The Industry Expertise Channel of Mortgage Lending

Zhanbing Xiao, Yuxiang Zheng

UBC SAUDER SCHOOL OF BUSINESS

Dec 2021

Motivation

- The 2008 great crisis caused significant losses to both the U.S. and the rest of the world.
- Banks' loosing screening and over securitization of mortgage are key triggers of the 2008 crisis.
- Widespread mortgage fraud.

Motivation

- The 2008 great crisis caused significant losses to both the U.S. and the rest of the world.
- Banks' loosing screening and over securitization of mortgage are key triggers of the 2008 crisis.
- Widespread mortgage fraud.
- Many questions remain to be answered.
  1. Are the loosing screening and mortgage fraud due to banks' risk taking or banks' lack of credible information of mortgage borrowers?
  2. In addition to the hard information from household credit reports and tax records, what other information channels do banks rely on in mortgage lending?
  3. Does soft information of borrowers matter in the mortgage market?

This Paper

- Document a new channel that reduces the information asymmetry between banks and mortgage borrowers - the industry expertise channel.
- This channel relies on the soft information banks gain in the corporate loan market.
- This channel is a consequence of information spillover from the corporate loan market to the mortgage market
- Show the importance of this channel in banks' allocation of mortgage credits across counties.

Lending Specialization in the Corporate Loan Market

- Banks specialize in lending towards specific industries in the corporate loan market (e.g., Laeven and Levine (2007), Berger et al. (2017), Giometti and Pietrosanti(2020)).
- The lending specialization enables banks to develop industry expertise, which improves their abilities in collecting and process information of the industry.

The Industry Expertise Channel

- A positive spillover effect of the industry expertise on the mortgage market.

The Industry Expertise Channel

- A positive spillover effect of the industry expertise on the mortgage market.
- Key Arguments:
  1. Banks that have expertise in an industry can better understand economies of counties where the industry is a major sector, as the industry is key to the county's economic growth.
  2. Household income growth is positively correlated with a county's economic growth.
  3. Households rely on monthly income for mortgage payments.
  4. Consequently, the industry expertise can help banks better evaluate household short-term and long-term financial health, and hence their mortgage affordability.

The Industry Expertise Channel

- The industry expertise channel facilities the flow of the information that banks obtain in the corporate loan market to the mortgage market - lower information barriers in mortgage lending.
- Reduced information asymmetry improves household access to mortgage credits.

Key Findings

- Banks allocate more mortgage credits to counties sharing their industry specializations.
- The allocation effect is stronger when information asymmetry between banks and mortgage borrowers is high or when local risk is high.
- Mortgages originated through the channel contain more soft information and have better performance.

Data and Sample

- **LPC DealScan Loan database** - Syndicated Loan Data
- **HMDA** - Mortgage Data
- **Call Reports** - Bank Characteristics
- **Summary of Deposits** - Depository Branches
- **Quarterly Census of Employment and Wages (QCEW)** - Employment at the 6-digit NAICS industry level for the more than 3,000 counties in the U.S
- Bureau of Economic Analysis, Compustat, Federal Housing Finance Agency (FHFA) and NBER database.
- 103 BHCs from 1995 to 2013.

Banks' Lending Specialization

- At the 3-digit NAICS level;

$$Specialization_{i,t}^{b} = \begin{cases} 1 & L_{i,t}^{b} \geq L_{i,t}^{*} \\ 0 & otherwise \end{cases} \tag{1}$$

  - b: bank, i: industry, t: year.
  - $L_{i,t}^{b} = \frac{Loan_{i,t}^{b}}{\sum_{i=1}^{I} Loan_{i,t}^{b}}$: a bank $b's$ portfolio share in the industry i.
  - $L_{i,t}^{*}$: 75^{th} percentile of the distribution of all banks' portfolio shares in the industry i plus the 1.5 inter-quartile range of the distribution (Paravisini et al.(2020)).

Counties' Industry Specialization

- At the 3-digit NAICS level;
- Drop all jobs created by government-owned entities or by financial firms;
- Rank the relative importance of each industry in a county based on the number of residents working in an industry;
- The top-three industries in a county.
- On average, the top-three industries create about more than 40% of jobs in a county.

Verifying the Key Argument

- The top-three industries are crucial for a county's economic growth and especially for household income growth - critical to household mortgage payments.
- Banks' understanding of these industries matters for their mortgage decisions.

Growth of the Top-three Industries and County Economic Development

$$Y_{jt} = \theta_j + \tau_t + \beta * \textit{Sales Growth}_{jt} + \delta \boldsymbol{X}_{ijt} + \varepsilon_{jt} \quad (2)$$

- where j represents county, t represents year.
- Y_{jt} is the dependent variable (GDP growth, household income growth or mortgage delinquency rate).
- $\textit{Sales Growth}_{jt}$ is the weighted average of sales growth of all public firms in the U.S. in the top-three industries that the county j specializes in.
- $\boldsymbol{X}_{jt}$ is a vector of county-level controls including the logarithm of population, the proportion of people above 65, and the proportion of whites.
- θ_j represents county fixed effects, and τ_t represents year fixed effects.

Growth of the Top-three Industries and County Economic Development

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	GDP Growth			Income Growth			Change in Mortgage Delinquency		
Sales Growth	0.809***	1.230***	1.056***	0.203***	0.068***	0.072***	-0.463***	-0.024**	-0.027**
	(0.061)	(0.090)	(0.088)	(0.006)	(0.008)	(0.008)	(0.013)	(0.011)	(0.011)
Observations	39,774	39,769	39,769	57,512	57,507	57,411	4,700	4,700	4,700
R-squared	0.004	0.114	0.134	0.046	0.235	0.244	0.327	0.727	0.734
County Controls	No	No	Yes	No	No	Yes	No	Yes	Yes
County FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

- A one standard deviation increase in sales growth is associated with an 8.3% increase in income growth.

The Industry Expertise Channel and Mortgage Lending

$$Y_{i,j,t} = \mu_i + \pi_{j,t} + \beta * \text{Same Industry}_{i,j,t} + \delta X_{i,j,t} + \varepsilon_{i,j,t} \quad (3)$$

- where i represents a bank, j represents a mortgage borrower's home county, t represents mortgage origination year;
- $Y_{i,j,t}$ is the logarithm of the number of approved mortgages.
- Same Industry$_{i,j,t}$ is a dummy indicating a bank and a county share same industry specializations.
- $X_{i,j,t}$ is a vector of controls at the bank-county-year level.
- μ_i is bank fixed effects, and $\pi_{j,t}$ is county by year fixed effects.

The Industry Expertise Channel and Mortgage Lending - Number

	(1)	(2)	(3)	(4)	(5)
	Log(No. Approved Mortgages)				
Same Industry	0.185***	0.102***	0.087***	0.053***	0.028***
	(0.012)	(0.010)	(0.008)	(0.008)	(0.007)
Observations	321,067	314,508	245,786	245,250	245,117
Bank-county Controls	No	No	Yes	Yes	Yes
Bank Controls	No	No	No	Yes	Yes
County*Year FE	No	Yes	Yes	Yes	Yes
Bank FE	No	Yes	Yes	Yes	No
Bank*State FE	No	No	No	No	Yes
Adjusted R-squared	0.001	0.433	0.688	0.696	0.770

- Counties that share same industry specializations with banks receive about 2.8% - 20.3% more mortgage credits.

The Industry Expertise Channel and Mortgage Approval Rates

	(1)	(2)	(3)	(4)	(5)
	Mortgage Approval Rate				
Same Industry	0.037***	0.004***	0.006***	0.006***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	321,067	314,508	245,786	245,250	245,117
Bank-county Controls	No	No	Yes	Yes	Yes
Bank Controls	No	No	No	Yes	Yes
County*Year FE	No	Yes	Yes	Yes	Yes
Bank FE	No	Yes	Yes	Yes	No
Bank*State FE	No	No	No	No	Yes
Adjusted R-squared	0.004	0.322	0.387	0.393	0.452

- Mortgage approval rate is about 40-370 basis points higher in counties that share same industry specializations with banks.

Information Asymmetry

- Access to credits is limited for long-distance borrowers (e.g., Degryse and Ongena (2005), Agarwal and Hauswald (2010), Hollander and Verriest (2016)).
- Such information asymmetry can be mitigated through branch expansions, social networks, or reduced travel costs, etc. (e.g., Alessandrini et al. (2009), Rehbein and Rother (2020), Levine et al. (2020)).

Information Asymmetry

	(1)	(2)	(3)	(4)
	Log(No. Approved Mortgages)			
	Branch		Social Network	
Same Industry	0.067***	0.044***	0.318***	0.278***
	(0.009)	(0.008)	(0.052)	(0.046)
Same Industry*VAR	-0.028***	-0.032***	-0.033***	-0.030***
	(0.009)	(0.008)	(0.006)	(0.005)
VAR	0.620***	0.526***	0.293***	0.237***
	(0.011)	(0.011)	(0.009)	(0.013)
Observations	245,250	245,117	245,118	244,986
Controls	Yes	Yes	Yes	Yes
County*Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	No	Yes	No
Bank*State FE	No	Yes	No	Yes
Adjusted R-squared	0.696	0.770	0.706	0.772

Local Risk

- Banks' information demand is higher when local risk increases, as borrowers are more likely to miss their mortgage payments and default, resulting in significant losses.

Local Risk

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(No. Approved Mortgages)					
	Industry Growth		Housing Price Growth		Loan to Income Ratio	
Same Industry	0.049***	0.025***	0.044***	0.023***	0.026***	0.008
	(0.008)	(0.007)	(0.008)	(0.007)	(0.009)	(0.008)
Same Industry*VAR	-0.028***	-0.020***	-0.035***	-0.017***	0.081***	0.059***
	(0.007)	(0.006)	(0.007)	(0.006)	(0.009)	(0.007)
Observations	239,425	239,297	240,778	240,647	245,250	245,117
Controls	Yes	Yes	Yes	Yes	Yes	Yes
County*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	No	Yes	No	Yes	No
Bank*State FE	No	Yes	No	Yes	No	Yes
Adjusted R-squared	0.697	0.771	0.694	0.769	0.696	0.770

Soft Information in Mortgages

- Mortgages originated through the industry expertise channel should be less standardized, i.e., larger dispersion in mortgage size.

  1. Better information allows banks to better discriminate between "good" and "bad" borrowers.
  2. Therefore, banks can grant mortgages with favorable terms to "good" borrowers and mortgages with strict terms to "bad" borrowers. (e.g., Cornell and Welch (1996), Rajan, Seru, and Vig (2015), Skrastins and Vig (2019))

Soft Information in Mortgages

	(1)	(2)	(3)	(4)
	Log(STD. Mortgage Size)		Log(IQ. Mortgage Size)	
Same Industry	0.144***	0.005*	0.146***	0.015***
	(0.005)	(0.003)	(0.004)	(0.003)
Observations	320,418	244,859	320,380	244,841
Controls	No	Yes	No	Yes
County*Year FE	No	Yes	No	Yes
Bank FE	No	No	No	No
Bank*State FE	No	Yes	No	Yes
Adjusted R-squared	0.00447	0.659	0.00466	0.595

Bank Defaulting Experience and Reliance on the Channel

- Defaults on banks' corporate loan portfolios create exogenous shocks to banks' perception of their screening and monitoring ability, resulting in lower confidence in their expertise in relevant industries.
- Banks write tighter loan contracts to new borrowers after experiencing shocks. (e.g., Murfin (2012), Giometti and Pietrosanti (2020)).
- Banks should rely less on the industry expertise channel after losing confidence on their industry expertise.

Bank Defaulting Experience and Reliance on the Channel

	(1)	(2)	(3)
	Log(No. Approved Mortgages)		
Corporate Default	-0.201***	-0.400***	-0.123*
	(0.070)	(0.079)	(0.069)
Observations	14,086	14,037	13,837
Bank-County Controls	Yes	Yes	Yes
Bank Controls	No	Yes	Yes
County*Year FE	Yes	Yes	Yes
Bank FE	Yes	Yes	No
Bank*State FE	No	No	Yes
Adjusted R-squared	0.721	0.730	0.828

- Banks cuts mortgage lending by 11.6% after the defaulting shocks.

Implications for Mortgage Performance

	(1)	(2)	(3)	(4)
	ROA - RE Loans		ΔROA - RE Loans	
Rank of Specialized Lending	0.0006***	0.0002**	0.0003**	0.0002*
	(0.0002)	(0.0001)	(0.0001)	(0.0001)
Log(Assets)	-0.0047***	0.0007	-0.0002	0.0012**
	(0.0007)	(0.0007)	(0.0002)	(0.0005)
Total Loans/Assets	0.0239***	0.0187***	-0.0036	-0.0064*
	(0.0064)	(0.0056)	(0.0041)	(0.0037)
Deposits/Assets	-0.0190***	-0.0000	-0.0003	-0.0039
	(0.0040)	(0.0034)	(0.0027)	(0.0035)
RE Loans/Total Loans	0.0305***	0.0401***	-0.0002	0.0022
	(0.0046)	(0.0033)	(0.0026)	(0.0031)
C&I Loans/Total Loans	-0.0009	-0.0003	-0.0015	0.0033
	(0.0053)	(0.0038)	(0.0029)	(0.0033)
Total Liquidity/Assets	-0.0065	0.0023	0.0029	-0.0028
	(0.0063)	(0.0053)	(0.0037)	(0.0034)
Observations	651	651	651	651
Bank FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
Adjusted R-squared	0.850	0.935	0.034	0.389

Conclusions

- Document a new information channel that banks rely on in mortgage lending - the industry expertise channel.
- Banks allocate more mortgage credits to counties sharing their industry specializations, especially when information asymmetry is high or when local risk is high.
- Mortgages originated through the channel contain more soft information and have better performance.