ADAPTATION OF UKRAINIAN FINANCIAL MARKET TO THE FOREIGN FINANCIAL MARKET

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Abstract

In the current work we investigation depend of Ukrainian financial markets segments from influences of the external financial market. In the article we propose the methodology of the investigation which includes three main units. The main ideas of these units are recognition of the most influential external financial market by indicators set, forecasting of the tendencies and influences of the foreign financial markets segments, construction of adaptation decision for the regulation of the Ukrainian financial market. We used the VAR models and variance analysis for the determination of the influences foreign financial market. The investigation of MosPrime Index and DAX Index as most influential indicators of external market allowed to define the adaptation type of the stock and credit segments of the Ukrainian financial market.

Keywords: Adaptation, Financial Market, Index, Models, Influence, Stock Market, Credit Market, Forecasting.

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1. Introduction

Last two decades, the globalization process onto the financial market has unstoppable trend. Cross border capital flow, increase labor flow, open new market and its integration into the world economy are the description of the globalization process.

Otmar Issing (2000) recognizes globalization and internationalization of world economy. Global markets are markets in which the law of one price applies, in the sense that it would be possible to buy or sell products for the same price irrespective of geographical location and local circumstances. When products are purchased and sold outside national boundaries, price differentials may remain as long as there are costs specifically associated with cross-border exchange as opposed to exchange within national boundaries. Hence, the process of internationalization of financial markets is only a step towards global financial markets. This distinction between globalization and internationalization seems to apply to financial markets as well as to markets for goods and non- financial services. Over recent decades, financial markets have gained a clear cross-border orientation but, overall, it can be argued that they are still not truly global. [1]

Camilleri (2003) Global financial market activity refers to the transactions and financial flows that occur within bond, equity, derivatives, banking, and exchange rate markets around the world. The importance of the globalization of financial markets lies in the fact that the financing process is an integral part of both commercial and non-profit making activities. The surge in financial market activity during the last years may be attributed to deregulation and technological improvements, which now allow access to worldwide markets at reasonable transaction and information costs [2].

Knight (2006) discusses the consequences of the liberalization of international transactions in financial instruments by many countries. Collectively, these actions have come to be referred to as "financial globalization". The financial crises of the 1990s were often associated with periods of rapid liberalization of financial systems. The episodes highlight the importance of the quality of a country's institutions in achieving a successful liberalization. Governance issues need to be at the centre of public discourse on the role of national institutions and legal systems in the process of globalization. Today we have a better understanding of how factors relating to the organisation of an economy – its legal system, accounting rules, disclosure principles and market practices – influence its long-term economic growth [3].

Thus, the globalization and integration influence leads to the rapid spread of the crisis on the open market. The fluctuations of the external financial markets can destabilize situation onto the national financial market and lead to the local financial crisis. Therefore, the important task of the regulation of Ukrainian financial market is adaptation its segments (stock market, credit market, currency market and insurance market) to the changes of external financial markets.

In this paper, we investigation of the possibility of adaptation of Ukrainian financial market segments to the foreign financial market by following tasks:

i) recognition of the most influential external financial market by indicators set.

ii) forecasting of the tendencies and influences of the foreign financial markets segments

iii) construction of adaptation decision for the regulation of the Ukrainian financial market

2. Methodology

In this paper we use following algorithm which includes three units (fig. 1).

### 2.1. Monitoring unit of external financial market.

The purpose of this unit is to investigate the external financial markets and determination of the most influential markets and segments. In this paper we understand complex procedures for monitoring, evaluating current transformations managed object and purpose of those changes to achieve the specified parameters of its development. Monitoring of external financial markets can be used for the investigation of the fluctuation onto the influential financial markets and segments.

On the first stage of this unit, we investigate the most influential financial market. The results of this stage are the hypothesis of the influential markets. We propose three indicators for the constructing of this hypothesis:

i) of the total amount turnover, which reflects the amount of import and export between countries and, consequently, the onset of currency relations between countries

ii) the part of public debt external Greyhounds. Those countries which Ukraine has a large external debt have forced the impact on the economy of Ukraine and according to its financial market

iii) the share of foreign currency, which carry trade operations and Ukrainian national debt. As a specific currency belonging to the country, according domestic policy change can lead to changes in the exchange rate and foreign exchange reference Ukraine, which is reflected in the dynamics of financial markets.

Figure 1. Algorithm of investigation of adaptation of Ukrainian financial marker
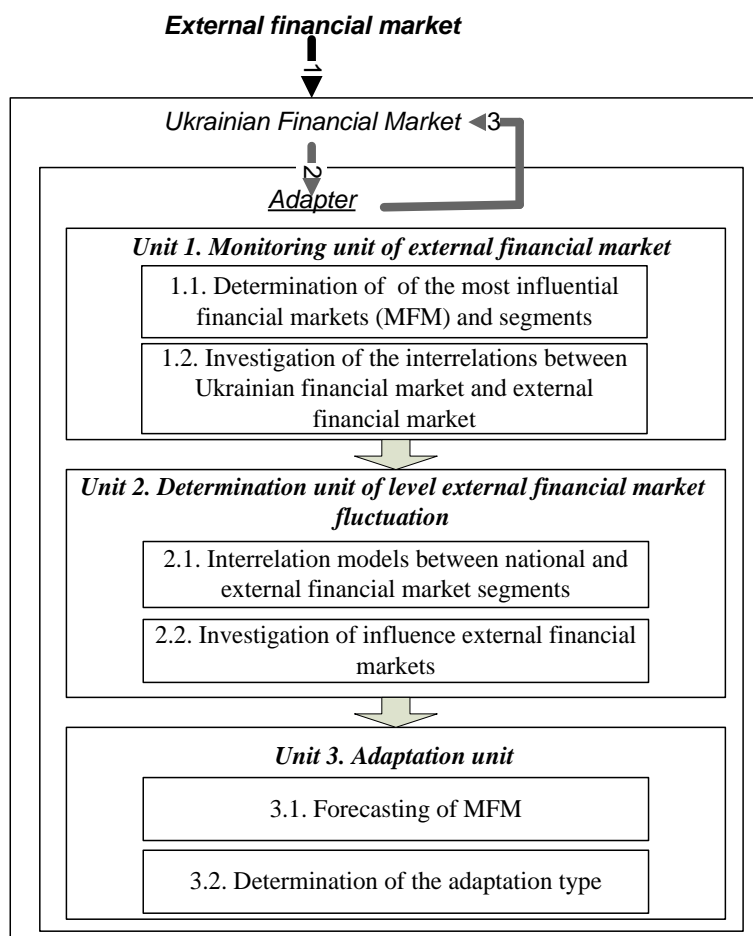
To determine the financial markets that are influencing the financial market of Ukraine to hold the ranking for three indicators selected countries. It is necessary to determine the rating on a separate index for the rule: the worst rating is "1", each improvement leads to increased rating to "1"

$$R^{all} = \frac{\sum_{i=1}^{3} R_i}{3},$$

where R_i - ranking countries by i-th index.

For the three countries that have the highest ratings will be hypothesized on the impact of financial markets on the Ukrainian financial market. To prove this hypothesis must using Granger causality test to determine the causes and consequences of interaction. The hypothesis about the impact of foreign markets on financial market of the country by a separate individual country market will be confirmed if the Granger causality test for will cause foreign financial markets onto the Ukrainian financial market.

2.2. Determination unit of level external financial market fluctuation

The purpose of the determination unit is the constructing models of the interaction through the use of VAR-models [4]. In this block cancers solved a following problems:

1) construction of VAR-models of interaction between national and foreign markets segments (stage 2.1);

2) conducting variance analysis to determine the impact of the share of foreign markets at Ukrainian financial market (stage 2.2).

2.3. Adaptation unit

The main idea of the adaptation unit is investigation of the type of adaptation depends from the external market development. To solve this problem, we will use fourth type of adaptations [5, 6].

i) 1st level adaptation. Adaptation due to the high gain contour - this method allows adaptation to strengthen protective circuit system that will reduce the impact of the external influences. From the standpoint of the financial market is seen as closing the market to foreign investors and foreign capital.

ii) 2nd level adaptation. This adaptation calls parametric adaptation. This type is possible

adaptations in general certainty of the future state of the external market that allows to develop a number of effective action to eliminate external fluctuations in the financial market of the country.

iii) 3rd level adaptation. Adaptation is in change the parameters of the required quality criterion. This adaptation occurs when you provide the necessary level of functioning as a dynamic system. Thus, violation of stability due to the influence of external fluctuations requires the formation of a new indicator of stability and then develop effective action to achieve it.

iv) 4th level adaptation - structural adaptation is change the structure of the system depending on the required quality criterion. This adaptation is more complex, as aimed at changing the structure of the financial market. However, it can be used in case of significant destructive fluctuations in the financial market. Thus, the recent financial crisis has led to the need to change the whole structure of regulation of the financial market in the world.

Specify how to adapt to changes in financial market depends on two parameters:

i) level of influence of the external financial market segments;

ii) level of changing of the external financial market segments.

To determine the changing of these levels we use triangular verbal space: high, average, low. Since regulation of the financial market includes both short and long-term aspects and the process of adaptation takes time, it is advisable to consider changing the exponent of changes in annual terms. As an indicator of the work proposed to use the average growth rate over the period. Analysis of the literature [7] allowed to form the critical values for the exponent changes in the external financial market: a high change - the value of the average rate of growth greater than 70%, the average change - from 30% to 70%, low change - up to 30%. The level of influence of the external financial market is characterized by index particle dispersion changes in global change, which is calculated using analysis of variance based on the use of VAR-models. In dispersion analysis [7], the following critical values to determine the effect: a high impact - from 50% to 100%, average impact - from 20% to 50% and low impact of 20% dispersion study.

Combining these two parameters allows us to construct a adaptation matrix (Fig. 2), described in Table. 1.

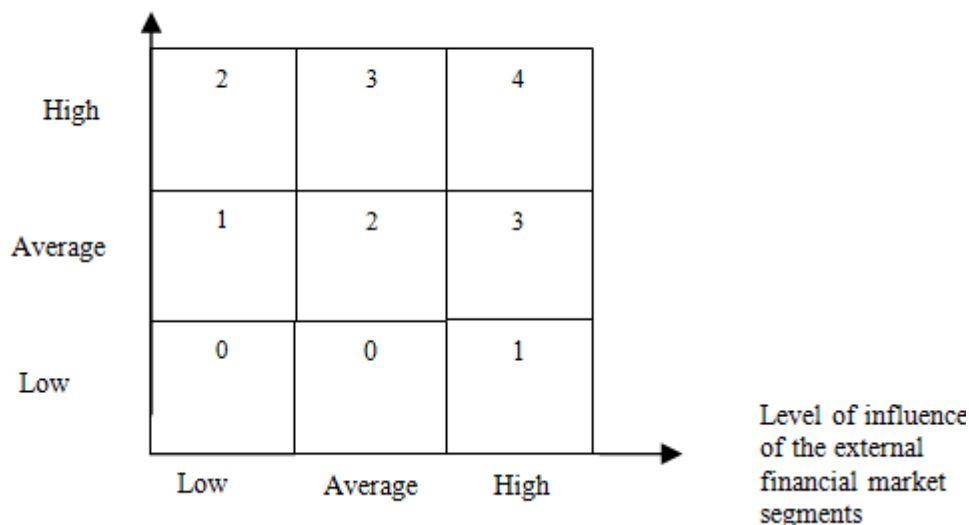**Figure 2.** Adaptation matrix of the Ukrainian financial market to external fluctuations

Table 1. Table of adaptive decisions on financial market

		level of changing of the external financial market segments		
		High	Average	Low
level of influence of the external financial market	High	modification of the parameters of the system to a known value projected external financial market	change the parameters of the required quality criterion	changes in the structure the system depending on the required quality criterion
	Average	adaptation due to the high strengthen contour	modification of the parameters of the system to a known value projected external financial market	change the parameters of the required quality criterion
	Low	without adaptation	without adaptation	adaptation due to the high strengthen contour

3. RESULTS

3.1. Monitoring unit of external financial market.

According to the proposed algorithm of adaptation of the financial market (Fig.) are the three main indicators of openness and cooperation of the national economy with the world economy (Table 2-4).

Table 2. Export and import in Ukrainian economy in 2013

Countries	Trade turnover, % to total turnover
European Union	26,1
Russia	24,6
China	7,7
Turkey	3,9
Belarus	3,9
USA	2,6
Kazakhstan	2,1
Others	29,1

According table 1, more than half of turnover for Ukraine observed between the EU and Russia. A large proportion is also in China - 7.7%, but more than 80% is imports of goods and services.

Table 3. Geographic structure of state debt in 2013

Countries	% state debt to total state debt
USA	57,5
Russia	33,7
China	3,1
European Union	3,0
Others	2,7

Analysis of the geographical structure of the state debt indicates the high dependence of Ukraine from the political relations with USA and Russia. The changes of these financial markets could make destabilizing effect onto the Ukrainian financial markets.

Table 4. Foreign currencies in the Ukrainian economy in 2013

Countries	% of currency into the trade turnover	% of currency into the state debt
USD	75,5	74,7
EUR	11,2	10,7
Special Drawing Rights	-	9,3
RUB	12,5	2,6
UAH	-	1,9
CHF	-	0,2
Others	0,3	0,4

The results of the total rating are show in the table 5.

Table 5. Total rating of most influential economies onto the Ukrainian economy

Countries	Rating				
	Trade turnover, % to total turnover	% state debt to total state debt	% of currency into the trade turnover	% of currency into the state debt	Total
USA	1	5	5	6	4,25
Russia	3	4	4	3	3,5
China	2	3	1,5	1,5	2
European Union	4	2	3	4	3,25
Others	5	1	1,5	1,5	2,25

Thus, analysis of the data in Table 6.23 allows to propose the following hypothesis:

i) Hypothesis 1 (H1). Financial US market has a significant impact on the dynamics Ukrainian financial market.

ii) Hypothesis 2 (H2). Financial EU market has a significant impact on the dynamics Ukrainian financial market.

ii) Hypothesis 3 (H3). The Russian financial market in a significant impact on the dynamics Ukrainian financial market.

The analysis of the sets of business activity indicators of the financial markets allowes to identify following indexes (table 6).

Table 6. Indicators of the business activity of significant financial markets

	Stock market	Credit market	Currency market	Insurance market
USA	Dow Jones index	Libor USD	Interaction in the foreign exchange market by using the exchange rate. These couples exchange is traditional Ukrainian financial market	The insurance market is underdeveloped and there are no preferences for foreign companies, so consider this segment interaction with foreign markets makes no sense
Russia	RTS index	MosPrime		
European Union	DAX index	Libor EUR		

In this paper, we used Granger causality test for the analysis of interaction in stock and credit segments of the financial market. The results of the analysis are show in the table 7.

Table 7. Interrelation between Ukrainian financial market and foreign financial markets

	Foreign markets								
	Lag 1, 2 months			Lag 6 months			Lag 12 months		
	USA	EU	Russia	USA	EU	Russia	USA	EU	Russia
Stock market	+	+	+	+	-	-	-	-	-
Credit market	+	-	-	-	+	+	-	-	+

Note: "+" is interrelation, "-" - cannot be concluded about interrelation

According the dates of the table 7 we could make following conclusions:

i) for the Ukrainian stock market confirmed all three hypotheses (H1, H2, H3) in the short term;

ii) there is a strong integration of the Ukrainian market to global stock space, and marked during the global financial crisis. Thus, the beginning of the crisis in June 2007 led to the crisis on the Ukrainian stock market in December 2007, and then to the crisis in the financial market as a whole. It should also be noted that on 27 February 2008 the US stock market held a "Black Tuesday." On this day, the US stock market reacted to the decline in the market in China and Europe and disappointing forecasts for the economy in the United States. On Tuesday, the Dow Jones industrial index fell by the end of trading on the New York Stock Exchange (NYSE) to 416.02 points.

During the auctions the index lost 500 points or more [21, 41]. It was the largest drop Dow Jones industrial index from the time of September 11, 2001, and after six months there was a strong fall of the PFTS index.

iii) for the credit market also confirmed three hypotheses, but to influence credit markets US and EU only in the short term, and for the Russian credit market - both in the short and in the long term.

3.2. Determination unit of level external financial market fluctuation

We used VAR-models for the determination of the influence external market onto the Ukrainian financial market segments. The variances of effect of foreign markets to changes in the Ukrainian financial market show in fig.3.

Figure 3. Graphically impact on the development of foreign credit and stock markets onto the Ukrainian financial market segments

a) KP3M index   b) PFTS index
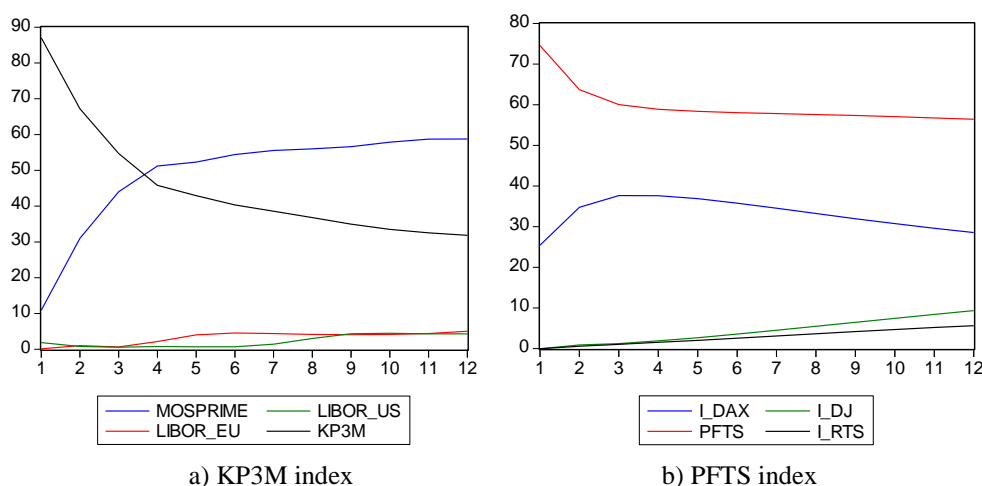
According the Fig. 3 we can make following conclusions:

i) the development of the credit market in Ukraine primarily affects the credit market in Russia; so its influence is growing, and after 4 months lag in the impact of the Russian market more than that of

their own trends. In the long term impact of the share is 58%; influence of other markets is at 8%;

ii) development of the stock market to a greater extent based on its own trends, but 2-3 periods influence the European market increased to 38%. In the long term, this effect is reduced, while increasing the impact of the US stock market to 10%, due to the

larger share of long-term debt in the United States. The influence of the Russian market is minimal.

Therefore, we found two main world indicators which influence onto the tendencies of Ukrainian financial market. There are MosPrime Index influences onto the credit segment of Ukrainian financial market and Dax Index influences onto the stock segment/

3.3. Adaptation unit

Because not all indicators of foreign markets are interrelated with Ukrainian financial market, it is reasonable forecasting the markets that significantly affect the national, there are Russian credit market and the European stock market in Europe. We used ARIMA models and exponential smoothing model for forecasting of these dynamics. As a criterion for model selection was chosen indicator MAPE, calculations are presented in Table 8.

Table 8. MAPE criterion

|	MAPE criterion, %	
	ARIMA model	MA model
MosPrime Index	12,5	5,89
DAX Index	Non significant	4,18

Thus, it is reasonable to use MA model. The results of the calculation of parameters show in the Table 9.

Table 9. Calculation of smoothing

	Start date of the time series S0	Start date of the trend of time series T0	Smoothing parameters α	Smoothing parameters for trends γ
MosPrime Index	27,78	-0,347	0,9	0,5
DAX Index	4294	88,37	0,9	0,1

On the Fig. 4 we can see originally date and smoothing time series.

Figure 4. Forecasting indexes of foreign markets segmets

a) MosPrime index   b) DAX index
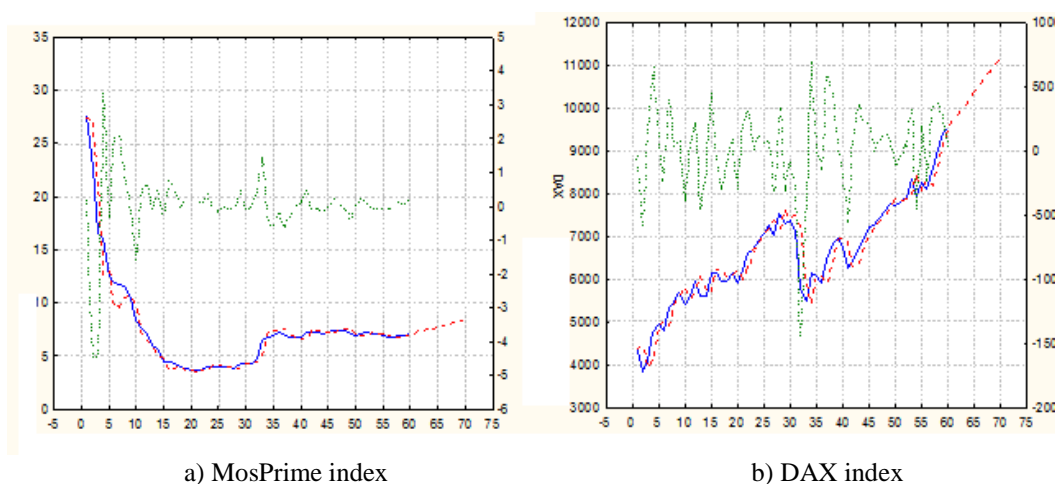
These predicted values suggest growing trends on the Russian credit market and stock market of Europe.

To select of adaption type we must calculate the degree of changes into the foreign financial markets. Thus, the calculation of the average growth rate showed that the tendency of Russian credit market has 17.3% increase per year, and the tendency of European stock market has 16.6% per year. This indicates low change in foreign financial markets. Thus, the matrix will adapt as follows. (Fig.5).

Figure 5. Adaptation matrix of the Ukrainian financial market to external fluctuations

Using the proposed adaptation matrix can be concluded on the necessary adaptive solutions:

i) for the stock market due to the average influence of the environment and its minor changes not need adaptation.

ii) adaptation of the first level is appropriate to implement the credit market, that is, the formation of a protective circuit to close the market, which will create the conditions for its effective functioning..

CONCLUSION

Thus, we have following main results in this article:

1) We offered approach for the investigation of the adaptation of Ukrainian financial market to the foreign financial market which bases onto the two indicators: influence of the external financial market segments and changing of the external financial market segments.

2) The investigation of the external financial market shows that most influential foreign financial segments are Russian credit market (MosPrime index influences with 58%) and European stock market (DAX Index influence with 38%)

3) The analysis of the average growths of MosPrime and DAX shows that the tendency of Russian credit market has 17.3% increase per year, and the tendency of European stock market has 16.6% per year. This indicates low change in foreign financial markets.

4) The determination of the levels of changes and influences of the foreign markets tendencies indicate two types of adaptation for the stock and credit market. Thus, the Ukrainian stock market does not need to be adapted for the fluctuations of the European stock market. Ukrainian credit market has first level adaptation which consist of protective circuit to close the national credit market.

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