Debt Prioritization in Equipment Financing at Small and Medium-Size Businesses
Part I: Effects of Contract Type and Collateral Type
By Lamont K. Black, PhD, and William R. Keeton, PhD

When in financial trouble, firms often prioritize their debt payments in the sense of making some but not all of the payments. By using Equifax data on 35,000 small and midsize businesses to shed light on this decision, this study may assist lenders and lessors in assessing and managing risks.

Debt Prioritization in Equipment Financing at Small and Medium-Size Businesses

Part I: Effects of Contract Type and Collateral Type

When in financial trouble, firms often prioritize their debt payments in the sense of making some but not all of the payments. By using Equifax data on 35,000 small and midsize businesses to shed light on this decision, this study may assist lenders and lessors in assessing and managing risks.

.

By Lamont K. Black, PhD, and William R. Keeton, PhD

Some borrowers that fall on hard economic times may manage to make all their scheduled payments. Others may be unable to make any of the payments. Often, however, the borrower is able to stay current on some debts but not all. In this case, the borrower must decide how to prioritize the debt payments.

The factors influencing this decision are of keen interest to borrowers, policymakers, and lenders. Understanding how their peers prioritize debt payments can help borrowers make better decisions themselves. Insight into the debt-prioritization decision can also help policymakers anticipate strains in the financial system and design appropriate remedies. Last but not least, understanding the debt-prioritization decision can help lenders better assess the risk of their loans and leases and manage delinquencies during economic downturns.[1]

Some of the factors that influence the debt-prioritization decision are common to nearly all types of debt. One is the size of the scheduled payment. A borrower that has only two payments due may be able to make the smaller one but not the larger one. And a borrower with more debts may choose to prioritize the ones with small payments to limit the number of delinquent accounts, a practice akin to "snowballing" in personal finance. Also relevant is the size of the balance, as a borrower could choose not to

Editor's note: With research endorsed by the Foundation, this article is the first of two on the topic of debt prioritization. Part II will appear in this journal next year.

There has been much research on debt prioritization by consumers during the financial crisis of 2007–2009, but in general academics have not studied the similar hard choices faced by struggling businesses.

waste funds on a debt on which it knows it will eventually default.

Other factors affecting the debt-prioritization decision apply mainly to debt backed by collateral, including most forms of equipment finance. When the value of the collateral falls below the balance due, the borrower may engage in "strategic default," failing to make the scheduled payment in the belief that the lender will be unable to collect the deficiency.

In the case of equipment, the borrower must also consider the likelihood that the lender will repossess the collateral if the borrower becomes delinquent. It was noted above that a high balance could induce a borrower to give up on the debt. With collateralized lending, however, the borrower must also consider that a high balance may increase the chance that the lender repossesses the equipment or takes other legal action instead of walking away.

The likelihood of repossession may also depend on the form of the contract, as the law makes repossession easier for true leases in which ownership remains with the lessor, which can affect its ability to redeploy or sell the equipment after repossessing it.[2]

Finally, in weighing whether to risk repossession, the borrower must consider how much the loss of the equipment would hurt its business, and in the case of a secured

loan, how much equity it might lose.

There have been many academic studies of debt prioritization by consumers, most of them in response to the financial crisis of 2007–2009, when households had to choose between defaulting on their home mortgages or their credit card loans. Although struggling businesses also faced hard choices about which debt payments to make in this period, their debt-prioritization decision remains unstudied by academic researchers. That is a gap we attempt to fill in this study, focusing on equipment financing by small and medium-size businesses.

This article, Part I, focuses on the effect on debt prioritization of the form of the contract and the type of collateral backing the obligation. The next article, Part II, focuses on the effect of the type of lender extending the credit and the nature of the relationship between the firm and the lender.

Data for the study was provided by Equifax from its commercial business unit, where data is continuously gathered and updated with business information from lenders that contribute to the Equifax commercial database. This database is considered one of the most comprehensive commercial credit databases for financial obligations in the industry. The data we use is for a random sample of 35,000 small and medium-size firms that obtained credit from lenders that contrib-

We find that a particular contract or collateral type may look less risky than other types when delinquency rates are compared for all obligations of different types, but more risky when compared for obligations of different types within a firm.

uted to the Equifax commercial database during the period from 2005:Q1 to 2019:Q3.

Debt prioritization can take two forms that are often not distinguished. In the first case, prioritization of *new delinquencies,* the firm has multiple obligations that are not delinquent, and it chooses to become delinquent on some of those obligations but not others. In the second case, prioritization of *delinquency cures,* the firm has multiple obligations that are already delinquent, and it chooses to cure the delinquency for some of them but not others.

Although we focus mainly on prioritization of new delinquencies, another contribution of the study is to also examine factors affecting prioritization of delinquency cures. Such prioritization is likely to be special interest to lenders as businesses rebound from the COVID-19 pandemic and work off their delinquencies.

A key takeaway from the study is that in estimating credit risk, lenders may be led astray by focusing on the overall delinquency rates of different contract types and collateral types. In a number of cases, we find that a particular contract type or collateral type looks less risky than other types when delinquency rates are compared for all obligations of different types—but more risky when delinquency rates are compared for obligations of dif-

ferent types *within* firms on a given date.

These results suggest that in deciding which type of contract to use or what type of equipment to finance for a customer, as well as pricing the obligation correctly, lenders would benefit from knowing what other types of obligations the customer has and how likely the customer is to prioritize payments on those obligations. In other words, in assessing the credit risk of an obligation, it is important for lenders to know not only if the obligation is junior to the firm's other obligations in the contractual sense, but also it if it is junior in a de facto sense.

The other key findings of this article may be summarized as follows. First, debt prioritization is not a rare phenomenon. In 14% of the cases in which a firm had at least two obligations that were less than 31 days past due and not otherwise impaired in the previous quarter, at least one of the obligations became 31+ days delinquent and one stayed current. Second, for obligations with similar original receivables, firms tended to prioritize payments on those with long terms over those with short terms.

Third, in those situations in which firms had both true leases and conditional sales or loans, they gave higher priority to staying current on their conditional sales or loans. We view this result as perhaps the most striking of this article and offer possible explanations.

Academic research suggests that consumers may prioritize debts with small payments to limit the number of delinquent accounts. We find some evidence for this hypothesis in our data in that firms tended to prioritize payments on obligations with long terms and small payments.

Fourth, in those cases where firms had obligations backed by hard collateral as well as obligations backed by soft collateral, they prioritized staying current on those backed by hard collateral. Fifth and finally, most but not all of the results hold for prioritization of delinquency cures, in the sense that factors that make a firm reluctant to become delinquent on an obligation also make it quicker to cure a delinquency once it happens.

Although these results all have high statistical significance, they are broad tendencies only and mask considerable heterogeneity in the debt-prioritization decision. That is evidenced by the fact that all the factors together explain a relatively small part of the total within-firm variation in new delinquencies and delinquency cures.

The remainder of this article is organized as follows.

- Section I briefly reviews the relevant academic literature.
- Section II describes the data from Equifax used in the study.
- Section III explains how delinquency is defined and shows how average delinquency rates varied over time and across different types of obligations.
- Section IV contains the regression analysis for prioritization of new delinquencies.
- Section V performs a similar analysis for the prioritization of delinquency cures.
- Section VI offers our conclusions.

I. RELATED ACADEMIC LITERATURE

This section summarizes two strands of academic literature relevant to our study. The first strand is about debt prioritization by consumers. One subset of these studies found that during the 2007–2009 financial crisis, households often defaulted on their home mortgages but stayed current on their credit cards—a departure from previous experience.[3]

The main explanation given was that the collapse in house prices caused borrowers to engage in "strategic default" by walking away from their underwater mortgages. Another theory was that consumers wanted to stay current on their credit cards to ensure access to liquidity in the event of an emergency such as job loss.

We do not have the data on collateral values that would be needed to investigate the prevalence of strategic default in equipment finance. However, our data do include lines of credit, referred to as "revolvers" in this article, and, consistent with the argument by the consumer studies about preserving access to liquidity, we find evidence that firms prioritized payments on these debts.

A second subset of studies has looked at how consumers prioritize payments on debt that is not delinquent but can be paid off faster by making more than the minimum required payment.[4] These studies find that rather than first paying off

Academic research on equipment finance suggests that the greater ease of repossession with a true lease might lead firms to prioritize payments on them to avoid losing essential equipment. We find no support for that idea.

the debts with the highest interest rates, as economic logic would suggest, consumers tend to pay off their smallest debts first so as to reduce the number of outstanding debts: a practice referred to in the popular financial press as "snowballing."

This research suggests that firms might behave in a similar manner by prioritizing debts with small payments over those with large payments to limit the number of delinquent accounts. We find some evidence for this theory in the following sense: for obligations with similar original receivables, firms prioritize payments on those obligations that have long terms and small monthly payments.

The Second Strand

The second strand of related academic literature deals with the economic implications of different contract types in equipment financing by businesses.[5] These studies point out that it easier for the lender to repossess the collateral both in and outside bankruptcy when it is financed by a true lease (which corresponds roughly to an "operating lease" in accounting standards and tax law) rather than by a secured loan, a conditional sale, or a lease that makes the lessee the effective owner and gives the lessor a security interest in the collateral (which corresponds roughly to a "capital lease" in accounting standards and tax law).

The studies also present evidence that the greater ease of repossession with true leases is a key factor in the choice of contract type by the two parties.[6] For purposes of our study, one implication of this feature of a true lease is that a firm may be more reluctant to become delinquent on such an obligation out of fear that it would lose the equipment, disrupting its business. In fact, however, we find the opposite: other things being equal, a firm is more likely to become delinquent on a true lease than on a loan or conditional sale. In Section IV, we offer two possible explanations for this result.

II. OVERVIEW OF DATA

The data for this study was provided by Equifax and draws from the Equifax commercial database. Lenders contributing to the Equifax commercial database agree to provide information on the financial obligation performance of their borrowers. This information is cleaned and checked for accuracy, then added to a central database that can be accessed by Equifax commercial clients to screen applicants for credit, with lender identities kept anonymous. Equifax's commercial database includes information on more than 50 million financial contracts.[7]

For the study, 35,000 firms were chosen randomly by Equifax from the population of all firms in their database subject to two conditions:

1. At some point in the period from 2005:Q1 to 2019:Q3, the firm had

In terms of both number and dollar value, the most important contract types in the data are true lease, conditional sale, and loan, while the most important collateral types are hard and soft.

at least one open obligation that was more than 90 days past due or in negative status and at least one obligation on the same date that was less than 31 days past due.

2. The firm's maximum credit during the sample period was less than $10 million.

Aside from delinquency status, which will be discussed in the next section, the data on each obligation includes three sets of variables that are the focus of our analysis.[8] First are what we call contract features—the original receivable, contract term, and current age of the obligation. Second are the type of contract used for financing and the type of collateral used to back the obligation. These types are shown in Table 1 along with the number of obligations and obligation-quarters and the average and median original receivable of each type.[9]

We use all nine contract types in the original data but have collapsed the 37 collateral types in the data into the five broad types shown in the table. In terms of both number of obligations and total dollar value, the most important contract types are true lease, conditional sale, and loan, while the most important collateral types are hard and soft.

The third key piece of information consists of the type of lender holding the obligation, as determined by Equifax. The seven lender types are independent finance companies, captive finance companies, three types of bank-re-lated lenders, credit card lenders, and alternative lenders. We use these lender types as controls in our regression analysis but defer discussion of their effects on debt prioritization, along with the effects of firm-lender relationships, to the follow-up article (Part II).[10]

III. OVERVIEW OF DELINQUENCY BEHAVIOR IN THE SAMPLE

In this section, we explain how delinquency is defined in the study and describe how the average delinquency rate varies over the sample period and across obligation types. We define an obligation to be delinquent on a particular date if it is in bad status, if it is closed in bad status or with a material loss before the next date, or if it is more than 30 days past due.[11]

Equifax classifies the status of an obligation as "bad" if the firm is in bankruptcy, if the obligation has been written off, or if the obligation has been subject to repossession, legal action, or extension. Following an earlier study using similar data, we define a loss to be material if it is over $100.[12]

On any date, some obligations will be newly delinquent and others will be previously delinquent. In this section, we focus on the overall delinquency rate including both types of delinquencies, though we will be careful to distinguish between them in our regression analysis.

Table 1.

Summary Statistics for Contract and Collateral Types, 2005:Q2 to 2019:Q3

For obligations open in previous quarter

Type	No. of obligations	Total original receivables ($K)	Average original receivable ($K)	Median original receivable ($K)	No. of obligation-quarters
Contract type					
True lease	315,677	11,067,483	35.1	11.3	3,141,353
Rental lease	10,908	635,664	58.3	19.7	102,003
Lease purchase	33,935	2,267,352	66.8	19.3	347,288
Conditional sale	94,813	10,000,523	105.5	45.4	895,228
Loan	64,196	6,852,082	106.7	49.5	556,334
Revolver	12,799	764,981	59.8	5.1	120,231
Credit card	303	4,925	16.3	11.2	2,817
MCA	77	6,971	90.5	56.0	143
Unknown	9,916	618,732	62.4	24.1	87,608
Collateral type					
Hard	163,983	18,391,802	112.2	56.1	1,537,750
Soft	360,401	10,553,481	29.3	9.9	3,559,879
Non-equipment	4,380	1,696,484	387.3	135.0	40,948
None	6,168	647,868	105.0	25.0	49,053
Unknown	7,692	929,078	120.8	36.0	65,375
All	542,624	32,218,713	59.4	16.6	5,253,005

Note: For contract types, *MCA* is merchant cash advances and *Unknown* is obligations for which contract type is not reported. For collateral types, *Hard* includes heavy equipment such as trucks, forklifts, and construction machinery that is long-lived and more likely to be easy to resell; *Soft* includes equipment such as copiers and computers that depreciate or obsolesce faster and are likely more difficult to resell; *Non-equipment* consists of items like inventories, receivables, and real estate; *None* is unsecured obligations; and *Unknown* is obligations for which collateral information is not reported. An obligation-quarter is a quarter in which a particular obligation appears in the sample. Thus, an obligation that appeared in 3 quarters during the sample period would account for 3 obligation-quarters.

Taken as a whole, conditional sales and loans had higher average delinquency rates than true leases, and hard collateral had higher average delinquency rates than soft. However, that reverses when looking at a given firm in a given quarter.

Figure 1 shows how this overall delinquency rate behaved over the sample period.

The delinquency rate increased sharply from the beginning of the period through 2010:Q1, six months after the official end of the economic recession caused by the financial crisis. The delinquency rate then fell through 2014, as the economy and financial system recovered. The rate then gradually increased until the end of the sample period, ending up a couple of percentage points higher than at the start of the period. Because the sample period ends in mid-2019, the data do not reflect the impact

of COVID-19 on the delinquency rate.

Table 2 breaks down the overall delinquency rate by contract type and broad collateral type for selected dates and for the period as a whole. Across contract types, it can be seen that the delinquency rate rose much more for conditional sales and loans than true leases during the financial crisis and recession, ended the period higher, and was higher for the period as a whole. The delinquency rate was also consistently higher for revolvers than true leases. Among collateral types, the delinquency rate rose much more for hard collateral

Figure 1. Average 31+ Day Delinquency Rate

For obligations open in the previous quarter

The differences in average delinquency rates in Table 2 could reflect correlation between contract and collateral types or specialization by high-risk firms in particular types of obligations. These are factors we will control for in our regression analysis.

Table 2.

31+ Day Delinquency Rate by Obligation Type (%)

For obligations also open in previous quarter
2005:Q2 to 2019:Q3

	2005:Q2	2010:Q1	2019:Q3	Entire period
Contract type				
True lease	7.73	11.06	7.90	8.66
Rental lease	1.50	11.16	7.70	6.78
Lease purchase	3.38	12.20	7.22	6.55
Conditional sale	4.70	21.75	11.38	11.11
Loan	7.79	22.99	13.91	11.90
Revolver	NA	15.35	15.64	14.50
Collateral type				
Hard	5.60	21.70	10.90	10.35
Soft	7.67	11.75	7.82	8.85
Non-equipment	3.23	10.26	13.64	11.48
None	6.91	19.08	14.74	12.91
All	7.14	14.74	9.20	9.37

Note: Delinquency rates are for the first day of the quarter.

than for soft collateral during the financial crisis and recession and was also higher for the period as a whole.

These differences in average delinquency rates across contract and collateral types can be misleading for two reasons. First, average delinquency rates could be high on a particular contract type only because it tends to be associated with a collateral type that has a high delinquency rate, or vice versa.

The second problem is that the reason that average delinquency rates are high for a particular contract or collateral type could be that firms with a high concentration of that type have high delinquency rates on all their obligations. As a result, the differences in average delinquency rates in Table 2 do not necessarily reflect differences in delinquency rates on obligation types within firms, which is the focus of this study.

We address the first problem by using multiple regression analysis in which we control for all obligation types, and the second problem by focusing on differences in delinquency rates across obligations

In 14% of the cases in which a firm could have prioritized new delinquencies, it actually did so, indicating that debt prioritization was empirically important.

at each firm and in each quarter. As we will see, many of the differences in Table 2 disappear or are even reversed when we take this approach.

IV. REGRESSION ANALYSIS FOR PRIORITIZATION OF NEW DELINQUENCIES

As noted in the Introduction, debt prioritization can arise either through prioritization of *new delinquencies* or prioritization of *delinquency cures.* In this section, we focus on the first type of debt prioritization.

Table 3 indicates how the sample was created for the regression analysis and provides a measure of the empirical importance of this type of debt prioritization. Line 1 in the table shows the number of firm-quarter combinations and associated obligations in which prioritization of new delinquencies was possible. Line 4 shows the number of firm-quarters (and associated number of obligations) in which such prioritization actually occurred.

Dividing the numbers in line 4 by the corresponding numbers in line

Table 3.

Construction of Regression Sample for Prioritization of New 31+ Day Delinquencies

2005:Q2 to 2019:Q3

Category	No. of firm-qtrs.	No. of obligation-qtrs.
1. Firm has at least two open obligations that were open and not delinquent on previous date.	635,630	4,484,531
2. All the obligations are now delinquent.	7,189	21,107
3. None of the obligations is now delinquent.	540,321	3,431,550
4. At least one of the obligations is now delinquent and at least one is not delinquent.	**88,120**	**1,031,874**
Memo 1: New delinquency prioritization rate (= line 4/line 1)	0.139	0.230
Memo 2: Overall new delinquency rate (= 100 × total no. of newly delinquent obligation-qtrs./line 1)		4.43%

Note: A firm-quarter is a quarter in which a particular firm appears in the sample, while an obligation-quarter is a quarter in which a particular obligation appears in the sample. Thus, a firm that appears in only 2 quarters and has 2 obligations in one quarter and 1 obligation in the other quarter would account for two firm-quarters and 3 obligation-quarters.

Although the regression variables explain a relatively small part of the total variation in new delinquencies within firms, the coefficients on a number of them are both statistically and economically significant.

1 yields the two measures of new delinquency prioritization shown in the next-to-last line. The first ratio, 0.139, can be viewed as the unweighted new delinquency prioritization rate. The second ratio, 0.230, can be viewed as the weighted prioritization rate, with each firm-quarter weighted by the number of obligations. These ratios indicate that prioritization of new delinquencies is empirically important in the data set.[13]

To analyze the factors determining prioritization of new delinquencies, we estimate an ordinary least squares regression on the sample of 1 million obligation-quarters in line 4. The dependent variable in this regression is a dummy variable for whether the obligation becomes delinquent in the quarter, and dummy variables (fixed effects) are included for all firm-quarter combinations.[14]

As shown in Table 4, four sets of variables are used to explain whether an obligation becomes delinquent. These variables explain a relatively small part of the total variation in new delinquencies within firms; however, the coefficients on a number of them are both statistically and economically significant.

Lagged Delinquency Status: Being Even Slightly Past Due Matters.
Recall that an obligation is treated as delinquent if it was only 1–30 days past due in the previous quarter. One would expect an obli-gation to have a greater chance of becoming delinquent this quarter if it was at least somewhat past due last quarter. We include a dummy variable in the regression to capture this effect. As expected, the probability of becoming delin-quent was 0.228 higher if the obli-gation was 1–30 days past due in the previous quarter than if it was not at all past due.

Contract Features: Long Term Is Prioritized Over Short Term, Given the Original Receivable.
Three contract features are included in the regression:

- the log of the original receivable,

- the log of the original contract term (in months), and

- the log of the contract age (also in months and as of the previous quarter).

We use the log transformation to make the results less sensitive to extreme values of variables and to allow the effect to depend not on the absolute change but on the proportional change, which is usually more plausible.

From Table 4, the contract feature most important in explaining which obligations become delinquent is the log of the original term of the contract. With a little math, the coefficient of -0.035 on this variable can be shown to imply that dou-bling the term would decrease the probability of an obligation becom-ing delinquent by 0.024, which is an economically significant change.

Table 4.

Regression for Prioritization of New 31+ Day Delinquencies

For obligations open and not delinquent in previous quarter
2005:Q2 to 2019:Q3

Estimated coefficients

Lagged delinquency status		Contract features		Contract type (True lease omitted)		Collateral type (Hard omitted)	
Variable	**Coeff.**	**Variable**	**Coeff.**	**Variable**	**Coeff.**	**Variable**	**Coeff.**
1–30 days past due	0.228 (186.7)	Log of contract term (mos.)	-0.035 (-51.5)	Rental lease	-0.014 (-4.3)	Soft	0.051 (35.3)
		Log of contract age (mos.)	-0.000[b] (-0.32)	Lease purchase	0.001[b] (0.3)	Non-equipment	-0.005[b] (-0.6)
		Log of original receivable	0.001 (3.69)	Conditional sale	-0.044 (-31.2)	None	0.017[a] (2.5)
				Loan	-0.032 (-13.5)		
				Revolver	-0.114 (-21.1)		

Regression statistics

Adjusted R^2	No. of observations (obligation-qtrs.)	No. of firm-qtrs.	No. of firms	Mean of dependent variable (avg. sample delinquency rate)
0.062	1,031,874	88,120	28,995	0.172

Note: Each coefficient is the estimated change in the probability of delinquency when the variable increases by one unit. Number in parentheses is the t-statistic corrected for heteroskedasticity. All coefficients are significantly different from zero at the 1% level except those indicated by [a], which are significant only at the 5% level, and those indicated by [b], which are not significant at either level. Regression is estimated by ordinary least squares, with fixed effects (dummy variables) included for all firm-quarter combinations in the sample. Coefficients are not shown for lender types and some contract and collateral types.

What accounts for this strong negative effect? With the original receivable held constant, a longer contract term implies a smaller monthly payment. The smaller payment size may make it easier for the firm to make the scheduled payment, reducing the probability of delinquency.

Another possibility is that the effect of the contract term is negative because it serves as a proxy for longer-lived equipment. If such equipment is more essential to the firm's business, the firm could be more reluctant to risk defaulting on the obligation and losing the equipment through repossession.[15]
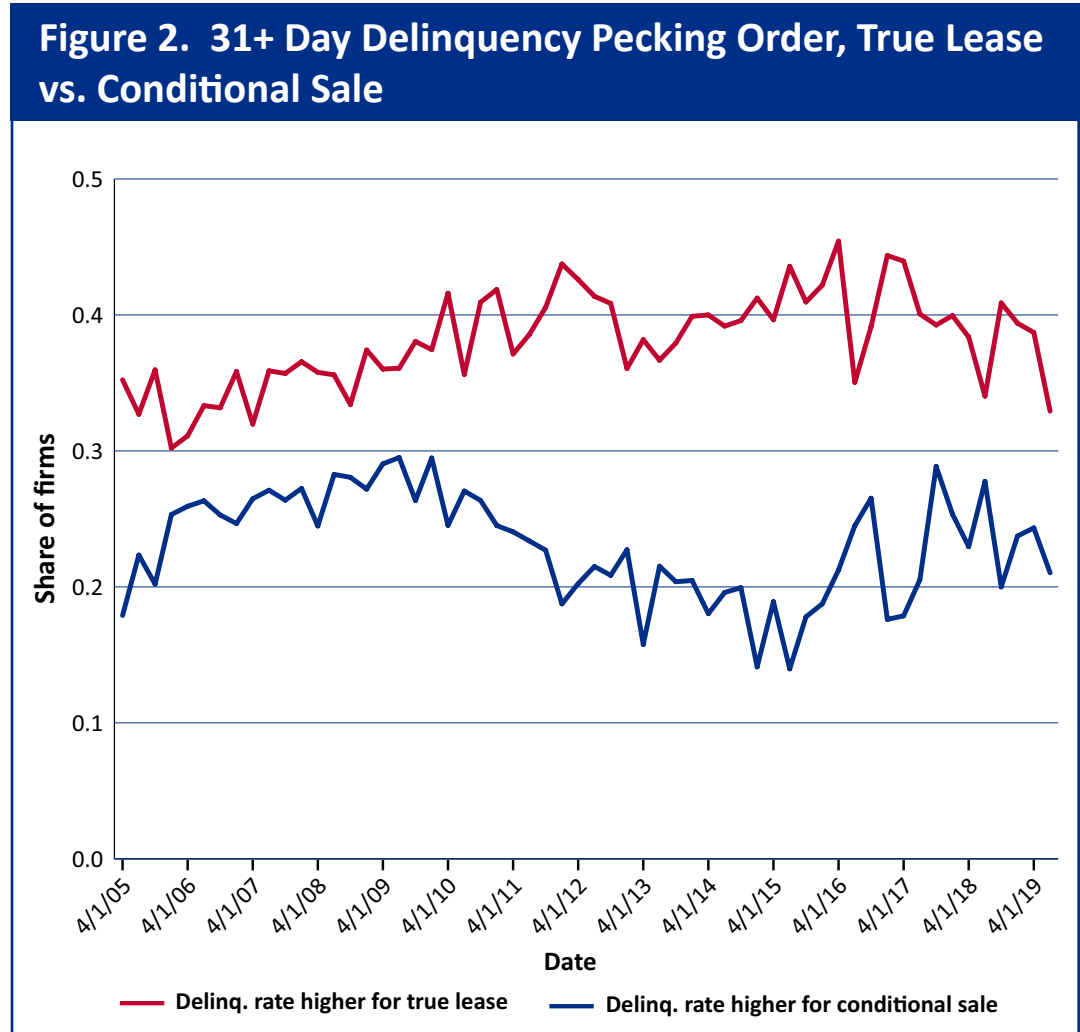
The regression results imply that the probability of new delinquency was 0.044 lower for a conditional sale than a true lease and 0.032 lower for a loan than a true lease, both of which are economically meaningful reductions.

Contract Types: Conditional Sales and Loans Are Prioritized Over True Leases.

While all seven contract types listed in Table 1 are included in the regression, Table 4 reports results for only the five main types. When estimating a regression in which a set of dummy variables add up to one for each observation, it is necessary to omit one of the variables. We omitted the dummy variable for true leases, so the reported coefficient on each contract type represents the effect of that type on the probability of new delinquency *relative* to true leases.

The results for contract type lead to two main conclusions. First is that the probability of an obligation becoming delinquent was significantly lower over the sample period if it was a conditional sale or loan than if it was a true lease. Specifically, the coefficients imply that the probability of delinquency was 0.044 lower if the obligation was a conditional sale, and 0.032 lower if it was a loan. These are economically meaningful reductions compared to the average probability of delinquency in the sample of 0.172.

Figure 2 illustrates the tendency for firms to prioritize payment of their

Figure 2. 31+ Day Delinquency Pecking Order, True Lease vs. Conditional Sale

Share of firms (y-axis)
Date (x-axis)

— Delinq. rate higher for true lease   — Delinq. rate higher for conditional sale

For firms with both true leases and conditional sales, the fraction that prioritized payment of conditional sales was higher, consistent with regression results shown in Table 4.

conditional sale contracts over their true leases and shows that the tendency persisted over the entire sample period. This chart uses a variation on the pecking order chart found in many of the studies of consumer debt prioritization cited in Section I.

We first select for each date all those firms that have both true lease and conditional sale contracts that were not delinquent on the previous date but at least one of which is delinquent on the current date. We then plot the fraction of these firms for which the delinquency rate was more than 25 percentage points higher on their true lease contracts than on their conditional sale contracts (red line) and the fraction of firms for which the opposite was true (the blue line).

Both fractions fluctuated considerably, but the fraction of firms that prioritized payment of conditional sale contracts (that is, had lower delinquency rates on them) was persistently higher than the fraction that prioritized true lease contracts, consistent with the regression results in Table 4. Though not shown, the pecking order chart for loans versus true leases looks similar.

What accounts for the negative effect of a conditional sale or loan contract on the probability of new delinquency relative to true leases? As noted in Section I, contracts such as conditional sales and loans in which the lender has only a secu-

rity interest might be expected to have a *higher* chance of becoming delinquent than contracts such as true leases, in which the lender has legal ownership, because the firm has less reason to fear repossession by the lender in the event of default.

We suggest two possible reasons why this is not the case. First, firms may choose a conditional sale or loan contract for their most essential equipment because they want to reduce the chance of the equipment being repossessed if they fall on hard times and have no choice but to miss a payment. In this situation, the fact that these contracts are backed by equipment that is more essential to the firm could make the firm more reluctant to miss a payment, even though the equipment has stronger protection from repossession due to the form of the contract.

Second, with contracts such as conditional sales and loans, where the firm has an ownership interest, the firm may be reluctant to incur even a low risk of repossession out of fear of losing the equity that it has built up in the equipment.[16]

The second key result on contract types from Table 4 is that revolvers have a lower probability of delinquency compared not only to true leases but also to the other contract types as well.

This result should be treated with caution because of the relatively

For firms with both hard and soft collateral, the fraction that prioritized payment of obligations backed by hard collateral was persistently higher, consistent with regression results shown in Table 4.

small number of revolver obligations in the sample. However, it is consistent with the conclusion in the consumer finance studies cited in Section I that households defaulted on their mortgages before their credit cards in the 2007–2009 financial crisis because they wanted to maintain their access to liquidity in case of a job loss or other financial emergency.

Remarkably, the differences among contract types described above are largely opposite those in Table 2, which compared delinquency rates for all contracts of given type rather than comparing delinquency rates on contract types within firms. In that case, it will be recalled, delinquency rates were several percentage points *higher* for conditional sales, loans, and revolvers than for true leases.

This reversal in results confirms the importance to lenders of taking debt prioritization into account when they make their credit and pricing decisions.

Collateral Type: Hard Is Prioritized Over Soft.

All five collateral types listed in Table 1 are included in the regression, but results are reported only for the first four. In this case, the dummy variable omitted from the regression is for hard collateral, so the reported coefficient on each collateral type represents the effect of that type on the probability of new delinquency *relative* to hard collateral. The main result from

Table 4 is that the probability of delinquency was 0.051 higher for soft collateral than hard collateral, a difference that is both statistically and economically significant.

As before, the pecking order chart for the two collateral types confirms the regression results (Figure 3).
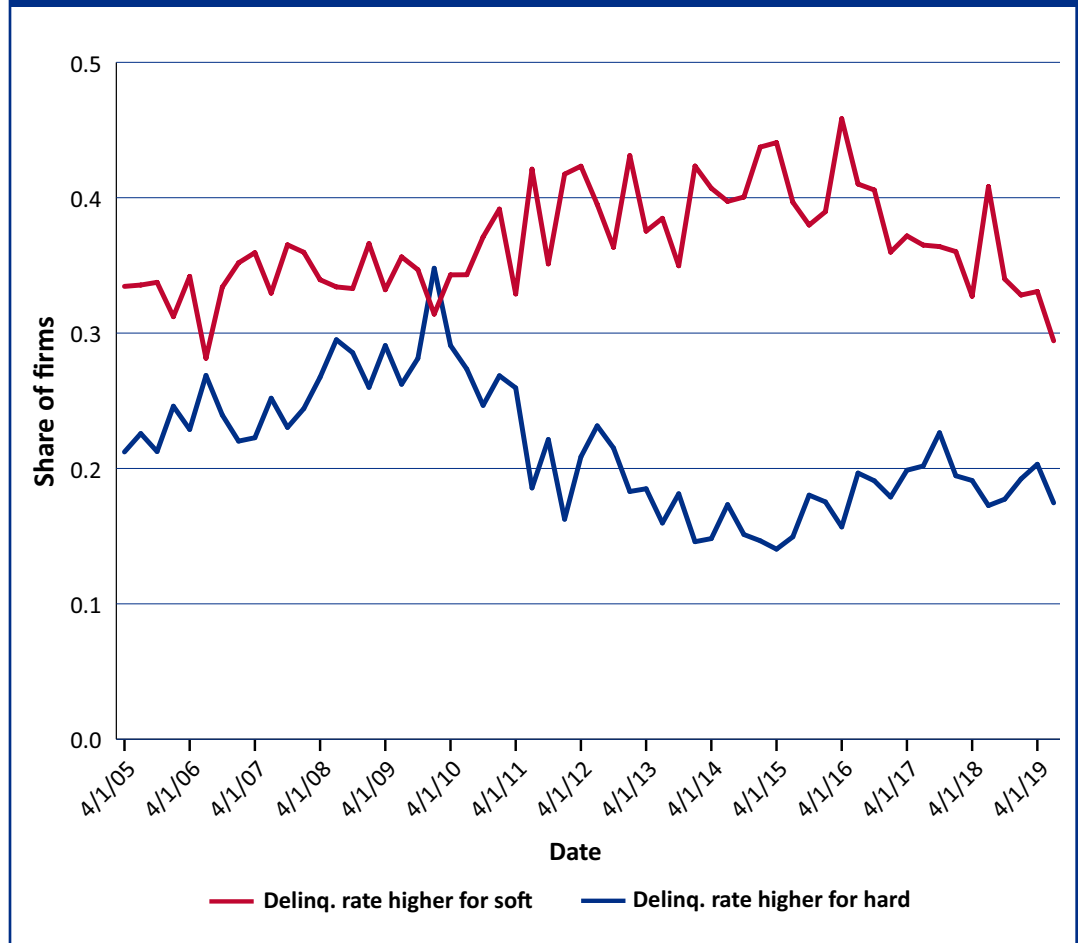
For firms with both types of collateral, the chart plots both the fraction of firms for which the new delinquency rate is more than 25 percentage points higher on soft collateral than hard (red line) and the fraction of firms for which the opposite is true (the blue line). Both fractions fluctuated considerably over the period, but the fraction of firms with a higher delinquency rate on soft collateral was consistently greater than the fraction with a higher delinquency rate on hard collateral, in accord with Table 4.

The most plausible explanation for these results is that contracts backed by soft collateral tend to be less essential to the firm than those backed by hard collateral, making the firm more willing to forgo the payment and risk having the collateral seized by the lender.

Another possibility is that soft collateral tends to be of lower value, giving the lender less incentive to incur the fixed costs of repossession in the event of missed payments. (As Table 1 showed, the median original receivable for soft collateral was less than a fifth that for hard.) In principle, however, the regression controls for this possibil-

The reversal in results when delinquency rates for different contract and collateral types are compared within firms highlights the importance to lenders of accounting for debt prioritization in assessing credit risk.

Figure 3. 31+ Day Delinquency Pecking Order, Soft vs. Hard Collateral

ity through inclusion of the contract features, making this a less convincing explanation for the strong positive effect of soft collateral on probability of delinquency.

Note finally that as in the case of contract types, the main result on collateral types in Table 4 is opposite that in Table 2, which looked at delinquency rates for all contracts of given collateral type rather than the difference in delinquency rates on collateral types within firms. In that case, the average delinquency rate was one and a half percentage point *lower* for soft collateral than hard collateral

over the sample period, pointing again to the importance to lenders of looking at differences in delinquency rates within firms when assessing credit risk.

V. REGRESSION ANALYSIS FOR PRIORITIZATION OF DELINQUENCY CURES

This section uses regression analysis to investigate the factors affecting the second type of debt prioritization—the decision by a firm as to which delinquent obligations to cure when it cures some of them but not all.

It could be argued that the same factors that make a firm more likely to become delinquent on an obligation should also make it less likely to cure a delinquency. For the most part, we find this to be true.

Table 5 indicates the steps followed to create the regression sample and provides a measure of the empirical importance of this type of debt prioritization. Line 1 shows the cases in which prioritization of delinquency cures was possible. Line 4 shows the cases in which prioritization of delinquency cures actually occurred, which make up the regression sample. The next-to-last line shows the ratios of the numbers in line 4 to those in line 1: 0.312 and 0.422. They represent the unweighted and weighted prioritization rates, respectively, and confirm that prioritization of delinquency cures was empirically important in the sample.

Table 6 shows the estimated coefficients for the same four sets of variables as before. The only difference is for *lagged delinquency status*. A delinquent obligation is less likely to cure, the more days past due it was in the previous quarter, so we include two dummy variables to capture this effect—one for whether the obligation was

Table 5.

Construction of Regression Sample for Prioritization of 31+ Day Delinquency Cures

2005:Q2 to 2019:Q3

Category	No. of firm-qtrs.	No. of obligation-qtrs.
1. Firm has at least two open obligations that were delinquent but not in bad status on previous date.	52,119	228,456
2. All the obligations are still delinquent.	24,159	87,138
3. None of the obligations is still delinquent.	11,696	44,930
4. At least one of the obligations is still delinquent and at least one is not delinquent.	**16,264**	**96,388**
Memo 1: Delinquency cure prioritization rate (= line 4/line 1)	0.312	0.422
Memo 2: Overall delinquency cure rate (= 100 × total no. of cured obligation-qtrs./line 1)		39.9%

Note: A firm-quarter is a quarter in which a particular firm appears in the sample, while an obligation-quarter is a quarter in which a particular obligation appears in the sample. Thus, a firm that appears in only two quarters and has 2 obligations in one quarter and 1 obligation in the other quarter would account for two firm-quarters and 3 obligation-quarters.

Table 6.

Regressions for Prioritization of 31+ Day Delinquency Cures

For obligations delinquent but not in bad status in previous quarter
2005:Q2 to 2019:Q3

Estimated coefficients

Lagged delinquency status		Contract features		Contract type (True lease omitted)		Collateral type (Hard omitted)	
Variable	Coeff.	Variable	Coeff.	Variable	Coeff.	Variable	Coeff.
61–90 days past due	-0.176 (-34.9)	Log of contract term (mos.)	0.048 (13.3)	Rental lease	-0.043[b] (-2.0)	Soft	-0.027[a] (-2.5)
Over 90 days past due	-0.284 (-51.9)	Log of contract age (mos.)	-0.037 (-10.8)	Lease purchase	0.032 (2.9)	Non-equipment	0.080[b] (1.5)
		Log of original receivable	-0.021 (-12.8)	*Conditional sale*	0.030 (3.5)	None	-0.132 (-3.6)
				Loan	0.096 (7.6)		
				Revolver	0.024[b] (0.9)		

Regression statistics

Adjusted R²	No. of observations (obligation-qtrs.)	No. of firm-qtrs.	No. of firms	Mean of dependent variable (average sample cure rate)
0.046	96,388	16,264	7,727	0.479

Note: Each coefficient is the estimated change in the probability of delinquency cure when the variable increases by one unit. Number in parentheses is the t-statistic corrected for heteroskedasticity. All coefficients are significantly different from zero at the 1% level except those indicated by [a], which are significant only at the 5% level, and those indicated by [b], which are not significant at either level. Regression is estimated by ordinary least squares, with fixed effects (dummy variables) included for all firm-quarter combinations in the sample. Coefficients are not shown for lender types and some contract and collateral types.

61–90 days past due and another for whether it was more than 90 days past due.

The omitted dummy variable in this case is that the obligation was 31–60 days past due, so the coefficients show how the probability of cure for an obligation that was the indicated number of days past due compares to an obligation that was only 31–60 days past due. As expected, both coefficients are highly negative and statistically significant.

For the remaining variables, it could be argued that the same factors that make a firm more likely to become delinquent on an obligation would make it less likely to cure a delinquency. If so, the coef-

Our findings may be useful in assessing and managing risks, as lenders' returns can depend on the implicit subordination of claims due to debt prioritization by borrowers. We have suggested possible reasons, but nailing down the reasons for the findings will require further study.

ficient on each variable in Table 6 would be opposite in sign from the corresponding coefficient in Table 4. For the most part, this turns out to be the case, though the coefficients are estimated with less precision because of the smaller sample.

The specific results from Table 6 may be summarized as follows. For *contract features,* the coefficient on contract term is consistent with the earlier results in that it is positive and highly significant. For *contract types,* an important similarity with the earlier results is that conditional sales and loans have a substantially higher probability of delinquency cure than true leases, just as they had a substantially lower probability of becoming delinquent than true leases in the earlier regressions.

On the other hand, revolvers do not have a statistically different probability of cure than true leases, in contrast to having the lowest probability of new delinquency among all contract types. One possible explanation is that once a revolver becomes delinquent, a firm may not be able to restore full access to the credit line by curing the delinquency, giving it less incentive to do so.

Finally, for *collateral types,* the results are consistent with the earlier regressions in that soft collateral has a lower probability of delinquency cure than hard collateral.

VI. CONCLUSIONS

This article has documented that prioritization of debts by small and medium-size businesses engaged in equipment finance is an empirically important phenomenon. While there is much unexplained variation across firms in which types of obligations are prioritized over others, the study has uncovered a number of consistent patterns. Over 2005–2019, firms in the sample tended to prioritize contracts with long terms over those with short terms, conditional sales and loans over true leases, and obligations backed by hard collateral over those backed by soft collateral.

Most of these patterns were found to apply to both the prioritization of new delinquencies and the prioritization of delinquency cures, although results for the latter are less certain due to smaller sample size. These findings may be useful to lenders in assessing and managing risks, as their returns can depend not only on the contractual seniority of claims but on implicit subordination arising from debt prioritization by borrowers.

Nailing down the reasons for the findings will require further study. One possibility we have suggested is that obligations that have long terms, that take the form of conditional sales or loans, or that are backed by hard collateral tend to be for equipment that the firm can least afford to lose through repossession.

For conditional sales and loans, another possibility suggested is that firms prioritize payments on these obligations to minimize the risk of losing their equity in the equipment.

Endnotes

1. For convenience, we use the term "lenders" in this article to refer to all creditors, whether they extend loans or grant leases.

2. A lessee's willingness to miss a payment could also depend on specific provisions of the contract, such as "hell or high water" clauses that make the obligation to pay irrevocable upon receipt of the equipment.

3. See Cohen-Cole and Morse (2010), Jagtiani and Lang (2011), Andersson et al. (2013), Chan et al. (2016), and Conway and Plosser (2017).

4. See Amar et al. (2011), Gal and McShane (2012), and Kettle et al. (2016).

5. See Sharpe and Nguyen (1995), Eisfeldt and Rampini (2009), and Gavazza (2010).

6. Specifically, the studies find that true leases tend to be used more often for high-risk firms, consistent with the idea that ability to repossess the equipment in the event of default is more needed for such firms. This finding does not rule out the possibility that some low-risk borrowers may prefer a true lease because of tax or accounting advantages, because the total payments are lower, or because they can change equipment more easily if their business needs happen to change. See Merrill (2020) for a useful explanation of these factors.

7. Equifax acquired PayNet in 2019 and merged the PayNet business into Equifax Commercial.

8. Obligations to lenders that did not contribute to Equifax when the sample was created are not included in the data.

9. These statistics are for all obligations that were open for at least one full quarter, which is why the effective sample period begins in 2005:Q2 rather than 2005:Q1. We limit the sample in this way because our primary interest is in delinquency behavior, and obligations open for less than a quarter are highly unlikely to become delinquent.

10. Specifically, we include a dummy variable for each lender type so that the coefficients on the variables of interest represents the effect of changes in those variables with lender type help constant.

11. Although not reported in this article, we also performed the regression analysis using 61+ day and 91+ day delinquency measures to confirm that the main results did not depend on the seriousness of the delinquency. An alternative approach worth exploring is to measure delinquency by recency (time elapsed since last payment).

12. See Murtagh (2005).

13. These ratios may overstate the prevalence of debt prioritization in the population of Equifax firms because the sample was chosen to exclude firms that never had an obligation more than 90 days past due.

14. This type of model is referred to as a fixed-effects linear probably model (LPM). The LPM is favored by many applied econometricians because the coefficients are easy to interpret (they represent the effect of each explanatory variable on the probability of delinquency) and the estimates are relatively robust to misspecification (Wooldridge 2013, pp. 248–253). However, the linear probability model has the disadvantage that it does not restrict the probability of delinquency to lie between zero and one and can generate predicted probabilities outside that range. To make sure our results were robust, we also used an alternative fixed-effects regression model that does not have this problem. It is referred to by econometricians as a fixed-effects conditional logit (Allison 2012, pp. 240–241). Though not reported below, all of the main results also hold for this regression model.

15. There is a third possible explanation for the negative coefficient on contract term. Given the original receivable and contract age, a longer contract term implies a higher current balance. If the obligation becomes delinquent, the higher balance will give the lender more incentive to repossess the equipment or take legal action against the firm rather than walking away. Realizing this, the firm may opt to stay current on the obligation.

16. The lender may be required to return to the borrower any surplus of the market value of the collateral over the amount due. However, in such cases the lender may sell the collateral below its true value or incur substantial transactions costs that it is entitled to subtract from the surplus payment to the borrower.

References

Allison, Paul D. (2012). *Logistic Regression Using SAS* (2nd ed.). SAS Press.

Amar, Moty, Dan Ariely, Ayal Shahar, Cynthia E. Cryder, & Scott I. Rick. (2011). Winning the Battle but Losing the War: The Psychology of Debt Management. *Journal of Marketing Research,* 48:S38–S50.

Andersson, Fredrik, Souphala Chomsisengphet, Dennis Glennon, & Feng Li. (2013). The Changing Pecking Order of Consumer Defaults. *Journal of Money, Credit and Banking,* 45:2–3.

Chan, Sewin, Andrew Haughwout, Andrew Hayashi, & Wilbert Van der Klaauw. (2016) Determinants of Mortgage Default and Consumer Credit Use: The Effects of Foreclosure Laws and Foreclosure Delays. *Journal of Money, Credit and Banking,* 48:2–3.

Cohen-Cole, Ethan, & Jonathan Morse. (2010, January 28). Your House or Your Credit Card, Which Would You Choose? Personal Delinquency Tradeoffs and Precautionary Liquidity Motives [Working paper]. Federal Reserve Bank of Boston.

Conway, Jacob, & Matthew Plosser. (2017, March 1). When Debts Compete, Which Wins? *Liberty Street Economics.* Federal Reserve Bank of New York.

Eisfeldt, Andrea L., & Adriano A. Rampini. (2009) Leasing, Ability to Repossess, and Debt Capacity. *Review of Financial Studies,* 22(4):1621–1657.

Gavazza, Alessandro. (2010) Asset Liquidity and Financial Contracts: Evidence from Aircraft Leases." *Journal of Financial Economics,* 95:62–84.

Gal, David, & Blakeley B. McShane. (2012). Can Small Victories Help Win the War? Evidence from Consumer Debt Management. *Journal of Marketing Research,* 49(4):487–501.

Jagtiani, Julapa, & William W. Lang. (2011). Strategic Defaults on First and Second Lien Mortgages during the

Financial Crisis. *Journal of Fixed Income,* 20(4).

Kettle, Keri L., Remi Trudel, Simon J. Blanchard, & Gerald Haubl. (2016). "Repayment Concentration and Consumer Motivation to Get Out of Debt." *Journal of Consumer Research,* 43(3):460–477.

Merrill, Thomas W. (2020). The Economics of Leasing. *Journal of Legal Analysis,* 12:221–272.

Murtagh, James P. (2005). Credit Risk: Characteristics for Success. *Journal of Equipment Lease Financing,* 23(1):1–15.

Sharpe, Steven A., & Hien H. Nguyen. (1995). Capital Market Imperfections and the Incentive to Lease. *Journal of Financial Economics,* 39:271–294.

Wooldridge, Jeffrey D. (2013). *Introductory Econometrics* (5th ed.). South-Western.

Lamont K. Black, PhD

LBLACK6@depaul.edu

Lamont Black is an associate professor of finance in the Driehaus College of Business at DePaul University in Chicago. He teaches undergraduate and graduate courses on money, banking, and capital markets as well as the emerging field of blockchain and cryptocurrency. He also is the academic director for the school's Keeley Center for Financial Services. Prior to joining the faculty of DePaul, Dr. Black was an economist at the Federal Reserve Board of Governors in Washington, D.C. His research has been published in such academic journals as the *Review of Financial Studies* and the *Journal of Money, Credit and Banking.* Dr. Black received a PhD in finance from the Kelley School of Business at Indiana University, Bloomington, as well as a PhD in economics. He received his bachelor's degree in modern thought and literature from Stanford University in Stanford, California.

William R. Keeton, PhD

keetonw@umkc.edu

William Keeton is an assistant teaching professor of finance at the Henry W. Bloch School of Management at the University of Missouri-Kansas City, where he teaches undergraduate and graduate courses on financial markets and institutions and payments. Prior to joining the Bloch School in 2012, Dr. Keeton served as an assistant vice president and economist for the Federal Reserve Bank of Kansas City, where he provided policy advice to senior management and conducted research on banking, financial markets, regional economics, and payments. While at the Kansas City Fed, Dr. Keeton wrote over two dozen research articles for the bank's *Economic Review.* Earlier in his career, he served in the Peace Corps in Colombia and taught undergraduate and

graduate economics at Yale University. Since joining the Bloch School, Dr. Keeton has continued his research on banking and helped teams of under-graduates achieve top finishes in an annual banking competition sponsored by the Conference of State Bank Supervisors. He received his PhD in eco-nomics from Massachusetts Institute of Technology and his masters and undergraduate degrees in economics from Yale University in New Haven, Connecticut.