International Review of Business Research Papers
Vol. 7. No. 3. May 2011. Pp. 94 - 111

The Pro-cyclical Effects of Bank Capital on Bank Lending: A Case of Kazakhstan

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This paper investigates the pro-cyclical effects of bank capital on bank lending growth during the period between August 2007 and August 2010 for Kazakhstan banking industry. A total of 30 banks' monthly observations are analyzed in a panel study framework. We find that the change of capital-asset ratio has significant negative impacts on the change in the growth of bank lending, exacerbating the credit squeeze that started in the second half of 2007 in Kazakhstan. The enhanced regulatory capital requirement and/or bank's accumulation of additional capital buffer due to increased concern about credit risk might have exerted an impetus to reduce loan growth during this liquidity squeeze period. Other sources of bank funds such as deposit and borrowing as well as the change in interest margin and provision amount, however, did not play significant roles in lending growth. Overall, the results are consistent with the recent concerns raised about the enhanced risk-sensitivity in the Basel II capital requirements which may exacerbate potential pro-cyclical behavior.

Field of Research: Bank Behavior, Financial Crisis, Kazakhstan

1. Introduction

Many economists attribute the double digit real economic growths of the past seven years in Kazakhstan to the rapid financial deepening, especially the explosive bank credit expansion in the economy. During this period of economic upswing, the competition for growth and market share based on an excessively optimistic view on asset prices and risk led major banks to increase their foreign currency leverage substantially and to enjoy high profit _ margins by extending loans to high risk sectors.

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The spread between lending and funding rates was substantially high for major banks, leading to doubling of their assets and net income annually. The local currency value was either appreciating against or narrowly pegged to the US dollar during the period. The conditions for foreign currency funding for the banking sector were ideal, and currency exposures were considered not significant enough to hedge. Banks, however, substantially increased their overall risk-taking with funding mismatches, both in terms of maturity and currency, and concentration on real estate lending under optimistic projections on the availability of foreign currency liquidity, the stability or strengthening of local currency value, and counterparty risks.

The market for external liquidity, however, had been hard hit by the development of sub-prime mortgage crisis in the second half of 2007, and this event, in turn, resulted in liquidity and currency shocks for Kazakhstan banking sector early on. Since the initial liquidity shock the National bank of Kazakhstan injected foreign currency liquidity in the market to defend local currency value.[1] Market participants including commercial banks started to reduce their currency exposures and hedged against potential losses from a sudden movement of local currency value. The commercial banks, either being forced by the regulator or following their own hedging strategies, started to reduce drastically both domestic and foreign currency lending.[2] During this time, foreign lenders and investors started to unwind their investment and exit from Kazakhstani market, and the resulting liquidity crunch virtually closed opportunities for Kazakhstani banks to refinance their maturing debts. The sell pressure of local currency denominated assets and the rising demand for dollar became unbearable for the central bank to defend its currency further, and on February 4, 2009, the central bank decided to radically widen the local currency trading corridor against dollar allowing the currency value to drop by almost a fifth from the previous day's close. The banking sector's credit crisis, however, started with the crash of oil price at the aftermath of Lehman Brothers bankruptcy announcement. The economy that had been heavily dependent on its oil sector experienced a sudden burst of asset price bubble and quickly cut down investment and consumption. This wide-spread economic retrench and credit squeeze have resulted in more than one-third of banking sector's loan book to become non-performing followed by a substantial erosion of overall bank capital. Those banks with increased uncertainty about the solvency had been accumulating their capital buffer as a precautionary action. The regulator reacted abruptly to enhance the liquidity and risk-based capital requirements for the banks as a response to the public

blames for the regulatory forbearance during the economic boom.

A well-capitalized bank can weather through the bad debt crisis without reducing asset size to maintain the regulatory capital requirement. But those banks that are unable to raise sufficient new capital quickly may be forced to actively manage their assets and reduce loan portfolios to maintain target capital ratio - whether it is the regulatory minimum level or an optimal level the bank desires to maintain. This “pro-cyclical” behavior of banks, when exercised collectively, tends to reinforce the momentum of current economic downturn and hamper the speedy recovery by restricting credit supply to the market. Borio, Furfine, and Lowe (2001) explained that the pro-cyclicality of financial system has its roots in information asymmetries between borrowers and lenders. When economic conditions are depressed and collateral values are low, even borrowers with profitable projects find it difficult to obtain funding. IMF (2009) also noted the emerging consensus among market participants and regulators that the current loan loss provisioning rules and practices tend to have a too short-term horizon and backward-looking perspectives. Also, the enhanced risk-sensitivity in capital requirements might have exacerbated potential pro-cyclical behavior, and therefore, regulatory policies would need to adjust to balance the impact of pro-cyclicality of bank regulation on the economy and the systemic risk reduction in the banking sector.

The magnitudes of the pro-cyclicality of bank regulations, especially the capital adequacy requirement, may be different among different countries and different institutions due to the uniqueness of each country and bank. Decrease in risky assets or loans to meet the target capital ratio depends on the leverage ratio (inverse of the capital ratio) each bank wants to maintain. Actual capital ratios have been widely varied among Kazakhstani banks. Therefore, bank behaviors in managing their assets to maintain the regulatory or desired level of capital ratio may be different. In addition, the regulators in Kazakhstan explained that the main cause of the recent shrinkage of bank loans was the lack of credible borrowers rather than enhanced capital requirement. The lack of qualified demand for loan is considered as the main cause of the decreasing loan size.

The linkage between real sector activities and the credit availability in the economy of Kazakhstan may be considered as the key element for fast economic recovery. However, the magnitude and direction of the effects of changes in bank capital on the lending growth would be an empirical issue,

and the understanding of these effects will shed light on the balanced approach of regulatory practice during the crisis and the speed of economic recovery in Kazakhstan. Therefore, this paper will look into the effects of bank capital change on bank lending in a panel study framework to investigate the magnitude of the pro-cyclicality of the capital requirement in Kazakhstani banking institutions during the credit-squeeze period since the second half of 2007. The next section introduces relevant literatures on this issue. Section three provides description of data and analytical methodology. Results of the analysis are discussed in section four. The final section provides a summary and implications.

2. Literature Review

Bernanke and Gertler (1995) explain the economic and financial cycle as the "financial accelerator" using an extensive theoretical modeling based on information asymmetry between banks and borrowers. When economic conditions are depressed, collateral value becomes low. Borrowers, even with good projects, find it difficult to obtain funding. During economic upturns, however, access to external financing, including easier bank financing, add stimulus to the economy.

Mishkin (1996) notes that banks play the most important role among various financial institutions in providing credits to an economy world-wide, and this phenomenon is especially prominent for an emerging country such as Kazakhstan. It is because other financial institutions and capital markets are not as developed as the banking sector and they may not be as effective as banks in handling the problems associated with the asymmetric information such as adverse selection and moral hazard. These problems, in turn, lead banks to behave pro-cyclically by restricting credit growth when economy faces downturn. Uncertainty increased significantly in Kazakhstan since the August 2007 liquidity shock, and information about borrowers' credibility and future payment capability became more asymmetric, worsening the adverse selection problem. This development rendered banks to tighten their lending standards for business and consumer loans for both their prime as well as sub-prime borrowers. Krainer (2001) also notes that bank lending becomes pro-cyclical and tends to drop during an economic downturn due to application of stricter credit standards to new loans applications and impaired credit quality of existing loans.

To understand the determinants of bank capital structure, Diamond and Rajan (2000) model the essential functions banks perform and investigate the role that capital plays. They conclude that the bank's capital structure affects its liquidity creation and credit-creation functions in addition to its stability. Greater bank capital reduces the probability of financial distress but also reduces liquidity creation. Requiring more capital makes a bank safer, but it also increases the bank's effective cost of capital by reducing the amount the bank can pledge to outsiders. An increase in capital requirements can cause a "credit crunch" for the cash poor and potentially alleviate the debt burden of cash rich; greater safety has adverse distributional consequences. An abrupt transition to higher capital requirements can lead to a bank run because maturing deposits may exceed what the bank can pledge. The optimal bank capital structure, therefore, trades off the effects on liquidity creation, costs of bank distress, and the ability to force borrower repayment.

Borio, Furfine, and Lowe (2001) argue that macroeconomic swings may be amplified by inappropriate responses of financial market participants to change in the time dimension of risk, especially in its systematic component. The mismanagement of risk arises partly from the short horizons that underlie most risk management methodologies and partly from insufficient attention being paid to the correlations across the borrowers and institutions. Combined, these two shortcomings mean that changes in the risk associated with the economic cycle tend to be assessed inaccurately (i.e. risk is underestimated in booms and overestimated in recessions). The current practices of bank provisions and capital ratios measurements contribute to the pro-cyclicality of the financial system by increasing the cyclicality of bank profitability and creating additional pressure for banks to raise capital, and more generally, by constraining lending in recessions.

Ayuso, Perez, and Saurina (2002) analyze the relationship between the Spanish business cycle and the capital buffers held by the Spanish commercial and savings banks. Based on their panel data analysis of annual data for the period between 1986 and 2000, covering a complete business cycle, they find a significant negative relationship between the business cycle and capital buffers. The increase (decrease) in GDP growth or GDP gap caused the growth of capital buffers, above the minimum required capital, to decrease (increase), and this result provided a case for the regulatory system to appropriately account the issue of the pro-cyclicality in capital buffers.

Bliss and Kaufman (2003) argue that the observed fluctuations in the level of bank capital through the business cycle – higher capital ratios during economic expansions and lower ratios during recessions – together with changes in the effective capital requirement if the ratio is risk-sensitive, are likely to create further pro-cyclical changes in bank loans and earning assets and give rise to perceived credit crunches.

Goodhart (2005) explains the focus of Basel II as improving individual, rather than systemic, bank risk management. The objective of Basel II was to bring regulatory bank capital in line with the bank's assessment of own economic capital. At the systemic level, however, he argues that the complex and prescriptive content of Basel II would raise dangers of 'endogenous risk' and pro-cyclicality, and this can be a serious problem since it would more likely make the boom-recession cycle much more extreme.

Jimenez and Saurina (2005) find strong empirical support of positive, although quite lagged, relationship between rapid credit growth and loan losses. Moreover, their study provides empirical evidence of more lenient credit terms during boom periods, both in terms of screening of borrowers and collateral requirements. Therefore, they confirm the predictions from various theoretical models that banks engage in too expansionary credit policies during lending booms.

Repullo and Suarez (2009) conclude that the new Basel II requirements might imply a substantial increase in pro-cyclicality, induced by bank capital regulation as capital-restrained banks would be induced to ration credit to some of their dependent borrowers. Berger and Bouwman (2009) provide evidence that increase in capital has positive impact on liquidity creation for larger banks but negative for smaller banks. The larger banks tend to be strictly regulated and the capital increase tends to increase risk absorption, leading to an increased capacity to lending. The smaller banks, on the other hand, tend to experience crowding-out effects on lending due to the increase in capital.

Gonzales (2009) explains the pro-cyclicality of financial system with (1) the information asymmetry between borrowers and lenders and (2) the inappropriate response of financial market participants to changes in risk over time, as reflected in lending and financial investment decisions. During economic downturn, collateral values become low, and even borrowers with

good credit history may find it difficult to obtain funding. Also, market participants behave as if risk rises as the downswing sets in. This is due to the difficulties in measuring the time dimension of risk, often leading to risk being overestimated during the recession.

In a Financial Stability Report, Banco de Espana (2009) describe the financial system as inherently pro-cyclical. During booms, agent tends to underestimate risks. However, they tend to react abruptly when the cycle changes. The report summarizes that this behavior would amplify the economic cycle. Whether or not capital regulations intensify this inherent behavior of financial agents had been a subject of debate in Basel II discussion.

Repullo, Saurina, and Trucharte (2010) compare alternative procedures to mitigate the pro-cyclicality problem of Basel II capital regulation. They find that capital requirements per unit of loans would be more pro-cyclical than the smoothing input of Basel II formula or output with the multiplier based on GDP growth.

Covas and Fujita (2010) quantify the pro-cyclical effects of bank capital requirements in a general equilibrium model where financing of capital goods production would be subject to an agency problem. They consider both the time-varying capital requirement (as in Basel II) as well as the constant requirement (as in Basel I), and find that capital requirements contributed significantly to magnifying output fluctuations.

Fonseca, Gonzalez, and Pereira da Silva (2010) analyze the cyclical effects of bank capital buffers using an international sample of 2,361 banks from 92 countries over the period of 1990 - 2007. They find that capital buffer reduces the bank credit supply, but it also has an expansionary effect on economic activity by reducing the spread between lending and deposit rates through monitoring and signaling effects.

3. Data and Methodology

Monthly observations of individual commercial bank’s balance sheet items such as the amounts of asset, loan, deposit, borrowing and equity capital are collected from August 2007 until August 2010 from the public sources of the National Bank of Kazakhstan and the Agency for Financial Market Supervision

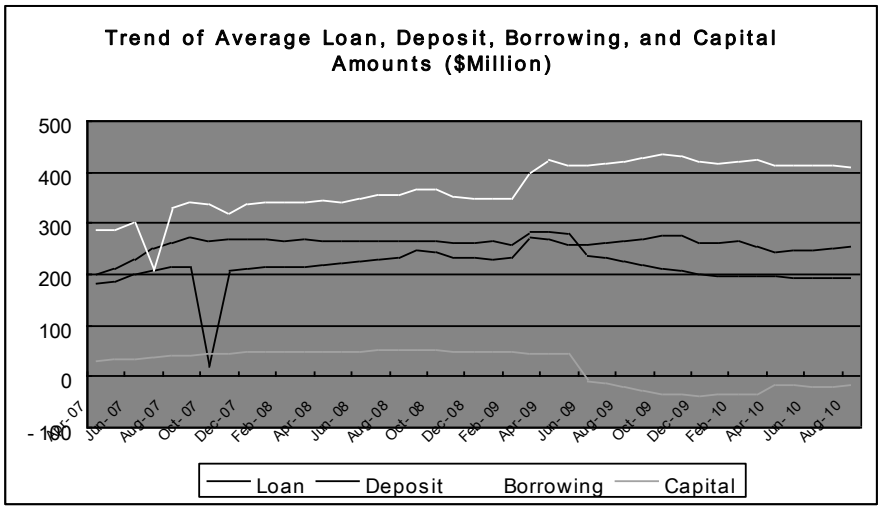
websites. In addition, data for the same period on interest income and expenses, total income and expenses, and provision for loan losses are collected from income statements.

Detailed data on individual bank's for public information started from early 2007 in the website of the regulatory agency. However, the observations for the initial several months for significant number of banks are missing, and therefore, the observations included in this study started from August 2007 when the initial foreign liquidity shock occurred. Several smaller banks and newly established institutions lack significant amount of observations necessary for this study. Therefore, a total of 30 banks were chosen based on the availability of reasonable amount of data for further analysis. To alleviate the size effects, loan, deposit, borrowing, and equity capital are taken as the ratios to the asset. Also, the ratios are taken for interest income to the total income, the interest expense to the total expenses, and the provision to the total loan amount. The first differences of these data are used in the final analysis.[3]

The following chart shows the trend of monthly average among 30 banks for loan, deposit, borrowing, and equity capital amounts during the period of April 2007 – August 2010.

Graph 1: Trends of Loan, Deposit, Borrowing, and Capital Amounts

(The figures are average amounts among 30 banks)



The sudden shift of these trends since February 2009 is due to the 20% devaluation of local currency (tenge) against dollar.[4] Some parts of deposit

and loan, as well as, the majority of the borrowings were denominated in US dollars, whereas, the equity capital was denominated in local currency. The aggregate capital for the banking sector was negative since June 2009 due to writing-off of non-performing loans. This trend shows minor improvement in early 2010 due to equity injection by government in several troubled banks.[5]

The dips in borrowing amount in August 2007 and in deposit amount in October 2007 are due to the sudden foreign currency liquidity outflows that occurred in August 2007. In this chart, the average amounts of equity capital and loan seem to move together showing the same sudden drops in the second half of 2009. However, the loan growth trend shifted from August 2007 from fast growing to almost flat when the international liquidity started to dry up and a short-term currency shock had occurred. The banking sector's credit crisis intensified in the second half of 2008 upon the oil price bust following the announcement of Lehman Brothers bankruptcy. A structural shift in the relationships of bank loan growth and equity capital requirement might happen after this announcement since the international liquidity completely dried-up afterwards. It might be possible that the regulatory enforcement intensified to counter the concern on systemic risk or moderated to account the pro-cyclical impact. The government bailout of troubled institutions and injection of capital to support banks could have reduced the banks' concerns on taking additional credit risks. Therefore, a dummy variable is assigned to distinguish the periods of pre- and post-Lehman Brothers Bankruptcy announcement and to capture the possible structural changes in relationships.

The descriptive analysis of the average amounts of loan, asset, deposit, borrowing, and equity capital for the period shows the characteristics as illustrated in Table 1 below:

Table 1: Descriptive Characteristics of the Average Amounts of Loan and Capital (in Million $)

	Mean	Std Dev	Min	Max	Skewness	Kurtosis
Loan	241.6	33	192.3	282.5	-0.5	-1.53
Equity	17.5	36	-36.8	51.5	-0.42	-1.8

The reactions of banks to adjust loan amounts to changes in capital ratio would be realized with lags. The first differences of the ratios to the asset

amount for loan (DLOAN), deposit (DDEP), borrowing (DLIB), and capital (DCAP) are calculated, and the contemporaneous and one month lag data for these variables are analyzed to show their correlation coefficients during the analysis period as depicted in Table 2.

Table 2: Correlation Coefficient Matrix for Capital, Loan, Deposit, and Borrowing

(Variables are the first differences of the ratios to the asset amount)

	DCAP	DLOAN(-1)	DDEP(-1)
DLOAN(-1)	-0.207		
DDEP(-1)	-0.113	0.460	
DLIB(-1)	0.072	-0.590	-0.249

The results indicate the existence of negative relationships between bank capital and the first lag of loan and the first lag of deposit amount. Also, a positive relationship is found between capital and the first lag of borrowing. Among loan, deposit and borrowing, there exist a positive relationship between loan and deposit, and negative relationships between loan and borrowing and between deposit and borrowing. In the analysis of the correlation coefficient alone the indication is that the change in capital may affect the loan growth amount with lags while the loan growth may have contemporaneous correlations with deposit and borrowing. The panel data at the individual bank levels will be analyzed to find more detailed relationships for these variables.

For institutional level, several panel regression models are employed for 30 banks. The estimation models assume fixed intercept, distinct intercepts, and random effects models. The basic regression models are specified as follows:

$$DLOAN_{it} = \sum_{j=1}^{p} DCAP_{it-j} \cdot \beta_j + \sum_{k=1}^{q} X_{it-k} \cdot \Gamma_k + \alpha_0 + \upsilon_{it}$$

Where, i represents individual bank and t represents different months in the data set. The variable X represents either deposit (DDEP) or borrowing (DLIB) to control possible compounding effects exerted by these variables. Also, the net interest margin and provision amount are entered to the panel study independently to control for the effects of these variables on the loan amount. In addition, the post-Lehman Brothers Bankruptcy (post-Lehman) dummy variable is included as the products of independent variables (DDEP, DLIB,

and DCAP) and the dummy to capture potential structural change in these variables during the post-Lehman period due possibly to changes in regulatory policy or banks' lending behaviors. The errors, υ, are assumed independently and identically distributed. The intercept term, α, can be common for all banks (Total model) or differs among individual banks (Fixed Effect model) to catch heterogeneity of individual bank characteristics. The random effect model resembles the Fixed Effect model, but it assumes that the intercepts are drawn from a common distribution with mean α and variance σ_α^2. The estimates for this model will not be consistent if individual intercepts are correlated with the independent variables. Due to this reason, it is important to test for correlation. The Hausman test statistic for the difference between the Fixed Effects and Random Effects estimates are provided.

The main hypotheses to be tested are that the coefficients for DCAP, β_j, are significantly different from zero for different models. If they are significantly negative, then it indicates that the capital requirement has a pro-cyclical impact on bank lending growth after controlling the compounding effects of other variables on lending. If there were structural changes in the relationships between the independent and dependent variables during the post-Lehman period, the coefficients of the variables representing the products of the independent and the dummy variables would be significantly different from zero. The signs of these coefficients may be either positive or negative upon the directions of structural changes in regulatory and bank behaviors.

The number of observations for an individual bank is 36 months, and therefore, the lags in the right-hand side variables are limited to 3 lags in the final analysis. In addition, the independent variables other than the capital are entered into the regressions one by one to avoid possible multicollinearity problem and to save the degree of freedom although the funding sources for the loans may differ for different banks. Since the main emphasis on the analysis focuses on the pro-cyclicality of equity capital on loan, an understanding of the impacts of the change in capital ratio on the change in loan size is more important.

4. The Results of Analysis

The panel analysis is conducted in two different phases – entire-period and post-Lehman period. In the entire-period analysis, the dummy variable is assigned to indicate the post-Lehman period. Some observations are missing from a certain bank data set, but the Ahrens-Pincus Unbalancedness measure (APUI) is 0.997 showing that the problem of missing observations is not significant for this study. As seen in the Table 3 below, all the lag variables for borrowing (DLIB) are not significant to affect the change in loan growth. However, the second and third lag variables in the change in capital asset ratio (DCAP) significantly and negatively affect the loan growth at 5% and 1% significance levels, respectively, in the Basic Model. Similar negative impacts are shown in the Fixed Effect and Random Effect models also. The F-test statistic for testing the null hypothesis of $\alpha_i = \alpha$ is insignificant, meaning that there is no gain in the Fixed Model over the Basic Model to have different intercepts in the regression. The table also reports the Hausman test statistic for the difference between the Fixed Effect and Random Effect model. Again, this statistic is not significant, meaning no gains over the Fixed Effect model for conducting the Random Effect model. All the dummy variables except the third lag of capital (Dum*DCAP) are not statistically significant in the all period analysis. However, the third lag is significant at 5% level and positive. Therefore, the impact of the third lag capital dummy variable on the loan growth in the post-Lehman period may be neutralized and becomes insignificant. On the other hand, the estimate of the first lag capital dummy is negative although insignificant. It is interesting to know whether the first lag capital variable (DCAP(-1)) becomes significantly negative for the post period although the third lag capital variable (DCAP(-3)) may have insignificant effect on the loan growth.

Table 3: Panel Regression Results for the Entire-Period

(September 2007 – August 2010)

Dependent Variable: DLOAN

Ahrens-Pincus Unbalancedness Measure APUI = 0.997

	Basic Model		Fixed Effect		Random Effect	
Variables	**Est. Coefficient**	**P-value**	**Est. Coefficient**	**P-value**	**Est. Coefficient**	**P-value**
DLIB(-1)	-.029515	[.106]	-.026904	[.148]	-.028824	[.110]
DLIB(-2)	-.017971	[.239]	-.016139	[.298]	-.017486	[.247]
DLIB(-3)	.003321	[.781]	.004238	[.726]	.003563	[.763]
DCAP(-1)	-.064956	[.232]	-.068277	[.216]	-.06583	[.220]
DCAP(-2)	**-.126752****	**[.018]**	**-.13040****	**[.017]**	**-.12772****	**[.016]**
DCAP(-3)	**-.147137*****	**[.006]**	**-.15094*****	**[.006]**	**-.14814*****	**[.005]**
Dum*DLIB(-1)	.020904	[0.356]	.017198	[.458]	.019920	[.375]
Dum*DLIB(-2)	.021587	[0.296]	.018578	[.380]	.020787	[.310]
Dum*DLIB(-3)	.007568	[0.684]	.005495	[.772]	.007015	[.703]
Dum*DCAP(-1)	-.04924	[0.507]	-.04315	[.568]	-.047642	[.516]
Dum*DCAP(-2)	.10558	[0.153]	.111967	[.137]	.107245	[.143]
Dum*DCAP(-3)	**.17108****	**[0.021]**	**.179227****	**[0.017]**	**.173210****	**[.018]**
Constant	-.001587	[.513]			-.0015689	[.574]
R^2	.024		.035		.024	
F-test (29,935) on H_0 : $\alpha_i = \alpha$			0.36786	[0.9992]		
Hausman Test (Chi-Sq (12)					0.46918	[1.000]

If any of these lags for capital variable are significant in the post period, then it means that the pro-cyclicality of capital on the loan growth remains in the liquidity-squeeze period, implying that the bank regulator did not responded properly to counter the shrinkage of loan market experienced since the second half of 2007 or government's fiscal support could not provide enough confidence for commercial banks to take credit risk again.

The same analyses were conducted for the post-period to see if the pro-cyclicality of bank capital on bank loan growth remains for the post-Lehman period. During this period, housing bubble burst, non-performing loans soared, stock market bottomed, and exchange rate devalued.[6] In order to mitigate the negative effects on real sector economy, government implemented various fiscal measures and extended subsidies to economically significant sectors.

The bank regulators were also needed to take on a carefully balanced approach with the aim in mind to reduce the pro-cyclicality of capital regulation. However, the enforcement of the enhanced capital regulations were immediate rather than gradual, exacerbating the current difficulties experienced by individual banks and forcing them to deleverage and reduce loans. The revisions in capital regulation since the initial shock in August 2007 were intended toward the system safety, but they more likely produced unintended and disorderly results for the safety of the banking system. The results of the analyses for the post-Lehman period are show in Table 4 below:

Table 4. Panel Regression Results for the Post Lehman Brothers Bankruptcy Announcement Period

(September 2008 – August 2010)

Dependent variable: DLOAN

Ahrens-Pincus Unbalancedness measure APUI = 0.994

	Basic Model		**Fixed Effect**		**Random Effect**	
Variables	**Est. Coefficient**	**P-value**	**Est. Coefficient**	**P-value**	**Est. Coefficient**	**P-value**
DLIB(-1)	-.015794	[.131]	-.015905	[.136]	-.015843	[.123]
DLIB(-2)	.0036562	[.732]	.0035374	[.746]	.0036027	[.732]
DLIB(-3)	.011850	[.274]	.011851	[.284]	.011845	[.266]
DCAP(-1)	**-.171428*** **	**[.000]**	**-.173869*** **	**[.000]**	**-.172411*** **	**[.000]**
DCAP(-2)	-.021579	[.581]	-.022108	[.582]	-.021847	[.571]
DCAP(-3)	.022912	[.551]	.022493	[.569]	.022671	[.549]
Constant	**-.005485** **	**[.016]**			**-.005511* **	**[.052]**
R^2	.032		.061		.032	
F-test (29,581) on H_0 : $\alpha_i = \alpha$			0.60547	[0.9502]		
Hausman Test (Chi-Sq (6))					0.0189	[1.000]

The results consistently show that the change in capital variable affects negatively and significantly the lending growth implying the similar pro-cyclical impact of bank capital on bank lending during the post-Lehman period. However, the negative effect realized with one month lag shows more immediate adjustment of loan growth to the change in capital ratio. This result implies that the regulatory enforcement on capital adequacy has been strengthened or banks have been trying to accumulate more capital buffers

reflecting the current risks under the uncertainty experienced during the post-Lehman period. The constant term is also significantly negative, implying natural reduction in loan portfolio due to aggressive provisioning or loan reduction or other reasons not considered in this framework.

5. Conclusion

The issue of pro-cyclical effect of bank capital on bank lending received very modest attention in Kazakhstan. Public discussions focused more on the causes and the sequences of the banking crisis, and both the banking sector and the bank regulators focused more on remedying the previous practices of excessive risk-taking. Policy revisions should make sure to support, rather than hinder, the goals of speedy economic recovery and system stability. Excessive regulation, without considering a balanced approach between rushing to reinforce the prudential norms and overbid them after being much neglected and countering the inherent pro-cyclical effects of bank regulations, can be dangerous and backward-looking. This paper provides evidence of pro-cyclical effects for bank capital regulation on bank lending, and shows that the change in bank capital ratio during the liquidity squeeze period for the banking sector in Kazakhstan during September 2007 and August 2010 had a significant negative effect on the growth of bank lending, exacerbating the liquidity squeeze and economic contraction. As noted in IMF report [2009], a priority list and appropriate time-line must be laid out in implementing the enhanced prudential norms, and a rule-based, forward-looking capital adequacy regulation should be devised for an emerging country such as Kazakhstan.

Endnotes

1. Due to the initial foreign liquidity shock in the middle of August 2007, the tenge-dollar exchange rate suddenly deteriorated for the short period of time. The monthly exchange rate (tenge per dollar) depreciation from July 2007 to August 2007 was 9.9%. The central bank immediately injected foreign liquidity in the market to defend the local currency value, and the local currency gained its value against dollar by 9% from August 2007 to September 2007. In this process, the net foreign reserve reduced by 3.4billion (14.5%) to 20 billion in August 2007, and by another 1.6 billion (8%) to 18.4 billion in September 2007.

2. The borrowing cost for the corporations and individuals also substantially increased immediately after the shock. The tenge lending rate increased from 14.85% in July 2007 to 15.3% in August 2007, and

to 16.55% in September 2007. The rate stayed around 18% level since then, showing that banks and/or regulator were unconvinced of the artificial currency market stability by the central bank's intervention.

3. The results of the models with the variables of deposit, net interest income, and loan-loss provision included independently and combined are very similar to the model with borrowing variable only. Therefore, only the results for the model with the borrowing and capital variables will be reported.

4. On February 4, 2009, the National Bank of Kazakhstan devalued the local currency (KZT) official exchange rate against one US dollar from KZT122.32 to KZT143.98 to prevent massive outflows of the hard currency due to the severe liquidity crisis experienced since September 2008.

5. Four major financial institutions including three commercial banks defaulted in 2009, and the government effectively took control over two of the big four banks. Bank Tulan Alem (BTA), the largest in the nation was acquired by Samruk-Kazyna, the State Welfare Fund in February 2009. Alliance Bank, the 4th largest, was offered to sell majority ownership to government, and the government agreed the deal after the creditors waive their rights to demand early debt repayment due to the change of control of the bank (the poison put). The bank defaulted in April 2009. Astana Finance, the largest non-banking financial institution specializing in mortgage lending and leasing defaulted in May 2009. Temirbank, the 10th largest bank owned by BTA defaulted in November 2009.

6. The Kazakhstan stock market (KASE) index peaked on February 21, 2008 at 2,858.11. Since then, it gradually declined to settle below 2,000 level on August 28. Significant drops were recorded in early October (-9.47% on Oct. 6, -5.43% on Oct. 7, and -12.12% on Oct. 8) due to crude price burst after the Lehman Brothers bankruptcy announcement, and the index settled below 1,000 level on October 16. It bottomed on March 4, 2009 at 594.52 which is close to 80% drop from its peak one year ago.

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Appendix

Major Changes in Banking Regulation in Kazakhstan (since Third Quarter 2007)

Since 3rd quarter 2007, the bank regulator in Kazakhstan toughened its regulations including credit policy, capital requirement and provisioning requirement among others. The new regulations tightened credit policy by raising standards for asset classification requirement and borrowers' financial conditions. The capital requirement was also toughened by including certain liabilities which were not included before in the denominator of the capital ratios. Unsecured guarantees and sureties of a bank issued to secure external borrowings of a bank's subsidiary or affiliated party and certain loans with early acceleration condition by creditors became additional items to be included in calculations of several types of capital ratios. Also, the requirements for sufficiency of own capital to the real estate and consumer loans were effectively increased by weighting of loans for the degree of riskiness based on the loan to value (LTV) ratios (e.g. 50% degree of risk on the LTV less than 50%, 75% risk on the LTV less than 60%, 100% risk on the LTV less than 70%, and 150% risk on other loans).