenia	0,6847	1,2193	0,4735	0,7278	0,6310	1,5338	0,0387	0,1233
Estonia	0,4802	1,3078	0,1636	0,2191	0,9584	1,6133	0,2720	0,6368
Latvia	0,8072	1,0571	0,2782	0,3790	1,2650	1,5209	0,1514	0,5939
Ukraine	0,6272	1,0119	0,0534	0,3058	0,9047	1,7160	0,2062	0,3573
Whole group	0,6095	1,1894	-0,0269	0,6770	0,8494	1,6864	-0,0185	0,6134

Source: author's calculations.

Here we assume that, for a group of countries, the crisis signal arrives when any two of the four selected indicators exceed the prescribed limit values, and for an individual country, the situation is dangerous if at least three of the four indicators exceed them.

The reliability of the results obtained was verified by the criterion of "noise/signal" (used to determine how much the right "signal" of the crisis onset is distorted by the "noise") for the group of countries considered, and for each country separately. Thus, for Armenia, the figure was 0.0833, Estonia - 0 (number of false signals about the crisis equals zero), for Latvia - 0.2728; for the whole group of countries - 0.3182, and for Ukraine - 0.909 (very close to unity), which prevented adequate identification of crisis periods in Ukraine's economy.

Given the fact that the use of the above approach is not effective for Ukraine's economy, we made a transition to the class of panel data models with fixed and random effects, which made it possible to consider those properties, which are likely to affect the deployment of negative trends. As part of the developed model, we used, as variables, the ratios of the following macroeconomic indicators:

(1) GDP growth (%) to the rate of growth of money and quasi-money,% (x_{1it}) (2) loans secured by banking sector (current prices, US dollars) to GDP (at current prices in US dollars) (x_{4it}); and (3) bank loans (increase over previous year, %) to inflation (consumer price index, average annual, %) (x_{5it}).

Based on the *F*-test and *Durbin-Hausman-Vue* test, we proved that panel data model with fixed effects has better quality characteristics than the model (*pooled model*) with a total cross section (*F*-test showed that the values of the unique sections have statistically significant differences between each other) and the random effect model (no reason to reject the null hypothesis of intergroup correlation so it is inappropriate to introduce random effects into the model). And the linear model takes the form:

$$x_{jit}^T \beta = -4,98 \cdot x_{1it} + 2,61 \cdot x_{4it} - 3,10 \cdot x_{5it} , \quad (3)$$



where the variables chosen as indicators - potential predictors of negative trends in the economy, as in the previous case, include ratios: (x_{1it}) GDP growth (%) to the growth rate of money and quasi-money (%), and (x_{4it}) bank loans (at current prices in US dollars) to GDP (at current prices, US dollars). Limit values for the new variables are presented in Table. 2.

Table 2

Limit values of indicators - potential predictors of negative trends (model 3) of the development of emerging-type economies in the cluster group consisting on Armenia, Estonia, Latvia, and Ukraine

country	Indicators ratios					
	x_{1it}		x_{4it}		x_{5it}	
	min	max	min	Max	min	Max
Armenia	0,6847	1,2193	0,0387	0,1233	0,5809	1,4789
Estonia	0,4802	1,3078	0,2720	0,6368	0,9542	1,6284
Latvia	0,8072	1,0571	0,1514	0,5939	1,2464	1,5029
Ukraine	0,6272	1,0119	0,2062	0,3573	0,6934	1,5376
Whole group	0,6095	1,1894	-0,0185	0,6134	0,7530	1,6526

Source: author's calculations.

In this case, the calculated values of the criterion of "noise/signal" are as follows: for Armenia - 0.0833, for Estonia - 0.3000, for Latvia - 0.2728 and for Ukraine - 0.7273. In general, for the whole group, the relationship of "noise/signal" was estimated at 0.5455. Thus, the obtained values exceed zero, and are significantly and sufficiently lesser than unity, so the proposed three-factor model (3) can be considered suitable for predicting the likelihood of crises in the selected emerging-type economies and evaluated thresholds can be used for early warning of threatening economic imbalances.

On the basis of binary choice models and the concept of index pressure on the exchange market, we also developed a three-factor probit-model to assess crisis transmission channels and identified additional indicators of the spread of negative trends in Ukraine's economic development [23]. In this model, the indicators include: national stock indices during period t ($PFTSt$); Brent index of oil price ($ICE\ Brent$), USD/barrel ($PETROLEUMt$); and the ratio of current account balance to GDP (CA_t). These macro indicators were used to assess the likelihood of economic crisis in Ukraine in the short term based on three forecasting methods: expertise (option 1), extrapolation (option 2), and simulation (option 3), whose results are presented in Table 3.

Table 3

Forecast of the likelihood of financial and economic crisis in Ukraine in 2014

Forecast periods	Variant 1	Variant 3	Variant 4
II qua 2014 p.	0,2679	0,9003	0,2303
III qua 2014 p.	0,4847	0,9105	0,3641
IV qua 2014 p.	0,7498	0,9096	0,5475

Source: author's calculations

The results of experimental calculations for the developed models have shown that, in the negative scenario of the macroeconomic situation in Ukraine, there is a high likelihood of financial crisis in Ukraine in 2014 (at up to 91%).

On the whole, the estimated indicators of economic imbalances in 2013 signaled the presence of general macroeconomic imbalances in Ukraine, which gives reason to expect a decline in economic dynamics in 2014. Increased prices for energy resources, unstable



political situation, and intensification of inflationary processes have caused a decrease in aggregate supply and emergence of imbalances in the real economy.

In the foreign sector, the inflow of investments into Ukraine continues to decrease, and the balance of the current account amounted to -8.2% of GDP in 2013, which exceeds the upper criterion proposed by the Procedure for the Determination of Macroeconomic Imbalances in the EU [2]. Since the beginning of 2014, a significant devaluation of the hryvnia has taken place followed by the acceleration of the dynamics of consumer price index and producer price index, excess of goods imports over exports, and lack of foreign investment, which indicates an imbalance in the external sector.

In the budget sector, the budget deficit, in 2013, exceeded 3% of GDP, so, in the short term, a discretionary fiscal policy will be conducted, because there is a high risk of failure to meet the planned budget of Ukraine in 2014. The monetary sector too should be considered unbalanced: real average annual weighted rate on credits of commercial banks, compared to 2012, has not changed significantly, however, it is quite high as it is; due to negative economic expectations, an outflow of funds from the banking sector is observed, but more liquid monetary aggregates, especially M0, are increasing, which aggravates macroeconomic instability in the monetary sphere.

Besides, there are risks and threats that can cause a negative scenario in 2014-2015, with unpredictable and devastating consequences for Ukraine's economy, among which: the growing influence of destructive force majeure shocks from the outside world on economic processes in Ukraine; termination of the flows of foreign investment in the absence of guarantees of capital security and phasing out of investment plans by foreign companies, deterioration of external economic environment due to the fall on the global commodity markets; growing unemployment, shortfall of planned budget revenues, worsening problems of the balance between central and local budgets; the spread of import substitution policy in the trade partner countries, which will lead to losing significant segments of the global markets; a significant increase in the state budget deficit and cash deficits in the Pension Fund and other funds of state social insurance and in National Joint-Stock Company "Naftogaz of Ukraine"; increased devaluation trends on the exchange market, rising inflation; continued low credit activity of commercial banks, the spread of insolvency in the real economy, a major money issue for the financing of the budget deficit; further increase in domestic debt without adequate use of funds for economic modernization; in the context of the Association Agreement with the EU, the EU's refusal to provide necessary and sufficient financial and technical assistance to Ukraine during the transition period to adapt the national economy to the conditions of the European market and implementation of the provisions of Association, primarily the introduction of new standards, which are applicable in the EU.

Continued political struggles would lead to slower economic dynamics, as the main engine of growth in 2014 - domestic consumption - would not be engaged: hryvnia devaluation, inflation, lack of money in the budget (for the expected indexation of wages and social benefits on the eve of the elections) would reduce the demand of the population, and the absence/delay of investment income (external and internal) would not provide the necessary lifting industries.

In case of failure of the agreements with Russia, in addition to the phasing out of the projects of intergovernmental cooperation (leading to loss of revenues and jobs) and continuation of trade wars, revision of the gas price and the corresponding increase in production costs is possible leading to a reduction of the competitiveness of Ukrainian products, and loss of various segments of international markets.

In general, the identification of threatening imbalances in key sectors of Ukraine's economy in 2013 indicates the development of the macroeconomic situation in Ukraine's



economy in 2014, most likely, along the pessimistic scenario with a significant slowdown of economic dynamics and spread of the crisis.

Thus, the results of the cluster analysis have proved that, for Ukraine, there is a possibility of formal admission to the group of countries with emerging-type economies (in particular, to the group of marginal markets (*frontier markets*)).

The above considered approaches to identify the indicators of threatening economic imbalances can be used as a comprehensive model tool for quantitative analysis of macro-political measures in the context of the prevention of negative development trends and dangerous crisis situations in Ukraine and its countries, which are characterized by similar levels of emerging type economy.

The results of the simulation of the indicators to identify and assess the levels of economic imbalances in Ukraine by the criteria proposed in the paper showed the presence of certain imbalances and economic instability in the retrospective period of 2003-2012, and, in 2013, significant sectoral imbalances in Ukraine's economy.

The results of experimental calculations for the proposed model show that in the negative (inertia-risky) scenario of the development of macroeconomic situation, there is a high likelihood of financial crisis in Ukraine in 2014 (at up to 91%). Given the fact that Ukraine's economy is currently in decline, threatening macroeconomic imbalances should be timely identified for their prompt detection and prevention of possible crises.

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