Conference Paper

Determinants of Internet Financial Reporting of Croatian Banks – Panel Analysis

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Abstract

In the recent years, reporting and transparency of banks is in the focus of national and international regulators and their aim is to increase the transparency of financial institutions in order to strengthen stability of the banking system. In this paper, the authors used dynamic panel analysis in order to analyze the practice of Internet financial reporting of Croatian banks in the period from 2010 to 2014. Research of Bank's Internet financial reporting practices was carried out at two levels. At the first, descriptive level, the goal of the research was to determine the level as well as trends of Internet financial reporting of 27 Croatian banks during the observed period. It is assumed that the level of Internet financial reporting during the analyzed period increased as a result of stricter regulations in the financial sector. In order to measure the level of financial reporting by banks, Bank Internet financial reporting score was developed on the basis of 45 elements - criteria which are divided into two groups: financial reporting (20 elements) and corporate governance and risks (25 elements). The second goal of the research was to determine factors that significantly affect the practice of Bank Internet financial reporting in Croatia. The authors applied dynamic panel analysis in order to determine the impact of size, profitability, adequacy of capital and ownership structure on the level of Internet financial reporting of banks.

Keywords: Internal financial reporting, determinants, banking sector, panel analysis

1. Introduction

Development and widespread use of Internet technologies have enabled companies' cheap and quick way of presenting information on the business operations to a wide range of users. On the other side, users usually use Internet to obtain different information. Therefore, the Internet financial reporting today is the common practice of financial and non-financial companies and there is a large number of studies dealing with the analysis of the Internet financial reporting practices. Through this paper authors conducted a research of Internet financial reporting of Croatian banks. Conducted research has two aspects: comparative and explanatory. Within the comparative part of the research goal is to determine the level of Internet financial reporting by banks in the period 2010-2014, and in the explanatory part of the study variables or factors that significantly affect the level of transparency of Croatian banks are being determined.

Papers dealing with Internet financial reporting of banks are not as extensive as those related to the analysis of Internet financial reporting of non-financial companies and thus, within this paper emphasis is on features of Internet financial reporting of banks. As contribution of this paper in relation to similar studies, designing new index of Bank's Internet financial reporting (BIFRS) may be pointed out. This index consists of 45 elements or criteria related to the characteristics of corporate governance, financial reporting and risk management in banks. Also, in order to determine the factors which affect banks' Internet financial reporting, authors used a dynamic panel analysis on a sample of Croatian banks.

The paper is structured as follows. After the introductory part, second part of the paper shows the previous research related to financial reporting of banks. The third part shows the structure of the research: research sample, methodology for designing the index of bank Internet financial reporting and research hypothesis. Results of the conducted research are presented in the fourth part of the paper and within the last part of the paper, concluding remarks are given.

2. Previous Research on Internet Financial Reporting of Banks

Internal financial reporting is today common practice of financial and non-financial companies and there is a large number of studies dealing with the analysis of Internet financial reporting practices. However, it should be pointed out that papers dealing with Internet financial reporting of banks are not as extensive as those related to the analysis of Internet financial reporting of non-financial companies.

In one of the earlier studies related to reporting of banks authors Kahl and Belkaoui (1981) [14] analyzed the extent of disclosure by 70 banks from 18 countries. Results of their research indicated that reporting practices of banks were different among the observed countries and that there was a positive relationship between the size of the bank and the level of disclosure. In [13] analyzed the factors affecting the Internet financial reporting of banks in Bahrain. By applying the method of discriminant analysis the authors came to conclusion that the financial reporting on the Internet was most affected by the size of the bank. In [9] investigated the reporting practices of banks in Bangladesh and the relationship between the level of reporting and bank size, profitability and bank auditor. Disclosure index comprised of 61 items, including both voluntary and mandatory items. The results showed that the size and profitability of banks significantly affected the level of reporting. Similar research was conducted on a sample of Indian banks [6] and research results showed that the size of the bank and banks' leverage significantly affected the extent of reporting while variables percentage of state ownership, percentage of foreign ownership and profitability were not significantly related to the level of disclosure. In [4] conducted extensive research on a sample of 600 banks from 31 countries in the period 1993-2000. They created a composite disclosure index that consisted of 17 sub-indices in order to determine which segments of banks' reporting are most useful from the bank's point of view and which are the most useful for financial users. Results have shown that increased disclosure

decreases stock volatility, increases market values and increases the usefulness of information in predicting valuations.

A comprehensive descriptive research on the topic of bank disclosure was conducted by [12]. He created a composite Bank disclosure Index and analyzed disclosure practices on a sample of 20.000 banks from 180 countries in the period 1995-2004. The research results indicate an increase in the transparency of banks in the observed period. OECD countries have greater bank transparency in relation to other countries, and among the developed countries, the banking system of the United States proved to be one of the most transparent in the entire research period. In [10] conducted a study on mandatory and voluntary reporting of listing banks in India. Index of total 184 items was created out of which 101 were mandatory and 83 were voluntary items. The research results showed that bank size, profitability, board structure and market discipline were significant while variables bank age, complexity of business and assets in place were not significant in explaining the level of bank's disclosure. Research results also indicated that Indian banks are very compliant with the rules regarding mandatory reporting and average index value for this segment equals 88. In the segment of voluntary reporting index is quite lower and it amounts 25.

Research on E-reporting of Croatian banks was performed by [15] on a sample of 32 banks. According to the research large banks, more profitable banks and banks that have a lower rate of capital adequacy have higher both mandatory and voluntary disclosure indexes. In [5] analyzed the determinants of voluntary bank reporting on the sample of banks listed on the Kazakhstan Stock Exchange. The authors examined the effect of size, age and board composition on the voluntary bank disclosure, and according to research results, size and the number of outside directors in the board have positive impact on the level of bank disclosure score. Study performed on a sample of listed banks in Bangladesh by [3] reveals that most of the listed banks have satisfactory level of voluntary disclosure. The average value of the disclosure index amounted 62%, and both variables size and the age of the bank proved to be significant factors in explaining levels of bank disclosure in Bangladesh.

Determinants of voluntary reporting of listing banks in Tunisia were analyzed by [8]. Their research results indicate that bank disclosure is negatively related to factors such as larger board, blockholder ownership and state ownership. Variables foreign ownership and bank performance are positively related to bank disclosure, while no significant relationship with the bank disclosure was noted for the proportion of independent directors, CEO duality and auditor reputation variables. Also, results indicate that larger banks are more transparent since positive relationship was confirmed for the size variable. Similar research was conducted on a sample of commercial banks from Nepal [20]. With regard to selected determinants of bank Internet reporting variables foreign ownership, board independence and bank size were found to be significantly associated with web-based disclosure. In [21] analyzed the factors that explain the differences in bank transparency in seven developing countries. According to results the ownership concentration has a negative impact on transparency while the positive effect was observed for the variable state ownership. The authors also included macroeconomic and legal factors in the analysis and observed positive impact of the

Banks	2010.	2011.	2012.	2013.	2014.
Number of banks at the beginning of the year	32	32	31	30	29
Banks that merged with other banks	-	-	1	-	1
Banks whose authorization has been withdrawn	-	1	-	1	1
Number of banks at the end of the year	**32**	**31**	**30**	**29**	**27**

TABLE 1: Research sample.

existence of an explicit deposit insurance system and protection of shareholders' rights on transparency. Furthermore, negative association was found between bank transparency and variables development of financial market and inflation. Finally, positive correlation between transparency and bank profitability measured by indicators ROA and ROE was confirmed.

3. Research Structure

3.1. Research Sample

Analysis of bank Internet financial reporting was conducted on a sample of banks that operated in the Republic of Croatia in period 2010-2014. Since the research refers to the period from 2010 to 2014, the number of banks has varied from 32 banks in 2010 to 27 banks in 2014. In this period a decline in a number of banks on Croatian banking market can be noted and reasons for such trend are merger processes and withdrawal of the authorization for operating from the Croatian National Bank. Specifically, in the observed period for three banks authorization has been withdrawn and a procedure of forced liquidation or bankruptcy was started. Furthermore, through merging processes two banks were merged with other banks. Finally, the study was conducted only on those banks that were operating continuously in the whole period meaning that sample included a total of 27 banks. Data on banks that operated in the Republic of Croatia in the observed period were collected from the web site of Croatian National Bank and afterwards all required data were collected from the annual reports and reports on public disclosure of compliance with prudential requirements that were available on the website of each bank.

3.2. Bank Internet Financial Reporting Score

In order to measure the level of banks' Internet financial reporting, bank Internet financial reporting score (BIFRS) was developed on the basis of 45 elements - criteria. The score is based on the works of Pervan (2006), and the original version of the index was expanded and amended by elements that are specific to bank reporting and defined through appropriate legislation (Credit Institutions Act, OG, No. 159/2013,

19/2015, 102/2015, Regulation [19]. The index consists of 45 elements which are divided into two groups: financial reporting (20 elements) and corporate governance and risks (25 elements). The structure of the index is presented in table 2.

In forming the overall bank Internet financial reporting score each individual criteria has an equal weighting. It should be noted that there are different approaches in the literature where the authors defined different weights for each group of criteria [16, 18]. In this paper, in order to avoid subjectivity, authors have chosen equal weights for all the criteria. For each defined criteria it is determined whether the bank reports about it or not, meaning that score may be 1 (criteria is met) or 0 (criteria is not met). Overall bank Internet financial reporting score is calculated by simple summing grades for each criteria whereby the maximum possible score can be 45.

3.3. Research Hypotheses

At first, descriptive level, the aim of the research is to determine the achieved level of financial reporting by banks. In recent years reporting and transparency of banks are in the focus of regulators whose aim is to increase the transparency of financial institutions in order to strengthen the stability of the banking system. In this paper, analysis was conducted for the period from 2010 to 2014 and it is assumed that the level of financial reporting in the observed period increased as a result of improved practices of corporate reporting by banks due to the tightening of regulations related to financial reporting generally as well as regulations that refer to specific reporting requirements in the banking sector. At the other, explanatory level, the aim of the research is to determine the factors that significantly affect the reporting practices of banks in the Republic of Croatia. In this part of the paper hypotheses are formulated based on the theoretical framework from previous research related to the Internet financial reporting. Explanatory research usually use various theories that explain voluntary financial reporting (agency theory and signaling theory). In most of such research it is assumed that larger companies have greater agent costs and that intense financial reporting can reduce these costs [16]. Thus, it can be assumed that the size of the bank significantly influences the scope of financial reporting, and most of the studies confirmed a positive relationship between the size of the bank and the level of transparency [3]. Based on these theoretical assumptions first research hypothesis was formed:

H1: There is a significant and positive correlation between the size of bank and the level of the Internet financial reporting.

According to the signaling theory profitable companies try to distinguish from less profitable through enhanced financial reporting. Also, more profitable companies have extra financial resources and have more incentives to disclose to both the stakeholders and the public that they are more profitable than their counterparts in the same industry (Basuony & Mohamed, 2014). On the other hand, there are opposite opinions that less profitable companies will try to explain the reasons of poor financial performance and mitigate negative consequences and loss of reputation through increased financial reporting. Due to impact of profitability, at the level of bank Internet financial reporting mixed results can be found in literature. According to [9, 10] there is positive

	Financial reporting
1.	Balance sheet
2.	Profit and loss account
3.	Statement of Comprehensive Income
4.	Statement of Cash Flows
5.	Changes in shareholder equity statement
6.	Notes to the financial statements
7.	Annual report
8.	Semi-annual reports
9.	Quarterly reports
10.	Audit report
11.	Reports from previous years
12.	Consolidated financial statements
13.	Statement of managements responsibility for the financial reports
14.	Accounting policies
15.	Subsequent events
16.	Future development of the company
17.	Financial instruments
18.	Financial performance (ROA)
19.	Information on purchase of own shares
20.	Segment reports
	Corporate governance and risks
21.	Statement on application of code of corporate governance
22.	Applied rules of corporate governance
23.	Organizational structure of the bank
24.	Description of legal persons in the group
25.	History of the bank and a brief description of the business
26.	Data about the management
27.	Data about the members of the Supervisory Board
28.	Diversity policy in the selection of the management members
29.	Research and development activities
30.	Press and public releases
31.	Reporting on social responsibility
32.	Information on employees
33.	Corporate strategies
34.	The composition of the nomination committee, the risk committee and committee for compensations
35.	Composition of the audit committee
36.	Compensation policies
37.	Objectives and policy of the company related to financial risk management
38.	Information on market risk
39.	Information on credit risk
40.	Information on liquidity risk
41.	Information on operational risk
42.	Information on currency risk
43.	Information on interest rate risk
44.	Information on regulatory capital
45.	Capital requirements

TABLE 2: Criteria for the formation of bank Internet financial reporting score.

relationship between profitability and the level of bank transparency. However, there are papers that found negative relationship or no relationship between these variables [6, 11, 16]. According to previous mixed research results second research hypothesis was defined:

H2: There is a significant relationship between bank profitability and the level of Internet financial reporting.

Capital adequacy can be seen as an indicator of the bank stability and measure of market discipline. Specifically, in order to ensure the stability of the financial system, regulators define the minimum capital requirements which banks must comply so it can be assumed that the fulfillment of the capital requirements is associated with the level of bank reporting. In [10, 15] found a negative relationship between the level of reporting and capital adequacy as a measure of market discipline. However, authors question whether such relation is caused by lower monitoring or bankruptcy costs or by the fact that large banks can hold smaller amounts of own funds since they are too big to fail and have better risk management practices [15]. In [6] found weak support to indicate that banks with higher capital adequacy ratios provide more transparent disclosures. This result can be explained within the assumptions of signaling theory due to the fact that stronger banks enhance their disclosure transparency as a signal to investors. Based on the opposite findings of previous research the aim of this research is to examine the direction and intensity of relation between capital adequacy and Internet financial reporting by testing the following hypothesis:

H3: There is a significant and positive correlation between capital adequacy and the level of bank Internet financial reporting.

The ownership structure measured by the share of foreign ownership can also be an important factor in bank reporting. Significant number of banks that operate in the Republic of Croatia is in foreign ownership, and since the foreign owners are mainly from developed EU countries with developed capital markets and better corporate governance practices, their access to financial reporting may be significantly different. Foreign owners may be more aware of the importance of transparency than the local owners and thus it can be expected that foreign ownership has a positive impact on the level of banks' Internet financial reporting. In [8] found a positive impact of foreign ownership on the level of voluntary reporting by banks and [17] confirmed a significant influence of foreign ownership on the level of Internet financial reporting on a sample of non-financial companies. Based on such results following hypothesis was formed:

H4: There is a significant and positive correlation between foreign ownership and the level of bank Internet financial reporting.

3.4. Research Results

In this paper, the authors analyzed the practice of the Internet financial reporting by banks in the period of 2010-2014 on a sample of 27 Croatian banks applying dynamic panel analysis. The research of banks' Internet financial reporting practices was performed on two levels. At first, descriptive level, the authors analyzed the achieved

Hypothesis	Predicted sign	Proxy variable
H1 (size)	+	Logarithm of deposits
H2 (profitability)	+/-	Return on assets (net profit/total assets)
H3 (capital adequacy)	+	Adequacy capital ratio
H4 (foreign ownership)	+	Majority foreign ownership: yes/no

TABLE 3: Proxy and predicted sign for explanatory variables.

Year	2010	2011	2012	2013	2014
BIFRS	28.19	29.59	30.07	32.62	32.22

TABLE 4: Bank Internet financial reporting score *(BIFRS)*. Source: Authors' calculations.

level of bank's Internet financial reporting in the observed period. Bank Internet financial reporting score *(BIFRS)* was measured according to 45 criteria presented in table 2 for 27 banks in each year of the observed period. The average value of bank Internet financial reporting score can be observed as the achieved level of bank's transparency and the obtained results are shown in table 4. With regard to obtained results, a slight increase in bank Internet financial reporting can be noted. Average BIFRS score in 2010 was 28.19 and in 2014 it amounts to 32.22 which implies that banks improved their Internet financial reporting practices in the observed period. Such results are consistent with our expectations and are a consequence of increased financial reporting requirements in general as well as increased requirements in the area of bank operations regarding risk reporting and other reporting requirements stated in the Credit Institutions Act.

In the second part of the study the authors analyzed the factors that influence the practice of banks' Internet financial reporting practices in Croatia. Descriptive statistics for the variables used in the study is shown in table 5.

The authors used dynamic panel model in order to examine the impact of size, profitability, capital adequacy and ownership structure on the level of Internet financial reporting of banks. Dependent variable, bank Internet financial reporting score *(BIFRS)* appears in the model as an explanatory factor so it correlates with the error term and the assumption of strict exogeneity of the regressors cannot be applied. In order to overcome this issue and to obtain consistent estimator of δ, a generalized methods of moments (GMM) panel estimator, developed for dynamic panel models by [2], was

Variable	Obs.	Mean	Std. Dev.	Min.	Max
BIFRS	135	30.19259	6.778474	2	41
SIZE	135	9.413279	0.7204011	8.099318	10.94782
ROA	135	3.473232	5.299397	-12.85584	11.08207
CAPAD	135	18.56926	7.488205	-4.18	45.61
OWNER	135	0.614814	0.488451	0	1

TABLE 5: Descriptive statistics. Source: Authors' calculations.

Variable	BIFRS	ROA	SIZE	CAPAD	OWNER
BIFRS	1.0000				
ROA	-0.1294	1.0000			
SIZE	0.5566	0.1161	1.0000		
CAPAD	-0.0731	0.1465	-0.1023	1.0000	
OWNER	0.1443	0.0819	0.2497	0.3702	1.0000

TABLE 6: Pairwise correlation. Source: Authors' calculations.

employed on the data for 27 banks which operated in the Republic of Croatia in the period 2010-2014.

$$BIFRS_{it} = \alpha + \delta BIFRS_{i,t-1} + \beta_1 ROA_{it} + \beta_2 SIZE_{it} + \beta_3 CAPAD_{it} + \beta_4 OWNER_{it} + \varepsilon_{it},$$

$$\varepsilon_{it} = v_i + u_{it} \tag{1}$$

In model (1), the variable $BIFRS_{it}$ presents the level of Internet financial reporting of bank i at time t, with i = 1,...., N, t = 1...., T; α is a constant term, $BIFRS_{i,t-1}$ is one-period lagged bank Internet financial reporting score, δ is the speed of adjustment to equilibrium, ROA represents bank profitability, $SIZE$ stands for bank size, $CAPAD$ stands for capital adequacy and $OWNER$ stands for structure of bank ownership. Furthermore, $\beta_{1....} \beta_4$ are the parameters of variables of our interest, ε_{it} is the disturbance, with v_i the unobserved firm-specific effect and u_{it} the idiosyncratic error.

The results of the pairwise correlation matrix are presented in table 6, from which it is clear that most of the correlation coefficients demonstrate weak correlation between variables. The highest correlation is observed between variables $SIZE$ and $BIFRS$ and it amounts 0.5566. Such correlation results do not indicate the problem of multicollinearity.

Table 7 shows results of applied dynamic panel analysis. Sargan test of over-identifying restrictions verifies the overall validity of instruments. This is achieved by examining the moment conditions' sample analogue used in the estimation process [1]. The instrument will be assumed as valid and the dynamic panel model will be adequately specified if the moment condition holds. Another requirement for consistent estimation by using GMM estimator is that the error is serially uncorrelated. This is tested by m_1 and m_2 Arellano and Bond test statistics. It is considered that the GMM system estimator is consistent if there is no second-order serial correlation in residuals (m_2 statistics) while the presence of a first-order autocorrelation in the differenced residuals (m_1 statistics) does not imply that the estimates are inconsistent.

Regarding the data presented in table 7 it can be concluded that the dynamic panel model is adequately specified. Arellano and Bond test statistics does not indicate presence of second-order autocorrelation and Sargan test shows no evidence of over-identifying restrictions. According to the obtained results, lagged bank Internet financial reporting variable ($BIFRS_{(t-1)}$) has statistically significant influence on current bank's reporting practices which confirms the dynamic character of the model specification. Variable $SIZE$ has positive impact on banks' financial reporting practices meaning that

Variables	BIFRS	
	Coef.	P>|z|
BIFRS$_{(t-1)}$	0.156272	0.0130
SIZE	10.39367	0.0000
ROA	-0.163317	0.0280
CAPAD	0.033738	0.7780
OWNER	1.530627	0.0910
Cons	-72.48455	0.0001
No. of observations	135	
Sargan test (p-value)	0.1255	
Arellano-Bond (m_1)(p-value)	0.0466	
Arellano-Bond (m_2) (p-value)	0.3258	

TABLE 7: Parameter estimates of dynamic panel model. Source: Authors' calculations.

larger banks publish more information on Internet and such result is in line with previous studies [3]. Research results confirmed the assumption of agency theory according to which larger companies have greater agent costs and more comprehensive financial reporting can reduce these costs.

Furthermore, variable *ROA* has statistically significant negative influence on bank's reporting practices. This result implies that less profitable banks try to explain the reasons for poor financial performance and mitigate negative consequences and loss of reputation. Variable *CAPAD* was not significant meaning that hypothesis related to the impact of capital adequacy on bank's Internet financial reporting practices was not confirmed. Finally, variable *OWNER* was significant at 10% level and the sign of coefficient is in line with our expectations. Such result implies that banks in foreign ownership are more transparent and have better Internet financial reporting practices than those in domestic ownership. In general, research results are in line with our expectations and are comparable with findings from previous studies related to Internet financial reporting practices with emphasis on Internet financial reporting of banks.

4. Conclusion

Through this paper authors analyzed the practice of Banks' Internet financial reporting in the period of 2010-2014 on a sample of 27 Croatian banks. In the first part of the research the authors analyzed the achieved level of banks' Internet financial reporting in the observed period by measuring Bank Internet financial reporting score (BIFRS). Research results indicate that Croatian banks are transparent since the average BIFRS value in the observed period amounts 30.19. However, this average value represents 67% of maximal score value which amounts 45 indicating that there is still area for further improvements. When analyzing the average BIFRS score in each year of the study separately, than a slight increase in BIFRS score can be noticed. More precisely, average BIFRS score in 2010 was 28.19 and in 2014 it amounts 32.22 which implies that banks improved their Internet financial reporting practices in the observed period. Such

results can be attributed to increased financial reporting requirements in general as well as increased requirements in the area of bank operations regarding risk reporting and other reporting requirements stated in the Credit Institutions Act.

In the second part of the study authors used dynamic panel model in order to examine the impact of size, profitability, capital adequacy and ownership structure on the level of Internet financial reporting of banks. It should be emphasized that through this research the practice of Internet financial reporting on a sample of Croatian banks was for the first time analyzed by using the dynamic panel analysis which makes additional contribution of this paper. Results of conducted panel analysis indicated that BIFRS was positively related with bank size and ownership structure. Negative relation was confirmed for profitability variable while variable representing capital adequacy was not found significant. Such results indicated that larger banks publish more information on the Internet and tend to reduce agent costs through intense financial reporting. Also, banks in foreign ownership are more transparent and have better financial reporting practices. That implies the conclusion that foreign owners are more aware of the importance of business transparency and need more disclosure in order to monitor management than domestic owners. ROA as a measure of bank's profitability was negatively related to BIFRS indicating that less profitable banks try to explain the reasons of poor financial performance. In the future, the research on Bank's Internet financial reporting score could be improved by including different criteria or adding weights to individual criteria or groups of criteria.

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