Procyclicality and Bank Capital in Kazakhstan

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The purpose of this paper is to establish what type of relationship exists between the assets and bank capital from one side and main economic indicators – GDP and GNP from the other.This study used data which was collected from the National Statistics Agency of the Republic of Kazakhstan and the data obtained from the World Bank. The absence of reliable data that goes back far enough is an obvious drawback for any empirical research of Kazakhstan. In order to partly counteract these problems the method of partial extrapolation is usually employed. The application of this method to this study allowed me to get a reliable enough set of data. The data set consists of monthly observations starting from January 2004 and ending in December 2012 (108 observations in total). Five sets of time series were collected: assets, equity, GDP, CPI, and IPI. The results show positive relationship among banks' performance and GDP, also CPI and IPI positively affect GDP.

1. Introduction

The linkage between the financial system and the business cycle has been the subject of much investigation. Arguments that the financial system is procyclical are quite consistent with economic events, such as the credit crunch in the U.S. during the early 1990s, the Russian and Asian financial crises in the late 1990s, and the large corporate bankruptcies of the early 2000s.(Berger, Udell, 2004). Mainly, the paper attempts to show that economic conditions are affected by banks' performance. Banking industry is one of the most influential sectors of the economy in Kazakhstan. Main industries of Republic of Kazakhstan include major industries**:** Chemical Processing, Copper Smelting, Forging and Pressing Machines, Instruments, Iron and Steel, Mineral Processing, Mining, Oil Refining, Rolling Equipment, Sugar Refining, Textiles and Banking.[1] Matkowski (2004) wrote that Russia, Belarus, Ukraine, and Kazakhstan have a higher share of industry and a relatively lower share of services.

Economic conditions are measured by GDP of Republic of Kazakhstan. Gross Domestic Product (GDP) macroeconomic indicator that reflects the market value of all final goods and services (that is intended for direct consumption) produced per year in all sectors of the economy in the state for consumption, exports and savings, regardless of the nationality of the factors of production used.

Banks' assets and bank capital are studied as variables which affect GDP. Besides that, Consumer Price Index is taken into consideration as one of variables which also may affect GDP. De Long (1988) estimated the size of the postwar improvement in

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performance relative to potential by constructing average output gaps by interpolating potential GNP between major cycle peaks.

GNP and GDP are typically used by researchers in order to measure country's economic conditions, development or growth.

A sample of Kazakhstani twenty banks were studied from 2004 till 2012 quarterly. The main purpose of the study is to identify whether such economic indicators as GDP and GNP are affected by banks' performance and Consumer Production Index. Previous studies took place in other countries had different results. For example, Naceur (2003) claims that macroeconomic indicators in Tunisia have no impact on banks' profitability.

The paper is significant in Kazakhstan due to the fact that there was no previous research in this area in Kazakhstan.

The rest of the paper includes such chapters as literature review, data and methodology, main economic indicators, empirical findings and conclusion. First of all, literature review provides theoretical background of the research and summarizes relevant articles with authors. Data and methodology part deals with data analysis and necessary explanations are provided there. Main economic indicators are discussed as major variables of the research. Empirical findings part provides necessary interpretations and results and is connected with the previous chapter. The last chapter is a conclusion, which briefly describes all steps of the research and describes the results, limitations and opportunities for further research.

2. Literature Review

The movement of money from lender to borrower and back again is called the cycle of money. (Brooks, 2010). Banks play a role of intermediaries, which borrow in order to lend. During recessions, cycle of money slows down while economic boom creates favorable conditions for this process to work. Shin (2011) claims that retail deposits of household savers is the most important source of funds available to the banking sector. He mentions the idea that credit increases rapidly during boom and increases less rapidly or even decreases during recession in South Korea. Therefore, during boom we can notice a high demand on funds. Favorable economic conditions create numerous opportunities for small and medium size businesses to obtain funds. Banks stand ready to lend and support all types of businesses. While, during economic recession it becomes problematic for businesses to obtain any funds. Generally, recession leads to higher risks, which means that there will be lower chance for borrowers to repay any borrowed amounts. Moreover, bank regulators are reluctant to increase any lending. Therefore, lending process slows down or even stops during economic recession.

Loans, their size and behavior received increased attention from both financial institutions and policymakers in Kazakhstan. Enormous articles are devoted to such problems as loan losses during financial crisis. Basic function implemented by commercial banks is financial intermediation, which includes deposits' accumulation for the purpose to give loans. Commercial bank loan portfolios are typically 10 to 15 times larger than bank capital, which includes common stock, retained earnings and paid in capital. Wahlen (1994) Lending capacity depends partly on economic conditions or business cycles. Rajan (1994) finds that when most borrowers are performing well, bank managers relax credit standards to hide losses on bad loans and protect their own reputation, whereas when a common negative shock hits a sector, reputational

considerations diminish and bank managers tighten credit standards. During an upswing in the business cycle, market conditions are favorable for the expansion of existing businesses, yielding an increase in the demand for credit. Dell'Ariccia, Marquez (2006).

In the United States, for example, virtually every major recession between the end of the Civil War and the beginning of World War II was associated with some kind of a banking panic (Friedman and Schwartz 1963). Some researchers analyze banks' performance during certain periods of time. For example, Ivashina (2008) has proved the fact in her paper that new loans to large borrowers fell by 47% during the peak period of the financial crisis (fourth quarter of 2008) relative to the prior quarter and by 79% relative to the peak of the credit boom (second quarter of 2007). New lending for real investment (such as working capital and capital expenditures) fell by only 14% in the last quarter of 2008, but contracted nearly as much as new lending for restructuring (LBOs, M&As, share repurchases) relative to the peak of the credit boom investments. An opposite opinion was presented by Persons in 1924, who came to conclusion that in years of business depression, such as 1904, 1908, and 1911, when loans and investments of New York Clearing House banks rose to relatively high levels; it was found that net deposits rose even more. Also, in years of active business, such as 1903, 1906-07, and 1910, when loans and investments declined to low levels, net deposits fell still lower. However, it was almost a century ago. Nowadays, researchers mostly prove the fact that there is a linkage between the financial system and the business cycle. It has been the subject of much investigation. Arguments that the financial system is procyclical are quite consistent with economic events, such as the credit crunch in the U.S. during the early 1990s, the Russian and Asian financial crises in the late 1990s, and the large corporate bankruptcies of the early 2000s.(Berger, Udell, 2004). Loan losses create a problem of decline in profitability. Boyd (2005) suggests that the average country experiences reductions in current and future output whose discounted present value is bounded between 63% and 302% of real GDP in the final pre-crisis year. Moreover, output losses are observed for a surprisingly long period of time. For example, only four out of 23 sample countries retain their pre-crisis trend level of output within 17 years of a crisis onset.

The Archarya, Gujral, Kulkarni, Shin (2011) also present the fact that credit losses between 2007 and 2009 were around $ 1.73 trillion worldwide. Favorable economic conditions create numerous opportunities for small and medium size businesses to obtain funds. Banks stand ready to lend and support all types of businesses. While, during economic recession it becomes problematic for businesses to obtain any funds. The procyclicality and banks' performance was deeply analyzed by Shin, Shin (2011) in their working paper, which is devoted to procyclicality and monetary aggregates.

Chen, Higgins and Mason (2005) mentioned that during recession, bank regulators may order banks to slow lending and pursue recoveries from defaulted firms. Anyway, amount of bad loans increases during recession. Such an idea was promoted by Salas and Saurina (2002), who analyzed the relation between problematic loans and the economic cycle in Spain, over the period 1985-1997.

One of the most important roles performed by banks is the creation of liquid claims on illiquid assets. (Goldstein and Pauzner, 2005).

Hughes (1970) studied models to predict deposits, which included two variables that could be controlled by the banks (dividend rate and advertising expenditures). In our

view, core deposits, like demand and savings deposits, which are largely rate inelastic, have historically insulated bank funding costs against economic shocks. In turn, core deposits have permitted banks to insulate borrowers against these shocks through implicit multiperiod contracts that insure borrowers against adverse credit shocks. (Berlin and Mester, 1999)

Some researchers claim that there is an evidence that economic environment affects behavior of depositors. For example, Diamond in 2000 mentioned in his article that bank runs are a common feature of the extreme crises that have played a prominent role in monetary history. During a bank run, depositors rush to withdraw their deposits because they expect the bank to fail. In fact, the sudden withdrawals can force the bank to liquidate many of its assets at a loss and to fail. During a panic with many bank failures, there is a disruption of the monetary system and a reduction in production.

Given today's increased financial and economic integration, no company can claim to be unaffected by what is happening in the global economic arena. Even so, external reporting practices are not designed to indicate the extent to which profits are generated by fluctuations in the company's macroeconomic environment during a reporting period. Oxelheim (2003)

Development of banking industry may be useful for the whole economy. Such researchers as Smith (1998) mentioned in his article an idea that in light of the fact that policy changes have been a major force behind a sharp increase in competition in industrial countries' banking sectors in recent years (OECD 1989), evidently policymakers currently think these costs might be large. The logic underlying these policy changes is clearly that increased banking competition improves the efficiency of the financial system which, in turn, improves macroeconomic performance. Smith (1998) claims that there is, in addition, a potentially important general equilibrium effect of this loan-pricing behavior of imperfectly competitive banks: Banks profitability feeds directly into the return on bank liabilities, which in turn works to raise the opportunity cost of funds in the economy, and thus further raises the cost of external financing. This implies that when banks have market power, even highly creditworthy firms (that are not bank dependent) may face a higher cost of financing, both in decentralized loan markets and in the market for bank loans. The author mentioned the fact that bank market power therefore reduces the level of macroeconomic activity, and the magnitude of this effect tends to be countercyclical because a deterioration of borrowers' balance sheets during a recession increases the opportunities for banks to exploit their advantage in providing financing to borrowers that face large agency costs in direct financing. Probably, the most telling illustration of the macroeconomic costs of restricting competition among banks is that it is possible in the model that the mere existence of banks has a negative net benefit to macroeconomic performance- lower output and greater cyclical fluctuations even though they reduce agency costs in the economy.

Ashcraft (2005) addresses the question of whether or not bank failures still matter. In his paper, the author mentioned that there are probably several reasons, but one of the more important is a common belief that bank failures involve significant macroeconomic costs. This view has been shaped in part by the experience of the United States during the Great Depression. Ben S. Bernanke (1983) documents the severe contraction in bank lending in the early 1930s, which was associated with widespread bank failures, and finds evidence that failed bank deposits have marginal

explanatory power beyond the money supply in explaining the variance of industrial production during this period.

The author mentioned the fact that there is the threat of contagion, where the failure of one institution prompts a run on other banks, spreading the effect of failure throughout the economy.

Allen and Gale (2000) mentioned in their article that there is a theory about contagion that small shocks, which affect few institutions spread by contagion to the rest of the financial sector and then infect the larger economy.

Quite an interesting fact was presented by Archarya, Gujral, Kulkarni, Shin (2011). It was mentioned that bank capital increased during crisis due to the fact that government sponsored financial institutions and gave an opportunity to raise funds through preferred stock and subordinated debt in the US, UK and Europe. Despite the fact that economic recession affected all financial institutions negatively, the role of government in such circumstances was supportive. Boyd, Kwak and Smith (2005) found a relationship between business cycle and banks' performance. In their analysis, they took 23 sample countries including developed and mature countries and countries of third world. They point out that every recession in the USA is somehow connected with some kind of banking panic. So called "banking system safety net" in the form of deposit insurance systems or lenders of last resort were created in order to support depositors.

Macroeconomic conditions affect firm performance. But firm performance reflects on banks' performance through banks' loan portfolios. In the presence of adverse loan performance, bank regulators may order banks to slow lending and pursue recoveries from defaulted firms. (Chen, Higgins, Mason, 2005)

Archarya, Gujral, Kulkarni, Shin (2011) mention the fact that during crisis period 2007-2009 financial intermediaries everywhere were at the center of the financial crisis. The capacity to lend suffered worldwide. Archarya, Gujral, Kulkarni, Shin (2011) also present the fact that credit losses between 2007 and 2009 were around $ 1.73 trillion worldwide. Favorable economic conditions create numerous opportunities for small and medium size businesses to obtain funds. Banks stand ready to lend and support all types of businesses. While, during economic recession it becomes problematic for businesses to obtain any funds.

Procyclical behavior of banking might threaten macroeconomic stability. Bikker and Hu (2002) proved the fact that bank profits appear to move up and down with the business cycle, allowing for accumulation of capital in boom periods. Bikker and Hu (2002) also mention cyclical patterns of lending, profits and provisioning in their working paper. According to them, capital and reserves include paid-up capital, reserved funds, retained profits and other capital funds.

3. Data and Methodology

The paper is totally devoted to the issue of investigation whether there is a correlation between economic indicators and bank capital and bank assets. A sample of 20 Kazakhstani banks, their bank capital and their assets in total since 2004 till 2012. Economic indicators, which were obtained from the National Statistics Agency of the Republic of Kazakhstan and some data from the World Bank.

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The absence of reliable data that goes back far enough is an obvious drawback for any empirical research in Kazakhstan. In order to partly counteract such problems the method of partial extrapolation is usually employed. The application of this method was quite useful in this study.

The data set consists of monthly observations starting from January 2004 and ending in December 2012 (108 observations in total). Five sets of time series were collected: assets, equity, GDP, and CPI.

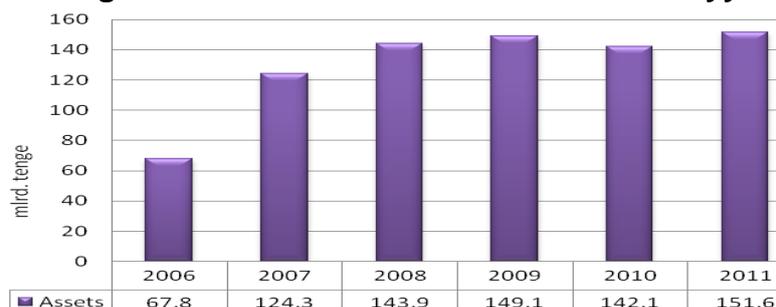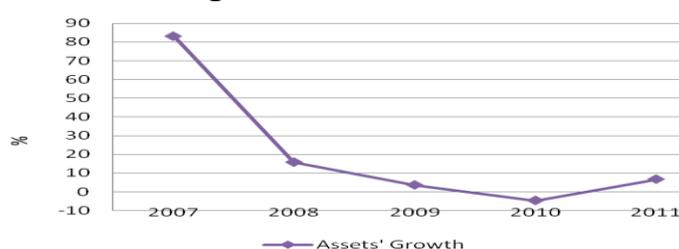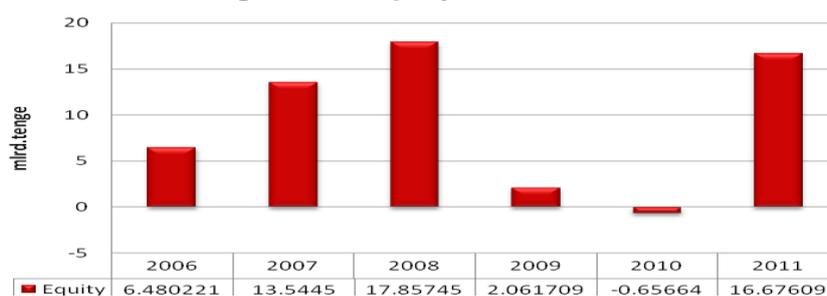**Diagram 1: The values of Assets 2006-2011yy.**

	2006	2007	2008	2009	2010	2011
Assets	67.8	124.3	143.9	149.1	142.1	151.6

Diagram 2: Assets' Growth

Diagram 3: Equity, 2006 – 2011

|	2006	2007	2008	2009	2010	2011
Equity	6.480221	13.5445	17.85745	2.061709	-0.65664	16.67609

From diagrams above, it is obvious that during the 2009 shareholders' equity of banks fell by 15.8 billion tenge. In 2010 the situation deteriorated further and the total capital of banks fell to a negative value of – 0.6565 billion tenge. In should be noted that after the government has purchased 25% stake in the four largest banks, banks' capital increased to 16.676 billion tenge.

If we consider the dynamics of the equity of banks in general, it should be noted that before the crisis, even though it was small, but still the growth of capital was noticeable. During the crisis and after that the capital turned out to be negative. After

the intervention of the government, problematic issues were solved and banks' capital has increased.

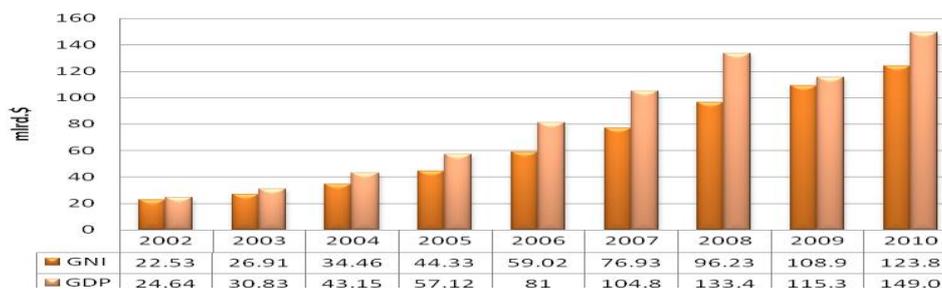**Diagram 4: Equity Growth**
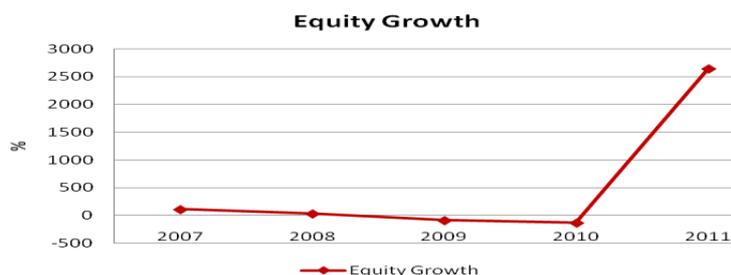
4. Main Economic Indicators

Gross Domestic Product (GDP) - macroeconomic indicator that reflects the market value of all final goods and services (that is intended for direct consumption) produced per year in all sectors of the economy in the state for consumption, exports and savings, regardless of the nationality of the factors of production used.

Diagram 5: GDP and GNP of the republic of Kazakhstan from 2002 to 2010 years, bill. $

	2002	2003	2004	2005	2006	2007	2008	2009	2010
GNI	22.53	26.91	34.46	44.33	59.02	76.93	96.23	108.9	123.8
GDP	24.64	30.83	43.15	57.12	81	104.8	133.4	115.3	149.0

Throughout the period between 2002 – 2010 years GDP of Kazakhstan showed a steady increase. To check the tightness of the statistical relationship among considerable variable the correlation coefficients were estimated and represented in the table below.

5. Empirical Findings

The data set consists of quarterly observations starting from January 2004 and ending in December 2012, which presents 108 observations.

$$GDP\ t = \beta_0 + \beta_1\,A + \beta_2\,BC + \beta_3 CPI + \beta_4 IPI + u_t \qquad (1)$$

Where

GDP t – Gross domestic product for period t
AG – Banks' assets' growth
B – Banks' capital growth
CPI – consumer price index,
IPI- industrial productivity index
u_t - stochastic error term.

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Tests for the unit root are applied to the data. One of the most important properties of a time series is it's stationarity. The regression analysis applied to time series will be reliable only for the time series that are stationary, that is, by definition stationary time series have a mean and variance that are constant over time and covariance between two time periods depend on a lag between two time periods and does not depend on the actual period under consideration. Unfortunately, nearly all time series exhibit non-stationarity when tested. In most of the cases financial time series data are assumed to be non stationary. Maysami (2004)

For non-stationary series the results of regression analysis, including t-statistics, F-statistics and others, would provide misleading results. In this case all considerable times series were checked on stationarity. To do so the Augmented Dickey - Fuller Unit root test was employed.

Seasonally adjusted data was tested for unit root and stationarity. All variables are not stationary, which was confirmed by three tests; ADF, PP both at 1% and 5% level of significance.

The null hypothesis for ADF cannot be rejected both at 1% and 5% level of significance for CPI, PPI, Banks' assets and Equity. The log values of variables were taken. Only after this step was performed, all data showed stationarity at both significance levels.

Table 1: Unit Root Test

Unit root and stationarity	ADF (1%)	ADF (5%)	PP (1%)	PP (5%)
Critical values	-3,48	-2,88	-3,48	-2,88
CPI	1,49		1,09	
IPI	-1,57		-1,63	
Banks' assets	-1,19		-1,44	
Banks' equity	-1,22		-1,05	

From the table above, it is noticeable that time series of all variables are not stationary; therefore, it needs to be transformed. The log values of variables were taken.

Table 2: Unit Root Test

Unit root test	ADF (1%)	ADF (5%)	PP (1%)	PP (5%)
Critical values	- 3,48	-2,88	-3,48	-2,88
CPI	-4,17		-3,93	
IPI	-10,36		-10,38	
Banks' assets	-10,72		-11,04	
Banks' equity	-4,61		-4,77	

Only after this step was performed, all data showed stationarity at both significance levels.

Table 3: Correlation among variables

	AG	EG	GDP	CPI
AG	1.000000	0.163845	0.361756	0.660552
EG	0.164561	1.000000	-0.499055	0.103887
GDP	0.435678	-0.499055	1.000000	0.219680
CPI	0.760552	0.103887	0.219680	1.000000

The pair correlation coefficient shows a significant relationship between CPI and Assets with correlation coefficient that equal 0.660552. The relationship between Assets and GDP (Gross Domestic Product) is considerably less significant, the correlation coefficient slightly more than 0.43. At the same time the link between Equity and Assets is not important, the coefficient of pair correlation is only 0.16.

Table 4: Regression analysis

GDP = C(1)+C(2)*ASSETS + C(3)*BANK_CAPITAL+ C(4)*CPI + C(5)*IPI

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	12.09	1.0962	9.100264	0.0000
C(2)	6.37	2.41	2.644160	0.0086
C(3)	5.34	1.17	-4.564060	0.0000
C(4)	53.03	3.93	-13.47824	0.0000
C(5)	9.95	4.71	2.110611	0.0356
R-squared	0.695923	Mean dependent var		1077.705
Adjusted R-squared	0.688740	S.D. dependent var		471.8629
S.E. of regression	150.3435	Akaike info criterion		14.57181
Sum squared resid	37190391	Schwarz criterion		14.63236
Log likelihood	2239.058	Hannan-Quinn criter.		14.59602
F-statistic	10.46120	Durbin-Watson stat		2.01145
Prob(F-statistic)	0.000000			

The regression above has the right functional form that confirms F-statistic coefficient (10.46120) with small p-value (0.00000). R-squared is significantly high. It means that regression model describes significantly than 69% of the pattern in the GDP. The regression does not have any problem with autocorrelation because Durbin Watson statistics is around 2.

All variables positively affect GDP, especially CPI. Therefore, it can be concluded that GDP depends on all variables and has positive correlation with all.

6. Conclusion

Basic research question of the paper was: is GDP of Kazakhstan affected by banks' performance in terms of assets and equity and CPI and IPI? It should be mentioned that the data was obtained from twenty largest Kazakhstani banks from 2004 till 2012 quarterly, which shows 108 observations in total. GDP, CPI and IPI data was obtained from World Bank and from some Kazakhstani websites for the same period of time.

The results show that both macroeconomic indicators and banks' performance significantly affect GDP. The model is a simple regression. Unit root test was employed in order to deal with stationarity problem. The following limitations deserve particular attention. Only large and creditworthy banks were studied. Small, regional banks were totally ignored. Another limitation is that all variables were analyzed quarterly, not semiannually or annually. The last limitation is that CPI and IPI were the only macroeconomic variables, which were studied as possible factors to affect GDP. The

research can be extended by taking other macroeconomic variables such as money supply or exchange rate.

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