

Global Retail Lending in the Aftermath of the US Financial Crisis: Distinguishing between Supply and Demand Effects

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12th Conference of the ECB-CFS Research Network

Rome, 12-13 November 2009

Motivation (I)

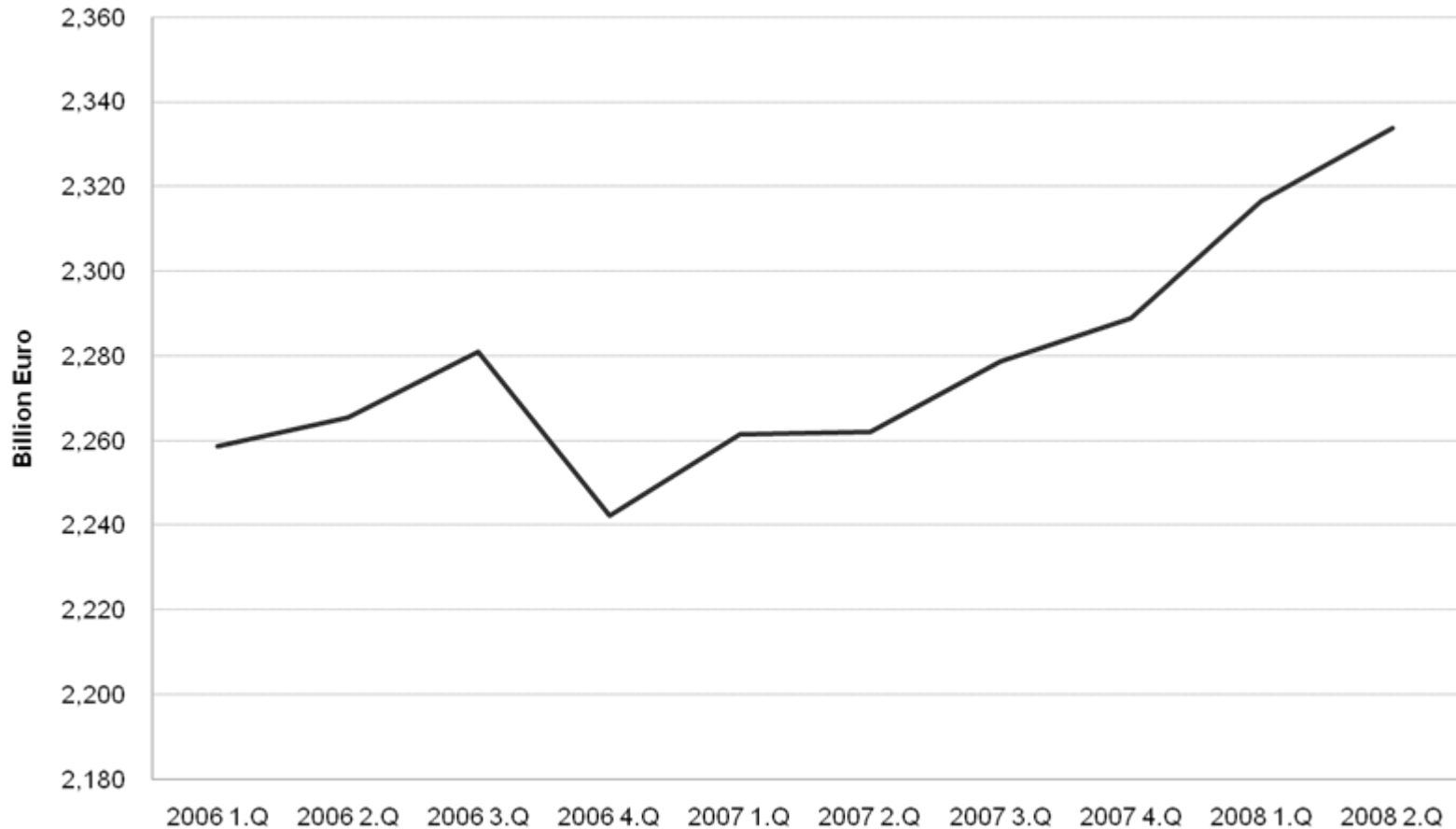
- Financial crisis is an event with significant impact.
- An important question is the global manifestations of the crisis.
- Does the US financial crisis affect the construction worker in Germany?
- If so, what are the potential channels?
- Does the trend in globalization in banking lead to the US financial crisis affecting the real economy in other countries through the bank lending channel?
- Implications for retail consumers of particular importance.

Motivation (II)

- We examine retail lending in Germany.
- German economy shows reasonable growth and record-low unemployment rates until 2008.
- German housing market does not experience highs and lows as in US, house prices pretty flat over last decade.
- Some interesting aggregate lending patterns.

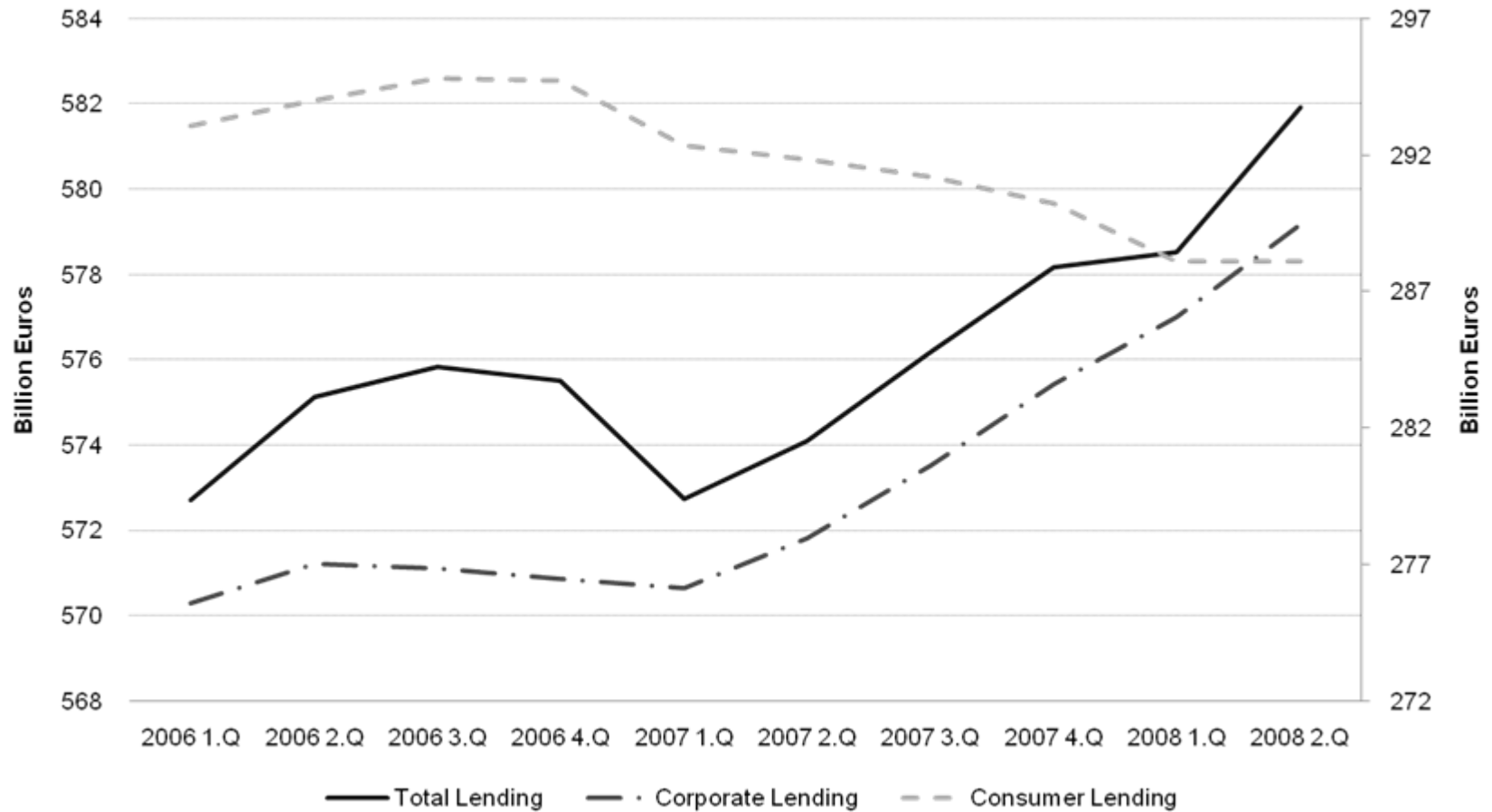
Germany: Aggregate Lending

Corporates and Consumer (All Bank Groups)



Aggregate Lending

Lending by Savings Banks



This paper

- Does the financial crisis affect lending in non-US countries with stable economic performance?
- Can we distinguish between demand and supply effects for retail customers?
- If there are supply effects, which type of credit is most affected?
- Is there a role for relationships in mitigating these effects?

Our Experimental Setting

- Unique database from July 2006-June 2008 relating to German savings banks:
 - Savings banks serve local customers (narrow banking).
 - Some savings banks are affected by subprime crisis directly through holdings in Landesbanken with large exposure to subprime crisis.
 - Other savings banks are not affected.
 - We have the universe of loan applications made, internal credit ratings, and loans approved.
 - Can compare and separate out the demand and supply effects for affected and non-affected banks.

Landesbanken in Germany



Institutional Details (I)

- 11 Landesbanken, or regional public banks. They are substantially owned by or have a common holding company with the savings banks in their federal state.
- Landesbanken obtain formal and informal guarantees and support from the savings banks.
- Moody's incorporates the savings banks' support to establish a rating floor for the Landesbanken.

Institutional Details (II)

- Sachsen LB has largest exposure, followed by West LB and Bayern LB.
 - Sachsen LB owners had to give a first loss guarantee of €2.75 billion to convince Landesbank Baden-Württemberg to buy it.
 - West LB got a first loss guarantee of €2 billion from its owners.
 - Bayern LB got a guarantee of €2.4 billion for its asset backed securities from its savings banks.
- Losses reported by these banks stem from their global portfolio. All banks showed high operating profits in all other business segments.

Experimental Design

- Is credit supply or demand affected by the financial crisis?
 - Does banks' supply of credit change if they are adversely affected by the crisis?
 - Does customers' demand for credit change?
- Identification:
 - Some savings banks are affected by sub-prime crisis, some are not.
 - We observe all loan applications and approvals before and after the crisis.

Related Literature (I)

- Growing literature on effects of globalization of banking (e.g. Peek and Rosengren, 1997; Rajan-Zingales, 2003; Berger, Dai, Ongena, and Smith, 2003; Mian, 2006)
- Most of this research examines the impact of banks entering foreign countries and implications for lending to customers in these countries.
- Relatively little research on what happens when your local bank starts having international exposure? How does it affect its small and retail customers?

Related Literature (II)

- Studies on effect of financial crisis on bank lending to corporations in the U.S. with mixed evidence:
 - Ivashina and Scharfstein (2008) document decrease.
 - Chari, Christiano, and Kehoe (2008) do not.
- Part of the difference due to crisis-related drawdowns of existing revolving credit facilities.
- We study retail lending in a different country to identify if bank lending channel propagates shocks in lending.
- We can directly distinguish between demand and supply effects.

Data (I)

- Data from July 2006-June 2008 provided by the German Savings Banks Association.
- Choice of event date
 - Privately known losses: August 2007 for all Landesbanken
 - Publicly known losses: individual quarter for each Landesbank dependent on when losses were publicly reported (robustness)
- For each completed loan applications we have
 - Accept or reject decision
 - 1 million consumer applications for consumer and mortgage loans at 357 different banks

Data (II)

Some unique features of the data

- All loan applications and bank decision for each loan application observed (unlike Dealscan or comparable US data sources).
- Savings banks' retail lending share > 40%; Germany one of the largest bank based systems.
- Internal credit rating as per Basel II guidelines.
- Can identify whether existing customer or new relationship.

Data (III)

- Borrower's internal credit rating based on a scorecard that includes
 - Age
 - Occupation
 - Nature of job
 - Years at job
 - Monthly repayment capacity
- Internal rating ranges from 1 to 12; 1 being lowest default probability. Average rating 5.
- On average 95.6% loan applications are accepted.

Descriptive statistics

Table 3: Aggregate Acceptance Rates - Affected versus Non-Affected Banks

This table presents aggregate acceptance rates for affected versus non-affected banks over time. Acceptance rates are aggregated across each quarter. The first Landesbank (Sachsen LB) was directly hit by the financial crisis in August 2007 (Q3 – 2007). At the same time, the massive exposure and vulnerability of the other Landesbanken (Bayern LB and West LB) also became obvious.

Quarter	Affected Banks	Non-Affected Banks
Q3 - 2006	97.34%	98.33%
Q4 - 2006	97.58%	97.85%
Q1 - 2007	97.75%	97.67%
Q2 - 2007	97.61%	97.23%
Q3 - 2007	93.96%	97.52%
Q4 - 2007	85.64%	97.20%
Q1 - 2008	84.58%	97.53%
Q2 - 2008	84.93%	98.03%

Loan Acceptance Rates at the Onset of the Financial Crisis (Diff-in-Diff)

Panel A: Pooled Consumer & Mortgage Loans				
	All	Affected	Non-Affected	Difference
Before August 2007	0.976 (.0002) [657,309]	0.975 (.0003) [239,644]	0.977 (.0002) [417,665]	0.002*** (.0004)
After August 2007	0.943 (.0003) [639,417]	0.864 (.0007) [233,968]	0.976 (.0002) [405,449]	0.113*** (.0007)
Difference	-0.041*** (.0003)	-0.111*** (.0008)	-0.001* (.0003)	-0.110*** (0.000)

Diff-in-Diff across rating classes

Panel D: Diff-in-Diff By Rating Classes

	Before August 2007			After August 2007			Diff-in-Diff (p-value)
	A ffected	Non- A ffected	Difference (p-value)	A ffected	Non- A ffected	Difference (p-value)	
Borrower Risk (Internal Rating)							
1	0.986	0.993	0.007	0.876	0.993	0.117	0.110
			<0.0001			<0.0001	<0.0001
2	0.988	0.989	0.000	0.889	0.989	0.100	0.099
			(.726)			<0.0001	<0.0001
3	0.989	0.987	-0.002	0.898	0.989	0.091	0.093
			(.055)			<0.0001	<0.0001
4	0.990	0.988	-0.003	0.903	0.988	0.085	0.088
			(.001)			<0.0001	<0.0001
5	0.988	0.987	0.000	0.890	0.987	0.097	0.097
			(.607)			<0.0001	<0.0001
6	0.986	0.985	0.000	0.890	0.986	0.095	0.096
			(.629)			<0.0001	<0.0001
7	0.983	0.985	0.002	0.890	0.985	0.095	0.093
			(.046)			<0.0001	<0.0001
8	0.978	0.981	0.003	0.870	0.980	0.110	0.107
			(.005)			<0.0001	<0.0001
9	0.973	0.975	0.002	0.859	0.977	0.118	0.116
			0.285			<0.0001	<0.0001
10	0.958	0.958	0.000	0.817	0.949	0.132	0.132
			0.841			<0.0001	<0.0001
11	0.885	0.917	0.032	0.715	0.904	0.189	0.157
			<0.0001			<0.0001	<0.0001
12	0.793	0.804	0.010	0.650	0.811	0.160	0.150
			(.107)			<0.0001	<0.0001

Acceptance rates

- Affected banks reduce lending relative to non-affected banks after August 2007.
- This is true both for consumer loans and mortgage loans.
- This result holds across rating classes but there is a slight migration to quality.

Multivariate Diff-in Diff Analysis

Estimate: $Y_{i,b,t} = A_b + B_t + \delta * X_{i,b,t} + \beta_1 * \text{AFFECTED} * \text{POST-AUGUST2007} + \beta_2 * \text{NON-AFFECTED} * \text{POST-AUGUST2007} + \varepsilon_{i,b,t}$

- $Y_{i,b,t} = 1$ if a loan application by customer i at bank b at time t is successful; 0 otherwise.
- A and B are fixed effects for banks and time, respectively
- $X_{i,b,t}$ are individual controls that capture in particular each borrower's risk as measured by the internal scoring.
- $\text{AFFECTED} = 1$ if a savings bank is an owner of a Landesbank that is affected by the financial crisis, while $\text{NON-AFFECTED} = 1$ if a savings bank is an owner of a Landesbank that is not affected by the financial crisis.
- $\text{POST-AUGUST2007} = 1$ if the loan application is made after August 2007, i.e. after the beginning of the financial crisis, and zero otherwise.
- The key variables of interest are the interaction terms $\text{AFFECTED} * \text{POST-AUGUST2007}$ and $\text{NON-AFFECTED} * \text{POST-AUGUST2007}$. Our inference is thus based on a comparison of the coefficients β_1 and β_2 .
- Probit with fixed effects gives inconsistent estimates in panel, hence use linear probability model, do robustness check to show get similar results with either model.

Consumer & Mortgage Loans

	(1)		(2)		(3)	
(1) Affected x Post August 2007	-0.071***	(.0008)	-0.072***	(.0008)	-0.072***	(.0227)
(2) Unaffected x Post August 2007	0.011***	(.0006)	0.010***	(.0007)	0.010*	(.0056)
Borrower Risk (Internal Rating)						
1	0.228***	(.0023)	0.228***	(.0023)	0.228***	(.0269)
2	0.216***	(.0023)	0.216***	(.0023)	0.216***	(.0257)
3	0.209***	(.0022)	0.209***	(.0022)	0.209***	(.0248)
4	0.207***	(.0022)	0.207***	(.0022)	0.207***	(.0246)
5	0.203***	(.0022)	0.203***	(.0022)	0.203***	(.0243)
6	0.200***	(.0022)	0.200***	(.0022)	0.200***	(.0243)
7	0.197***	(.0022)	0.197***	(.0022)	0.197***	(.0242)
8	0.190***	(.0022)	0.190***	(.0022)	0.190***	(.0239)
9	0.182***	(.0023)	0.182***	(.0023)	0.182***	(.0233)
10	0.157***	(.0023)	0.157***	(.0023)	0.157***	(.0216)
11	0.097***	(.0026)	0.097***	(.0026)	0.097***	(.0147)
Consumer Confidence			0.001***	(.0001)	0.0010	(.0007)
Time Fixed Effects	yes		yes		yes	
Bank Fixed Effects	yes		yes		yes	
Standard Errors Clustered at Bank Level					yes	
Diagnostics						
Adj. R ²	21.84%		21.84%		21.84%	
Wald Test: All coefficients =0 (p-value)	<0.0001		<0.0001		<0.0001	
Difference-in-Differences:						
DD- Estimate: (1) - (2)	0.082***		0.082***		0.082***	
Wald-Test: (1) - (2) [p-value]	<0.0001		<0.0001		<0.0001	
No. of observations	1,244,441		1,244,441		1,244,441	

Loan acceptance rates (I)

- Affected banks significantly reduce loan acceptance rates after Aug 2007 as compared to non-affected banks, after controlling for internal credit rating etc.,
- DD estimate of 8.2% is economically and statistically significant. Rejection rates double for affected banks.

Loan acceptance rates (II)

- DD estimate is 7.3% for consumer loans and 12.1% for mortgages. The difference between the two groups is significant.
- Mortgages are affected more than consumer loans.
- Results suggest banks constrain lending or supply side effect.

Loan acceptance rates and bank liquidity (I)

- Which banks curtail lending the most?
- Use heterogeneity among 146 affected savings banks
- We study a subsample of affected banks after August 2007 to explore the effect of size and liquidity on loan acceptance rates
- Use linear probability model without bank fixed effects because of annual observations per bank
 - Cluster standard errors at bank level
 - Diff-in-diff-in-diff tests give similar results

Loan acceptance rates and bank liquidity (II)

	Pooled Sample		Consumer Loans		Mortgage Loans	
	(1)	(2)	(1)	(2)	(3)	(4)
Log (Bank Size)	0.049***	(.016)	0.044***	(.0156)	0.0794***	(.0253)
Borrower Risk (Internal Rating)						
1	0.227***	(.046)	0.278***	(.0415)	0.348***	(.0694)
2	0.245***	(.0416)	0.279***	(.0409)	0.304***	(.0666)
3	0.254***	(.0401)	0.267***	(.0401)	0.298***	(.067)
4	0.260***	(.0403)	0.264***	(.0401)	0.333***	(.0676)
5	0.250***	(.0393)	0.253***	(.0393)	0.307***	(.0648)
6	0.248***	(.0388)	0.249***	(.0386)	0.304***	(.0658)
7	0.250***	(.0391)	0.252***	(.0392)	0.276***	(.0591)
8	0.229***	(.0402)	0.230***	(.0403)	0.268***	(.0588)
9	0.218***	(.0381)	0.218***	(.0379)	0.229***	(.0677)
10	0.173***	(.0376)	0.174***	(.0379)	0.156***	(.0493)
11	0.072***	(.0263)	0.071***	(.0266)	0.0716	(.0445)
Consumer Confidence	0.0135	(.0099)	0.016*	(.0096)	-0.0076	(.0149)
Time Fixed Effects	yes		yes		yes	
Standard Errors Clustered at Bank Level	yes		yes		yes	
Diagnostics						
Adj. R ²	5.13%		5.64%		6.95%	
Wald Test: All coefficients =0 (p-value)	<0.0001		<0.0001		<0.0001	
Mortgage - Consumer Loans:						
Δ [Log(Bank Size)]					0.035***	
p-value					<0.0001	
No. of observations	207,609		176,793		30,816	

Loan acceptance rates and bank liquidity (III)

	Pooled Sample		Consumer Loans		Mortgage Loans	
	(4)	(5)	(5)	(6)	(6)	(6)
Liquidity (% of Total Assets)	16.149***	(6.311)	13.910***	(5.26)	31.866***	(11.2482)
Borrower Risk (Internal Rating)						
1	0.231***	(.0481)	0.281***	(.0429)	0.332***	(.067)
2	0.246***	(.0427)	0.278***	(.0418)	0.290***	(.0633)
3	0.253***	(.0411)	0.264***	(.0409)	0.287***	(.064)
4	0.258***	(.0411)	0.261***	(.0409)	0.321***	(.0645)
5	0.247***	(.0401)	0.249***	(.0401)	0.294***	(.0623)
6	0.245***	(.0394)	0.246***	(.0394)	0.294***	(.063)
7	0.245***	(.0398)	0.247***	(.0399)	0.260***	(.0569)
8	0.225***	(.0406)	0.225***	(.0409)	0.256***	(.0566)
9	0.212***	(.0385)	0.213***	(.0384)	0.224***	(.0641)
10	0.168***	(.0378)	0.170***	(.0382)	0.146***	(.0485)
11	0.071***	(.0268)	0.071***	(.0272)	0.0570	(.0439)
Consumer Confidence	0.0128	(.0098)	0.0155	(.0096)	-0.0082	(.0149)
Time Fixed Effects	yes		yes		yes	
Standard Errors Clustered at Bank Level	yes		yes		yes	
Diagnostics						
Adj. R ²	6.26%		6.44%		10.21%	
Wald Test: All coefficients =0 (p-value)	<0.0001		<0.0001		<0.0001	
Mortgage - Consumer Loans:						
Δ [Liquidity (% of Total Assets)]					17.965***	
p-value					<0.0001	
No. of observations	207,609		176,793		30,816	

Loan acceptance rates and bank liquidity (IV)

- The results for bank size and liquidity show that banks that entered the crisis with already low liquidity reduced lending more compared to other affected banks.
- We further analyze the risk distribution of *accepted* loans of affected versus non-affected banks before and after August 2007 and find that there were no differences in the savings banks' local portfolio.
 - Borrower quality as measured by the risk distribution of loan *applications* does not change either.
- What about demand for loans?

Demand for Loans

- Loan demand can be affected in two possible ways
 - General decline in demand.
 - Customers of affected banks can reduce demand more than from non-affected banks.
- Two proxies for loan demand
 - Number of loan applications per week
 - Use fixed effect OLS and negative binomial model with fixed effects to account for count nature of data.
 - Loan amount demanded
 - Available only for mortgage loans. Use $\ln(\text{amount})$ as dependent variable and fixed effect OLS.

Demand – Loan Applications

	<u>Consumer & Mortgage Loans</u>		<u>Consumer Loans</u>		<u>Mortgage Loans</u>	
	(1) OLS	(2) Negative Binomial	(3) OLS	(4) Negative Binomial	(5) OLS	(6) Negative Binomial
(1) Affected x Post August 2007	-8.131** (3.5957)	-0.207** (.0896)	-8.133** (3.254)	-0.189** (.0895)	-10.4366 (5.9764)	-0.244** (.1161)
(2) Unaffected x Post August 2007	-9.749*** (2.918)	-0.284*** (.0514)	-10.753*** (2.1651)	-0.291*** (.0429)	-12.249* (5.83)	-0.257*** (.072)
Mean Internal Rating	-1.245** (.635)	-0.039*** (.015)	-1.423*** (.4195)	-0.0682*** (.0159)	-0.3932 (.8432)	0.0128 (.0189)
Consumer Confidence	0.878* (.4289)	0.023*** (.0045)	0.3830 (.3657)	0.020*** (.0038)	1.482** (.5786)	0.0245*** (.0068)
Time Fixed Effects	yes	yes	yes	yes	yes	yes
Bank Fixed Effects	yes	yes	yes	yes	yes	yes
Standard Errors Clustered at State Level	yes	yes	yes	yes	yes	yes
Diagnostics						
Adj. R ² / Pseudo-R ²	80.98%	22.10%	81.41%	22.03%	86.05%	23.04%
LR-Test: $\alpha=0$ (p-value)		<0.0001		<0.0001		<0.0001
Difference-in-Differences:						
DD- Estimate: (1) - (2)	1.6180	0.0770	2.6200	0.1010	1.8124	0.0130
Wald-Test: (1) - (2) [p-value]	0.6599	0.4293	0.4581	0.3319	0.7939	0.7907
No. of observations	32,638	32,638	25,822	25,822	6,816	6,816

Demand for Loans – Loan Application Amounts

	(1) OLS		(2) OLS		(3) OLS	
(1) Affected x Post August 2007	-0.049***	(.0091)	-0.049***	(.0092)	-0.0490	(.0203)
(2) Unaffected x Post August 2007	-0.045***	(.0063)	-0.044***	(.0066)	-0.0444	(.0211)
Borrower Risk (Internal Rating)						
1	-0.595***	(.0146)	-0.595***	(.0146)	-0.595***	(.0268)
2	-0.449***	(.0154)	-0.449***	(.0154)	-0.449***	(.0133)
3	-0.455***	(.0154)	-0.455***	(.0154)	-0.455***	(.0101)
4	-0.346***	(.0152)	-0.346***	(.0152)	-0.346***	(.0359)
5	-0.298***	(.0151)	-0.298***	(.0151)	-0.298***	(.0324)
6	-0.192***	(.0151)	-0.192***	(.0151)	-0.192***	(.025)
7	-0.117***	(.015)	-0.117***	(.015)	-0.117***	(.022)
8	-0.087***	(.015)	-0.087***	(.015)	-0.087***	(.0117)
9	-0.048***	(.0149)	-0.048***	(.0149)	-0.048***	(.0112)
10	-0.041***	(.015)	-0.041***	(.015)	-0.041***	(.0134)
11	-0.087***	(.0159)	-0.087***	(.0159)	-0.087***	(.0106)
Consumer Confidence			-0.0004	(.0012)	-0.0004	(.0017)
Time Fixed Effects	yes		yes		yes	
Bank Fixed Effects	yes		yes		yes	
Standard Errors Clustered at State Level					yes	
Diagnostics						
Adj. R ²	14.17%		14.17%		14.17%	
Difference-in-Differences:						
DD- Estimate: (1) - (2)	0.0046		0.0046		0.0046	
Wald-Test: (1) - (2) [p-value]	0.5762		0.5729		0.5953	
No. of observations	317,583		317,583		317,583	

Bank-Borrower Relationships (I)

- What is the role of relationships in credit rationing?
- In addition to time before and after Aug 2007, and affected vs. non-affected savings banks, we use relationship status as a third source of identifying variation.

Bank-Borrower Relationships (II)

- Use diff-in-diff-in-diff estimates
- $$Y_{i,b,t} = A_b + B_t + \delta * X_{i,b,t} + \beta_1 * \text{POST-AUGUST2007} + \beta_2 * \text{RELATIONSHIPS} + \beta_3 * \text{AFFECTED} * \text{POST-AUGUST2007} + \beta_4 * \text{RELATIONSHIPS} * \text{POST-AUGUST2007} + \beta_5 * \text{AFFECTED} * \text{RELATIONSHIPS} + \beta_6 * \text{AFFECTED} * \text{POST-AUGUST2007} * \text{RELATIONSHIPS} + \epsilon_{i,b,t,r}$$
- RELATIONSHIPS = 1 if prior checking account with savings bank.
- Inference is based on the coefficient of β_6 .

Bank-Borrower Relationships (III)

		Dependent Variabel: Approved (Yes/No)					
		Pooled Sample		Consumer Loans		Mortgage Loans	
		(1)		(2)		(3)	
		LPM		LPM		LPM	
Secular Effects							
Post August 2007		0.011***	(.0006)	0.014***	(.0006)	0.006***	(.0012)
Relationships		0.028***	(.0019)	0.009***	(.0019)	0.018***	(.0025)
Second Level Interactions							
Affected x Post August 2007		-0.081***	(.0008)	-0.072***	(.0008)	-0.119***	(.0022)
Relationships x Post August 2007		0.004**	(.0022)	0.007*	(.004)	-0.007***	(.0027)
Relationships x Affected		0.020***	(.003)	0.016***	(.004)	0.048***	(.005)
Diff-in-Diff-in-Diff							
Affected x Post August 2007 x Relationships		0.049***	(.005)	0.041***	(.007)	0.018**	(.008)
Borrower Risk (Internal Rating)							
	1	0.221***	(.0023)	0.218***	(.0026)	0.206***	(.0059)
	2	0.210***	(.0023)	0.212***	(.0025)	0.195***	(.0059)
	3	0.204***	(.0022)	0.209***	(.0024)	0.184***	(.0059)
	4	0.202***	(.0022)	0.207***	(.0024)	0.182***	(.0059)
	5	0.198***	(.0022)	0.203***	(.0024)	0.172***	(.0059)
	6	0.195***	(.0022)	0.202***	(.0024)	0.162***	(.0059)
	7	0.193***	(.0022)	0.200***	(.0024)	0.151***	(.0059)
	8	0.187***	(.0022)	0.196***	(.0024)	0.131***	(.0059)
	9	0.180***	(.0023)	0.188***	(.0024)	0.128***	(.0059)
	10	0.155***	(.0023)	0.162***	(.0025)	0.109***	(.006)
	11	0.097***	(.0026)	0.096***	(.0028)	0.086***	(.0064)
Time Fixed Effects		yes		yes		yes	
Bank Fixed Effects		yes		yes		yes	
Diagnostics							
Adj. R ²		22.04%		23.25%		24.07%	
Wald Test: All coefficients =0 (p-value)		<0.0001		<0.0001		<0.0001	
Mortgage - Consumer Loans:							
	Δ[Affected x Post August 2007]					0.047***	
	p-value					<0.0001	
	Δ[Affected x Post August 2007 x Relationships]					-0.023***	
	p-value					<0.0001	
No. of observations		1,244,441		926,825		317,616	

Bank-Borrower Relationships (IV)

- In general, relationships had a positive effect on loan approval, relationship customers 2.8% more likely to be approved than new customer.
- All else constant, relationship customers have a 4.9% higher likelihood of being approved than new customers at affected banks after August 2007.

Robustness Checks (I)

- Choice of estimation model
 - Estimate Probit with and without fixed effects. Results are very similar.
- Out of sample data to test parallel trend assumption.
 - Use Jan. 2006 – Dec. 2006 as sample period.
 - Define July 1, 2006 as fictitious event and rerun experiment. Find insignificant diff-in-diff.

Robustness Checks (II)

- Geographic proximity and access to credit
 - It is unlikely that results are driven by common economic shock that only affects these 3 regions in Germany
 - Analyzing the lending behavior of contiguous savings banks in regions with and without affected Landesbanken provides a clean test
 - We repeat our tests for subsample of 31 groups of contiguous savings banks and find very similar results

Conclusion

- We take advantage of a unique dataset to study whether US financial crisis affects credit to retail customers in another country.
- We are able to directly distinguish between supply and demand effects. We find:
 - Little evidence of a demand effect.
 - Evidence of a supply side effect through bank lending channel - increased rejection rates by banks affected by the US financial crisis on local German retail lending.
 - These effects are stronger for mortgage as compared to consumer debt.
 - Banks that entered the crisis with low level of liquidity are reacting more strongly.
 - Relationships help mitigate supply side credit rationing.