Some statistical evaluation on the development of individual groups in the European economies banking sector

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Abstract
Economic development is not possible without taking into account the changes occurring in the financial markets. Thus, one of the key values in the structure of the financial market is given to banking sector. At the same time, in the context of globalization and close economic relationship between the countries, financial turmoil within one country will sooner or later have an impact on the development of individual segments of the global financial market as a whole. The more such events of financial distress, the bigger the level of country integration into the global system of economic and financial relations, the higher the degree of the corresponding negative impact. Based on these individual statistical indicators of banking sectors of different groups of European countries were described in the paper. The distinction and a certain degree of similarity are shown in the processes that characterize the development of banking sectors of different economies. Based on regression analysis the prevailing dependence of banking sectors performance in the various groups of countries in Europe was revealed, as well as some similarities. This allowed us to draw conclusions about defining role in the development of banks inside the structure of banking sector of the economy and the possibility of using some similar approaches to address issues related to the development of the banking sector in each country separately.

Keywords: assets, obligations, banking sector, statisical evaluation, regression

JEL classifications: G21 - Banks; Depository Institutions; Micro Finance Institutions; Mortgages: C15 - Statistical Simulation Methods: General; C21 - Cross-Sectional Models; Spatial Models; Treatment Effect Models; Quantile Regressions

Introduction

In the development of the individual segments of the global financial market, both in terms of the financial markets of individual countries, and taking into account the diversity of the existing tool base of financial resources redistribution, clearly there is a close relationship and mutual influence (Rodrik, 2002). The demonstration of such a relationship can be considered as a corresponding change in the dynamics of the financial flows of various economic sectors (Kuzemin and Lyashenko, 2008; Edison, Levine, Ricci and Slok, 2002), where various flows of banking sector can be referred to a generalized reflection of the movement of such flows (Kots, Lyashenko, 2013; Van Rijckeghem and Weder, 2003; Herrmann and Mihaljek, 2010). This is connected to the fact that banks define a key role in the development of both financial markets and performance of the various sectors of the economy. The impact of the banking sector on the most prevalent areas of economic relations between the different entities is of great important, where such an effect can be negative sometimes.

Thus recent phenomena of financial and economic crisis faced by almost all European countries show a significant concern (Garcia and Nieto, 2005; Taylor, 2009). In addition, these phenomena find their reflection in the movement of various financial flows in their banking sectors, which determine the theme of the chosen direction of the study.

Methodology and data analysis

The review and analysis of the relationships between various financial flows is mostly based on the study of statistical evaluations of individual indicators of the studied processes and on the functioning of various entities (Golovan, Evdokimov, Karminsky, and Peresetsky, 2004; Casu, Girardone and Molyneux, 2004; Williams, and Nguyen, 2005). This is due to the fact that such data are not only displayed but also characterize the dynamics of the studied financial flows.

Among specific financial flows of the banking sector it’s necessary to specify the output financial flows of banks, which are identified with the active conduct of the bank's operations and financial input streams that are associated with the conduct of passive operations of the bank. At the same time among indicators reflecting the movement of such flows and, therefore, the development of the banking sector we should specify: the amount of claims to the non-banking sector of the economy and the banks, the amount of liabilities to non-bank sector of the economy and the banks, the volume of loans granted to non-banking sector of the economy and the banks, the amount of resources on deposit accounts from non-bank sector and banks. It is rational to consider not the absolute values of these indicators but their changes within a certain period of time. This needs to be done in order to fully monitor the changes of the dynamics of the banking sector in their comparative perspective.

Among the banking sectors involved the exploration of different European economies, which can be combined into a single group, will take place. This choice is based on the fact that the banking sectors involved should not only be linked to the level of economic relations, but also to be comparable, at least in the mentality of development of the individual country economies, or at least from the point of view of those countries where such a mentality is declared and is strived for. Therefore, first

of all it's necessary to allocate such groups of European countries, where it is reasonable to consider: the group of developed (group 1) and developing Europe countries (Group 2), which can also be divided into two subgroups: the countries of the former Soviet Union (group 3), and a group of developing countries of the rest of Europe (Group 4). It should be noted that such European groups were allocated according to Bank for International Settlement statistics. It also is important to emphasize that these allocated groups in some way define the impact of the current institutional controls of economic processes on the performance and development of the banking sector in different European countries (Almeida, Campello and Weisbach, 2004; Allayannis and Mozumdar, 2004).

The period from 2000 to 2011 was selected that allowed us to monitor periods of stable economic development along with the periods of crisis demonstration.

At the same time, the confidence of the ongoing statistical analysis is defined by simple descriptive statistics as well as the possibility of regression relations between the analyzed data series. The corresponding regression relations can be derived from the study of the mutual influence between the various indicators that characterize the changes in financial flows in banking sectors within a certain period of time.

Results and discussion

Prior to the direct presentation of the material of this study also we should point out that all the data for calculations, spreadsheets and chart were taken from Bank for International Settlement site and grouped according to the above allocated groups of European countries.

Analysis of the data based on their descriptive statistics

Separate statistical characteristics of data sets which compose parameters of banking sectors in different groups of European countries are shown in Table 1 and Table 2.

Table 1: Statistical characteristics of data sets composed from the indicators that characterize the development of banking sectors in different groups of European countries in terms of banks individual input financial flows

Separate statistical characteristics	Groups of European countries			
	1	2	3	4
Total				
	liabilities			
average	129,98	5,26	2,86	2,40
standard deviation	389,91	31,22	26,68	9,70
median value	139,99	6,52	4,06	0,74
minimum value	-1161,47	-167,79	-133,25	-34,54
maximum value	1212,99	45,19	48,81	23,60
	deposits			
average	114,85	5,20	2,84	2,36
standard deviation	377,23	31,33	26,71	9,72
median value	128,87	6,43	3,90	0,65

minimum value	-1303,72	-168,52	-133,32	-35,19
maximum value	1168,96	45,15	48,69	23,51
Non-banking sector of economy				
	liabilities			
average	30,41	1,46	0,51	0,94
standard deviation	103,09	3,73	1,67	3,71
median value	27,00	1,12	0,16	0,56
minimum value	-252,53	-8,54	-2,58	-12,09
maximum value	317,73	9,41	4,57	10,54
	deposits			
average	28,38	1,44	0,51	0,92
standard deviation	95,10	3,73	1,66	3,72
median value	23,82	1,18	0,19	0,54
minimum value	-249,76	-8,54	-2,58	-12,09
maximum value	276,24	9,66	4,55	10,37
Banks				
	liabilities			
average	99,57	3,80	2,35	1,45
standard deviation	312,26	30,40	26,66	8,28
median value	125,01	6,03	3,97	1,42
minimum value	-908,94	-166,55	-136,66	-29,89
maximum value	1037,60	43,08	51,14	15,48
	deposits			
average	86,47	3,76	2,33	1,43
standard deviation	308,02	30,43	26,68	8,29
median value	108,31	5,93	3,97	1,31
minimum value	-1053,96	-166,82	-136,71	-30,11
maximum value	1008,04	42,99	50,96	15,37

Table 2: Statistical characteristics of data sets composed from the indicators that characterize the development of banking sectors in different groups of European countries in terms of banks individual output financial flows

Separate statistical characteristics	Groups of European countries			
	1	2	3	4
Total				
	Assets			
average	166,77	13,09	3,31	9,78
standard deviation	444,90	28,10	12,35	17,30
median value	187,37	9,30	2,24	8,31
minimum value	-1148,34	-56,57	-35,93	-31,59
maximum value	1559,02	72,90	35,75	47,12
	Credits			
average	121,29	10,22	2,61	7,60
standard deviation	384,72	22,49	10,75	13,21
median value	109,26	5,20	1,44	3,77
minimum value	-1159,29	-28,93	-21,98	-19,67
maximum value	1353,10	68,77	33,63	47,94

Non-banking sector of economy				
	Assets			
average	57,24	5,65	1,21	4,44
standard deviation	102,10	12,45	5,02	8,55
median value	65,87	4,04	0,51	4,31
minimum value	-204,07	-18,46	-9,85	-13,05
maximum value	280,23	36,55	18,26	24,20
	Credits			
average	36,40	4,51	1,08	3,43
standard deviation	67,16	10,17	4,34	6,73
median value	35,54	2,02	0,43	1,25
minimum value	-115,52	-12,27	-5,94	-8,89
maximum value	204,77	37,43	18,02	20,73
	Assets			
average	109,53	7,45	2,10	5,34
standard deviation	371,48	17,11	8,48	10,28
median value	97,43	5,31	1,26	4,33
minimum value	-997,54	-38,11	-26,08	-18,64
maximum value	1278,79	44,51	25,10	31,85
	Credits			
average	84,90	5,70	1,53	4,17
standard deviation	336,07	13,89	7,81	7,87
median value	53,99	3,91	0,68	3,83
minimum value	-1061,90	-25,84	-22,10	-16,29
maximum value	1158,36	39,78	22,83	31,26

Table 1 and Table 2 show that statistical characteristics of these data series, which compose different indicators displaying the development status of the banking sectors of economies in certain groups of European countries, are distinguishable from each other. This presupposes the statistical distinctiveness of such data sets, and therefore provides a basis for the construction of a regression to identify the relationship between the studied parameters.

However, despite the significant difference in the values of descriptive statistics of the test data series it is also important that there are strong economic linkages between the financial flows of the banking sectors in different groups of European countries. In particular, the current trend in the changes of the total assets of the banking sectors can be a the reflection of the demonstration of distress economic relationships between different groups of European countries (Figure 1). This choice of further consideration is made on the basis of:

Bank assets are an integral part of the key parts of the balance that shows trend and efficiency of its banking activities in general,

assets are the reflection of not only active bank operations effectiveness, but also the efficiency of the use of borrowed funds as a result of passive operations, where active and passive operations are considered to be the basis of banking activities, the basis for the banking sector development.

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Chart 1 Changes dynamics of overall assets in banking sectors of economy in different groups of European countries.

Table 1 shows that the changes trends in the total assets of the banking sector in certain groups of European countries are comparable, despite the substantial differences in the extent of such changes. In the period 2000-2007, there is a general positive trend in the change of the total assets of the banking sectors in European economies. At the same time, in the period 2008-2011, a negative trend is displayed, although the value of the negative changes is being reduced within a certain period of the time. The volume changes in the total assets of the banking sectors in the economies of the various European countries are largely dependent on the degree of economies development. That is why first of all it is rational to review such groups as developed and developing European countries, where the latter can be divided into the countries of Europe, which belonged to the former Soviet Union and other European countries that did not belong to the former Soviet Union.

At the same time, despite the difference in the volume change of total assets of the banking sectors of economies in different groups of European countries, there is unevenness in the development of their banking sectors as part of the international capital market in particular for all of these groups. It is reflected in Table 2. Thus, Chart 1 shows that the nature of these changes indicates the same influence on the part of the same factors for different banking sectors of the groups in Europe.

Regression dependence of individual groups of the banking sectors of economies of European countries

Table 3 presents the results of the statistical estimates of regression relations between the banking sector total assets and the volume of liabilities to non-bank sector of the economy and the banks separately for developed countries, developing countries, where the countries of the former Soviet Union are represented and the developing countries, where the countries that did not belong to the former Soviet Union are represented. All calculations are made in the software environment R (free software for statistical computing and work with graphics)

Here and in the tables below the values of the standardized coefficients (β) for the independent variables and their significance are shown, as well as parameters reflecting the overall significance of the models.

Table 3: Statistical evaluation of the regression influence dependence of the liabilities volume to non-bank sector of the economy (1) and banks (2) on the total assets of the banking sector for different groups in European countries

independent variable	β	t(45)	p-level	R	F	p
dependent variable – Total assets for the group of developed European countries						
1	0,1058	1,4863	0,1441	0,93	161,74	0,0000
2	0,8616	12,0983	0,0000			
dependent variable – Total assets for the group of developing						

countries where the countries of the former Soviet Union are represented						
1	0,1002	0,7588	0,4519	0,46	6,19	0,0042
2	0,4557	3,4514	0,0012			
dependent variable – Total assets for the group of the developing countries, where the countries that did not belong to the former Soviet Union are represented						
1	0,2577	1,9604	0,0561	0,50	7,51	0,0015
2	0,3829	2,9135	0,0055			

From Table 3 level of commitments influence of the non-banking sector of the economy and banks on the total assets of the banking sector is considered to be positive for different groups of European countries. In this case, despite the amount of different extent of this effect, which is explained primarily by the difference in the economic development of some of the groups of European countries, the degree of liabilities influence to banks is higher than the degree of influence to the non-bank sector of the economy. Therefore, in this aspect, it is the banks development that mainly determines the banking sector of the economy in different groups of European countries within the studied time interval.
Table 4 presents the results of the statistical evaluation of regression influence between the total assets of the banking sector and the volume of loans granted to non-banking sector of the economy and the banks for different groups of European countries.

Table 4: Statistical evaluation of the regression influence dependence of the liabilities volume of loans granted to non-banking sector of the economy (1) and banks (2) on the total assets of the banking sector for different groups in European countries

independent variable	β	t(45)	p-level	R	F	p
dependent variable – Total assets for the group of developing countries						
1	0,1757	4,2331	0,0001	0,97	513,15	0,0000
2	0,8512	20,5036	0,0000			
dependent variable – Total assets for the group of developing countries where the countries of the former Soviet Union are represented						
1	0,3446	8,2510	0,0000	0,97	373,83	0,0000
2	0,7447	17,8315	0,0000			
dependent variable – Total assets for the group of the developing countries, where the countries that did not belong to the former Soviet Union are represented						
1	0,4562	6,9351	0,0000	0,94	171,44	0,0000
1	0,5818	8,8442	0,0000			

Table 4 shows that the volume influence of loans granted to non-banking sector of the economy and banks on the total assets of the banking sector is similar to results presented in Table 3. Thus, in this aspect, you can also say that it is the development of banks that mainly determines the banking sector of the economy in different groups of European countries within the studied time interval.

Table 5 shows the results of statistical estimates of regression relations between the total assets of the banking sectors and the volume

of borrowed funds to deposit accounts from non-banking sector and banks for different groups of European countries.

Table 5: Statistical evaluation of the regression influence dependence of the volume of borrowed funds to deposit accounts from the non-banking sector (1), banks (2) to the total assets of the banking sector for different groups of European countries

independent variable	β	t(45)	p-level	R	F	P
dependent variable – Total assets for the group of developing countries						
1	0,1471	2,0134	0,0501	0,93	141,63	0,0000
2	0,8259	11,3051	0,0000			
dependent variable – Total assets for the group of developing countries where the countries of the former Soviet Union are represented						
1	0,0962	0,7270	0,4710	0,46	6,07	0,0046
2	0,4526	3,4207	0,0013			
dependent variable – Total assets for the group of the developing countries, where the countries that did not belong to the former Soviet Union are represented						
1	0,2388	1,8069	0,0774	0,49	7,24	0,0019
2	0,3880	2,9358	0,0052			

As it can be seen from Table 5, the influences of the volume of borrowed funds to deposit accounts from the non-banking sector and banks to the total assets of the banking sector in different groups of countries in Europe also inherit the above results.

Based on the above data, we can assume that the degree of various parameters influence of the non-banking sector and banks to the total assets change in the banking sector considering different groups of European countries is defined not only by changes in the relevant variables regression models (see data in Table 1 and Table 2), but also by the presence of different institutional regulators of economic processes, the degree of the state banking sector regulation. In particular, this conclusion can be confirmed by comparing the obtained values from regression models for a group of developing countries in Europe, where the countries of the former Soviet Union are represented and the group of the developing countries, where the countries that did not belong to the former Soviet Union are represented. The degree of influence on institutional controls of economic processes for the latter group is different.

Conclusions

The above statistical relations between various indicators of the state of the banking sector not only reflect the development dynamics, but also allow a comparative analysis of the banking sector functioning of economies of different countries.

On the present stage the banking sector development is mostly determined by the level of functioning of the banks with the bank ability to generate a variety of financial and economic crises. At the same time, despite the differences in the institutional regulation in the banking sector for different groups of European countries it is necessary to consider the possibility of using a similar approach to address specific

issues related to the development of the banking sector in each country separately. In this case, it is in many ways the institutional features of the banking sector of the economy regulation that determine the specific application of standardized approaches.

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