Relation between marketing expenses and bank's financial position: Ukrainian reality

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Received 27 February 2016
Revised 17 October 2016
Accepted 2 December 2016

Abstract

Purpose – The purpose of this paper is to determine relation between marketing expenses and bank's financial position. Factor and cluster analyses were applied to unify different financial variables into financial clusters. Each cluster has specific long-term and short-term financial position and is allocated to appropriate rating position of new rating system. Using rating positions, it is possible to determine whether overall bank position is fragile or stable, and which financial position is vulnerable. Comparing marketing expenses with financial positions, it is possible to evaluate how effectively banks manage their financial resources, and what impact marketing activity has on the financial position.

Design/methodology/approach – Financial statements of Ukrainian banks for last five years are analyzed. Database of financial documents are reviewed. Coefficient, principal components, and hierarchical cluster analyzes are applied to elaborate new rating system. "Bartlett's Test of Sphericity" and "Kaiser-Meyer-Olkin Measure of Sampling Adequacy Test" validate input data. Box-and-whisker plots are used to describe graphically interaction between marketing expenses and bank financial positions.

Findings – The new rating system describes short-term and long-term bank financial positions. In their marketing activity, Ukrainian banks mostly have uneven distribution of marketing expenses in context of financial positions. Such pattern disrupts long-term stability of Ukrainian banking system. Each financial variable has different impact on marketing activity; however, the correlation level is insignificant. In general, Ukrainian banks do not consider financial positions in marketing planning.

Practical implications – New rating system can be used by the National Bank of Ukraine, the main supervisory bank of Ukraine, to determine fragile banks and to predict their bankruptcy. Banks may use findings to analyze their financial positions and to find optimal marketing expenses.

Originality/value – This paper contributes into the scientific literature in novelty of marketing-finance interaction in the Ukrainian banking system. New rating system of Ukrainian banks considers different aspects of bank financial stability: liquidity level, credit risks, deposit portfolio, and bank's ability to attract additional financial resources on financial markets. Cluster analysis helps to allocate similar financial factors to different clusters and to evaluate financial risks in conjunction. As legal regulations concerning banking market, are also considered, the rating system can be adjusted to different countries. In addition, marketing expenses are analyzed in context of banks' financial positions.

Keywords Marketing, Banking, Financial services, Long-term position, Short-term position, Fragility

Paper type Research paper

1. Introduction

Modern banks use different marketing strategies and instruments in their activity; however, these strategies may be ineffective in a highly competitive banking market. Each bank tries to attain high market share and to get high profits. On the other hand, considering high level of competitiveness on the banking market, it has to spend a lot of money on marketing instruments. Another way to decrease costs may be to avoid "marketing wars" with rivals. In any way, banks face a dilemma: either to increase costs on marketing activity and possibly weaken financial position, or to decrease them and lose market share.

The issue of marketing budget, strategy, and instruments remains keen for all banks, as they have to decide how much money to spend, how to evaluate marketing activity, and which instruments are the most effective. In other words, banks have to find equilibrium between their possibilities and desires, i.e. between bank financial position and marketing efforts. Ukrainian banking system is not an exception.

Benchmarking: An International Journal
Vol. 24 No. 4, 2017
pp. 903-933

1463-5771
DOI 10.1108/BIJ-02-2016-0026

The development of banking products and services has to meet customers' demands. Each client has specific needs and desires. For last years, we may observe a strong diversification not only in banking product and service range, but also in customers' desires. Clients in Ukraine choose the bank that can both satisfy their needs and become a business-partner. Today clients want to have personal attitude. Without a doubt, this transition to personal maintenance in the banking industry costs a lot of money. Banks hope to get not only increased customer satisfaction from investments into personal maintenance but also:

(1) greater market share;

(2) clients' loyalty to the bank; and

(3) greater profits in the long-term period.

Marketing-finance interaction is vital for bank's success as strong interdependencies between two departments exist. As separate disciplines, marketing and finance approach the business practice in different ways. Indeed, while financial department tries to optimize bank costs to maximize profits, marketing department tries to invest as much as possible in marketing strategies and other activities. At first sight, these actions may be contradictory, but they should be viewed as complementary. Thus, it is necessary for any bank to find this optimization point in which the bank spends optimal amount of money and gets maximum return on investments into marketing activity.

Described above problem in Ukrainian banking system requires solutions. First of all, we determine key financial factors. Banks should take into account both long- and short-term financial positions. Second, we elaborate new rating system for Ukrainian banks. This new system will give us a possibility to analyze bank's financial power, taking into consideration both American and Ukrainian methodologies. Third, we allocate banks to clusters, characterized with specific factors. And fourth, we analyze a correlation between bank's financial position and its marketing expenses.

2. Literature review

The issue of marketing-finance interaction is not new. However, it is not still well explored. Only few researchers examined this interaction on the banking market. Interest to marketing/finance interface occurred in the late 1980s and early 1990s. Peles (1970) reported an association between current-year sales and advertising expenditures from up to three years prior to the current year. Mathur and Jain (1974) applied net present value to retail distribution in urban inner cities. Green *et al.* (1995) examined determinants of long-term performance of entrants into the software industry and found significant benefits to advertising among word processing suppliers. Kumar *et al.* (2000) examined company performance evaluating market return index. Zinkhan and Verbrugge (2000) argued that the link between marketing and finance becomes critical as firms focus on enhancing economic value. Srivastava *et al.* (1998) analyzed how marketing would be affected by central economic planning.

In terms of analysis of marketing efficiency, there is a broad marketing literature concerning the effects of advertising on sales, advertising expenditures, and profits, and extensive published research on the relationship between strategic management variables, market share, and profit (Szymanski *et al.*, 1993; Capon *et al.*, 1990). Hozier and Schatzberg (2000) analyzed correlation between the termination of advertising companies and their stock returns. Mathur and Mathur evaluated stock price depending on green marketing activities. Some researchers examined specific industries. Hasan *et al.* (2001) study thrift institutions, and Hozier and Schatzberg study the advertising industry (i.e. ad agencies).

Many scientists use different methods to answer the question: do marketing activities contribute to overall firm performance? One such method is the event study, a technique

introduced into the economics and finance literature by Fama and French (1996). The event studies found in the business literature form part of a larger group of methods which can be termed "event history analysis" (Yamaguchi, 1991). Abnormally high (low) returns around the event date, after adjustments for risk and overall stock market fluctuations, are reflective of positive (negative) wealth effects (Verbrugge, 1997; Zinkhan and Zinkhan, 1994).

In common, researchers determined different dependent and independent variables. In the same time, they have different opinions about cause-effect connections. Some assume that marketing activity is a result of a financial one and that company's financial position determines marketing strategy. Others claim that financial position is a reflection of a marketing strategy. However, we suppose that in this interaction there is no an initial source: marketing and finance are complementary.

3. Objectives

The aim of this paper is to explore interaction between marketing expenses and bank's financial position on the Ukrainian banking market. In addition, we determine financial factors that are crucial for long- and short-term financial position of a bank. Conducting factor and cluster analyses, we create new rating model for Ukrainian banks. Specifically new model consists of two positions that determine strong and weak sides of a bank. Matching rating positions and marketing expenses, we evaluate the relation between bank's financial position and marketing activity. Also, the authors examine hypotheses:

(1) banks with relatively high concentration of big credit risks (BCR) have vulnerable long-term financial position;

(2) banks with stable long-term financial position have even distribution of marketing expenses;

(3) banks with stable short-term financial position have even distribution of marketing expenses; and

(4) banks with low levels of capital adequacy have even distribution of marketing expenses.

4. Data and methods

We use financial statements of all Ukrainian banks as a primary source of data. Table I contains descriptive statistics about bank assets. The biggest bank accounts for 21.71 percent of the whole banking system, four biggest banks – 50.79 percent, ten biggest ones – 73.08 percent.

In our research we used data of 25 biggest Ukrainian banks by assets (90.78 percent of total Ukrainian banking market), because other banks mostly specialize on specific market niche such as micro crediting, real estate crediting, and other activities. It is incorrect to compare full-specialized banks with others. Moreover, these minor-specialized banks are not subjected to legal requirements established by the National Bank of Ukraine; thus, we analyze only full-specialized Ukrainian banks.

The research consists of five stages:

(1) selection and calculation of key financial parameters that characterize bank's financial position in context of its possible marketing strategy;

(2) reduction the quantity of financial parameters by the assignment of correlated variables into one factor. For this stage we use the principal components analysis;

(3) preliminary description of identified factors;

(4) detection of homogeneous bank groups with identified factors. On this stage we use hierarchical cluster analysis; and

(5) description of interconnection between detected bank clusters and marketing expenses.

No.	Bank	Assets (mln. $)	Market share (%)	Cumulative market share (%)	Official link
1	Privatbank	11,036,621	21.71	21.71	http://en.privatbank.ua/
2	State Savings Bank of Ukraine	6,641,038	13.06	34.77	www.oschadbank.ua/en/
3	Ukreximbank	5,886,729	11.58	46.34	www.eximb.com/eng/
4	UniCredit Bank (Ukrsotsbank)	2,259,069	4.44	50.79	https://en.unicredit.ua/
5	Subsidiary Bank Sberbank of Russia	2,158,547	4.25	55.03	https://en.sberbank.ua/
6	Raiffeisen Bank Aval	2,134,913	4.20	59.23	www.aval.ua/en/
7	UkrSibbank (BNP Paribas Group)	1,809,042	3.56	62.79	https://ukrsibbank.com/en/
8	Alfa-Bank Ukraine	1,765,081	3.47	66.26	www.alfabank.ua/en/index_english.htm
9	Prominvestbank	1,735,465	3.41	69.67	www.pib.com.ua/en/
10	Ukrgasbank	1,731,424	3.41	73.08	www.ukrgasbank.com/eng/
11	First Ukrainian International Bank	1,568,460	3.08	76.16	http://pumb.ua/en/
12	VTB Bank Ukraine	1,067,339	2.10	78.26	http://vtb.ua/
13	Credit Agricole Bank	968,245	1.90	80.17	https://credit-agricole.ua/eng
14	OTP Bank	881,412	1.73	81.90	http://en.otpbank.com.ua/
15	Pivdennyi Bank	818,489	1.61	83.51	http://bank.com.ua/en/
16	Citibank (Ukraine)	670,197	1.32	84.83	www.citigroup.com
17	ING Bank Ukraine	629,297	1.24	86.07	www.ingbankukraine.com/en/
18	Megabank	370,100	0.73	86.79	www.megabank.net/en/
19	KredoBank	344,669	0.68	87.47	www.kredobank.com.ua/
20	ProCredit Bank	324,372	0.64	88.11	http://en.procreditbank.com.ua/
21	Bank Credit Dnepr	313,967	0.62	88.73	http://creditdnepr.com.ua/
22	Platinum Bank	298,454	0.59	89.31	http://en.platinumbank.com.ua/
23	Diamantbank	296,143	0.58	89.90	http://diamantbank.ua/en/
24	Universal Bank	241,729	0.48	90.37	www.universalbank.com.ua/eng/
25	Pravex-Bank	205,854	0.40	90.78	www.pravex.com/eng/main
…	…				…
109	The whole banking system	46,156,655.67	100.00	100.00	

Table I.
Biggest Ukrainian banks by assets (January 1, 2016)

In our research we applied factor analysis to group financial parameters to similar factors. Using Kohonen self-organizing maps, a method of hierarchical cluster analysis, we allocated banks to appropriate clusters. Finally, we combined financial factor with bank cluster. After that, the authors compared marketing expenses with bank rating score.

5. Research results

Selection and calculation of key financial parameters

To determine key financial parameters that describe bank's financial position in the Ukrainian banking system, we consider:

(1) Basel principles of effective bank supervision that were included into legal control documents of the National Bank of Ukraine (the main supervisory bank in Ukraine); and

(2) profitability and unprofitability as one of the most important indicators of bank's efficiency.

In Table II we provide key 11 financial parameters as input variables. They are structured into five units: capital adequacy, liquidity risks, credit risks, financial stability, and efficiency.

Block	Name	Symbol	Formula
Capital adequacy	The scale of regulatory capital	SRC	(regulatory capital)/(minimum standard of regulatory capital)
Capital adequacy	The adequacy of regulatory capital	ARC	(regulatory capital)/(assets, reduced by the amount of established appropriate reserves for active operations)
Liquidity risks	Current liquidity	CL	(Assets with a finite maturity of up to 31 days)/(the bank's liabilities with final maturity of less than 31 days)
Liquidity risks	Quick assets	QA	(Quick assets)/(total assets)
Credit risks	Big credit risks	BCR	(The sum of all large credit risks, provided by the bank with respect to all contractors and all related parties)/(regulatory capital)
Credit risks	Maximum credit risk to a single counterparty	MCR1C	(The requirements of the bank to the counterparty or group of related counterparties and all financial liabilities issued by the bank with respect to a counterparty or group of related counterparties)/(regulatory capital)
Credit risks	Share of substandard loans in all bank credit portfolio	SC	(Provided substandard loans/total sum of provided loans
Credit risks	Loans to deposits ratio	LTD	(Provided loans)/(deposits)
Financial stability	Financial leverage	FL	(Liabilities)/(equity)
Efficiency	Return on equity	ROE	(Net profit)/(equity)

Table II.
List of input variables

The adequacy of regulatory capital (ARC) reflects bank's ability to perform in time and fully its liabilities that result from trade, credit, and other monetary operations.

The scale of regulatory capital (SRC) shows the ratio of bank regulatory capital value to a minimum established level.

Current liquidity (CL) shows minimum value of assets the bank must have to perform in time and fully its liabilities during one month.

Quick assets (QA) reflect bank's capability of transforming its assets into cash.

Variable "BCR" we use to restrict concentration of BCR for a single counterparty or for a group of counterparties. Credit risk, taken for a single counterparty or for a group of counterparties, is considered high when the total liabilities to a single counterparty or to a group of counterparties exceed 10 percent of a bank regulatory capital.

Maximum credit risk to a single counterparty (MCRC1C) is used to restrict credit risk that emerges when counterparty does not perform its liabilities.

Share of substandard loans in bank credit portfolio (SC) reflects the extent of risk of credit operations and perspectives of bank liquidity.

Loans to deposits (LTD) shows the ratio of bank loan portfolio to deposit one, and is an important indicator of long-term bank liquidity.

Financial leverage (FL) characterizes bank's capability of attracting new financial resources on financial markets.

Return on equity (ROE) characterizes how effectively the bank uses shareholders' equity.

The calculation of selected financial parameters on January 1, 2016 is provided in Table AI.

Reduction the quantity of chosen financial indicators

Before applying of hierarchical clusters analysis, we reduce the dimension of input data provided in Table AI. For this, we use Principal Components Analysis as a part of factor analysis in software SPSS 21.

Necessity to conduct factor analysis is determined by correlation among variables. Table III contains the results of pair comparison of input data form Table AI. Relatively high correlation is observed among BCR-MCRC-FL variables, and it makes sense to group these variables into one group.

Table IV contains results of data validation by Kaiser-Meyer-Olkin Measure of Sampling Adequacy Test and Bartlett's Test of Sphericity. The value of Kaiser-Meyer-Olkin Measure of Sampling Adequacy is 0.703 and points that factor model is acceptable. χ^2 value is 547.269 with 45 degrees of freedom. Bartlett's Sig. value is 0.000. Null hypothesis that correlation matrix is sporadic is rejected with probability of error 0.000; thus, null hypothesis is wrong. Bartlett's Sig. value also indicates that correlations among variables of input data exist, and that it is possible to group them.

Using factors as predictors, communality is quadrant of multiple correlations among dependent variables. It measures the percent of dispersion in a given variable that is mutually justified by all factors and may be interpreted as a reliability of this variable. From Table V we may conclude that factor model justifies relatively high share of dispersion of each variable: from 0.537 for CL and 0.917 for BCR. Thus, there is no necessity to exclude any variable.

Table III.
Correlation matrix

	SRC	ARC	CL	QA	BCR	MCR1C	SC	LTD	FL	ROE
SRC	1	0.081	−0.008	0.038	−0.13	−0.11	0.118	0.05	−0.106	−0.018
ARC	0.081	1	0.26	0.343	−0.294	−0.267	−0.064	0.031	−0.232	0.13
CL	−0.008	0.26	1	0.255	−0.055	−0.046	−0.022	0.157	−0.108	−0.035
QA	0.038	0.343	0.255	1	−0.088	−0.127	−0.111	0.123	−0.033	0.18
BCR	−0.13	−0.294	−0.055	−0.088	1	0.906	0.261	0.111	0.837	0.421
MCR1C	−0.11	−0.267	−0.046	−0.127	0.906	1	0.346	0.08	0.816	0.398
SC	0.118	−0.064	−0.022	−0.111	0.261	0.346	1	0.011	0.135	−0.231
LTD	0.05	0.031	0.157	0.123	0.111	0.08	0.011	1	−0.077	−0.094
FL	−0.106	−0.232	−0.108	−0.033	0.837	0.816	0.135	−0.077	1	0.595
ROE	−0.018	0.13	−0.035	0.18	0.421	0.398	−0.231	−0.094	0.595	1

Table IV.
Results of data validation

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.703
Bartlett's Test of Sphericity	Approx. χ^2	547.269
	df	45
	Sig.	0.000

Note: Results of "Bartlett's test of sphericity" and "Kaiser-Meyer-Olkin measure of sampling adequacy test"

Table V.
Communalities

Variable	Initial	Extraction
SRC	1	0.731
ARC	1	0.594
CL	1	0.537
QA	1	0.573
BCR	1	0.917
MCR1C	1	0.915
SC	1	0.697
LTD	1	0.547
FL	1	0.9
ROE	1	0.82

In our research we would have to use ten factors to justify 100 percent of dispersion. However, using conventional criterion to cease the process of factor extraction, in which initial value becomes less than 1.0, we calculated that four factors would be reasonable to use in further research. According to data from Table VI, four factors have value of more than 1. First component explains 31.978 percent of total dispersion, second – 16.761 percent, third – 13.094 percent, and fourth – 10.484 percent. In sum, these four components justify 72.318 percent of total dispersion. Considering that factor model, consisting of four factors, keeps more than 72 percent of input data, we assume that it makes sense to apply this model in further research.

In the next step of factor analysis is a rotated component matrix (Table VII). According to the rule of factor analysis, variables of input data that have the highest value of correlation with a given component of a factor model, gather into one factor. Using this rule, we group output variables into appropriate factors. Table VIII contains the results of this grouping.

Preliminary description of identified factors

Grouping variables by the components of the factor model, we determine four factors.

- Factor 1 – "Relation between profitability and concentration of big credit risks";
- Factor 2 – "Relation between capital adequacy and capital liquidity".
- Factor 3 – "Relation between long-term and short-term liquidity".
- Factor 4 – "Relation between scope of activity and substandard credit portfolio."

	Initial eigenvalues			Rotation sums of squared loadings		
Component	Total	% of variance	Cumulative%	Total	% of variance	Cumulative %
1	3.198	31.978	31.978	3.198	31.978	31.978
2	1.676	16.761	48.74	1.676	16.761	48.74
3	1.309	13.094	61.834	1.309	13.094	61.834
4	1.048	10.484	72.318	1.048	10.484	72.318
5	0.911	9.115	81.432			
6	0.71	7.098	88.53			
7	0.631	11475	94.841			
8	0.294	2.935	97.776			
9	0.135	1.353	99.129			
10	0.087	0.871	100			

Table VI.
Total variance explained

	Component			
	1	2	3	4
SRC	−0.122	0.248	−0.214	0.78
ARC	−0.213	0.733	0.045	0.099
CL	−0.05	0.434	0.587	−0.048
QA	0.007	0.729	0.195	−0.049
BCR	0.933	−0.169	0.131	0.037
MCR1C	0.922	−0.189	0.131	0.113
SC	0.213	−0.298	0.276	0.698
LTD	0.036	0.055	0.737	0.012
FL	0.938	−0.027	−0.132	−0.031
ROE	0.647	0.472	−0.366	−0.213

Table VII.
Rotated component matrix

First factor "Relation between profitability and concentration of big credit risks" combines variable ROE from block "Efficiency," variables BCR and MRC1C from block "Credit risks," and variable FL from block "Financial stability." There is a nonlinear relation between profitability and the rate of borrowed and own capital, as big loans are concentrated in a credit portfolio, i.e. the higher the value of this relation, the less stable is bank's financial position and vice versa. We assume that big Ukrainian banks get profits if they give only huge loans and only to specific borrowers. However, rising credit risks may have asymmetric consequences. Such operations may lead to bank bankruptcy, as a bank has fragile financial position. The higher the value of this factor, the higher is the level of bank's financial fragility. This factor considers long-term financial position.

Second factor, "Relation between capital adequacy and capital liquidity" combines ARC from block "Capital adequacy" and QA from "Liquidity risks." This factor characterizes bank's ability to perform in time and fully its liabilities, and bank's ability to transform assets into cash. On the one hand, the low value of these parameters worsens bank's financial position. On the other hand, too high value leads to ineffective usage of own financial resources, and banks lose profits. However, the high value of second factor is safer for banks, as banks with low values of capital adequacy and QA are more vulnerable during financial instabilities on banking markets. In other words, banks benefit more from excessive liquidity levels and capital adequacy than from low ones. This factor reflects short-term bank financial position.

Third factor, "Relation between long-term and short-term liquidity" combines variables LTD and SL from block "Liquidity risks." It characterizes bank's ability to perform in time and fully its liabilities that result from trade, credit, and other monetary operations during one month. Also, this factor evaluates how the bank can attract additional deposits to maintain its credit operations, and how issued loans are insured by deposits. The low value of this factor shows a stable long-term bank's financial position; however, short-term liquidity level may be insufficient. The high value of this factor shows that a bank has unstable long-term financial position, but it has stable short-term liquidity. This factor reflects long-term bank's financial position.

Fourth factor, "Relation between scope of activity and substandard credit portfolio" combines variables SRC from block "Capital adequacy" and SC from block "Credit risks." It characterizes relation between the scope of activity of a bank by regulatory capital and share of substandard loans in credit portfolio. The bigger bank's scope of activity, the higher is probability that credit portfolio will be substandard. The higher the value of this factor, the higher is the level of credit risks. This factor describes short-term bank financial position.

Table VIII.
Grouping the variables of output variables into factors

Factor model components	Output variables	Correlation coefficients
Factor 1	FL	0.938
	BCR	0.933
	MRC1C	0.922
	ROE	0.647
Factor 2	ARC	0.733
	QA	0.729
Factor 3	LTD	0.737
	CL	0.587
Factor 4	SRC	0.78
	SC	0.698

Detection of homogeneous banks' groups on the basis of a hierarchical cluster analysis

Input data on January 1, 2016 for hierarchical cluster analysis are provided in Table AII. To assess the degree of similarity among bank financial positions, we use Squared Euclidean Distance estimation. In addition, we apply agglomerative algorithm supposing that banks at first are grouped into small clusters. Then, these banks are grouped into more concentrated clusters. Step-by-step agglomerative algorithm is provided in Table AIII.

The sharp jump is observed after 120th step. It shows that for data that contain 125 observations, the optimal number of clusters is five. Allocation of banks to appropriate clusters is provided in Table AIV. Table IX contains information about the number of banks in each cluster and values of factors in each cluster.

Migration of Ukrainian banks is among clusters is provided in Table X.

On the basis of financial analysis and cluster profiles of Ukrainian banks, we create new rating system. This rating system consists of two components: short-term financial position and long-term financial position. New rating system is provided in Table XI.

	Number of banks	Factor 1	Factor 2	Factor 3	Factor 4
Cluster 1	16	−0.2203069	0.6462640	−0.7148891	1.9317416
Cluster 2	85	−0.0952465	−0.3213786	−0.172912	−0.353045
Cluster 3	4	0.1289277	−2.5099106	2.1634547	1.0617503
Cluster 4	19	0.0241716	1.4090063	0.9874282	−0.2890805
Cluster 5	1	10.6458926	0.2454839	−1.2792092	0.3464898

Table IX.
Clusters

Bank	January 1, 2012	January 1, 2013	January 1, 2014	January 1, 2015	January 1, 2016
Privatbank	1	1	1	1	1
State Savings Bank of Ukraine	1	1	1	1	2
Ukreximbank	1	1	1	1	3
Prominvestbank	2	2	2	4	3
UniCredit Bank (Ukrsotsbank)	2	2	2	2	1
Raiffeisen Bank Aval	2	2	2	2	1
Subsidiary Bank Sberbank of Russia	2	2	2	2	3
Alfa-Bank Ukraine	4	4	4	4	2
VTB Bank Ukraine	2	2	2	4	3
First Ukrainian International Bank	2	2	2	2	2
UkrSibbank (BNP Paribas Group)	2	2	2	4	2
OTP Bank	2	2	2	2	2
Ukrgasbank	4	2	2	2	2
Credit Agricole Bank	2	2	2	2	4
Pivdennyi Bank	2	2	2	2	2
ING Bank Ukraine	4	4	4	4	4
Citibank (Ukraine)	4	4	4	4	4
Bank Credit Dnepr	2	2	2	2	5
Platinum Bank	2	2	2	2	2
Megabank	2	2	2	2	2
Universal Bank	2	2	2	2	2
KredoBank	2	2	2	2	2
Diamantbank	2	2	2	2	2
Pravex-Bank	2	2	2	2	1
ProCredit Bank	2	2	2	2	2

Table X.
Cluster migration

The long-term financial position is characterized by two factors: "Relation between profitability and concentration of big credit risks" – CR, and "Relation between long-term and short-term liquidity" – L.

Long-term financial position has four positions:

(1) CR + *L*+ – banks with this long-term financial position have relatively low concentration of BCR that positively affects their long-term profitability. In addition, these banks have sufficient levels of long-term liquidity and may perform in time and fully their liabilities that result from trade, credit, and other monetary operations.

(2) CR + *L*– – banks with this long-term financial position have relatively low concentration of BCR that positively affects their long-term profitability. However, insufficient level of long-term liquidity has a negative impact on bank's ability to perform in time and fully liabilities that result from trade, credit, and other monetary operations.

(3) CR– *L*+– banks with this long-term financial position have relatively high concentration of BCR that negatively affects their long-term profitability. On the other hand, these banks have sufficient levels of long-term liquidity and may perform in time and fully their liabilities that result from trade, credit, and other monetary operations.

(4) CR– *L*– – banks with this long-term financial position have relatively high concentration of BCR that negatively affects their long-term profitability. Moreover, insufficient level of long-term liquidity has a negative impact on bank's ability to perform in time and fully liabilities that result from trade, credit, and other monetary operations.

The short-term bank financial position is characterized by two factors: "Relation between capital adequacy and capital liquidity" – A and "Relation between scope of activity and substandard credit portfolio" – CP.

Short-term financial position has four positions:

(1) *A* + CP+ – banks with this short-term financial position have relatively high level of capital adequacy; thus, effectively managing own financial resources, they perform liabilities in a short-term period. The level of short-term liquidity is optimal. In addition, these banks have relatively low share of substandard loans in their credit portfolios. This low share correlates with bank's scope of activity, i.e. the number of issued loans does not disrupt short-term financial stability.

(2) *A* + CP– – banks with this short-term financial position have relatively high level of capital adequacy; thus, effectively managing own financial resources, they perform liabilities in a short-term period. The level of short-term liquidity is optimal. However, these banks have relatively high share of substandard loans in their credit portfolios. This high share does not correlate with bank's scope of activity, i.e. the number of issued loans disrupts short-term financial stability.

Table XI.
New rating system

	Short-term financial position			
	A + CP+	*A* + CP–	*A*– CP+	*A*– CP–
Long-term financial position				
CR + *L*+	CR + *L*+; *A* + CP+	CR + *L*+; *A* + CP–	CR + *L*+; *A*– CP+	CR + *L*+; *A*– CP–
CR + *L*–	CR + *L*+; *A* + CP–	CR + *L*–; *A* + CP–	CR + *L*–; *A*– CP+	CR + *L*–; *A*– CP–
CR– *L*+	CR– *L*+; *A* + CP+	CR– *L*+; *A* + CP–	CR– *L*+; *A*– CP+	CR– *L*+; *A*– CP–
CR– *L*–	CR– *L*–; *A* + CP+	CR– *L*–; *A* + CP–	CR– *L*–; *A*– CP+	CR– *L*–; *A*– CP–

(3) $A-$CP+ – banks with this short-term financial position have relatively low level of capital adequacy; thus, ineffective management of own financial resources may result in banks' inability to perform liabilities in short-term period. The level of short-term liquidity does not correlate with banks' liabilities. However, these banks have relatively low share of substandard loans in their credit portfolios. This low share correlates with bank's scope of activity, i.e. the number of issued loans does not disrupt short-term financial stability.

(4) $A-$CP– – banks with this short-term financial position have relatively low level of capital adequacy; thus, ineffective management of own financial resources may result in banks' inability to perform liabilities in short-term period. The level of short-term liquidity does not correlate with banks' liabilities. In addition, these banks have relatively high share of substandard loans in their credit portfolios. This high share does not correlate with bank's scope of activity, i.e. the number of issued loans disrupts short-term financial stability.

Using elaborated rating system, we allocate bank clusters to appropriate rating positions (Table XII).

Banks of the first cluster have unstable long-term financial position. They are characterized with high concentration of BCR that disrupt long-term probability. Insufficient level of long-term liquidity negatively affects bank's ability to perform its liabilities that result from trade, credit, and other monetary operations. Meanwhile in short-term aspect, these banks have high level of capital adequacy. Thus, banks effectively manage their own financial resources in a short-term period. The level of short-term liquidity is optimal. However, these banks have high share of substandard loans in credit portfolios. This high share does not correlate with bank scope of activity, i.e. the number of issued loans disrupts short-term financial stability.

Having unstable long-term financial position, banks from the second cluster are similar to those from the first cluster. High concentration of BCR and insufficient level of long-term liquidity negatively affect bank's ability to perform its liabilities that result from trade, credit, and other monetary operations. In a short-term period, these banks have low level of capital adequacy; therefore, they ineffectively manage their financial resources in a short-term period. The level of short-term liquidity does not correlate with banks' liabilities. However, they have relatively low concentration of substandard loans in credit portfolios. The share of substandard loans correlates with bank's scope of activity, i.e. the number of issued loans does not disrupt short-term financial stability. Thus, in a short-term period, banks compensate insufficient short-term liquidity by low share of substandard credits in their credit portfolios.

Banks of the third cluster have long-term financial position that is characterized by high concentration of BCR. This concentration negatively affects long-term profitability. However, sufficient level of long-term liquidity permits banks to perform their liabilities that result from trade, credit, and other monetary operations. Therefore, if liquidity level is balanced, long-term bank financial position may be stable. On the other hand, these banks

Bank cluster	Rating position
1	CR– $L-$; $A+$CP–
2	CR– $L-$; $A-$ CP+
3	CR– $L+$; $A-$ CP–
4	CR+ $L+$; $A+$CP+
5	CR– $L-$; $A-$ CP+

Table XII. Rating positions of clusters

have low level of capital adequacy. The level of short-term liquidity does not correlate with banks' liabilities. In addition, they have high share of substandard loans in credit portfolios. The share of substandard loans does not correlate with bank's scope of activity, i.e. the number of issued loans disrupts short-term financial stability. Hence, banks of this cluster are the most vulnerable in a Ukrainian banking system.

Banks of the fourth cluster are the most stable in long and short-term. Relatively low concentration of BCR along with sufficient level of long-term liquidity strengthens long-term bank's financial position. High level of capital adequacy and optimal level of short-term liquidity made these banks financially stable in short-term period. The share of substandard loans correlates with bank's scope of activity, i.e. the number of issued loans does not disrupt short-term financial stability. Banks of this cluster are the most stable on the Ukrainian banking market and are safe for credit-deposit and other relations.

Bank from the fifth cluster is similar to banks from the second one. High concentration of BCR and insufficient level of long-term liquidity negatively affect bank's ability to perform its liabilities. In a short-term period, this bank has low level of capital adequacy; therefore, it ineffectively manages its financial resources in a short-term period. The level of short-term liquidity does not correlate with its liabilities. However, it has relatively low concentration of substandard loans in credit portfolio. Thus, in a short-term period, this bank compensates insufficient short-term liquidity by low share of substandard credits in credit portfolio.

From the cluster description above, we confirm hypothesis that banks with relatively high concentration of BCR have vulnerable long-term financial position.

Marketing/finance interaction

Having received bank rating positions, the authors compare these positions with marketing expenses. To evaluate interaction, we use two variables for marketing expenses: share of marketing expenses in total administrative expenses (MTE) and share of marketing expenses in bank assets (MA). To describe graphically interaction between bank financial position and marketing expenses, we use box-and-whisker plots. These plots are used in descriptive statistics to depict groups of numerical data through their quartiles. They may also have lines extending vertically from the boxes (whiskers) indicating variability outside the upper and lower quartiles. The spacing between the different parts of the box indicates the degree of dispersion (spread) and skewness in the data, and shows outliers. The bottom and top of the box are always the first and third quartiles, and the band inside the box is always the second quartile (the median). But the ends of the whiskers can represent several possible alternative values.

In Figure 1 we describe relation between bank clusters and share of marketing expenses in total administrative expenses (MTE). Figure 2 describes relation between share of marketing expenses in bank assets (MA) and bank clusters. Data about MTE and MA are provided in Table AIV. Both graphics have common interpretation:

(1) each box represents second quartile with a bold line showing a median value;

(2) the bottom and the top of each box are the first and third quartiles;

(3) whiskers out of the box show the range of the first and third quartiles; and

(4) circles and stars show distribution of variables that are out of normal distribution of dispersion.

Fifth cluster has only one bank; thus, it cannot be analyzed by dispersion analysis. Other four clusters, in general have positive skewness. It means that banks with

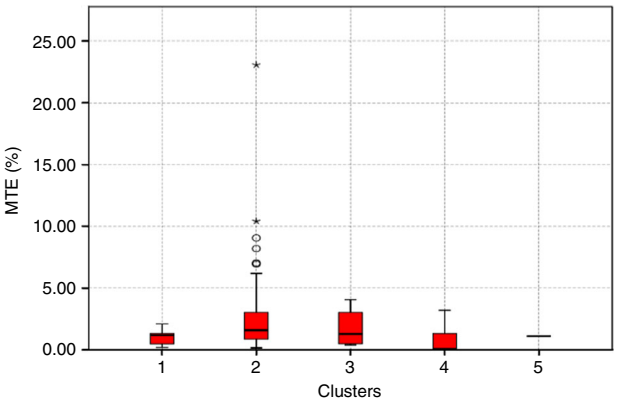

Figure 1.
Relation between share of marketing expenses in total administrative expenses and bank clusters

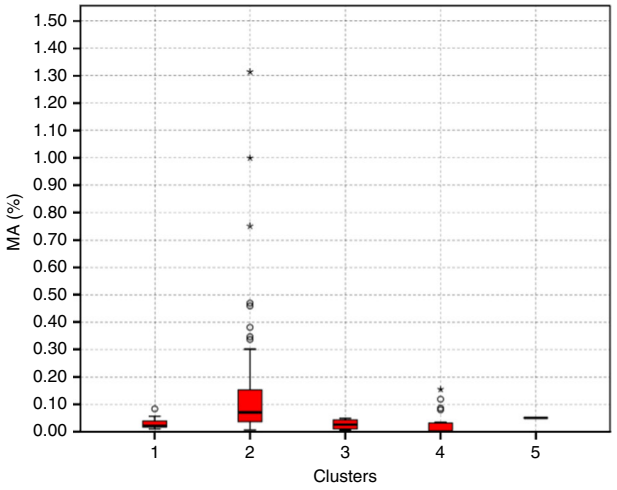

Figure 2.
Relation between share of marketing expenses in bank assets and bank clusters

higher than median value of share of marketing expenses in total administrative expenses have uneven distribution. The most representative is the second cluster that has a bank with more than 20 percent of share of marketing expenses in total administrative expenses.

The same pattern is observed in share of marketing expenses in bank assets. However, the value of skewness is higher, i.e. some banks have more uneven distribution of their marketing expenses to assets than they do in marketing expenses to total administrative expenses.

Banks from the first cluster have unstable long-term financial position, but effective management of own financial resources in a short-term period and optimal level of short-term liquidity make these banks stable in a short-term period. They are threatened with high concentration of BCR. However, they spend relatively little on marketing and optimize expenses. Thus, they do not disrupt financial stability and try to direct marketing efforts on the retention of their positions on the banking market.

The banks from the second cluster also have unstable long-term financial position. But on the top of that, they ineffectively manage their financial resources. We may

observe this ineffective management in Figures 1 and 2, on which cluster two has high positive skewness. Banks from this cluster threaten themselves with unreasoned marketing expenses.

The banks of the third, the most unstable cluster, have relatively even marketing expense distribution. Thus, we may conclude that these banks, on the one hand, do not worsen their positions with high marketing expenses, but, on the other hand, they do not try to elaborate effective marketing strategy to affect weak positions on the banking market.

Banks from the fourth cluster have very little marketing expenses and have the most stable financial positions. It indicates that the less they spend the more stable they are. The value of marketing expenses correlates with their scope of activity and maintains financial positions. In addition, marketing expenses of these banks are relatively evenly distributed. The hypothesis that banks with stable long-term financial position have even distribution of marketing expenses is confirmed.

Fifth cluster is represented by only one bank and cannot be evaluated on the basis of the correlation.

Banks from the second and the third clusters have low level of capital adequacy. In the second one, we observe uneven distribution of marketing expenses. It rejects the hypothesis that banks with low level of capital adequacy have even distribution of marketing expenses. However, the third cluster confirms this hypothesis. This phenomenon may be attributed to sufficient level of long-term liquidity, as banks do not have to spend a lot of money to attract more clients. Thus, the hypothesis about distribution of marketing expenses in the context of capital adequacy depends on long-term liquidity level.

Finally, the hypothesis that banks with stable short-term financial position have even distribution of marketing expenses is rejected by the fourth cluster. Banks of this cluster have stable sufficient level of capital adequacy and little number of substandard loans. However, necessity to expand scope of activity requires banks to spend more money on marketing to hold current market share and to increase it in future.

6. Conclusions

Ukrainian banking market is a highly competitive market on which banks compete for higher market share. Chosen marketing strategy may be crucial in this battle. However, without careful financial analysis, banks may choose ineffective marketing strategies and spend a lot of money. They do not consider financial stability. Therefore, banks may have substantial capital adequacy level, but inappropriate financial management leads to ineffective marketing efforts.

To find appropriate marketing budget, managers should consider bank financial abilities. The authors elaborated new rating system that helps to determine bank's position in short- and long-term periods. Basing on rating positions, bank managers may evaluate whether financial resources are enough to maintain current marketing strategy and whether marketing expenses do not disrupt bank's financial position.

Having used factor analysis to evaluate impact of variables, the authors found key financial factors affecting bank's financial position. On the basis of cluster analysis, these factors were allocated to similar clusters, and new rating system was elaborated. Eventually, 25 Ukrainian banks were allocated to appropriate clusters with specific financial positions.

Having compared marketing expenses of Ukrainian banks with their rating positions, the authors found that the most stable banks have uneven distribution of marketing expenses, as these banks have to spend more money on marketing to hold current market share and to increase it in future. The most fragile banks do not try to elaborate effective marketing strategies to affect weak positions on the banking market. In addition, high

concentration of substandard credits makes banks decrease marketing activity, as they cannot spend a lot of money. On the other hand, banks from the second cluster have low concentration of substandard credits. Hence, trying to attract as many clients as possible and to provide loans, these banks spend unevenly a lot of money on marketing.

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Appendix 1

Bank	SRC (%)	ARC (%)	CL (%)	QA (%)	BCR (%)	MCR1C (%)	SC (%)	LTD (%)	FL (%)	ROE (%)
Privatbank (January 1, 2016)	21,293.33	10.70	60.00	13.69	395.26	25.72	17.57	99.83	863.67	0.79
State Savings Bank of Ukraine (January 1, 2016)	8,117.06	6.29	97.25	14.25	549.80	24.46	79.94	70.30	2,071.40	−167.20
Ukreximbank (January 1, 2016)	1,901.90	2.41	123.09	2.33	593.90	28.16	87.44	70.85	−4,618.12	−451.93
Prominvestbank (January 1, 2016)	2,679.58	5.35	109.14	9.50	1,401.26	93.80	67.67	189.36	−439.48	−165.23
UniCredit Bank (Ukrsotsbank) (January 1, 2016)	9,869.75	28.00	43.16	18.98	149.22	35.49	86.57	135.94	294.70	−23.48
Raiffeisen Bank Aval (January 1, 2016)	6,558.96	18.91	69.16	24.01	76.41	20.56	69.34	64.44	717.47	−22.96
Subsidiary Bank Sberbank of Russia (January 1, 2016)	1,889.75	4.70	41.16	5.50	1,498.24	70.49	51.78	253.15	2,184.54	−279.07
Alfa-Bank Ukraine (January 1, 2016)	2,915.13	8.12	63.09	15.16	1,095.05	74.73	42.40	108.79	1,514.63	−101.30
VTB Bank Ukraine (January 1, 2016)	3,171.68	11.63	67.05	3.35	887.07	79.37	72.91	177.75	2,937.04	−539.62
First Ukrainian International Bank (January 1, 2016)	3,158.77	11.29	72.40	5.69	423.86	36.64	45.25	95.30	926.66	−47.79
UkrSibbank (BNP Paribas Group) (January 1, 2016)	2,171.94	13.18	92.88	4.54	173.02	21.78	33.80	62.94	2,307.94	1.26
OTP Bank (January 1, 2016)	1,371.87	9.10	57.32	4.78	350.37	56.47	88.24	73.12	1,185.02	−172.98
Ukrgasbank (January 1, 2016)	3,577.21	23.60	54.07	9.55	285.72	43.14	55.39	51.00	868.06	6.05
Credit Agricole Bank (January 1, 2016)	2,444.15	20.31	87.03	27.84	111.18	19.38	30.13	73.48	1,015.93	21.19
Pivdennyi Bank (January 1, 2016)	1,384.63	14.00	72.13	22.76	537.78	31.82	12.27	118.07	873.36	2.60
ING Bank Ukraine (January 1, 2016)	2,456.27	48.95	119.55	21.14	261.11	11.02	40.22	326.52	412.53	29.01
Citibank (Ukraine) (January 1, 2016)	1,876.60	56.78	111.41	33.06	52.57	17.47	0.00	21.18	553.74	66.27
Bank Credit Dnepr (January 1, 2016)	−53.88	−0.86	58.00	12.26	5,069.00	352.75	81.03	74.94	23,599.69	888.89
Platinum Bank (January 1, 2016)	138.75	3.44	50.37	3.90	517.06	19.39	12.40	99.70	4,077.72	−305.54
Megabank (January 1, 2016)	824.65	11.79	49.62	11.41	412.19	24.00	7.12	132.78	971.38	2.90
Universal Bank (January 1, 2016)	338.71	9.73	70.96	12.16	145.68	40.73	74.32	116.12	777.93	−304.12
KredoBank (January 1, 2016)	924.02	14.62	70.00	17.21	35.67	14.17	15.98	73.21	896.71	13.55
Diamantbank (January 1, 2016)	305.62	4.75	85.12	31.04	978.66	55.14	14.53	72.87	1,804.28	−0.82
Pravex-Bank (January 1, 2016)	1,176.13	49.50	86.59	8.91	84.04	20.67	153.59	61.04	185.01	−46.06
ProCredit Bank (January 1, 2016)	655.64	12.63	53.58	31.06	0.00	7.43	8.69	77.54	1,329.69	14.49
Privatbank (January 1, 2015)	18,351.62	11.18	83.91	19.16	174.13	20.23	14.21	114.15	801.40	3.30
State Savings Bank of Ukraine (January 1, 2015)	16,536.91	18.57	104.70	24.74	183.51	17.83	32.44	125.11	463.11	−37.65
Ukreximbank (January 1, 2015)	16,815.35	18.51	134.69	25.14	172.67	15.27	62.17	86.64	830.83	−72.44
Prominvestbank (January 1, 2015)	9,825.48	21.82	201.26	29.65	178.59	17.17	24.58	281.38	766.69	−56.85
UniCredit Bank (Ukrsotsbank) (January 1, 2015)	2,958.60	7.61	60.93	13.87	317.33	44.20	71.21	144.40	673.54	−42.67
Raiffeisen Bank Aval (January 1, 2015)	5,068.21	13.05	68.92	23.76	54.18	18.56	53.69	103.14	662.15	−22.24
Subsidiary Bank Sberbank of Russia (January 1, 2015)	5,649.94	15.04	46.72	18.29	414.72	22.24	22.17	252.38	1,097.21	2.77
Alfa-Bank Ukraine (January 1, 2015)	5,649.94	16.64	89.04	25.57	217.79	23.70	24.23	141.79	945.50	−21.20

(*continued*)

Table AI.
Input data for factor analysis by principal components

Table AI.

Bank	SRC (%)	ARC (%)	CL (%)	QA (%)	BCR (%)	MCR1C (%)	SC (%)	LTD (%)	FL (%)	ROE (%)
VTB Bank Ukraine (January 1, 2015)	3,528.87	10.26	61.03	25.46	501.23	46.29	16.02	370.70	617.47	12.63
First Ukrainian International Bank (January 1, 2015)	4,168.29	15.13	54.22	18.93	209.27	21.29	18.13	105.37	641.83	1.13
UkrSibbank (BNP Paribas Group) (January 1, 2015)	2,710.06	16.03	87.31	34.47	60.48	20.38	33.00	85.54	1,379.11	−48.87
OTP Bank (January 1, 2015)	2,163.42	10.40	63.37	11.19	168.45	30.39	32.77	114.39	1,464.25	−145.41
Ukrgasbank (January 1, 2015)	3,416.87	21.26	47.97	15.89	201.33	33.54	69.41	81.14	1,238.93	−178.36
Credit Agricole Bank (January 1, 2015)	1,882.30	13.82	87.66	17.38	228.02	24.76	12.88	82.44	1,391.12	6.40
Pivdennyi Bank (January 1, 2015)	1,285.44	11.70	51.37	19.77	462.52	24.53	9.88	147.94	698.56	2.39
ING Bank Ukraine (January 1, 2015)	1,303.08	45.57	170.95	54.08	599.81	18.22	28.64	372.56	545.73	12.22
Citibank (Ukraine) (January 1, 2015)	770.85	42.85	128.98	22.08	172.97	11.93	0.00	35.30	485.82	76.65
Bank Credit Dnepr (January 1, 2015)	971.38	16.04	57.54	21.71	301.68	17.50	14.82	98.06	924.00	−14.91
Platinum Bank (January 1, 2015)	669.72	10.03	112.27	15.66	230.99	25.64	9.82	105.12	2,687.58	−109.80
Megabank (January 1, 2015)	700.81	13.45	79.13	20.88	314.30	22.82	6.63	155.62	870.49	5.04
Universal Bank (January 1, 2015)	691.25	18.28	113.56	16.14	195.92	23.26	35.64	139.25	963.63	−79.53
KredoBank (January 1, 2015)	496.11	14.53	90.95	14.66	57.63	21.15	12.06	86.82	1,121.68	0.93
Diamantbank (January 1, 2015)	462.80	11.31	73.19	31.62	431.39	24.69	7.87	94.90	1,675.93	2.80
Pravex-Bank (January 1, 2015)	358.79	10.27	55.18	28.44	222.12	30.88	45.12	76.06	513.50	−36.66
ProCredit Bank (January 1, 2015)	465.78	12.20	42.67	17.91	0.00	5.37	5.64	101.16	985.99	19.09
Privatbank (January 1, 2014)	18,240.09	12.16	90.06	15.72	10.32	10.32	18.70	106.74	956.00	9.22
State Savings Bank of Ukraine (January 1, 2014)	16,125.85	25.41	77.68	7.21	208.60	15.45	13.78	111.23	406.31	3.32
Ukreximbank (January 1, 2014)	16,745.67	29.22	54.74	8.44	99.14	21.50	33.07	98.38	421.75	1.10
Prominvestbank (January 1, 2014)	4,379.02	13.68	67.50	6.63	429.37	22.85	18.57	204.35	638.04	−47.83
UniCredit Bank (Ukrsotsbank) (January 1, 2014)	4,883.66	15.86	89.31	12.55	74.98	14.20	54.64	126.67	396.75	0.13
Raiffeisen Bank Aval (January 1, 2014)	7,067.24	20.62	73.79	13.45	0.00	9.64	36.13	102.38	500.55	10.09
Subsidiary Bank Sberbank of Russia (January 1, 2014)	3,557.93	12.39	71.37	11.41	381.59	23.28	10.69	137.03	857.10	15.62
Alfa-Bank Ukraine (January 1, 2014)	4,267.69	19.01	148.70	20.71	219.64	19.72	21.10	127.77	597.67	0.31
VTB Bank Ukraine (January 1, 2014)	3,292.86	14.73	64.07	12.64	228.64	33.89	39.98	167.64	688.47	−6.05
First Ukrainian International Bank (January 1, 2014)	3,200.26	11.78	64.30	14.79	134.84	16.48	11.09	97.33	613.78	9.56
UkrSibbank (BNP Paribas Group) (January 1, 2014)	3,898.70	23.01	70.71	17.95	8.37	8.37	8.86	87.79	809.78	0.92
OTP Bank (January 1, 2014)	3,494.26	20.61	63.99	12.68	41.62	12.05	15.37	148.09	457.31	3.49
Ukrgasbank (January 1, 2014)	3,759.49	21.02	56.85	9.24	127.05	22.17	18.60	117.92	426.13	22.16
Credit Agricole Bank (January 1, 2014)	1,663.33	15.79	68.98	14.66	148.33	20.59	2.33	105.58	749.08	22.14
Pivdennyi Bank (January 1, 2014)	1,189.09	13.69	53.84	10.54	328.09	23.04	4.81	130.15	564.77	3.38
ING Bank Ukraine (January 1, 2014)	1,415.60	19.20	101.60	25.84	332.28	18.82	3.71	173.00	487.71	4.63

(*continued*)

Bank	SRC (%)	ARC (%)	CL (%)	QA (%)	BCR (%)	MCR1C (%)	SC (%)	LTD (%)	FL (%)	ROE (%)
Citibank (Ukraine) (January 1, 2014)	730.33	39.67	80.35	21.52	167.50	12.05	0.00	53.18	541.86	51.60
Bank Credit Dnepr (January 1, 2014)	581.13	13.21	107.20	11.60	308.61	19.09	13.15	77.28	922.22	−3.99
Platinum Bank (January 1, 2014)	593.31	11.05	118.03	11.24	78.06	16.84	8.25	99.20	1,282.66	8.21
Megabank (January 1, 2014)	594.82	14.59	61.94	10.85	228.62	24.15	6.36	127.09	704.88	2.97
Universal Bank (January 1, 2014)	725.65	18.01	97.32	8.79	120.48	20.87	9.88	116.57	1,102.23	0.80
KredoBank (January 1, 2014)	649.32	19.78	88.27	8.75	26.18	13.17	17.34	85.34	581.53	0.08
Diamantbank (January 1, 2014)	429.82	11.16	68.68	13.48	382.88	19.60	3.79	83.55	1,610.70	1.73
Pravex-Bank (January 1, 2014)	608.02	17.54	86.56	21.92	81.38	23.24	39.14	77.85	304.96	−5.94
ProCredit Bank (January 1, 2014)	311.48	15.89	46.98	16.74	0.00	4.20	4.62	99.22	640.96	17.52
Privatbank (January 1, 2013)	13,667.77	10.91	84.74	16.35	12.19	12.19	26.08	106.94	842.19	8.38
State Savings Bank of Ukraine (January 1, 2013)	15,240.94	25.35	60.23	18.01	221.08	17.51	9.06	129.92	374.64	3.12
Ukreximbank (January 1, 2013)	16,875.56	29.18	90.68	21.69	101.26	21.01	28.86	90.15	392.54	0.89
Prominvestbank (January 1, 2013)	4,470.53	13.98	88.02	7.53	331.88	20.72	12.60	210.83	683.52	4.26
UniCredit Bank (Ukrsotsbank) (January 1, 2013)	5,458.22	18.84	85.81	15.32	13.35	13.35	69.42	128.95	407.11	0.11
Raiffeisen Bank Aval (January 1, 2013)	6,477.18	18.76	79.96	20.54	20.87	10.64	41.48	93.77	651.56	0.53
Subsidiary Bank Sberbank of Russia (January 1, 2013)	2,779.76	12.56	78.07	8.53	413.84	22.76	4.15	151.61	771.64	13.23
Alfa-Bank Ukraine (January 1, 2013)	4,002.74	18.49	105.86	22.79	126.16	21.49	48.11	119.72	524.14	0.88
VTB Bank Ukraine (January 1, 2013)	3,570.51	12.97	73.32	11.65	226.55	31.92	28.74	194.15	744.57	23.49
First Ukrainian International Bank (January 1, 2013)	3,557.08	17.63	70.20	15.59	80.34	14.86	19.58	97.34	569.77	6.43
UkrSibbank (BNP Paribas Group) (January 1, 2013)	3,787.45	20.03	63.12	19.76	11.81	11.81	13.45	88.43	884.79	2.48
OTP Bank (January 1, 2013)	2,505.89	13.77	53.69	13.14	116.57	19.94	17.08	163.32	482.37	7.50
Ukrgasbank (January 1, 2013)	3,173.40	22.73	52.51	12.49	164.19	14.62	28.45	123.51	450.45	28.84
Credit Agricole Bank (January 1, 2013)	1,598.07	19.39	79.22	23.22	94.94	12.76	2.48	96.82	746.34	26.24
Pivdennyi Bank (January 1, 2013)	1,210.60	15.60	40.65	11.10	276.39	22.02	4.55	114.71	511.89	3.39
ING Bank Ukraine (January 1, 2013)	1,686.97	34.08	141.04	15.64	331.49	18.98	1.10	192.30	450.81	26.40
Citibank (Ukraine) (January 1, 2013)	659.11	42.53	95.56	29.84	182.95	13.91	0.00	46.25	502.67	56.08
Bank Credit Dnepr (January 1, 2013)	707.05	12.39	142.26	7.49	384.65	23.55	9.01	84.04	1,305.05	0.28
Platinum Bank (January 1, 2013)	472.47	13.92	161.68	4.46	42.12	16.76	4.20	91.93	865.62	1.60
Megabank (January 1, 2013)	615.66	16.89	69.02	12.07	162.54	23.21	5.97	133.04	637.45	0.31
Universal Bank (January 1, 2013)	735.79	16.47	93.19	6.90	149.15	19.16	11.88	125.30	1,066.68	−45.35
KredoBank (January 1, 2013)	457.16	16.14	100.57	19.64	44.90	18.80	13.72	77.12	654.68	−10.22
Diamantbank (January 1, 2013)	297.97	13.24	77.48	11.27	499.16	24.31	3.69	80.82	1,150.17	1.05
Pravex-Bank (January 1, 2013)	838.86	22.01	74.85	13.03	86.44	17.23	41.72	109.06	310.30	−23.94

(*continued*)

Table AI.

Bank	SRC (%)	ARC (%)	CL (%)	QA (%)	BCR (%)	MCR1C (%)	SC (%)	LTD (%)	FL (%)	ROE (%)
ProCredit Bank (January 1, 2013)	270.90	15.60	66.88	17.76	14.75	14.75	6.71	98.30	719.22	17.30
Privatbank (January 1, 2012)	13,015.65	11.72	77.11	15.00	43.84	18.17	16.96	103.90	766.54	8.51
State Savings Bank of Ukraine (January 1, 2012)	15,319.22	30.54	73.29	7.51	202.33	19.24	6.01	112.61	319.16	3.01
Ukreximbank (January 1, 2012)	16,357.49	30.42	49.00	11.49	60.12	21.13	23.72	124.15	323.62	0.50
Prominvestbank (January 1, 2012)	4,103.93	13.16	54.97	9.01	255.13	23.68	20.91	121.34	650.92	0.59
UniCredit Bank (Ukrsotsbank) (January 1, 2012)	4,282.66	13.28	61.51	11.04	44.81	13.09	28.74	151.48	508.48	0.22
Raiffeisen Bank Aval (January 1, 2012)	6,592.25	16.16	45.31	13.95	32.08	11.26	21.23	101.36	693.39	0.47
Subsidiary Bank Sberbank of Russia (January 1, 2012)	2,119.54	13.94	67.52	9.96	329.61	20.24	15.42	145.64	664.50	11.61
Alfa-Bank Ukraine (January 1, 2012)	4,072.51	18.21	108.77	21.34	214.06	20.84	22.18	146.43	586.24	0.43
VTB Bank Ukraine (January 1, 2012)	4,358.50	13.17	57.05	9.96	209.70	27.21	11.02	206.19	813.74	14.34
First Ukrainian International Bank (January 1, 2012)	3,718.03	15.86	68.34	20.16	78.61	12.97	15.89	62.35	765.18	6.65
UkrSibbank (BNP Paribas Group) (January 1, 2012)	6,137.04	22.89	66.98	22.91	7.43	7.43	14.88	72.27	2,510.81	−295.28
OTP Bank (January 1, 2012)	3,900.13	21.25	48.05	8.13	34.72	12.02	12.93	143.06	564.86	16.98
Ukrgasbank (January 1, 2012)	2,457.03	22.59	129.89	12.26	347.07	153.33	33.77	214.65	547.53	−128.88
Credit Agricole Bank (January 1, 2012)	857.04	14.54	51.08	16.11	92.58	19.42	5.13	102.81	802.36	6.02
Pivdennyi Bank (January 1, 2012)	1,268.70	17.63	59.36	9.08	246.09	20.80	7.22	91.08	542.83	3.35
ING Bank Ukraine (January 1, 2012)	1,574.18	42.52	96.06	19.58	311.66	19.70	4.95	197.70	532.03	10.13
Citibank (Ukraine) (January 1, 2012)	654.42	44.96	91.56	17.87	187.53	14.08	0.00	28.38	609.82	52.11
Bank Credit Dnepr (January 1, 2012)	728.53	12.75	86.50	8.33	283.07	18.80	4.55	93.55	1,325.89	0.36
Platinum Bank (January 1, 2012)	416.02	12.64	176.86	10.71	146.02	20.81	6.44	73.76	901.14	0.79
Megabank (January 1, 2012)	638.52	20.37	94.75	9.40	129.69	19.49	6.17	110.54	597.22	0.54
Universal Bank (January 1, 2012)	830.48	16.29	78.42	11.73	102.31	22.45	26.94	134.44	1,319.81	−92.00
KredoBank (January 1, 2012)	613.56	22.00	54.09	12.61	24.18	13.18	5.72	56.36	426.41	12.99
Diamantbank (January 1, 2012)	240.12	12.56	54.67	11.23	617.91	24.29	7.44	72.95	953.91	1.36
Pravex-Bank (January 1, 2012)	798.30	15.96	62.40	9.68	119.91	19.68	19.32	117.76	447.55	−12.42
ProCredit Bank (January 1, 2012)	335.41	17.48	62.18	13.70	16.28	16.28	3.10	72.13	786.59	8.23

Table AI.

Appendix 2

Bank	Factor 1	Factor 2	Factor 3	Factor 4
Alfa-Bank Ukraine (January 1, 2012)	−0.0553534	0.6239459	0.718117	−0.136824
Alfa-Bank Ukraine (January 1, 2013)	−0.0532493	0.5623164	0.6041638	0.4663758
Alfa-Bank Ukraine (January 1, 2014)	−0.0578744	0.9437736	10.1160398	−0.1876471
Alfa-Bank Ukraine (January 1, 2015)	−0.0041961	0.641026	0.4120444	0.1854567
Alfa-Bank Ukraine (January 1, 2016)	0.8568349	−10.1154422	0.3680488	0.3757406
Bank Credit Dnepr (January 1, 2012)	−0.0455537	−0.5390029	−0.346701	−10.0176029
Bank Credit Dnepr (January 1, 2013)	0.0786841	−0.2259249	0.4894393	−10.0126596
Bank Credit Dnepr (January 1, 2014)	−0.0503408	−0.2568014	−0.0322466	−0.8618476
Bank Credit Dnepr (January 1, 2015)	−0.0470769	0.034892	−0.4294216	−0.6475801
Bank Credit Dnepr (January 1, 2016)	100.6458926	0.2454839	−10.2792092	0.3464898
Citibank (Ukraine) (January 1, 2012)	−0.1924768	10.6493153	−10.0221501	−0.7221463
Citibank (Ukraine) (January 1, 2013)	−0.1168577	20.2397792	−0.5947351	−0.7897507
Citibank (Ukraine) (January 1, 2014)	−0.1934327	10.5318485	−0.8867803	−0.7867818
Citibank (Ukraine) (January 1, 2015)	−0.1395642	20.1430134	−0.372679	−0.8445393
Citibank (Ukraine) (January 1, 2016)	−0.1599579	30.2705772	−0.6949232	−0.4366407
Credit Agricole Bank (January 1, 2012)	−0.1837203	−0.2702146	−0.7243559	−0.911104
Credit Agricole Bank (January 1, 2013)	−0.1745729	0.6662982	−0.3775115	−0.886974
Credit Agricole Bank (January 1, 2014)	−0.1302857	−0.0738663	−0.5264586	−0.885573
Credit Agricole Bank (January 1, 2015)	0.0557152	0.03928	−0.3151855	−0.6402218
Credit Agricole Bank (January 1, 2016)	−0.0018325	0.8907869	−0.233279	−0.1074953
Diamantbank (January 1, 2012)	0.1546955	−0.7103901	−0.8493838	−0.9289591
Diamantbank (January 1, 2013)	0.1140495	−0.468623	−0.4816874	−10.0506091
Diamantbank (January 1, 2014)	0.0866497	−0.4684413	−0.6257699	−10.0614526
Diamantbank (January 1, 2015)	0.2947775	0.5441308	−0.1081313	−0.9837883
Diamantbank (January 1, 2016)	0.9120664	0.150247	0.1507575	−0.8654691
First Ukrainian International Bank (January 1, 2012)	−0.2239786	0.2302918	−0.9062856	−0.2495458
First Ukrainian International Bank (January 1, 2013)	−0.2457287	0.0297943	−0.5364403	−0.1856825
First Ukrainian International Bank (January 1, 2014)	−0.1978713	−0.2898533	−0.6679609	−0.4961415
First Ukrainian International Bank (January 1, 2015)	−0.099401	−0.0217633	−0.6274258	−0.1166366
First Ukrainian International Bank (January 1, 2016)	0.1000285	−10.1594516	−0.1673612	0.3653912
ING Bank Ukraine (January 1, 2012)	−0.0829524	10.5142711	0.9745745	−0.5852284
ING Bank Ukraine (January 1, 2013)	−0.0511414	10.3250371	10.5045263	−0.8681532
ING Bank Ukraine (January 1, 2014)	−0.0061222	0.8440381	0.9616799	−0.948156
ING Bank Ukraine (January 1, 2015)	0.4294692	30.9329469	40.7242333	−0.352437
ING Bank Ukraine (January 1, 2016)	−0.0449545	10.9599161	20.8220627	0.2483159
KredoBank (January 1, 2012)	−0.3672846	−0.084023	−10.2445929	−0.821012
KredoBank (January 1, 2013)	−0.2172586	0.2668658	−0.0449156	−0.8211303
KredoBank (January 1, 2014)	−0.3372837	−0.2396531	−0.3541547	−0.6567621
KredoBank (January 1, 2015)	−0.1344639	−0.1087366	−0.2218241	−0.8671746
KredoBank (January 1, 2016)	−0.2047581	−0.0770413	−0.6931576	−0.6924622
Megabank (January 1, 2012)	−0.2309888	−0.0918265	−0.0249906	−0.918352
Megabank (January 1, 2013)	−0.1542335	−0.3065937	−0.1279198	−0.9327413
Megabank (January 1, 2014)	−0.0985331	−0.5326987	−0.300968	−0.9380932
Megabank (January 1, 2015)	0.0494019	0.1020921	0.4170073	−0.9993433
Megabank (January 1, 2016)	0.0532565	−0.7282079	−0.3951025	−0.9025525
OTP Bank (January 1, 2012)	−0.3427286	−0.3051094	−0.6474434	−0.2380537
OTP Bank (January 1, 2013)	−0.1831044	−0.4580627	−0.080233	−0.452486
OTP Bank (January 1, 2014)	−0.3341006	−0.034329	−0.1949493	−0.2763302
OTP Bank (January 1, 2015)	−0.2031103	−10.1607916	0.0732559	−0.005933
OTP Bank (January 1, 2016)	0.1069907	−20.0974191	0.1391583	10.2550939

(*continued*)

Table AII.
Input data for the hierarchical cluster analysis by Ward's method

Bank	Factor 1	Factor 2	Factor 3	Factor 4
Pivdennyi Bank (January 1, 2012)	−0.1710306	−0.4811169	−0.7748925	−0.7507701
Pivdennyi Bank (January 1, 2013)	−0.1357526	−0.598461	−0.792903	−0.8261895
Pivdennyi Bank (January 1, 2014)	−0.0763619	−0.6274537	−0.4164937	−0.8828936
Pivdennyi Bank (January 1, 2015)	0.1095934	−0.266744	−0.0586391	−0.7904224
Pivdennyi Bank (January 1, 2016)	0.2569803	0.1376718	0.0456603	−0.6942283
Platinum Bank (January 1, 2012)	−0.1142511	0.2491925	0.9177835	−10.1842177
Platinum Bank (January 1, 2013)	−0.2605673	−0.1222597	0.7112609	−10.1998836
Platinum Bank (January 1, 2014)	−0.1272676	−0.1985183	0.212431	−10.0632728
Platinum Bank (January 1, 2015)	0.0362927	−0.3753176	0.5643832	−0.8960132
Platinum Bank (January 1, 2016)	−0.1098372	−20.3519017	−0.0933795	−0.6933251
Pravex-Bank (January 1, 2012)	−0.2517123	−0.6215846	−0.3120571	−0.5855552
Pravex-Bank (January 1, 2013)	−0.2758245	−0.2176318	0.0216894	−0.0056635
Pravex-Bank (January 1, 2014)	−0.1381967	0.2107238	−0.0076613	−0.1708261
Pravex-Bank (January 1, 2015)	0.0369822	−0.1419704	−0.21497	−0.0640926
Pravex-Bank (January 1, 2016)	−0.165061	0.2155716	0.509247	20.9950416
Privatbank (January 1, 2012)	−0.2419526	0.2221456	−0.890172	10.0585236
Privatbank (January 1, 2013)	−0.2687971	0.3110991	−0.712955	10.3168463
Privatbank (January 1, 2014)	−0.3108545	0.6224661	−0.9558852	10.82755
Privatbank (January 1, 2015)	−0.1509736	0.6968838	−0.8662148	10.7665891
Privatbank (January 1, 2016)	−0.0241212	0.2680874	−10.5237595	20.3540368
ProCredit Bank (January 1, 2012)	−0.2825744	−0.1758012	−0.9319466	−10.0023623
ProCredit Bank (January 1, 2013)	−0.23953	−0.0007039	−0.5175097	−0.9999877
ProCredit Bank (January 1, 2014)	−0.3679871	−0.1621914	−0.8887705	−10.0223796
ProCredit Bank (January 1, 2015)	−0.2902119	−0.2845372	−0.9274482	−10.0219587
ProCredit Bank (January 1, 2016)	−0.1514371	0.5315172	−0.7840091	−0.9273525
Prominvestbank (January 1, 2012)	−0.0956585	−0.6847457	−0.5546503	−0.0877196
Prominvestbank (January 1, 2013)	−0.0508295	−0.4263082	0.7745081	−0.348834
Prominvestbank (January 1, 2014)	−0.0850132	−0.838035	0.5905865	−0.1264577
Prominvestbank (January 1, 2015)	−0.0877818	20.0164383	30.5056984	0.5745969
Prominvestbank (January 1, 2016)	0.8783019	−10.6513966	20.4325366	0.8570905
Raiffeisen Bank Aval (January 1, 2012)	−0.3255178	−0.1924817	−10.0671106	0.3233535
Raiffeisen Bank Aval (January 1, 2013)	−0.2507197	0.4360015	−0.3506208	0.7301011
Raiffeisen Bank Aval (January 1, 2014)	−0.3367071	0.1611555	−0.5681578	0.7222101
Raiffeisen Bank Aval (January 1, 2015)	−0.1409124	0.0650887	−0.1060572	0.7733062
Raiffeisen Bank Aval (January 1, 2016)	−0.1024921	0.3231006	−0.4557842	10.4608921
State Savings Bank of Ukraine (January 1, 2012)	−0.3394973	0.7394658	−10.1383364	10.4305396
State Savings Bank of Ukraine (January 1, 2013)	−0.2505926	0.9695594	−0.9695469	10.4170695
State Savings Bank of Ukraine (January 1, 2014)	−0.328899	0.5278306	−10.0781301	10.6389772
State Savings Bank of Ukraine (January 1, 2015)	−0.2146338	10.1953314	−0.0071936	10.9948651
State Savings Bank of Ukraine (January 1, 2016)	0.1213933	−0.9868407	0.3487011	10.8629547
Subsidiary Bank Sberbank of Russia (January 1, 2012)	−0.0427965	−0.5351283	−0.0548214	−0.5549597
Subsidiary Bank Sberbank of Russia (January 1, 2013)	0.0192833	−0.5139194	0.0502987	−0.7492119
Subsidiary Bank Sberbank of Russia (January 1, 2014)	0.0424628	−0.4003654	−0.1670766	−0.4696725
Subsidiary Bank Sberbank of Russia (January 1, 2015)	0.1403695	−0.1072005	0.7432789	0.1018199
Subsidiary Bank Sberbank of Russia (January 1, 2016)	0.8207832	−20.5983544	20.0056378	0.5058996
Ukreximbank (January 1, 2012)	−0.359375	0.7238136	−10.2773618	20.0215455
Ukreximbank (January 1, 2013)	−0.2439637	10.5448403	−0.8022945	20.1320833
Ukreximbank (January 1, 2014)	−0.3209501	0.5131813	−10.4424716	20.2851932
Ukreximbank (January 1, 2015)	−0.1906526	10.2136882	0.3438168	20.7024111
Ukreximbank (January 1, 2016)	−10.3139146	−20.8789624	20.0227131	10.3540884
Ukrgasbank (January 1, 2012)	0.8819009	−0.2686712	20.5874096	0.2952511
Ukrgasbank (January 1, 2013)	−0.1806401	−0.0656785	−0.5432421	0.0260884
Ukrgasbank (January 1, 2014)	−0.1956509	−0.2368476	−0.6516948	−0.111808
Ukrgasbank (January 1, 2015)	−0.1928348	−0.7740189	−0.1301208	10.2486656

Table AII.

(*continued*)

Bank	Factor 1	Factor 2	Factor 3	Factor 4
Ukrgasbank (January 1, 2016)	0.1603689	−0.4114022	−0.9641707	0.8481639
UkrSibbank (BNP Paribas Group) (January 1, 2012)	−0.667252	0.0222345	−0.2765793	0.4450791
UkrSibbank (BNP Paribas Group) (January 1, 2013)	−0.2770033	0.3680498	−0.7696733	−0.2475772
UkrSibbank (BNP Paribas Group) (January 1, 2014)	−0.3476832	0.4891402	−0.7371091	−0.3130344
UkrSibbank (BNP Paribas Group) (January 1, 2015)	−0.0482026	0.8806769	0.1661902	−0.0093148
UkrSibbank (BNP Paribas Group) (January 1, 2016)	0.0802876	−0.7436765	−0.5375552	−0.1270209
UniCredit Bank (Ukrsotsbank) (January 1, 2012)	−0.2881601	−0.5213448	−0.1390758	0.0517969
UniCredit Bank (Ukrsotsbank) (January 1, 2013)	−0.2180175	−0.0195224	0.3110933	10.1873202
UniCredit Bank (Ukrsotsbank) (January 1, 2014)	−0.2149021	−0.2324094	0.2401394	0.7282873
UniCredit Bank (Ukrsotsbank) (January 1, 2015)	0.2047652	−10.1101563	0.500239	0.8625925
UniCredit Bank (Ukrsotsbank) (January 1, 2016)	−0.0120943	0.253159	−0.1711832	20.505701
Universal Bank (January 1, 2012)	−0.2304316	−0.6192035	0.3656361	−0.3711279
Universal Bank (January 1, 2013)	−0.2349231	−0.5638996	0.2096886	−0.7917108
Universal Bank (January 1, 2014)	−0.1406345	−0.2196992	0.0746671	−0.8633331
Universal Bank (January 1, 2015)	−0.1345618	−0.060473	10.111087	−0.2496995
Universal Bank (January 1, 2016)	−0.42056	−10.8551043	10.1060653	0.8214939
VTB Bank Ukraine (January 1, 2012)	−0.0318853	−0.5245347	0.236838	−0.3491653
VTB Bank Ukraine (January 1, 2013)	0.0832577	−0.4332867	0.5699155	−0.0896511
VTB Bank Ukraine (January 1, 2014)	0.0510748	−0.5251091	0.3498369	0.2183661
VTB Bank Ukraine (January 1, 2015)	0.4438401	0.0700839	20.4689419	−0.4874106

Table AII.

Appendix 3

Stage	Cluster combined Cluster 1	Cluster 2	Coefficients	Stage cluster first appears Cluster 1	Cluster 2	Next stage
1	75	125	0.005	0	0	3
2	70	118	0.011	0	0	24
3	50	75	0.02	0	1	30
4	68	71	0.031	0	0	18
5	90	115	0.041	0	0	43
6	73	98	0.052	0	0	49
7	39	43	0.064	0	0	57
8	61	86	0.077	0	0	29
9	20	65	0.091	0	0	24
10	64	100	0.106	0	0	57
11	35	88	0.124	0	0	20
12	11	104	0.142	0	0	84
13	67	117	0.16	0	0	86
14	87	107	0.178	0	0	21
15	63	112	0.2	0	0	45
16	26	51	0.221	0	0	31
17	44	93	0.243	0	0	50
18	68	95	0.266	4	0	28
19	47	120	0.292	0	0	28
20	35	85	0.317	11	0	45
21	57	87	0.347	0	14	56
22	42	92	0.378	0	0	86
23	109	121	0.411	0	0	63
24	20	70	0.449	9	2	49
25	40	82	0.49	0	0	48
26	22	60	0.532	0	0	62
27	77	102	0.577	0	0	67
28	47	68	0.624	19	18	65
29	61	110	0.672	8	0	85
30	50	114	0.723	3	0	58
31	26	52	0.777	16	0	67
32	76	101	0.83	0	0	55
33	99	105	0.891	0	0	70
34	33	83	0.953	0	0	80
35	79	84	10.017	0	0	51
36	56	81	10.082	0	0	68
37	53	103	10.153	0	0	64
38	62	74	10.225	0	0	47
39	72	124	10.305	0	0	56
40	45	69	10.389	0	0	50
41	14	36	10.475	0	0	94
42	25	89	10.568	0	0	89
43	90	123	10.666	5	0	75
44	94	119	10.768	0	0	79
45	35	63	окт.87	20	15	85
46	31	55	10.978	0	0	61
47	49	62	20.089	0	38	70
48	40	96	20.199	25	0	65

Table AIII.
Agglomeration schedule

(*continued*)

Stage	Cluster combined Cluster 1	Cluster 2	Coefficients	Stage cluster first appears Cluster 1	Cluster 2	Next stage
49	20	73	20.319	24	6	75
50	44	45	20.443	17	40	79
51	54	79	20.571	0	35	63
52	58	108	20.703	0	0	80
53	15	97	20.836	0	0	60
54	10	37	20.979	0	0	84
55	6	76	30.127	0	32	93
56	57	72	30.278	21	39	81
57	39	64	30.431	7	10	62
58	50	122	30.589	30	0	95
59	32	46	30.757	0	0	88
60	15	48	30.927	53	0	83
61	31	80	40.098	46	0	92
62	22	39	40.284	26	57	89
63	54	109	40.477	51	23	69
64	1	53	40.67	0	37	104
65	40	47	40.867	48	28	81
66	91	116	50.066	0	0	73
67	26	77	50.268	31	27	93
68	56	111	50.487	36	0	92
69	54	59	50.708	63	0	88
70	49	99	50.958	47	33	97
71	13	106	60.243	0	0	100
72	16	29	60.532	0	0	112
73	66	91	60.84	0	66	107
74	27	28	70.152	0	0	91
75	20	90	70.486	49	43	103
76	8	30	70.826	0	0	98
77	5	24	80.189	0	0	105
78	2	38	80.565	0	0	98
79	44	94	80.951	50	44	99
80	33	58	90.391	34	52	94
81	40	57	90.857	65	56	103
82	34	113	100.324	0	0	116
83	15	23	100.852	60	0	99
84	10	11	110.384	54	12	106
85	35	61	110.947	45	29	97
86	42	67	120.537	22	13	101
87	4	7	130.14	0	0	109
88	32	54	130.799	59	69	111
89	22	25	140.508	62	42	95
90	12	21	150.238	0	0	102
91	27	78	150.976	74	0	105
92	31	56	160.715	61	68	100
93	6	26	170.464	55	67	104
94	14	33	180.283	41	80	107
95	22	50	190.246	89	58	108
96	3	9	200.32	0	0	109
97	35	49	210.474	85	70	110
98	2	8	220.832	78	76	102
99	15	44	240.302	83	79	114
100	13	31	250.824	71	92	110
101	17	42	270.445	0	86	118

(*continued*)

Table AIII.

Stage	Cluster combined Cluster 1	Cluster 2	Coefficients	Stage cluster first appears Cluster 1	Cluster 2	Next stage
102	2	12	290.109	98	90	115
103	20	40	300.811	75	81	108
104	1	6	320.597	64	93	113
105	5	27	340.421	77	91	113
106	10	19	360.486	84	0	111
107	14	66	390.259	94	73	116
108	20	22	420.335	103	95	114
109	3	4	450.596	96	87	121
110	13	35	490.373	100	97	117
111	10	32	530.459	106	88	115
112	16	41	580.157	72	0	120
113	1	5	640.124	104	105	123
114	15	20	700.104	99	108	119
115	2	10	770.627	102	111	117
116	14	34	850.671	107	82	118
117	2	13	990.682	115	110	119
118	14	17	1,180.255	116	101	120
119	2	15	1,440.479	117	114	121
120	14	16	1,760.479	118	112	122
121	2	3	2,230.468	119	109	122
122	2	14	2,930.457	121	120	123
123	1	2	3,790.92	113	122	124
124	1	18	4,960	123	0	0

Table AIII.

Appendix 4

Bank	Cluster	MTE (%)	MA (%)
Privatbank (January 1, 2016)	1	1.1362	0.0389
State Savings Bank of Ukraine (January 1, 2016)	2	0.7652	0.0204
Ukreximbank (January 1, 2016)	3	0.3991	0.0052
Prominvestbank (January 1, 2016)	3	2.0138	0.0376
UniCredit Bank (Ukrsotsbank) (January 1, 2016)	1	0.8918	0.0357
Raiffeisen Bank Aval (January 1, 2016)	1	2.1	0.0565
Subsidiary Bank Sberbank of Russia (January 1, 2016)	3	0.5561	0.0145
Alfa-Bank Ukraine (January 1, 2016)	2	1.2325	0.0549
VTB Bank Ukraine (January 1, 2016)	3	4.0602	0.0489
First Ukrainian International Bank (January 1, 2016)	2	2.465	0.1078
UkrSibbank (BNP Paribas Group) (January 1, 2016)	2	0.4244	0.019
OTP Bank (January 1, 2016)	2	0.6299	0.0345
Ukrgasbank (January 1, 2016)	2	1.0949	0.0125
Credit Agricole Bank (January 1, 2016)	4	0.7804	0.029
Pivdennyi Bank (January 1, 2016)	2	1.6146	0.0499
ING Bank Ukraine (January 1, 2016)	4	0.00	0.00
Citibank (Ukraine) (January 1, 2016)	4	0.0791	0.0008
Bank Credit Dnepr (January 1, 2016)	5	1.1124	0.0506
Platinum Bank (January 1, 2016)	2	5.6411	0.4691
Megabank (January 1, 2016)	2	1.8523	0.0519
Universal Bank (January 1, 2016)	2	1.5053	0.1068
KredoBank (January 1, 2016)	2	1.5334	0.1002
Diamantbank (January 1, 2016)	2	0.604	0.0257
Pravex-Bank (January 1, 2016)	1	0.1833	0.0215
ProCredit Bank (January 1, 2016)	2	2.9812	0.1242
Privatbank (January 1, 2015)	1	1.8188	0.0836
State Savings Bank of Ukraine (January 1, 2015)	1	0.4	0.01
Ukreximbank (January 1, 2015)	1	0.41	0.01
Prominvestbank (January 1, 2015)	4	2.08	0.03
UniCredit Bank (Ukrsotsbank) (January 1, 2015)	2	0.75	0.03
Raiffeisen Bank Aval (January 1, 2015)	2	2.00	0.06
Subsidiary Bank Sberbank of Russia (January 1, 2015)	2	0.71	0.02
Alfa-Bank Ukraine (January 1, 2015)	4	1.61	0.08
VTB Bank Ukraine (January 1, 2015)	4	1.02	0.03
First Ukrainian International Bank (January 1, 2015)	2	3.4758	0.1532
UkrSibbank (BNP Paribas Group) (January 1, 2015)	4	0.4517	0.0516
OTP Bank (January 1, 2015)	2	1.4356	0.084
Ukrgasbank (January 1, 2015)	2	0.3215	0.0153
Credit Agricole Bank (January 1, 2015)	2	0.7011	0.0243
Pivdennyi Bank (January 1, 2015)	2	1.5615	0.0544
ING Bank Ukraine (January 1, 2015)	4	0.00	0.00
Citibank (Ukraine) (January 1, 2015)	4	0.00	0.00
Bank Credit Dnepr (January 1, 2015)	2	3.0308	0.0646
Platinum Bank (January 1, 2015)	2	4.9352	0.4587
Megabank (January 1, 2015)	2	1.0019	0.0329
Universal Bank (January 1, 2015)	2	2.2933	0.3436
KredoBank (January 1, 2015)	2	1.3462	0.167
Diamantbank (January 1, 2015)	2	0.7208	0.0547
Pravex-Bank (January 1, 2015)	2	0.2865	0.044
ProCredit Bank (January 1, 2015)	2	2.6398	0.2483

(*continued*)

Table AIV.
Cluster membership

Bank	Cluster	MTE (%)	MA (%)
Privatbank (January 1, 2014)	1	1.2214	0.038
State Savings Bank of Ukraine (January 1, 2014)	1	0.515	0.0173
Ukreximbank (January 1, 2014)	1	1.3821	0.0176
Prominvestbank (January 1, 2014)	2	0.8143	0.0251
UniCredit Bank (Ukrsotsbank) (January 1, 2014)	2	1.9522	0.0416
Raiffeisen Bank Aval (January 1, 2014)	2	1.466	0.0853
Subsidiary Bank Sberbank of Russia (January 1, 2014)	2	2.7476	0.0984
Alfa-Bank Ukraine (January 1, 2014)	4	3.2011	0.155
VTB Bank Ukraine (January 1, 2014)	2	2.0691	0.092
First Ukrainian International Bank (January 1, 2014)	2	6.9248	0.2896
UkrSibbank (BNP Paribas Group) (January 1, 2014)	2	0.8041	0.0649
OTP Bank (January 1, 2014)	2	1.9948	0.1317
Ukrgasbank (January 1, 2014)	2	0.8159	0.0241
Credit Agricole Bank (January 1, 2014)	2	3.0366	0.1437
Pivdennyi Bank (January 1, 2014)	2	1.6096	0.0669
ING Bank Ukraine (January 1, 2014)	4	0.0476	0.0003
Citibank (Ukraine) (January 1, 2014)	4	0.0465	0.0007
Bank Credit Dnepr (January 1, 2014)	2	0.4436	0.0211
Platinum Bank (January 1, 2014)	2	6.2047	0.7514
Megabank (January 1, 2014)	2	1.7043	0.0674
Universal Bank (January 1, 2014)	2	3.9468	0.2396
KredoBank (January 1, 2014)	2	1.161	0.088
Diamantbank (January 1, 2014)	2	0.455	0.0164
Pravex-Bank (January 1, 2014)	2	0.253	0.0307
ProCredit Bank (January 1, 2014)	2	3.0916	0.3361
Privatbank (January 1, 2013)	1	1.2331	0.1001
State Savings Bank of Ukraine (January 1, 2013)	1	0.5181	0.098
Ukreximbank (January 1, 2013)	1	1.2499	0.0342
Prominvestbank (January 1, 2013)	2	1.5872	0.0771
UniCredit Bank (Ukrsotsbank) (January 1, 2013)	2	10.4121	0.4556
Raiffeisen Bank Aval (January 1, 2013)	2	1.3987	0.2206
Subsidiary Bank Sberbank of Russia (January 1, 2013)	2	1.3747	0.0725
Alfa-Bank Ukraine (January 1, 2013)	4	2.5197	0.2669
VTB Bank Ukraine (January 1, 2013)	2	3.427	0.225
First Ukrainian International Bank (January 1, 2013)	2	5.3729	0.3983
UkrSibbank (BNP Paribas Group) (January 1, 2013)	2	0.7032	0.1085
OTP Bank (January 1, 2013)	2	4.0223	0.3536
Ukrgasbank (January 1, 2013)	2	0.9285	0.1179
Credit Agricole Bank (January 1, 2013)	2	4.0345	0.498
Pivdennyi Bank (January 1, 2013)	2	1.6807	0.1527
ING Bank Ukraine (January 1, 2013)	4	0.0578	0.0011
Citibank (Ukraine) (January 1, 2013)	4	0.0927	0.0057
Bank Credit Dnepr (January 1, 2013)	2	1.167	0.0646
Platinum Bank (January 1, 2013)	2	8.1844	6.7011
Megabank (January 1, 2013)	2	1.3364	0.1206
Universal Bank (January 1, 2013)	2	4.0067	0.3898
KredoBank (January 1, 2013)	2	1.6207	0.3043
Diamantbank (January 1, 2013)	2	1.2389	0.159
Pravex-Bank (January 1, 2013)	2	0.4195	0.1459
ProCredit Bank (January 1, 2013)	2	3.1194	0.8259
Privatbank (January 1, 2012)	1	1.2455	0.0436
State Savings Bank of Ukraine (January 1, 2012)	1	0.4294	0.015
Ukreximbank (January 1, 2012)	1	1.4613	0.0198
Prominvestbank (January 1, 2012)	2	0.1521	0.0061

Table AIV. (*continued*)

Bank	Cluster	MTE (%)	MA (%)
UniCredit Bank (Ukrsotsbank) (January 1, 2012)	2	1.7749	0.0632
Raiffeisen Bank Aval (January 1, 2012)	2	1.0947	0.0573
Subsidiary Bank Sberbank of Russia (January 1, 2012)	2	0.7701	0.0296
Alfa-Bank Ukraine (January 1, 2012)	4	2.153	0.086
VTB Bank Ukraine (January 1, 2012)	2	2.4605	0.0772
First Ukrainian International Bank (January 1, 2012)	2	23.0617	0.0794
UkrSibbank (BNP Paribas Group) (January 1, 2012)	2	1.1359	0.0708
OTP Bank (January 1, 2012)	2	1.8958	0.0802
Ukrgasbank (January 1, 2012)	4	0.5474	0.0149
Credit Agricole Bank (January 1, 2012)	2	4.9811	0.3804
Pivdennyi Bank (January 1, 2012)	2	3.9835	0.1612
ING Bank Ukraine (January 1, 2012)	4	0.0783	0.0012
Citibank (Ukraine) (January 1, 2012)	4	0.07	0.0012
Bank Credit Dnepr (January 1, 2012)	2	7.0183	0.202
Platinum Bank (January 1, 2012)	2	9.0467	0.9993
Megabank (January 1, 2012)	2	1.3913	0.0603
Universal Bank (January 1, 2012)	2	4.3261	0.3006
KredoBank (January 1, 2012)	2	0.443	0.0355
Diamantbank (January 1, 2012)	2	1.4035	0.0754
Pravex-Bank (January 1, 2012)	2	0.8624	0.0831
ProCredit Bank (January 1, 2012)	2	2.5708	0.2458

Table AIV.

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