LOAN-TO-VALUE CAPS, BANK LENDING, AND SPILL-OVER TO GENERAL-PURPOSE LOANS

by Selva Bahar Baziki, Tanju Çapacıoğlu[1]

We study the effect of two policy shocks in loan-to-value (LTV) ratios on bank lending and residential borrowers' unsecured loan usage with a unique and comprehensive bank-linked individual credit data set in a large emerging economy which allows for the disentanglement of supply and demand dynamics. We show that following the introduction of an LTV cap, banks that were previously above the limit have reduced residential lending in favour of unsecured general-purpose loans to new residential borrowers and riskier commercial loans. Conversely, following an easing in the LTV ratio cap, previously constrained residential borrowers tend to take out more general-purpose credit compared to unconstrained residential borrowers, further exhibiting a form of "credit spill-over." From the perspective of financial stability, this unintended consequence of a widely used macroprudential policy change suggests that LTV related policies do not necessarily reduce bank balance sheet risk, and an LTV cap alone may not be enough in ensuring that residential loans are secured beyond the LTV cap and may need to be supplemented by other measures relating to debt service ratios, income or risk weight adjustments.

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1. Introduction

Following the financial crisis in 2008 supervisory authorities have put to use a variety policies to curb high levels of growth in corporate and household debt and leverage. The cap on Loan-to-value (LTV) ratio for housing loans is chief among these measures, used widely in more than 45 countries, both in advanced and emerging economies. This contribution summarizes our paper looking at the effect of two incidences of exogenous policy shocks to an LTV cap policy in a large emerging economy by using a comprehensive bank-linked individual credit registry for all loans.

Since the identification of the demand and supply-side factors are essential in this analysis, we use the rich nature of the dataset to disentangle these two forces and aim to answer the following questions: how does the residential, general-purpose (g-p), and commercial lending of constrained banks and additional g-p borrowing of constrained individuals respond to the introduction and subsequent easing in LTV caps? We offer a new insight through the use of a unique database and the study of an easing in LTV caps to complement the literature that has so far focused on credit cycle outcomes using more aggregated data.[2]

The remainder of this contribution will introduce the mechanism, data and empirical strategy; present the results of analysis around the introduction of the LTV cap and also the subsequent easing in the cap to finally conclude with future policy suggestions.

2. Mechanism, data and empirical strategy

With the introduction of a cap borrowers who could only afford homes with leverage ratios above the cap become credit constrained. While this may discourage some potential borrowers, it could also encourage some others to supplement their savings with non-residential loans for the required down payment and thus creating higher demand for g-p loans in the period leading up to the residential contract. This demand side development could be met with an accommodating change on the supply side due to two factors: i) as the introduction of the LTV ratio cap will make both residential lending safer which may create unfulfilled risk appetite, and ii) the cap will free up funds on the retail side of the bank's balance sheet which may be used precisely to address this development and accommodate a riskier (unsecured) lending behaviour by banks.

On the other hand, when the LTV cap is relaxed, banks and consumers are expected to respond through a reverse mechanism lowering demand for additional funds, and lowering the demand for risk taking in balance sheet items.

To put these mechanisms to test, we perform two sets of analysis across the introduction and expansion of the cap merging three novel data sets form January 2011 to April 2017 on a monthly frequency. We employ a bank-individual-loan level data on all consumer loans of individuals which includes housing, g-p, vehicle loans and credit cards balances, with details on loan amount, type, maturity, interest rate, and collateral. We append this data with transaction-level data on all housing loans which include the appraised value of the property, location, volume, origination and maturity

[2] Previous work in the field summerized in Cerutti et al. 2015 focus on the link between macroprudential policies and credit growth, or financial cycles (Lim et al. 2011; Kuttner and Shim 2016; Jimenez et al. 2017; and Igan and Kang 2012).

dates of the loan and bank-level data on balance sheet and income statements and macroeconomic observables.

The first set of analysis is performed on the introduction of the cap looking at the entire population of housing loans using a differences-in-differences methodology. We use the pre-introduction LTV levels of each bank to determine their exposure level to the introduction of the cap and use the following model for bank b, individual i, time t, and location l:

$$Loan_{b,i,t} = \beta_0 + \beta_1 After_t + \beta_2 LTV_b + \beta_3 After_t * LTV_b + \beta_4 BankObs_{b,t-1} + \beta_5 MacroObs_{t-1} + \alpha_b + \varphi_l + \theta_t + \varepsilon_{b,i,l,t}$$

Where α_b stand for bank, φ_l for location, and θ_t for time fixed-effects. We first begin with identify the lending differences among the low and high exposure banks before and after the policy change by estimating changes in residential loans issued, $Loan_{b,i,t}$, and we saturate this model with location*month fixed effects where we take location to represent common credit demand factors such as price level, population composition, and labor market shocks. Next, we explore whether banks of different LTV exposure have exercised different corporate lending in an effort to satiate their risk appetite. To this end we perform an analysis on the same firm borrowing from banks of different exposure levels to control for any demand side effects by estimating $Loan_{b,f,t}$, corporate lending by bank b to firm f, and saturating the model with firm*month fixed effects. And finally, we investigate if g-p loan issuance differs across banks by looking at share of g-p lending to house appraisal value $GPloans_{b,i,t}/HousePrice_{b,i,t}$ to LTV constrained or non-constrained individuals within the same bank by employing bank*time fixed effects and personal observables to the model.

In the second set of analysis we use individual-linked data that connects each residential loan to the individual's other lending and perform a quasi-experimental analysis to quantify the effects of an *expansionary* policy change on September 2016 on additional retail borrowing by constrained individuals. The individual-level analysis of an LTV cap expansion is novel in the literature, but comes at a slight cost as the coverage of residential loans for this period falls to 85% of the population.

3. Effects on bank retail lending and composition

We find that, upon the introduction of the cap, banks' lending behaviour in residential and commercial loans differ depending on the degree of exposure they have had to the policy introduction. In a series of bank-county level regressions we find that banks across the board reduced their lending in the period following the introduction of the cap due to changes in reserve requirement ratios.[3] However, banks that had a higher level of LTV ratios before the cap, in other words banks that were affected by the introduction of the cap -exposed banks- reduce their residential lending (Table1) and increase their g-p lending more (Table 2), reduce their commercial lending less (Table 3) and increase their lending to riskier firms more (Table 4) relative to other banks.[4] This suggests that banks that were used to a higher level of risk exposure on their balance

[3] A fact also corroborated by Gropp et al. 2014 who find that increasing bank capital requirements lower bank credit supply. For more, see Hanson et al. 2011.

[4] The analysis windows shown here are 1 and 6 months, for other variations on windows please see the main article. The LTV cap is a borrower-based measure which could lower the amount of residential lending by the bank, having the same effect on bank balance sheets as capital requirements on residential loans, as shown in Auer and Ongena 2016.

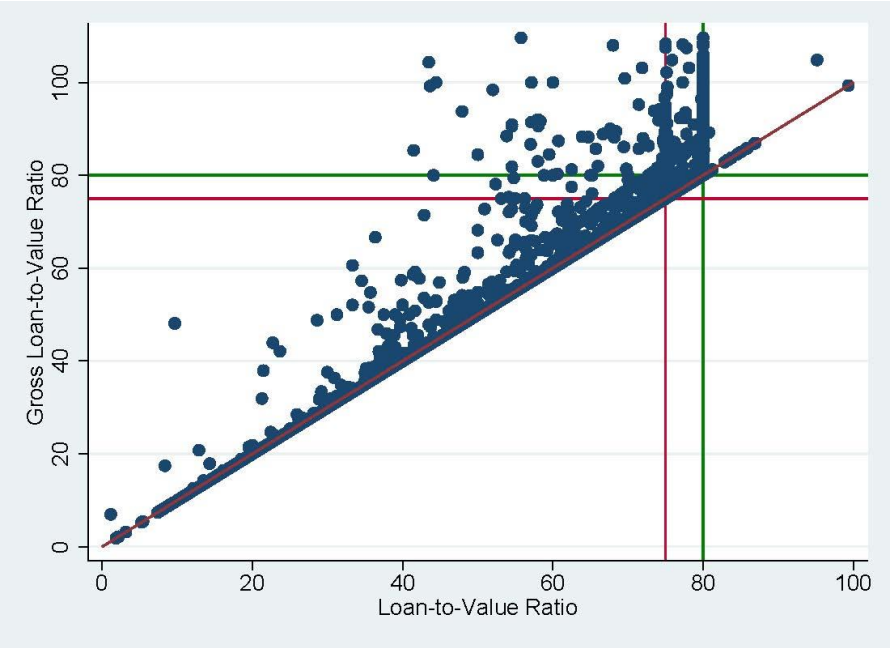
sheets through residential lending find that the lower level of risk in residential loans does not match their risk appetite, and therefore switch from residential lending to unsecured retail loans, or riskier lending in commercial loans.

In the final leg of this exercise, we show that LTV constrained residential loan customers use more g-p loans compared to unconstrained borrowers of the same bank in the same month (Table 5). Additionally, the amount of g-p usage increases as the constraint bracket below the limit tightens, meaning as the individual's level of constraint goes up.

4. Does the LTV cap generate additional need-based borrowing? A quasi-experimental approach on spill-over

Next, we examine the effect of an increase in the cap in following on other borrowing behaviour by consumers using individual-bank linked data in a quasi-experimental setting. Contrary to the introduction of the LTV cap, an increase in the LTV ratio cap should lower the number of individuals who are credit constrained due to the cap, and therefore should not create a spill-over effect from residential to non-residential borrowing. Interestingly however, a mapping of gross individual leverage to residential loan leverage ratios by residential borrowers shows that there is still a piling up of individuals at the new LTV restriction as shown in Figure 1.

Figure 1 : Residential LTV Ratios - Gross leverages are still higher than the LTV cap



Note: LTV ratio is the value of the loan divided by the appraisal value of the residential unit. Gross LTV ratio takes the additional g-p borrowing of the residential borrower in the 2 month period leading up to the residential purchase into account and takes this composite borrowing as a share of the appraisal value. Each dot on the graph shows the residential borrowing performed in November 2016 when the LTV cap was 80% and its associated LTV ratio (horizontal axis) and gross LTV ratio (vertical axis). Individuals on the 45degree line have no additional borrowing in the two months leading up to the residential purchase. All points above this line indicate the residential loan owner has also borrowed at least one g-p loan. The red lines depict the old limit (75%) and the green lines the new limit. Although few borrowers look to be leveraged beyond the cap in their LTV ratio, many borrowers exceed this limit in the Gross LTV ratio, with some borrowers leveraged even beyond 100%.

Surprisingly, after an easing in policy consumers constrained by the LTV cap tend to take out more g-p loans compared to unconstrained individuals with housing loans, exhibiting both a form of "credit spill-over" and also a "flight to quality" where the higher LTV cap regime is not used as a way to

reduce the amount of down payment they would have to take out of their savings, but instead, as an opportunity to borrow even higher amounts of both housing and g-p loans to purchase more expensive homes. The difference in additional borrowing by constrained residential borrowers are on average 5 to 6 thousand TL more after the policy, roughly equal to half the per-capita g-p lending. Considering how g-p loans have shorter maturities and higher interest rates, this top-up tendency signals a potential stress factor for the financial sector (Table 6).

5. Conclusion

Since the onset of the global financial crisis, many regulators have introduced macroprudential policies to increase the resilience of their financial sector. LTV ratio cap is chief among these measures. This contribution summarizes our investigation of the introduction of and an expansionary amendment to the LTV ratio cap in Turkey, a large emerging economy, with the use of a novel bank linked individual credit database to assess the effect of the policy on bank lending practices and additional borrowing by credit constrained individuals.

We show that following the introduction of an LTV cap, banks that were previously above the cap reduced residential lending in favour of unsecured general-purpose loans to new residential borrowers and riskier commercial loans. LTV constrained residential loan customers use more g-p loans compared to unconstrained borrowers of the same bank in the same month. Furthermore, after an easing in the LTV ratio cap the additional g-p borrowing of constrained borrowers over unconstrained borrowers have *increased* on average more than 5 thousand TL (equivalent to half the per-capita g-p lending at the time).

LTV is a popular measure since it serves the dual purpose of slowing down demand for residential loans, and also increasing the repayment likelihood of the loan by increasing borrower's debt servicing capacity. But both of these points are based on the assumption that the individual will not engage in additional borrowing. Our results highlight an important unintended consequence of easing in a macroprudential policy since constrained borrowers are taking on even more *unsecured* debt following the policy change and as a result have an even higher effective LTV on their residential loans. We postulate that this additional non-residential lending could be used to finance the down-payment for the home, creating a *"credit spill-over"*. Furthermore, this finding also suggests that residential borrowers are purchasing more expensive houses than they otherwise would have, an outcome supported by rising average house prices associated with residential loans in this period. While this may be a signal that borrowers are using higher LTV ratios as an opportunity to buy better homes, signalling a *"flight to quality"* in residential loans, the increase in household liabilities can also be a signal for increased incidences of payment difficulties and a future rise in non-performing loan ratios.

From the perspective of sound financial regulation, these unintended effects of prudential policies can increase the risk associated with collateralized loans and bank balance sheets which points to the fact that an LTV cap alone may not be enough in ensuring that residential loans are secured beyond the LTV cap and that residential borrowing is not spilling over into other types of loans. Claessens et al. 2013 find that policies targeting consumers help in improving the banks' balance sheets through lower leverage. We add that lower leverage in housing loans does not necessarily mean lower risk or leverage on the consumer side, and as such LTV caps as a macroprudential policy could better serve

its purpose of ensuring financial stability if coupled with policies that take debt service ratios into account so that the risks on banks' balance sheets are better contained during times of distress.[5]

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[5] Several papers find that rising house prices lower LTV's binding power, and income/debt related measures are better at curbing house price and credit expansion (IMF Staff Guidance Paper 2014, Jung and Lee 2017, Kim 2014, Kuttner and Shim 2016. We add to this by stating that such a ratio could aid in not only slow down housing credit, but also non-residential, unsecured borrowing if used along with LTV caps, in line with findings in Jacome and Mitra 2015.

Table 1: Effects of LTV Regulations on the Amount of Housing Loans

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Policy:	**Tightening (2011/M01)**				**Loosening (2016/M10)**			
Window:	**1-Month**		**6-Months**		**1-Month**		**6-Months**	
After	0.505***		0.181***		-0.742***		-0.064	
	(0.125)		(0.049)		(0.198)		(0.063)	
After*LTV	-0.785***	-0.832***	-0.274***	-0.262***	1.181***	1.187***	0.185*	0.218**
	(0.183)	(0.188)	(0.072)	(0.074)	(0.313)	(0.320)	(0.100)	(0.102)
LTV	2.811		14.075***		5.753*		-1.802	
	(4.118)		(2.631)		(2.979)		(1.469)	
Constant	2.261		-5.220***		0.965		5.744***	
	(2.760)		(1.745)		(1.889)		(0.933)	
Obs	35,725	35,516	266,240	264,962	75,051	74,896	401,190	400,175
R-sq	0.232	0.240	0.217	0.232	0.238	0.242	0.232	0.245
After	0.012		0.002		-0.106***		-0.012	
	(0.012)		(0.004)		(0.036)		(0.017)	
After*Exposure	-0.140***	-0.144***	-0.026*	-0.027*	0.234***	0.236***	0.103***	0.150***
	(0.038)	(0.040)	(0.014)	(0.015)	(0.076)	(0.078)	(0.035)	(0.038)
Exposure	-0.016		0.287***		3.421**		32.965***	
	(0.173)		(0.052)		(1.627)		(4.798)	
Constant	4.140***		4.080***		2.980***		-17.565***	
	(0.026)		(0.007)		(0.777)		(3.216)	
Obs	35,717	35,508	266,227	264,949	75,051	74,896	400,993	399,978
R-sq	0.232	0.239	0.217	0.232	0.238	0.242	0.232	0.244
After	0.001		0.006		-0.026***		-0.002	
	(0.021)		(0.008)		(0.008)		(0.004)	
After*Quantile	-0.055**	-0.056**	-0.033***	-0.032***	0.039***	0.039***	0.071***	0.070***
	(0.023)	(0.024)	(0.009)	(0.009)	(0.009)	(0.009)	(0.004)	(0.004)
Quantile	0.168***	0.570**	0.098***	-0.034	-0.179***	0.169**	-0.190***	0.251***
	(0.032)	(0.229)	(0.012)	(0.174)	(0.019)	(0.077)	(0.016)	(0.026)
Constant	4.093***		4.115***		4.793***		4.785***	
	(0.030)		(0.012)		(0.019)		(0.016)	
Obs	16,971	16,795	86,595	85,663	68,955	68,787	372,701	371,641
R-sq	0.266	0.274	0.213	0.245	0.243	0.247	0.235	0.247
Bank Observables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Observables	Yes	n/p	Yes	n/p	Yes	n/p	Yes	n/p
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	-	Yes	-	Yes	-	Yes	-
Time (Year) FE	Yes	-	Yes	-	Yes	-	Yes	-
County*Month FE	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**

Note: The table reports estimates from ordinary least squares regressions with different windows. The dependent variable is the natural logarithm of housing loans across banks, individual and location. LTV is the weighted Loan-to-Value ratio of banks. Exposure is the ratio of non-conforming housing loans due to the LTV cap in the total housing loans. Quantile is a dummy variable that indicates the top and bottom 5 banks based on LTV ratios. Bank Observables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA Ratio and NPL Ratio. Macro Observables are yearly growth rate of industrial production index, inflation rate, monthly change in CBRT effective policy rate and in reel effective exchange rate. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. "Yes" indicates set of characteristics or fixed effects. "-" indicates set of characteristics or fixed effects is not included. "n/p" indicates set of characteristics or fixed effects cannot be included. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 2: Effects of LTV Regulations on the Amount of G-P Loans

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Policy	**Tightening (2011/M01)**				**Loosening (2016/M10)**			
Window:	**1-Month**		**6-Months**		**1-Month**		**6-Months**	
G-P of NonResidential Borrowers								
After	-0.312		-0.377***		-1.676***		-6.065***	
	(0.408)		(0.142)		(0.078)		(0.104)	
After*LTV	-0.022	1.728***	-0.118	0.188	3.593***	3.633***	9.299***	8.403***
	(0.595)	(0.605)	(0.201)	(0.209)	(0.122)	(0.123)	(0.165)	(0.167)
LTV	-0.457	-0.912*	3.892***	3.758***	-11.563***		-2.450	
	(0.484)	(0.502)	(0.158)	(0.160)	(2.074)		(1.843)	
Constant	5.287***		-5.344***		4.841***		1.255	
	(0.572)		(0.187)		(1.315)		(1.168)	
Bank Observables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Observables	Yes	n/p	Yes	n/p	Yes	n/p	Yes	n/p
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	-	Yes	-	Yes	-	Yes	-
Time (Year) FE	Yes	-	Yes	-	Yes	-	Yes	-
City*Month FE	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**
Obs	35,725	35,516	266,240	264,962	78,768	78,617	420,936	419,925
R-sq	0.355	0.406	0.247	0.316	0.999	0.999	0.971	0.975
G-P of Residential Borrowers								
After	-3.192***		-1.359***		-6.165***		-7.103***	
	(0.150)		(0.051)		(0.156)		(0.076)	
After*LTV	4.194***	4.182***	1.759***	1.854***	10.804***	10.879***	11.520***	11.595***
	(0.208)	(0.208)	(0.071)	(0.071)	(0.235)	(0.236)	(0.120)	(0.117)
LTV	0.568***	0.478***	-0.208***	-0.252***	2.984***		-4.348***	
	(0.147)	(0.143)	(0.029)	(0.027)	(0.301)		(0.256)	
Constant	-0.785***		-1.085***		-2.050***		3.792***	
	(0.130)		(0.045)		(0.191)		(0.163)	
Bank Observables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Observables	Yes	n/p	Yes	n/p	Yes	n/p	Yes	n/p
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	-	Yes	-	Yes	-	Yes	-
Time (Year) FE	Yes	-	Yes	-	Yes	-	Yes	-
City*Month FE	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**
Obs	35,725	35,516	266,240	264,962	78,768	78,617	420,936	419,925
R-sq	0.262	0.298	0.161	0.257	0.992	0.992	0.956	0.959

Note. The table reports estimates from ordinary least squares regressions with different windows. The dependent variable is the natural logarithm of general-purpose loans borrowed by nonresidential and residential borrowers (consumers who borrow g-p in the month of and the month before the their house purchase). LTV is the weighted Loan-to-Value ratio of banks. Bank Observables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA Ratio and NPL Ratio. Macro Observables are yearly growth rate of industrial production index, inflation rate, monthly change in CBRT effective policy rate and in reel effective exchange rate. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. "Yes" indicates set of characteristics or fixed effects. "-" indicates set of characteristics or fixed effects is not included. "n/p" indicates set of characteristics or fixed effects cannot be included. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 3: Effects of LTV Regulations on the Amount of Commercial Loans

	(1)	(2)	(7)	(8)	(9)	(10)	(15)	(16)
Policy	**Tightening (2011/M01)**				**Loosening (2016/M10)**			
Window:	**1-Month**		**6-Months**		**1-Month**		**6-Months**	
After	-0.309***		-0.142***		-0.000		0.024***	
	(0.019)		(0.006)		(0.011)		(0.006)	
After*LTV	0.317***	0.140**	0.466***	0.058*	-0.042***	-0.041***	0.024***	0.029***
	(0.052)	(0.060)	(0.018)	(0.030)	(0.013)	(0.016)	(0.006)	(0.009)
LTV	-1.135***		-2.450***		-0.011	-0.028	-0.069	-0.154***
	(0.153)		(0.064)		(0.179)	(0.216)	(0.047)	(0.052)
Constant	4.397***		4.603***		4.198***		4.277***	
	(0.032)		(0.011)		(0.178)		(0.047)	
Bank Observables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro Observables	Yes	n/p	Yes	n/p	Yes	n/p	Yes	n/p
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	-	Yes	-	Yes	-	Yes	-
Time (Year) FE	Yes	-	Yes	-	Yes	-	Yes	-
Firm*Month FE	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**
Obs	348,309	115,759	1,810,980	635,786	510,769	161,186	2,995,343	893,937
R-sq	0.798	0.682	0.661	0.676	0.849	0.742	0.717	0.740

Note. -- The table reports estimates from ordinary least squares regressions with different windows. The dependent variable is the natural logarithm of commercial loans across banks and firms. LTV is the weighted Loan-to-Value ratio of banks. Bank Observables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA Ratio and NPL Ratio. Macro Observables are yearly growth rate of industrial production index, inflation rate, monthly change in CBRT effective policy rate and in reel effective exchange rate. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. "Yes" indicates set of characteristics or fixed effects. "-" indicates set of characteristics or fixed effects is not included. "n/p" indicates set of characteristics or fixed effects cannot be included. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 4: Effects of LTV Regulations on the Amount of Commercial Loans by Risky and NonRisky Firms

	(1)	(2)	(7)	(8)	(9)	(10)	(15)	(16)
Policy	**Tightening (2011/M01)**				**Loosening (2016/M10)**			
Window:	**1-Month**		**6-Months**		**1-Month**		**6-Months**	
After	-0.312***		-0.285***		0.003		0.006	-0.095***
	(0.029)		(0.010)		(0.019)		(0.009)	(0.015)
Rating	-0.026***	-0.023***	-0.044***	-0.038***	-0.006	0.007	0.000	-0.002
	(0.009)	(0.006)	(0.002)	(0.002)	(0.015)	(0.016)	(0.004)	(0.004)
LTV	-16.578***		20.059***		0.317***		0.502***	
	(6.392)		(1.124)		(0.096)		(0.023)	
After*LTV	0.892***		0.722***		-0.076***		0.064***	
	(0.098)		(0.027)		(0.028)		(0.010)	
Rate*LTV	0.118***	0.104***	0.180***	0.155***	-0.043***	-0.057***	-0.064***	-0.064***
	(0.026)	(0.019)	(0.008)	(0.007)	(0.017)	(0.017)	(0.004)	(0.004)
After*LTV*Rate	-0.059***	-0.042***	-0.080***	-0.054***	0.010**	0.007*	-0.006***	-0.005***
	(0.016)	(0.013)	(0.004)	(0.005)	(0.005)	(0.004)	(0.001)	(0.001)
Constant	66.210***		-2.366***		4.193***		3.913***	
	(8.072)		(0.450)		(0.214)		(0.018)	
Bank Observables	Yes	n/p	Yes	n/p	Yes	n/p	Yes	n/p
Macro Observables	Yes	n/p	Yes	n/p	Yes	n/p	Yes	n/p
Bank FE	Yes	-	Yes	-	Yes	-	Yes	-
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time (Year) FE	Yes	-	Yes	-	Yes	-	Yes	-
Bank*Month FE	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**	**-**	**Yes**
Obs	312,571	159,592	1,603,534	1,298,736	275,621	136,032	2,331,384	1,555,586
R-sq	0.810	0.699	0.667	0.627	0.873	0.795	0.734	0.737

Note. -- The table reports estimates from ordinary least squares regressions with different windows. The dependent variable is the natural logarithm of commercial loans across banks and firms. LTV is the weighted Loan-to-Value ratio of banks. Bank Observables include the lagged values of Bank Total Assets, Capital Ratio, Liquidity Ratio, Credit Ratio, Deposit Ratio, ROA Ratio and NPL Ratio. Macro Observables are yearly growth rate of industrial production index, inflation rate, monthly change in CBRT effective policy rate and in reel effective exchange rate. Coefficients are listed in the first row, robust standard errors are reported in the row below, and the corresponding significance levels are placed adjacently. "Yes" indicates set of characteristics or fixed effects. "-" indicates set of characteristics or fixed effects is not included. "n/p" indicates set of characteristics or fixed effects cannot be included. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 5 : Effects of LTV Cap on the G-P Demand of LTV Constrained Individuals (2016)

	(1)	(2)	(7)	(8)
Window:	**1-Month**		**6-Months**	
70 vs 75				
LTVconst	4.460***	4.460***	4.577***	4.734***
	(0.530)	(0.530)	(0.301)	(0.286)
After*LTVconst	1.895	1.895	3.129***	3.494***
	(1.350)	(1.350)	(0.483)	(0.492)
Obs	41,292	41,292	283,896	262,691
71 vs 76				
LTVconst	4.483***	4.753***	4.932***	5.088***
	(0.521)	(0.558)	(0.320)	(0.305)
After*LTVconst	3.526**	3.957***	4.024***	4.479***
	(1.388)	(1.500)	(0.527)	(0.539)
Obs	45,286	41,292	283,896	262,691
72 vs 77				
LTVconst	4.788***	5.056***	5.282***	5.432***
	(0.551)	(0.589)	(0.341)	(0.327)
After*LTVconst	3.949***	4.408***	4.365***	4.849***
	(1.407)	(1.513)	(0.559)	(0.572)
Obs	45,286	41,292	283,896	262,691
73 vs 78				
LTVconst	5.184***	5.458***	5.552***	5.886***
	(0.596)	(0.634)	(0.337)	(0.355)
After*LTVconst	4.241***	4.739***	4.804***	5.126***
	(1.371)	(1.471)	(0.572)	(0.607)
Obs	45,286	41,292	283,896	262,691
74 vs 79				
LTVconst	5.698***	5.953***	6.253***	6.597***
	(0.658)	(0.697)	(0.377)	(0.396)
After*LTVconst	5.082***	5.646***	5.410***	5.743***
	(1.463)	(1.559)	(0.637)	(0.673)
Obs	45,286	41,292	283,896	262,691
75 vs 80				
LTVconst	8.752***	9.089***	9.773***	10.269***
	(0.984)	(1.039)	(0.589)	(0.619)
After*LTVconst	3.521**	4.111**	3.543***	3.782***
	(1.657)	(1.756)	(0.828)	(0.871)
Obs	45,286	41,292	283,896	262,691
Individual Observables	-	Yes	-	Yes
Bank Observables	-	n/p	-	n/p
Macro Observables	-	n/p	-	n/p
Bank*Month FE	**Yes**	**Yes**	**Yes**	**Yes**

Note. -- Robust standard errors are shown in parenthesis. LTVconst marks individuals who are constrained by the LTV ratio cap. The regression is performed on a cross-section of housing loan customers in 2016. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Table 6 : Differences in Differences Estimates for various time brackets and LTV cutoffs

	(1)	(2)	(3)	(4)	(5)	(6)
Brackets	**70 vs 75**	**71 vs 76**	**72 vs 77**	**73 vs 78**	**74 vs 79**	**75 vs 80**
August 2016 to November 2016						
After	0.226	1.136**	1.135**	1.127**	1.059**	0.922*
	(0.523)	(0.517)	(0.516)	(0.514)	(0.512)	(0.506)
LTVconstr	4.973***	5.325***	5.674***	6.188***	6.876***	10.508***
	(0.343)	(0.358)	(0.378)	(0.405)	(0.447)	(0.670)
LTVconstr*After	2.399***	3.967***	4.221***	4.315***	4.913***	2.845***
	(0.592)	(0.643)	(0.673)	(0.706)	(0.767)	(0.953)
Obs	92632	92632	92632	92632	92632	92632
July 2016 to December 2016						
After	0.208	1.263**	1.261**	1.250**	1.190**	1.057*
	(0.566)	(0.564)	(0.564)	(0.563)	(0.561)	(0.556)
LTVconstr	5.435***	5.822***	6.210***	6.766***	7.538***	11.559***
	(0.550)	(0.584)	(0.623)	(0.676)	(0.751)	(1.149)
LTVconstr*After	2.601***	3.774***	4.041***	4.126***	4.640***	2.217*
	(0.653)	(0.702)	(0.745)	(0.798)	(0.881)	(1.251)
Obs	133130	133130	133130	133130	133130	133130
June 2016 to January 2017						
After	(0.123	0.577	0.595	0.606	0.619	0.6
	(0.681)	(0.664)	(0.663)	(0.662)	(0.660)	(0.657)
LTVconstr	5.069***	5.438***	5.814***	6.345***	7.080***	10.967***
	(0.398)	(0.422)	(0.450)	(0.488)	(0.541)	(0.833)
LTVconstr*After	3.674***	4.753***	5.118***	5.321***	5.914***	3.744***
	(0.566)	(0.624)	(0.665)	(0.712)	(0.789)	(1.049)
Obs	177793	177793	177793	177793	177793	177793

Note: Robust standard errors are shown in parenthesis. LTVconst marks individuals who are constrained by the LTV ratio cap. The regression estimates are on a cross-section of housing loan customers in September (before) and October (after) of 2016 with varying constraint ranges for LTV. Column 1 shows individuals at and above 70% LTV ratio before, and 75% after the policy change, each column thereafter increases the criteria by one percentage points for both before and after. All the columns include individual and bank covariates which are not reported, the full results are available in the paper. *** Significant at 1%, ** significant at 5%, * significant at 10%.