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The Effect of Borrower Information Sharing on Delinquencies: Evidence from the US Lending Market

By Andrew Sutherland

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Use of Social Media by Captive Finance Companies

By James M. Johnson, PhD, and Susan Carol

While there are great disparities in social media usage between parent companies and their subsidiaries, research is showing that gap will close in the next few years. Opportunities abound in business development, branding, recruiting, research, news monitoring, product marketing, and customer relations management.

The Future of Financing Advanced Energy Efficient Building Equipment

By Kerry Cebul and Natalie Volpe

Lessors and other institutional investors have been hesitant to enter the commercial building energy efficiency market. What will it take for secondary markets to develop within the efficiency sector? This article looks at both existing and emerging equipment types in this market and emerging financing models.

The Effect of Borrower Information Sharing on Delinquencies: Evidence from the US Lending Market

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When a lender accesses a credit report to evaluate a contract application, it relies on previous information about the applicant's past performance. So does information sharing affect the frequency and severity of delinquencies? This study based on data from PayNet explores the ties between information sharing and payment performance.

When a lender accesses a credit report to evaluate a contract application, it benefits from the fact that other lenders have been willing to share information about the applicant's past contract performance and current indebtedness.

Economic theory and practitioner anecdotes suggest that credit repositories have two important effects on contract originations and delinquencies. First, they help lenders detect bad deals – potential contracts to high risk borrowers with poor track records or excessive leverage – before they are approved. Second, they discipline the borrower's behavior. As soon as a borrower knows that its payment history will be released to other lenders that it may contract with in the future, it strengthens the incentive to make on-time payments.

The results support these hypotheses.

This article uses the introduction of the PayNet repository in the U.S. lending market in 2001 to explore whether and how information sharing impacts the frequency and severity of delinquencies. The "how" relates to the role of firm characteristics, specifically the size and age of the borrower.

Unlike their more established peers, smaller firms do not typically disclose financial statements to the public, attract analyst coverage, or generate substantial media attention. This can make it more difficult for lenders to evaluate the creditworthiness of small firms, which can lead to poor contract decisions or hesitation about working with this group of borrowers to begin with. Additionally, there is less of a stigma associated with missing payments when they are not revealed in public financial statements or noticed by the financial press.

On the other hand, larger firms tend to have more intensive (in terms of both size and scope) relationships with their lender. They also are more likely to be aware of and respond to the lender's decision to join the repository and make their payment history available to other members. Firm age could also be relevant, given that younger firms are less likely to have an established track record of borrowing.

This study evaluates these predictions by examining how the effects of information sharing depend on the individual and interactive effects of firm size and age.

Borrower information sharing is such a pervasive feature of our economy that it is easy to take for granted its role in helping lenders screen applicants and allocate capital to firms. While lenders have exchanged information about borrowers for well over a century,[1] there is limited large-sample empirical evidence on the role of information sharing in the U.S. setting. That said, interesting insights have been produced from studies of the introduction of credit registries around the world.

Jappelli and Pagano (2002) analyze the presence of credit bureaus or registries in 39 countries. They find that information sharing is associated with greater lending activity in the economy, and mixed evidence on the change in defaults. Djankov, McLiesh, and Scleifer (2007) use a larger sample of 129 countries to show that the effect of information sharing on lending

activity depends on the legal origin and creditor rights of the

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country. Specifically, whereas common law countries tend to support their credit markets through creditor rights, French legal origin nations rely more on state-operated credit bureaus.

Despite this evidence, it remains difficult to discern whether information sharing has a causal effect on delinquencies in the United States for at least three reasons. First, unlike the developing countries that recently introduced credit bureaus or registries for the first time, the United States has sound legal institutions and enforcement mechanisms that help creditors recover proceeds

in the event of default. The role of information sharing for foreign lenders lacking such recourse options is likely to be very different because collateral-based lending is less appealing.

Second, many developing countries implement credit-reporting systems at the same time as regulatory reform and fiscal programs designed to spur lending, investment, and growth. In these cases, how does one separate the effects of information sharing from other concurrent initiatives? Third, and related to this point, the use of economywide measures of defaults and lending do not permit the granular contract-level analysis that is needed to rule out such competing explanations.

The primary hurdle to exploring the role of information sharing in the United States has been a lack of data covering a sizable number of lenders and firms. Even though practically every consumer and firm in the country has a credit report, finding a setting to compare contract-level outcomes before and after information sharing has proven very difficult for researchers. This article fills this gap using

contract data from PayNet's payment information repository.

Multiple aspects of the PayNet database make for an ideal setting to pursue this study. More than 250 lenders have become members at different points of time during the repository's existence. This allows the researcher to control for time-specific influences on contracting before and after information sharing occurs. Furthermore, the repository contains contract and delinquency records for a broad group of firms, permitting the analysis of how the effects of information sharing interact with firm traits.

While this study uses the equipment finance market as a setting, the results provide relevant evidence about information sharing for other developed credit markets. Aside from PayNet, U.S. lenders engage in other forms of information sharing through UCC filings and other reporting systems such as Dun & Bradstreet (D&B). Information sharing obviously plays a role in other lending markets, both in the United States and abroad, including consumer credit and home

mortgages, where missed payments are reported to bureaus.

Related to this point, the U.S. House of Representatives Subcommittee on Financial Institutions recently held a hearing discussing the merits of a proposal requiring utilities and landlords to share positive and negative payment data with credit bureaus (U.S. House, 2013). The purpose of that proposal is twofold: to reduce the number of individuals with thin or empty credit files, and to enable opaque but creditworthy borrowers to get loans.

Looking outside the lending setting, information sharing mechanisms are fundamental features of labor markets (where prospective employers ask past employers for references), insurance markets (where underwriters share claims histories and driving infractions of policyholders), and product and service markets (where platforms such as Angie's List and Yelp influence the decisions of consumers). In these settings, there is a similar lack of evidence on the effect of information exchange.

SETTING AND DATA DESCRIPTION

In 2001, PayNet launched an online credit repository that would allow lenders (including banks, captives, and finance companies) to obtain borrower information via the Internet. The repository operates on the principle of reciprocity: lenders can only participate by agreeing to share all past, present, and future credit files with other members. PayNet employs algorithms and analysts to screen information being contributed to the database for accuracy and completeness, and lenders' identities in the credit files are kept anonymous.

These policies alleviate the natural concerns associated with sharing client information. When discussing Wells Fargo's involvement with PayNet, Senior Vice President and Credit Manager Curt Zoerhof comments "PayNet does make a lot of sense. Our credit department is reluctant to call other lessors for a reference. If you have an anonymous system, that's helpful" (Jackson, 2000).

The PayNet repository offered a more comprehensive and

detailed account of borrower information than competing sources. Unlike the consumer lending market, credit reporting in the commercial market evolved much later, and even in 2000 it was difficult for lenders to know how borrowers had performed on term loan contracts (Murtagh, 2005). Other information sources (e.g., D&B) provided credit files containing utility bill and other smaller short-term payment histories that were consolidated at the borrower level, which offered a noisy signal of creditworthiness for more substantial, long-term lease applications (Jackson, 2001).

More than 250 lenders subsequently decided to become PayNet members, including eight of the 10 largest equipment finance companies. PayNet provided a sample of contracts for this study, permitting the comparison of delinquencies before and after the firm's lender became a member. To preserve the confidentiality of contract parties, the lender and borrower identities were kept anonymous.

The initial sample contains the credit files of 20,000 borrowers, containing over 500,000 contracts with

218 lenders. To ensure a usable sample for the tests, all borrowers have at least one open contract in the two-year period before and after their lender became a member. Table 1 provides summary statistics for the contracts.

The average (median) contract size is $118,165 ($26,023); though over 8,000 exceed $1 million and the largest is over $1 billion. The mean contract term is 48 months, and the majority require monthly payments. For a typical contract, the average and maximum days past due are 10 and 31 days, respectively, though for firms

with serious payment issues these figures are much higher.

Table 2 shows there is considerable variation in how borrowers perform on contracts.

Forty-three percent of the time, borrowers make every single payment on time. The worst delinquency on the contract is 30 days or less 23% of the time, and 31 to 60 days, 61 to 90 days, and over 90 days 18%, 7%, and 9% of the time, respectively. More than half of sample contracts are true leases, while conditional sales, loans, and lease purchases make up most of the remaining deals. A wide variety of equipment is financed by members, the most common of which is copiers and fax machines, though on a dollar-weighted basis trucks, construction and mining equipment, and computers comprise a larger portion of the sample (not tabulated for brevity).

Tables 3 and 4 describe the lenders and borrowers. The typical lender has relationships with 142 borrowers in the sample via 515 open contracts. These figures obviously under-state the true magnitude of lenders' operations given the

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sample includes only 20,000 borrowers – a modest slice of the entire market. Lenders vary in the performance of their contract portfolio. The typical lender has 55% of its contracts always paid on time; for lenders at the 25th (75th) percentile the figure is 38% (71%).

When it comes to the frequency of delinquencies over 90 days, the typical lender averages 8%. The average borrower has $1.4 million of contracts outstanding, has been in business 11 years, and possesses 100 months of borrowing history. Nearly 59% have paid late on an open contract, with 7% experiencing a delinquency over 90 days. For the 60% of firms with non-missing SIC codes, the most common sector is service providers.

Table 1. Sample Contract Characteristics

	Contract size (dollars)	Maturity (months)	Payment frequency (per year)	Average days past due	Maximum days past due
Average	118,165	45.5	11.1	9.9	30.5
Median	26,023	48.0	12.0	1.0	6.0

This table presents descriptive statistics for contracts used in the analyses. Delinquency variables are measured across both open and closed contracts. N=502,972.

Table 2. Worst Delinquencies by Type

	Always paid on time	Late by <=30 days	Late by 31-60 days	Late by 61-90 days	Late by >90 days
% of contracts	42.6%	22.8%	18.3%	7.3%	9.0%

This table categorizes the 502,972 contracts in Table 1 according to the worst delinquency experienced (maximum days past due).

Table 3. Lender Characteristics

	Number of Borrowers	Number of Contracts	% Contracts always paid on time	% Contracts late by > 90 days
Average	142.2	515.4	54.6%	8.2%
Median	20.0	42.6	54.7%	5.1%

This table presents descriptive statistics for the lenders in the analyses. N=218. Figures are measured across the time series of the sample for each lender.

Table 4. Borrower Characteristics

	Total contracts outstanding	Years in business	Have paid late on open contract	Have paid >90 days late on open contract
Average	1,470,905	10.8	58.5%	7.0%
Median	93,508	10.8	65.7%	0.0%

This table presents descriptive statistics for the borrowers in the analyses. N=20,000. Figures are measured across the time series of the sample for each borrower. Total Contracts Outstanding is calculated as the dollar sum of the borrower's contracts in the PayNet system for a given quarter.

RESEARCH APPROACH

The statistical tests compare various delinquency measures before and after the lender has joined PayNet. The comparison is performed using an ordinary least squares regression, which includes both borrower and lender fixed effects.[2] Intuitively, this approach measures the change in delinquency for every borrower with its lender individually, and presents an average of this change across all borrowers in the sample.

There are two advantages of this specification. First, by conducting the analysis within borrower, it controls for unobservable firm characteristics or sample composition changes unrelated to information sharing that could bias the results. For example, by becoming a member, a lender learns about and contracts with a pool of borrowers that differs from its prior clientele. In this case, simply comparing delinquencies before and after the lender's entry to the system is not meaningful because the sample of firms differs across the periods. The fixed-effects approach avoids this problem by tracking the same firms and lenders over time.

Second, given that lenders join in a staggered (but relatively stable) pattern over more than a decade, the analysis covers a wide variety of economic conditions, reducing the likelihood that the results are biased by the economic conditions present when any individual lender joins (Doblas-Madrid and Minetti, 2013).

RESULTS

Table 5 presents the main results, beginning with an analysis of the average days past due on a contract during its life (if the borrower has more than one contract, a simple average is used).[3] Column 1 (2) shows that in the one (two) year period before the lender's entry, the average contract goes 6.1 (6.3) days past due. In the one (two) year period after the entry, this declines by a statistically significant and economically meaningful 14.9% (18.3%). Next, columns 3 and 4 explore whether these results hold when using an alternative delinquency measure: the number of days currently delinquent on contracts. This differs from the prior measure in being a more timely measure of contract performance. Whereas the first measure captures the average delinquency status over the life of the contract to date, the latter measure identifies how far behind the firm is on its most recent payment. The results are similar – over the two (four) year window, days currently delinquent falls by 27.7% (25.9%) of the pre-entry period average.

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> A natural question is whether the decline is concentrated in a particular category of delinquencies: Does information sharing reduce the incidence of the most serious types of payment problems, only less serious ones, or both?

Table 5. Change in Delinquencies Around Lenders' Entry to Repository

	Average days past due (year before to year after entry)	Average days past due (two years before to two years after entry)	Average days currently delinquent (year before to year after entry)	Average days currently delinquent (two years before to two years after entry)
Pre-entry mean (# days)	6.10	6.30	6.48	6.61
Post-PayNet entry	-14.9%	-18.3%	-27.7%	-25.9%
T-statistic	[-7.44]	[-8.81]	[-9.76]	[-10.81]
Post-entry mean (# days)	5.19	5.15	4.69	4.90
R-squared	0.429	0.385	0.325	0.309
# Observations	56,834	66,042	56,834	66,042

Table 6. Change in Delinquencies by Type

	Has been <31 days delinquent (two years before to two years after entry)	Has been 31-60 days delinquent (two years before to two years after entry)	Has been 61-90 days delinquent (two years before to two years after entry)	Has been >90 days delinquent (two years before to two years after entry}
Pre-entry mean	42.0%	14.3%	5.6%	5.2%
Post-PayNet entry	-11.3%	-4.1%	-1.4%	-1.2%
T-statistic	[-9.22]	[-7.76]	[-5.53]	[-5.75]
R-squared	0.265	0.155	0.052	0.074
# Observations	66,042	66,042	66,042	66,042

Table 7. Change in Days Currently Delinquent by Borrower Type

	Average days currently delinquent (two years before to two years after entry)			
	Young, small firms	Old, small firms	Young, big firms	Old, big firms
Pre-entry mean (# days)	5.79	6.51	8.61	7.00
Post-PayNet entry	-27.4%	-16.2%	-37.0%	-32.9%
T-statistic	[-7.28]	[-4.49]	[-11.02]	[-10.04]
Post-entry mean (# days)	4.20	5.46	5.42	4.70
R-squared	0.352	0.364	0.368	0.309
# Observations	18,486	19,955	6,004	21,597

delinquencies: Does information sharing reduce the incidence of the most serious types of payment problems, only less serious ones, or both?

Table 6 examines this question. In columns 1 through 4, the dependent variable is whether (1 = yes, 0 = no) the borrower has experienced a delinquency of 30 days or less, 31 to 60 days, 61 to 90 days, or more than 90 days during the four-year window. The results show reductions across all categories of delinquency around the lender's entry to the system, though the strongest effect appears in reducing the least severe types of payment problems. Borrowers are 11.3% less likely to be delinquent by 30 days or less in the two-year period after the their lender joins, though as a percentage of the pre-period mean, the reduction is similar to what happens in other delinquency categories.

The final set of tests examines how payment behavior

changes by firm type. Table 7 separates borrowers into groups according to their size (small if under $250,000 of ongoing contracts; large otherwise) and age (young if under 8 years; old otherwise).[4] For brevity, results focus on the change in days currently delinquent over a four-year window, but inferences are similar using other delinquency measures and time periods. Columns 1 and 2 present the change in days currently delinquent in small firms according to their age. Young, small firms see a statistically significant reduction in days delinquent, whereas older small firms see a smaller and statistically insignificant decline.

Columns 3 and 4 proceed to analyze larger firms and show that both old and young firms in this group experience a significant reduction in days delinquent, though the decline is larger for the latter. Together, these findings suggest that information sharing has a more important effect on the payment performance of young firms, controlling for size. Interestingly, controlling for firm age, the results are stronger for larger firms.

One possible explanation for the stronger effect for this is that large firms are more likely to have been aware that their lender joined PayNet, possibly owing to a more intensive relationship with their lender spanning multiple products and involving more frequent interaction. Related, large firms have more to lose in terms of jeopardizing future credit access by missing payments and having it known to a broad pool of lenders.

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CONCLUSION

This study has examined the change in borrower delinquencies around the period in which lenders entered the PayNet equipment finance repository. Discussions with practitioners and economic research suggest that information

sharing via a credit repository reduces delinquencies by allowing lenders to make more informed origination decisions and strengthening borrowers' incentives to pay on time. The results are consistent with these predictions and show the strongest effect for less serious delinquencies – those involving 30 or fewer days.

The study also indicates that the improvement in on-time payment is driven by large and young firms. These results provide novel evidence about the role of information sharing not only in the U.S. equipment finance sector – an economically large market in itself – but also other credit markets where information sharing is present. More broadly, these findings are relevant to related settings where firms exchange information about the behavior of agents, including insurance and employment markets.

As is generally true of analyses of this type, this study should be interpreted with caution. Some results might be attributed to other changes lenders made to their origination practices at the time they joined PayNet (e.g., hiring more loan officers,

improving their IT infrastructure). Disentangling these effects is difficult without knowing the identities of the lenders in the sample and what conditions were present when they joined.

Additionally, while the PayNet repository resembles other reporting systems in that it compiles both negative (defaults) and positive (successful payments and firm biographical) information and operates on the principle of reciprocity, the equipment finance focus is unique relative to the more comprehensive consumer reporting databases in the United States and commercial bureaus around the world. As such, the purpose of this study is to produce descriptive evidence of interesting associations between information sharing and payment performance. These limitations provide opportunities for future research on information sharing.

Acknowledgments

Endnotes

1. Nugent (1939) traces the origins of borrower information sharing in the United States to the 1870s, when immigrants moved from small communities (where personal qualities and wealth were common knowledge) to cities (where one's own neighbors remained "anonymous").

2. To account for correlation between observations in the same period, standard errors are clustered at the quarter-year level. Related, to address concerns about serial correlation overstating the significance of the results, the tests aggregate all contracts at the relationship (borrower-lender) level for each period rather than study each contract separately.

3. The author used the natural logarithm of days-based delinquency measures to avoid problems related to skewness in these variables. Post-entry delinquency figures are presented using the logarithmic approximation to facilitate interpretation.

4. These thresholds were chosen to match common industry definitions of small firms and to ensure a sufficient number of observations in each of the four groups.

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