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The Effect of Business Cycles' Fluctuations on Bank Profitability: The Case Study on Iran Melli Bank (1992-2014)

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Abstract
Regarding the analysis and stability of both fiscal and banking sectors, the link between business cycles 'fluctuations and banks 'profitability has been highly underscored up to this point. Macroeconomics conditions can impact banks 'performance, thereby they are possible to affect other economic sectors too. The present paper, based on Arellano and Bond (1991) GMM model, examines the impact of macroeconomic variables on Iran Melli Bank's profitability. Paper's respective data were extracted from Iran Melli Bank's balance sheets and Iranian Central Bank temporal series data for the period of 1992-2014. Research findings demonstrate that there is a significant relation between business cycles 'fluctuations and Iran Melli Bank's profitability, accordingly, in addition to downsizing itself for gaining more profits, it should consider investment and and the quality of its production for recession era and also improve its state of liquidity for the boom period.

1. Introduction

Providing financial resources for investors, fund-raising and allocating the resources, banks play a substantial role in states' economic development. Managers, investors and analysers have always been concerned about firms 'performance, as it substantially impacts banks profitability. Estimates show that banks profitability is both affected by those internal issues of firms, including management's decision-making, and changes in the macroeconomics environment (Duraj and Moci, 2015). The close tie between banking industry and other economic sectors is forged upon an inextricable relation among different constituents. Macroeconomics conditions, interruptions by government or central bank in the economy and business circles, formed within global economy, can change profitability of banks, loan recipients, and finally it may negatively impact bank profitability (Heidary, Hadi et al, 2011). Accordingly, in order to

evaluate the stability and soundness of fiscal and banking sectors, it is highly required to be aware about the link between business cycles 'fluctuations and banking sector profitability. A bad economic situation is possible to worsen the portfolio quality of loans, cause credit losses and finally reduce profitability (Gambacorta and Mistrulli, 2004).

Considering how business cycles crucially influence the behaviour of economic firms (banks), how their behaviour/s affects other sectors of the society, and due to the lack of enough research on this area, authors of the present study became motivated to choose "the impact of business cycles 'fluctuations on banks' profitability: the case study on Iran Melli Bank "as the topic of their work. Thereby the main research question here is "what is the type of relation between business cycles 'fluctuations and a bank's profitability?" The significance of the research lies in the fact that it empirically provides investors, creditors and any other ones using financial information with accurate understanding of business cycles 'impact/s on banks' profitability and an analysis of different macroeconomic situations. The research is firstly to examine the relation between the profitability of Iran Melli Bank and business cycles. It is also aimed at informing investors, creditors, financial analysers and other users of financial informations about the aforesaid impact. The research is also expected to have some scientific value and achievements as followings:

1. Its results may expand the theoretical foundations of past research on banks profitability.
2. The evidences provided by the current study may help banks determine the appropriate policy in different economic conditions so as to improve the state and stability of banking system profitability. It can provide investors, creditors, financial analysers and other users within capital market with some useful information.
3. The research results may suggest some new ideas for future research with this field.

Thereby, the research firstly examined some related theories along with the significance of the topic, and then reviewed the literature related to the impact of business cycles 'fluctuations on banks 'profitability. Consequently through collecting balance sheets 'data, profit/loss statement of Iran Melli Bank and extracting information of Iran Melli Bank accounts from the temporal series database of Iranian Central Bank, and using Eviews 8 software, it attempted to estimate the model and finally explain its results.

2. Theoretical Foundations and Literature Review

2.1 Theoretical Framework

Business cyclesare some regular fluctuations in nations 'macroeconomics performance which are regulated by business firms. A cycle begins with an era of economic boom which occurs in different economic activities and leads to recession and economic contraction. These changes occur at many times, however, they are not regular (Borns and Mitchell, 1946). Four stages of a business cycle formation can be summarised as boom and improvement, the climax, recession and the lowest point. A recession follows the economic boom. In this state, total production and goods price both fall, accordingly as banks 'devised services fall among derivative services, the number of banks 'activities decreases, therefore banks profit margin reduces in the end. Thus economic recession causes reduction of income and also regarding investors/owners of the company, it brings about the fall of profit margin and reduction of invest return rate

(Eynian, 2014). On the other hand, companies can't repay their debts to creditors, an issue that leads to the decrease of profit margin and increase of both liquidity and credit risks. As the main economic firms in all countries, banks act within domestic/global economy so that they can gain profits and meet the needs/wants of their customers, employees and shareholders. However the aforementioned aims are fulfilled whether banks behave in accordance with ethics/codes of behaviour and based on understanding diverse economic variables, likewise they should be able to forecast financial/economic factors through proper tools and then take steps in this regard (Albertazzi and Gambacorta 2009). Different factors which are probable to in/directly affect banking profit/s are as followings:

a) Gross Domestic Products(GDP): The total monetary value of the goods, produced by domestic economic units within a specific period (annual or quarterly). In short, upon economic boom, banking facilities are more demanded by households and manufacturing firms, therefore loaners '(banks) financial status will improve through loans 'interests, in other words, banking profitability will rise. (Nazarian and Amini, 2012).

b) Recession: it is the rise in prices general level. However if the fall of both recession and currency value is serious, their impact/s on financial debts and contracts within sectors of income distribution, production, consumption, saving, investing, international trading and etc. will become evident. Recession slows down the pace of economic growth and decreases the profitability of firms, because it reduces saving rates and increases costs/risks of productive investments (Shorak et al, Mutahari et al, 2007).

Iran Melli Bank current properties include cash balance, different investments, received accounts/documents, demands and granted facilities within the framework of Islamic contracts. Its fixed assets encompass some infrastructure resources, including buildings, other immovable properties, computer equipment, furniture and vehicles. The total assets of Iran Melli Bank (current and fixed) assets, which holds an index for assessing bank's size, and accordingly the size is expected to leave a significant effect on bank profitability.

Regarding the bank size measurement, the larger the bank size, the more it can benefit from the advantages of its large size for its transactions, by the way, it gains more profit. Therefore a positive relation is expected to be between the size and profitability of the bank (Ramlall, 2009). Offering facilities to business, industrial and production, banks brings about economic development. Besides, through providing facilities, they foster development of exports, domestic production, industrial, agricultural and domestic business, transportation and ease of imports. Regarding the relation between offered facilities by a bank and its profitability, whether the bank facilities expand, its interest income/s and consequently profitability goes up.

The loans-to-GDP ratio bear witness to the importance of banks within the economy. Thus a respective low ratio means a market-oriented economy in which savers and borrowers (specifically firms), directly, and without banks mediation, negotiate with each other (Albertazzi and Gambacorta, 2009). Due to their vital/potential part in collecting small/large financial resources within national economy and directing them into long-term economic activities, the degree of development along with the level of capital market boom, both are important factors for a state's economic development. Through providing the chance for purchasing and selling

securities, on one hand banks provide the applicants with loans and financial resources, and on the other hand, they offer a good return for suppliers (Nazarian and Amini, 2012). As the stock exchange may work both as the partner and rival of banks, it is expected that fluctuations of the Stock Exchange have a significant relation with bank profitability.

2.2 A Review of Empirical Studies

Growe et al (2014) in a research, through GMM technique, analysed the relation between profitability and measuring the performance of US local banks during the period of 1994-2011. The results of their work shows that non-interest expenses and credit losses have a considerably negative impact on profitability, yet the ratio of interest expense to asset/s positively affects profitability.

Qinhua Pan and Meiling Pan(2014) examined the impact/s of macroeconomics elements on Chinese commercial banks 'profitability in a decade after China joined The World Trade Organisation. Evidences provided by the said work showin the said period, the profitability of its commercial banks rose considerably. During the era of 1998-2012, through the empirical analysis panel, above researchers studied the impact of foreign elements on Chinese Capital Market. The return of assets in their work was hold as the dependent variable, on the other hand, GDP, inflation rate, money supply growth, interest rate, and investments in stock market formed the independent variables of the research. Among the selected macroeconomic variables, the impact of money supply growth is the most outstanding one.

Souhir Slimi (2012) studied how the business cycles' impact upon banks profitability. The results of their work establish that any rise in banks' capital, expenses and liquidity proportions leads to the growth of their profitability, nevertheless increased expenses result in the fall of profitability. Due to the results of this research, Middle East and North Africa banks have to maintain their capital through supportive programs and passing enough regulations.

Kanas et al(2012), in their work show that business cycles, short-term interest rate, inflation expectations, credit risk and structure of loan portfolio impact the profit of US banks. The superiority of quasi-parametric system to linear model inside prudential macro-policy is due to supervision over banking system. In accordance with the single quasi-parametric empirical model, the US banks profitability and their temporal series data during the era of 1988-2011, the assessment of US banks 'variables was done based on non-parametric evidences, which can't be determined through the linear model. These variables are business cycles, short-term interest, inflation expectations and credit risks. According to the results of this study, not only does profitability stress on banking sectors variables, it also encompasses macroeconomics variables. The research finally shows that policy-makers consider a series of both macroeconomics and banking variables for banking profit management and increasing/maintaining financial stability.

Nicolasaperjez (2009), via the multiple-panels threshold method, and in business cycle conditions, examined the bank profitability within Greek banking system. Empirical findings clarify that there is a significant and positive relation between bank profitability and business cycle.

Flamine et al(2009)studied those factors affecting commercial banks 'profitability in Sub-Saharan African countries. Their findings demonstrate that there is a relation between banking profit, credit risk, banks size, diversification and private ownership. They also show that banks return is impacted by macroeconomics variables, low inflation and stable growth. Accordingly they state that high profitability is possible to reduce financial mediation, and the high return can point to loan high interest/s if banks are compared to other countries banks. In accordance with them, when loan interest is high, banks are not successful in offering financial services.

Norri Boroojerdi and Mardani (2011) studied the market structure and state-owned banks profitability, the results of their work show that per capita GDP, on behalf of economic development, is directly linked to profitably. This finding, there is a negative and significant relation between banks 'size and their profitability, also conforms to that of Demirguc-Kunt (2006). Bank size is measured in a manner as the larger the bank size, the more it can use advantages of its large size for its transactions, and eventually gains more profit. Therefore a positive relation is expected to be between bank size and its profit (Ramllal, 2009),however the results of their study proves the vice versa, as there is no link between the large size of state-owned banks and using econometrics.

Nazarian and Amini (2012) analysed the relation between business cycles and profitability of banking sector,their findings show the lack of a direct relation between banks 'profitability and economic development growth rate, they also prove that there is a positive/significant relation between banking profitability and GDP growth rate (as business cycles 'fluctuations index), besides there is a direct/positive relation between inflation rate and the costs of operational banking network, and there is a direct relation between capital market and profitability.

Shavalpoor and Ashari (2013) studied the impact/s of credit risk on Iranian banks 'profitability, they also calculated the banking profitability through the ratio of return on assets and return on equity. Analysing the data of 15 banks and credit institutes during 2003-2009, they concluded that there is a negative relation between credit risk and bank profitability.

3. Research Methodology

In order to examine the impact of business cycles on the profitability of Iran Melli Bank, some data, including current annual values which are mentioned in its balance sheets, received from General Directorate of Iran Melli Bank, and the information related to macroeconomics data, part of temporal series information of this bank and annual journals, were collected. As the research was to analyse variables 'status, it collected some information on the basis of variables 'past, accordingly the present work falls under the category of post-event studies. Considering its purpose, it is an applied research too, and through studying the impact of business cycles on Iran Melli Bank's profitability, it is possible to help users via providing related and useful information. Since the present work sought to shed light on the links among different variables, it is correlational. And regarding its data, it is quantitative.

4. Research Model and Measuring Research Variables

GMM assessment model here was suggested for testing the impact of business cycles on Iran Melli Bank's profitability, by Arellano and Bond(1991). The said model was assessed through

econometrics of two-step GMM,for the mixed data during the period of 1990-2012. The dynamic pattern is the one, within econometrics, that is possible to be used for panel mixed data. A feature of mixed data is that if the time factor is added to it, the dynamics among the variables can be accurately examined.

Generally a dynamic pattern in mixed data is as below:

$(y_{i,t}-y_{i,t-1})=a(y_{i,t-1}-y_{i,t-2})+\beta'(X_{i,t}-X_{i,t-1})+(\epsilon_{i,t}-\epsilon_{i,t-1})$ $\qquad$ (1)

Arellano and Bond equation is as following:

$Y_{it}=aY_{it-1}+\beta X_{it}+\mu_{it}$ (2)

Sargent test evaluates the validity of the chosen model by Arellano and Bond (1991), Blundell and Bond (1998) and Arellano and Bond (1995).

In this equation, Y_{jt} reflects gain and loss, X_{jt} is the vector of explanatory variable:

$X_{jt} = [GDP_{jt}, DCPI_{jt}, BL_{jt}, VSM_{jt}, TA_{jt}]$

In which GDP_{jt} is the real GDP, $DCPI_{jt}$ the inflation rate, BL_{jt} the total loan divided by VSM_{jt}, GDP and stock market fluctuations, and TA_{jt} is the total properties of Iran Melli Bank. All variables, but ratios and interest rates, are calculated logarithmically. This model was assessed with GMM Estimator of Arellano and Bond (1991), that ensures both performance and compatibility, provided that the model doesn't have second time consecutive correlation and used tools are invalid (a case which is assessed through Sargent test). Table no. 4 encompasses the results of equation (no.2) assessment, in which Y_{jt} is the net profit.

4.1 Business cycles and Hodrick-Prescott Filter

Studies on GDP temporal series show that not only this variable is of fluctuation during time, but also it has a long-term growth process, which on average is upward. Thereby in order to analyse business cycles and calculate the potential production rate, it is required to deterend their values. The present study, to enter the impact of business cycles into the respective model, uses the Hodrick–Prescott filter. Technically, Hodrick–Prescott filter is a bilateral linear filter, minimising Y_t temporal series variance, which for the calculated squares, chooses an easy path. Hodrick–Prescott filter was firstly introduced by Hodrick and Prescott in 1980s for business eras, however, by and by it was used in other areas for comparing business cycles of different countries. Since then, it has converted into a standard method for detrending temporal series.

4.2 GARCH Model

Generally ARCH model is as below:

$Y_t= X_tB+\epsilon_t$ $\qquad$ (3)

$\sigma_t^2=\gamma_0+\gamma_1\epsilon_{t-1}^2+\gamma_2\epsilon_{t-2}^2+......+\gamma_m\epsilon_{t-m}^2$ $\qquad$ (4)

GARCH model, is the advanced version of ARCH, however the advantage of GARCH to ARCH is that the later requires assessing many different parameters.

It is also possible to utilise GARCH model considering the fact that they can be converted into each other.

GARCH (1, 1): $\sigma_t^2=\gamma_0+\gamma_1\epsilon_{t-1}^2+\delta_1\sigma_{T-1}^2$ $\qquad$ (5)

The present study, chose to use GARCH model for assessing index fluctuations within stock exchange.

4.3 Variables Static Test
The present research uses ADF single root test, generally used for determining the static of temporal series process**.**

Table no. 1 ADF test for Data level

Variables	ADF Statistics	Critical Values		
		On 1% Level	On 5% Level	On 10% Level
Y	-1.64	-3.73	-2.99	-2.63
DCPI	-2.89	-3.73	-2.99	-2.63
GDP	-2.32	-3.73	-2.99	-2.63
TA	-1.46	-3.73	-2.99	-2.63
VSM	-1.50	-3.78	-3.01	-2.64
BL	-2.26	-3.73	-2.99	-2.63

Table no. 1,ADF Test results reflect the value and level of each variable. As the table establishes, variables are not static on 5% level. Thereby in order to change them into static form on 5% level, it is required to equate their differential.

Table no. 2- the results of ADF test, attained through one-time differential equation.

Variables	ADF Test Statistics	Critical Values		
		On 1% Level	On 5% Level	On 10% Level
D(LY)	-6.33	-3.75	-2.99	-2.63
D(LDCPI)	-6.24	-3.76	-3.00	-2.64
D(CLGDP)	-3.08	-3.75	-2.99	-2.63
D(LTA	-3.59	-3.75	-2.99	-2.63
D(ALVSM)	21.30	-3.76	-3.00	-2.64
D(LBL)	-3.73	-3.75	-2.99	-2.63

Table no. 2, the results of ADF are specifically for data with one-time differential equation, and it shows that variables are static on 5% level.

4.4 Examining the Normality of Residuals

To examine the normality of residuals, Jarque-Bera statistics is used.

Table no. 3- Examining the Normality of Remainders.

Jarque-Bera Statistics	Significance Level
5.37	0.068

The Zero assumption in this test points to normality of the remainder/s. In accordance with the results of this test, it can be stated that on 95% confidence level, residual distribution is normal.

4.5 Research Hypotheses

In accordance with the theoretical foundations, presented above, and for answering the research question, 5 hypotheses are introduced and tested by the present work:

1. There is a significant relation between the loans-to-GDP ratio and Iran Melli Bank's profitability.
2. There is a significant relation between the impact/s of business cycles 'fluctuations on Iran Melli Bank's profitability.
3. There is a significant relation between the impact of Iranian Stock Exchange fluctuations and Iran Melli Bank's profitability.
4. Inflation significantly impacts the profitability of Iran Melli Bank.
5. There is a significant relation between the size of Iran Melli Bank and its profitability.

5. Research Findings

The results of the GMM model assessment show (table no. 4), the R-squared value holds the model determination coefficient and also model explanatory potential. They also elaborate that 85% of changes in the dependent variable are caused by independent variables, and coefficient signals conform to economic theories. However the Sargent statistics in this model points to the validity of instrumental variables within the model. As visible through estimation results, J value here, prob=0.14, reflects that the 0 assumption means the chosen tools have been appropriately chosen and used. Accordingly, it is possible to state that the tool used by the model is valid on 95% level. In the following, each research hypothesis is examined in details.

Table no. 4- Model Estimation Results

Significance Level	t Test	Standard Deviation	Coefficient	Independent Variables
0.00	2.36	0.13	0.31	-1.
0.01	3.12	0.85	2.68	BL
0.00	4.67	1.10	5.17	GDP
0.17	1.40	0.00	0.00	VSM
0.00	-2.51	0.10	-0.26	DCPI
0.03	-2.75	0.67	-1.86	TA
R-Squared 0.85 Adjusted R-Squared 0.79				
Instrument Rank 13J-Statistic2.03				
Prob(J-Statistic) 0.14Durbin-Watson stat2.03				

*All variables stand on 95% level with one-time differential-equation.

5.1 The Relation between Loan-to-GDP Ratio and Profitability
Due to the table no.4, there is a positive and significant relation between Iran Melli Bank offered facilities/loans-to-GDP ratio and this bank's profitability. Model estimation model show that upon 1% increase in the facilities-to-GDP proportion, an impact of 2.68% is left on the profitability of Iran Melli Bank. As Iranian fiscal and monetary tools are not much developed, funding projects is mainly dependent on the banking system, accordingly it has increased the facilities-ratio-to-GDP during past years.

5.2 The Effect of Business Cycles 'Fluctuations on Bank Profitability
As mentioned earlier, in order to measure the impact value of business cycles 'fluctuations, the GDP, de-trended via Hodrick–Prescott filter, is used so as to determine the impact size of GDP fluctuation on Iran Melli Bank's profitability. Table no. 4 shows that GDP fluctuation has a significant/positive relation with the profitability of Iran Melli Bank. It means that the profitability of Iran Melli Bank increases 5.17% whether GDP fluctuates by 1%. Consequently it can be put that the first hypothesis of the research is valid by 95%. Therefore, business cycles have a significant impact on Iran Melli Bank's Profitability.

5.3 The Impact of Fluctuations in Iranian Stock Exchange General Index on Profitability
Thereby, due to table no. 4 results, the third hypothesis of the research (there is a significant relation between fluctuations in Tehran Stock Exchange index and profitability of Iran Melli

Bank) is rejected. Being recently introduced to Iranian money/capital market, it has not been recognised as an efficient tool. Its other cause is the fluctuations in Iranian market during past decades, it has also affected investors 'capital. As these two approaches are parallel, they are not welcomed together. On the other hand, banks are better welcomed due to benefiting from a fair stability as an efficient tool. Thus it is possible to reject the third hypothesis on 95% level.

5.4 The Impact of Inflation on Profitability

Table no.4, proves there is a significant relation between inflation and Iran Melli Bank's profits, however the said link is negative. Accordingly it means, inflation negatively/significantly affect the profits of Iran Melli Bank, and upon 1% rise of the inflation, profits of the respective banks are expected to increase by 0.26%. thus if a serious inflation occurs in Iranian economy, a phenomenon that is possible to highly impact Iran Melli Bank's profit, the said issue becomes bolder.

5.5 The Impact of Iran Melli Bank's Size on Its Profitability

Total assets variable is here taken in order to measure the size (Ramllal, 2009). Table no. 4 results show that there is a negative/significant relation between the size and profitability of Iran Melli Bank. It means upon 1% increase in the total assets of this bank (as bank size), will have a 1.86% effect on its Profits. It also implies that the size of the said bank has become over-large and is losing some of its profits, therefore it has to take some fundamental steps in this regard.

6. Conclusion and Suggestions

Due to the results of the present study, there is a significant relation between the profitability of Iran Melli Bank and variables such as GDP (as an index for measuring the impact/s of business cycles within the model), total assets of the bank as size and loans-to-GDP ratio. They also show that Tehran Stock Exchange fluctuations have a significant relation with Iran Melli Bank's profitability. According to results, there is a significant relation between inflation and profitability. Sargent test value shows that the used tools by the present study enjoy a significant relation and properly explain the model. R-Squared statistics, which is model determination coefficient and its explanatory potential, stood at 0.85. In other words, 85% of changes in dependent variable could be caused by the independent ones.

According to research findings, Iran Melli Bank should regulate its activities in order to function the best during boom and recession eras, besides the results put that the related bank's activities should specifically be differentiated for the said periods. During recession, banks should consider investing and property quality for gaining more profit/s, they also should promote liquidity during boom period so that they don't face with liquidity risk/s. Then these results conform to those by Albertazzi and Gambacorta (2009), Nicolasaperjez (2009), Flamini et al (200), Souhir Slimi (2012), Canas et al (2012), Nazarian and Amini (2012), Mashayekh and Mennati (2013).

Due to the presence of a significant relation between Iran Melli Bank's size and its profitability during nation's inflation situation, banks prefer to increase their fixed assets, and it leads to the

fall of their liquidity, and on the other hand, according to legal obligations and funding law/s, banks, specifically Iran Melli Bank, have to provide some specific companies with facilities/loans. As the size of Iran Melli Bank negatively impacts its profitability, the author of the present study suggests that Iran Melli Bank should downsize itself, or generally increase its agility in order to improve its efficiency and performance. The results of this hypothesis, expecting a positive relation between bank size and its profitability, conforms to Noori Boroojerdi and Mardani (2011) and Ramelall (2009). In addition, it can be suggested that, using new banking tools and moving towards activities which help the bank to become more independent, the bank take steps towards more profitability, maintaining both its and public interests.

  Testing the hypothesis "the Stock Exchange fluctuations (the Stock Exchange general Index), has a significant impact on Iran Melli Bank's profitability", and lack of significant relation between fluctuations in the Stock Exchange general index and Iran Melli Bank's profitability, show that Tehran Stock Exchange general index fluctuations have no impact on this Iranian bank's profitability, and the results of this hypothesis doesn't conform to those of Albertazzi and Gombacorta (2009), Nazarian and Amini (2012). Considering the model assessment (table no. 4), this variable does not much affect Iran Melli Bank's profits. Accordingly the inefficiency of this tool in Iranian fiscal and monetary market, can be an obstacle to banks funding projects/industries, and it could also make banks move much more towards deviation of their resources.

  Regarding the impact of inflation on Iran Melli Bank's profitability, based on the results of this research (table no. 4), there is a negative relation between inflation rate and the bank's profitability, therefore it means losing profits during inflation conditions and increase of organisational expenses and deviation of optimum performance. Due to the fact that inflation impacts Iran Melli Bank's performance, it also affects trade and economic activities. And it is also possible to have destructive impacts on economy and society, thereby for reducing inflation rate, it is required to take fundamental and serious steps in this regard, so as to national capitals are not wasted and the society moves toward development.

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