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BANKING BUSINESS INDICATORS IN CROATIAN ECONOMIC SURROUNDINGS

POKAZATELJI BANKOVNOG POSLOVANJA U EKONOMSKOM OKRUŽENJU REPUBLIKE HRVATSKE

ABSTRACT

In European and developing countries banks are dominant financial institutions in the process of financial intermediation, especially seen on smaller, less developed territorial counties. The paper analyses banking indicators according to counties in Croatia and compares them with indicators of economic development in each county. Recent data on mentioned variables have been collected from official sources and analysed using exploratory data analysis tools for outliers detection, various concentration indicators and using correlation and cluster analysis. The findings in this paper reveal high values for certain indicators in bank business for certain counties in Croatia and relatively significant concentration for most indicators. Clusters of similar counties are recognised after a multivariate cluster analysis was applied. The research results gained might be a useful tool for government structures in forming regional policies, as well as for financial institutions, primarily banks, in shaping market approach and re-examining market potential of a particular county. In the analysis conducted, the position of County of Osijek-Baranja has been stressed out.

Key words: *banking intermediation, economic surroundings, concentration measures, cluster analysis, dendrogram, County of Osijek-Baranja*

SAŽETAK

U europskim financijskim sustavima i zemljama u razvoju, u financijskom posredovanju

prednjače banke kao dominantne financijske institucije, a ukoliko se mehanizam financijskog posredovanja promatra na užim teritorijalnim jedinicama nižeg stupnja ekonomskog razvoja, dominacija banaka još je izraženija. U radu se analiziraju podaci o poslovanju banaka po županijama Republike Hrvatske i uspoređuju se s pokazateljima ekonomske snage po županijama. Recentni podaci spomenutih varijabli prikupljeni su iz službenih izvora te su analizirani primjenom metoda statističke eksplorativne analize otkrivanja outliera, izračunom niza koncentracijskih omjera te uporabom korelacijske i klaster analize. Nalazi u radu otkrivaju netipično velike vrijednosti pojedinih indikatora bankovnog poslovanja za pojedine županije te relativno značajnu koncentraciju po većini indikatora. Multivarijatnom klaster analizom razdvojeni su klasteri županija sličnih karakteristika. Zaključci u radu korisni su nositeljima ekonomskih politika u oblikovanju razvojnih regionalnih politika, kao i financijskim institucijama, prvenstveno bankama, u oblikovanju tržišnog pristupa i preispitivanju tržišnog potencijala pojedine županije u Republici Hrvatskoj. U provedenoj analizi posebno je istaknut položaj Osječko-baranjske županije.

Ključne riječi: *bankovno posredovanje, ekonomsko okruženje, mjere koncentracije, klaster analiza, dendrogram, Osječko-baranjska županija*

1. Introduction

Financial intermediation of banks and other financial intermediaries is a key form of channelling and allocating surplus funds. Certain functions and advantages resulting from financial intermediation are decreased transaction and information costs, liquidity, risk sharing, asset transformation, diversification, reduction in information symmetry, etc. (Mishkin and Eakins, 2012, 62-67).

Significance of banks, institutional investors or other financial intermediaries depends on the type of financial system. Financial literature and research differentiate two types of financial systems: bank-based and market-based. In a bank-based system, banks and credit financing is the core of this kind of financial system. Since other, more or less developed nonbanking financial institutions exist together with the above mentioned ones, the level of intermediation in this type of system is high. In this kind of financial system, bank and savings association's deposits are the most important investment opportunity, while the corporations and households are dependent on bank financing. Financial systems in Europe, Japan and in developing countries are bank-based financial systems. Market-based financial systems, such as ones in the USA and partially the UK, are based on highly developed capital markets and nonbanking financial institutions with a strong and well diversified banking sector. The efficient capital allocation results in a developed, open, efficient and a competitive financial market (Leko, 2012, 5-6).

Numerous researches have considered the influence of financial structure on economic growth (Allen and Gale, 1999, Levine, 2002, Demirgüç-Kunt and Levine, 2001, Areatis et al, 2005). Levine claimed that the structure of financial sector is irrelevant and has no influence on the economic growth. Nor bank-based or market-based financial systems could not be entirely related to economic growth. Instead, the research showed that the total significance of financial services, banks and financial market combined is relevant for the economic growth. The overall development of financial system is strongly related to economic growth, however no evidence point to superiority of either bank or market-based financial system (Levine, 2002, 398).

Bađun has done a thorough review and research analysis of the influence of banks' financial intermediation on economic growth. The paper gives no definite conclusions. It concludes that, together with the prevailing opinion of the positive influence of financial intermediation on economic growth, additional research need to be conducted (Bađun, 2009, 138).

Papers on this topic are represented in the research done on the topic of financial and economic integration and its consequent influence on financial intermediation and economic growth. Aziakpono concludes that the development of financial system and financial intermediation with a consequent economic growth is a prerequisite for achieving positive effects on monetary, financial and economic integrations (Aziakpono, 2003).

Though papers and research on influence of banks and financial intermediation on economic growth on the sample of different countries are numerous, regional analyses are inadequate. Valverde at al. investigated the influence of financial intermediation on economic growth on the example of territorial units – Spanish regions. They emphasize that such an approach in this analysis is more relevant since regional data are more homogeneous, legal framework is the same, while the financial system is unambiguous and defined. The results obtained using the method of dynamic panels on the example of regions in Spain, confirm a positive and significant connection between bank intermediation and regional growth (Valverde et.al., 2007, 311-326).

This paper analyses and compares selected banking and economic indicators according to counties in Croatia. Recent data on mentioned variables have been collected from official sources. For the purpose of this paper the desk-research of the official data for 21 counties of Croatia for 2010, and statistical analysis methods appropriate for such cross-sectional data are applied. The descriptive exploratory analysis, using variability and concentration measures, correlation analysis methods, and finally cluster analysis are conducted.

The aim of this paper is to analyse the scale of bank intermediation on the county level, to re-examine the level of concentration of banking indicators and compare bank indicators to specific economic indicators. The findings in this paper reveal high values for certain banking indicators for certain counties in Croatia and relatively significant concentration for most indicators. Clusters of similar counties are recognised after a multivariate cluster analysis was applied. Position of County of Osijek-Baranja has been pointed out in particular chapter.

2. Data and research methods

2.1. Banking and economic indicators according to counties in Croatia

The paper analyses banking and economic indicators according to counties in Croatia. Bank indicators according to counties are: bank's net assets, nonperforming loans[205], number of bank branches, number of banks with branches in certain county and number of ATMs. The GDP, number of inhabitants, GDP *per capita*, registered unemployment (number and rate) and the net salary are economic indicators used for counties. The data mentioned above are either publicly available or can be obtained at request from the CNB, CBS and CPII. The data on net assets and nonperforming loans refer to counterparties from Croatia with headquarters or residence in a certain county. The total net assets of banks at the end of September 2013 was 362.4 billion HRK, nonperforming loans were 43.4 billion HRK, while banks had 1,251

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[205] Loans categorised in risk category B1, B2, B3 and C according to methodology of CNB

branches and 4,083 ATMs on Croatian territory. The City of Zagreb participates in this structure with 59.2 % of bank's net assets, 40.5% nonperforming loans, and together with County of Zagreb makes up to 23.6% of all branches and 28.4% off all ATMs. The share higher than 5% in the bank's net assets have only County of Split-Dalmatia with 5.5% and County of Primorje-Gorski kotar with 5.0%. The share of nonperforming loans higher than 5% is present in more counties: Split-Dalmatia with 8.9%, Osijek-Baranja with 6.6%, Istria and Zagreb with the same share of 5.5% and Primorje-Gorski kotar with 5%. Table 1 shows the values of banking indicators according to counties in Croatia on September 30th, 2013.

Table 1 Selected banking indicators according to counties in Croatia on September 30th, 2013

County of	Net assets (thous. HRK)*	Nonperforming loans*** (gross amount, thous. HRK)*	Bank branches**	Banks with branches in certain county**	ATMs**
Bjelovar-Bilogora	3,669,243	738,324	25	11	70
Slavonski Brod-Posavina	4,642,279	969,297	32	14	76
Dubrovnik-Neretva	6,365,843	1,273,670	61	13	175
City of Zagreb	214,383,735	17,592,728	-	-	-
Istria	13,326,926	2,402,374	107	17	343
Karlovac	3,601,401	476,797	32	12	93
Koprivnica-Križevci	4,519,059	534,055	33	12	68
Krapina-Zagorje	4,155,778	774,206	29	8	97
Lika-Senj	1,616,954	254,289	19	8	56
Međimurje	3,589,874	820,700	30	12	86
Osijek-Baranja	**14,390,857**	**2,855,380**	**76**	**17**	**202**
Požega-Slavonija	2,306,342	296,461	24	13	51
Primorje-Gorski kotar	18,259,722	2,185,434	106	23	374
Sisak-Moslavina	5,535,925	813,292	35	10	109
Split-Dalmatia	19,969,930	3,873,650	151	20	466
Šibenik-Knin	4,495,508	919,494	41	11	144
Varaždin	7,604,702	1,594,110	39	15	132
Virovitica-Podravina	2,672,419	465,495	27	11	44
Vukovar-Sirmium	5,031,069	1,108,237	31	13	112
Zadar	8,204,218	1,092,554	58	18	227
Zagreb	14,085,680	2,399,673	295	31	1158
Total	**362,427,465**	**43,440,221**	**1,251**	**31**	**4,083**

Remarks: * Data on net assets and nonperforming loans refer to counterparties from Croatia with headquarters or residence in a certain county, ** Data for City of Zagreb are included in County of Zagreb, ***Loans categorised in risk category B1, B2, B3 and C according to methodology of CNB.
Source: CNB, data obtained at request

Economic indicators shown data from year 2010, due to limitations of data collected. The dominance of the City of Zagreb is less obvious. The share of City of Zagreb in the total GDP is 33.3% in total population 17.9 % and in registered unemployment 12.5 %, GDP per capita in Zagreb makes up for 221.2% of the average GDP per capita, 127.3% of net salary in relation to the average salary, and 152.6% of bank assets in relation of the GDP to the average value in Croatia. Table 2 shows indicators of economic surrounding in 2010.

Table 2 Selected economic indicators according to counties in Croatia, 2010

County of	GDP, thous. HRK	Inhabitants in thous.	GDP per capita, HRK	Registered unemployment	Net salary	Net assets / GDP
Bjelovar-Bilogora	6.052.965	124	48.966	12.415	4.498	62.5
Slavonski Brod-Posavina	6.696.884	172	39.030	16.297	4.649	77.0
Dubrovnik-Neretva	9.739.922	128	76.189	7.459	5.240	72.7
City of Zagreb	107.699.671	793	135.853	37.712	6.245	170.8
Istria	20.199.996	215	93.968	7.949	5.269	63.3
Karlovac	7.044.337	131	53.946	11.894	5.119	54.0
Koprivnica-Križevci	7.010.189	119	58.918	7.375	4.874	61.8
Krapina-Zagorje	6.017.586	136	44.338	6.835	4.549	73.3
Lika-Senj	2.957.902	49	60.315	3.305	4.923	52.2
Međimurje	6.774.139	118	57.450	7.088	4.251	62.4
Osijek-Baranja	**17.457.779**	**318**	**54.929**	**32.723**	**4.774**	**86.5**
Požega-Slavonija	3.573.539	81	44.105	5.795	4.605	66.9
Primorje-Gorski kotar	27.312.057	304	89.936	17.878	5.312	74.0
Sisak-Moslavina	10.326.890	170	60.924	18.454	5.014	55.8
Split-Dalmatia	28.404.837	483	58.814	37.871	5.089	88.9
Šibenik-Knin	6.491.838	113	57.469	7.742	5.031	70.4
Varaždin	10.759.218	180	59.811	9.716	4.345	76.4
Virovitica-Podravina	3.699.194	87	42.761	9.242	4.415	69.4
Vukovar-Sirmium	7.870.330	196	40.224	18.748	4.630	72.2
Zadar	10.523.022	177	59.612	10.672	5.137	74.8
Zagreb	17.194.672	329	52.202	15.256	5.085	93.1
Total	**323.806.969**	**4.419**	**61.417**	**302.425**	**4.907**	**111.9**

Source: CBS and HZZ

2.2. Position of County of Osijek-Baranja

County of Osijek-Baranja is the fourth largest county in Croatia with 4,149 m2 and a share of 7.34% in the total Croatian territory. According to data from 2010, County of Osijek-Baranja had a population of 318,000 or 7.2% of total population, taking the fourth place among Croatian counties. Its GDP was around 17,458 million HRK with a 5.4% share in the national GDP, being the fifth county according to GDP size. According to registered unemployment in 2010 and 2012, it was the third county in Croatia with the share of 10.8% and 10.6%. County of Osijek-Baranja was 13th in 2010 according to GDP per capita and net salary, fourth according to bank net asset and GDP ratio.

Table 3 Position of County of Osijek-Baranja according to selected indicators

	Share in 2010 (%)	Share in 2012. (%)	Rank in 2010 (No. 1 is largest)	Rank in 2012 (No. 1 is largest)
Net assets (thous. HRK)	4.4	4.1	5	5
Nonperforming loans (gross amount, thous. HRK)	6.9	6.4	4	3
Bank branches	6.7	6.2	5	5
Bank with branches in certain counties	51.5	58.1	6	4
ATMs	4.9	4.8	6	6
GDP, thous. HRK	5.4	-	5	-
Inhabitants in thous.	7.2	-	4	-
Registered unemployment	10.8	10.6	3	3

	Share in 2010 (%)	Share in 2012. (%)	Rank in 2010 *(No. 1 is largest)*	Rank in 2012 *(No. 1 is largest)*
GDP per capita, HRK	-	-	13	-
Net salary, HRK	-	-	13	-
Net assets / GDP	-	-	4	-

Source: Author's calculations

According to banking indicators, County of Osijek-Baranja had 14,691 million HRK in net assets, which made around 4.1% of total bank assets, taking the fifth place among Croatian counties according to bank's net assets. According to nonperforming loans, County of Osijek-Baranja is on third place in 2012, with a share of 6.4% in total nonperforming loans and with an absolute amount of 2,478 million HRK. In 2012 58.1% of all banks in Croatia were doing business in County of Osijek-Baranja, while the share of bank branches in this County was 6.2% and for ATMs 4.8%.

2.3.The research methods applied

In this paper the results of statistical analysis applied on official data for large number of banking and economic indicators for Croatia in 2010 are presented. Firstly, descriptive exploratory analysis of data for all 21 counties of Croatia was done with the purpose of discovering the main patterns of data, as well as with the aim of discovering outliers, such as data for the strongest economy of the City of Zagreb, which is typical for the monocentric urban development. Secondly, the study of concentration of selected variables indicating banking intermediation and economic development, over the counties of Croatia is developed based of several measures of concentration (Šošić, 2004). And, finally, cluster analysis was used with the aim to discover the position of counties, especially of County of Osijek-Baranja, in relation to all other counties of Croatia, and in the situation when the City of Zagreb, as an outlying one, is excluded.

3. Cluster analysis and concentration measures

For the purpose of analysing the concentration of banking and economic indicators over the counties of Croatia the concentration ratios of different orders are used, as well as the Gini and the normalised Gini coefficients (more in Dumičić et.al., 2012). Concentration measures for banks assets, nonperforming loans and GDP in thousands HRK are presented in table 4.

Table 4 Gini and the normalised Gini coefficients and concentration ratios for selected variables for counties of Croatia

|	Net assets (thous. HRK)*		Nonperforming loans (gross amount, thous. HRK)*		GDP, thous. HRK
	2010.	2012.	2010.	2012.	2010.
Gini coefficient (G)	0.6627	0.6851	0.4959	0.5773	0.5053
Normalised Gini coefficient (G*)	0.6958	0.7193	0.5207	0.6062	0.5305
Concentration ratio C_1	0.5336	0.5805	0.3704	0.4033	0.3326
Concentration ratio C_4	0.7119	0.7319	0.5889	0.6132	0.5671
Concentration ratio C_6	0.7928	0.8089	0.6929	0.7162	0.6741
No. of counties (N)	21	21	21	21	21

Source: Author's calculations

The Gini coefficient G and the normalised Gini coefficient G* both show an important concentration of bank's net assets by counties of Croatia. In the year 2012 it increased compared to 2010. So, Gini coefficient G from value of 0.6627 increased up to 0.6851, and normalised G* was moved from 0.6958 to 0.7193. Concentration ratios C_1, C_4 and C_6 indicate an increase of concentration in 2012 compared to 2010, too. Quite high value of concentration ratio of the first order C_1 of 0.53 in 2010 and 0.58 in 2012 resulted from very high bank's net assets concentration in only one county (City of Zagreb). Concentration of nonperforming loans by counties of Croatia slightly increased in 2012 compared to 2010 which is shown through all considered concentration ratios, and value of the concentration ratio C_1 (City of Zagreb) is lower for this variable than for net assets, with value of 0.37 in 2010 and 0.40 in 2012. The Gini coefficients G and G* indicate moderately high concentration of nonperforming loans by counties of Croatia. In the year 2012 this coefficients increased, G from 0.4959 to 0.5773. and G* from 0.5208 to 0.6062. Gini coefficients G and G* (G=0.5053 and G*=0.5305) show moderately concentration of GDP by counties of Croatia. Concentration ratios of the order one, four and six for GDP had lower values than for banking indicators, and in 2010 they equals C_1=0.33. C_4=0.57 and C_6=0.67.

Considering the clustering approach in this research, firstly, a cluster analysis was applied based on Ward linkage and squared Euclidean distances using five clusters for all 21 counties of Croatia. Since, the City of Zagreb appeared to be an outlier considering very high value of bank's net assets, GDP *per capita*, as well as high values of some other variables, it was excluded from the secondly conducted cluster analysis. So, using only 20 remaining counties of Croatia, a new cluster analysis was conducted based the same approach, as described above.

There are two groups of variables based on banking and economic indicators for Croatia in 2010 used for cluster analysis, the former given in absolute, and the latter in relative measurement units. The first group of five absolutely given variables used for n=21, and afterwards for n=20, counties for 2010 are: GDP in thous. HRK, banking assets in thous. HRK, nonperforming loans in thous. HRK, number of registered unemployed people and number of inhabitants. The second group of five variables, all expressed relatively, used for n=21, and afterwards for n=20 counties, for 2010 are: GDP *per capita* in HRK, unemployed rate, share of nonperforming loans in bank's net assets, banks' assets *per capita* in HRK and net salary in HRK.

Figure 1 Dendrogram based on the first group of variables (in absolute measurement units) and 20 counties of Croatia in 2010
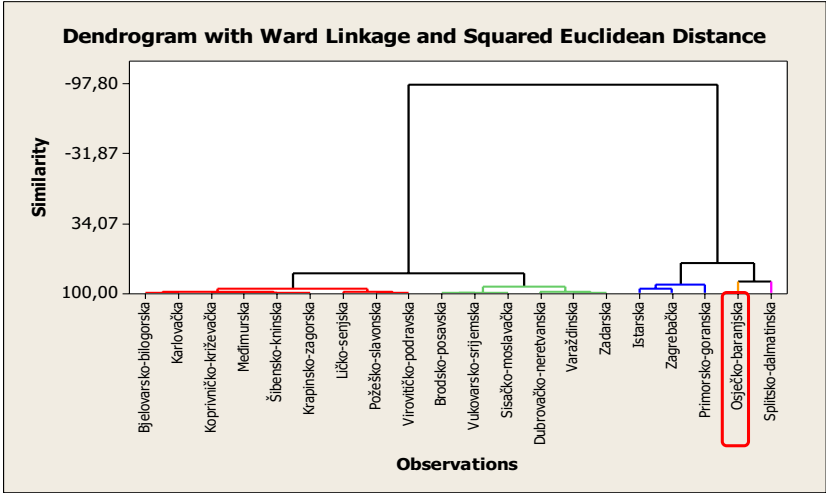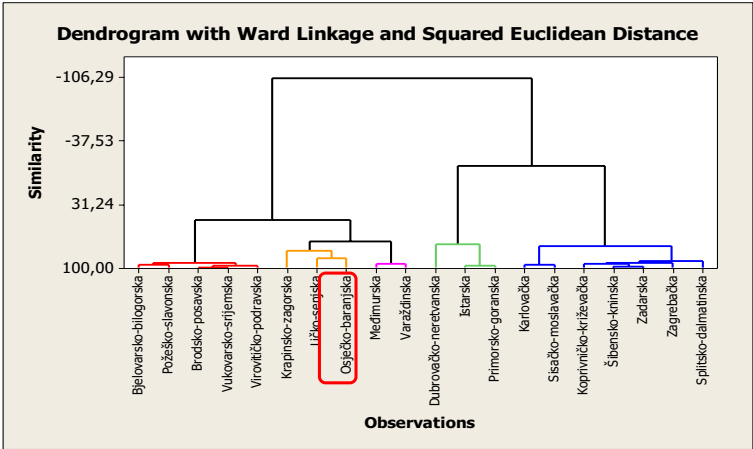

Source: Author's calculations

Cluster analysis based on Ward linkage and squared Euclidean distances for the <u>first</u> group of five variables and 21 counties of Croatia in 2010 gave the five clusters solution and in that case County of Osijek-Baranja was in the same cluster as County of Split-Dalmatia. When clustering was applied for 20 counties only (after excluding City of Zagreb), the position of County of Osijek-Baranja was changed, and it became a single unit cluster of its own, as it is shown in figure 1.

More visible rearranging of clusters followed when cluster analysis was applied firstly for 21 and later for 20 counties based relatively expressed five previously mentioned variables.

Figure 2 Dendrogram based on the second group of five variables (in relative measurement units) and 20 counties of Croatia in 2010

Source: Author's calculations

The five clusters solution based on Ward linkage and squared Euclidean distances for 21 and 20 counties based on the <u>second</u> group of five relatively given variables showed visibly different results compared to the usage of absolutely given variables. After excluding City of Zagreb from the cluster analysis, the County of Osijek-Baranja moved from the seven-member cluster, where it was together with the counties of: Bjelovar-Bilogora, Požega-Slavonija, Slavonski Brod-Posavina, Vukovar-Sirmium, Virovitica-Podravina and Sisak-Moslavina to the three-members cluster with the counties of Krapina-Zagorje and Lika-Senj, as it can be seen in figure 2. This means that the presence of City of Zagreb with extremely high values of bank's net assets, GDP *per capita* and outlying values of some other variables highly influences the position of remaining counties of Croatia, and especially of County of Osijek-Baranja, so rearranging and new clustering of 20 counties based on five variables resulted.

4. Conclusion

Developed mechanism of financial intermediation is essential for achieving economic development. Numerous studies researched this relationship with a prevailing conclusion of positive influence of financial intermediation on economic growth. Due to limited availability of data, especially longer time series of selected indicators, in this paper methodology is limited to descriptive exploratory analysis, concentration and cluster analysis of selected banking and economic indicators. The findings in this paper reveal high values for certain banking indicators for certain counties in Croatia and relatively significant concentration for most indicators. The City of Zagreb appeared to be an outlier considering very high concentration ratio C_1 especially for bank's net assets. Clusters of similar counties are recognised after a multivariate cluster analysis was applied. Cluster analysis including and excluding Grad Zagreb gave different results. Cluster analysis on first group of indicator which represented indicators in absolute values combining economic and banking indicators excluding City of Zagreb positions Counties in five clusters and County of Osijek-Baranja was cluster for itself. Cluster analysis on banking and economic indicators of relative value excluding City of Zagreb formed five clusters and County of Osijek-Baranja was in the cluster together with counties of Krapina-Zagorje and Lika-Senj. Cluster analysis indicates that the County of Osijek-Baranja is in cluster of medium or less developed counties according to used banking and economic indicators. The research results and further research in this field might be a useful tool for government structures in forming regional policies, as well as for financial institutions, primarily banks, in shaping market approach and re-examining market potential of a particular county.

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