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Disentangling the effect of supply and demand factors on bank lending. Evidence from Bank Lending Survey in Azerbaijan

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Abstract

This paper examines the role of supply and demand conditions on bank lending using data from the Bank Lending Survey (BLS) in Azerbaijan. Results suggest that both supply and demand factors play an important role in credit growth rate. The estimated impact of softening in credit conditions on the quarter-on-quarter consumer lending growth rate ranges between 0.14 and 0.21 percentage points while the effect of the decrease in demand is found to range between -0.24 and -0.34 percentage points, depending on the specifications. Results remain to be robust to the introduction of various control variables, time dummies, and different specifications. We further compare results for systematically important (SI) banks and others (NSI) and find that the effect is asymmetric for different bank groups.

Key words: Bank Lending Survey, panel data, credit growth, supply tightening, demand easing, bank-level.

JEL classification: E30, E32, E52, G21

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1. Introduction

Credit conditions affecting credit developments have been of great interest to policymakers. While changes in the overall lending can easily be observed, underlying factors driving the dynamics cannot be distinguished in the aggregate data where both demand and supply conditions play a role. Understanding factors affecting the loan dynamics is important because conditions driving bank lending have different consequences for the economy and require different policy reactions. In the case of Azerbaijan, after the sudden drop in oil prices, which was followed by the devaluation of the local currency, the new macroeconomic situation led to significant changes in the financial sector. A sharp decline was observed in the banking sector. However, to what extent it was the result of the tightening credit conditions or reduced demand by businesses and households still remain a study question. Besides, even if it was because of the supply side factors, -to what extent it was the results of the credit risk developments, lack of available funds, or bank balance sheet constraints remains unanswered.

In the light of these questions, we study the role of demand and supply factors in determining credit developments in Azerbaijan using bank-level data from the Bank Lending Survey (BLS). BLS is an important source of information for policy-makers where banks are regularly asked how their lending conditions have changed over the past three months. It also provides reasons behind their adjustments to the credit standards including bank-related supply-side factors such as the liquidity position, balance sheet constraints, and non-bank-related factors including customer credit worthiness, banks' perception of risk (i.e., expectations about general economic activity).

For the purpose of our analysis, we combine individual bank lending data with BLS survey indicators to disentangle the role of supply and demand factors in the overall credit dynamics and the effect of specific factors contributing to the changes in credit standards. The sample covers 26 local banks in Azerbaijan at a quarterly frequency over the years 2015-2020. We assess the role of overall supply and demand indicators and the contribution of the specific supply-side factors on bank lending for businesses and consumers separately.

To our knowledge, this is the first study for a developing country to disentangle the importance of supply and demand factors using individual bank-level data. Secondly, certain shifts in credit standards (i.e, regulative restrictions, market risk) can affect banks unevenly depending on their systemic importance, risk-taking abilities, and other bank-related characteristics. Bearing this in mind, we further investigate the possible heterogeneous impact of these factors on bank lending by differentiating between systematically important banks and others that we did not come across in similar studies before.

The rest of the paper is structured as follows. Section 2 provides a brief literature review. Section 3 presents the main characteristics of the data and provides some descriptive evidence. Section 4 describes the empirical methodology. Section 5 presents the main findings and Section 6 concludes.

2. Literature review

Among the first studies using BLS data is Bell and Young (2010) which provides descriptive evidence on the use of the survey for assessing official rates and bank lending during the financial crisis. Combining individual bank-level BLS survey results and micro-level bank data they examine how BLS responses correspond to changes in official rates and bank lending during the global financial crisis. Their findings indicate that BLS can be a useful resource for policymakers to get insights about changes in credit circumstances.

Other studies employ the cross-sectional dimension of BLS data, which includes 1) country-level or regional BLS data (De Bondt, et al., 2010; Ciccarelli, et al., 2010), 2) individual data both for BLS responses and for bank lending data of surveyed banks (Del Giovane, et al., 2010). De Bondt (2010) found that surveys in several European countries explained the growth in lending and foreign investment to non-financial corporations, as well as the real GDP growth rate. The survey results, particularly those relating to business loans, are found to be an important leading indicator for bank lending and real GDP growth in the eurozone.

Del Giovane et al. (2010) used micro data on loans amount and qualitative data from the BLS to analyze the impact of supply and demand factors in credit developments for Italian banks during 2002Q4-2009Q4. The quarterly growth rates of survey results on business and mortgage loans, as well as nominal GDP, the discount rate, and bank fixed effects are included in the regression as explanatory variables and the growth rate of bank loans as a dependent variable. The study examined three main periods: pre-crisis interval, crisis interval, and Lehman crisis interval. Their anlayisis showed that both demand and supply factors had a significant negative impact on credit trends in Italy throughout the financial crisis, with supply effects peaking in 2008Q4 and 2009Q1.

Blaes (2011) carried out a similar investigation for 14 German banks. Real GDP, capital ratio, real insolvency claims were included in the model as primary explanatory variables. Their findings suggested that the bank-related supply and demand-side indicators were necessary for explaining the slowdown of bank lending during the crisis period.

One of the recent empirical studies on the subject is the research of Deryugina, et al. (2015) on the identification of supply and demand shocks in Russia, covering the years 2001-2014. Besides macro-based SVAR and ECM models, notwithstanding the brief history of the survey, they developed a panel model that connects bank-specific BLS statistics to actual lending growth. Their results show that the BLS data represent significant shifts in loan demand and supply during the recovery period in 2010–2011 and contraction in 2014

Altavilla et al. (2018) examined credit demand and supply factors from 116 banks in 13 Eurozone countries based on BLS during the crisis. The primary goal of the study was to determine whether borrowers demand less loans from banks with weak balance sheet positions. Following a standard monetary policy shock,

it should be noted that bank balance sheet strength affects both credit supply and demand. Their findings reveal that individual bank's supply is a better predictor of loan activity during times of crisis.

This paper builds on recent research and adds to the body of knowledge on the information acquired by bank loan surveys.

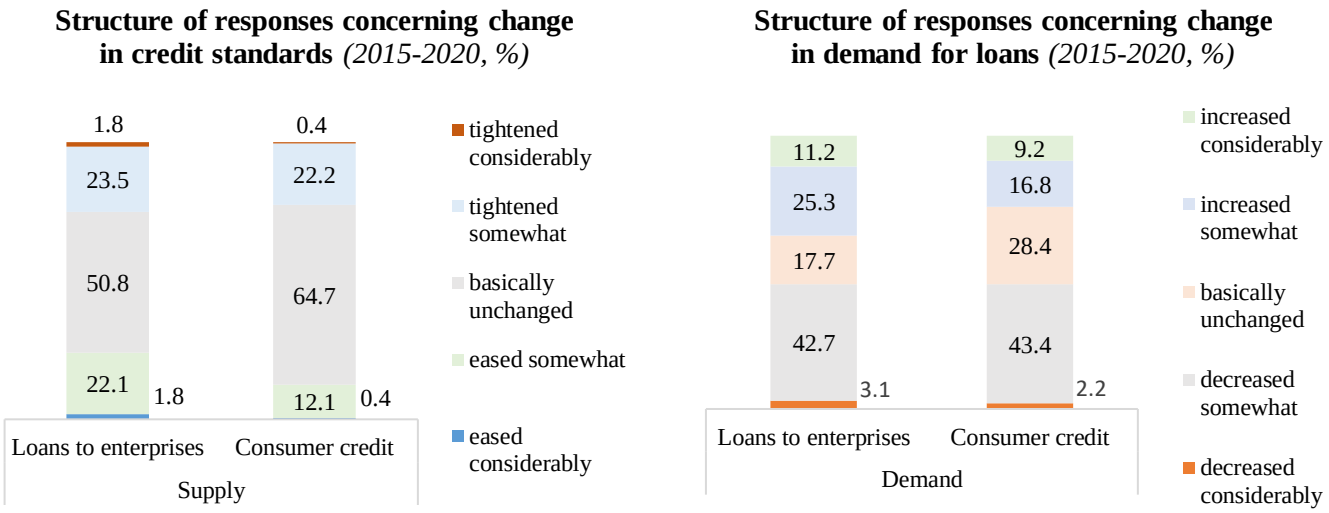
3. Data

This section provides details of some descriptive statistics. In this paper, panel data of Azerbaijani banks participating in the Bank Lending Survey is used to assess the role of demand and supply factors in the credit development of domestic loans.

Bank Lending Survey (also called Senior Loan Officer Opinion Surveys) is the primary source of qualitative information for credit conditions and standards. The main goal of the survey is to better understand the bank lending behavior that affects the monetary transmission mechanism and business cycles. Every quarter the central banks request commercial banks to assess their opinions about credit standards and the changes they perceive in demand for their loans. Commercial banks in turn give their opinion about different market segments: business loans and consumer loans. This allows central banks to disentangle credit supply and demand factors that influence bank lending.

The Central Bank of Azerbaijan Republic (CBAR) introduced the BLS in 2015 and provides quarterly information on banks' lending conditions. The first set of responses begins in the second quarter of 2015 and ends in the third quarter of 2020. The survey is based on a number of questions regarding changes in demand and supply factors for bank loans over the past three months and the next three months' expectations. We mainly focus on two credit channels: business credits and consumer credits. The survey contains 10 questions for consumer loans and 6 questions for business loans. To focus on the main analysis, we use banks' assessment of changes in credit standards, factors determining these changes, and demand for credits. The dataset includes an unbalanced panel of 26 Azerbaijan banks that participated in the survey over a sample period of 19 quarters (2015Q2 - 2020Q3), totaling 338 observations. The newly issued loans granted by survey banks for both households and enterprises accounted for almost 95% of the total loan offered by the Azerbaijan banking sector at the time of the research (end of 2020). Figure 1 illustrates the responses provided by banks over the period 2015-2020. Responses for supply-side (left) factors mostly falls in the "basically unchanged" category and only very few banks reported considerable changes ("eased considerably", "tightened considerably") in their credit standards.

Figure 1. Structure of responses concerning changes in credit standards and perceived changes in demand for loans (2015-2020)



Source: CBAR

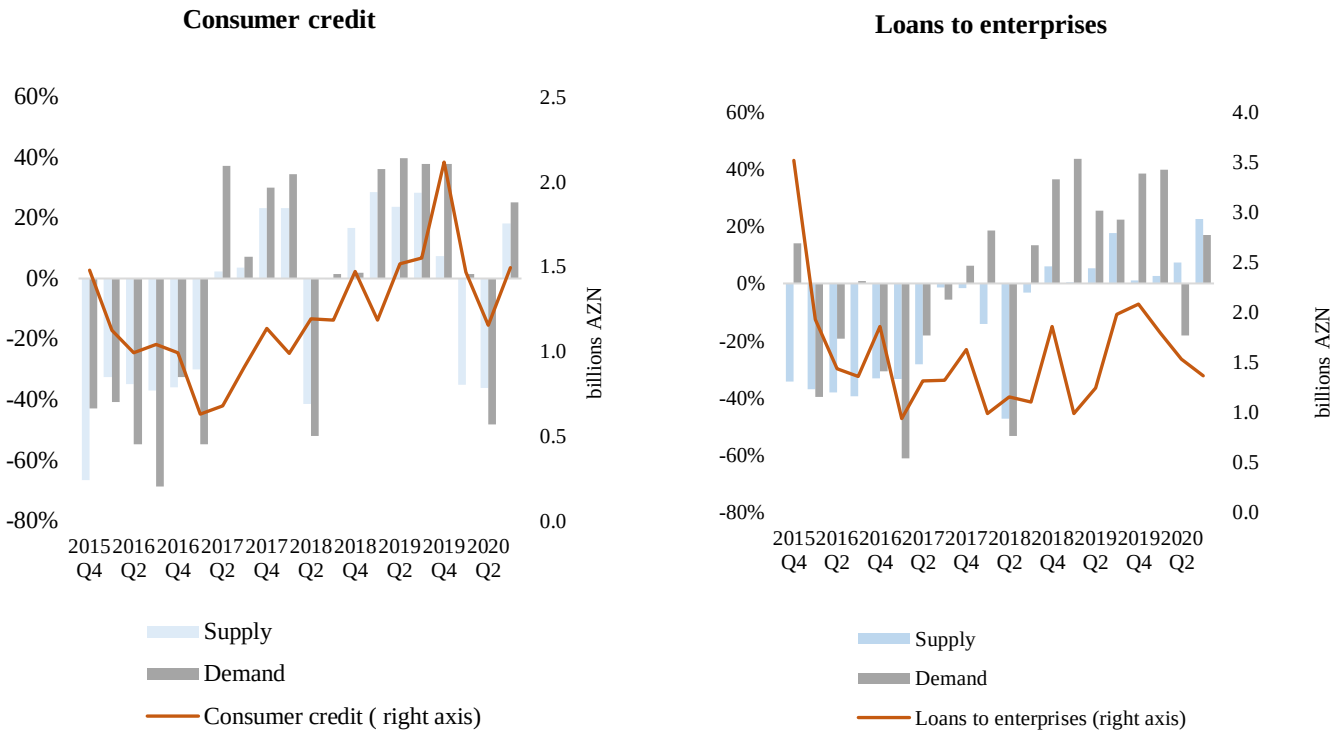
The rest of the answers ranges between "eased somewhat" (22% for business credits and 12% for consumer loans) and "tightened somewhat" (24 % for business loans and 22% for consumer loans). Nonetheless, we notice more variance in the responses related to the demand conditions (right) with most of the answers falling under the category "decreased somewhat". Answers reporting "decreased considerably" are also more frequent in comparison to the supply side factors.

Figure 2 shows the relationship between BLS indicators of the aggregate percentage change in supply and demand conditions reported by banks and new issued bank loans.4 Evolution of BLS indicators and loan dynamics shows similar patterns. Specifically, during the devaluation period of the local currency (2015 Q2-2017 Q2), there has been sharp decline in bank lending which is also evident on BLS responses of the supply and demand conditions. Almost all Azerbaijani banks have reported tightening in their credit standards and decrease in demand for loans during that period. The relationship seems particularly stronger for consumer loans where increase (decrease) in loan provision is also goes in line with the reports of easing (tightening) credit standards and increase (decrease) in demand conditions over the sample period[5].

[4] The qualitative responses of banks are determined at the aggregate level by means of net percentage change. A positive (negative) percentage indicates an aggregate easing (tightening) of credit standards/ conditions or an aggregate increase (decrease) in demand for loans.

[5] Data from banks quarterly lending amounts and loan rates are taken from Statistics Department of CBAR.

Figure 2. Changes in credit standards/conditions and demand for business and consumer credits



Source: CBAR

4. Methodology

Due to the panel structure of the data, a fixed effects method is employed to estimate the relationship between loan growth and variables of interest.

The model is carried out on an unbalanced panel of 26 Azerbaijan banks, over a sample period of 2015 Q2-2020Q3, in the following form:

$$\Delta Loans_{it} = \beta_0 + \beta_1 BLS\_S_{it-1} + \beta_2 BLS\_D_{it} + \gamma X_{it} + \varphi_i + q_t + \delta_T + \varepsilon_{it} \quad (1)$$

where $\Delta Loans_{it}$ is the quarter-on-quarter growth rate of bank lending for bank i in the quarter t, BLS_S_{it-1} is a vector of survey responses for supply indicators for bank i at time $t-1$; BLS_D_{it} is the indicator of demand condition for bank i at time t; X is a vector of other control variables such as the bank specific (branch ratio, individial bank interest rate) and macro variables (GDP growth rate, refinancing rate); φ_i indicates bank level fixed effects to account for unobserved bank specific characteristics; $q_t$is the quarter dummies to control for seasonal factors in bank lending, while δ_T indicates time fixed effects.

Since BLS indicators are qualitative variables, they enter the regression in the form of dummy variables. Thus, equation 1 can be rewritten as:

$$\Delta Loans_{it} = \propto_0 + \beta_1(L)BLS\_S\_easing_{it-1} + \beta_2(L)BLS\_S\_tightening_{it-1} + \beta_3 BLS\_D\_decrease_{it} + \beta_4 BLS\_D\_increase_{it} + \gamma X_{it} + \varphi_i + q_t + \delta_T + \varepsilon_{it}, \quad (2)$$

Where, for example, $BLS\_S\_easing_{it-1}$ takes the value of 1 if a bank indicates easing of standards ("eased considerably" or "eased somewhat") in the period $t-1$ and 0 otherwise. The rest of the BLS indicators are included in the regression in the same way. The parameter of interest are $\beta_1, \beta_2, \beta_3, \beta_4$ where the expected signs for β_1 and β_4 are positive and negative for β_2, β_3.

5. Results

The relationship between the growth rate of bank loans and BLS indicators of supply and demand conditions is assessed in two stages. In the first stage, the overall change in credit demand and credit standards obtained from the survey are assessed with the growth rate of consumer and business loans. The association between factors affecting changes in credit standards and credit growth rates is analyzed in the second stage. Bank fixed effects and seasonal dummies are included in all specifications.

Table 1 reports results for consumer credits. Column 1 includes only BLS indicators as part of the regression model. Both supply and demand conditions appear to be statistically significant. Softening in credit conditions ("supply easing") is associated with a 0.13 percentage point increase in q-o-q consumers' credit growth while responses of "demand decrease" reduce credit growth by 0.32 percentage point. Column 2 includes other control variables related to bank-specific indicators and general macroeconomic conditions in the country in addition to the BLS variables. Among other control variables, only individual bank interest rate shows a significant and negative relationship with credit growth rate while results from the previous specification for BLS indicators remain largely similar both in terms of magnitude and significance. Column 3 includes time dummies to control for time-specific factors that may affect all banks in the country in addition to the indicators in column 2. Results show that even including time dummies the BLS indicators of "supply tightening" and "demand decrease" remain robust. GDP growth rate becomes statistically significant at a 10% level. Finally, we include the interaction terms of BLS supply and demand indicators and a dummy to understand the relationship between credit supply and demand conditions and consumer credit growth rates during the crisis period. Column 4 and 5 shows these results with and without time fixed effects respectively[6]. While we see no significant change in the relationship during the crisis period, the individual effects of supply easing and demand decrease remain unchanged in terms of the statistical significance but appear larger in

[6] Crisis dummy takes the value 1 for all quarters during 2015Q4-2017Q2 to capture the currency crisis period in Azerbaijan.

magnitude in comparison to the previous specifications. Easing in the supply conditions is associated with a 0.19 and 0.21 percentage point increase in credit growth rate and a decrease in demand is associated with a 0.31 and 0.33 percentage point reduction in columns 4 and 5 respectively.

Table 1. Estimated panel regressions for consumer credits
(sample period: 2015Q2 – 2020Q2)

Variables	(I)	(II)	(III)	(IV)	(V)
BLS indicators of supply conditions					
supply tightening	0.044 (0.087)	0.054 (0.092)	0.062 (0.116)	0.258* (0.145)	0.170 (0.166)
supply easing	0.136** (-0.059)	0.152** (-0.074)	0.170** (-0.071)	0.194** (-0.094)	0.213** (-0.092)
BLS indicators of demand conditions					
demand decrease	-0.322** (0.127)	-0.283** (0.116)	-0.241** (0.108)	-0.319** (0.137)	-0.338** (0.142)
demand increase	0.007 (0.081)	-0.012 (0.082)	-0.008 (0.084)	-0.045 (0.106)	-0.041 (0.107)
Control variables					
branch ratio		4.470 (3.702)	1.425 (3.501)	1.739 (3.957)	0.601 (3.653)
GDP growth sa		0.550 (0.938)	4.121* (2.238)	0.440 (0.919)	3.059 (1.881)
bank interest rate		-3.804* (2.157)	-3.541 (2.200)	-4.056* (2.259)	-3.838* (2.297)
refinancing rate		0.001 (0.007)	0.024 (0.042)	0.002 (0.007)	-0.010 (0.033)
crisis dummy				-0.157 (0.157)	-0.227 (0.356)
Additional effect during the banking crisis					
supply tightening*crisis dummy				-0.291 (0.213)	-0.209 (0.222)
supply easing*crisis dummy				-0.175 (0.213)	-0.166 (0.214)
demand decrease*crisis dummy				0.210 (0.191)	0.229 (0.214)
demand increase*crisis dummy				0.070 (0.163)	0.063 (0.188)
Bank fixed effect	Yes	Yes	Yes	Yes	Yes
Seasonal dummies	Yes	Yes	Yes	Yes	Yes
Time dummies	No	No	Yes	No	Yes
Observations	338	337	337	337	337
R-squared	0.13	0.18	0.2	0.2	0.21
Adjusted R-squared	0.04	0.08	0.08	0.09	0.07
					**p<0.1; **p<0.05; ***p<0.01*

Overall, results indicate that there is a significant relationship between BLS indicators of supply and demand conditions and bank loan growth rates. Results remain robust to different specifications including

other control variables and time-fixed effects. Demand factors, as captured by the BLS, appear to have a larger effect in magnitude than supply factors, though the statistical significance level remains similar across different specifications.

Table 2 presents same estimation specifications for systematically important (SI) and others separately. Column 1 includes control variables in addition to the BLS indicators noted as before, while column 2 uses the same specification with the addition of time dummies. Splitting the sample suggests differing results across sub-samples. Results show that there is not a significant relationship between BLS indicators of demand conditions and the credit growth rate in the sub-sample of systematically important banks. The effect of supply easing becomes statistically significant only when we control for time dummies. On the contrary, results from the sub-sample of non-systematically important (NSI) banks suggest a significant relationship between both supply and demand conditions and the rate of credit growth aligning with our previous findings. The easing of supply conditions reported by NSI banks is associated with 0.19 percentage point increase and reports of demand decrease reduce q-o-q loan growth to consumers by 0.34 percentage point. The statistical significance reaches to 99 % level once control is introduced by time dummies. Results remain robust in the presence of interaction terms of the crisis dummy and BLS indicators (column 3). Other control variables including bank branch ratio, GDP growth, individual bank interest rate, and refinancing rate shows an expected sign across all specifications in both groups of sub-samples.

Table 2. Estimated panel regressions for consumer credits

	systemically important (SI) banks			*Others (NSI)*		
Variables	(I)	(II)	(III)	(I)	(II)	(III)
BLS indicators of supply conditions						
supply tightening	-0.088 (0.267)	-0.057 (0.344)	0.142 (0.335)	0.098 (0.106)	0.103 (0.134)	0.292* (0.157)
supply easing	0.106 (0.152)	0.366** (0.177)	0.137 (0.141)	0.190** (0.088)	0.228*** (0.080)	0.249** (0.110)
BLS indicators of demand conditions						
demand decrease	0.041 (0.122)	0.174 (0.280)	0.174 (0.216)	-0.342** (0.134)	-0.315*** (0.111)	-0.391** (0.166)
demand increase	0.080 (0.143)	0.331 (0.200)	0.089 (0.121)	-0.024 (0.093)	-0.035 (0.093)	-0.068 (0.128)
Control variables						
branch ratio	1.652 (3.120)	1.742 (5.150)	0.106 (8.007)	11.606 (10.933)	6.049 (10.089)	10.753 (10.745)
GDP growth s.a.	0.458 (1.196)	6.348** (2.487)	0.102 (1.509)	0.444 (1.080)	4.442* (2.407)	0.391 (1.039)
bank interest rate	-5.622* (3.284)	-6.206** (2.857)	-5.195 (3.880)	-3.949 (2.402)	-3.662 (2.477)	-4.360* (2.548)
refinancing rate	-0.006 (0.022)	-0.103 (0.105)	-0.002 (0.026)	-0.001 (0.006)	0.037 (0.044)	0.001 (0.006)
crisis dummy			-0.018 (0.298)			-0.251 (0.198)
Additional effect during the banking crisis						
supply tightening*crisis dummy			-0.214 (0.452)			-0.284 (0.237)
supply easing*crisis dummy			0.225 (0.328)			-0.251 (0.194)
demand decrease*crisis dummy			-0.149 (0.249)			0.322 (0.257)
demand increase*crisis dummy			0.011 (0.113)			0.177 (0.198)
Bank fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Seasonal dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	No	Yes	No	No	Yes	No
Observations	58	58	58	279	279	279
R-squared	0.42	0.51	0.43	0.17	0.2	0.2
Adjusted R-squared	0.22	0.15	0.12	0.07	0.06	0.07
						**p<0.1; **p<0.05; ***p<0.01*

Findings for business loans to enterprises are presented in Table 3. Results do not show a significant relationship between BLS indicators and credit growth to businesses. Among other control variables, only individual bank interest rate appears to be highly statistically significant and shows a consistent relationship

across all specifications. Estimation results show that one percentage point increase in bank interest rates is associated with a 0.04-percentage point decline in the rate of credit growth to businesses on average. We also do not find any evidence of the significant relationship between BLS indicators and loan growth rate during the crisis period (Column III and IV).

Table 3. Estimated panel regressions for loans to enterprises

Variables	(I)	(II)	(III)	(IV)
BLS indicators of supply conditions				
supply tightening	0.055 (0.144)	-0.025 (0.155)	0.066 (0.160)	-0.004 (0.173)
supply easing	-0.101 (0.173)	-0.110 (0.164)	-0.162 (0.227)	-0.119 (0.223)
BLS indicators of demand conditions				
demand decrease	-0.174 (0.149)	-0.212 (0.152)	-0.245 (0.237)	-0.234 (0.222)
demand increase	-0.063 (0.130)	-0.074 (0.126)	-0.184 (0.183)	-0.159 (0.170)
Control variables				
branch ratio	0.263 (1.116)	0.049 (1.428)	0.483 (1.286)	0.047 (1.558)
GDP growth s.a.	2.901 (1.788)	2.806* (1.636)	3.021 (1.971)	4.525** (2.139)
bank interest rate	-4.021*** (0.687)	-4.032*** (0.849)	-3.953*** (0.659)	-3.978*** (0.837)
refinancing rate	-0.019 (0.014)	0.075 (0.049)	-0.019 (0.014)	-0.076 (0.134)
crisis dummy			-0.333 (0.267)	-0.920 (0.663)
Additional effect during the banking crisis				
supply tightening*crisis dummy			0.073 (0.163)	0.013 (0.180)
supply easing*crisis dummy			0.428 (0.485)	0.175 (0.506)
demand decrease*crisis dummy			0.219 (0.324)	0.103 (0.308)
demand increase*crisis dummy			0.388 (0.299)	0.292 (0.312)
Bank fixed effect	*Yes*	*Yes*	*Yes*	*Yes*
Seasonal dummies	*Yes*	*Yes*	*Yes*	*Yes*
Time dummies	*No*	*Yes*	*No*	*Yes*
Observations	*310*	*310*	*310*	*310*
R-squared	*0.18*	*0.22*	*0.19*	*0.23*
Adjusted R-squared	*0.08*	*0.1*	*0.07*	*0.09*
				**p<0.1; **p<0.05; ***p<0.01*

As in the case of consumer loans, we also report estimation results for SI and NSI banks separately to determine whether the estimated impact of supply and demand conditions was different among different groups of banks. Among BLS indicators only supply tightening reported by SI banks appears to be weakly statistically significant with unexpected signs (Table 4, Column IV), but loses its significance once we control time dummies and add interaction terms. We see no evidence of the relationship between BLS indicators of supply and demand conditions and the rate of credit growth for NSI banks.

Table 4. Estimated panel regressions for loans to enterprises

	systemically important banks (SI)			*Others (NSI)*		
Variables	(I)	(II)	(III)	(IV)	(V)	(VI)
BLS indicators of supply conditions						
supply tightening	0.381* (0.216)	0.241 (0.412)	0.429 (0.346)	-0.036 (0.160)	-0.133 (0.174)	0.020 (0.177)
supply easing	-0.117 (0.261)	0.174 (0.131)	-0.143 (0.355)	-0.096 (0.216)	-0.155 (0.207)	-0.190 (0.303)
BLS indicators of demand conditions						
demand decrease	-0.106 (0.376)	-0.187 (0.375)	0.087 (0.442)	-0.127 (0.226)	-0.162 (0.230)	-0.341 (0.337)
demand increase	0.134 (0.282)	0.454 (0.397)	0.239 (0.383)	-0.072 (0.212)	-0.099 (0.198)	-0.250 (0.263)
Control variables						
branch ratio	12.311*** (4.527)	23.684*** (7.792)	20.231*** (5.851)	-2.261 (2.848)	-3.042 (3.305)	-2.079 (3.535)
GDP growth s.a.	5.932* (3.090)	7.861* (3.203)	5.715** (2.197)	2.797 (1.893)	2.666 (1.766)	3.331 (2.268)
bank interest rate	-24.145*** (2.260)	-22.244*** (3.096)	-23.363*** (1.655)	-3.313*** (0.906)	-3.124** (1.261)	-3.241*** (0.937)
refinancing rate	-0.044* (0.022)	-0.081** (0.030)	-0.037* (0.019)	-0.020 (0.016)	0.078 (0.062)	-0.020 (0.017)
crisis dummy			0.689* (0.398)			-0.558* (0.291)
Additional effect during the banking crisis						
supply tightening*crisis dummy			-0.348 (0.246)			0.067 (0.199)
supply easing*crisis dummy						0.401 (0.548)
demand decrease*crisis dummy			-0.437 (0.493)			0.502 (0.313)
demand increase*crisis dummy			0.169 (0.804)			0.501 (0.332)
Bank fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Seasonal dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	No	Yes	No	No	Yes	No
Observations	58	58	58	252	252	252
R-squared	0.48	0.55	0.51	0.16	0.21	0.17
Adjusted R-squared	0.3	0.23	0.26	0.04	0.07	0.04
						**p<0.1; **p<0.05; ***p<0.01*

Other control variables including branch ratio, GDP growth, and the refinancing rate appear to be significant with an expected sign for the SI banks group. Individual bank interest shows a negative and highly significant relationship with the loan growth rate for both groups of sub-samples. However, the estimated impact of the bank interest rate is approximately eight times higher for SI banks (0.24-percentage point) than NSI banks. Estimation results do not vary significantly by the inclusion of the time dummies and interaction terms. Overall, results suggest that there is no significant relationship between BLS indicators and business loan growth rates and bank interest rate appears to be the strongest determinant of the business loans for both groups of banks.

As described in section 3, various factors can drive the changes in the overall supply conditions and therefore the credit growth dynamics. However, relevant policy reactions can also depend on the specific factors contributing to the changes in credit standards. Therefore, our next specification incorporates individual supply-side factors described in section 3 as a substitute for the overall indicator of BLS supply conditions. The rest of the variables including the overall indicator of BLS demand conditions enter the regression as before. It would be interesting to note that findings from previous results from Table 5 column I do not show a significant relationship between individual supply-side factors and rate of credit growth to consumers. In contrast to the overall indicator of the supply conditions, the insignificance of the individual supply-side factors could be because there is not always a clear consistency between the banks' answers concerning the changes in their credit standards and replies concerning the factors behind these changes. There are responses where a bank indicates a change in the overall supply conditions but reports "basically unchanged" for factors contributing to the change. The overall indicator of the "demand decrease" reported by all banks shows similar properties as found in all estimations suggesting a dampening impact on loan provision in all specification variants. Controlling for time dummies does not significantly affect estimation results except for GDP growth where a weak statistical significance is achieved with a positive impact on the rate of credit growth (Table 5, column II). In column III we add an interaction term between a crisis dummy and banks' ability to access market financing contributed to tightening and easing respectively. Results suggest no significant role of the banks' ability to market financing on the rate of credit growth during the crisis period. Adding time dummies does not show a significant change in the estimated relationship (Column IV).

Table 5. Consumer credits and factors behind changes in credit standards

(sample period: 2015Q2 – 2020Q2)

Variables	(I)	(II)	(III)	(IV)
BLS factors behind changes in credit standards				
Perception of risk:				
contributed to tightening	0.032	0.026	0.043	0.016
contributed to easing	0.036	0.060	0.047	0.077
Bank's ability to access market financial access:				
contributed to tightening	-0.003	-0.002	0.164	0.139
contributed to easing	0.179	0.173	0.160	0.125
Pressure from competition:				
contributed to tightening	-0.176	-0.173	-0.207*	-0.179
contributed to easing	-0.029	-0.044	-0.050	-0.039
Bank's liquidity position:				
contributed to tightening	-0.007	0.022	0.031	0.035
contributed to easing	-0.128	-0.167	-0.126	-0.144
Costs related to maintain bank's capital adequacy:				
contributed to tightening	0.062	0.042	0.059	0.042
contributed to easing	0.003	0.024	-0.002	0.023
BLS indicators of demand conditions				
demand decrease	-0.212**	-0.183*	-0.192*	-0.202**
demand increase	0.037	0.039	0.025	0.026
Control variables				
branch ratio	4.306	1.539	2.613	1.212
GDP growth s.a.	0.645	3.892*	0.682	3.381*
bank interest rate	-2.355	-2.073	-2.266	-1.939
refinancing rate	-0.005	-0.006	-0.006	-0.021
crisis dummy			-0.093	-0.046
Additional effect during the crisis				
Bank's ability to access market financial access				
contributed to tightening*crisis dummy			-0.242	-0.223
contributed to easing*crisis dummy			0.097	0.147
Bank fixed effect	Yes	Yes	Yes	Yes
Seasonal dummies	Yes	Yes	Yes	Yes
Time dummies	No	Yes	No	Yes
Observations	335	335	335	335
R-squared	0.17	0.19	0.18	0.19
Adjusted R-squared	0.04	0.03	0.05	0.03
				**p<0.1; **p<0.05; ***p<0.01*

Asymmetric impact of supply side factors?

In the next step, we split the sample into SI and NSI sub-samples again using the same specification above to verify if there is an asymmetric impact of specific supply-side factors and other explanatory variables on consumer credit dynamics. The estimation results are provided in Table 6. It is interesting to note that tightening of the credit standards due to the banks' perception of risk shows a positive and highly significant sign-on credit growth for SI banks across all three specifications.[7] The opposite association is observed for the NSI sub-sample although not statistically important. One possible explanation could be due to the argument that SI banks have relatively higher risk tolerance against the uncertainties and therefore may increase their loan provision with the applications that NSI banks considered to be risky. Similarly, the tightening effect of costs related to maintaining bank's capital adequacy also shows a positive impact for SI banks while the easing effect of the same factor shows a negative association with loan dynamics. This comes in line with the narrative that SI banks usually have a higher capital adequacy ratio and may benefit from their comparative advantage when other banks restrict their credit supply. Tightening due to the bank's ability to access finance shows no significant impact on loan growth in both sub-samples, however, estimation specification from column 3 suggests it could have a significant dampening effect (-1.15 percentage point) during the currency crisis period for SI banks. Contribution of the "pressure from competition" to the tightening also play an important role by negatively affecting credit dynamics for both groups of banks but the effect is larger in magnitude for SI banks.

[7] Bank's perception of risk includes expectations regarding general economic activity, customer risk expectations, and risk on collateral demanded. However, results need to be taken with caution, as there is no significant variation in responses to the individual supply side factors where larger number of responses fall under the "remained basically unchanged" category.

Table 6. Consumer credits and factors behind changes in credit standards
(sample period: 2015Q2 – 2020Q2)

	systemically important banks (SI)			*Others (NSI)*		
Variables	(I)	(II)	(III)	(IV)	(V)	(VI)
BLS factors behind changes in credit standards						
Perception of risk						
contributed to tightening	0.369***	0.530**	0.493***	-0.001	-0.006	0.009
contributed to easing	0.265	0.210	0.226	0.101	0.140	0.093
Bank's ability to access market financial access						
contributed to tightening	-0.350	-0.383	0.639	0.061	0.014	0.176
contributed to easing	0.693***	0.815	0.799***	0.061	0.047	0.113
Pressure from competition						
contributed to tightening	-0.671**	-0.978**	-0.895***	-0.189*	-0.133	-0.211**
contributed to easing	-0.251	0.006	-0.179	-0.009	-0.042	-0.032
Bank's liquidity position						
contributed to tightening	0.115	-0.044	0.077	0.017	0.070	0.060
contributed to easing	-0.308***	-0.330	-0.267	-0.055	-0.100	-0.072
Costs related to maintain bank's capital adequacy						
contributed to tightening	0.521***	0.806*	0.468**	0.087	0.051	0.084
contributed to easing	-0.399***	0.056	-0.443***	0.059	0.057	0.011
BLS indicators of demand conditions						
demand decrease	0.078	0.238	0.202	-0.236**	-0.224**	-0.203*
demand increase	0.064	0.263	0.006	0.035	0.027	0.039
Control variables						
branch ratio	12.037**	20.799***	12.082	7.213	1.969	5.589
GDP growth s.a.	-2.470	-0.057	-2.627	0.757	4.669*	0.854
bank interest rate	-5.114**	-5.493	-5.209**	-2.088	-1.695	-2.146
refinancing rate	-0.013	-0.214**	-0.017	-0.007	0.0003	-0.007
crisis dummy			0.030			-0.090
Additional effect during the crisis						
Bank's ability to access market financial access						
contributed to tightening*crisis dummy			-1.154***			-0.200
contributed to easing*crisis dummy			-0.211			-0.146
Bank fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Seasonal dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	No	Yes	No	No	Yes	No
Observations	58	58	58	277	277	277
R-squared	0.56	0.66	0.61	0.14	0.17	0.15
Adjusted R-squared	0.27	0.23	0.28	-	-	-
						**p<0.1; **p<0.05; ***p<0.01*

In a similar way, Table 7 presents results for business loans. Among supply-side factors, the contribution of risk perception to supply easing seems to have a negative impact on business loan growth rate. It is also interesting to note that tightening due to the banks' liquidity position appears to be negatively associated with

credit developments in the NSI group while the opposite is observed for the SI bank group. The easing effect originating from banks' liquidity position shows a negative sign for SI banks. The rest of the control variables show similar findings as found previously.

Table 7. Loans to enterprises and factors behind changes in credit standards
(sample period: 2015Q2 – 2020Q2)

	systemically important banks (SI)			*Others (NSI)*		
Variables	(I)	(II)	(III)	(IV)	(V)	(VI)
BLS factors behind changes in credit standards						
Perception of risk						
contributed to tightening	0.076	-0.279	-0.213	-0.027	-0.005	0.001
contributed to easing	0.270	0.063	0.032	-0.595**	-0.603*	-0.633**
Bank's ability to access market financial access						
contributed to tightening	1.078	1.319	-0.524	-0.095	-0.126	-0.058
contributed to easing	0.384	0.650*	0.115	0.152	0.218	0.195
Pressure from competition						
contributed to tightening				0.164	0.119	0.131
contributed to easing	0.091	0.296	0.034	0.044	-0.052	-0.009
Bank's liquidity position						
contributed to tightening	0.030	-0.063	0.098	-0.255**	-0.217*	-0.249**
contributed to easing	-0.291**	-0.432	-0.371**	-0.245	-0.225	-0.181
Costs related to maintain bank's capital adequacy						
contributed to tightening	-0.407**	-0.265	-1.608***	0.041	-0.025	0.014
contributed to easing	-0.065	-0.300	0.432***	0.690**	0.560	0.719**
BLS indicators of demand conditions						
demand decrease	-0.348	-0.321	-1.025***	-0.173	-0.212	-0.100
demand increase	-0.074	0.286	-0.370	-0.088	-0.127	-0.096
Control variables						
branch ratio	16.375	30.943**	18.293	-1.766	-3.162	-2.312
GDP growth s.a.	6.705*	8.347***	5.143	2.830	2.910*	3.645
bank interest rate	-25.271***	-22.325***	-26.726***	-3.240***	-3.085**	-3.207***
refinancing rate	-0.032	-0.120	-0.008	-0.016	0.076	-0.019
crisis dummy			0.284**			-0.155
Additional effect during the crisis						
Bank's ability to access market financial access						
contributed to tightening*crisis dummy			2.602***			-0.078
contributed to easing*crisis dummy						-0.390
Bank fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Seasonal dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	No	Yes	No	No	Yes	No
Observations	58	58	58	253	253	253
R-squared	0.54	0.61	0.59	0.2	0.25	0.21
Adjusted R-squared	0.25	0.14	0.28	0.06	0.08	0.05

6. Conclusion

This paper examines the role of supply and demand conditions on bank lending using data from the Bank Lending Survey (BLS) in Azerbaijan. The estimation analysis is conducted over the period 2015Q2-2020Q2 using survey responses of all operating banks in Azerbaijan.

The first part of the analysis investigates the link between overall changes in BLS indicators of supply and demand conditions and bank lending for businesses and households. Correspondingly, we also explore the possible heterogeneous impact of these variables by splitting the sample into subsamples of SI and NSI banks. Results indicate that both supply and demand conditions play an important role in the dynamics of consumer loans, but the relationship appears to be asymmetric, as it is significant only when the indicators signal a softening in credit conditions ("supply easing") and decrease in demand. The estimated impact of softening in credit conditions on consumer lending growth rate ranges between 0.14 and 0.21 percentage points while the effect of the decrease in demand is found to range between -0.24 and -0.34 percentage points. Further, results suggest that the association between overall BLS indicators and credit growth differs across banks as the relationship is statistically significant for NSI banks only. No significant association is found between BLS indicators and business lending dynamics as the individual bank interest rate is found to be the only determining factor of lending to businesses. Results remain to be robust to the introduction of various control variables, time dummies, and different specifications.

The second part of the analysis provides a more in-depth analysis of changes in credit standards by examining specific factors determining the changes in the supply conditions and their individual impact on bank lending dynamics (Table 6 and Table 7). Our most interesting finding is that the impact of some supply conditions is not uniform and differ across systematically important banks and others. Supply-tightening due to the banks' perception of risk appears to have a positive relationship with consumer lending growth of SI banks while we observe a negative association in the sub-sample of NSI banks. Similarly, tightening (easing) due to the costs related to maintaining banks' capital adequacy also shows a positive (negative) association with bank lending growth of SI banks.

The findings has important policy implications since a uniform regulation (i.e., "costs related to maintaining bank's capital adequacy" in our example) may end up having uneven effects on different types and sizes of banks. Thus, findings from the second part of this study suggest the importance of a differentiated approach where a more symmetric distribution of the regulatory burden is achieved.

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Appendix

Table 1: Bank Lending Survey Questionnaire

Loans to enterprises	
Supply	*Demand*
Over the past three months, how have your bank's credit standards as applied to the approval of loans to enterprises changed?	Over the past three months, how has the demand for loans to enterprises changed at your bank?
Supply factors	*Demand factors*
Over the past three months, how have the following factors affected your bank's credit standards as applied to the approval of loans to enterprises?	Over the past three months, how have the following factors affected the overall demand for loans to enterprises?
○ Cost of banks and balance sheet constraints ○ Pressure from competition ○ Perception of risk	○ Financing needs ○ Use of alternative finance
Consumer credits	
Supply	*Demand*
Over the past three months, how have your bank's credit standards as applied to the approval of loans to consumer changed?	Over the past three months, how has the demand for loans to enterprises changed at your bank?
Supply factors	*Demand factors*
○ Cost of banks and balance sheet constraints ○ Pressure from competition ○ Perception of risk	○ Financing needs ○ Use of alternative finance

Responses related to the credit standards and conditions range between "tightened considerably", "tightened somewhat", "remained basically unchanged", "eased somewhat", "eased considerably" while responses related to the demand factors vary as "increased considerably", "increased somewhat", "remained basically unchanged", "decreased somewhat", "decreased considerably". Concerning the factors contributing to changes in credit standards, banks are asked to rate the importance of the cost of funds and balance sheet constraints, pressure from the competition, and perception of risk, choosing their answers on a scale of five options (from "contributed considerably to tightening of credit standards" to "contributed considerably to easing of credit standards"). Questionnaire examples are provided in Table 1.