Business Drivers of Bank Stability in Kazakhstan

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Review of Integrative Business & Economics Research

ABSTRACT

In a micro-prudential context, ceteris paribus, risk exposure emanates primarily from bank activities. Using data for 2007 – 2016, the paper analyzes the business models and financial stability of Kazakhstani banks which entered the crisis with aggressive lending and dependence on short-term wholesale funding. The post-crisis period is characterized by active engagement in securities' investments, non-interest generating activities and significant increase in the deposit base. The research results provide evidence that Kazakhstani banks' financial stability worsens with greater bank size, lending growth and securities' investments; while current levels of short-term borrowings improve banks' stability through more diversified funding structures. Capitalization remains the primary regulatory tool for strengthening the Kazakhstan banking system. The results suggest that, regardless of size and systemic importance, banks should be supervised from a micro level (or business models') prospective in order to prevent possible macroeconomic contagion.

Keywords: Kazakhstan, bank stability, business models, risk-taking.

Received 19 April 2017 | Revised 17 August 2017 | Accepted 29 August 2017.

1. INTRODUCTION

The Kazakhstan banking system has been in existence as an independent financial structure since the fall of the Soviet Union in December 1991. The first decade, 1991 – 2000, was characterized by systemic reforms, financial restructuring and economic turbulence exacerbated by the Asian financial crisis (1997) and the Russian default (1998). Sherif et al. (2002) observe that the state's departure from distribution of bank services led to weak management, undercapitalization, and eventually to massive failures of newly established private banks in the post-Soviet region. Indeed, the number of banks in Kazakhstan surged to 204 in 1993 and then reduced to 55 during the first ten years of state independence. [1] The second decade, 2001 - 2010, was characterized by the expansion of strategic industries and the rapid development of a more sound banking system through tighter prudential regulations. The number of

[1] Formation of financial and credit system of Kazakhstan, August 19' 2013, http://e-history.kz/en/contents/view/785

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

banks stabilized and varied between 34 and 37; the progress, however, was impeded by the global financial crisis that led to the insolvency of the four largest Kazakhstani banks in 2009. The current decade, 2011 – 2020, is time of recovery and post-crisis reforms aimed at building a more sustainable financial system which is an essential condition for success in ongoing economic integration with Russia and other CIS economies (Karmiski and Kostrov, 2014).

Effective micro-prudential regulation requires deeper understanding of bank business models, their inherit risks and potential impact on bank stability. From the asset side of a bank balance sheet, asset quality, excessive lending growth and aggressive investments in financial markets are major drivers of bank failures during economic downturns (Altunbas et al., 2011). From the liability side, non-deposit funding makes banks vulnerable to distress (Gropp and Heider, 2009). Deleveraging via off-balance sheet and cross-border activities significantly contribute to bank fragility. Ayadi et al. (2011) recommend closer monitoring of bank business models for timely assessment and prevention of risks that may threaten bank stability.

The paper pursues two objectives. *First*, it analyzes the evolution of business models of Kazakhstani banks during 2007-2016. Following Demirguc-Kunt and Huisinga (2010), Altunbas et al. (2011), bank business models are defined as key ratios that differentiate across lending, trading, securities' investments, wholesale funding and off-balance sheet operations. *Second*, the research work empirically estimates the effect of business activities on financial stability of Kazakhstani banks measured by Z-score index. The index assesses financial strength of a bank from both profitability and capitalization perspectives. However, shifts in business models may change a bank's risk profile and weaken its financial positions.

Results from the paper have several important implications for national bank regulators. *First*, the paper provides evidence that the financial stability of Kazakhstani banks deteriorates with greater bank size and supports introduction of capital buffers for systemically important banks in the country. *Second*, close monitoring of loan growth (on individual and aggregate levels) is important since aggressive lending is strongly associated with lower bank stability. *Third*, shifts in business models from traditional lending to greater investments in capital markets undermine bank soundness. The current level of short-term borrowings, however, provides banks with some benefits from more diversified funding structures. *Finally*, Kazakhstani banks' sustainability is strongly dependent on the degree of equity capitalization. Additional capitalization is urgently required to improve the loss-absorbing capacity and constrain the risk appetite of Kazakhstani banks.

The rest of the paper is organized as follows. Second section reviews the major empirical works on the relationship between bank business models and bank stability. Third section describes the sample and data. Forth section explains the model and methodology. Fifth section reports and analyze empirical results. Final section concludes.

2. LITERATURE REVIEW

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Empirical literature provides diverse opinions on the relationship between bank business models and bank stability depending on the periods of study and sample compositions. However, the consensus is observed with respect to selection of specific business variables that may influence bank financial stability; they include, but are not limited to, bank size, asset growth, investment and funding strategies, capitalization and non-interest generating activities.

2.1 Bank size

Past empirical studies suggest that bank size has a different effect on the stability (or risk-taking) of banks. Kohler (2012) finds positive association between size and stability of EU-15 listed and unlisted banks. Agoraki et al. (2011) for transition economies and Fungacova and Weill (2010a) for Russia report that banks with greater market power are more stable. The positive relationship between size and stability is explained by the better abilities of large banks to diversify their risks compared to small banks as they have more opportunities to engage in cross-border investments, securitization and derivatives' trading (Gropp and Heider, 2007). Indeed, Widyatini (2017) states that high concentration of lending in a specific sector significantly increases bank risk profile. Altunbas et al. (2011) provide evidence that large EU and US banks tend to accept greater risk pre-crisis and receive more state liquidity support during the crisis. Kohler (2013) explains the negative relationship between bank size and stability by stronger engagement in non-traditional and off-balance sheet activities that reduce initial benefits of diversification and make large banks vulnerable to distress.

2.2 Asset growth and structure

Empirical literature widely suggests that severity of bank distress increases with asset and loan growth. Dell'Ariccia and Marquez (2006) for U.S. banks and Jimnez et al. (2010) for Spanish banks find positive relationship between credit expansion and risk realization. Foos et al. (2010), Altunbas et al. (2011) and Kohler (2012) argue that banks become risky only when *excessive* loan growth (above the mean industry growth rate) is combined with lower lending and collateral standards. In contrast to above studies, Demirgüç-Kunt and Huizinga (2010) report the positive effect of asset growth on return on assets and Z-score using bank sample from 101 countries during 1995-2007.

Deregulation and financial innovations shift banks' business focus from traditional lending to trading, securitization, and off-balance sheet operations, which, in turn, contributes to banks' deleveraging and volatility of revenue (Shin, 2009; Marques-Ibanez and Scheicher, 2010). Beltratti and Stulz (2012) find that banks with a greater proportion of loans and deposits perform better during the crisis compared to banks involved in non-traditional banking activities. Demirgüç-Kunt and Huizinga (2010), Altunbas et al. (2011) provide evidence that excessive engagement in trading activities increases bank fragility. Kohler (2012), however, points to a favorable association between market-based activities and bank stability through better diversification of European banks' business models.

2.3 Funding structure

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

The wholesale interbank loan market is traditionally used to offset bank needs in short-term funds. However, excessive reliance on this type of borrowings exposes banks to high liquidity risk and increases their sensitivity to adverse market conditions (Huan and Rantovski, 2008). Post-crisis studies on the relationship between funding structures and bank risk-taking provide mixed empirical results. Demirgüç-Kunt and Huizinga (2010) report that banks from developed economies have greater reliance on non-deposit funding compared to banks from developing countries; however, the effect of non-deposit funding on bank stability is not material. Altunbas et al. (2011) find that market funding significantly increases systemic risk of US and EU banks and associated with greater probability to draw funds from public support. The authors also state that a greater share of market funding increases the likelihood of distress for riskier banks but there is no effect on prudent banks.

Bank capitalization is another important metric of bank stability that serves as a perpetual funding source as well as an ultimate reserve to cover losses. Empirical literature, however, evidences a more complex link between bank capitalization and risk-taking. One scope of the literature supports a positive relationship between capitalization and bank stability. For example, Beltratti and Stultz (2012) state that greater Tier 1 capital improves the performance of large global banks during the crisis. Berger and Bouwman (2013) also provide evidence that the survival probability of US banks in market and banking crises increases with better capitalization. Lee and Hsieh (2013) confirm that greater capitalization reduces the risk-taking of banks from 42 Asian countries and improves their stability. Another strand of the literature suggests that additional capitalization motivates banks to accept risk. For example, Athanasoglou (2011) reports a positive and significant relationship between capital and the risk-taking of banks from seven South Eastern European countries and causation depends on the current degree of bank capitalization. Using data for US banks during1985 – 2012, Delis et al. (2014) also find that better capitalized banks tend to accept greater risk.

2.4 Non-interest generating activities

Engagement in non-traditional banking changes the composition of bank revenue towards non-interest income. Demirgüç-Kunt and Huizinga (2010) report that a greater share of fee and commission income decreases bank stability measured by Z-score index. One explanation of the effect is the volatile nature of non-interest income and its tendency to decline more during times of market distress. In contrast, Kohler (2012) states that greater reliance on non-interest income improves bank risk profiles through better revenue diversification. The effect also depends on bank size: larger banks become riskier if they generate more non-interest income, whereas smaller banks benefit from diverse income structures. Kohler (2013) analyzes German banks during 2002-2010 and finds that banks with traditional business models (savings, retail cooperative banks) are able to improve their stability with greater reliance on non-interest income, whereas banks with investment-oriented business models become more risky. The results suggest that the business mix of traditional and non-traditional banking activities is able to contribute to bank stability.

3. SAMPLE AND DATA

3.1 Sample

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Annual data for Kazakhstani banks is collected for the period 2007 – 2016 from audited reports prepared according to International Financial Reporting Standards (IFRS). The sample consists of 29 banks out of existing 35 banks and represents 98% of total bank assets as of 1 January 2016. Table 1 presents summary statistics for dependent, independent and macroeconomic control variables.

Table 1. Descriptive statistics of Kazakhstani banks, 2007-2016.

	Obs	Mean	Median	Max	Min	St. dev.	IQR
Bank stability							
Z-score	275	17.056	9.858	175.923	-5.710	23.391	13.334
Bank business models							
Size	275	18.507	18.733	22.351	14.090	1.958	2.964
Loan growth	275	0.507	0.247	9.099	-0.987	1.133	0.553
Investments in securities/Total assets	275	0.108	0.086	0.572	0.000	0.099	0.117
Fee income/Total operating revenue	275	0.138	0.118	0.449	0.009	0.088	0.104
Short – term borrowings/Total assets	275	0.076	0.041	0.453	0.000	0.093	0.109
Equity/Total assets	275	0.255	0.156	0.965	-1.255	0.253	0.235
Macroeconomic variables							
GDP growth	10	0.055	0.058	0.030	0.012	0.012	0.040
Inflation	10	0.090	0.075	0.188	0.049	0.039	0.031

Table 1 summarizes descriptive statistics during 2007 – 2016. IQR is the interquartile range between the 75th and the 25th percentile. Z-score is a dependent variable of bank stability. Size is measured by natural logarithm of Total assets; Investments in securities include held-to-maturity and available-for-sale securities; Fee income is fee and commission income out of total operating revenue.

Z-score, a measure of financial stability, has a mean value of 17.056[2]. The lowest Z-score in the sample belongs to distressed Temir bank (a subsidiary of a defaulted BTA bank)[3]. The maximum Z-score belongs to private RBK bank in the pre-crisis period. The business variables show that Kazakhstani banks pursue quite aggressive lending with mean growth of 50.7%. Investments in securities account for 10.8% of total assets. Fee and commission income represents 13.8% of total operating income. The average level of short-term borrowings and equity financing is 7.6% and 25.5% of total assets respectively. The largest negative equity to total assets ratio belongs to Alliance bank that became insolvent in 2009. The section for macroeconomic variables reports the average annual real GDP growth rate 5.5% and average inflation rate stands at 9.0%.

3.2 Bank financial stability

Z-score estimates bank stability from both profitability and capital adequacy perspectives and it is widely used in multiple studies (Berger et al., 2009; Martinez-Miera and Repullo, 2010; Demirgüç-Kunt and Huizinga, 2010). Z-score is calculated as sum of Return on assets and Equity to assets ratios divided by standard deviation of Return on assets:

[2] For comparison, Demirgüç-Kunt and Huizinga (2010) report mean Z-score for developing countries as 17.692, for developed economies as 35.263 and Z-score for the total sample as 30.740 during 1995-2007.
[3] BTA bank received government capital support in February 2009, which resulted in 74% of state shareholding.

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$$Z-score_{it} = \frac{ROA_{it} + E/A_{it}}{\delta(ROA)_{iT}}$$

Where ROA_{it} is Return on assets for bank *i* at time *t*, E/A_{it} is Equity to assets ratio for bank *i* at time *t* and δ_{ROAiT} is a standard deviation of Return on assets of bank *i* over the period of study *T*. Higher value of Z-score implies better bank stability and longer distance to default in the medium-term horizon (Bhagat et al., 2015). Figure 1 presents Z – score for Kazakhstani banks during 2007 - 2016.

Figure 1. Z-score of Kazakhstani banks, 2007-2016.

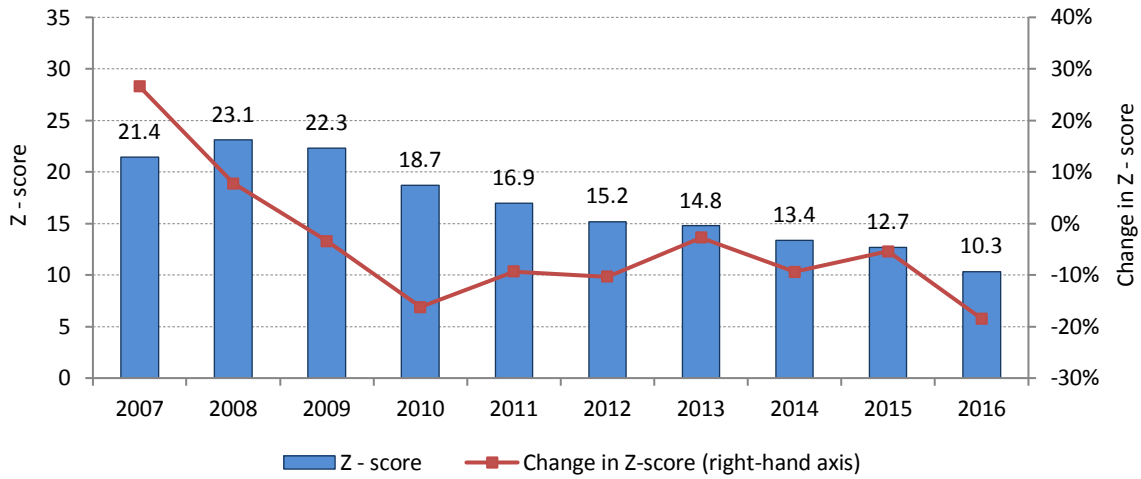

Figure 1 presents average Z – score for Kazakhstani banks during 2007 – 2016 scaled on the left-hand primary axis. Annual percentage change in Z-score is scaled on the right-hand secondary axis.

The bars in the Figure 1 show that Z-score declines from 21.4 (as at January 2007) to 10.3 (as at January 2016) over the period of study. More specifically, Kazakhstani banks' financial stability deteriorates by 12.8% during the crisis (2007 – 2010) and by 44.7% in the post-crisis period (2011 – 2016) which is quite a warning. The line in the Figure 1 presents annual percentage changes in Z-score that are mainly negative starting from the year 2009. It seems that banks' financial stability in the country continues to suffer from business models' risks realization exacerbated by an adverse macroeconomic environment[4].

3.3 Bank business activities

Business activities are the major variables of interest for explaining financial stability of Kazakhstani banks. Investment and funding strategies are analyzed from balance sheets' prospective; whereas banks' engagement in non-interest generating activities is assessed from an income composition. Investment strategies are captured by size of loan portfolio, lending growth and investments in long-term securities. Figure 2, Panel A, shows that loan portfolio dominates in total asset structure; however, its share shrinks from 73.4% (as at January 2008) to 59.3% of total assets (as at January 2015). In contrast, securities' share increases more than three times, from 3.7% to 13.9% during

[4] Kazakhstani economy experienced several waves of currency devaluation: around 70% weaker Kazakhstani tenge against US dollar only during 2014 - 2015 years.

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2007 – 2015 and then declines to 6.1% by 2016. Figure 2, Panel B, demonstrates that Kazakhstani banks experience aggressive lending growth 107.0% just prior to the financial crisis followed by slowdown during the crisis and graduate recovery thereafter. The graph clearly indicates volatile nature of securities' investments as fast growth changes to sharp declines.

Figure 2. Asset composition and growth of Kazakhstani banks, 2007-2016

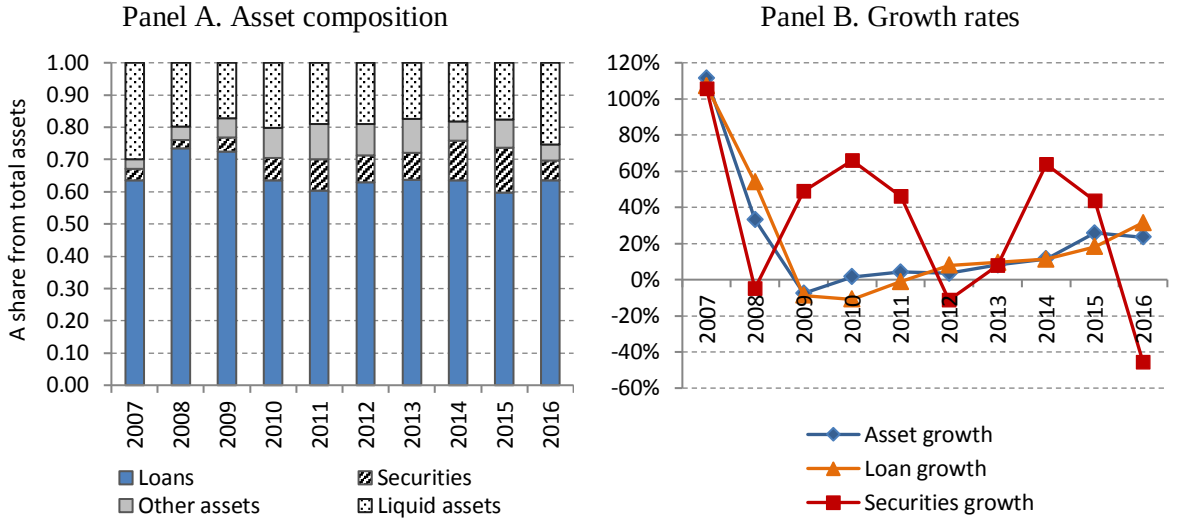

Figure shows asset composition (Panel A) and growth rates (Panel B) in assets, loans and securities' investments of Kazakhstani banks during 2007-2016. Securities include held-to-maturity and available-for-sale securities. Liquid assets include cash and cash equivalents, deposits at the Central bank, deposits in banks and marketable securities.

Bank funding is grouped by wholesale market borrowings, long-term borrowings and equity financing. The shareholders' equity serves not only as a source of funds but also as a buffer to absorb losses incurred from banks' operations (Berger and Bowman, 2013). Figure 3, Panel A, indicates the lowest level of deposits (38.5% of total assets) and highest reliance on short-term borrowings (27.3% out of total asset) as at January 2007. Over the period of study, the deposit base continuously improves reaching 68.3%, while short-term and long-term borrowings fall to 5.8% and 12.4% of total assets respectively as at January 2016. Equity financing increases to 13.1% of total assets in 2014 followed by decline to 10.0% by 2016. The drop in equity to 5.7% of total assets in 2010 is associated with insolvency of the four largest banks, which received state support[5]. Because of the government intervention, capitalization of Kazakhstani banks recovers. Figure 3, Panel B, shows that all funding sources experience high growth prior to the crisis: 114.6% in deposits, 139.3% in short-term borrowings, 70.3% in long-term borrowings and 129.5% in equity capital. Then, growth rates slowdown and even turn to negative for short-term and long-term borrowings. Moreover, it is evident that short-term financing exhibits greater changes over the period of study.

[5] BTA banks, Halyk Saving Bank, Kazkommertz bank and Alliance bank received state support in 2009.

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Figure 3. Funding composition and growth of Kazakhstani banks, 2007-2016

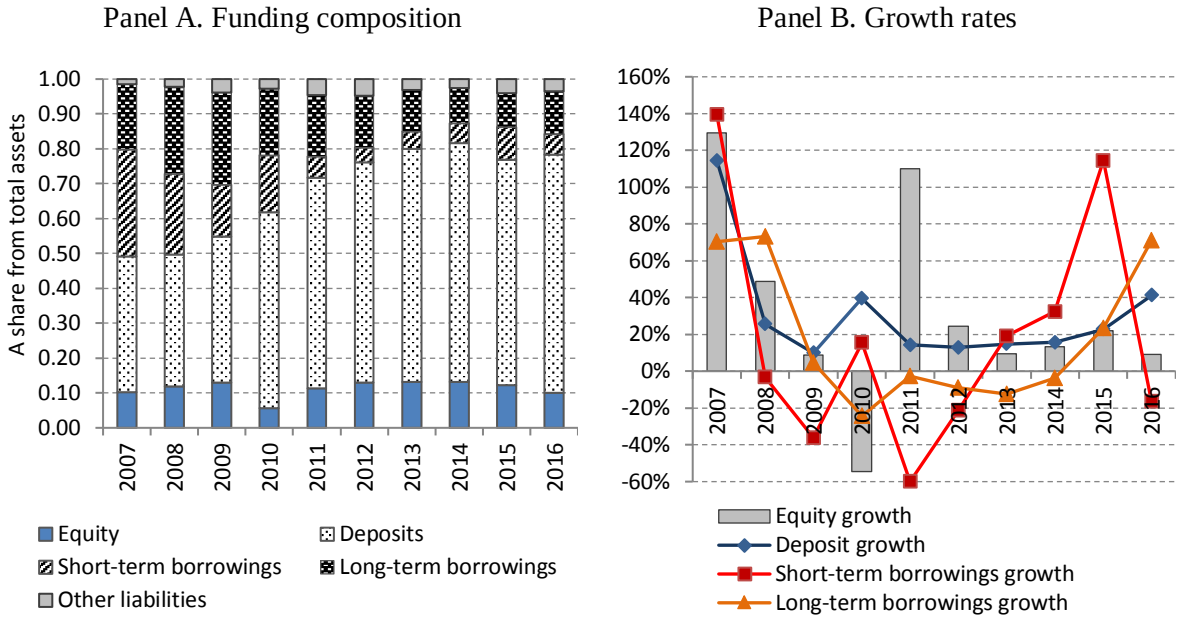

Figure shows funding composition (Panel A) and growth rates (Panel B) in deposits, short-term and long-term borrowings of Kazakhstani banks during the sample period 2007-2016. Deposits include all customer deposits. Short-term borrowings include wholesale market and interbank funding. Lines in Panel B represent percentage growth rates in deposits, short-term and long-term borrowings. Bars represent equity growth.

Financial results from bank investment and funding strategies are directly reflected in an income statement in the form of net interest income, net gains/losses from foreign exchange and proprietary trading. However, some activities generate non-interest revenue for a bank. For example, banks earn fee and commission income from credit cards' servicing, securitization, financial guarantees, brokerage activities etc. Figure 4 presents the composition and growth of Kazakhstani banks' total operating revenue for 2007-2016.

Figure 4, Panel A, shows that interest income of Kazakhstani banks decreases from 86.4% as at January 2009 to 54.5% as at January 2016. It is mainly associated with a shrink of loan portfolios due to low credit supply and significant loan losses. At the same time, fee and commission income of Kazakhstani banks increases persistently from 7.8% as at January 2009 to 17.9% of total operating revenue as at January 2014 followed by decline to 10.7% by 2016. During 2015, Kazakhstani banks generated a significant share of income from securities and foreign exchange trading[6]. Figure 4, Panel B, demonstrates that interest and fee sources of income rise by 89.2% and 35.9% respectively as at January 2008 followed by sharp decline in growth. Interest revenue exhibits negative growth during 2011 – 2012. It seems that Kazakhstani banks try to compensate falling interest income by expanding their non-interest generating activities as fee revenue grows at faster rate starting from 2010.

[6] Halyk Saving Bank and Kaspi Bank contributed the most to the increase in the share of other income.

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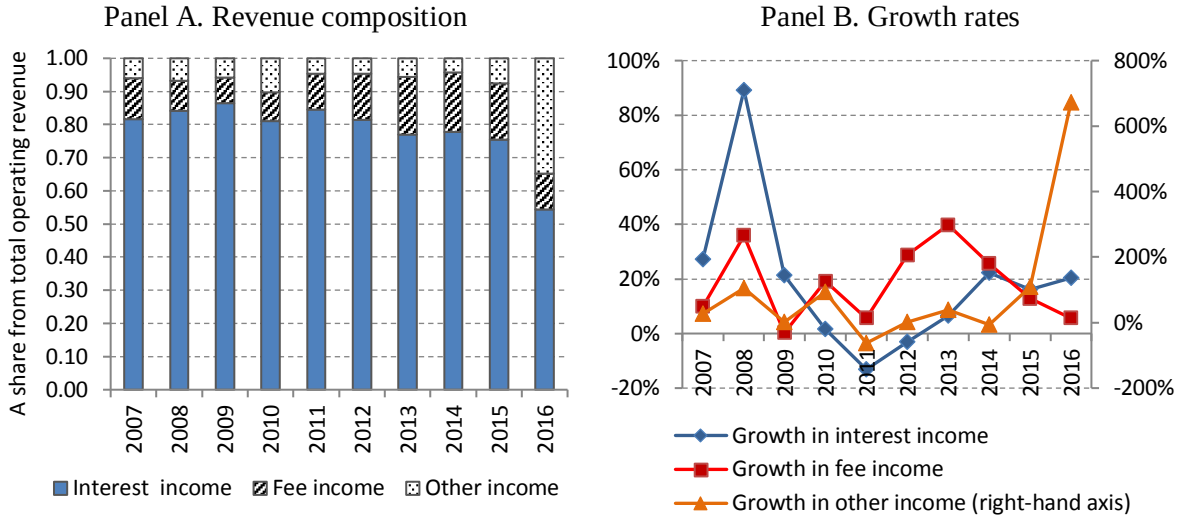
Figure 4. Revenue composition and growth of Kazakhstani banks, 2007-2016



Figure, Panel A, shows the share of interest, fee income and other income of Kazakhstani banks out of Total operating revenue during the sample period 2007-2016. Other income includes net gains (or losses) from securities and foreign exchange trading, dividends received and other sources of income. Panel B shows growth rates in interest and fee revenues scaled on the left-hand primary axis and other income of Kazakhstani banks is scaled on the right-hand secondary axis.

4. MODEL AND METHODOLOGY

Dependent variables of bank *Stability (Z – score)* is regressed against the set of bank business variables and the vector of macroeconomic control variables, X_t^m. In line with Altunbas et al. (2011) and Dietrich et al. (2014), the empirical investigation is based on the following baseline model specifications:

$$Z - score_{i,t} = C_i + \beta_1 Size_{i,t} + \beta_2 Loan\ growth_{i,t} + \beta_3 Securities_{i,t} + \beta_4 Fee\ income_{i,t} + \beta_5 ST\ Borrow_{i,t} + \beta_6 Equity_{i,t} + \sum_{m=1}^{M} X_t^m + \varepsilon_{i,t} \quad (eq.1)$$

All variables indexed by *i* and *t* are specific to bank *i* at time *t*. C_i is an unobservable constant bank-specific characteristics and $\varepsilon_{i,t}$ is an idiosyncratic error with mean 0.

Following Delis et al. (2014) and Dietrich et al. (2014), all bank-specific variables enter the regression without lag effect which assumes that the decision on risk-taking is made by financial institutions simultaneously depending on expected profitability, liquidity and capitalization. Bank stability is also affected by the macroeconomic environment in which banks operate. Following Dietrich et al. (2014) and Bhagat et al. (2015), I introduce dummy variable of *Crisis* that takes the value of "1" for years 2008, 2009 and 2010 and "0" otherwise. The crisis years are defined by Lehman Brothers' default in September 2008. *GDP growth* controls for business cycle effect on bank stability. Guidara et al. (2013) state that banks not only enjoy better capitalization and profitability during economic upturns but also accept greater risks. Finally, I include an *annual inflation rate*, which impacts lending supply, bank real returns and cost of

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borrowings (Ladskronet and Rutenberg, 1985). Table 2 summarizes dependent, independent and control variables:

Table 2. Summary of dependent and independent variables

Variables	Measure	Description
Dependent variable of bank stability:		
Z-score $_{i,t}$	$Z-score_{it} = \frac{ROA_{it} + E/A_{it}}{\delta(ROA)_{iT}}$	ROA is the ratio of net income to total assets E/A is the ratio of equity to assets δ(ROA) is standard deviation of ROA
Bank-specific business variables:		
Size $_{i,t}$	*Size = Ln (Total assets)*	Absolute amount of total assets
Loan growth $_{i,t}$	$Growth = \frac{Loan_t}{Loan_{t-1}} - 1$	Loans include all loans to firms and individuals
Securities $_{i,t}$	$Invest = \frac{Securities' investments}{Total\ assets}$	Securities' investments include available-for-sale and held-to-maturity securities
Fee income $_{i,t}$	$Fee = \frac{Fee\ income}{Total\ operating\ revenue}$	Fee income includes fee and commission revenue
ST Borrow $_{i,t}$	$Borrow = \frac{Short-term\ funding}{Total\ assets}$	Short - term wholesale funding includes interbank loans and other short – term borrowings with maturity less than one year
Equity $_{i,t}$	$Equity = \frac{Equity}{Total\ assets}$	Equity represents shareholders' capital
Country-level macroeconomic variables:		
Crisis $_{t}$	*Dummy variable that takes the value of "1" for crisis years; or "0" otherwise.*	Crisis years are defined as 2008, 2009, 2010
GDP growth $_{t}$	$GDPgrowth = \frac{GDP_t}{GDP_{t-1}} - 1$	Annual growth rate of real GDP at the reported year
Inflation $_{t}$	$Inflation = \frac{CPI_{\ t}}{CPI_{t-1}} - 1$	CPI is a consumer price index at the reported year

The model equation 1 is estimated by the Panel ordinary least squares regression method using both fixed and random effects. The Hausman specification test verifies the condition on zero correlation between individual effect (C_i) and explanatory variables, $\rho\ (C_i, \beta_{it}) = 0$ (Hausman, 1978). If this condition is violated, the appropriate estimation model is a fixed effect; otherwise, both models (fixed effect and random effect) produce consistent estimates. The major reason for selecting this methodology is the absence of endogeneity issue.

Data are checked for multi-collinearity in order to avoid the inflated standard errors when independent variables are strongly correlated. Variance-inflated factors report absence of collinearity issue. Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests indicate that all business variables are stationary at level except for bank size for which ADF and PP tests report conflicting results. The additional Levin, Lin and Chu panel unit root test confirms the absence of unit root for bank size with p-value less than 1%. Robustness of empirical results is verified by panel Generalized Method of Moments' estimator with the fixed effect which effectively solves problems of heteroskedasticity.

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5. EMPIRICAL RESULTS

Table 3 presents Pearson correlation coefficients between business variables of Kazakhstani banks. Z-score is negatively correlated with bank size and weakly negatively correlated with short-term borrowings, while the correlation between Z-score and equity capitalization is strongly positive. Among the pairs of bank specific variables, bank size indicates moderate negative correlation with fee income and strong negative correlation with bank equity, and positive correlation with short-term borrowings. Short-term market funding has positive association with lending growth and negative correlation with equity financing.

Table 3. Correlation coefficients between bank-specific variables of Kazakhstani banks, 2007 – 2016.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	Z-score	1						
(2)	Size	-0.558	1					
(3)	Loan growth	0.066	-0.129	1				
(4)	Securities	-0.014	0.067	0.159	1			
(5)	Fee income	0.154	-0.261	-0.039	-0.026	1		
(6)	ST Borrow	-0.289	0.284	0.216	-0.105	-0.134	1	
(7)	Equity	0.683	-0.787	0.069	-0.005	0.251	-0.353	1

Table 3 shows correlation coefficients between Z-score and business-specific variables of Kazakhstani banks. The following correlation criteria are applied: 0 – 0.2 scarcely correlated; 0.2 – 0.4 weakly correlated; 0.4 – 0.6 correlated; 0.6 – 1.0 strongly correlated.

Table 4 shows the panel regression results for Z-score and business activities of Kazakhstani banks using equation (1). Generalized Method of Moments verifies the consistency of the main results. The effect of each variable on bank stability is discussed one by one in line with its presentation in the table 4.

Bank size has significant negative effect on Z-score indicating that large Kazakhstani banks are less stable. The result complies with findings of Altunbas et al. (2011) and Kohler (2013) for US and EU banks. Karminski and Kostrov (2014) also report that too large and too small Russian banks exhibit higher insolvency. Similar to studies of Foos et al. (2010), Kohler (2012), *aggressive lending* is strongly associated with poorer bank stability[7]. It seems that Kazakhstani banks tend to lower lending and collateral standards (to facilitate growth), which subsequently result in greater credit losses and damage bank stability. *Investments in securities* have negative effect on Kazakhstani banks' stability and the result is consistent with Demirgüç-Kunt and Huizinga (2010), Altunbas et al. (2011) who point out that non-traditional asset-based activities are associated with greater default probability of banks.

[7] The result is robust with one and two lags for lending growth in terms of sign and significance.

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Table 4. Business activities and financial stability of Kazakhstani banks, 2007 – 2016.

Dependent variable is Z-score stability index (Z-score)
Method: Panel least squares fixed effect and panel cross-section random effect
GMM is a Panel Generalized Methods of Moments estimated with fixed effect

	Fixed	Random	GMM
Size	-7.137*** (-7.836)	-5.468*** (-6.709)	-7.863*** (-7.985)
Loan growth	-1.578*** (-3.040)	-1.594*** (-3.099)	-2.347*** (-3.935)
Securities	-24.891*** (-3.385)	-21.377** (-2.981)	-22.180** (-2.850)
Fee income	-4.306 (-0.492)	-3.353 (0.393)	11.510 (1.213)
ST Borrow	36.027*** (4.542)	30.590*** (3.911)	75.664*** (5.073)
Equity	54.216*** (12.180)	54.088*** (12.355)	58.723*** (12.009)
Crisis	-5.814*** (-3.467)	-3.575** (-2.233)	-8.068*** (-4.247)
GDP growth	-104.436*** (-4.282)	-76.154*** (-3.252)	-132.602** (-4.889)
Inflation	22.843 (1.454)	16.946 (1.086)	18.782 (1.133)
Bank fixed effect	141.153*** (7.725)	108.652*** (6.553)	152.182*** (7.792)
Adj. R^2	0.860	0.614	
F-test	45.739***	48.723***	
Hausman Test (Chi-Sq, 9)		36.160***	
Sargan-Hansen Test (J-stat)			0.495
Observations	271	271	271

Table 4 presents the regression coefficients of model (1) for the sample of Kazakhstani banks. T-statistics is given in parentheses. P-values are marked by asterisks as follows:
*Significant at 10%; **Significant at 5%; ***Significant at 1%.

Fee-generating activities are not material in explaining financial soundness of Kazakhstani banks. *Short-term market borrowings* have significantly positive effect on bank financial stability that is in contrast to most of Western studies. Deeper analysis reveals that a share of short-term financing is relatively small compared to banks from developed economies and does not threaten financial soundness at the current level. *Capitalization* is associated with stronger Kazakhstani banks' stability confirming its powerful function as a regulatory tool for constraining bank risk appetite and improving long-term bank sustainability. The results are consistent with Beltratti and Stultz (2012), Lee and Hsein (2013).

Among macroeconomic variables, the coefficient for *Crisis* is negative and significant implying that Kazakhstani banks' stability worsens during crisis years. However, *real*

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

GDP growth also reports significantly negative coefficient indicating that Z – score falls when GDP rises. The phenomena could be associated with Kazakhstani banks' countercyclical behavior when they are willing to accept greater risk during economic upturns (Guidara et al., 2013). The result also could be explained by a presence of a systemic factor (not considered in the model) such as state injection of capital in four distressed banks accounted for 60% of market share in 2009. *Inflation level* is not material for bank stability in the country in spite of its high level during the crisis and post-crisis years.

The bank fixed effect is highly significant indicating the strong unobservable heterogeneity among sample banks that influences their individual stability. The Hausman test confirms efficiency of the fixed effect over the random effect as the null hypothesis of the test is rejected. Adjusted R-squared reports the goodness of fit of the model specification and F-test indicates the overall significance of the model. The Sargan-Hansen test supports the validity of instrumental variables for the regression tested with the GMM estimator, which confirms the robustness of main results.

6. CONCLUSION

Using annual Kazakhstan's bank data for 2007 – 2016, the paper contributes to the design of effective post-crisis prudential regulation, which requires deeper understanding of structural changes in business models and their potential impact on bank stability. Data analysis shows that bank financial stability in Kazakhstan has deteriorated around 51.8% over the period of study as Z-score persistently declines reaching the minimum value of 10.3% as at January 2016. From a business prospective, Kazakhstani banks follow a traditional banking strategy with dominating loans and deposits in the balance sheet structures. At the same time, banks increase investments in securities, participation in non-interest activities and considerably decrease their dependence on wholesale funding. The empirical results indicate that financial stability of Kazakhstani banks worsens with greater bank size, lending growth and engagement in securities' investments. The current level of short-term borrowings, however, has a favorable effect on bank stability. It is also evident that Kazakhstani banks have a strong need for additional equity capitalization to enhance their long-term financial sustainability.

The paper sets the stage for future research. First, the presence of countercyclical behavior effecting Kazakhstani banks' stability requires deeper investigation by including variables that may create this effect (for example, state ownership of banks). Second, the expansion of the sample to other CIS countries (especially those that form the Eurasian Economic Union) will provide valuable comparative assessment of bank financial stability in the region.

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