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An empirical study to measure the impact of financial and macro economical figures on capital adequacy

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ABSTRACT

Capital adequacy plays an important role for reducing different risk components in banking industry. In this paper, we present an empirical study to measure the impact of financial and macro economical factors on capital adequacy. We gather the necessary information from financial statements and balance sheets of nine Iranian private banks over the period of 2005-2011. The results of analyzing the data based on the implementation of linear regression technique reveal that there are some meaningful relationship between financial figures, including bank size and profitability, and capital adequacy. However, the survey does not show any relationship between macro economical factors, including growth domestic product and inflations, and capital adequacy.

1. Introduction

Capital adequacy (CA) is believed as one of most important criteria for measure financial capability of banking systems. It shows banks' ability to pay their loans and it is one of the primary requirements for listing in stock exchange (Schooner & Taylor, 2010; Fadzlan & Habibullah, 2010). There are many studies to see the relationship between capital adequacy and other financial and macroeconomic figures. Lin et al. (2005) investigated risk-based capital adequacy in evaluating on insolvency-risk and financial performances in Taiwan's banking industry. They implemented the index of insolvency-risk (IR) to the failure risk in Taiwan's banking industry over the period of 1993–2000, to find out the relationship between (CA) in evaluating on IR and financial performances. The study tried to indicate the diverse impacts before and after the revision of capital-adequacy regulation in Taiwan, which was, at the end of 1998.

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They reported a positive relationship between the CA and the IR index, and a substantially positive relationship between the CA and different financial performances. Alternatively, the study showed a substantially negative relationship between IR and financial performances. They also provided some recommendations on risk management for all the stakeholders, government, banking and financial industry.

Tanveer Shehzad et al. (2010) in an assignment investigated the effect of bank ownership concentration on two factors of bank riskiness, namely banks' non-performing loans and CA based on the financial information of approximately 500 commercial banks over a period of 2005–2007. They found that concentrated ownership could substantially reduce a bank's non-performing loans ratio, conditional on supervisory control and shareholders protection rights. In addition, ownership concentration also were reported to have important impact on CA ratio positively conditional on shareholder protection. Simshauser (2010) Resource adequacy, capital adequacy and investment uncertainty in the Australian power market.

Arnold et al. (2012) analyzed different aspects, which need to be considered when promoting financial stability, monitoring the progress made in some key aspects and the remaining challenges. The study investigated the measurement of systemic risk and of individual institutions' contribution to it and explained various issues of macroprudential frameworks, including how the countercyclical capital buffer envisaged in Basel III takes into account the ownerships of the financial cycle and the strengths and weaknesses of macro-stress tests. The study also analyzed some possible challenges of how best to control financial systems to detect signs of vulnerability, which could lead to future bouts of financial instability and of how to set prudential policy accordingly. In addition, the study discussed the evolution of CA standards and the new emphasis on liquidity standards and regulations.

Ho and Hsu (2010) investigated the relationship between firms' financial framework and their risky investment policies in Taiwan's banking industry. They used regression analysis in two different periods of before the period of 1996-2000 and after the first financial reform of 2001–2006 to study the effects of the first financial reform on banking firms' financial structures. The first results indicated that the restrictions on CAR had influenced firms' risky investment strategies, as market share and leverage were positively related. The results of the second study indicated that the firm performance was positively associated with firm size, leverage and financial cost. Finally, the regression results demonstrated that financial structures for banking firms were positively associated with the states of business cycle.

Mishra and Sharma (2011) investigated India's demand for international reserve by concentrating on the effect of national monetary disequilibrium. They evaluated India's position in terms of reserve adequacy and reported that India was well placed and could meet the minimum adequacy requirements. In addition, their results disclosed that the central bank was holding significant excess reserves and the related opportunity cost (1.5% of GDP) appeared to be quite considerable. Further, the estimates of reserve demand function recommended that scale of foreign trade, uncertainty and profitability considerations was an important factor to determine India's long-term reserve demand regulations. More importantly, their results indicated that national monetary disequilibrium did play a crucial impact in short-run reserve movements.

Ghadimi et al. (2012) studied the impact of various important factors on profitability of banking system in Iran for a panel data over the period of 2001-2010. The sample of banking system incorporated ten various banks with two different types of internal and external variables. Internal factors included ownership ratio, ratio of total loans given to all assets, ratio of bank customers' deposit to banks' assets, ratio of interest free revenues, ratio of total interest free loans on total assets, on total revenue. External factors included actual rate of interest, economic growth, and inflation rate. They implemented econometrics technique and their results indicated that ownership ratio, ratio of total equity on total assets, along with inflation rate had negative effect on profitability. Besides, the

ratio of customers' deposit on total assets, the ratio of total loans on total assets and economic growth had positive influence on profitability.

Samadi et al. (2012) studied the impacts of operating risk and capital structure on profitability of banking industry. The study included 17 commercial banks, which were active from 2006 to 2010 in Iran and the results of the study indicated that although there was a positive relationship between capital structure and profitability but there was no meaningful relationship between operating risk and capital structure.

In this paper, we present an empirical study to measure the impact of financial and economical on capital adequacy. We gather the necessary information from financial statements and balance sheets of nine Iranian private banks over the period of 2005-2011. The organization of this paper first presents the problem statement in section 2. Section 3 reports the results of our survey and finally, concluding remarks are given in the last to summarize the contribution of the paper.

2. The proposed model

The proposed model of this paper considers one main hypothesis as follows,

Main hypothesis: There is a meaningful relationship between CA and macro econometrical factors.

Based on this idea, we propose two sub-hypotheses as follows,

1. There is a meaningful relationship between inflation and CA.
2. There is a meaningful relationship between econometrical factors and CA.

The second hypothesis implies that there is a meaningful relationship between financial figures and CA.

1. There is a meaningful relationship between profitability and CA.
2. There is a meaningful relationship between bank size and CA.

We gather the necessary information from financial statements and balance sheets of nine Iranian private banks over the period of 2005-2011. The proposed study of this paper uses the following regression model.

$$CAR_{i,t}=\beta_0+\beta_1 ROA_{i,t}+\beta_2 Size_{i,t}+\beta_3 Inf_{i,t}+\beta_4 GDP_{i,t}+\beta_5 CRisk_{i,t}+\beta_6 InsRisk_{i,t}+\beta_7 P_{i,t}+\beta_8 OE_{i,t}+\varepsilon_{i,t}, \quad (1)$$

where $CAP_{i,t}$ is the CA ratio calculated as based capital divided by total weighted assets for risk analysis in terms of percent. This ratio reflects the performance of banks and it is an obligatory rules for all banks to calculate this ratio and report it to central bank of Iran. In addition, $ROA_{i,t}$ is return on assets, $Size_{i,t}$ is bank size, $GDP_{i,t}$ is growth domestic product, $Inf_{i,t}$ represents inflation, $CRisk_{i,t}$ is credit risk, which is calculated as the ratio of received acquired loans by total assets, $InsRisk_{i,t}$ is the risk of not being able to pay the liabilities and it is the same as current ratio, $P_{i,t}$ is the average stock price and $\beta_8 OE_{i,t}$ is the operating efficiency, which is calculated as the operating expenses on operating profit.

3. The results

In this section, we present details of our finding on the regression function and we first present some basic statistical observations such as mean, standard deviation, Skewness, etc.

Table 1
Basic statistics

	CA	ROA	Size	Inf	GDP	CRisk	InsRisk	P	OE
Mean	11.175	0.0195	18.752	17.108	0.224	0.073	0.994	2222.8	1.530
Median	9.255	0.020	19.000	18.400	0.208	0.048	1.030	2118.5	0.773
Max	28.290	0.050	20.470	25.400	0.404	0.445	1.494	4145	7.208
Min	4.900	0.000	16.910	10.800	0.054	0.000	0.173	1035	-0.763
Standard deviation	5.065	0.012	1.050	5.266	0.106	0.081	0.235	886.9	1.703
Skewness	1.632	0.843	-0.229	0.310	0.156	2.401	-1.604	0.552	1.552
Strain	5.333	2.790	1.848	1.632	2.579	10.761	7.153	2.416	4.833
Jarkko Ruutu	6.20236	5.654	3.008	4.609	0.559	6.13	5.932	2.597	7.456
P-Value	0.062	0.059	0.222	0.0998	0.756	0.060	0.061	0.273	0.068

Next, we study the correlation among different variable in order to find out whether there is any strong correlation between dependent variable and independent variables and Table 2 shows the results.

Table 2
The results of correlations

	CA	ROA	Size	Inf	GDP	CRisk	InsRisk	P	OE
CA	1	0.702	-0.425	-0.024	-0.066	-0.248	0.299	-0.056	-0.381
P-value		.000	.001	.974	.770	.049	.045	.019	.005
ROA	0.702	1	-0.587	-0.011	0.091	-0.312	-0.127	0.502	-0.391
P-Value	.000		.000	.757	.966	.011	.478	.001	.006
Size	-0.425	-0.587	1	-0.037	-0.148	-0.014	0.204	-0.426	0.384
P-Value	.001	.000		.955	.687	.740	.193	.009	.012
Inf	-0.024	-0.011	-0.037	1	0.477	-0.026	0.001	-0.219	0.009
P-Value	.974	.757	.955		.004	.882	.960	.178	.645
GDP growth	-0.066	0.091	-0.148	0.477	1	-0.153	-0.052	0.066	-0.257
P-Value	.770	.966	.687	.004		.556	.785	.724	.696
CRisk	-0.248	-0.312	-0.014	-0.026	-0.153	1	-0.039	-0.286	0.165
P-Value	.049	.011	.740	.882	.556		.783	.301	.327
InsRisk	0.299	-0.127	0.204	0.001	-0.052	-0.039	1	-0.323	0.019
P-Value	.045	.478	.193	.960	.785	.783		.050	.972
P	-0.056	0.502	-0.426	-0.219	0.066	-0.286	-0.323	1	-0.367
P-Value	.019	.001	.009	.178	.724	.301	.050		.068
OE	-0.381	-0.391	0.384	0.009	-0.257	0.165	0.019	-0.367	1
P-Value	.005	.006	.012	.645	.696	.327	.972	.068	

As we can observe from the results of Table 2, there are some meaningful correlation between independent variables and dependent variables when the level of significance is set to one percent. We have used ordinary least square technique (OLS) on Eq. (1) and F-value has been calculated as 2.949497 with 8 and 23 degrees of freedom and the level of significance was 0.0413. Chi-Square value was also calculated as 23.119 with 8 degrees of freedom and significance level of 0.0032, which means the relationships are all linear and we can rely on the results of OLS estimation. Table 3 shows details of our findings from the implementation of regression technique.

The results of regression analysis yields R^2=0.743928, adjusted R^2=0.677845, F-Value=11.25748 with P-value= 0.00000. This means that the independent variables can describe approximately 68% of the changes on dependent variable. In addition, Durbin-Watson ratio is calculated as 1.7131, which means there is no correlation between residuals. The results indicate that there is a meaningful and positive relationship between ROA and CRisk with CA. In addition, there is a meaningful and negative relationship between bank size, stock price and operating efficiency and CA. Therefore, we can accept the first two sub-hypotheses associated with the second main hypothesis. In other word,

there is a meaningful relationship between profitability and bank size with CA. However, we could not confirm any relationship between macro economical factors and CA.

Table 3
The results of regression analysis

	Coefficient	Standard deviation	t-student	P-Value
CA	18.98727	6.572099	2.889073	0.0070
ROA	342.1352	55.00288	6.220314	0.0000
Size	-0.716290	0.349090	-2.051876	0.0487
Inf	-0.050129	0.083306	-0.601745	0.5517
GDP	-0.765650	5.013658	-0.152713	0.8796
CRisk	-5.490578	4.041342	-1.358603	0.1841
InsRisk	6.117739	2.601275	2.351824	0.0252
P	-0.002260	0.000816	-2.768341	0.0094
OE	-0.563916	0.123871	-4.552447	0.0001

The results of this survey are not consistent with the results of Awojobi and Amel (2011) in terms of the relationship between bank size and CA. In addition, the results of Awojobi and Amel (2011) did not confirm our positive relationship between profitability and CA. However, the results of this survey are consistent with Awojobi and Amel (2011) in terms of the direct relationship between profitability and CA and reverse relationship between credit risk and CA.

4. Conclusion

In this paper, we have presented an empirical study to measure the effects of financial and macro economical factors on capital adequacy. We have gathered the necessary information from financial statements and balance sheets of nine Iranian private banks over the period of 2005-2011. The results of analyzing the data based on the implementation of linear regression technique revealed that there are some meaningful relationship between financial figures, including bank size and profitability, and capital adequacy. However, the survey does not show any relationship between macro economical factors, including growth domestic product and inflations, and capital adequacy.

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References

Awojobi, O., & Amel, R. (2011). Analysing risk management in banks: Evidence of bank efficiency and macroeconomic impact. *Journal of Money, Investment and Banking*, 22, 147-162.

Arnold, B., Borio, C., Ellis, L., & Moshirian, F. (2012). Systemic risk, macroprudential policy frameworks, monitoring financial systems and the evolution of capital adequacy. *Journal of Banking & Finance*, 36(12), 3125-3132.

Fadzlan, S, & Habibullah, M. (2010). Does economic freedom fosters banks' performance? Panel evidence from Malaysia. *Journal of Contemporary Accounting & Economics*, 6, 77-91.

Ghadimi, M., Taghavi, M., Kassaipour, N. (2012). A study on the effect of different factors on profitability of banking system. *Management Science Letters*, 2, 1849-1854.

Lin, S.L., Penm, J.H.W., Gong, S.C., & Chang, C.S. (2005). Risk-based capital adequacy in assessing on insolvency-risk and financial performances in Taiwan's banking industry. *Research in International Business and Finance*, 19(2), 111-153.

Ho, S.J., & Hsu, S.C. (2010). Leverage, performance and capital adequacy ratio in Taiwan's banking industry. *Japan and the World Economy*, 22(4), 264-272.

Mishra, R.K., & Sharma, C. (2011). India's demand for international reserve and monetary disequilibrium: Reserve adequacy under floating regime. *Journal of Policy Modeling*, 33(6), 901-919.

Samadi, M. T. (2012). An empirical study on the impact of operating risk on structure capital and profitability in Iranian banking sector. *Management Science Letters*, 2, 1689-1694.

Schooner, H.M., & Taylor, M.W. (2010). The new capital adequacy framework: Basel II and credit risk. *Global Bank Regulation,* 147-164.

Simshauser, P. (2010). Resource adequacy, capital adequacy and investment uncertainty in the Australian power market. *The Electricity Journal*, 23(1), 67-84.

Tanveer Shehzad, C., de Haan, J., & Scholtens, B. (2010). The impact of bank ownership concentration on impaired loans and capital adequacy. *Journal of Banking & Finance*, 34(2), 399-408.