

## **SME Credit Availability Around the World:**

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### Evidence from the World Bank's Enterprise Survey

#### **ABSTRACT:**

In this study, we use data from the World Bank's Enterprise Surveys of 80 countries over the period from 2006 – 2011 to model the credit-allocation process for SMEs into a sequence of three steps. Based upon these three steps, we classify small businesses into four groups based upon their credit needs. In a first step, we analyze which firms do, and do not, need credit. The “no-need” firms have received scant attention in the literature even though they typically account for more than half of all small firms. We find that a “no-need” firm is older and smaller than a firm that needs credit; is more likely to be organized as a corporation and to have an outside auditor; is more likely to be owned by a male and by a foreigner; and is more likely to be located in a small city and in a country with higher GDP per capita and GDP growth.

In a second step, we analyze firms who need credit but fail to apply because they feared being turned down or thought that interest rates and collateral requirements were too unfavorable (*discouraged firms*). Like the “no-need” group, discouraged borrowers have received little attention in the literature. Discouraged borrowers typically outnumber firms that apply for and are denied credit. Among firms that need credit, we find that a “discouraged” firm is younger, smaller and growing slower than a firm that applied for credit; is much less likely to be organized as a corporation or to have an external auditor; is less likely to run by an experienced management team or to be owned by a foreigner or female; and is more likely to be located in a small city and in a country with higher inflation and lower GDP per capita but with higher GDP growth.

In our third step, we analyze firms that applied for credit and either were turned down (*denied firms*) or were extended credit (*approved firms*). Among firms that apply for credit, we find that an approved firm is older, larger, and grows faster than a denied firm; is less likely to be organized as corporations but more likely to have an external auditor; is more likely to be run by more experienced management team and to be owned by foreigner and a male; and is more likely to be located in a large city and in a country with lower inflation and GDP per capita but higher GDP growth.

**Key Words:** availability of credit; denied credit; discrimination; discouraged firm; entrepreneurship; small business; WBES

**JEL Classification:** G21, G32, J71, L11, M13

## **SME Credit Availability Around the World: Evidence from the World Bank's Enterprise Survey**

### **1 Introduction**

Among small and medium enterprises (“SMEs”) around the world, who needs credit and who gets credit? The answer to this question is of great importance not only to the firms themselves, but also to prospective lenders to these firms and to policymakers interested in the financial health of these firms. In this paper, we analyze data from a series of World Bank sponsored surveys of 80 countries to provide new evidence on how to answer this question.

The availability of credit is one of the most fundamental issues facing a small business; therefore, it has received much attention in the academic literature (see, e.g., early work by Petersen and Rajan, 1994; Berger and Udell, 1995; and Cole, 1998). However, many small firms indicate that they do not need credit (“no-need” firms) while others indicate that they needed credit but did not apply for credit (“discouraged” firms). With a few notable exceptions, starting with Cole (2009), the existing literature essentially has ignored “no-need” firms (see also Brown *et al.*, 2011). “Discouraged” firms—those that do not apply for credit because they expect to be turned down—have received somewhat more attention in the literature than “no-need” firms, but not nearly as much as firms that actually apply for credit. Many of the studies that have analyzed “discouraged” firms pool them with firms that actually applied for, but were denied credit, even though Cole (2009) finds important and significant differences in the two groups.

In this study, we analyze these four groups of firms to shed new light upon their similarities and differences. We utilize data from the World Bank's Enterprise Surveys (“WBES”) over the period from 2006 – 2011 to estimate a sequential set of three logistic regression models. First, a firm first decides if it needs credit (“no-need” firms versus all other firms). Second, the firm decides if it will apply for credit (“discouraged” firms versus “denied” and “approved” firms). Finally, the firm learns from its prospective lender whether or not it is successful in obtaining credit (“approved” firms versus “denied” firms).

Beginning in 2006, the World Bank implemented a “Global Methodology” for its SME surveys, which was designed to ensure a consistent definition of the population, a consistent methodology of implementation and a common core questionnaire. This methodology enables researchers to compare the results of surveys across countries and years.<sup>1</sup> Hence, the results of our study provide politicians, policymakers, and regulators with new insights on how to tailor macroeconomic policy and regulations to help small businesses obtain credit when they need credit.

Overall, we find that a “no-need” firm is older and smaller than a firm that needs credit; is more likely to be organized as a corporation and to have an outside auditor; is more likely to be owned by a male and by a foreigner; and is more likely to be located in a small city and in a country with higher GDP per capita and GDP growth.

Among firms that need credit, we find that a “discouraged” firm is younger, smaller and growing slower than a firm that applied for credit; is much less likely to be organized as a corporation or to have an external auditor; is less likely to run by an experienced management team or to be owned by a foreigner or female; and is more likely to be located in a small city and in a country with higher inflation and lower GDP per capita but with higher GDP growth.

Among firms that apply for credit, we find that an approved firm is older, larger, and grows faster than a denied firm; is less likely to be organized as corporations but more likely to have an external auditor; is more likely to be run by more experienced management team and to be owned by foreigner and a male; and is more likely to be located in a large city and in a country with lower inflation and GDP per capita but higher GDP growth.

Why are these issues of importance? Small businesses are critical to economic growth and employment. In the U.S., for example, the government reports that small firms account for over

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<sup>1</sup> In addition, we use a set of year dummies and a set of macro-economic variables to control for differences across time and economic development.

half of all private-sector employment and produce almost two-thirds of net job growth.<sup>2</sup> The importance of small firms in less developed countries where publicly traded firms are less prominent is all but certain to be even larger. Therefore, a better understanding of who needs credit and who gets credit can help policymakers to take actions that will lead to more jobs and faster economic growth.

We contribute to the literature in at least three important ways. First, we provide the first rigorous analysis of the differences in our four types of firms—non-borrowers, discouraged borrowers, denied borrowers and approved borrowers—for a large international sample of countries around the world. So far, researchers only have analyzed SMEs in the U.S. (Cole, 2009) and Europe (Brown *et al.*, 2011).

Second, we provide an analysis of credit availability that properly accounts for the inherent self-selection mechanisms involved in the credit application process: who needs credit, who applies for credit conditional upon needing credit, and who gets credit, conditional upon applying for credit. Most previous researchers except for Cole (2009) and Brown *et al.* (2011) have ignored firms that do not need credit, and many have pooled discouraged and denied firms. We find significant differences across these groups. Hence, our results shed new light upon the credit-allocation process.

Third, we provide evidence from the 2006 – 2011 WBES on the availability of credit to small businesses using the World Bank’s “global methodology.” This contributes to the growing literature on SME finance that has emerged from these surveys, including Beck *et al.* (2005, 2006, 2008); Chakravarty and Xiang (2009); De la Torre *et al.* (2010) and Brown *et al.* (2011).

In section 2, we briefly review the literature on the availability of credit, followed by a description of our data in section 3 and methodology and our variables in section 4. Our results appear in section 5 and we provide a summary and conclusions in section 6.

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<sup>2</sup> See, “Frequently Asked Questions,” Office of Advocacy, U.S. Small Business Administration (2010). For research purposes, the SBA and Federal Reserve Board define small businesses as independent firms with fewer than 500 employees.

## **2 Related Literature**

The literature on availability of credit to SMEs dates back at least to Wendt (1947), but really came into prominence following the release of a series of nationally representative surveys of SMEs in the U.S. conducted by the Federal Reserve Board beginning in the late 1980s. More recently, international interest in this area has grown following the release of a series of international surveys of SMEs conducted by the World Bank.

### **2.1 Studies using the Federal Reserve's Survey of Small Business Finances**

In a seminal article, Petersen and Rajan (1994) analyzes data on loan rates from the 1987 iteration of the Survey of Small Business Finances (SSBF) for evidence on how relationships influence the availability of credit to small firms. The authors find that the length of a relationship between a borrower and her bank decreases the rate she is charged.

Berger and Udell (1995) also analyzes data on loan rates from the 1987 SSBF, but focused on lines of credit at small business in order to provide more compelling evidence on the importance of relationships. The authors also find that the length of a relationship between a borrower and her bank lowers the spread charged by the bank on her credit line.

Cole (1998) is the first study to analyze data from the 1993 SSBF and is the first to focus on determinants of the loan turndown decision rather than of loan rates. Cole finds that a pre-existing relationship between a prospective borrower and her bank increases the likelihood that her bank approves the loan application, but also finds that the length of that relationship is not important.

Chakraborty and Hu (2006) also uses data from the 1993 SSBF to analyze how relationships affect a lender's decision to secure lines of credit and other types of loans with collateral. These authors find that the length of relationship decreases the likelihood of collateral for a line of credit, but not for other types of loans. Previously, Berger and Udell (1995) had

shown that longer relationships reduced the likelihood of collateral being required for lines of credit, using data from the 1987 SSBF.

Cole (2009) is the first study to focus on “no-need” firms, and to separate firms into the four categories that we also use. He analyzes data from the 1993, 1998 and 2003 iteration of the SSBFs and finds that “no-need” firms look very much like “approved” firms and that “discouraged” firms differ from “denied” firms in a number of significant ways.

Han *et al.* (2009) analyzes discouraged SMEs in the U.S., using data only from the 1998 SSBF. These authors find that both the demographics of the entrepreneur, such as age and personal wealth, and of the business, such as size and use of financial products, influence discouragement. They also find that riskier borrowers are more likely to be discouraged, which they interpret as an “efficient self-rationing mechanism.”

Chakravarty and Yilmazer (2009) uses data from the SSBFs to provide evidence on the availability of credit to “discouraged,” “denied” and “approved” firms, but ignore “no-need” firms that constitute more than half of all SSBF firms. These authors find that various measures of the strength of the relationship between a firm and its prospective borrower are associated with a higher likelihood of applying for credit and, conditional upon applying a higher likelihood of obtaining credit.

## **2.2 Studies using the World Bank’s SME Surveys**

Beck *et al.* (2005) uses data from World Bank surveys of more than 4,000 SMEs in 54 countries to analyze whether financial, legal and corruption obstacles affect firm growth rates. These authors find that it is growth of the smallest of firms that are consistently most affected by all three types of obstacles.

Beck *et al.* (2006) uses data on more than 10,000 firms in 80 countries to examine financial obstacles faced by SMEs. This study finds that older, larger, and foreign-owned firms report fewer financing obstacles; and that institutional development is the most important factor in explaining cross-country differences in financing obstacles.

Beck *et al.* (2008) uses data on more than 3,000 firms from 48 countries to analyze how financial and institutional development affects firm-level financing at SMEs. This study finds that, in countries with poor institutions, firms use less finance, especially from banks; and that small firms, in general, use less bank finance.

Chakravarty and Xiang (2009) uses data on more than 8,000 firms from ten countries to analyze discouraged firms. These authors find that discouraged firms differ across developed and developing countries; and that larger firms, more transparent firms, and firms with stronger banking relationships are less likely to be discouraged.

De la Torre *et al.* (2010) uses data from World Bank's SME surveys to provide evidence on bank involvement in SME finance. This study finds that all sizes of banks cater to SMEs, and that large banks have comparative advantages in offering many products.

In the study closest to ours, Brown *et al.* (2011) follows the general methodology of Cole (2009). Their firm-level data come from the 2004/2005 and 2008 waves of the Business Environment and Enterprise Performance Survey (BEEPS). These authors look at 20 countries in Eastern and Western Europe prior to, whereas we look at 80 countries around the world after, implementation of the "Global Methodology" that ensures consistency across surveys. They find that small and financially opaque firms are less likely to apply for credit, while firms with more financing needs are more likely to apply for credit. Most interestingly, they also find that firms applying for credit rarely are denied credit.

### **3 Data**

To conduct this study, we use data from the World Bank's Enterprise Surveys. The World Bank conducted these surveys in 99 countries between 2006 and 2011. Our final sample includes 41,991 firm-year observations from 80 countries over the 2006 – 2011 period. We delete data from two countries, as only one observation per country was available for our analysis. We delete data from 17 other countries because not all information necessary for our analysis was available

from the survey. Appendix Table 1 identifies the number of observations in our sample by country and shows the year of the WBES for each country.

In order to focus on SMEs and to be consistent with research on U.S. SMEs, we only use data from firms with less than 500 employees according to the definition of SME in the US.

The WBESs collect information about the business environment, how it is perceived by individual firms, how it changes over time, and about the various constraints to firm performance and growth. In each country surveyed, the WBESs collect firm-level data on a representative sample in the non-agricultural, formal private economy in the manufacturing, services, transportation, and construction sectors; the surveys explicitly exclude firms in the public-utilities, government-services, health-care, and the financial-services sectors.

Besides the consistent definition of the population, the methodology of implementation and core questionnaire have served as foundation for the so-called “Global Methodology” under which the various surveys have been conducted. Because the standardized approach of the Global Methodology was implemented beginning in 2006, it is possible to compare the surveys across countries and years.

The data collected through the surveys include quantitative as well as qualitative information. World Bank representatives conducted face-to-face interviews with company owners and managers in order to gather information on their firms and the business environment in each country. The surveys address a broad range of topics, such as general information on the company, infrastructure, services, crime, finance, and labor.

One key limitation of the WBESs is the fact that most of the data gathered in the survey are based on subjective perceptions of the owners and managers of the firms, with the exception of some company figures. Another is the fact that the WBESs do not provide some key information about firms that typically are required by banks when a company applies for a loan—performance indicators, such as the profitability, debt-equity-ratio, margins, etc. are not included in the data. Even so, the WBESs provide detailed information about each firm's most recent

borrowing experience. This includes whether or not the firm applied for credit and, if the firm did not apply, did it fail to apply because it feared its application would be rejected (discouraged borrowers).

## **4 Methodology and Model Specification**

### **4.1 Model Specification**

In order to analyze characteristics of firms that need credit, apply for credit and get credit, we follow the methodology of Cole (2009). First, we classify firms into one of four categories based upon their responses to questions regarding their most recent loan request during the previous years:

- (1) *“No-Need”* Firms: the firm did not apply for credit during the previous three years because the firm did not need credit.
- (2) *“Discouraged”* Firms: the firm did not apply for credit during the previous year because the firm feared rejection, even though it needed credit.
- (3) *“Denied”* Firms: the firm did apply for credit during the previous three years but was denied credit by its prospective lender(s).
- (4) *“Approved”* Firms: the firm did apply for credit and was approved for credit by its prospective lender.

Once we have classified our sample firms, we calculate descriptive statistics for each group of firms and test for significant differences across categories. We also conduct multivariate tests on the data, estimating logistic regression models that explain the sequential selection of the loan application and approval process. First, a firm decides whether it needs credit. We include firms from all four groups in this analysis, and define *Need Credit* as equal to zero for “no-need” firms and a value of one to all other firms (“discouraged”, “denied,” and “approved” firms).

Second, a firm that needs credit decides whether to apply for credit. We exclude “no-need” firms from this model and define *Apply for Credit* as equal to zero for “discouraged” firms

and equal to one for firms in one of the two groups that applied for credit (“denied” and “approved” firms).

Third, a firm that decides to apply for credit is either approved or denied credit by its prospective lender. In this stage of the model, we include only those firms that applied for credit and define *Get Credit* as equal to zero for “denied” firms and equal to one for “approved” firms.

We estimate this three-step sequential model using a univariate probit model at step 1 and using a bivariate probit selection model (see Van de Ven and Van Pragg (1981) and Greene (1992) and (1996)) at steps 2 and 3. This selection model is an extension of the bivariate probit model, which itself is an extension of the univariate probit model. We use a probit model because our dependent variables are binary (i.e., they take on a value of zero or one), so that ordinary least squares is inappropriate. We use a bivariate probit selection model at steps 2 and 3 in order to account for a non-random selection mechanism operating on those firms that need credit and on those firms that applied for credit. We cannot use the standard Heckman (1979) selection model because our the dependent variable in our second equation is binary; in Heckman’s model, the dependent variable in the second equation is continuous and can be estimated by ordinary least squares. The bivariate probit model consists of two equations

$$y_1^* = \beta_1' x_1 + \epsilon_1, y_1 = \text{sign}(y_1^*) \quad (1)$$

and

$$y_2^* = \beta_2' x_2 + \epsilon_2, y_2 = \text{sign}(y_2^*) \quad (2)$$

where:

$$\epsilon_1, \epsilon_2 \sim \text{Bivariate Normal}(0,0,1,1,\rho)$$

In the bivariate probit selection model,  $[y_1, x_1]$  are only observed when  $y_2$  is equal to one, so the error terms in eq. (1) and eq. (2) must be re-specified as  $\epsilon_j = \exp(\gamma_j + z_j) u_j$ , where  $[u_1, u_2]$  have the bivariate standard normal distribution. The estimated correlation coefficient  $\rho$  (the correlation between error terms  $\epsilon_1$  and  $\epsilon_2$ ) can be used to test for selection bias. If  $\rho$  is statistically significant, then we can reject the null hypothesis that selection bias is not present.

In our particular setting, our selection equation at step 2 is the Need Credit equation, explaining who needs credit, and our primary equation of interest is the Apply for Credit equation. At step 3, our selection equation is the Apply for Credit equation and our primary equation of interest is the Get Credit equation.

Our methodology differs in one important ways from Cole (2009) by following Claessens *et al.* (2001) in using country-level sampling weights, where the weights are the inverse of the number of firms in a country in a given year; this procedure enables us to avoid giving undue weight to countries with larger samples. In addition to analyzing our full sample, we also analyze separately firms from developing and developed countries. We categorize countries in developing and developed countries based upon the World Bank income classification. Developing countries include the countries classified as low-income and lower middle-income, while developed countries include those in the categories of upper middle-income and high-income. In line with the results of Beck *et al.* (2008), we expect firms in developed countries to face fewer difficulties in obtaining a credit, as the financial sector in these countries is usually further developed.

## **4.2 Dependent variables**

In this section, we explain in detail our classification criteria for each borrower type with reference to specific WBES questions.

*No-Need:* Firms reporting that they did not apply for credit during the last complete fiscal year and also answered with “No need for a loan - establishment has sufficient capital” when asked about the main reason of absence of a credit application on question K.17 of the WBES (2006-2010) questionnaire.

*Discouraged:* Firms reporting that they did not apply for credit during the last complete fiscal year and also answered with “Application procedures for loans or line of credit are complex,” “Interest rates are not favorable,” “Collateral requirements for loans or line of credit are unattainable,” “Size of loan and maturity are insufficient,” “Did not think it would be

approved,” or “Other,” when asked about the main reason of absence of a credit application on question K.17 of the WBES (2006-2010) questionnaire.

*Denied:* Firms reporting that they applied for credit during the last complete fiscal year and which do not report a credit at the time of the interview. These firms are identified using questions K.16 (application of credit during last complete fiscal year), K.8 (existence of credit at this time), and K.10 (year of approval of existing credit) of the WBESs (2006 – 2010).

*Approved:* Firms reporting that they applied for a loan during the last fiscal year, that they had a credit at the time of the interview, and that a credit was granted in the last complete fiscal year or in the current year by its prospective lender(s).

### **4.3 Independent variables**

For explanatory variables, we generally follow the existing literature on the availability of credit, which hypothesizes that a lender is more likely to extend credit to a firm when that firm shares characteristics of other firms that historically have been most likely to repay their credits. We expect that the same set of characteristics should explain *no-need firms* relative to *need firms*; *applied firms* relative to *discouraged firms*; as well as *approved firms* relative to *denied firms*.

#### *4.3.1 Firm Characteristics*

Firm characteristics include public reputation as proxied by firm age; growth opportunities as proxied by the growth of the firm; firm size as measured by the sales volume; the legal form; firm transparency as proxied by the reported use of an external auditor; and firm industrial classification as measured by a set of dummy variables.

We expect that the age of a firm, measured by the number of years since the firm started its operations, is a positive influence on the availability of credit. Older firms are thought to be more creditworthy because they have survived the high-risk start-up period in a firm’s life cycle and, over time, have developed a public track record that can be scrutinized by a prospective lender. Hence, firm age can be used as a proxy for the firm’s reputation. Beck *et al.* (2006) argue that older firms report fewer financing issues.

Larger firms, as measured by the sales volume, are thought to be more creditworthy because they tend to be better established and typically are more diversified than are smaller firms. Beck *et al.* (2006) and Aterido *et al.* (2007) find that micro and small firms face more obstacles in accessing finance than do large firms. We use the logarithm of the sales volume.

In order to capture the growth of a company, we include the sales growth variable. Sales growth is measured as the difference between the sales volumes at the end of the referring fiscal year compared to the sales volume three fiscal years ago. Creditors are more likely to favor firms with positive-growth rates because they are usually better able to cover interest rate expenses and amortization rates for loans than are firms with negative or low growth rates.

We also use information on legal form of organization to classify firms as corporations or non-corporations, which includes both proprietorships and partnerships.<sup>3</sup>

We classify firms by industry using a set of dummy variables: one each for *construction*,<sup>4</sup> *restaurant\_hotel*, *textiles*,<sup>5</sup> *manufacturing*,<sup>6</sup> *food*, *retail\_wholesale* trading companies and *other services*. Firms in manufacturing industries are thought to be more creditworthy because they typically have more tangible assets that can be pledged as collateral than do firms in more service-oriented industries.

Furthermore, we check whether the existence of an external auditor has a significant influence on credit need, applications and availability. Hope *et al.* (2011) find that private firms having their financial statement reviewed by an external auditor face fewer problems in gaining access to external finance, presumably because of the greater transparency.

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<sup>3</sup> There are too few partnerships to conduct a meaningful analysis of this group separately from proprietorships.

<sup>4</sup> *Construction* includes firms classified in the construction and transportation industries.

<sup>5</sup> *Textiles* includes firms classified in the textiles, leather and garments industries.

<sup>6</sup> *Manufacturing* includes firms classified in the metals & machinery, electronics, chemicals & pharmaceuticals, wood & furniture, non-metallic & plastic materials, auto & auto components, and other manufacturing industries.

#### 4.3.2 *Owner Characteristics*

Our vector of *owner characteristics* includes variables such as the *experience of the top manager* in this sector, the gender of the owner as measured by dummy variables for *female- or male-owned firms*; and dummy variables for *domestic-owned or foreign-owned firms*.

We include a variable measuring the experience of the top manager in this sector in years. The more experienced is a top manager, the better is her track record and, thus, the better is her creditworthiness expected to be.

The gender of the firm owner variable takes into account whether there are any females amongst the owners of the firm. We have no expectations regarding indicators for firms with female owners, even though Muravyev *et al.* (2009) argue that the probability that female-managed firms obtain credit is lower than with male-managed firms. We include this variable in an effort to ascertain whether minority-owned firms are experiencing disparate outcomes in the credit markets relative to firms whose controlling owners are males.

Furthermore, we include a dummy variable regarding foreign and domestic ownership. The company is “*foreign-owned*” if private foreign individuals, companies or organizations own 50% or more of the firm. The results of this variable might heavily depend on the country of the owner and the country in which the firm is acting. Generally, we expect that a lender perceives a domestic owner to be more creditworthy because it should be easier for a lender to gather information on domestic than on foreign owners; in addition, it should be easier to collect unsecured debt from a domestic owner.

#### 4.3.3 *Market/Environmental Characteristics*

We measure market characteristics using GDP growth, GDP per capita, the inflation rate, by a set of dummy variables indicating the year of the credit application, and by a dummy variable indicating that a firm is located in a large city rather than in a rural area. We obtain the GDP growth variable, the inflation rate and GDP per capita variable from the World Development Indicators database.

We account for potential effects of macroeconomic developments by including variables for GDP growth, inflation and GDP per capita. Controlling for GDP growth allows us to control for business cycles effects that might affect credit availability, as the creditworthiness of borrowers varies over the business cycle, too (Bernanke and Gertler, 1989; Kiyotaki and Moore, 1997). We expect that GDP growth has a negative relation with credit availability. In accordance with the empirical results from Keeton and Morris (1988) and Sinkey and Greenawalt (1991), we assume that the average probability of default of a loan is highly correlated with economic development. However, developing countries with higher GDP growth are likely to exhibit higher default probabilities compared to developed countries, so it is unclear *à priori* which effect will dominate when analyzing the whole sample. We also expect the income status of a country to influence credit availability. Hence, we include GDP per capita as an explanatory variable. In line with the results of Beck *et al.* (2008), we expect firms in developed countries to face fewer difficulties in obtaining a credit, as the financial sector in these countries is usually better developed.

Previous research has found that rural markets are less competitive than urban markets. This lack of competition could make it more difficult to obtain a loan; however, it also could make it easier for a firm with a pre-existing relationship with a lender to obtain a loan, albeit at a higher interest rate. Consequently, we are agnostic on the sign of this variable. We define *large cities* as those with populations over 250,000 whereas we define *small cities* as those with less than 250,000 residents.

**Table 1** gives a brief overview and description of the variables used in our analysis.

## 5 Results

### 5.1 Descriptive Statistics and Univariate Results

**Table 2** presents descriptive statistics for the full sample, and, separately, for firms that need credit and for firms that have no need for credit, along with a *t*-test for differences in means

of these two groups. We will first describe the full-sample means before we will discuss the differences in the means of the *t*-tests.

### *5.1.1 Full Sample*

The averages for our full sample appear in column 2 of Table 2. The average firm in our sample has been in business for 17.8 years. More than 70 percent of the firms have positive employment growth, reporting more employees as of the date the survey than three years earlier. By employment size, the average firm in our sample has fewer than 20 employees. By legal form of organization, 57 percent of the firms organize as corporations while the remaining 43 percent organize as proprietorships or partnerships. Almost half of the firms (47 percent) have their financial statements checked and certified by an external auditor.

By industry, 32 percent of the firms are in manufacturing, 23 percent are in retail and wholesale trade, 6 percent are in construction, 3 percent in restaurant and hotels, 13 percent in each textiles and food, and 10 percent in other services.

Regarding the owner characteristics, the top manager has, on average, 18 years of experience in this sector. By ownership, 91 percent of the firms are domestic, while the remaining 9 percent are foreign-owned. Foreign ownership refers to the nationality of the shareholders. If the primary owner is a foreign national resident in the country, it is still a foreign owned firm. At least one of the owners is a female at 36 percent of the firms.

The average GDP growth of the 80 countries in the sample is 5.7 percent, while the average inflation rate is 7.6 percent. Looking at the distribution by survey year, 32 percent of the firm-year observations come from 2006, 18 percent from 2007, 22 percent from 2008, 15 percent in 2009, 12 percent from 2010 and 1 percent from 2011. By location, 72 percent of all firms included in the survey are in a city that has more than 250,000 inhabitants. Because of the standardized approach of the Global methodology implemented in 2006, it is possible to compare the various indicator sets across various countries and different years.

### 5.1.2 *No-Need Firms versus Need Credit Firms*

In columns 3 and 4 of **Table 2** are the averages for our “Need” and “No-Need” subsamples, respectively; the difference in mean appears in column 5, followed in column 6 with a *t*-statistic for a significance test on the difference in means shown in column 5. Most of the firm characteristics are significantly different for the subsamples of firms that need credit (“discouraged,” “denied,” and “approved”) and firms that have “no need” for credit.

Overall, 67 percent of all companies needed credit while 33 percent did not. This result is different from the U.S., where Cole (2009) reports that only 55 percent of all companies needed credit.

When compared to a firm with no need for credit, a firm needing credit is younger (17.4 vs. 18.1 years), larger, less likely to be organized as a corporation (56% vs. 59%), and less likely to be certified by an external auditor (46% vs. 48%); by industry, it is more likely to be in the textiles (14% vs. 11%), manufacturing (33% vs. 31%), and food (13% vs. 12%) sectors, and less likely to be in the retail/wholesale trade (21% vs. 25%) and restaurant/hotel sectors (3% vs. 4%).

By ownership characteristics, a firm in need of credit is more likely to be domestic-owned (92% vs. 88%) and female-owned (37% vs. 35%), but no less experienced in management.

By market characteristics, a firm in need of credit is more likely to be located in a large city (74% vs. 69%), and in a country with lower GDP per capita (\$4,691 vs. \$5,274) and slower GDP growth (5.5% vs. 5.8%), i.e., need for credit is usually higher (lower) in economic downturns (upswings).

### 5.1.3 *Discouraged versus Applied Firms*

**Table 3** presents averages for all firms that need credit, and then, separately, for firms that applied for a credit and for discouraged firms, i.e., for firms that needed credit but did not apply because they feared rejection, along with a *t*-test for differences in means of these two groups.

Overall, almost 39% of the 29,174 firms that needed credit were discouraged. This is significantly more than in the U.S. (28%; Cole, 2009) and Western Europe (17%; Brown *et al.*, 2011) but similar to Eastern Europe (40%; Brown *et al.*, 2011).

Relative to a “discouraged” firm, an “applied” firm is significantly older (20.2 vs. 14.8 years), larger, more likely to be growing (73% vs. 69%), more likely to be organized as a corporation (67% vs. 39%), and more likely to be certified by an external auditor (55% vs. 32%); by industry, it is less likely to be in the restaurant/hotel (2% vs. 4%), textiles (14% vs. 15%), and retail and wholesale (21% vs. 22%) sectors, and more likely to be in the construction (6.4% vs. 5.6%), manufacturing (34% vs. 31%) and food (14% vs. 13%) sectors.

By owner characteristics, an “applied” firm has more experienced management (19.4 vs. 15.6 years), is more likely to be foreign-owned (8.2% vs. 6.6%), and is more likely to have a female owner (39% vs. 33%).

By market characteristic, an “applied” firm is significantly more likely to be located in a large city and in a country with slower GDP growth (5.4% vs. 6.3%) and higher GDP per capita (\$5,521 vs. \$3,380), and lower inflation (7.0% vs. 8.6%).

#### 5.1.4 *Approved Firms versus Denied Firms*

**Table 4** presents descriptive statistics for firms that applied for a credit, and then, separately, for firms that received credit (“approved” firms) and for firms that were turned down (“denied” firms), along with the difference in these two means and a *t*-test for significant differences in means.

Overall, just under half (49.7%) of the firms applying for credit were turned down by their prospective lenders. By comparison, Cole (2009) reports that only 11% - 22% of the U.S. firms applying for credit were turned down. Hence, credit around the world appears to be much tighter than in the U.S.

When compared with a “denied” firm, we find that an “approved” firm is significantly older (22.3 vs. 18.2 years), larger, more likely to be growing (75% vs. 70%), are less likely to be

organized as corporations (65.6% vs. 68.3%), and more likely to be certified by an external auditor (57.6% vs. 52.7%); by industry, it is less likely to be in the construction (5.4% vs. 7.4%), and retail/wholesale trade (17.6% vs. 24.5%) sectors, and more likely to in the textiles (15.4% vs. 11.9%), manufacturing (36.2% vs. 32.0%) and food (15.3% vs. 12.4%) sectors.

By owner characteristics, an “approved” firm is significantly larger, has significantly more managerial experience (22.4 vs. 18.2 years), is significantly more likely to be foreign-owned (8.7% vs. 7.6%) and is significantly less likely to have a female owner (38.0% vs. 40.8%).

By market characteristics, an “approved” firm is significantly more likely to be located in a large city (85.5% vs. 67.9%), and in a country with faster GDP growth (6.5% vs. 4.4%), lower GDP per capita (\$4,656 vs. \$6,398) and lower inflation (5.0% vs. 9.1%).

## 5.2 Multivariate Results

In **Table 5**, we present our multivariate results from estimating a set of the three sequential logistic regression models explaining who needs credit, who applies for credit and who gets credit, as described in section 4.2. Rather than present logit coefficients, which are uninformative other than sign, we exponentiate these coefficients to obtain the “odds ratios” associated with each variable. This enables us to talk about the magnitude of effects. An odds ratio greater than 1.00 indicates that a firm with that characteristic is more likely to need credit, whereas an odds ratio less than 1.00 indicates that a firm with that characteristic is less likely to need credit.

In Column 2, we show the results for firms that need credit versus firms that do not need credit. *Need Credit* is equal to zero if the firm indicated that it did not need credit (“no-need” firms) and equal to one else (including “discouraged,” “denied,” and “approved” firms). Column 3 presents the results for *Applied*, which is equal to zero for “discouraged” and equal to one for firms that applied for a credit (including “denied” and “approved” firms). Column 4 shows the results for *Get Credit*, which is equal to one for “approved” firms and zero for “denied” firms.

### 5.2.1 *Which firms need credit?*

Column 2 of Table 5 present results for estimating the weighted logistic regression model explaining which firms need credit. Among firm characteristics, we see that larger firms are more likely to need credit. For each increment in size (less than 20 employees, 20 – 100 employees, more than 100 employees), the odds ratio of 1.187 indicates that a firm is 18.7% more likely to need credit. We also find a quadratic relation between firm age and the need for credit, with a positive sign on firm age squares and a negative sign on firm age; this is consistent with a declining need for credit as a firm ages, with the decline at a decreasing rate. Corporations are less likely to need credit, with the odds ratio indicating that a corporation is 13.3% less likely to need credit than a proprietorship or partnership.

By industry, we see strong and significant differences in the need for credit. Relative to our omitted categories, firms in the construction sector are 16.0% more likely to need credit, firms in other services are 16.1% more likely to need credit, firms in the manufacturing sector are 26.0% more likely to need credit, firms in the food sector are 26.9% more likely to need credit, and firms in the textiles sector are 32.7% more likely to need credit; whereas firms in the restaurant/hotel sector are 38.0% less likely to need credit.

By owner characteristics, firms with more experienced management are significantly less likely to need credit. For each additional ten year of experience, a firm is 3.0% less likely to need credit. Domestic-owned firms are 84.4% more likely to need credit than are foreign-owned firms. The lower demand of foreign-owned firms confirms our predictions, as these firms are more likely have alternative funding sources. A firm with a female owner is 19.2% more likely to need credit than is a firm with no female owners. This result suggests that female-owned firms are more likely to be credit constrained than are male-owned firms.

By market characteristics, firms located in small cities are 5.7% more likely to need credit. Firms located in a country with higher GDP growth, higher GDP per capita and lower inflation are less likely to need credit. For each percentage point increase in GDP growth, a firm

is 0.9% less likely to need credit. For each thousand-dollar increase in GDP per capita, a firm is 1.8% less likely to need credit. For each percentage point increase in the inflation rate, a firm is 2.7% more likely to need credit.

Our year dummies clearly show the impact of the 2008 – 2009 financial crisis on the need for credit. Relative to the omitted year of 2008, we see that a firm was 43% more likely to need credit in 2006, 65.5% more likely to need credit in 2007, 72% more likely to need credit in 2010 and 227% more likely to need credit in 2011; the coefficient for 2009 is not significantly different from zero.

Columns 2 and 3 of **Table 6** present results for our weighted logistic regression model when we split our sample into developed and developing countries, respectively. As in column 2 of Table 5, we find a positive relation between firm size in both subsamples, but the odds ratio indicates a much stronger relation in developed (25.9%) than developing (12.9%) countries. The signs on firm age and firm age squared are consistent with those in column 2 of Table 5, but the standard errors are higher because of the smaller sample sizes and we lose statistical significance. Corporations are less likely to need credit in both subsamples, but only in the developing sample is this variable statistically significant, with the odds ratio indicating that corporations are 9.8% less likely to need credit. Firms with external auditors are more likely to need credit in developed countries but less likely to need credit in developing countries, but only the latter result is significant. In developing countries, such firms are 16.6% less likely to need credit.

By industry, restaurant/hotel firms are significantly less likely to need credit, while textiles and manufacturing firms are significantly more likely to need credit, in both developed and developing countries. Firms in the construction, food, and other services sectors are significantly more likely to need credit in developing, but not developed, countries.

By ownership characteristics, we see that the results for management experience and female ownership are driven by developing countries, where firms with less experienced managers and female owners are more likely to need credit. Only the result for domestic

ownership is significant in both subsamples; such firms are significantly more likely to need credit than are foreign-owned firms.

By market characteristics, we find a positive relation between inflation and the need for credit and a negative relation between per capita GDP and the need for credit in both developed and developing countries.

We find strong differences between developed and developing countries in the year dummies. For 2006, the coefficient is negative and significant for developed countries but positive and significant for developing countries. For 2007 and 2009, the coefficients are insignificant for developed countries but positive and significant for developing countries. Only for 2010 and 2011 are the coefficients positive and significant for both subsamples.

### 5.2.2 *Which firms apply for a credit?*

Column 3 in **Table 5** shows the results from the second stage of our sequential logit model where *applycredit* is equal to one if the firm applied for credit (“denied” and “approved” firms) and is equal to zero if the firm indicated that it needed credit but was “discouraged” and did not apply.

Among firm characteristics, we see that larger firms are significantly less likely to be discouraged. For each increment in firm size (less than 20 employees, 20-100 employees, and more than 100 employees), a firm is 72.8% more likely to apply for credit. We also find a positive relation between the likelihood of applying and our interaction between firm size and firm growth. Corporations are less likely to be discouraged. A corporation is 58.6% more likely to apply than a proprietorship or partnership. Similarly, a firm with an external auditor is less likely to be discouraged. Such firms are 76.7% more likely to apply than are similar firms without an external auditor. It is likely that a firm with an external auditor receives better advice on whether or not to apply for credit than does a firm without such counsel.

By industry, we find that firms in the restaurant/hotel, other services, textiles and manufacturing sectors are significantly more likely to be discouraged than are firms in the omitted categories, by 20% - 30%.

Among owner characteristics, we find that firms with more experienced management, with domestic owners and with female owners are significantly less likely to be discouraged and more likely to apply for credit. Firms with female owners are 12.7% more likely to apply while firms with domestic owners are 37.5% more likely to apply. For each additional ten years of managerial experience, a firm is 8.0% more likely to apply.

Among market characteristics, we find that firms in smaller cities are significantly more likely to be discouraged; the associated odds ratio indicates that such firms are 23% less likely to apply than are firms in larger cities. Firms located in countries with higher per capita GDP and lower inflation are less likely to be discouraged; for each additional \$1,000 in per capital GDP, a firm is 6.7% more likely to apply, while, for each percentage point in inflation, a firm is 2.9% less likely to apply.

Finally, we find that three of our six year dummies are significant. In each of these years (2006, 2007 and 2009), firms were significantly more likely to be discouraged and less likely to apply for credit relative to the omitted crisis year of 2008.

Columns 4 and 5 of **Table 6** present results for our weighted logistic regression model when we split our sample into developed and developing countries, respectively. Overall, almost 39% of the 29,174 firms that needed credit were discouraged. However, while the ratio of discouraged borrowers in developing countries is 44%, in developed countries, only 28% of the companies are discouraged. We thus also take a closer look on this difference.

As in column 3 of Table 5, we find a positive relation between firm size in both subsamples. The odds ratios indicate a strong relation in both developed (43%) and developing (39%) countries. Similar results hold for corporations and for firms with external auditors, for which we also find significantly positive relations of similar magnitude in both subsamples.

However, we do find some differences in the two subsamples. Firms with positive growth are significantly less likely to be discouraged in developed, but not in developing, countries. In developing countries, only large firm with positive growth are less likely to be discouraged. In developed, but not developing, countries, firm age is positive and significant and firm age squared is negative and significant, indicating a quadratic relationship that is consistent with older firms being less likely to be discouraged, but at a decreasing rate as firms age.

By industry, we find that firms in the textiles sector are significantly more likely to be discouraged in both developed and developing countries. In developing, but not developed, countries, firms in the manufacturing and other services sectors are significantly more likely to be discouraged and less likely to apply.

Among our owner characteristics, domestic-owned firms are significantly less likely to be discouraged in both developed and developing countries. Firms with more experienced management are more likely to be discouraged in developing countries but not in developed countries. Firms with a female owner are less likely to be discouraged in developing countries, but more likely to be discouraged in developed countries. The result for developed countries is consistent with Cole (2009), who finds that female-owned firms in the U.S. are much more likely to be discouraged.

Among market characteristics, firms located in small cities, and firms located in countries with lower per capita GDP and higher inflation are more likely to be discouraged in both developed and developing countries. However, firms located in countries with higher GDP growth are more likely to be discouraged in developing countries, but are less likely to be discouraged in developed countries. This is consistent with the better-developed financial markets in developed countries, which reward firm growth in the allocation of credit.

Our year dummies show strong differences in the effect of the financial crisis on developed and developing countries. Firms in developed countries were more likely to be discouraged in each year relative to 2008, and only 2011 lacks statistical significance. Firm in

developing countries were significantly more likely to be discouraged in only 2007 and, even in that year, the coefficient is only about half that of developed countries.

### 5.2.3 *Who gets credit?*

Column 4 in **Table 5** presents the results from the third stage of our sequential logit model, where *getcredit* is equal to one if the firm indicated that it applied for a credit and got a credit (“approved” firms) and equal to zero if it applied for credit but was turned down (“denied” firms). Overall, our analyses suggest that many firms in our sample were experiencing limited access to credit. As mentioned above, only 50.3% of the firms applying for credit have their applications approved. Given this substantial share of firms that are denied or discouraged from applying for credit, it is worthwhile looking closer at the determinants of loan rejection.

Among firm characteristics, we see that larger firms are significantly less likely to be denied credit. For each increment in firm size (less than 20 employees, 20-100 employees, and more than 100 employees), a firm is 20.6% more likely to be extended credit. This result confirms, among others, the findings of Beck *et al.* (20006) that financing obstacles are higher for small firms than for large firms. The reason for this relationship is that information asymmetries are expected to be greater for young and newly established firms. Banks have not had enough time to monitor/evaluate such firms, and young firms have not had enough time to build long-term relationships with suppliers of finance, respectively. Furthermore, larger firms are thought to be more creditworthy because they tend to be better established and typically are more diversified than are smaller firms.

We also find that firms with positive growth are less likely to be denied credit, but only if they are larger firms. The costs of applying for a loan and the likelihood of being rejected for small firms is thus higher because the financial transparency is usually lower for this firms. Furthermore, firms with external auditors are less likely to be denied credit; audited firms are 11.4% more likely to be extended credit than are firms without such auditors. Clearly, this type of external certification improves financial transparency and, thus, the availability of credit to SMEs

by lowering informational asymmetries. Furthermore, small firms also have fewer tangible assets to provide as collateral and are less profitable than are larger firms.

By industry, firms in the restaurant/hotel, other services, textiles and manufacturing sectors are more likely to be denied credit than are firms in the omitted categories. Moreover, these industry effects are large. Firms in these four industries are 28.5%, 39.7%, 25.1% and 23.8% less likely to be extended credit, respectively.

Among the owner characteristics, only managerial experience has a significant effect on the likelihood of approval. For each additional year of experience, a firm is 1.7% more likely to be extended credit.

Among the market characteristics, we find that firms in small cities and in countries with higher per capita GDP and higher inflation are more likely to be denied credit, while firms in countries with higher GDP growth are less likely to be denied credit. A firm in small city is 14.3% less likely to be extended credit. For each \$1,000 in per capita GDP, a firm is 5.7% less likely to be extended credit. For each percentage point increase in inflation, a firm is 5.0% less likely to be extended credit. For each percentage point increase in GDP growth, a firm is 1.6% more likely to be extended credit.

Not surprising, another crucial determinant of credit availability is the economic environment as proxied by our set of year dummies. Companies applying in times of turmoil (2008) were significantly more likely turned down than in the years before or after the crisis. The odds ratios indicate that the impact of the crisis was massive. Relative to 2008, firms applying in 2006 and 2007 were more than eight times as likely to be extended credit; firm applying in 2009 were more than five times as likely to be extended credit; and firms applying during 2010 and 2011 were more than 12 times as likely to be extended credit.

Columns 6 and 7 of **Table 6** present results for our weighted logistic regression model when we split our sample into developed and developing countries, respectively. As in column 3 of Table 5, we find a positive relation between firm size in both subsamples. The odds ratios

indicate a strong relation in both developed (15.4%) and developing (14.5%) countries. Similar results hold for firms with external auditors, for which we also find significantly positive relations of similar magnitude in both subsamples.

Among ownership characteristics, firms with a female owner are more likely to be extended credit in developed countries, but are more likely to be denied credit in developing countries. This might be attributable to stronger anti-discrimination laws in developed relative to developing countries. Our results are in line with the results of Cavalluzzo and Cavalluzzo (1998) and Cole and Mehran (2011) using the Surveys of Small Business Finance (SSBF) for the United States to study the impact of borrower's gender on the probability of loan approval. They both show that female small business owners are not disadvantaged vis-à-vis their male counterparts in a developed country. On the other side, our results also confirm the analyses of Muravyev et al. (2009) using the Business Environment and Enterprise Performance Survey (BEEPS) to study gender-based discrimination in small business lending in 26 transition economies. These authors provided evidence that female-owned businesses are significantly less likely to receive a loan compared to their male counterparts. Our results in developing countries suggest that women owners are discriminated, when we assume that there exist no differences in riskiness or entrepreneurial ability between the investigated male- and female-owned firms.

Among market characteristics, we find that firms located in small cities are much more likely to be denied credit while firms located in countries with higher per capita GDP are less likely to be denied credit, but each of these effects is much stronger in developed relative to developing countries. Inflation increases the likelihood of denial in developing countries but reduces it in developed countries.

With respect to the year dummies, we find that each is positive and significant in each year for both the developed and developing countries; however, the magnitude of the time dummies are about four times as large in the developed countries. In other words, the negative

impact of the financial crisis on the availability of credit to SMEs was far more severe in developed relative to developing countries.

## **6 Conclusions**

In this study, we use data on more than 41,000 SMEs in 80 countries surveyed by the World Bank to analyze the availability of credit around the world. Following Cole (2009), we classify firms into one of four mutually exclusive groups: no-need, discouraged, denied and approved. As compared with results for the U.S. reported by Cole (2009), we find that firms around the world are much more likely to be discouraged from applying for credit, even though they need credit; and are much more likely to be denied credit when they need and apply for credit. In our sample, almost 40% of the overall firms that needed credit did not apply because they were discouraged, whereas in the U.S., the corresponding figure is about 30%. However, when we split our sample into developed and developing countries, we find similar that only 33% of the firms in developed countries are discouraged, consistent with the U.S., while 44% of the firms in developing countries are discouraged.

Firms are discouraged not only by subjective feelings, but also by unfavorable interest rates and collateral conditions. However, the reason why a firm is discouraged from applying for a loan is not fully clear. High interest rates and large collateral requirements may reflect true impediments of promising firms and projects. On the other hand, high interest rates and large collateral requirement might also be due to financial difficulties of the discouraged firm. The subjective “feeling” of discouragement can be the result of the fact that a firm knows that the probability of success of the relevant project is low, or because of non-economic reasons such as discrimination.

In our sample, almost half of the firms that applied were turned down, whereas in U.S., the corresponding figure is less than 20%. In other words, credit is much less “available” around the world than in the U.S., so that policies to improve the availability of credit are even more important. Surprisingly, the turndown rate was higher in developed countries (54%) than in

developing countries (54% vs. 48%); however, this might be an artifact of the financial crisis years, when lenders that are more sophisticated would have been more likely to deny credit.

Overall, we find that a “no-need” firm is older and smaller than a firm that needs credit; is more likely to be organized as a corporation and to have an outside auditor; is more likely to be owned by a male and by a foreigner; and is more likely to be located in a small city and in a country with higher GDP per capita and GDP growth.

Among firms that need credit, we find that a “discouraged” firm is younger, smaller and growing slower than a firm that applied for credit; is much less likely to be organized as a corporation or to have an external auditor; is less likely to run by an experienced management team or to be owned by a foreigner or female; and is more likely to be located in a small city and in a country with higher inflation and lower GDP per capita but with higher GDP growth.

Among firms that apply for credit, we find that an approved firm is older, larger, and growing faster; is less likely to be organized as corporations but more likely to have an external auditor; is more likely to be run by more experienced management team and to be owned by foreigner and a male; and is more likely to be located in a large city and in a country with lower inflation and GDP per capita but higher GDP growth.

Our results suggest to policy-makers that the need for policy to foster credit access is still one of the key issues in many countries. Policy measures should promote credit access, as many small firms (above all in certain industries) are discouraged from applying for credit. These credit constraints might limit product development and innovation by some firms, possibly harming long-term economic growth (see Levine, 2005, for an overview of the literature supporting this relationship). As our results reveal, a policy to increase information sharing and transparency (for example by external auditors) seem to be an effective way to improve credit availability, as it reduces informational asymmetries and significantly improves the probability of getting a credit. Still, the question remains whether this large fraction of discouraged and denied borrowers

reflects missed growth opportunities, or if it is the result of a useful screening of weak applicants and, thus, points to a more efficient allocation of credit.

We contribute to the literature in at least three important ways. First, we provide the first rigorous analysis of the differences in our four types of firms: non-borrowers, discouraged borrowers, denied borrowers and approved borrowers, for a large international sample of countries around the world. So far, researchers only have analyzed SMEs in the U.S. (Cole, 2009) and Europe (Brown *et al.*, 2011). We also separately consider developing and developed countries. Even though our study reveals some differences between developing and developed countries, it also shows a number of interesting similarities and patterns between these two groups.

Second, we provide an analysis of credit availability that properly accounts for the inherent self-selection mechanisms involved in the credit application process: who needs credit, who applies for credit conditional upon needing credit, and who gets credit, conditional upon applying for credit. Most previous researchers, except for Cole (2009) and Brown *et al.* (2011), have ignored firms that do not need credit, and many have pooled discouraged and denied firms. We find differences across these groups. Hence, our results shed new light upon the credit-allocation process.

Third, we provide evidence from the 2006 – 2011 WBES on the availability of credit to small businesses using the World Bank’s “global methodology.” This contributes to the growing literature on SME finance that has emerged from these surveys, including Beck *et al.* (2005, 2006, 2008); Chakravarty and Xiang (2009) and De la Torre *et al.* (2010). Our study, however, analyzes only those surveys conducted under the “Global Methodology” implemented by the World Bank in 2006 to ensure comparability of surveys across years and countries.

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**Table 1:**  
**Definitions of variables used to explain who needs credit and who gets credit around the world**

<b>Variables</b>	<b>Description</b>
<b>Dependent variables</b>	
<i>Needcredit</i>	Binary variable which takes on a value of 1 if the firm indicated that it needed credit, and 0 otherwise.
<i>Applycredit</i>	Binary variable which takes on a value of 1 if the firm indicated that it applied for credit, and 0 otherwise.
<i>Getcredit</i>	Binary variable which takes on a value of 1 if the firm indicated that it got credit, and 0 otherwise.
<b>Independent variables</b>	
<b><i>Firm characteristics</i></b>	
<i>Age</i>	Number of years since the firm started its operations as a proxy for the firm's reputation.
<i>lnSales</i>	Firm's size measured by the ln of the sales volume.
<i>SalesGrowth</i>	Firm's growth is measured by the growth of sales.
<i>Corp</i>	Dummy variable for firms that are organized as corporations.
<i>NonCorp</i>	Dummy variable for firms that are organized either as proprietorships or as partnerships.
<i>Externalauditor</i>	Dummy variable for firms with checked and certified statements.
<i>Sectors</i>	Dummy variables for the sectors in which a firm is operating (construction, restaurant or hotel, textiles, manufacturing, food, retail wholesales, and other services)
<b><i>Owner characteristics</i></b>	
<i>Experiencemgt</i>	Experience of the top manager in this sector in years.
<i>Domesticowned</i>	Dummy variable with a domestic owner.
<i>Foreignowned</i>	Dummy variable with a foreign owner.
<i>Femaleowner</i>	Dummy variable for female-managed firms.
<i>Maleowner</i>	Dummy variable for male-managed firms.
<b><i>Market/Environmental characteristics</i></b>	
<i>Smallcity</i>	Dummy variable for firms located in cities with a population less than 250,000 people.
<i>Largecity</i>	Dummy variable for firms located in cities with a population over 250,000 people.
<i>GDPgrowth</i>	The yearly real GDP growth (%).
<i>GDPpercapita</i>	Real GDP per capita in USD.
<i>Inflation</i>	The annual inflation rate (in %).
<i>Year</i>	Dummy variable for the year in which the survey was conducted.

**Table 2:****Descriptive statistics for the full sample and, separately, for Need and No-Need firms**

Need for credit (*needcredit*) is a binary variable that takes on a value of 1 if the firm indicated that it needed credit (applied for credit and was extended or denied credit or was discouraged and did not apply for credit) and a value of 0 if the firm did not apply for credit because it did not need credit. For each variable in column 1, column 2 presents the mean for the full sample, and columns 3 and 4 present the means for “need” firms and “no need” firms, respectively. Column 5 presents the difference in the means of “need” firms and “no need” firms, and column 6 presents the results of *t*-tests for significance of the differences in means. Variables are defined in Table 1. Data are from the World Bank Enterprise Surveys, and include 43,418 firm-year observations from 80 countries over the 2006 – 2011 period.

\*, \*\*, \*\*\* indicate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

(1) Variable	(2) All	(3) Need	(4) No Need	(5) Difference	(6) <i>t</i> -Statistic
Observations	41,991	28,129	13,862		
<b>Firm Characteristics</b>					
Age	17.378	17.475	17.181	0.294	1.77**
lnSales	16.663	16.835	16.299	0.536	15.79***
Salesgrowth	0.369	0.385	0.336	0.049	4.67***
Corp	0.560	0.549	0.582	-0.033	-6.47***
NonCorp	0.440	0.451	0.418	0.033	6.47***
Externalauditor	0.456	0.446	0.475	-0.029	-5.50***
Construction	0.062	0.061	0.063	-0.002	-1.04
Restaurant_Hotel	0.032	0.026	0.044	-0.018	-8.89***
OtherServ	0.095	0.093	0.098	-0.005	-1.51*
Textiles	0.130	0.140	0.111	0.029	8.71***
Manufacturing	0.325	0.332	0.311	0.021	4.34***
Food	0.126	0.131	0.118	0.013	3.66***
Retail_Wholesale	0.230	0.217	0.255	-0.038	-8.50***
<b>Owner Characteristics</b>					
Experiencemgmt	17.833	17.840	17.820	0.020	0.16
Domesticowned	0.914	0.930	0.882	0.048	15.40***
Foreignowned	0.086	0.070	0.118	-0.048	-15.40***
Femaleowner	0.364	0.371	0.349	0.022	4.40***
Maleowner	0.636	0.629	0.651	-0.022	-4.40***
<b>Market Characteristics</b>					
Smallcity	0.280	0.266	0.308	-0.042	-8.84***
Largecity	0.720	0.734	0.692	0.042	8.84***
GDPgrowth	5.720	5.806	5.546	0.261	4.19***
GDPpercapita	4,831.17	4,630.28	5,238.82	-608.54	-13.21***
Inflation	7.638	7.666	7.579	0.087	1.40*
Year2006	0.320	0.320	0.318	0.002	0.32
Year2007	0.181	0.190	0.163	0.027	6.90***
Year2008	0.218	0.204	0.249	-0.045	-10.26***
Year2009	0.151	0.141	0.174	-0.033	-8.64***
Year2010	0.122	0.136	0.092	0.044	13.85***
Year2011	0.008	0.010	0.004	0.005	6.54***

**Table 3:**  
**Descriptive statistics for Need-Credit firms and, separately, for Applied and Discouraged firms**

Applied for Credit (*applycredit*) is a binary variable that takes on a value of 1 if the firm applied for credit and was extended or denied credit and a value of 0 if the firm was discouraged and did not apply for credit. For each variable in column 1, column 2 presents the mean for firms indicating a need for credit, and columns 3 and 4 present the means for “applied” firms and “discouraged” firms, respectively. Column 5 presents the difference in the means of “applied” firms and “discouraged” firms, and column 6 presents the results of *t*-tests for significance of the differences in means. Variables are defined in Table 1. Data are from the World Bank Enterprise Surveys, and include 43,418 firm-year observations from 80 countries over the 2006 – 2011 period.

\*, \*\*, \*\*\* indicate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

(1) Variable	(2) Need	(3) Applied	(4) Discouraged	(5) Difference	(6) <i>t</i> -Statistic
Observations	28,129	16,902	11,227		
<b>Firm characteristics</b>					
Age	17.475	19.319	14.699	4.620	24.12***
lnSales	16.835	17.384	16.020	1.364	35.80***
Salesgrowth	0.385	0.401	0.361	0.040	3.23***
Corp	0.549	0.657	0.386	0.271	46.13***
NonCorp	0.451	0.343	0.614	-0.271	-46.13***
Externalauditor	0.446	0.534	0.314	0.220	37.90***
Construction	0.061	0.064	0.056	0.008	2.89***
Restaurant_Hotel	0.026	0.017	0.040	-0.023	-10.93***
OtherServ	0.093	0.093	0.093	0.000	0.14
Textiles	0.140	0.134	0.148	-0.014	-3.23***
Manufacturing	0.332	0.344	0.313	0.031	5.47***
Food	0.131	0.134	0.126	0.008	1.92**
Retail_Wholesale	0.217	0.213	0.224	-0.011	-2.22**
<b>Owner characteristics</b>					
Experiencemgmt	17.840	19.321	15.609	3.712	26.71***
Domesticowned	0.930	0.927	0.935	-0.008	-2.70***
Foreignowned	0.070	0.073	0.065	0.008	2.70***
Femaleowner	0.371	0.396	0.334	0.062	10.61***
Maleowner	0.629	0.604	0.666	-0.062	-10.61***
<b>Market characteristics</b>					
Smallcity	0.266	0.237	0.310	-0.073	-13.28***
Largecity	0.734	0.763	0.690	0.073	13.28***
GDPgrowth	5.806	5.476	6.304	-0.828	-11.99***
GDPpercapita	4,630.28	5,472.81	3,361.88	2,110.93	43.92***
Inflation	7.666	7.032	8.622	-1.590	-19.97***
Year2006	0.320	0.314	0.328	-0.014	-2.47***
Year2007	0.190	0.124	0.289	-0.165	-33.41***
Year2008	0.203	0.223	0.175	0.048	10.04***
Year2009	0.141	0.154	0.120	0.034	8.13***
Year2010	0.136	0.173	0.082	0.091	23.48***
Year2011	0.010	0.012	0.006	0.006	6.31***

**Table 4:****Descriptive statistics for Applied firms and, separately, for Approved and Denied firms**

The dependent variable *Get Credit (getcredit)* is a binary variable that takes on a value of 1 if the firm applied for and was extended credit and a value of 0 if the firm applied for and was denied credit. For each variable in column 1, column 2 presents the mean for firms indicating that they applied for credit, and columns 3 and 4 present the means for “approved” firms and “denied” firms, respectively. Column 5 presents the difference in the means of “approved” firms and “denied” firms, and column 6 presents the results of *t*-tests for significance of the differences in means. Variables are defined in Table 1. Data are from the World Bank Enterprise Surveys, and include 43,418 firm-year observations from 80 countries over the 2006 – 2011 period.

\*, \*\*, \*\*\* indicate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

(1) Variable	(2) Applied	(3) Approved	(4) Denied	(5) Difference	(6) <i>t</i> -Statistic
Observations	16,902	8,462	8,440		
<b>Firm characteristics</b>					
Age	19.319	21.233	17.400	3.833	14.51***
lnSales	17.384	17.911	16.827	1.084	20.63***
Salesgrowth	0.401	0.356	0.447	-0.091	-5.44***
Corp	0.657	0.642	0.672	-0.030	-4.09***
NonCorp	0.343	0.358	0.328	0.030	4.09***
Externalauditor	0.534	0.554	0.514	0.040	5.27***
Construction	0.064	0.054	0.074	-0.020	-5.17***
Restaurant_Hotel	0.018	0.011	0.023	-0.012	-5.71***
OtherServ	0.093	0.091	0.096	-0.005	-1.27
Textiles	0.134	0.153	0.116	0.037	7.05***
Manufacturing	0.344	0.369	0.319	0.050	6.78***
Food	0.134	0.146	0.122	0.024	4.61***
Retail_Wholesale	0.213	0.176	0.250	-0.074	-11.81***
<b>Owner characteristics</b>					
Experiencemgmt	19.321	20.532	18.108	2.424	13.69***
Domesticowned	0.927	0.924	0.930	-0.006	-1.46*
Foreignowned	0.073	0.076	0.070	0.006	1.46*
Femaleowner	0.396	0.386	0.406	-0.020	-2.73***
Maleowner	0.604	0.614	0.594	0.020	2.73***
<b>Market characteristics</b>					
Smallcity	0.237	0.150	0.325	-0.175	-27.31***
Largecity	0.763	0.850	0.675	0.175	27.31***
GDPgrowth	5.476	6.475	4.473	2.002	23.63***
GDPpercapita	5,472.81	4,615.55	6,332.29	-1,716.74	-25.80***
Inflation	7.032	4.997	9.071	-4.074	-51.04***
Year2006	0.314	0.437	0.192	0.245	35.56***
Year2007	0.123	0.150	0.096	0.054	10.71***
Year2008	0.223	0.001	0.445	-0.444	-81.89***
Year2009	0.154	0.124	0.184	-0.060	-10.70***
Year2010	0.173	0.271	0.074	0.197	34.99***
Year2011	0.013	0.017	0.008	0.009	4.77***

**Table 3:**  
**Regressions results explaining who needs credit, who applies for credit, who gets credit?**  
**Full sample: developing and developed countries**

The dependent variable Need for Credit (*needcredit*) is a binary variable that takes on a value of 1 if the firm indicated that it needed credit (applied for credit and was extended or denied credit or was discouraged and did not apply for credit) and a value of 0 if the firm did not apply for credit because it did not need credit. The dependent variable Applied for Credit (*applycredit*) is a binary variable that takes on a value of 1 if the firm applied for credit and was extended or denied credit and a value of 0 if the firm was discouraged and did not apply for credit. The dependent variable Get Credit (*getcredit*) is a binary variable that takes on a value of 1 if the firm applied for and was extended credit and a value of 0 if the firm applied for and was denied credit. Explanatory variables are defined in Table 1. Data are from the World Bank Enterprise Surveys, and include 43,418 firm-year observations from 80 countries over the 2006 – 2011 period. We use a binary logistic regression model and report odds ratios over robust standard errors (in parentheses). \*, \*\*, \*\*\* indicate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

(1) Variables	(2) Needcredit	(3) Applycredit	(4) Getcredit
<b>Firm Characteristics</b>			
Age	-0.000 (0.000)	0.001 *** (0.000)	0.000 (0.001)
lnSales	0.010 *** (0.001)	0.016 *** (0.006)	0.007 ** (0.003)
Salesgrowth	0.009 ** (0.004)	0.015 ** (0.007)	0.007 (0.009)
Corp	-0.029 *** (0.008)	0.117 *** (0.020)	-0.009 (0.022)
Externalauditor	-0.023 *** (0.007)	0.144 *** (0.023)	-0.013 (0.023)
Construction	0.049 *** (0.015)	0.038 (0.025)	-0.034 (0.036)
Restaurant_Hotel	-0.088 *** (0.022)	-0.030 (0.040)	-0.067 (0.053)
OtherServ	0.032 ** (0.013)	-0.019 (0.018)	-0.129 *** (0.031)
Textiles	0.080 *** (0.011)	-0.039 * (0.019)	-0.054 * (0.028)
Manufacturing	0.055 *** (0.009)	-0.030 ** (0.014)	-0.047 * * (0.025)
Food	0.054 *** (0.011)	0.018 (0.022)	-0.022 (0.029)
<b>Owner Characteristics</b>			
Experiencemgmt	-0.001 ** (0.000)	0.002 *** (0.001)	0.003 *** (0.001)
Domesticowned	0.139 *** (0.013)	0.035 (0.040)	0.039 (0.028)
Femaleowner	0.030 *** (0.007)	0.008 (0.012)	-0.001 (0.017)

<b>Market Characteristics</b>			
Smallcity	0.010 (0.008)	-0.046*** (0.012)	-0.051*** (0.018)
GDPgrowth	-0.003*** (0.001)		0.007*** (0.002)
GDPpercapita	-0.004*** (0.001)	0.016*** (0.003)	-0.013*** (0.002)
Inflation	0.006*** (0.001)	-0.008*** (0.001)	-0.011*** (0.002)
Year2006	0.071*** (0.011)	-0.085*** (0.015)	0.685*** (0.032)
Year2007	0.086*** (0.011)	-0.182*** (0.017)	0.628*** (0.037)
Year2009	-0.003 (0.014)	-0.043** (0.019)	0.608*** (0.036)
Year2010	0.119*** (0.013)	-0.014 (0.027)	0.593*** (0.045)
Year2011	0.204*** (0.022)	-0.063 (0.050)	0.555*** (0.045)
Constant	-0.573*** (0.0813)	-0.698 (0.540)	-1.771*** (0.315)
Observations	31,978	31,978 1448.82 0.0000	21,753 844.88 0.0000

**Table 4:**  
**Regressions results explaining who needs credit, who applies for credit, who gets credit?**  
**Developing vs. developed countries**

The dependent variable Need for credit (*needcredit*) is a binary variable that takes on a value of 1 if the firm indicated that it needed credit (applied for credit and was extended or denied credit or was discouraged and did not apply for credit) and a value of 0 if the firm did not apply for credit because it did not need credit. The dependent variable Applied for Credit (*applycredit*) is a binary variable that takes on a value of 1 if the firm applied for credit and was extended or denied credit and a value of 0 if the firm was discouraged and did not apply for credit. The dependent variable Get Credit (*getcredit*) is a binary variable that takes on a value of 1 if the firm applied for and was extended credit and a value of 0 if the firm applied for and was denied credit. Explanatory variables are defined in Table 1. Data are from the World Bank Enterprise Surveys, and include 14,314 (29,104) firm year observations on 22 (58) developed (developing) countries over the 2006 – 2011 period. We use a binary logistic regression model and report odds ratios over robust standard errors (in parentheses).

\*, \*\*, \*\*\* indicate statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

(1) VARIABLES	(2) Needcredit Developed	(3) Needcredit Developing	(4) Applycredit Developed	(5) Applycredit Developing	(6) Getcredit Developed	(7) Getcredit Developing
<b>Firm Characteristics</b>						
Age	0.001 (0.000)	-0.000 (0.000)	0.001 (0.001)	0.001 *** (0.001)		0.000 (0.000)
lnSales	0.011 *** (0.003)	0.008 *** (0.001)	0.028 *** (0.010)	0.017 *** (0.005)		0.013 *** (0.003)
Salesgrowth	0.015 ** (0.007)	0.007 (0.004)	0.010 (0.010)	0.014 * (0.007)	*	0.002 (0.008)
Corp	-0.013 (0.016)	-0.020 ** (0.009)	0.064 *** (0.023)	0.106 *** (0.022)		-0.023 (0.019)
Externalauditor	0.023 (0.014)	-0.041 *** (0.009)	0.113 *** (0.039)	0.154 *** (0.023)		0.035 ** (0.018)
Construction	0.061 ** (0.027)	0.040 ** (0.017)	0.046 (0.041)	0.042 (0.028)		-0.036 (0.038)
Restaurant_Hotel	-0.078 * (0.046)	-0.090 *** (0.025)	-0.041 (0.063)	-0.001 (0.040)	**	-0.042 (0.065)
OtherServ	0.025 (0.025)	0.032 ** (0.015)	0.004 (0.031)	-0.026 (0.021)	*	-0.121 *** (0.031)
Textiles	0.065 *** (0.022)	0.088 *** (0.013)	-0.035 (0.027)	-0.042 * (0.024)		-0.090 *** (0.028)
Manufacturing	0.035 ** (0.018)	0.062 *** (0.011)	-0.013 (0.022)	-0.040 ** (0.017)		-0.064 *** (0.025)
Food	0.015 (0.024)	0.065 *** (0.013)	0.100 ** (0.040)	-0.013 (0.024)	**	-0.056 * (0.030)
<b>Owner Characteristics</b>						
Experiencemgmt	0.001 (0.001)	-0.001 *** (0.000)	0.000 (0.001)	0.003 *** (0.001)		0.003 *** (0.001)
Domesticowned	0.178 *** (0.024)	0.128 *** (0.016)	0.061 (0.067)	0.023 (0.039)		0.034 (0.031)
Femaleowner	0.017 (0.014)	0.035 *** (0.009)	-0.026 (0.016)	0.018 (0.016)	***	0.010 (0.017)
<b>Market Characteristics</b>						
Smallcity	0.011 (0.016)	0.010 (0.009)	-0.044 ** (0.022)	-0.043 *** (0.014)	***	-0.048 ** (0.020)
GDPgrowth	0.000	-0.001	0.004 **	-0.001		0.006 ***

## Credit Availability

GDPpercapita	(0.001) -0.003 *	(0.001) -0.006***	(0.002) 0.011 ***	(0.001) 0.044***	***	(0.002) 0.010 **
Inflation	(0.002) 0.011 ***	(0.002) 0.006***	(0.003) -0.006**	(0.007) -0.009***	***	(0.005) -0.014 ***
Year2006	(0.002) -0.056 **	(0.001) 0.109***	(0.002) -0.166**	(0.001) -0.062***	***	(0.002) 0.787 ***
Year2007	(0.023) 0.010	(0.013) 0.120***	(0.066) -0.086**	(0.023) -0.199***	***	(0.028) 0.693 ***
Year2009	(0.022) 0.045 *	(0.013) 0.025	(0.035) 0.032	(0.020) -0.062***		(0.037) 0.742 ***
Year2010	(0.027) 0.137 ***	(0.017) 0.124***	(0.037) -0.068**	(0.022) -0.032	***	(0.030) 0.657 ***
Year2011	(0.021) 0.146 ***	(0.016) 0.280***	(0.034) -0.022	(0.035) -0.216***	***	(0.042) 0.576 ***
Constant	(0.038)	(0.018)	(0.053)	(0.077)		(0.048)
Observations	14,314	29,104	9,023	20,171	6,074	11,372
Pseudo R2	0.286	0.324	0.121	0.138	0.607	0.224

**Appendix Table 1:**  
**Number of observations and survey year(s) per country**

#	Country	No Observations	Survey year(s)	#	Country	No Observations	Survey year(s)
1	Afghanistan	517	2008	41	Mali	490	2007
2	Albania	280	2007	42	Mauritania	231	2006
3	Angola	422	2006, 2010	43	Mexico	1219	2006
4	Argentina	1888	2006, 2011	44	Micronesia	64	2009
5	Armenia	347	2009	45	Moldova	339	2009
6	Azerbaijan	314	2009	46	Mongolia	342	2009
7	Belarus	233	2008	47	Montenegro	111	2009
8	Bhutan	240	2009	48	Mozambique	474	2007
9	Bolivia	912	2006, 2010	49	Namibia	316	2006
10	Bosnia/Herzeg.	330	2009	50	Nepal	359	2009
11	Botswana	335	2006, 2010	51	Nicaragua	447	2006
12	Brazil	1105	2009	52	Nigeria	1818	2007
13	Bulgaria	1214	2007, 2009	53	Panama	555	2006
14	Burundi	266	2006	54	Paraguay	567	2006
15	Chile	1853	2006, 2011	55	Peru	1509	2006, 2010
16	Colombia	1852	2006, 2011	56	Philippines	993	2009
17	Croatia	569	2007	57	Poland	385	2009
18	Czech Rep.	218	2009	58	Romania	447	2009
19	DRC	338	2006, 2010	59	Russia	848	2009
20	Ecuador	952	2006, 2010	60	Rwanda	206	2006
21	El Salvador	635	2006	61	Samoa	89	2009
22	Estonia	246	2009	62	Senegal	503	2007
23	Fiji	135	2009	63	Serbia	354	2009
24	Fyr Macedonia	341	2009	64	Slovak Rep	234	2009
25	Gambia	172	2006	65	Slovenia	261	2009
26	Georgia	333	2008	66	South Africa	897	2007
27	Ghana	489	2007	67	Swaziland	288	2006
28	Guatemala	481	2006	68	Tajikistan	324	2008
29	Guinea	219	2006	69	Tanzania	404	2006
30	Guinea Bissau	157	2006	70	Timor Leste	103	2009
31	Honduras	405	2006	71	Tonga	144	2009
32	Hungary	264	2009	72	Turkey	1025	2008
33	Indonesia	422	2009	73	Uganda	551	2006
34	Kazakhstan	489	2009	74	Ukraine	749	2008
35	Kenya	630	2007	75	Uruguay	1122	2006, 2010
36	Kosovo	240	209	76	Uzbekistan	341	2008
37	Kyrgyz Rep.	219	2009	77	Vanuatu	120	2009
38	Lao PDR	342	2009	78	Vietnam	959	2009
39	Latvia	241	2009	79	Yemen	431	2010
40	Lithuania	249	2009	80	Zambia	478	2007