



INFORMATION SHARING AND LENDER SPECIALIZATION: EVIDENCE FROM THE U.S. COMMERCIAL LENDING MARKET

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Overview

- Large literature highlights importance of access to information for credit allocation
 - Better access to information improves screening and monitoring
 - Information asymmetries across markets and products act as entry barriers for lenders
- Advances in information technology have enhanced information sharing
 - Credit bureau coverage has increased from 52.3% in 2005 to 70.1% in 2016 for ten largest economies by GDP
 - Reduction in information asymmetries reduces market segmentation
 - But also increases competition
 - Padilla and Pagano (1997); Jappelli and Pagano (2002)
- How do advances in financial technology shape the boundaries of lending?

This paper

- Lenders enter new markets after sharing (and observing) information in a credit bureau
- New market entry conditional on information (“coverage”) in bureau
 - Incumbent lenders respond to new information from new joiners
- Comparative advantage in lending informs new market entry
 - Lenders specialize in specific collateral types
 - Winton (1999); Sharpe (1990); Rajan (1992); Paravisini et al (2015)
 - Entry stronger when a competing lender shares information on new markets within a lender’s comparative advantage
- Entry is more pronounced in markets with greater adverse selection
 - Higher competition for borrowers
 - Stricter non-compete clauses in labor contracts

This paper

- Provide evidence that advances in information technology shape boundaries of lending
 - Complements work linking organizational design of lending to credit information
 - Stein (2002); Berger et al (2005); Liberti and Mian (2009); Liberti, Seru, and Vig (2017)
 - Implications for matching/competition in lending markets
- Provides one explanation for why lenders voluntarily share information despite heightened competition
 - Information asymmetry creates a market imperfection
 - Rents from specialization outweigh costs of heightened competition
 - Lenders rationally share information to overcome adverse selection

Tracing Information to Lending: Empirical Complications

- Need an event which isolates lender's exposure to the technology shock
 - Track lender's portfolio pre and post information sharing
- Need an event for which the timing of the information shock varies across lenders
 - One-time introduction of an information event suffers from the usual unobservable / omitted factor problems
 - Lenders join bureau in a staggered manner
- Selection remains a concern due to voluntary entry
- Hard to disentangle the effects of information sharing technology from the supply and demand of capital on the boundaries of lending

PayNet Credit Bureau

- Private Equipment Finance Credit Bureau in the U.S.
 - Established in 2001 to address limited information sharing between lenders for commercial loans/leases
 - Timely, verified contract terms and payment history available to members (\$1.4T of contracts in system)
 - Rules: reciprocity, lenders' identities anonymous, members cannot mine database or use it for direct marketing
 - Borrower data is meaningful
 - Doblas-Madrid and Minetti (2013); Sutherland (2017)
- U.S. equipment expenditures:
 - 72% of private fixed non-residential investment in U.S.
 - \$800B in annual financing from banks and non-banks
 - Much less developed credit reporting vs. consumer/trade credit setting pre-PayNet

PayNet Credit Bureau

- Lenders join in staggered pattern 2001-2014
 - Unrelated to any single credit event
 - 8/10 largest lenders have joined (two-thirds of market volume)
- Must share ongoing and pre-entry credit information
 - PayNet collects data by establishing direct link into lenders' accounting/IT system
 - PayNet audits data internally (lender's past, other lenders) and externally (UCC filings)
 - Joining process takes 2-12 months, depending on IT system compatibility
- Our sample: credit file panel 20,000 randomly chosen firms
 - No borrower/lender identities, just ID#
 - Detailed contract info and borrower info

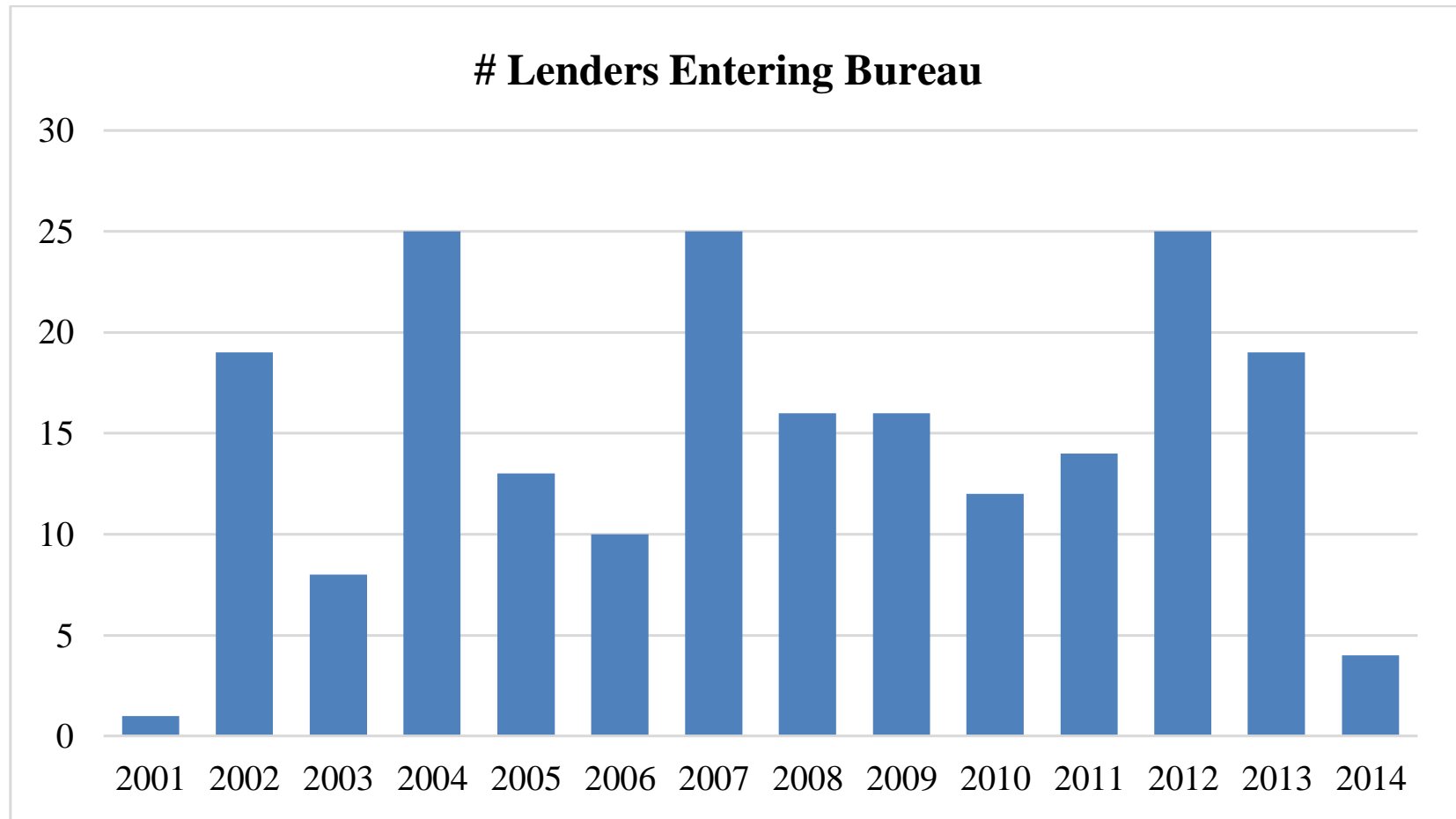
Empirical Strategy

- Consider lender A that joins in 2004
 - Lender A lends against agricultural equipment plus other equipment types
 - Trace lending dynamics around entry
 - **BUT: Entry of A is endogenous**
- Specialist agricultural equipment lender B joins in 2006
 - Entry of A is arguably exogenous to B
 - Exploit B's entry as a shock to information available in the bureau
 - A's lending in agriculture only should respond to shock
 - **BUT: Information shock might be correlated with demand**
- Agriculture equipment lender C that joins in 2008 provides the counterfactual
 - Is exposed to same demand shocks as lender A but not exposed to information shock in bureau from Lender B joining in 2006
 - But will be exposed to shocks to information in bureau after 2008

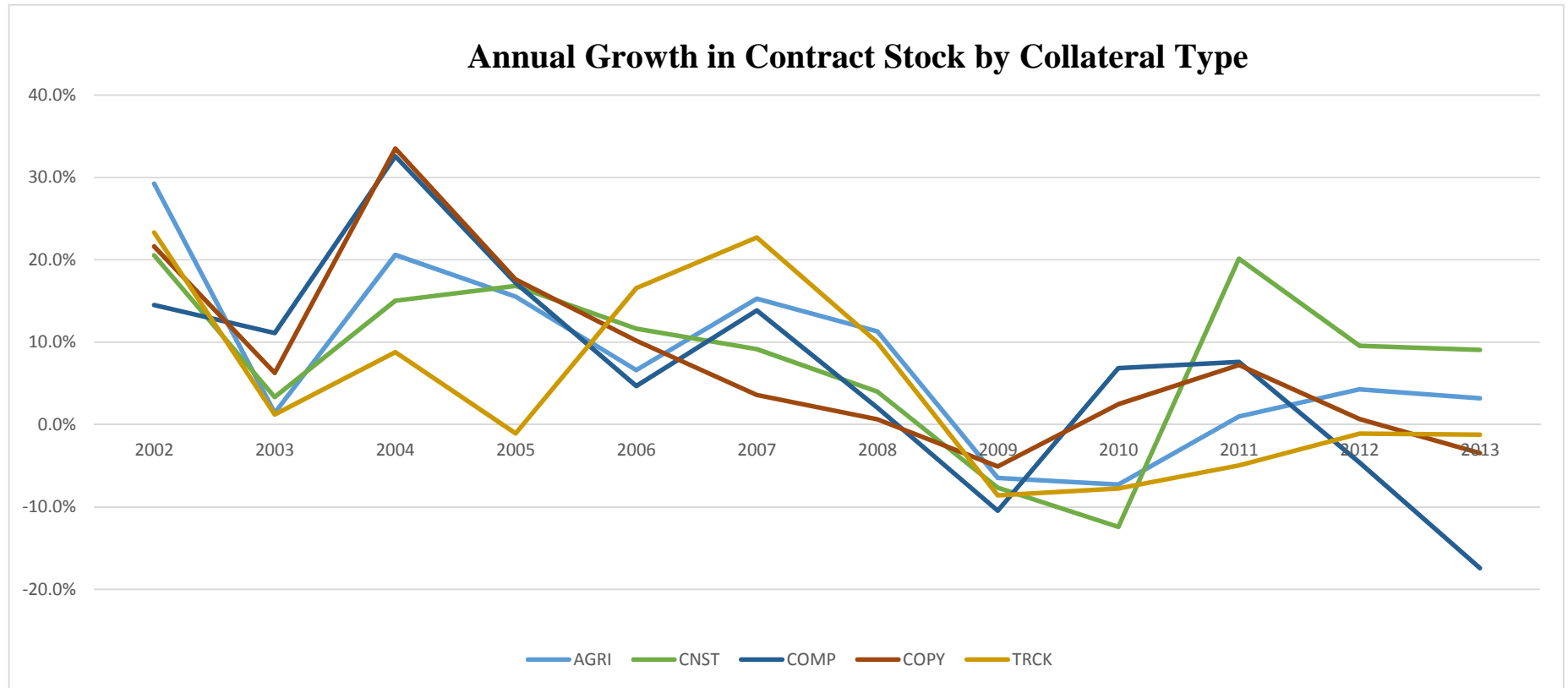
Identification: Key Points

- Identification relies on the staggered entry of lenders
 - Entry of *other* lenders provides plausibly exogenous shock to information in the bureau
 - Non-member lenders (that enter later) provide the counterfactual to mitigate demand concerns
- Compare expansion of lending into new markets for an incumbent lender when a second lender joins
 - Is expansion of incumbent correlated with new credit information in entering bureau?
 - Are expansion effects stronger when new credit information is relevant to incumbent lender's comparative advantage?
 - Examine expansion *within* a lender-collateral type
 - Should observe no effect for the counterfactual non-member

Staggered entry of lenders



Staggered shocks to bureau information (coverage)



Empirical Framework

LENDING EXPOSURE RESPONSE TO INFORMATION SHOCKS

$$y_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \beta \times Information_{j,t} + \gamma \times Post_{i,t} \times Information_{j,t} + \varepsilon_{i,j,t}$$

- Unit of Observation:
 - Lender \times Collateral-Type \times Quarter
- Dependent Variable:
 - Log exposure (credit, #contracts, #states) for lender i in collateral-type j in quarter t
- Post = 1 in the periods after lender i enters bureau
- Information is the log number of open contracts appearing in the bureau for collateral-type j in quarter t

Empirical Framework

LENDING EXPOSURE RESPONSE TO INFORMATION SHOCKS

$$y_{i,j,t} = \alpha_{i,j} + \alpha_{i,t} + \beta \times \text{Information}_{j,t} + \gamma \times \text{Post}_{i,t} \times \text{Information}_{j,t} + \varepsilon_{i,j,t}$$

- DID estimator γ captures response of lender i to information shock to credit in collateral type j
- β captures correlation of lending by lender i with information in the bureau before lender i enters
 - Expect zero effect if expansion is related to sharing of information only
- Show effects hold locally in geographic regions
 - Lender expands in collateral-type j and region k when information shock is specific to this collateral-region

Lender Exposure Response to Information

	Log Credit		
	(1)	(2)	(3)
Information	0.017 [0.57]	0.028 [1.41]	
Post * Information	0.070** [2.53]	0.098*** [4.05]	0.115*** [4.62]
Adj R-Sq.	0.868	0.696	0.696
N	41,618	170,847	170,847
Lender x Collateral Type FEs	Yes	Yes	Yes
Lender x Quarter FEs	Yes	Yes	Yes
Region x Quarter FEs		Yes	
Region x Collateral Type Specific Trends		Yes	
Collateral Type-Region-Quarter FEs			Yes

Focus on \$credit for purpose of presentation: similar results for #contracts and #states

Examining Lender Exposure Responses

- Examine if entry is more pronounced in markets with greater adverse selection
 - Greater entry barriers
- 1. Competition for borrowers
 - Exposure response to bureau information is stronger in states with greatest competition prior to PayNet
- 2. Non-compete clauses in labor contracts
 - New entrant can acquire information by poaching loan officers
 - Enforcement varies by state
 - Garmaise 2011; Jeffers 2017
 - New entrant can also acquire information, by joining bureau
 - Exposure response more pronounced in states with stronger non-compete enforcement

Additional Tests

- Response unrelated to information shocks to other collateral types
 - Run a placebo test where *Information* is the log number of open contracts appearing in the bureau for collateral-type $-j$ in quarter t
 - Confirms that credit information relevant for lender's comparative advantage matters
- Inclusion of stale information attenuates effects
 - DID coefficient weakens where *Information* is the log number of open contracts appearing in the bureau for collateral-type j in quarter $t-x$
- Response not driven by early joiners
- Results robust to dropping 5, 10, and 25 largest lenders

Collateral Expertise

- Lenders increase credit, contract, and geographic exposure *within* collateral type in response to access to new credit information
- Do they also enter new collateral types?
 - Bureau reduces, but does not eliminate, information asymmetries
 - Lenders should enter markets where information asymmetry is lowest
 - Dell’Ariccia (2001)
 - Comparative advantage across related collateral types
 - Carey et al. (1998); Benmelech et al. (2005); Eisfeldt and Rampini (2009); Murfin and Pratt (2017)

Empirical Framework

COLLATERAL EXPERTISE

$$y_{i,j,t} = \alpha_i + \alpha_j + \beta \times Post + \delta \times Relatedness_{i,j} + \gamma \times Post \times Relatedness_{i,j} + \varepsilon_{i,j,t}$$

- Unit of Observation:
 - Lender × Collateral-Type × Quarter
- Relatedness: Captures similarity of lending technology for two collateral types.
- Stigler ‘Survivor Principle’: How often do we observe two collateral types together in a lender’s portfolio?
 - Measure ‘abnormal’ similarity using graph theory
 - Teece et al. (1994); Bryce and Winter (2009)
 - Telecommunications, computers, and copiers are highly related; boats, energy, and logging are unrelated

Collateral Expertise

	(1)	(2)	(3)
	Log Credit	Log Credit	Log Credit
Relatedness	0.358*** [3.44]		
Post * Relatedness	0.534*** [5.22]	0.444*** [5.50]	0.159 [1.08]
Post * Relatedness * Information			0.052* [1.77]
Adj R-Sq.	0.234	0.555	0.555
N	157,254	157,254	157,254
Collateral Type FEs	Yes	No	No
Lender x Collateral Type FEs	No	Yes	Yes
Lender x Quarter FEs	Yes	Yes	Yes

New Collateral entry higher for related collateral types

Entry into related collateral types dependent on information shared by *other* lenders in bureau

Do Large and Small Lenders Behave Differently?

- Large and small lenders use different monitoring technologies
 - Stein (2002); Petersen (2004); Berger et al (2005); Liberti and Mian (2009)
- Small lenders
 - Relationship lending less scalable across exposures
- Large lenders
 - Rely on hard information: difficult to contract with opaque firms lacking credit scores
 - Use PayNet as a substitute for soft information acquisition
- Credit information sharing facilitates:
 - New market entry by small lenders
 - Larger lenders have better access to small borrowers

Implications for the Structure of Lender-Borrower Relationships

- Borrowers benefit from enhanced access to credit:
 - More relationships
 - More credit
 - Greater financial flexibility
 - More likely to start new relationship or contract 'off-cycle'
- Consistent with existing literature on access to credit
 - Lenders are better able to screen and monitor
- Information sharing increases competition within specialized lending markets
 - Better match between specialized borrowers and lenders' comparative advantage

Conclusions

- Financial technology that improves credit information sharing facilitates new market entry
 - Lenders expand within their comparative advantage
 - Stronger effects where adverse selection is greater
 - Rents from specialization outweigh costs of heightened competition
 - Information sharing shapes boundaries of lending
- Provides one rationale for why lenders are willing to share credit information with competitors
- Implications for competition in credit markets
 - Comparative advantage is a key component in lending
 - Information sharing enhances access to credit for borrowers
 - Typical view: better monitoring and screening by lenders
 - Additionally: better access to (specialized) lenders