

Accrual Accounting and Access to External Funds: Evidence from Small Businesses

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Abstract

This paper examines two related questions. First, does accrual accounting, in comparison to cash accounting, facilitate small businesses' access to external funds? Second, does it also affect the nature of the firm's borrowing relationships, i.e., arm's length financing as opposed to relationship-based financing? These questions are prompted by theory that suggests information problems can lead to credit rationing, particularly for small businesses since they tend to be more opaque. We find a positive relation between a firm's use of accrual accounting and its access to lines of credit and trade credit, two primary forms of external financing of small businesses. We find accrual accounting is positively associated with both the amount and terms of borrowing for these forms of financing. We also find accrual accounting facilitates a larger number of credit relationships and relationships with more distant financial institutions. Additionally, accrual accounting is associated with a shorter duration of borrowing relationships and lowered reliance on personal contact in communications with financial institutions. Overall, the evidence supports the argument that the use of accrual accounting can play a significant role in easing the credit constraints of small businesses and in facilitating greater use of arm's length financing.

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I. Introduction

In their recent survey of research on the role of financial reporting in debt contracting, Armstrong et al. (2010) highlight the lack of understanding as to "whether attributes of firms' financial reports influence their ability to access debt markets." This paper is directed at addressing this void. Specifically, we examine whether accrual accounting, in comparison to cash accounting, affects small businesses' access to external credit from financial intermediaries and suppliers. We also examine the impact of accrual accounting on the nature of the borrowing relationship as it relates to the firm's use of arm's length financing as opposed to relationship-based financing. By pursuing these questions, we seek to understand not only whether accrual accounting enhances the small firm's ability to raise external funds, but also how it is able to do so.

Small businesses are an important segment of the U.S. economy providing "55% of all jobs and 66% of all net new jobs since the 1970s" and occupying "30-50% of all commercial space".² Despite its significance, this segment of the economy has received relatively sparse attention in the accounting literature. In particular, we have limited understanding of the impact of accounting on small business financing. Information asymmetry is acute for small businesses because there are simply fewer sources of reliable information about these firms. One reason for this information scarcity lies in the fact that these businesses face higher failure rates. Also, there is a lack of "economies of scale in lending to these businesses", which in turn discourages the information-seeking activities of financial intermediaries (Liu et al. 2011). Finally, small businesses are generally private and hence not subject to the mandatory disclosure requirements of publicly

² <https://www.sba.gov/offices/headquarters/ocpl/resources/13493>

listed firms. Thus, lenders have more limited information for ex-ante screening and ex-post monitoring of small businesses than for public firms. One way lenders could address the information problem is to “price protect” themselves by charging opaque borrowers a higher interest rate. However, theory suggests that such an approach is potentially problematic in credit markets (Stiglitz and Weiss 1981). First, elevated interest rates are likely to attract high-risk borrowers while discouraging potential low-risk borrowers. Second, high interest rates may induce borrower actions that are contrary to the interests of the lender, such as investing in riskier projects (Stiglitz and Weiss 1981). Therefore, “lenders may optimally choose to ration the quantity of loans they grant rather than raising the rate to clear the market” (Petersen and Rajan 1994). Because information asymmetry problems are more acute for small businesses they are more likely to face such credit rationing outcomes.

Cassar et al. (2014) argue that “borrowers can reduce information asymmetries with lenders by using more sophisticated accounting methods to signal their type and provide more decision-relevant data”. The use of accrual-based accounting is one measure of the sophistication of the accounting method used by firms. Accrual accounting provides a better measurement of a firm’s periodic performance and financial condition than does cash accounting. Specifically, accrual accounting entails the timely recognition of revenue and expenses, capturing the firm’s economic earnings more accurately (Dechow 1994). Further, by requiring a broader recognition of a firm’s assets and liabilities, it provides a better gauge of the owner’s equity of the firm. Given these features, accrual accounting, in comparison with cash accounting, is likely to be more useful to lenders in evaluating the credit worthiness of small businesses. Consequently, we anticipate accrual accounting to be positively associated with small businesses’ access to external credit.

Another solution to overcome information asymmetry problems that small businesses have with lenders is to rely on relationship-based financing wherein a firm enters into a long term, sometimes exclusive, borrowing relationship with a financial institution. Such a relationship enables financial institutions to gather information about firms' credit worthiness and monitor them on an on-going basis after a loan has been made. However, Rajan (1992) notes that an exclusive relationship can be costly to the borrower in that it exposes the firm to potential holdup problems.³ Instead of relying on relationship-based financing, firms can improve their access to external credit by improving the quality of information provided to lenders. In doing so, firms move away from relationship-based financing to arm's length financing, wherein they turn to obtaining funds from multiple sources of financing located over greater distances, and rely less on personal contacts. The availability of arm's length financing reduces the necessity for a firm to enter into a long term financing relationship with any one particular creditor, suggesting that higher quality information will also reduce the duration of a firm's relationship with its creditors. Thus, we also anticipate that accrual accounting will impact the small business' external financing in that it can help reduce the firm's reliance on relationship-based financing and instead will facilitate arm's length financing arrangements. We empirically evaluate these predictions.

Our empirical analysis focuses on the two primary forms of external credit for small businesses: lines of credit from banks (LCs) and trade credit provided by suppliers (TC) (Mach and Wolken, 2006).^{4,5} Our analysis involves data gathered from the 2003 Survey of Small Business Finances (SSBF). This survey was carried out under the auspices of the Board of Governors of

³ The argument here is that banks with exclusive relationship with borrowers will be able to extract information rents in the form of higher interest costs. They are able to do so due to the fact that they have access to firm specific information that is not transferable (Rajan 1992).

⁴ In the 2003 SSBF survey, credit lines are used by 34% of firms and trade credit from supplier(s) is used by 60% of firms (Mach and Wolken, 2006, pages A178 and A181).

⁵ For completeness, we also evaluate the impact of accrual accounting on small businesses' access to bank loans.

the Federal Reserve System and covers over 4,000 non-farm and non-financial small businesses. Our findings are as follows. We find a positive association between the use of accrual accounting and small businesses' access to both lines of credit and trade credit. With respect to lines of credit (LCs), we find that small businesses that use accrual accounting, as opposed to cash accounting, have a larger number of LCs and a larger amount of credit available through LCs. With respect to trade credit, we find a positive relation between the use of accrual accounting and the number of suppliers that provide trade credit and the extent of purchases financed through such credit. We also examine whether the use of accrual accounting is associated with favorable terms of trade credit received and find it is associated with a longer interest-free repayment window.

The above results suggest that accrual accounting is associated with better access to external credit in the form of lines of credit and trade credit. While important, these results do not help explain how accrual accounting improves firms' access to external funds. Our next set of analyses examines the potential answer to this question that this happens because accrual accounting makes it easier for a firm to enter into arm's length financing arrangements. Consistent with our prediction above, we find that small businesses using accrual accounting have, on average, a larger number of financial institutions with which they transact and that the financial service providers are geographically more distant from the firm's business headquarters. We also find that accrual accounting facilitates more remote forms of communication with the firms' financiers such as email and phone as opposed to in-person meetings. If accrual accounting lowers small businesses' reliance on nearby financial institutions and facilitates distant banking relationships, it should also increase their ability to enter into new credit relationships with financial institutions. Consistent with this argument, we find a negative association between accrual accounting and the average

duration of the firm's relationships with its financial institutions suggesting that accrual accounting helps enhance the portability of the firm's borrowing arrangements. Taken together, this set of results suggests that accrual accounting lowers small businesses' reliance on relationship-based financing and promotes arm's length financing (Petersen and Rajan 1994).

While we interpret our findings as being indicative of the favorable impact of accrual accounting on access to external funds, a potential concern is whether the observed relation flows in the opposite direction, i.e., whether the positive relation is due to the influence of external credit on the choice of accrual accounting. For example, it is possible that small businesses are more likely to adopt accrual-based accounting in response to lenders' increased informational demands. Alternatively, firm characteristics that are associated with lower costs / higher benefits of using accrual accounting for the borrower may also be associated with lower costs of information acquisition by lenders. In light of these concerns, we adopt an instrumental variable (IV) approach to further evaluate the relation between accrual accounting (in comparison to cash accounting) and access to external credit. Re-estimating our tests, we continue to find the use of accrual accounting is associated with larger amounts of credit under LCs and a greater proportion of purchases made using trade credit. Consistent with accrual accounting facilitating arm's length financing, we also find a positive association between accrual accounting and the number of financial institutions the small business transacts with and the average distance between the small business and its financial institutions. Thus, our overall results remain unaltered under the IV estimation.

Our study contributes to three strands of existing research. First, our results are relevant to the research on the debt market effects of accounting quality. Despite accounting information being a crucial source of information for lenders, we have a limited understanding of whether and

how the quality of the firm's accounting impacts its access to external financing. Prior research in this regard has focused on large, publicly traded firms and documents how the quality of accrual-based financial reports impacts the cost of capital (e.g. Francis et al. 2005). By using a small business setting, we provide a useful departure from this literature in that we focus on the accounting choices (i.e., accrual accounting versus cash accounting) of firms that have high information asymmetry and hence are more likely to face credit rationing conditions. Our results highlight the role of accrual accounting in improving firms' access to external funds both in terms of the quantity of credit and in terms of the firm's ability to enter into arm's length financing arrangements with multiple, geographically distant creditors.

Second, our study contributes to the growing literature on the impact of accounting on small businesses. To clarify this contribution of our study, it is important that we distinguish it from prior research in this area. Minnis (2011) focuses on private firms and finds audited financial statements help reduce the cost of debt. In contrast, our focus is on how the use of accrual accounting impacts small businesses' access to external credit. We also depart from the focus in Allee and Yohn (2009) on the preparation of formal financial statements and its impact on approval of new loan applications and interest rates on the loans approved. Our focus on the comparison between cash and accrual accounting speaks to the issue of the quality of firm-specific information. Also, contrary to the aforementioned studies, we focus on lines of credit and trade credit, the two most prominent forms of small business financing. Further, we also examine whether accrual accounting facilitates arm's length contracting between the firm and its funding sources. More related to our study is Cassar et al. (2014). Similar to our study, they contrast the effects of cash and accrual accounting. However, we differ from their study in two key ways. First, while their focus is limited to the likelihood of new loan approval and interest rates of new

loans approved as is the case in Allee and Yohn (2009), we take a more comprehensive look at multiple sources of external financing, including credit from suppliers and non-price terms of such credit. Second, their attention is directed on understanding how accrual accounting interacts with other alternative sources of firm-specific information in lending decisions. Our study seeks to understand whether accrual accounting helps access external funds and whether it achieves this by enabling firms to enter into arm's length financing arrangements.

Finally, our findings also contribute to the research on the role of information quality in credit markets. While much of this research distinguishes between soft and hard information, we highlight the importance of the quality of hard information. Theory (see, for example, Diamond 1984) notes that banks have a competitive advantage in collecting information and hence are better able to evaluate and extend credit to information-problematic borrowers. Our results suggest that improvements in the quality of hard information provided by borrowers can also help increase access by facilitating relationships with more lenders and geographically more distant lenders, by facilitating more remote forms of interaction, and by increasing the portability of the borrowing relationship.

The rest of the paper is organized as follows: Section 2 describes the related literature and develops our hypotheses. Section 3 discusses the data and details the empirical methods. Section 4 presents the results, and Section 5 summarizes and concludes the paper.

2. Related Literature and Hypothesis Development

2.1 Background

Information asymmetry between borrowers and lenders creates problems of adverse selection (Leland and Pyle 1977) and moral hazard (Jensen and Meckling 1976). One solution for the lender is to impose a higher interest rate in settings involving higher information asymmetry.

Stiglitz and Weiss (1981), however, counter that a high interest rate can exacerbate, rather than alleviate, the adverse selection and moral hazard problems because it can serve to attract relatively riskier borrowers and affect ex-post borrower behavior by inducing excessive risk-taking. Thus, lenders may ration the amount of loans instead (Rajan and Petersen 1994). Small businesses are more susceptible to such credit rationing since they tend to be, for the reasons noted previously, relatively opaque firms.

Given the opacity of small businesses, considerable research has been directed at understanding the appropriate form of financing for these firms. The early consensus that emerged from this inquiry is that small businesses will rely on “relationship-based lending” with their local banks. As Beck et al. (2011) note, relationship-based lending is “a type of financing based primarily on “soft” information gathered by the loan officer through continuous, personalized, direct contacts with SMEs (small and medium enterprises), their owners and managers, and the local community in which they operate” (e.g. Berger and Udell. 1995, 2002).⁶ However, a number of recent studies challenge this conventional wisdom by noting that small businesses need not strictly rely on relationship-based financing but that arm’s length financing is also a viable option for these firms (e.g., Berger and Udell 2006; De la Torre, et al. 2010; Beck et al. 2011). Arm’s length financing essentially involves the use of “hard information to screen firms” (Beck et al 2011).⁷ In addition to helping screen borrowers, hard information also facilitates monitoring of borrowers after a loan is made. A firm’s financial statement is a canonical example of hard information in that it represents information that can be reduced to numbers and effectively transmitted and processed (Petersen 2004).

⁶ In addition to the reliance on soft information, relationship-based lending also suggests that the financial intermediaries involved are smaller and less hierarchical, a characteristic vital for dealing with opaque firms (Stein 2002).

⁷ Besides hard information, arm’s length financing also implies the use of “hard assets” as collateral (Beck et al 2011).

While the literature to date emphasizes the distinction between hard and soft information, we have limited understanding as to whether the quality of hard information matters in small businesses' access to external credit. As Berger and Udell (2006) posit, "the borrower must have informative financial statements" for it to matter with respect to the firm's access to external financing, particularly when the financing is more in the form of arm's length transacting rather than relationship-based financing. By examining whether and how the use of accrual accounting impacts the firm's access to external financing, we take up this issue in this study,

2.2 Testable Hypotheses

Accrual accounting, relative to cash accounting, is posited to provide a more accurate picture of a firm's operations, because it focuses on the true economic transactions of the firm rather than the timing of cash receipts and payments associated with the transactions (Dechow 1994). First, accrual accounting, unlike cash accounting, requires the recognition of revenue when it is earned, not when cash payment is received (revenue recognition principle). Second, it requires that expenses be matched against the corresponding revenues recognized, not when the payments are made (matching principle). Besides affording better measurement of a firm's economic income (and hence a better measurement of a firm's performance), accrual accounting is also posited to provide more accurate information about a firm's assets and liabilities and their associated changes.⁸ Stated differently, accrual accounting provides a better assessment of a firm's financial standing by recognizing a firm's noncash assets and liabilities. Consequentially, information contained in accrual-based financial records is more helpful in preparing accurate forecasts of the firm's economic future. This allows lenders to better assess the risk of borrowing

⁸ FASB Concepts Statement No.1 paragraphs 37-47 provides more discussion about accrual accounting.

firms.⁹ In the context of small businesses, Dun and Bradstreet (D&B) takes the position that “being able to display an accurate picture of your business operations is necessary for you to demonstrate your business’s credit quality and to build market credibility”, and that adoption of accrual accounting is necessary in order to obtain financing and trade credit, and to attract customers in the long run.¹⁰ To the extent that accrual accounting ameliorates a firm’s information environment, it can improve a firm’s access to external credit markets. Given that lines of credit and trade credit represent the dominant sources of financing for small businesses, greater access to external financing could be reflected in more lines of credit and larger amounts of trade credit. This reasoning leads to the following testable hypothesis:

H1a: The use of accrual accounting is associated with greater access to lines of credit and trade credit.

While our central focus is on the relation between accrual accounting (in comparison with cash accounting) and firms’ access to external funds, we recognize that accrual accounting can also impact the terms of external financing. This issue is important because borrowers care not only about the quantity of financing, but also its price. It is ex-ante unclear whether accrual accounting has a positive influence on the quantity alone or both the quantity and price of external financing. Therefore, we also examine the following hypothesis on the terms of lines of credit and trade credit:

H1b: The use of accrual accounting for financial records is associated with more favorable terms of lines of credit and trade credit.

⁹ Accrual accounting is beneficial not only to parties external to a firm such as its borrowers. It also helps firm insiders such as the firm’s managers to properly manage the firm’s debts and the flow of financial activity. While important, our study focuses on the role of accrual accounting on the relation between the firm and its outside lenders.

¹⁰ <http://www.dandb.com/credit-resources/business-finances/why-a-small-business-should-use-accruals-based-accounting/>

To the extent that accrual accounting enhances the firm's ability to access external funds, a question that follows is what is the mechanism by which this happens. To recall, a prevailing view is that greater opacity implies more reliance on relationship-based financing, while greater transparency affords more arm's length financing arrangements (Petersen and Rajan 1994). A hallmark of arm's length financing is the greater reliance on hard information as opposed to soft information. Because accrual accounting enhances the quality of hard information, it should help facilitate arm's length financing by the firm. Berger and Udell (2006) argue that high quality accounting is a part of the "necessary conditions for informative financial statements" that can facilitate arm's length financing. For example, arm's length financing may involve the use of contracting devices such as covenants. Some of these covenants, such as financial covenants, are based on financial statement numbers (e.g. financial ratios such as leverage and profitability ratios). If the financial statements are not based on sound accounting standards, the covenants involved would be largely ineffective and hence not facilitate contracting between the firm and its external lenders.

Because data limitations preclude direct measurement of the extent of arm's length financing that small businesses have, we take a comprehensive approach to addressing the relation between accrual accounting and arm's length financing. Specifically, we focus on the following four aspects regarding arm's length financing (Petersen and Rajan 1994, 2002): First, does accrual accounting allow the firm to enter into financing agreements with multiple lenders? Second, does accrual accounting allow the firm to enter into financing agreements with geographically distant lenders? Third, does accrual accounting allow the firm to rely less on long-term relationships with its lenders? Finally, does accrual accounting allow the firm to rely less on in-person transactions with its lenders? These are stated in the following testable hypotheses for small businesses:

H2a: The use of accrual accounting is associated with a larger number of financial institutions with which the firm transacts (i.e., less borrowing concentration).

H2b: The use of accrual accounting is associated with a longer average distance between the firm's head office and its lenders (i.e., more geographically distant lenders).

H2c: The use of accrual accounting is associated with shorter durations of banking relationships with lenders (i.e., less repeated transactions).

H2d: The use of accrual accounting is associated with more remote forms of communication with lenders.

3. Data, Methodology, and Key Variables

3.1. Data

The data used in this study is from the 2003 Survey of Small Business Finances (SSBF) conducted by the Federal Reserve Board (FRB). The survey covers 4,240 firms that are for-profit, non-financial, non-farm, non-subsidary businesses that have fewer than 500 employees. The data was mostly collected by telephone interviews that took place between June and December in 2004.¹¹ The survey data includes but is not limited to, i) demographic information, ii) data on the materials the respondents used to respond to survey questions, iii) information about the characteristics of financial service suppliers, and iv) information about the firm's external financing.

Survey data often has missing values because of the respondent's refusal to answer or mistakes on the part of staff members conducting the survey. The FRB uses a statistical process of multiple imputation to fill in the missing values in the 2003 SSBF data.¹² Through the imputation process, the FRB has created five copies (called implicates) of the 2003 data, where the non-missing values of the data are the same across the five copies, but the imputed values of missing

¹¹ The reference date for most questions is the date of the interview. The reference date for the firm's financial information is the day of the firm's most recent fiscal-year end and can range from July 1, 2003 – June 30, 2004.

¹² Therefore, the 2003 SSBF has a relatively small amount of missing values – on average only 1.8% of items asked for were missing and the median firm had less than 0.5% missing items

data may differ.¹³ This yields a total of 21,200 observations for the 4,240 firms. We require the sample firms to have non-negative total assets and non-missing data for the accounting method used (i.e., cash versus accrual versus hybrid). This step reduces the number of observations to 20,827. We further limit the sample to observations with non-missing control variables, resulting in a base sample of 20,267 observations for 5 implicates (4,052-4,055 observations per implicate). Details of the sample formation procedure are reported in Table I.

Table I about here

3.2. Analysis Method

Analysis of multiply-imputed data involves two steps: 1) estimating the parameters of interest separately for each implicate, and 2) summarizing the parameter statistics using sample variances adjusted for the between-imputation variance of each parameter (Rubin 1987; Little and Rubin 2002). We follow the SAS procedures suggested by the FRB when analyzing the data. Specifically, we use SAS SURVEYREG or SURVEYLOGISTIC for the first step and SAS MIANALYZE for the second step.¹⁴ For the 2003 SSBF survey, the FRB used a stratified random sampling with oversampling of larger firms (20-499 employees) because larger firms, although a small percentage of the population, are of special interest to researchers. Because of the complex and unequal probability in sampling design, the FRB provides sample stratification and weights and suggests that researchers use estimates constructed using weighted statistics to make unbiased inferences for the population (2003 SSBF Technical Codebook). Accordingly, we follow the FRB suggestion in all our analyses, including univariate analysis and descriptive statistics.

¹³ To impute a missing value, the FRB fits a model to obtain a predicted value of the missing value, and then adds a random term to the predicted value. The goal of the imputation process is to obtain the best possible estimates of the true but unobserved values of data which are missing. As more imputed values are generated for each missing value, the approximation to the true sampling distribution improves (Rubin 1987). The 2003 SSBF Technical Codebook (pages 14-16) contains a detailed description of this procedure.

¹⁴ Details of the FRB's suggestions are in the 2003 SSBF Technical Codebook (pages 41-50).

3.3. Key Variables

Dependent Variables

Our dependent variables are broadly classified into measures of external credit (LCs and TC) and measures of arm's length financing. The following is a description of the key dependent variables:

Lines of Credit (LCs): Lines of credit are arrangements with a financial institution that allow a firm to borrow funds during a specified period up to a specific credit limit (FRB 2003 Annotated Survey Questionnaire). We use the following variables:

- *# of LCs:* The total number of lines of credit the firm maintains.
- *Total LC Amount:* The dollar value of credit limits under these lines of credit.
- *# of LC Renewal Applications:* The number of times the firm attempted to renew existing lines of credit during the past three years. We expect that firms are more likely to apply for renewal of existing LCs when terms of the existing LCs are favorable and the chance of their renewal applications being accepted is reasonably high.

Trade Credit (TC): TC is extended to small businesses for short periods, generally 30-60 days and is used to reduce transaction costs (Mach and Wolken, 2006).

- *# of TC Suppliers:* The number of suppliers from whom the firm made purchases using trade credit during the interview reference year.
- *% of Purchases in TC:* Percentage of the firm's total purchases made using trade credit during the interview reference year.
- *TC Financing Duration:* The duration of trade credit with zero interest offered by the most important supplier. It has values I through III and is coded as follows: I for cash on delivery,

2 for 1-7 days, 3 for 8-10 days, 4 for 11-14 days, 5 for 15 days, 6 for 16-20 days, 7 for 21-30 days, 8 for 31-45 days, 9 for 46-60 days, 10 for 61-90 days, and 11 for more than 90 days.

Arm's Length Financing: Similar to Petersen and Rajan (1994, 2002), we use the following variables to measure the nature of the small business' relationship with its financial institutions, i.e., arm's length financing versus relationship-based financing:

- *# of Fin. Institutions:* Number of financial institutions the firm dealt with during the interview reference year. It is a number derived by the FRB based on the number of financial service flags with non-missing values. A higher number indicates less concentration of borrowing and lower (greater) reliance on relationship-based (arm's length) financing.
- *Distance:* Average distance (in miles) from the firm's main office to financial institutions the firm transacts with, as reported by the firm. A larger distance denotes lower (greater) reliance on relationship-based (arm's length) financing.
- *Duration:* Average number of months the firm has conducted business with its financial institutions. A shorter duration denotes less private information the lenders acquired through repeated transactions with the firm, and hence lower (greater) reliance on relationship-based (arm's length) financing.
- *Contact Mode:* The method of communication the firm uses with its financial institutions. It is coded as follows: 1 for in person, 2 for by telephone, 3 for by mail, 4 for direct withdrawal or wire, 5 for through ATM, 6 for via the internet, and 7 for other. The larger the number, the less personal the interaction between the small business and its lender and the lower (greater) the reliance on relationship-based (arm's length) financing.

Key Independent Variable

- *Accrual*: Indicator variable coded as 1 if the firm keeps its books using accrual accounting during the interview reference year, and 0 if it uses cash or hybrid accounting method.

Appendix A reports detailed descriptions of all variables used in the study.

3.4. Descriptive Statistics

Firm Characteristics: Table 2 reports summary statistics for key dependent and independent variables. Sample firms have average sales of \$1.1 million and about 9 employees. The average duration the firms have been in business (*Firm-Age*) is 14.4 years, suggesting that these firms are younger than large, publicly traded firms. Most of the sample firms (92%) are manager-owned. The most common form of organization is corporations (47%)¹⁵, followed by proprietorships (44%). Regarding industry composition, the majority of the firms are in the service (46%) and wholesale industries (25%).

Table 2 about here

External Credit: LCs are the most common form of credit obtained from financial institutions – 35% of the firms report they have at least one outstanding line of credit. Trade credit is the most widely used form of external credit with 61% of the firms reporting they use some trade credit. The firms have, on average, about 13 suppliers offering trade credit and they make around 39% of their purchases using trade credit. The average duration for trade credit is 6.5, which corresponds to the 16-20 day bracket. It is useful to note that the sample firms report an average monthly penalty of about 1% for not paying off trade credit before it is due (not tabulated). This suggests trade credit can be a relatively expensive form of credit compared to loans or LCs (Petersen and Rajan 1994). However, 59% of firms report they always repay by the due date, and the remaining 41% report they make late payments less than 30% of the time. This general pattern

¹⁵ 31% are S-Corporations and 16% are C-Corporations.

of trade credit usage suggests that most firms limit their use of trade credit such that the effective cost is much lower relative to the full cost of using this as a means of long-term financing. Also, to the extent that some firms are paying the penalty, it suggests that these firms face conditions that are akin to credit rationing (Mach and Wolken, 2006).

Arm's Length Financing: Sample firms interact with an average of 2.4 financial institutions,¹⁶ and the average duration of their relationship is nearly 105 months (8.7 years). The mean distance between the firm's head office and its financial institutions is 117 miles, and the average mode of communication with financial institutions is 2.03, which in our classification is roughly equivalent to communicating by telephone.

Accrual Accounting: 25% of the firms surveyed report they use accrual accounting and the remaining 75% use cash-based or other accounting methods. Based on untabulated descriptive statistics, however, only 16% of the sample firms report that they use formal financial statements to answer the survey questions. Of the firms that report they use formal financial statements, roughly half report the use of accrual accounting. Conversely, of the firms that use accrual accounting only 29% report the use of formal financial statements to respond to the survey. This is further discussed in sub-section 4.7.1. below.

4. Results

4.1. Correlations

Table 3 reports correlations of our key dependent and independent variables. Consistent with our hypotheses, the use of accrual accounting (*Accrual*) is positively associated with the number of LCs ($\rho = 0.22$) and total credit available under LCs ($\rho = 0.32$). The availability and use

¹⁶ Financial institutions include commercial banks, savings and loan associations, credit unions, leasing companies, and other sources of financial service.

of trade credit is similarly larger for firms that use accrual accounting. The correlations between *Accrual* and the number of suppliers providing trade credit and the fraction of total firm purchases made using trade credit are 0.47 and 0.37, respectively. The positive correlation ($\rho = 0.07$) between *Accrual* and the duration of trade credit suggests that firms using accrual accounting tend to receive better credit terms (i.e., a longer period with zero interest) from their suppliers. All of the above correlations are significant at the 5% level or better.

Table 3 about here

One notable firm characteristic that correlates with, both, the use of accrual accounting and external credit availability is firm size. Both sales revenue and the number of employees are highly positively associated with *Accrual*, with correlations of 0.45 for log-transformed sales and 0.37 for the number of employees. The correlations also show that larger firms generally have greater access to external credit and greater use of arm's length financing (or less reliance on relationship financing). The total number and value of LCs are highly positively correlated with the two measures of firms size with correlations greater than 0.31. With respect to trade credit, the number of trade credit suppliers and the % of total purchases made using trade credit are positively associated with both sales ($\rho \geq 0.44$) and the number of employees ($\rho \geq 0.29$). The average distance and communication mode are positively and significantly associated with the two measures of firm size as well. These correlations highlight the importance of controlling for the effect of firm size when examining the association between accrual accounting and access to external credit (reliance on arm's length financing). Accordingly, we begin our analysis by examining the association between accrual accounting and our key dependent variables for portfolios of firm-size in a univariate setting.

4.2. Univariate Tests

In Table 4, we classify the sample into three subgroups based on firm size: sales below \$1 million (2464 observations), between \$1 million and \$3 million (610 observations), and greater than \$3 million (979 observations). We then examine whether firms that use accrual accounting have better access to external credit and make greater use of arm's length financing than firms within that subgroup that do not use accrual accounting. Table 4, Panel A reports the results for lines of credit and trade credit, and Table 4, Panel B reports the results for arm's length financing.

Table 4, Panels A and B about here

Panel A shows that the average number (proportion) of firms that use accrual accounting is 515 (21%), 319 (52%) and 744(76%) for the smallest, middle, and largest size subgroups, respectively. This is consistent with the positive correlation between *Accrual* and *Sales* in Table 3. However, this also shows that not all firms that use accrual accounting are large firms. Panel A shows that accrual accounting is generally associated with more credit resources and greater usage across all three portfolios. Firms using accrual accounting are more likely to use lines of credit (LC = 1) across all size portfolios ($p\text{-value} \leq 0.06$). The amount of credit available via LCs (Total LC Value) is also larger ($p\text{-value} \leq 0.05$) except for the smallest subgroup (sales < \$1 million). Results are similar and stronger for trade credit (TC). The fraction of firms that have access to trade credit is higher for firms that use accrual accounting in each of the three size subgroups with the difference significant at the 4% level in the largest size subgroup and at the 1% level in the remaining two subgroups. Similarly, the fraction of all purchases funded by trade credit is higher for firms that use accrual accounting than for those that do not ($p\text{-value} < 0.01$).

Table 4, Panel B relates the mean values of the four measures of arm's length financing to accrual accounting across the three subgroups. In the smallest size subgroup, compared to firms

that do not use accrual accounting, firms using accrual accounting tend to transact with more financial institutions ($p < 0.01$) and more distant financial institutions ($p = 0.01$). These firms on average have a shorter duration of relationship with their financial institutions ($p = 0.01$) and their communication mode is less personal ($p = 0.11$). However, other than the number of financial institutions for the largest size subgroup (with sales $> \$3$ million) and the contact mode for the middle size subgroup (with $\$1$ million \leq Sales $< \$3$ million), these patterns do not hold for the remaining two subgroups. This pattern suggests that smaller firms benefit more from using accrual accounting in improving their arm's length financing than do larger firms.

Overall, the results in Table 4 show that accrual accounting is positively associated with access to external credit across all size subgroups, while it is associated with more arm's length financing for firms with sales less than $\$1$ million. These results are generally supportive of the hypotheses. More importantly, they suggest that it is unlikely that the association between accrual accounting and firms' access to external credit or arm's length financing is attributable to large firms.

4.3. Multivariate Tests – Access to External Credit

4.3.1. Lines of Credit (LCs)

We next turn to multivariate tests of our hypotheses. We begin with tests of the firm's LC facilities. Specifically, we examine how the firm's accounting choice is related to the number of LCs, the total amount of credit available under LCs and the number of LC renewal applications. Besides the indicator variable for the use of accrual accounting (*Accrual*), we include a comprehensive set of firm characteristics and performance attributes that can potentially affect the credit resources of the firm. To capture the impact of formal financial statements, separate from the use of accrual accounting, we include an indicator variable for whether the firm has

formal financial statements compiled by an accounting professional. To account for the impact of aspects of the firm's capital structure, we include firm leverage (the ratio of debt to total assets) and the firm's credit rating based on the Dun & Bradstreet credit score (higher values of the rating show higher credit quality). We also include firm size as measured by sales revenue, the number of employees and the number of sites in which the firm's businesses operate, and firm performance (return on assets). Because firm age can impact the use of external credit, we include it in the model (Petersen and Rajan 1994). To account for the impact of the business structure of the firm, we include the ownership stake of the manager(s), an indicator for whether the firm is managed by the owner, and indicator variables for whether the firm is organized as a proprietorship or partnership (corporations are the base case). Finally, the model includes indicator variables for the five major industrial sectors (Mining, Construction, Manufacturing, Wholesale, and Services).¹⁷

Results reported in Table 5 show that after accounting for the impact of these variables, *Accrual* is positively associated with the number of LCs that the firm maintains (one-sided p-value = 0.065), the total credit amount available under these LCs (p-value = 0.02), and the number of LC renewal applications during the last three years (p-value = 0.08). The results also show that after considering the impact of the firm's accounting choice, whether the firm compiles formal financial statements does not matter to its LC resources – the associations with *Financial Report* while positive are not significant at traditional levels. Firm size measured, both, by sales and number of employees has a strong positive impact (p-value < 0.01) on each of these aspects of the LC resources, and firm performance has a negative effect (p-value < 0.01). The latter result

¹⁷ Mining, Construction, Manufacturing, and Wholesale are the industries that are generally required by the IRS to use accrual accounting. However, there are several regulatory exemptions from this requirement for the firms with annual revenue less than \$10 million (Revenue Procedure 2002-28).

is consistent with the interpretation that better firm performance reduces the need for external funding. Interestingly, the results also suggest that proprietorship firms have fewer LCs (p-value = 0.01), smaller amounts of credit available under LCs (p-value < 0.01) and fewer LC renewal applications (p-value = 0.03), suggesting that these firms on average face greater credit rationing. Overall, the results of Table 5 support the hypothesis that the use of accrual-based accounting is associated with better access to external credit as reflected in more and larger lines of credit (Hypothesis 1a) and more favorable terms as reflected in more renewal applications (Hypothesis 1b).

Table 5 about here

4.3.2. Trade Credit (TC)

We next examine the number of TC relationships the firm has and the fraction of all firm purchases that are made using TC. In addition, we examine the average duration of zero-interest TC financing available to the firm. The model includes the control variables discussed above. Results reported in Table 6 show that *Accrual* is strongly and positively associated with the number of TC relationships (p-value < 0.01) and the extent to which TC is used to fund the firm's purchases (p-value < 0.01). As before, firm size has a strong positive impact on these TC dimensions and firm performance has a strong negative impact (p-value < 0.01). Also, after accounting for *Accrual*, whether the firm compiles formal financial statements is not significantly related to the credit resources of the firm. For these aspects of TC, the impact of the capital structure policy variables is also negligible – both leverage and credit rating are not significant. The results also show that businesses organized as proprietorships on average have fewer TC relationships and rely less on TC for their purchases, all else equal. This is consistent with the LC results that the proprietorship structure is associated with lesser credit from financial institutions.

Table 6 about here

We expect that accrual accounting is also likely to be related to the duration of zero-interest financing available via TC (H1b), since accrual accounting provides information about the firm's performance and its financial condition that is more accurate and has higher ongoing consistency. For this test, we include only those firms that use trade credit from their suppliers. Results reported in the rightmost columns of Table 6 show that the average duration of zero-interest TC financing is positively associated with *Accrual* (p -value < 0.05) and the compilation of formal financial statements (p -value = 0.08). Unlike the results thus far, this aspect of TC financing is not related to firm size. Overall, the results of Table 6 support Hypothesis 1a that the use of accrual accounting is associated with greater access to external credit via more trade credit relationships and greater usage of trade credit. The results also support Hypothesis 1b in that accrual accounting is associated with better terms of trade credit in the form of longer durations of the zero-interest window.

4.4. Multivariate Tests – Arm's Length Financing

We next turn to tests of our second hypothesis. Specifically, we examine the association between the use of accrual accounting and the relationship small businesses have with financial institutions, i.e., the lenders to the firm including commercial banks, suppliers and other lenders. Better quality hard information is more efficacious in overcoming information asymmetry problems, allowing firms to transact with more financial institutions and more distant ones. Thus, better quality hard information is likely to facilitate arm's length financing and lower reliance on relationship-based financing that is established by conveying firm information to specific lenders by a series of meetings and/or transactional interactions. Following the same logic, we also expect that the choice of accrual accounting can impact the mode of communication between the

borrower and lender, facilitating more remote forms of interaction (for example, via telephone and email as opposed to in-person meetings).

Table 7 shows that accrual accounting is positively associated with the number of financial institutions with which the firm interacts (p -value = 0.02). The average distance at which these institutions are located from the firm is somewhat larger when the firm uses accrual accounting (p -value = 0.10). The results also show that the average duration of relationships with lending institutions is shorter for firms using accrual accounting (p -value < 0.01). This is consistent with the interpretation that these firms begin interactions with more new financial institutions, which in turn suggests that accrual accounting helps make the borrowing relationship more portable. Finally, the method of communication used by small businesses to interact with their financial institutions is more remote for firms using accrual accounting (p -value = 0.02). Overall, the results of Table 7, support Hypotheses 2a-2d that the use of accrual accounting is systematically associated with the number and nature of borrowing relationships in which the firm participates, and suggests that accrual accounting facilitates small businesses' arm's length financing.

Table 7 about here

4.5. Instrumental Variable Estimation

While we have used the firm's choice of accrual accounting as a predetermined variable, it is possible that the endogenous choice of the accounting method affects our results. This choice could be endogenous for various reasons. For example, firms in need of external financing may have adopted accrual accounting in response to lenders' demand for accrual-based financial record-keeping. Alternatively, certain firm characteristics could determine both a firm's adoption of accrual accounting and its access to external credit. For example, the marginal cost of using accrual-based accounting is lower for larger firms and such firms are less risky, *ceteris paribus*,

making lenders more willing to extend credit. To examine whether such endogenous choice impacts our results, we use an instrument variable approach where whether or not the firm extends any credit to its customers (*Credit-Sale*) serves as the instrument for *Accrual*.¹⁸ Cash accounting distorts the operating performance of a firm when the firm extends credit to its customers, because credit sales are not reflected in the firm's revenue until the associated accounts receivable are collected. Therefore, we expect that firms with credit sales are more likely to use accrual accounting. However, it is unlikely that firms' decision to extend credit sales influences their access to external credit and the extent of arm's length financing. Using *Credit-Sale* as an instrument variable for *Accrual*, we estimate the following 2SLS model:

$$Accrual = a_0 + a_1Credit-Sale + u$$

$$External\ Credit\ (Arm's\ Length\ Financing) = b_0 + b_1Accrual + \Sigma Controls + v$$

Table 8 about here

Appendix B reports results of the first stage estimation. Consistent with our discussion, *Credit-Sale* is highly correlated with the use of accrual accounting with an average adjusted R² of 14.33% ($p < 0.01$). Appendix B also shows *Credit-Sale* continues to be positively and significantly associated with *Accrual* when we include all the covariates used in the second stage regression. Panel A of Table 8 reports reduced-form regression results for our main test of Hypothesis 1a. The results show that the total amount available under LCs and the proportion of firm purchases made using trade credit are significantly positively related to the use of accrual-based accounting (p -value < 0.01). The strength of the association is generally stronger after accounting for the endogeneity

¹⁸ 53% of firms that extend credit sales and thus have account receivables use accrual accounting. Therefore, while highly correlated *Credit-Sale* is not equivalent to accrual accounting. Cassar et al. (2014) use the number of days in inventory as an instrument variable for accrual accounting in addition to *Credit-Sale*. This variable, however, is irrelevant for firms in the service industry and about 46% of small businesses in our sample are in the service industry. Therefore, we do not use the number of days in inventory as an additional instrument.

of the accrual accounting choice, i.e., compared to corresponding OLS results reported in Tables 5 and 6. Further, the impact of the control variables in Table 8 closely resembles their impact in the earlier results. Panel B of Table 8 reports results for our main tests of Hypothesis 2. The use of accrual accounting is significantly positively related to the number of financial institutions with which the firm interacts (p -value < 0.01) and the distance at which these institutions are located from the firm (p -value = 0.02). Here also, the results are stronger after accounting for the endogeneity of the accrual accounting choice. Overall, while we acknowledge the constraints we face in addressing the endogeneity issue due to data limitations, to the extent that our instrument variable approach using *Credit-Sale* helps mitigate the endogeneity issue, the results in Table 8 further confirm our inference on the relation between small businesses' use of accrual accounting and their access to external credit and arm's length financing.¹⁹

4.6. Loan Financing

Our study is related to a recent paper by Allee and Yohn (2009) that also uses the same SSBF survey data. The main focus in Allee and Yohn (2009) is on the factors associated with the use of formal financial statements and their sophistication including whether the statements are compiled, reviewed and/or audited by an accounting professional, and whether the statements are accrual-based or not. While not the main focus of their paper, they also relate the use/sophistication of formal financial statements to access to new loans. They find that the use of financial statements in and of itself does not have a significant impact on the likelihood of new loans being granted or the cost of new loans. However, having financial statements prepared on an accrual basis is associated with lower interest rates on new loans. For completeness, we

¹⁹ We estimate the 2SLS for other measures of LCs, TC, and arm's length financing. We find results qualitatively similar for all other measures except for Duration and Contact Mode. The impact of *Accrual* on Duration and Contact Mode is insignificant. These 2SLS results are not tabulated for brevity but available upon request.

conduct a comprehensive set of tests on the relationship between loans availed by small businesses and their use of accrual accounting. In addition to the likelihood of new loan approvals and interest rates on new loans approved tested in Allee and Yohn (2009), we also examine how the use of accrual accounting is associated with the number and value of existing loans on the books of the firm. Loans are measured as the sum of capital leases, car and equipment loans, mortgages, and other loans outstanding on the firm's books.²⁰

4.6.1. Loans – Univariate Analysis

Untabulated results show that the correlations between *Accrual* and the total number and value of loans outstanding are significantly positive.²¹ *Accrual* is also positively associated with the likelihood of all new loan applications being accepted and negatively associated with the interest rate on new loans approved. Similar to the univariate analysis of LCs and TC conditional on firm size, we examine the firm's loans for subgroups of firm size. The proportion of firms with a loan on the books is higher when firms use accrual accounting – the differences in this proportion between accrual and non-accrual accounting firms within the smallest and middle size subgroups are significant at the 1% level. For the largest size subgroup, the difference is not significantly different from zero. However, within this subgroup the mean total loan value of for firms that use accrual accounting is much higher than for firms using non-accrual accounting. For the other two subgroups also, the mean total value of loans is higher for firms that use accrual accounting.

4.6.2. Loans – Multivariate Analysis

²⁰ The Federal Reserve Board classifies credit from financial institutions into lines of credit (LCs), loans (e.g., vehicle or equipment loans, business mortgages), and capital leases (Mach and Wolken, 2006). In this study, we combine loans and capital leases under the broad classification of 'loans'. As suggested by the types of loans, this category of financing is primarily long-term.

²¹ The results of the univariate analyses discussed here are not tabulated for the sake of brevity. They are available from the authors upon request.

Similar to the analysis of LCs and TC discussed earlier, we examine loans in a multivariate setting. We use the same regression model as the one in Tables 5 (LCs) and 6 (TC). Panel A of Table 9 shows a significant positive association between the number of loans and *Accrual* (p-value = 0.04). Similarly, total loan value is positively associated with *Accrual* (p-value = 0.01). Expectedly, the number of loans and total loan value are each positively related to firm leverage (p-value < 0.01) and negatively related to the credit rating (p-value < 0.01). They are also positively related to firm size measured by sales and the number of employees (p-value < 0.01), and negatively related to firm performance (p-value < 0.01) and firm age (p-value < 0.05). As before, the negative relation with firm performance is consistent with the argument that better firm performance reduces the firm's need for additional debt financing. Similarly, like most of the results so far, whether the firm compiles formal financial statements by an accounting professional is not significantly related to the number or value of loans.

Table 9 Panels A and B about here

Panel B of Table 9 examines the association between *Accrual* and the likelihood of new loan approvals and the interest rate on these new loans. Tests of these aspects of the firm's loan activity are similar to corresponding tests in Allee and Yohn (2009) and Cassar et al. (2014), and include only those firms that sought new loans in the three years prior to the survey. Unlike the corresponding insignificant impact of accrual-based financial statements in Allee and Yohn (2009) and accrual accounting in Cassar et al. (2014), we find accrual accounting to be positively and significantly associated with the likelihood of new loan approval (p-value = 0.02). The difference in results is further examined in subsection 4.7.1. below.

Consistent with the results in Allee and Yohn (2009), we find *Accrual* is negatively associated with new loan interest rates (p-value = 0.01). The impact of firm leverage on the likelihood of

new loan approval is negative (p-value = 0.06) and the impact of credit rating is positive (p-value 0.01). The credit rating also has a significant negative effect on the new loan interest rate (p-value = 0.02). Firm performance does not have a significant impact probably because the tests are conditioned on the firm having sought a new loan. Overall, the results of Table 9 provide further support for Hypothesis 1a that the use of accrual accounting for financial records is associated with the firm securing more credit and for Hypothesis 1b that such credit is availed at better terms. Finally, we re-estimate the relationship between *Accrual* and the total value of loans using the 2SLS model of Table 8.²² We find that *Accrual* is significantly positively associated with total loan value (p-value < 0.01).

4.7. Additional Analysis

4.7.1. Use of Accrual Accounting versus Use of Financial Statements

To examine the benefits of using accrual accounting independent of the production of formal financial statements, in this sub-section we re-examine the use of accrual accounting for subgroups of firms that report they use financial statements to respond to the SSBF survey questions and those that use other means. Firms in the former subgroup (N = 839) correspond to the group of firms Allee and Yohn (2009) focus on. About 53% of such firms report the use of accrual accounting to maintain financial records. Firms in the latter subgroup (N = 3,213) use a variety of other methods to answer the questions, including tax records, bank statements, memory, etc. About 35% of such firms report they use accrual accounting to maintain their financial records. Thus, 1,576 firms are coded as using accrual accounting in our tests as opposed to about 466 if we were to limit the sample to firms that used formal financial statements. In Panel A of Table 10 we re-estimate regressions for the three forms of credit examined in Table

²² These results are not tabulated for the sake of brevity. They are available from the authors upon request.

5 (LCs), Table 6 (TC) and Table 9 (Loans) separately for these two subgroups of firms. For the sake of brevity, we report only the coefficient on *Accrual* and its significance. The results show that the use of accrual accounting is positively associated with the number of LCs (p-value = 0.10) and the total value of credit available under LCs (p-value 0.01) for the subgroup of firms that do not use formal financial statements (to respond to survey questions). For the subgroup that uses formal financial statements, only # of *LC Renewal Applications* is positively associated (p-value = 0.06) with *Accrual*. For TC, in both subgroups *Accrual* is positively associated with the number of TC suppliers and the fraction of purchases financed through TC (p-value < 0.01). However, TC duration has a significant positive association (p-value = 0.02) with *Accrual* only in the subgroup that does not use formal financial statements.

Table 10 Panels A and B about here

The differences between the two subgroups are probably sharpest for the firm's existing loans and new loan activity. For existing loans, the association between *Accrual* and the number of loans has higher significance (p-value < 0.01) for firms that don't use formal financial statements than for those that do (p-value = 0.08). There is a similar pattern for the total value of existing loans with the association significant at the 2% level for non-users of formal financial statements and at the 9% level for users. Further, *Accrual* is positively associated with the likelihood of new loan approvals (p-value = 0.02) and negatively associated with the interest rate on new loans (p-value = 0.01) for non-users of formal financial statements whereas the corresponding associations for users are insignificant. This finding is consistent with Cassar et al. (2014) and supports their argument that other types of firm information can substitute for information provided by accrual accounting.

We also re-estimate our results for arm's length financing for these two subgroups of firms. As before, only results for *Accrual* are reported in Panel B of Table 10. Here also the two subgroups behave quite differently. *Accrual* is significantly positively associated with the number of financial institutions (p-value < 0.01) and the average distance from the financial institutions (p-value = 0.03) only for firms that do not use formal financial statements (p-values < 0.01 and 0.03, respectively). Similarly, *Accrual* is negatively and significantly associated with the average duration of relationships with financial institutions only for the non-user subgroup. Finally, for the contact mode, the association between *Accrual* and the remoteness of the mode of contact is positive in both subgroups but significant only in the user subgroup (p-value = 0.01). Overall, the results of Table 10 suggest that the benefits of using accrual accounting with regard to the firm's access to external credit and the firm's interactions with financial institutions are above and beyond the benefits arising from the production of formal financial statements.

4.7.2. Robustness Tests with Alternative Samples

C-Corporations are generally required to use accrual-based accounting for tax reporting purposes. To examine if our results are driven by the presence of C-Corporations, we remove them from the sample (942-943 firms from each implicate) and re-estimate the regressions in Tables 5, 6, and 9. We also form an alternative sample excluding firms with annual sales revenue over \$5 million (802-803 firms from each implicate) and again re-estimate these regressions. Both sub-samples yield qualitatively similar results for loans, TC, and the extent of arm's length financing. However, in both samples the coefficient on *Accrual* in the regressions for LCs is no longer significant at conventional levels.²³

5. Summary and Conclusions

²³ These results are not reported for the sake of brevity. They are available from the authors upon request.

Using data from the 2003 Survey of Small Business Finances conducted by the Federal Reserve Board, we use of accrual accounting by small businesses is positively associated with various aspects of their access to external credit. Specifically, firms that use accrual accounting tend to have more lines of credit and a larger amount of such credit. Tests of trade credit, the most frequently used form of external credit for small businesses, also yield similar results – firms that use accrual accounting receive credit from more suppliers and for longer durations with zero-interest. Similarly, these firms have more loans and a larger amount of loans on their books, and are more likely to get new loans approved and at lower interest rates. We also find that for firms using accrual accounting, lenders tend to be located at a greater distance from the firm, and that interactions between the firm and its lenders involve less in-person contact. These results suggest that accrual accounting is associated with improvements in the quality of the “hard” information provided by the firm, which makes transacting on the basis of the information easier. Further supporting this interpretation, we find that the use of accrual accounting is associated with greater portability of the borrowing relationship – the average duration of the firm’s relationships with its financial institutions is inversely related to the use of accrual accounting. These results together suggest that accrual accounting facilitates small businesses’ arm’s length financing and lowers their reliance on relationship-based financing.

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Appendix A: Variable Description

This Appendix reports detailed variable descriptions. Data in parentheses provides references to the specific items from the survey questionnaire used in the 2003 Survey of Small Business Finances.

Accrual	An indicator variable coded as 1 if the firm uses accrual-based accounting, and 0 otherwise. This is based on the survey question about the firm's accounting method. (PI_2)
# of Business Sites	Number of sites the business has offices, plants, or stores, including the main office. (D1)
Credit Rating	Firm's credit rank based on its Dun and Bradstreet Rank Credit Score (DB Score). It has values 1-5, with 1 being most risky and 6 being least risky. (A0_DB_CREDRK). The values correspond to DB Scores as below: 1 = DB score 0-10; 2 = DB score 11-25; 3 = DB score 26 – 50 4 = DB score 51-75 5 = DB score 76-100
Credit-Sale	An indicator variable coded as 1 if the firm has account receivables or trade notes, and 0 otherwise. (R2)
Construction	Indicator for the firm being in the construction industry that takes a value of 1 if the firm's two-digit SIC is in the range 15-17.
Contact Mode	Average rank of the methods of interaction used by the firm in its transactions with its financial institutions. The ranks are coded as follows: 1: In person 2: By telephone 3: By mail 4: Direct withdrawal or wire 5: Through an ATM 6: Internet or other
Corporation	Indicator variable coded as 1 if the firm is a corporation, and 0 otherwise.
Distance (miles)	Average number of miles between the main office of the firm and its financial institutions. (IH7_1(1-20))
Duration (months)	Average length of relationship the firm has with its financial institutions in months. (IH4_(1-20))
Financial Report	Indicator variable coded as 1 if the firm compiles financial statements or accounting reports, and 0 otherwise (based on N3T1). If the questions were skipped for legitimate reason, we code this variable as 0.
Firm Age (years)	Number of years the firm has been in business
# of Fin. Institutions	Number of financial institutions the firm dealt with (NINST). FRB constructed this measure by counting the number of financial service flags that have non-missing values.
# of Loans	Sum of all mortgage loans, car loans, equipment loans, capital leases and all other loans on the books of the firm. This measure is constructed using the firm's response to loan questions (e.g., How many mortgages does the firm have?)
# of LC	Total number of lines of credit. (F9_(1-3))
Leverage	Ratio of debt (S1) to total assets (R12).
Manager Ownership	Percentage of the firm owned by the firm's manager(s). (C_SHARE_1)
Manufacturing	Indicator for the firm being in the manufacturing industry coded as 1 if the firm's two-digit SIC is in the range 20-39.
Mining	Indicator for the firm being in the mining industry coded as 1 if the firm's two-digit SIC is in the range 13-14.
New Loans Approved	Indicator variable coded as 1 if one or more recent new loans the firm applied for were always approved, and 0 otherwise (MRL4)
New Loan Interest (%)	Interest rate on the new loans (MRL20). The variable is available only when the firm had approved new loan(s).

Owner Exp	# of years of experience the owner(s) of the business has managing or owning a business, including the existing firm. (C_EXPER_1)
Owner Mgr	Indicator variable coded as 1 when the firm owner(s) manages the day-to-day operation of the business. (C_MANAGE_1)
Proprietorship	Indicator variable coded as 1 if firm type is proprietorship, and 0 otherwise.
Partnership	Indicator variable coded as 1 if firm type is partnership, and 0 otherwise.
% of Purchases with TC	Percentage of total purchases made by the firm using trade credit during the most recent fiscal year. (L2)
# of LC Renewal Applications	The number of times the firm attempted to renew existing lines of credit during the past three years. (MRL1)
ROA	Ratio of operating income to total assets. Operating income is defined as (sales + other income – total operating costs). (P2 + P4 – P5/R12)
Sales	Sales Revenue (\$ '000). (P2)
Total # of Employees	# of people that worked in the company (including owner(s) during a typical pay period in 2003. (A_TOTEMP)
Service	Indicator for the firm being in the service industry coded as 1 if the firm's two-digit SIC is in the range 70-89.
Total Loan Value	Total principal the firm owes for all loans counted under (# of Loans). This question is constructed using the firm's response to loan value questions (e.g., What is the total amount of principal owed on this/all mortgages?)
Total LC Amount	The sum of credit available under the lines of credits.
# of TC Suppliers	Number of suppliers that gave trade credit to the firm during the most recent fiscal year (L3).
TC Financing Duration	Financing duration offered by the most important suppliers. It is measured as the number of days between the invoice date and the due date for the full payment for the invoice (L11) and is coded as follows. 1: Cash on delivery 2: 1-7 days/1 week 3: 8-10 days 4: 11-14 days 5: 15 days 6: 16-20 days 7: 21-30 days 8: 31-45 days 9: 46-60 days 10: 61-90 days 11: > 90 days
Wholesale	Indicator for the firm being in the wholesale industry coded as 1 if the firm's two-digit SIC is in the range 50-59.

Appendix B: Estimation of the Choice of Accrual-Based Accounting

This table reports OLS estimation of the first stage regression used in the 2SLS analysis. The results for each implicate (there are five implicates) are summarized using SAS MIANALYZE procedure. Dependent variable, *Accrual*, is an indicator variable coded as 1 if the firm keeps its book using accrual accounting, and 0 otherwise. *Credit-Sale* is an indicator variable coded as 1 if the firm offers credit sales, and 0 otherwise. Detailed variable descriptions are reported in Appendix A.

Dependent Variable = Accrual						
	Instrument Only			All Exogenous Variables		
	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>
Credit-Sale	0.249	14.97	< 0.01	0.183	10.31	<.0001
Financial Report				0.087	2.08	0.04
Leverage				0.001	0.19	0.85
Credit Rating				-0.003	-0.43	0.67
ROA				-0.001	-0.57	0.57
log(1+Sales)				0.009	2.3	0.02
Total # of Employees				0.002	7.56	< 0.01
# of Business Sites				0.002	1.58	0.12
Firm Age				0.000	0.24	0.81
Owner Mgr				-0.085	-2.56	0.01
Owner Exp				0.000	0.53	0.60
Manager Ownership				-0.001	-1.84	0.07
Proprietorship				-0.175	-8.18	< 0.01
Partnership				-0.071	-2.04	0.04
Mining				-0.340	-5.82	< 0.01
Construction				-0.014	-0.35	0.73
Manufacturing				0.099	2.37	0.02
Wholesales				0.083	2.57	0.01
Service				-0.060	-2.1	0.04
intercept	0.119	11.75	< 0.01	0.241	3.07	< 0.01
Observations	4,164-4,165			4,052-4,055		
Average Adj. R ²	14.33			32.73		

Table I
Sample Formation

	# of observations	# of unique firms	
Initial Sample	21,200	4,240 per implicate	
1) Delete if total assets missing or negative & Accrual is missing	20,827	4,165	Implicate 1
		4,165	implicate 2
		4,164	Implicate 3
		4,167	Implicate 4
		4,166	Implicate 5
		<hr/> 20,827	
2) Delete if control variables are missing	20,267	4,053	implicate 1
		4,053	implicate 2
		4,052	implicate 3
		4,055	implicate 4
		4,054	implicate 5
		<hr/> 20267	

Table 2
Descriptive Statistics

The following descriptive statistics are prepared using SAS PROC SURVEYMEANS and PROC MIANALYZE procedures as per the 2003 SSBF Technical Codebook. Detailed variable descriptions are in Appendix A.

	<u>Mean</u>	<u>StdErr</u>
<u>Line of Credits (L/C)</u>		
LC = 1	0.35	0.01
# of LC	0.45	0.01
Total LC Amount (\$'000)	114	11
# of LC Renewal Applications	0.42	0.02
<u>Trade Credits (T/C)</u>		
TC=1	0.61	0.01
# of TC Suppliers	13.30	0.59
% of Purchases with TC	39.11	0.84
TC Financing Duration	6.49	0.04
<u>Arm's Length Financing</u>		
# of Fin. Institutions	2.37	0.03
Distance (miles)	116.68	5.18
Duration (months)	104.77	1.85
Contact Mode	2.03	0.02
<u>Firm Characteristics</u>		
Accruals	0.25	0.01
Financial Report	0.16	0.01
Leverage	0.62	0.03
Credit Rating	3.51	0.03
ROA	1.62	0.10
Sales (\$'000)	1,097	42
Total # of Employees	8.73	0.17
# of Business Sites	1.32	0.03
Firm Age	14.39	0.22
Owner Mgr	0.92	0.01
Owner Exp	19.75	0.24
Manager Ownership	81.14	0.51
Proprietorship	0.44	0.01
Partnership	0.09	0.01
Corporation	0.47	0.01
Mining	0.00	0.00
Construction	0.11	0.11
Manufacturing	0.07	0.07
Wholesale	0.25	0.25
Service	0.46	0.46

Table 3
Correlations

This table reports Pearson correlations between key dependent and independent variables. Values in bold are significant at the 5% level or better.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
Accruals = I	A	I														
Financial Rreport = I	B	0.08	I													
log(Sales)	C	0.45	0.12	I												
Total # of Employees	D	0.37	0.06	0.55	I											
Manager Exp	E	0.17	0.06	0.25	0.20	I										
Proprietorship	F	-0.39	-0.10	-0.51	-0.31	-0.15	I									
# of TC Suppliers	G	0.47	0.09	0.60	0.48	0.25	-0.40	I								
% of Purchases with TC	H	0.37	0.06	0.44	0.29	0.20	-0.32	0.78	I							
TC Financing Duration	I	0.07	0.00	0.01	0.01	-0.02	-0.04	0.08	0.05	I						
# of LC	J	0.22	0.07	0.36	0.24	0.11	-0.23	0.32	0.22	0.04	I					
Total LC Amount	K	0.32	0.08	0.49	0.39	0.15	-0.32	0.46	0.33	0.07	0.80	I				
# of LC Renewal Applications	L	0.25	0.05	0.37	0.31	0.11	-0.23	0.34	0.23	0.04	0.41	0.52	I			
# of Fin. Institutions	M	0.29	0.08	0.45	0.38	0.11	-0.29	0.40	0.27	0.04	0.39	0.38	0.28	I		
Distance	N	0.18	0.02	0.26	0.22	0.03	-0.17	0.27	0.20	0.01	0.19	0.22	0.15	0.51	I	
Duration	O	-0.02	0.02	0.03	0.01	0.41	0.06	0.04	0.06	-0.02	0.01	0.00	-0.01	-0.14	-0.18	I
Contact Mode	P	0.12	0.03	0.14	0.14	-0.02	-0.10	0.13	0.05	0.03	0.10	0.13	0.08	0.22	0.31	-0.14

Table 4
Use of Accrual Accounting and Access to External Credit and Arm's Length Financing – Univariate Analysis

This table compares external credit resources and arm's length financing of firms that use accrual accounting versus cash accounting for their books. *Accrual* is an indicator variable coded as 1 if the firm keeps its financial records on an accrual basis, and 0 otherwise.

Panel A: External Credit

Sales	Accrual	Obs.	% of Purchases with TC	Total LC Value (\$)	TC = 1	LC = 1
\$1 mil < Sales	1	515	48.30	26,987	0.72	0.33
	0	1,949	30.01	21,229	0.52	0.28
	Diff (p-value)			p < 0.01	p = 0.18	p = 0.01
\$1 mil <= Sales < \$3 mil	1	319	69.16	425,000	0.86	0.67
	0	291	54.91	99,768	0.63	0.51
	Diff (t-stat)			p < 0.01	p = 0.05	p < 0.01
\$3 mil <= Sales	1	744	79.00	1,242,157	0.92	0.78
	0	235	54.62	539,436	0.78	0.57
	Diff (t-stat)			p < 0.01	p < 0.01	p = 0.04

Panel B: Arm's Length Financing

Sales	Accrual	Obs.	# of Fin. Institutions	log (1+Distance)	Duration	Contact Mode
\$1 mil < Sales	1	515	2.46	3.09	94	2.07
	0	1,949	2.08	2.79	107	1.96
	Diff (p-value)			p < 0.01	p = 0.01	p = 0.01
\$1 mil <= Sales < \$3 mil	1	319	3.25	3.37	97	2.23
	0	291	3.18	3.10	108	1.99
	Diff (p-value)			p = 0.73	p = 0.25	p = 0.26
\$3 mil <= Sales	1	744	3.95	3.75	111	2.56
	0	235	3.47	3.45	115	2.44
	Diff (p-value)			p = 0.01	p = 0.19	p = 0.73

Table 5
Use of Accrual Accounting and Access to Lines of Credit

This table examines the association between the firm's use of accrual accounting (*Accrual*) and the firm's short-term bank financing availability in the form of line of credits (*LC*). Dependent variables are the number of LCs (*# of LC*), the natural log of the total dollar value available under LCs (*Total LC Amount*), and the number of LC Renewal Applications (*# of LC Renewal Applications*).

	# of LC			log(1+ Total LC Amount)			# of LC Renewal Applications		
	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>
Accrual	0.059	1.50	0.13	0.620	2.25	0.02	0.088	1.73	0.08
Financial Report	0.093	1.24	0.22	0.527	1.08	0.28	0.120	1.10	0.27
Leverage	-0.017	-2.29	0.02	-0.149	-2.51	0.01	0.007	0.97	0.33
Credit Rating	0.025	2.17	0.03	0.251	2.98	0.00	0.000	-0.03	0.98
ROA	-0.009	-2.69	0.01	-0.091	-4.46	<0.01	-0.010	-2.47	0.01
Log(1+Sales)	0.067	10.46	<0.01	0.560	11.21	<0.01	0.079	7.77	<0.01
Total # of Employees	0.002	4.02	<0.01	0.026	7.77	<0.01	0.005	7.51	<0.01
# of Business Sites	0.006	1.21	0.23	0.045	1.47	0.14	0.006	1.68	0.09
Firm Age	-0.001	-0.32	0.75	-0.003	-0.21	0.83	0.003	1.58	0.11
Owner Mgr	0.146	3.36	0.00	0.554	1.46	0.14	-0.004	-0.05	0.96
Owner Exp	0.002	1.20	0.23	0.014	1.09	0.28	-0.001	-0.47	0.64
Manager Ownership	0.000	0.19	0.85	-0.001	-0.16	0.87	-0.001	-1.15	0.25
Proprietorship	-0.092	-2.47	0.01	-0.797	-3.05	0.00	-0.102	-2.22	0.03
Partnership	-0.073	-1.17	0.24	-0.640	-1.57	0.12	-0.002	-0.02	0.99
Mining	1.005	1.54	0.12	5.414	2.78	0.01	0.901	1.70	0.09
Construction	-0.024	-0.31	0.76	0.825	1.71	0.09	0.129	1.57	0.12
Manufacturing	-0.040	-0.52	0.61	0.928	1.88	0.06	0.170	1.90	0.06
Wholesales	-0.076	-1.06	0.29	-0.125	-0.32	0.75	0.103	1.51	0.13
Service	-0.121	-1.82	0.07	-0.177	-0.48	0.63	0.023	0.38	0.71
Intercept	-0.517	-4.42	<0.01	-4.272	-4.71	<0.01	-0.547	-3.17	0.00
Observations	4053			4053			4053		
F-statistics (p-value)	F = 75.99 (p < 0.01)			F = 122.13 (p < 0.01)			F = 45.32 (p < 0.01)		

Table 6
Use of Accrual Accounting and Trade Credit

This table examines the association between the firm's use of accrual accounting (*Accrual*) and their use of supplier-provided financing in the form of trade credit (*TC*) during the most recent fiscal year. Dependent variables are the natural log of the number of trade creditors of the firm (*# of TC Suppliers*), the percent of total purchases made using trade credit (*% of Purchases with TC*), and the interest free financing duration of trade credit offered by the most important supplier (*TC Financing Duration*). The test for TC financing duration only includes firms that have trade credit financing.

	log(1+# of TC Suppliers)			% of Purchases with TC			TC Financing Duration		
	Estimate	t-stat	p-value	Estimate	t-stat	p-value	Estimate	t-stat	p-value
Accrual	0.465	7.14	<.0001	10.828	5.42	<.0001	0.226	2.02	0.05
Financial Report	0.085	0.69	0.49	0.344	0.10	0.92	0.248	1.73	0.08
Leverage	0.025	1.63	0.10	0.759	1.61	0.11	-0.063	-1.67	0.09
Credit Rating	0.022	1.16	0.25	0.751	1.18	0.24	-0.030	-0.82	0.41
ROA	-0.035	-7.26	<.0001	-0.942	-5.74	<.0001	-0.015	-1.05	0.30
Log(1+Sales)	0.181	14.25	<.0001	4.050	9.39	<.0001	-0.004	-0.12	0.91
Total # of Employees	0.008	8.75	<.0001	0.038	1.60	0.11	0.000	0.19	0.85
# of Business Sites	0.000	0.05	0.96	-0.014	-0.14	0.89	-0.003	-0.27	0.79
Firm Age	0.004	1.31	0.19	0.075	0.81	0.42	-0.005	-0.96	0.34
Owner Mgr	-0.160	-1.77	0.08	-5.209	-1.94	0.05	0.028	0.17	0.86
Owner Exp	0.009	3.51	0.00	0.263	3.00	0.00	0.000	0.07	0.95
Manager Ownership	-0.002	-1.40	0.16	-0.061	-1.72	0.09	0.003	1.29	0.20
Proprietorship	-0.229	-3.96	<.0001	-4.957	-2.60	0.01	-0.095	-0.83	0.41
Partnership	-0.098	-0.92	0.36	-0.745	-0.23	0.82	0.174	0.86	0.39
Mining	1.050	2.75	0.01	32.549	2.59	0.01	1.580	2.55	0.01
Construction	0.585	5.87	<.0001	30.887	8.88	<.0001	-0.133	-0.71	0.47
Manufacturing	0.629	5.53	<.0001	17.419	4.79	<.0001	0.253	1.45	0.15
Wholesales	0.440	4.57	<.0001	13.435	4.37	<.0001	-0.278	-1.58	0.11
Service	0.049	0.58	0.56	1.150	0.40	0.69	-0.028	-0.18	0.86
Intercept	-1.120	-5.15	<.0001	-16.887	-2.31	0.02	6.537	12.71	<.0001
Observations	4053			4053			2816		
F-statistics (p-value)	F = 251.48 (p < 0.01)			F = 243.43 (p < 0.01)			F = 1550.20 (p < 0.01)		

Table 7
Use of Accrual Accounting and Arm's Length Financing

This table examines the association between the firm's use of accrual accounting (*Accrual*) and its relationship with financial institutions. Dependent variables include the total number of financing institutions that the firm dealt with during the most recent year (*# of Fin. Institutions*), the natural log of the average distance between the between the main office of the firm and its financial institutions (*Distance*), the average number of months the firm has done business with its financial institutions (*Duration*), and the average value of the most frequent method of conducting business with the firm's financial institutions (*Contact Mode*) – lowest value indicates contact in person, while highest value indicates most remote form of contact (internet).

	# of Fin. Institutions			log(1+ Distance)			Duration			Contact Mode		
	Estimate	t-stat	p-value	Estimate	t-stat	p-value	Estimate	t-stat	p-value	Estimate	t-stat	p-value
Accrual	0.176	2.37	0.02	0.177	1.65	0.10	-11.193	-3.25	0.00	0.140	2.42	0.02
Financial Report	0.119	0.95	0.34	-0.215	-1.27	0.20	-0.999	-0.18	0.86	0.089	0.87	0.39
Leverage	0.090	4.70	<.0001	0.127	4.51	<.0001	-2.658	-3.00	0.00	0.000	0.03	0.97
Credit Rating	-0.027	-1.18	0.24	-0.021	-0.58	0.56	4.033	3.29	0.00	0.057	2.55	0.01
ROA	-0.027	-4.50	<.0001	-0.027	-2.92	0.00	-0.034	-0.10	0.92	0.014	1.59	0.11
Log(1+Sales)	0.188	9.50	<.0001	0.128	5.80	<.0001	-1.254	-1.35	0.18	0.017	1.31	0.19
Total # of Employees	0.008	7.09	<.0001	0.004	4.14	<.0001	-0.146	-3.61	0.00	0.003	4.32	<.0001
# of Business Sites	0.012	1.09	0.28	0.002	0.43	0.67	0.273	0.76	0.45	0.008	0.96	0.34
Firm Age	-0.001	-0.35	0.72	-0.011	-2.18	0.03	4.070	15.59	<.0001	-0.009	-3.31	0.00
Owner Mgr	-0.137	-1.23	0.22	-0.318	-2.09	0.04	10.093	2.08	0.04	-0.109	-1.04	0.30
Owner Exp	0.002	0.65	0.52	0.003	0.53	0.59	1.070	4.87	<.0001	-0.001	-0.41	0.68
Manager Ownership	0.000	0.12	0.91	0.000	0.22	0.82	-0.099	-1.57	0.12	0.002	1.64	0.10
Proprietorship	-0.193	-2.82	0.00	-0.087	-0.82	0.41	11.127	3.02	0.00	-0.080	-1.39	0.16
Partnership	-0.130	-1.23	0.22	-0.390	-2.40	0.02	-1.339	-0.25	0.80	0.057	0.46	0.64
Mining	0.003	0.01	1.00	0.098	0.16	0.87	37.035	1.28	0.20	-0.334	-1.49	0.14
Construction	-0.372	-2.97	0.00	-0.187	-1.00	0.32	-2.487	-0.35	0.73	-0.184	-1.70	0.09
Manufacturing	-0.322	-2.42	0.02	-0.262	-1.42	0.16	-8.546	-1.28	0.20	0.068	0.56	0.58
Wholesales	-0.200	-1.79	0.07	-0.236	-1.47	0.14	-1.191	-0.22	0.83	-0.067	-0.68	0.50
Service	-0.205	-1.93	0.05	-0.223	-1.46	0.14	-7.266	-1.47	0.14	0.098	1.00	0.32
Intercept	0.471	1.28	0.20	2.009	4.88	<.0001	29.899	2.05	0.04	1.667	7.14	<.0001
Observations	3986			3986			3986			3986		
F-statistics (p-value)	F = 442.19 (p < 0.01)			F = 356.48 (p < 0.01)			F = 354.40 (p < 0.01)			F = 491.91 (p < 0.01)		

Table 8**Use of Accrual Accounting and Access to External Credit – 2SLS Estimation**

This table examines the association between the use of accrual accounting and key measures of access to external credit using the following models:

$$\text{Accrual} = a_0 + a_1 * \text{Credit-Sale} + e$$

$$\text{Financing (or Financial Inst.)} = b_0 + b_1 * \text{Accrual} + \sum \text{Control variable} + v$$

Credit-Sale is an indicator variable coded as 1 if the firm offer credit sales, and 0 otherwise. *Financing* is measured by the natural log of total amount available through lines of credit (*Total LC Amount*) and Percentage of total purchases made by the firm using trade credit (*% of Purchases with TC*). *Financial Inst.* is measured as the number of financial institutions (*# of Fin. Institutions*) or natural log of average miles between the main office of the business and to its financial institutions (*Distance*). Panel A (B) reports the reduced form 2nd stage estimation results for external financing (arm's length financing). Estimation results of the 1st stage regression for the *Accrual* equation with only instruments variables are reported in Appendix B.

Panel A: External Financing

	log(1+Total LC Amount)			% of Purchases with TC		
	Estimate	t-stat	P-value	Estimate	t-stat	P-value
Accrual	5.288	5.47	<0.01	35.225	5.44	<0.01
Financial Report	0.372	1.07	0.29	-0.320	-0.14	0.89
Leverage	0.230	3.76	0.00	1.056	2.60	0.01
Credit Rating	0.294	4.14	<0.01	0.964	2.03	0.04
ROA	-0.111	-4.60	<0.01	-0.932	-5.98	<0.01
log(1+Sales)	0.582	10.10	<0.01	3.199	8.31	<0.01
Total # of Employees	0.010	4.34	<0.01	-0.023	-1.61	0.11
# of Business Sites	0.010	1.03	0.30	-0.004	-0.06	0.95
Firm Age	0.005	0.50	0.62	0.058	0.91	0.36
Owner Mgr	0.682	2.35	0.02	-0.359	-0.19	0.85
Owner Exp	-0.004	-0.45	0.65	0.208	3.22	0.00
Manager Ownership	0.001	0.28	0.78	-0.022	-0.88	0.38
Proprietorship	0.088	0.29	0.77	-0.654	-0.33	0.75
Partnership	-0.394	-1.11	0.27	2.730	1.16	0.25
Mining	5.936	3.48	0.00	25.391	2.25	0.02
Construction	0.611	1.54	0.12	26.621	10.12	<0.01
Manufacturing	0.040	0.09	0.92	18.778	6.60	<0.01
Wholesales	-0.733	-2.17	0.03	11.529	5.12	<0.01
Service	-0.234	-0.76	0.44	1.811	0.89	0.37
Intercept	-6.017	-7.45	<0.01	-21.306	-4.00	<0.01
	F = 278.33 (p < 0.01)			F=561.61 (p < 0.01)		

Table 8 - Continued

Panel B: Arm's Length Financing

	# of Fin. Institutions			log(1+Distance)		
	<u>Estimate</u>	<u>t-stat</u>	<u>P-value</u>	<u>Estimate</u>	<u>t-stat</u>	<u>P-value</u>
Accrual	1.574	5.30	<0.01	1.005	2.97	<0.01
Financial Report	0.112	1.05	0.29	-0.118	-0.97	0.33
Leverage	0.103	5.45	<0.01	0.125	5.78	<0.01
Credit Rating	-0.024	-1.11	0.27	0.022	0.87	0.38
ROA	-0.026	-3.57	0.00	-0.026	-3.17	<0.01
log(1+Sales)	0.164	9.32	<0.01	0.103	4.94	<0.01
Total # of Employees	0.004	5.81	<0.01	0.002	3.09	<0.01
# of Business Sites	0.006	2.16	0.03	-0.002	-0.51	0.61
Firm Age	-0.003	-1.04	0.30	-0.009	-2.51	0.01
Owner Mgr	0.239	2.67	0.01	-0.111	-1.10	0.27
Owner Exp	-0.003	-1.10	0.27	-0.004	-1.09	0.27
Manager Ownership	-0.001	-1.09	0.27	0.000	0.18	0.86
Proprietorship	0.076	0.81	0.42	0.032	0.30	0.76
Partnership	-0.167	-1.52	0.13	-0.290	-2.30	0.02
Mining	0.050	0.10	0.92	0.754	1.27	0.20
Construction	-0.583	-4.78	<0.01	-0.195	-1.40	0.16
Manufacturing	-0.722	-5.49	<0.01	-0.164	-1.09	0.28
Wholesales	-0.353	-3.40	<0.01	-0.030	-0.26	0.80
Service	-0.268	-2.85	<0.01	-0.067	-0.61	0.54
Intercept	0.323	1.30	0.19	1.651	5.58	<0.01
	F = 610.67 (p < 0.01)			F = 559.19 (p < 0.01)		

Table 9
Use of Accrual Accounting and Loan Financing

This table examines the association between the firm's use of accrual accounting and its loans. Loans for this test include mortgages, car loans, equipment loans, capital leases and various other loans the firms have during the most recent fiscal year.

Panel A: Number and Value of Loans

Dependent variables include the natural log of the number of loans (*# of loans*) and the natural log of total value of the loans (*Total Loan Value*).

	log(1+# of Loans)			log(1+Total Loan Value)		
	Estimate	t-stat	p-value	Estimate	t-stat	p-value
Accrual	0.061	2.05	0.04	0.752	2.78	0.01
Financial Report	0.049	0.88	0.38	0.298	0.63	0.53
Leverage	0.060	6.94	<0.01	0.641	8.43	<0.01
Credit Rating	-0.037	-3.82	0.00	-0.286	-3.30	0.00
ROA	-0.014	-6.33	<0.01	-0.129	-5.85	<0.01
Log(1+Sales)	0.064	10.07	<0.01	0.596	9.58	<0.01
Total # of Employees	0.004	9.05	<0.01	0.023	6.28	<0.01
# of Business Sites	0.002	0.47	0.64	0.019	0.84	0.40
Firm Age	-0.003	-2.14	0.03	-0.042	-3.20	0.00
Owner Mgr	-0.050	-1.07	0.28	-0.548	-1.37	0.17
Owner Exp	0.001	0.56	0.58	0.013	0.99	0.32
Manager Ownership	0.000	-0.16	0.87	-0.001	-0.27	0.79
Proprietorship	-0.005	-0.18	0.86	0.161	0.60	0.55
Partnership	0.028	0.61	0.54	0.648	1.50	0.13
Mining	0.599	1.26	0.21	-0.267	-0.13	0.90
Construction	0.034	0.59	0.56	-0.496	-1.00	0.32
Manufacturing	-0.128	-2.3	0.02	-1.277	-2.46	0.01
Wholesales	-0.218	-4.71	<0.01	-2.311	-5.48	<0.01
Service	-0.156	-3.6	0.00	-1.576	-3.91	<0.01
Intercept	0.015	0.13	0.90	0.741	0.70	0.48
Observations	4053			4053		
F-statistics (p-value)	F = 128.33 (p < 0.01)			F = 175.63 (p < 0.01)		

Table 9 – Continued**Panel B: New Loans**

This table examines the association between the firm's use of accrual accounting (*Accrual*) and the likelihood of all new loan applications being approved (*New Loans Approved*) and the average interest rate of the newly approved loans (*New Loan Interest*). Firms that did not apply for new loans are excluded in this test.

	Prob.(New Loans Approved = 1)			New Loan Interest		
	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>
Accrual	0.615	2.31	0.02	-0.725	-2.76	0.01
Financial Report	-0.159	-0.42	0.67	0.491	1.29	0.20
Leverage	-0.102	-1.90	0.06	0.027	0.32	0.75
Credit Rating	0.571	6.88	<0.01	-0.223	-2.31	0.02
ROA	0.026	0.85	0.40	0.006	0.17	0.86
Log(1+Sales)	0.117	2.28	0.02	-0.135	-1.88	0.06
Total # of Employees	0.002	0.60	0.55	-0.005	-2.66	0.01
# of Business Sites	0.055	0.87	0.38	0.000	0.00	1.00
Firm Age	0.002	0.11	0.91	-0.013	-0.92	0.36
Owner Mgr	-1.091	-2.20	0.03	0.084	0.26	0.79
Owner Exp	0.024	1.91	0.06	-0.021	-1.44	0.15
Manager Ownership	0.002	0.35	0.73	-0.005	-0.74	0.46
Proprietorship	0.473	1.83	0.07	0.550	1.49	0.14
Partnership	0.368	0.87	0.38	-0.351	-0.98	0.33
Mining	13.561	18.21	<0.01	0.236	0.32	0.75
Construction	0.681	1.36	0.17	-0.743	-1.55	0.12
Manufacturing	0.256	0.50	0.62	0.015	0.04	0.97
Wholesales	0.145	0.34	0.73	-0.135	-0.34	0.73
Service	0.472	1.17	0.24	0.413	1.00	0.32
Intercept	-1.782	-1.89	0.06	10.085	8.21	<.0001
Observations	1820			1693		
F-statistics (p-value)	F = 48.36 (p < 0.01)			F = 294.15 (p < 0.01)		

Table 10
Use of Accrual Accounting and Access to External Credit –
Financial Statements versus No Financial Statements

This table examines the association between the firm's use of accrual accounting (*Accrual*) and access to external credit/arm's length financing separately for firms that also produce formal financial statements and firms that do not produce formal financial statements. Control variables are included in the regression. However, for brevity, we report only the coefficient and related statistics for the variable *Accrual* which is our variable of interest.

Panel A: Access to External Credit

The dependent variables include the number of LCs (*# of LC*), natural log of the total dollar value available under LCs (*Total LC Amount*), the number of LC renewal applications (*# of LC Renewal Applications*), the natural log of the number of trade creditors of the firm (*# of TC Suppliers*), the percent of total purchases made using trade credit (*% of Purchases with TC*), the average financing duration of trade credit offered by the most important supplier (*TC Financing Duration*), the natural log of the number of loans (*# of Loans*), the natural log of the total value of loans (*Total Loan Value*), the likelihood of new loan applications being approved (*New Loans Approved*) and the average interest rate of newly approved loans (*New Loan Interest*).

Dependent Variables	Independent Variable: Accrual					
	Used Fin. Statements			Did not use Fin. Statements		
	Estimate	t-stat	p-value	Estimate	t-stat	p-value
<i>Lines of Credit (LC)</i>						
# of LC	0.004	0.05	0.96	0.073	1.63	0.10
Total LC Amount	-0.056	-0.09	0.93	0.768	2.46	0.01
# of LC Renewal Applications	0.225	1.87	0.06	0.054	0.98	0.33
<i>Trade Credit (TC)</i>						
log(1+# of TC Suppliers)	0.062	5.19	<0.01	0.407	5.51	<0.01
% of Purchase with TC	15.050	3.68	<0.01	9.620	4.25	<0.01
TC Financing Duration	0.011	0.05	0.96	0.302	2.30	0.02
<i>Existing Loans</i>						
log(1+# of Loans)	0.123	1.73	0.08	0.140	4.12	<0.01
log(1+Total Loan Value)	0.991	1.68	0.09	0.727	2.40	0.02
<i>New Loans</i>						
Prob.(New Loans Approved = 1)	0.166	0.27	0.79	0.016	2.32	0.02
New Loan Interest	-0.016	-0.04	0.97	-0.822	-2.75	0.01

Table 10 - Continued

Panel B: Arm's Length Financing

Dependent variables include the total number of financing institutions that the firm dealt with during the most recent year (*# of Fin. Institutions*), the natural log of the average distance between the main office of the firm and its financial institutions (*Distance*), the average number of months the firm has done business with its financial institutions (*Duration*), and the average value of the most frequent method of conducting business with the firm's financial institutions (*Contact Mode*) – lowest value indicates contact in person, highest value indicates most remote form of contact (internet).

Dependent Variables	Independent Variable: <i>Accrual</i>					
	Used Fin. Statements			Did not use Fin. Statements		
	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>	<u>Estimate</u>	<u>t-stat</u>	<u>p-value</u>
# of Fin. Institutions	-0.121	-0.74	0.46	0.024	2.94***	<0.01
log(1+Distance)	-0.133	-0.64	0.52	0.261	2.16**	0.03
Duration	-9.474	-1.41	0.16	-11.901	-2.99***	<0.01
Contact Mode	0.335	2.55***	0.01	0.083	1.32	0.19