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# Entrepreneurial Finance around the World: The Impact of the Business Environment on Financing Constraints

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**Abstract:** In this paper we use a unique dataset of over 70,000 firms, most of which are small, in over 100 countries, to systematically study the use of different financing sources for new and young firms. As expected, we find that in all countries younger firms have significantly less reliance on bank financing and more reliance on informal financing. However, we also find that younger firms have better access to bank finance in countries with stronger rule of law and better credit information, and that the reliance of young firms on operations (leasing and trade credit) finance and informal finance decreases with the availability of credit information. Overall, our results suggest that improvements to the legal environment and availability of credit information are disproportionately beneficial for promoting access to formal finance by young firms.

* Corresponding author. The opinions expressed do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

## 1. Introduction

Access to external finance and the ability to undertake profitable investment opportunities is an important ingredient for success of any new business and ultimately for economic development and growth (see Levine, 2005). However, liquidity constraints hinder potential entrepreneurs from starting businesses (see, for example, Evans and Jovanovic, 1989) and reduce growth rates, especially in small businesses (Beck, Demirguc-Kunt, and Maksimovic, 2004). Relaxing these constraints can promote new firm entry and success. For example, a cross-country study of 35 European countries finds that that entry is higher in more financially dependent industries in countries that have higher financial development (Klapper, Laeven, and Rajan, 2006).

Financing options of mature firms are well explained by the pecking order of financing. These firms generally have more internal funds (retained earnings) due to higher profitability and lower growth opportunities and, therefore, might prefer to use internal funds first (Bulan and Yan, 2007, Brealey and Myers, 2002). Furthermore, a good reputation, such as a long credit history, mitigates the adverse selection problem between borrowers and lenders. Mature firms, therefore, are able to obtain loans on better financial terms compared to their younger firm counterparts (Bulan and Yan, 2007; Carpenter and Rondi, 2000) and generally use debt before equity for their financing needs (Bulan and Yan, 2007). For example, an empirical study of Iberian firms over the period 1994 – 2003 finds that debt ratio increases over the life cycle of firms (Teixeira et al., 2005).

Yet around the world, new firms without a proven track record experience more severe financing constraints. For instance, studies conducted in China, Italy and the U.S.

found that information asymmetry significantly limits the debt capacity of young firms (Carpenter and Rondi, 2000; Shirai; Bulan and Yan, 2007). In addition, higher financing constraints reduce the likelihood of starting a business in Thailand, especially in poorer regions (Paulson and Townsend, 2004). In comparision, having an existing bank relationship increases the chances of starting a business with hired employees in Bosnia and improves the odds of survival for the new entrepreneur (Demirguc-Kunt, Klapper, and Panos, 2008). Furthermore, according to studies of German and Canadian firms, a higher equity ratio in new firms has a particularly positive effect on investment in R&D, while such an effect has not been found in old firms (Müller and Zimmermann, 2006; Baldwin et al., 2002).

Without access to formal financing, start-up firms might resort to informal sources. For example, a previous study finds that family and friends provide affordable and accessible funding to Indian SME's in start-up and growth phases (Allen, et al., 2006). Yet financing from friends and family might be "unreliable, untimely" and bearing "significant non-financial costs" (Djankov et al 2002, p. 9). For instance, a study across 29 countries finds that firms choose informal financing over more formal routes when government officials are corrupt as a way to avoid paying bribes (Mehnaz and Wimpey, 2007); thus firms might be willing to bear the costs of informal financing if there is the added benefit of evading corruption. A study of Chinese firms finds that while more firms use informal financing than bank financing, only bank financing is associated with higher growth rates (Ayyagari et al., 2007).

To the best of our knowledge there is no systematic cross-country study of the access and cost of financing for new and young firms. Our study attempts to fill this gap

by examining a vast firm-level database constructed from 170 World Bank Enterprise Surveys (ES). This database includes about 70,000 firms, most of which are small and medium sized (SMEs) in 104 developing and developed countries, including many low-income countries.[1] We use this database to study what types of financing are important for new firms, relative to older firms. Furthermore, we exploit the large cross-country variation in our sample to test the effect of differences in institutions. In other words, our paper addresses two types of questions: (1) the relationship between firm age and access to external financing, and (2) the differential impact of business environment on access to financing by young versus older firms.

To address the first question we investigate the relationship between firm age and usage of different sources of financing, including local and foreign bank financing, leasing, trade credit, credit cards, family and friends, and informal lenders. We specifically focus on the use of formal versus informal finance. Along the same lines, we relate the age of the firm to the likelihood of obtaining a bank loan and the features of the most recent loan, such as maturity, collateral requirements, and interest rates.

To address the second question we look at the relationship between country-level characteristics, especially institutional factors such as rule of law, the quality of contract enforcement, availability of credit information, corruption, and other indicators of the business environment and firm age. Previous literature shows that a level of development and institutional environment in a country can significantly impact the type of financing that firms are able to access (Beck, Demirguc-Kunt, and Maksimovic, 2007, Brown, Chavis, Klapper 2008). We extend this research and investigate whether particular features of the institutional environment are more or less important to young firms,

[1] The complete questionnaire and database is available at http://www.enterprisesurveys.org/.

relative to older firms. In particular, we test the interaction of the country-level business environment characteristics with firm age and their relative impact on a number of financing outcomes, specifically on usage of bank finance, operations finance and informal finance.

A priori it is not clear whether better business environment should be more or less important to younger firms, relative to older ones. For example, on one side availability and quality of credit information might be more important to young firms because such information helps to reduce adverse selection and moral hazard problems, which are more present in younger firms. On the other side, new firm owners may not have a successful history or track record of borrowing and repayment. Ultimately, this is the empirical question our data allows us to answer – whether or not a specific feature of the business environment is more or less important for young firms versus older firms.

The rest of the paper is organized as follows: Section 2 presents our data and descriptive statistics, Section 3 presents our regression results on the relationship between firm age and access to financing, Section 4 presents our results on the differential impact of business environment on access to financing by young versus older firms and Section 5 concludes.

## 2. Data and Summary Statistics

The ES dataset includes firms across multiple sectors (manufacturing, services, agriculture, and construction). The database includes both quantitative and qualitative information on firm characteristics, including sources of finance, barriers to growth, access to infrastructure services, legal difficulties, and corruption. The dataset also

includes some measures of firm performance, such as multiple years of historical data on employment and sales.

The database includes over 70,000 firm-level observations collected in 170 cross-sectional surveys in 104 countries, i.e. many countries include multiple years of data. (We are unable to control for whether an individual firm is included in multiple survey years, although the likelihood of a firm being included more than once is insignificant). The database is globally represented, which we summarize by region: Sub-Saharan Africa (AFR); East Asia (EA); South Asia (SA); Eastern Europe and Central Asia (ECA); Latin America and Caribbean (LAC); and the Middle-East and Northern Africa (MENA). The database also includes a few industrialized countries (IND). Figure 1 shows the distribution of countries and observations, by region. A notable difference between the two panels is that surveys in Africa include a relatively small number of firm observations and fewer countries have multiple survey years, while surveys in EA include a relatively large number of firms and include multiple years. A complete list of countries and firm observations is shown in Annex 1.

Figure 2, Panel A, shows the distribution of firms across income groups, which highlights the uniqueness of our dataset. Unlike similar studies of entrepreneurial finance which focus on firms in the U.S. or other developed countries, firms in our database are distributed across income groups, with a focus on developing countries – which are most likely to face barriers in the business environment. Our database includes 38 low-income and 37 lower-middle income countries, which account for over 73% of observations. The surveys were conducted over the span for 7 years, 1999-2008. Figure 2, Panel B, shows

the distribution across firm years. The majority of observations were collected in the past 5 years.

Figure 3 shows the distribution of firms in our sample across sectors, ownership, and output markets. We expect these firm characteristics to affect access to financing, relative to other young firms. First, some surveys focused exclusively on manufacturing companies, so in part by design, the majority of firms in our sample are manufacturing firms (60%), followed by services (30%) and construction (6%). Since manufacturing companies are likely to be more capital intensive, sources of entrepreneurial finance should be particularly illustrative of country-level barriers to access to credit. Next, we find 4% of firms with state-ownership (particularly in lower income countries) and 5% with foreign ownership. Both types of firms might receive preferential access to financing. Finally, about 23% of firms in our sample are identified as exporters, which might have greater access to overseas customer and bank financing.

Importantly for our analysis, the ES data is a random sampling of firms. An important caveat, however, is that many surveys do not include new firms: 52% of surveys have a minimum firm age of one; 5% a minimum firm age two; 20% a minimum firm age three, and 20% a minimum firm age four. Therefore, summary tables include an increasing number of country and firm observations along the age dimension. Figure 4 shows the distribution of total firms, by age. We find that over 8% of the total sample is three years old or younger, while 58% of all firms are twelve years or younger. The largest number of observations is for age four, which includes observations from all country/year surveys, regardless of survey-specific minimum firm age.

### 2.1 *Variation in access to financial products*

We begin by examining whether age is related to access to a bank line of credit or overdraft facility (L/C). Figure 5 shows that access to L/Cs increases with firm age, from about 20% of new firms to over 40% of firms age 6 (and older). This supports the hypothesis that access to bank and other sources of formal financing is be related to firm age.

Next, we observe the complete distribution of sources for working capital and new investment financing, by age. Table 1 shows the percentage of total working capital (Panel A) or new investment (Panel B) financing provided by each of the sources of finance (i.e. the columns sum to 100%). We include the following financing sources: retained earnings; local banks; foreign banks; leasing; trade credit; credit cards; grants (including investment funds, development bank, and other state services); new equity; family and friends, informal sources (including microfinance); and other sources.

The primary source of working capital financing for all firm ages is retained earnings. In other words, on average, firm in all size buckets rely primarily on their own funds for over half of their financing needs, which is in line with the pecking order theory of capital structure. However, the reliance on different types of external financing shows a monotonic relationship with age: for instance, older firms use a larger percentage of local bank finance and leasing and rely less on informal sources and family and friends. As firms mature, they shift their dependence from informal sources of finance to more formal sources. Trade credit is also an important source of working capital financing for all firms, and becomes slightly more important as firms get older. Young firms are more likely to receive infusions of new equity capital, relative to older firms (however, these

are likely to be owner's own funds). Foreign bank financing is a small proportion of total financing, less than 1% for all age groups, perhaps because the barriers to foreign bank financing are high, regardless of age.

Table 2 shows the percentage of firms with access to select types of financing – for either working capital or new investment – by age. Panel A shows the percentage of firms that use the financing source for either working capital or new investment (i.e. the percent of firms for which the reported percentage of total financing is greater than zero). The columns do not sum to 100% since most firms use more than one source of financing. In Panel B we aggregate informal sources and family and friends ("Informal Finance"); foreign and domestic bank financing ("Bank Finance"); and leasing, factoring, and credit cards as "operations finance," following Allen et al. (2005) and Beck, et al. (2006). Once again, we find strong evidence that access to bank financing increases with firm age, while the use of informal sources of financing decreases with firm age. Similarly, use of "operational" financing (leasing, trade credit, and credit cards) is not strongly related to firm age. In the rest of the analysis we focus on these three aggregated sources of finance – Bank Finance, Operations finance and Informal Finance, as they largely capture the differences in more detailed sources of finance.

Table 3 shows the percentage of firms that use the three aggregated sources of finance by age and country-level income grouping. Interestingly, in Panel A we find that across income groups, new firms seem to have relatively equal access to bank financing, with the exception of low-income countries (that are generally associated with less developed financial systems and hence lower availability of financing for all age groups). In parallel, Panel C shows that the use of informal finance is consistently higher in lower-

income countries, across all size groups. However, the use of bank financing is increasing with age in all 4 income groups, and it almost doubles by the time firms reach 13 years, relative to new firms. On the other side, the use of informal finance gradually decreases with age in all income groups. Panel B suggests that the use of asset-based operations finance is relatively consistent across income groups, with the exception that very young firms in high-income countries seem to use significantly more leasing and trade credit. This might be explained by the importance of leasing for new firms in countries with developed financial markets.

### 2.2 *Other loan and firm characteristics*

Table 4 shows summary statistics of loan characteristics. We do not find a notable difference between the use of collateral, the percentage of loan size collateralized, interest rates, or maturity across firm age. However, new firms are less likely to have audited accounts.

Table 5 shows summary statistics of the variables used in our econometric specifications. Panel A shows summary statistics of all firms. (Complete variable definitions are shown in Appendix 2). The average firm age in our sample is 15 years, with a maximum age capped at 80 years. 27% of firms are identified as "Micro", with less than 10 employees; 39% are identified as "Small", with less than 50 employees; and the remaining firms as "Medium/Large". In our sample 23% of firms are exporters, 48% are corporations, and 52% have audited statements. Finally, 4% of firms are identified as state-owned and 5% as foreign-owned.

Table 5, Panel B, shows summary statistics disaggregated by firms with and without any external financing, i.e. whether retained earning is equal to or less than 100%.

## 3 The Relationship Between Age and Access to Finance

In this section we investigate the relationship between three categories of external finance and age. We exclude firms that use zero external financing, since we are unable to disentangle whether these firms rely on internal financing by choice or because they have been rejected for by external creditors. Table 6 reports regressions for each of the three sources of finance defined above: bank finance, operations finance (leasing, trade credit, and credit cards) and informal finance. In this table, the dependent variables is equal to one if the firm uses each type of financing for either working capital or new investment, and zero otherwise. In addition we include a dummy which equals to one if a firm has access to a line of credit or overdraft facility. We find that 44% of firms have a line of credit, compared to 32% of firms that use bank financing; the correlation between line of credit and bank financing is about 0.50, and significant at 1%. We estimate the model by probit with standard errors clustered by country and year (because several countries have more than one survey).

The regressions control for a number of firm characteristics, such as dummies indicating micro and small sized firms (medium/large firms are the omitted category), exporters, firms with audited statements, legal status (corporation vs. unlimited liability and other types), and state and foreign ownership. We also include dummies for sector fixed effects (manufacturing, services, and construction), country-level fixed-effects, and survey year. The key variable of interest is log of firm age.

The results are similar to the univariate results discussed before: bank finance is gradually increasing with age, while informal finance is gradually decreasing with age. The usage of line of credit behaves similarly to the usage of bank finance. The results for operations finance do not show any clear relationship with firm age. The multivariate regressions show that these patters are not driven by different composition of firms across countries, or different country-level characteristics (which are captured by firm-level control variables and country dummies).

To illustrate these results further, we repeat similar regressions but include dummies for firm age for each of the age groups between 1 and 15 years. In other words, we replace log age with 15 age dummies, while controlling for the same set of firm-level controls and sector/country/year dummies. The results are presented graphically in Figure 6. Panel A shows the coefficients on firm age dummies in the regression with Bank Finance as the dependent variable, panel B shows the regression for Operations finance, while Panel C shows the results with Informal Finance as the dependent variable. These graphs show that coefficients are gradually increasing with age for bank finance and gradually decreasing for informal finance. The results for operations finance do now show any significant pattern, in line with earlier results.

## 4. The Role of the Business Environment

In this section we look at the relationship between country-level characteristics, focusing on institutional factors such as rule of law and availability of credit information and firm age.

A priori it is not clear whether a better business environment should be more or less important to younger firms, relative to older ones. For example, the availability and quality of credit information might be more important to young firms because such information helps to reduce adverse selection and moral hazard problems, which are more present in younger firms. Alternatively, new firm owners may not have a successful history or a track record of borrowing and repayment.

Similarly, rule of law may be more important for older firms, which are more likely to rely on the formal legal system for conflict resolution. Or, it might be more important for younger firms that don't have a proven track record, visibility, large reputation capital, and other means of enforcing contracts. Ultimately, this is the empirical question we are looking to answer – whether or not a specific feature of the business environment is more or less important for young versus older firms.

Table 7 presents our regression results. The model is the same as in Table 6 and all control variables are included, except for country dummies. Instead, we include firm age, a country-level indicator of the business environment – and the interaction of age and the business environment measure. In addition, we include six regional dummies (Africa, South Asia, etc.) and three income categories dummies (low-income, lower-middle income, and high-middle income; high-income is the excluded category). Panels A and B present our results (from separate regressions) with rule of Law and Credit Information, respectively (additional coefficients, not shown, are similar to those reported in Table 6).

First, we observe that Rule of Law and Credit Information have a positive impact on bank finance and a negative impact on informal finance. This is to be expected, as

firms in countries with better rule of law are more likely to enter into formal credit contract, and hence less likely have to rely on informal contracts. Credit information supports the use of formal credit contracts as it allows banks to evaluate the creditworthiness of the borrower.

The interaction of Rule of Law and Firm Age is negative for Bank Finance, and not significant for other types of finance. This suggests that Rule of Law is less important for older firms. Thus, younger firms have better access to bank credit in countries with better rule of law, than they are in countries with worse rule of law. In other words, while younger firms have less bank access in all countries, they have even poorer access in countries with weak rule of law.

Alternatively, since the interaction term is symmetric, the results might be interpreted to suggest that rule of law is more important for younger firms. It might be the case that older firms can rely on alternative mechanisms, such as higher visibility, track record, reputation, etc., and rely less on rule of law to obtain credit.

We find no significant interactive effect of rule of law for either informal finance or operations finance. Instead, our regressions suggest that young firms use more informal sources of financing and less operational finance, regardless of the legal environment. These results are consistent with previous literature that suggests that firms' use of bank debt is higher relative to their use of trade credit in countries with efficient legal systems (Demirguc-Kunt and Maksimovic 2002).

Next, we repeat the process with Credit information as our country-level institutional measure in Panel B. The results show that credit information has a positive effect for usage of bank finance and negative for informal finance, as expected. In

addition, the interaction of credit information and firm age are significant for bank finance and informal finance. These interaction terms suggest that credit information is more important for availability of bank financing for younger firms. These results are again in line with the argument that older firms have other means of demonstrating creditworthiness, while younger firms are more reliant on the availability and quality of credit information through a public or private credit bureau.

Interestingly, credit information interaction is also significant for informal finance, suggesting that in countries with better credit information, younger firms rely less on informal finance, relative to older firms. This is a mirror result that suggests that informal finance is a second-best substitute to formal finance – when firms have more access to formal finance, they cut their usage of informal finance. Better rule of law and credit information are relatively more important for younger firms in increasing their usage of formal bank finance and decreasing their usage of informal finance.

We have also investigated other factors affecting the business environment, such as creditor rights, cost of contract enforcement, and rate of debt recovery. The results on these indicators have consistent signs, but are not significant at levels above 10% (and therefore are not reported).

Until now, we have used binary dependent variables, i.e. equal to one if the firm uses the type of financing and zero otherwise. However, the Enterprise surveys also collect information on the proportion that each source of finance contributes to working capital and new investment. We use this information for further tests. In other words, we create dependent variables equal to the sum of the total proportion for each financing source for new investment and working capital (separately). "Bank finance" is equal to

the sum of the percentage of total new investment financing from local or foreign banks; "Operations Finance" is the sum of financing for new investment from leasing, trade credit or credit cards; and "Informal Finance" is the sum of new investment financing from informal sources or friends or family. We calculate separate measures for working capital and new investments. We estimate regressions by Tobit model since our dependent variables are limited to between 0% and 100%.

Our results for new investment are shown in Table 8. We find that age is positively and significantly, related to the percentage of Bank Finance while significantly, and negatively related to the percentage of Operations and Informal finance. Furthermore, the economic significance of age on the amount of bank financing is large, relative to its impact on operations and informal financing, which though statistically significant are small economically. Second, we find that rule of law is significantly and positively related to greater access to formal financing – from bank and operational lenders – and significantly and negatively related to the size of informal finance. Finally, we find that the interaction of rule of law and bank finance is negative and significant; in other words, we find that weak legal environments significantly magnify the disparities between access to bank financing between young and old firms. However, the relationship with informal and informational finance is insignificant. We find similar results for working capital (not shown).

## 5. Conclusions

In this paper we systematically study the use of different financing sources for new and young firms. We use a unique dataset from over 170 surveys, which contain

about 70,000 firms, most of which are small and medium sized (SMEs) in 104 developing and developed countries, including many low-income countries. We address two types of questions: (1) the relationship between firm age and sources of external financing, and (2) the differential impact of business environment on access to financing by young versus older firms.

As expected, we confirm that in all countries younger firms have less reliance on bank financing and more reliance on informal financing. The relationship with operations finance, which consists of trade credit, leasing and credit cards, is less associated with firm age, although there is some weak evidence of a negative relationship between firm age and the use of trade credit and leasing for new investment.

Most interestingly, we explore the interaction of firm age and the business environment and the relative impact of the business environment on a young firm's mix of financing sources. We find that younger firms have better access to bank finance in countries with better rule of law, than they are in countries with worse rule of law. In other words, while younger firms have less bank access in all countries, they have worse access in countries with poor rule of law. Similarly, we find that credit information has a differentially positive effect on the use of bank finance by young firms; this might highlight the importance of personal credit histories for entrepreneurs without business track records. In parallel, we find that the use of informal finance by young firms decreases in countries with better credit information, reaffirming that informal finance is a second-best substitute to formal finance. Overall, our results suggest that improvements to the legal environment and credit information infrastructure are disproportionately beneficial for promoting access to formal finance by young firms.

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## Figure 1: Distributions of surveyed countries and firm observations, by region

*Figure 1a: Distribution of countries*

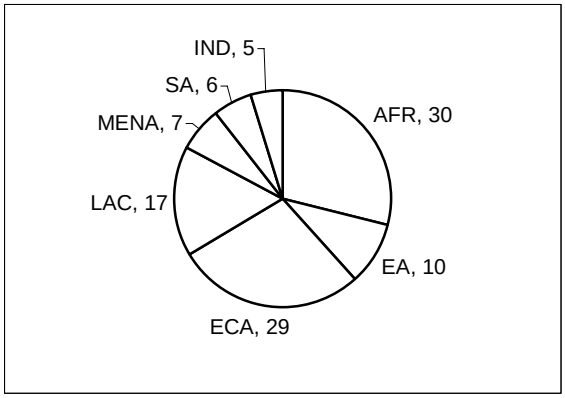
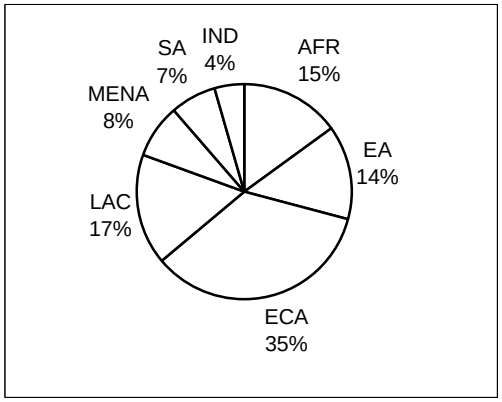
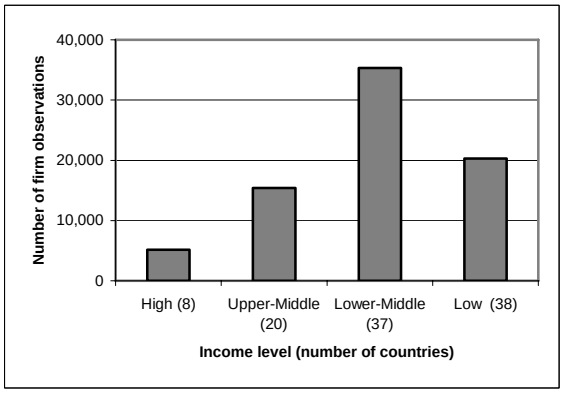
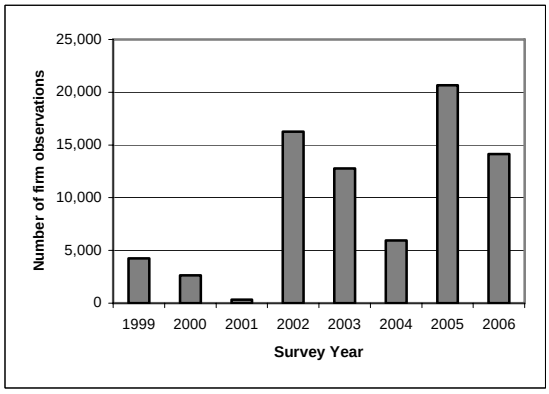



*Figure 1b: Distribution of observations*




## Figure 2: Distribution of total firms, by country-level income and year




## Figure 3: Distribution of total firms, by sector, ownership, and output markets

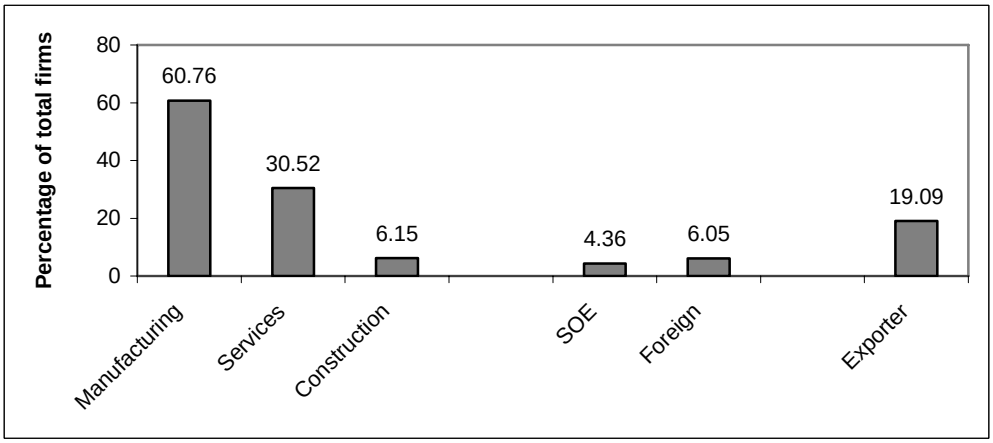


**Figure 4: Distribution of total firm observations, by age**

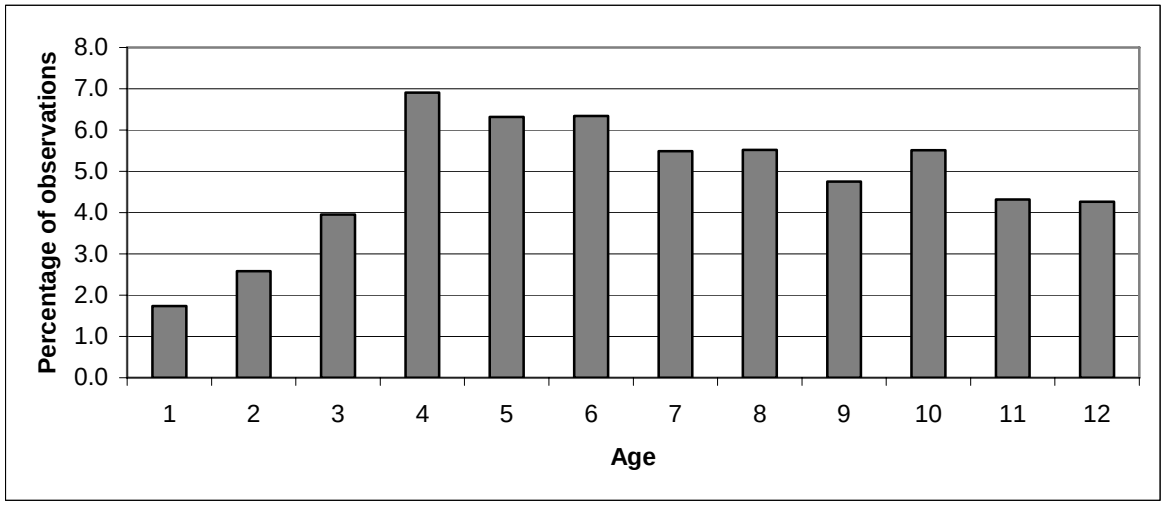
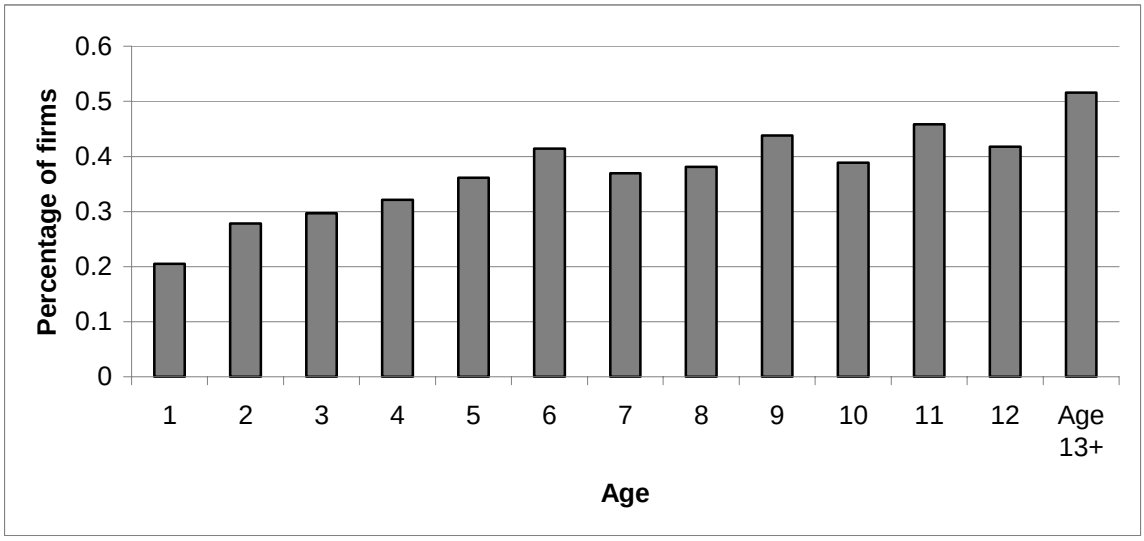



**Figure 5: Access to L/C, by Age**



## Table 1: Distribution of firm financing (percentages), by age
## (Columns sum to 100%)

This table shows the percentage of total Working Capital (Panel A) or New Investment (Panel B) financing provided by each of these sources.

| | 1-2 | 3-4 | 5-6 | 7-8 | 9-10 | 11-12 | 13+ | Total |
|---|---|---|---|---|---|---|---|---|
| ***Panel A: Working Capital*** | | | | | | | | |
| **Retained Earnings** | 61.4% | 68.0% | 63.9% | 66.9% | 65.2% | 66.2% | 59.6% | 63.0% |
| **Local Banks** | 8.1% | 7.9% | 9.4% | 10.2% | 10.5% | 10.9% | 15.1% | 12.0% |
| **Foreign Banks** | 0.7% | 0.6% | 0.7% | 0.9% | 0.6% | 0.6% | 0.8% | 0.7% |
| **Leasing** | 0.3% | 0.5% | 0.5% | 0.6% | 0.8% | 0.8% | 0.7% | 0.7% |
| **Trade Credit** | 12.3% | 7.0% | 9.7% | 7.6% | 8.9% | 9.0% | 11.1% | 9.7% |
| **Credit Cards** | 0.4% | 0.3% | 0.4% | 0.4% | 0.4% | 0.4% | 0.4% | 0.4% |
| **Family & Friends** | 6.9% | 5.1% | 4.8% | 3.9% | 3.9% | 3.2% | 2.6% | 3.6% |
| **Informal Sources** | 1.4% | 1.6% | 1.1% | 0.8% | 0.9% | 0.7% | 0.6% | 0.9% |
| **Grants** | 0.6% | 0.6% | 0.6% | 0.6% | 0.8% | 0.9% | 1.0% | 0.8% |
| **New Equity** | 6.0% | 5.3% | 5.3% | 4.7% | 4.7% | 4.4% | 3.5% | 4.3% |
| **Other** | 2.0% | 3.2% | 3.6% | 3.5% | 3.3% | 2.8% | 4.4% | 3.7% |
| ***Panel B: New Investment*** | | | | | | | | |
| **Retained Earnings** | 65.8% | 65.6% | 65.0% | 66.2% | 61.7% | 64.0% | 59.2% | 62.4% |
| **Local Banks** | 8.4% | 8.8% | 11.2% | 12.4% | 13.8% | 17.0% | 19.2% | 15.0% |
| **Foreign Banks** | 1.0% | 0.9% | 1.0% | 1.2% | 2.8% | 0.9% | 1.1% | 1.2% |
| **Leasing** | 1.3% | 2.2% | 2.6% | 2.4% | 2.9% | 3.0% | 3.2% | 2.8% |
| **Trade Credit** | 2.9% | 2.9% | 4.6% | 2.8% | 3.6% | 2.9% | 3.4% | 3.4% |
| **Credit Cards** | 0.1% | 0.2% | 0.3% | 0.1% | 0.2% | 0.3% | 0.2% | 0.2% |
| **Family & Friends** | 7.1% | 5.8% | 4.2% | 3.7% | 3.7% | 2.9% | 2.4% | 3.6% |
| **Informal Sources** | 3.1% | 3.1% | 1.1% | 0.8% | 0.8% | 0.6% | 0.5% | 1.1% |
| **Grants** | 1.5% | 1.1% | 1.2% | 1.3% | 1.1% | 1.1% | 1.9% | 1.5% |
| **New Equity** | 6.3% | 6.4% | 5.3% | 5.1% | 5.4% | 4.5% | 3.8% | 4.8% |
| **Other** | 2.4% | 3.2% | 3.6% | 4.0% | 3.9% | 2.9% | 5.2% | 4.2% |

## Table 2: Financing patterns (for either working capital or new investment), by age

Panel A shows the percentage of firms that use the financing source for either Working Capital or New Investment (i.e. the reported percentage of total financing is greater than zero). Panel B shows the percentage of firms that use the financing source, by aggregated categories: "Bank Finance" includes local and foreign banks; "Operations Finance" includes leasing, trade credit, and credit cards; "Informal Finance" includes family and friends and informal sources; "New Equity" includes equity, grants, and other sources.

| | 1-2 | 3-4 | 5-6 | 7-8 | 9-10 | 11-12 | 13+ | Total |
|---|---|---|---|---|---|---|---|---|
| ***Panel A: Detailed Financing Patterns*** | | | | | | | | |
| **Retained Earnings** | 84.6% | 85.0% | 83.4% | 85.0% | 85.1% | 85.8% | 82.5% | 83.8% |
| **Local Banks** | 17.2% | 19.8% | 24.9% | 28.0% | 27.3% | 30.8% | 36.9% | 30.1% |
| **Foreign Banks** | 1.8% | 2.0% | 2.1% | 4.8% | 5.0% | 2.2% | 3.5% | 3.3% |
| **Leasing** | 2.6% | 4.7% | 7.1% | 6.4% | 6.9% | 7.5% | 7.2% | 6.6% |
| **Trade Credit** | 29.7% | 22.1% | 26.8% | 21.4% | 29.0% | 26.3% | 28.8% | 26.8% |
| **Credit Cards** | 1.2% | 1.5% | 1.8% | 2.0% | 2.2% | 2.5% | 2.4% | 2.1% |
| **Family & Friends** | 22.1% | 15.1% | 14.0% | 13.0% | 13.6% | 10.4% | 8.7% | 11.8% |
| **Informal Sources** | 10.3% | 6.8% | 4.4% | 4.2% | 3.4% | 3.0% | 2.5% | 3.9% |
| **Grants** | 2.7% | 2.4% | 2.7% | 2.7% | 2.7% | 2.7% | 4.1% | 3.2% |
| **New Equity** | 9.5% | 10.1% | 9.5% | 10.0% | 10.3% | 10.0% | 9.5% | 9.7% |
| **Other** | 4.2% | 5.7% | 8.1% | 6.5% | 6.5% | 5.2% | 8.9% | 7.4% |
| ***Panel B: Aggregate Financing Patterns*** | | | | | | | | |
| | **1-2** | **3-4** | **5-6** | **7-8** | **9-10** | **11-12** | **13+** | **Total** |
| **Retained Earnings** | 84.6% | 85.0% | 83.4% | 85.0% | 85.1% | 85.8% | 82.5% | 83.8% |
| **Bank Finance** | 18.3% | 20.9% | 26.2% | 29.4% | 31.3% | 32.0% | 38.7% | 31.8% |
| **Operations Finance** | 31.7% | 25.9% | 30.6% | 25.8% | 33.6% | 31.3% | 33.5% | 31.2% |
| **Informal Finance** | 30.9% | 19.8% | 16.4% | 15.3% | 15.6% | 12.2% | 10.4% | 14.3% |
| **Equity Finance** | 15.3% | 17.1% | 19.1% | 18.0% | 18.3% | 16.8% | 20.9% | 19.0% |

## Table 3: Aggregated Financing Patterns, by country income-level and age

This table shows the percentage of firms that use the financing source for either Working Capital or New Investment (i.e. the reported percentage of total financing is greater than zero), aggregated by income-level. Panel A shows the percentage of firms that use "Bank Finance", defined as local and foreign banks; Panel B shows the percentage of firms that use "Operations Finance", defined as leasing, trade credit, and credit cards; Panel C shows the percentage of firms that use "Informal Finance", defined as family and friends and informal sources.

| | 1-2 | 3-4 | 5-6 | 7-8 | 9-10 | 11-12 | 13+ |
|---|---|---|---|---|---|---|---|
| ***Panel A: Bank Finance*** | | | | | | | |
| High | 20.0% | 31.7% | 32.7% | 40.6% | 38.3% | 44.7% | 45.3% |
| Upper-Middle | 24.5% | 22.7% | 27.7% | 30.9% | 31.7% | 33.1% | 38.9% |
| Lower-Middle | 21.3% | 20.0% | 25.2% | 28.8% | 33.0% | 33.0% | 40.1% |
| Low | 14.7% | 20.1% | 25.2% | 26.3% | 25.4% | 24.8% | 32.1% |
| ***Panel B: Operations Finance*** | | | | | | | |
| High | 43.3% | 22.0% | 26.7% | 33.3% | 35.6% | 33.2% | 38.3% |
| Upper-Middle | 33.5% | 37.2% | 34.6% | 32.9% | 35.3% | 34.3% | 34.3% |
| Lower-Middle | 31.0% | 19.4% | 30.3% | 20.2% | 31.5% | 26.8% | 30.9% |
| Low | 31.7% | 30.5% | 29.4% | 28.9% | 35.7% | 37.6% | 36.1% |
| ***Panel C: Informal Finance*** | | | | | | | |
| High | 6.7% | 9.7% | 10.0% | 9.4% | 8.1% | 9.8% | 5.9% |
| Upper-Middle | 23.4% | 20.7% | 16.8% | 14.8% | 13.1% | 12.2% | 10.5% |
| Lower-Middle | 23.3% | 20.7% | 16.6% | 14.0% | 17.6% | 11.0% | 11.4% |
| Low | 38.5% | 19.3% | 17.3% | 20.0% | 16.1% | 15.6% | 10.0% |

## Table 4: Summary statistics of loan characteristics, by firm age

| | 1-2 | 3-4 | 5-6 | 7-8 | 9-10 | 11-12 | 13+ | Total |
|---|---|---|---|---|---|---|---|---|
| Require collateral (1= Yes; 0 = No) | 76.2% | 76.7% | 78.3% | 73.4% | 80.6% | 80.0% | 75.0% | 76.4% |
| % Value of Collateral relative to loan value | 129.0% | 131.7% | 192.9% | 130.3% | 130.5% | 137.8% | 137.5% | 141.4% |
| Interest rate | 13.4% | 13.9% | 14.5% | 13.2% | 14.4% | 14.1% | 12.7% | 13.4% |
| Loan duration (months) | 34.7 | 33.2 | 32.2 | 35.2 | 31.5 | 32.3 | 36.2 | 34.5 |
| Audited financial statements | 42.2% | 37.1% | 43.4% | 51.7% | 53.5% | 50.1% | 61.1% | 52.6% |

## Table 5: Summary Statistics and Percent of Firms by Category

Complete variable descriptions are shown in Appendix 2. Panel A shows summary statistics for all firms that report financing sources. Panel B shows summary statistics for (i) firms that use external finance (i.e. retained earnings <100%) and (ii) firms that do not use external finance (i.e. retained earnings = 100%). All t-statistics are significant at 1%, except for 'High Income'.

| | ***Panel A: All Firms (68,419 Obs.)*** | | ***Panel B: Use External Finance? (Mean)*** | |
|---|---|---|---|---|
| | Mean | Std. Dev. | Yes (43,462 Obs.) | No (24,957 Obs.) |
| Firm Age | 15.9 | 15.3 | 16.3 | 15.3 |
| Percent of Firms in each Category | | | | |
| Micro | 27% | 45% | 23% | 36% |
| Small | 39% | 49% | 39% | 38% |
| Medium/Large | 34% | 47% | 38% | 26% |
| Exporter | 23% | 42% | 26% | 18% |
| Corp | 48% | 50% | 54% | 37% |
| Audit | 52% | 50% | 55% | 45% |
| Foreign_Own | 5% | 23% | 6% | 5% |
| State_Own | 4% | 19% | 3% | 5% |
| Low Income | 25% | 43% | 26% | 25% |
| Lower Middle | 46% | 50% | 44% | 47% |
| Upper Middle | 22% | 41% | 23% | 21% |
| High Income | 7% | 26% | 7% | 7% |
| Manufacturing | 58% | 49% | 62% | 51% |
| Services | 32% | 47% | 29% | 38% |
| Agro-industry | 2% | 13% | 2% | 1% |
| Construction | 7% | 25% | 5% | 9% |
| Africa | 16% | 37% | 17% | 15% |
| EA | 13% | 33% | 17% | 6% |
| ECA | 38% | 48% | 32% | 48% |
| LAC | 17% | 38% | 20% | 14% |
| MENA | 7% | 26% | 6% | 10% |
| SA | 4% | 19% | 4% | 3% |
| IND | 5% | 21% | 5% | 4% |

**Table 6: Is there a relationship between sources of finance and firm age?**

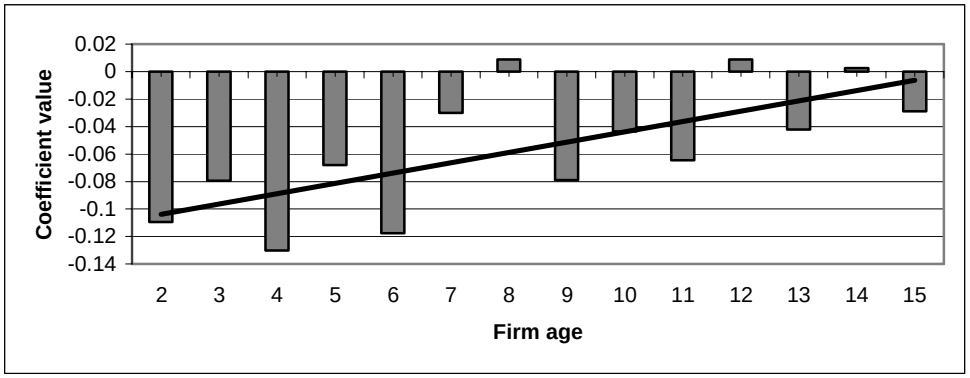
Table 6 reports probit estimates with country fixed effects. The dependent variable in the first column is a dummy equal to one if the firm reports using a line of credit or overdraft facility; the second column is a dummy equal to one if the firm uses local or foreign bank financing ("Bank Finance"), the third column is a dummy equal to one if the firm uses leasing, trade credit, or credit cards ("Operations finance"), and the forth column equals one if the firm uses informal financing. We exclude firms that do not use any source of external finance (i.e. retained earnings equals 100%). All variables are defined in Appendix 2. All regressions include sector fixed effects (manufacturing, services, and construction), country-level fixed-effects, and survey year fixed effects. Standard errors are clustered at by country and year. Asterisks *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | **Line of Credit** | **Bank Finance** | **Operations Finance** | **Informal Finance** |
| Ln Firm Age | 0.038 | 0.040 | 0.012 | -0.054 |
| | [0.001]*** | [0.008]*** | [0.179] | [0.000]*** |
| Micro | -0.255 | -0.227 | -0.101 | 0.164 |
| | [0.000]*** | [0.000]*** | [0.000]*** | [0.000]*** |
| Small | -0.173 | -0.153 | -0.007 | 0.056 |
| | [0.000]*** | [0.000]*** | [0.759] | [0.012]** |
| Exporter | 0.045 | 0.031 | 0.014 | -0.017 |
| | [0.000]*** | [0.040]** | [0.605] | [0.164] |
| Corp | 0.052 | 0.053 | 0.009 | -0.030 |
| | [0.018]** | [0.006]*** | [0.701] | [0.022]** |
| Audit | 0.090 | 0.047 | 0.009 | -0.031 |
| | [0.000]*** | [0.048]** | [0.573] | [0.011]** |
| Foreign Owned | -0.009 | 0.054 | 0.044 | -0.136 |
| | [0.789] | [0.466] | [0.669] | [0.000]*** |
| State Owned | -0.015 | -0.165 | -0.052 | -0.117 |
| | [0.826] | [0.000]*** | [0.122] | [0.000]*** |
| Observations | 38,555 | 37,940 | 37,940 | 37,918 |
| Pseudo $R^2$ | | 0.51 | 0.51 | 0.22 |

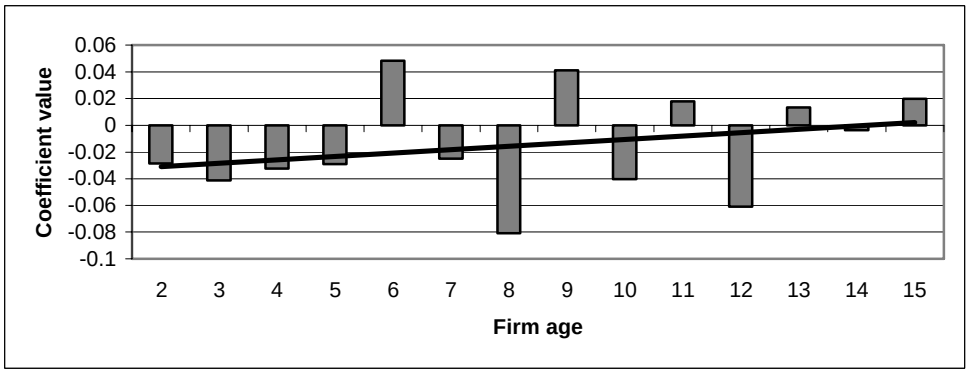
**Figure 6: Coefficients on the relationship between sources of finance and firm age**

Figure 6 reports the coefficients from a Probit estimations with country fixed-effects, and firm, industry, and year dummies as shown in Table 6. Panels A-C plot the coefficients for the age dummies 1 to 15 with a linear treadline.

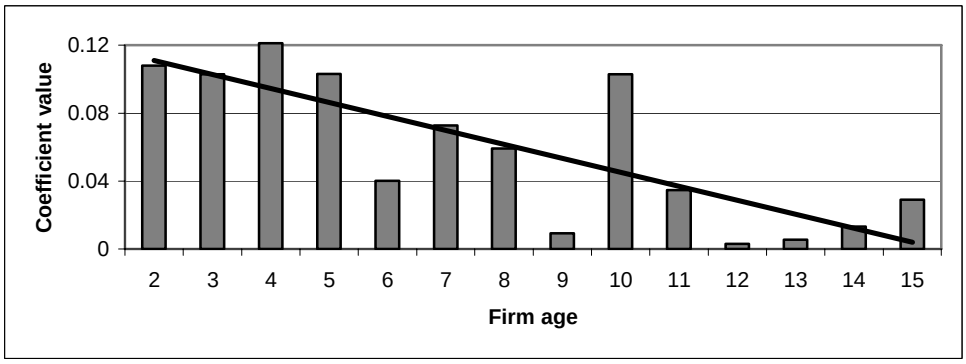
Panel A: Bank Finance




Panel B: Operations Finance




Panel C: Informal Finance



## Table 7: How does the business environment effect the relationship between age and patterns of financing?

Table 7 reports probit estimates. The first column is a dummy equal to one if the firm uses local or foreign bank financing ("Bank Finance"), the second column is a dummy equal to one if the firm uses leasing, trade credit, or credit cards ("Operations finance"), and the third column equals one if the firm uses informal financing. We exclude firms that do not use any source of external finance (i.e. retained earnings equals 100%). All regressions firm-level dummies: Micro, Small, Exporter, Corp, Audit, Foreign Own, and State Own. All variables are defined in Appendix 2. All regressions include sector fixed effects (manufacturing, services, and construction), region fixed effects, income group fixed-effects, and survey year fixed effects. Standard errors are clustered at by country and year. Asterisks *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

| | **(1)** | | **(2)** | | **(3)** | |
|---|---|---|---|---|---|---|
| ***Panel A: Rule of Law*** | | | | | | |
| | ***Bank Finance*** | | ***Operations Finance*** | | ***Informal Finance*** | |
| Ln Firm Age | 0.038 | 0.029 | 0.001 | -0.001 | -0.053 | -0.052 |
| | [0.002]*** | [0.014]** | [0.956] | [0.939] | [0.000]*** | [0.000]*** |
| Rule of Law | 0.092 | 0.17 | 0.038 | 0.048 | -0.063 | -0.068 |
| | [0.060]* | [0.004]*** | [0.485] | [0.393] | [0.011]** | [0.043]** |
| Rule of Law * Ln Age | | -0.032 | | -0.004 | | 0.003 |
| | | [0.046]** | | [0.716] | | [0.789] |
| Observations | 37,887 | 37,887 | 37,887 | 37,887 | 37,887 | 37,887 |
| Psuedo-$R^2$ | 0.05 | 0.06 | 0.08 | 0.16 | 0.22 | 0.15 |
| ***Panel B: Credit Information*** | | | | | | |
| | ***Bank Finance*** | | ***Operations Finance*** | | ***Informal Finance*** | |
| Ln Firm Age | 0.037 | 0.092 | 0.000 | 0.000 | -0.053 | -0.096 |
| | [0.004]*** | [0.003]*** | [0.977] | [0.994] | [0.000]*** | [0.003]*** |
| Credit Information | 0.008 | 0.048 | 0.002 | 0.002 | 0.000 | -0.030 |
| | [0.467] | [0.035]** | [0.877] | [0.913] | [0.999] | [0.090]* |
| Credit Information * Ln Age | | -0.017 | | 0.000 | | 0.014 |
| | | [0.018]** | | [0.979] | | [0.047]** |
| Observations | 37,922 | 37,922 | 37,922 | 37,922 | 37,922 | 37,922 |
| Psuedo-$R^2$ | 0.05 | 0.07 | 0.13 | 0.18 | 0.23 | 0.21 |

## Table 8: How does the business environment effect the relationship between age and penetration of financing?

Table 8 reports tobit estimates. Dependent variables equal the sum of the percentage of financing used for net investment (from 0 to 100). Panel A is the sum of new investment financing from local and foreign bank financing ("Bank Finance"), Panel B is the sum of new investment financing from leasing, trade credit, or credit cards ("Operations finance"), and Panel C is the sum of new investment financing from informal financing. We exclude firms that do not use any source of external finance (i.e. retained earnings equals 100%). %). All regressions firm-level dummys: Micro, Small, Exporter, Corp, Audit, Foreign Own, and State Own. All variables are defined in Appendix 2. All regressions include firm-level sector fixed effects (manufacturing, services, and construction), country-level regional and income group fixed-effects, and survey year fixed effects. Standard errors are clustered at by country and year. Asterisks *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

| | | | |
|---|---|---|---|
| ***Panel A: Bank Finance*** | | | |
| Ln Firm Age | 0.033 | 0.033 | 0.028 |
| | [0.029]** | [0.035]** | [0.049]** |
| Rule of Law | | 0.057 | 0.128 |
| | | [0.184] | [0.022]** |
| Rule of Law * | | | -0.028 |
| Ln Age | | | [0.048]** |
| Observations | 20,761 | 20,739 | 20,739 |
| Psuedo-$R^2$ | 0.11 | 0.06 | 0.06 |
| ***Panel B: Operations Finance*** | | | |
| Ln Firm Age | -0.008 | -0.009 | -0.010 |
| | [0.075]* | [0.029]** | [0.017]** |
| Rule of Law | | 0.020 | 0.037 |
| | | [0.226] | [0.076]* |
| Rule of Law * | | | -0.007 |
| Ln Age | | | [0.189] |
| Observations | 20,736 | 20,714 | 20,714 |
| Psuedo-$R^2$ | 0.10 | 0.06 | 0.06 |
| ***Panel C: Informal Finance*** | | | |
| Ln Firm Age | -0.015 | -0.016 | -0.017 |
| | [0.000]*** | [0.000]*** | [0.000]*** |
| Rule of Law | | -0.049 | -0.045 |
| | | [0.003]*** | [0.003]*** |
| Rule of Law * | | | -0.002 |
| Ln Age | | | [0.729] |
| Observations | 20,799 | 20,777 | 20,777 |
| Psuedo-$R^2$ | 0.16 | 0.11 | 0.11 |

## Appendix 1: List of Countries and Number of Observations

| | |
|---|---|
| Albania | 537 |
| Algeria | 557 |
| Angola | 540 |
| Argentina | 1,063 |
| Armenia | 647 |
| Azerbaijan | 657 |
| Bangladesh | 1,001 |
| Belarus | 707 |
| Benin | 197 |
| Bhutan | 98 |
| Bolivia | 1,284 |
| Bosnia | 509 |
| Botswana | 444 |
| Brazil | 1,642 |
| Bulgaria | 1,228 |
| Burkina Faso | 51 |
| Burundi | 407 |
| Cambodia | 503 |
| Cameroon | 119 |
| Cape Verde | 47 |
| Chile | 948 |
| China | 3,948 |
| Colombia | 1,000 |
| Costa Rica | 343 |
| Croatia | 550 |
| Czech Republic | 760 |
| Dominican Republic | 250 |
| Ecuador | 453 |
| Egypt | 1,973 |
| El Salvador | 465 |
| Eritrea | 79 |
| Estonia | 521 |
| Ethiopia | 427 |
| Gambia | 301 |
| Georgia | 374 |
| Germany | 1,196 |
| Greece | 546 |
| Guatemala | 455 |
| Guinea | 327 |
| Guinea-Bissau | 296 |
| Guyana | 163 |
| Honduras | 450 |
| Hungary | 1,007 |
| India | 2,722 |
| Indonesia | 713 |
| Ireland | 501 |
| Kazakhstan | 982 |
| Kenya | 284 |
| Korea, Rep. | 598 |
| Kosovo | 329 |
| Kyrgyz Republic | 609 |
| Lao PDR | 246 |
| Latvia | 547 |
| Lebanon | 354 |
| Lesotho | 75 |
| Lithuania | 756 |
| Macedonia | 506 |
| Madagascar | 293 |
| Malawi | 160 |
| Malaysia | 902 |
| Mali | 155 |
| Mauritania | 361 |
| Mauritius | 212 |
| Mexico | 1,480 |
| Moldova | 766 |
| Mongolia | 195 |
| Montenegro | 100 |
| Morocco | 1,709 |
| Mozambique | 194 |
| Namibia | 429 |
| Nepal | 223 |
| Nicaragua | 452 |
| Niger | 125 |
| Nigeria | 232 |
| Oman | 337 |
| Pakistan | 965 |
| Panama | 604 |
| Paraguay | 613 |
| Peru | 1,208 |
| Philippines | 716 |
| Poland | 1,829 |
| Portugal | 505 |
| Romania | 980 |
| Russia | 1,659 |
| Rwanda | 340 |
| Saudi Arabia | 681 |
| Senegal | 262 |
| Serbia | 550 |
| Slovak Republic | 528 |
| Slovenia | 536 |
| South Africa | 603 |
| Spain | 606 |
| Sri Lanka | 452 |
| Swaziland | 429 |
| Syria | 560 |
| Tajikistan | 483 |
| Tanzania | 760 |
| Thailand | 1,385 |
| Turkey | 2,544 |
| Uganda | 3,099 |
| Ukraine | 5,004 |
| Uzbekistan | 660 |
| Vietnam | 1,650 |
| Zambia | 207 |

## Appendix 2: Variable Definitions and Mean Statistics

| Variable Name | Definition | Mean |
|---|---|---|
| | ***Measures of Access to Finance*** | |
| Bank Finance | Dummy (0/1) = 1 if the firm uses local or foreign bank finance for working capital or new investment, and =0 otherwise. | 32% |
| Operations Finance | Dummy (0/1) = 1 if the firm uses leasing, trade credit, or credit cards for working capital or new investment and =0 otherwise. | 31% |
| Informal Finance | Dummy (0/1) = 1 if the firm uses informal finance or family and friends for working capital or new investment and =0 otherwise. | 14% |
| Equity Finance | Dummy (0/1) = 1 if the firm uses new equity, grants, or 'other' financing for working capital or new investment and =0 otherwise. | 19% |
| Retained Earnings | Dummy (0/1) = 1 if the firm uses retained earnings for 100% of working capital and new investment financing and =0 otherwise. | 20% |
| Self-Fund Raising | Dummy (0/1) =1 if the firm does not use local or foreign bank financing, but uses some other source of external financing (other than retained earnings) for working capital or new investment and =0 otherwise. | 32% |
| Line of Credit | Dummy (0/1) = 1 if the firm has a line of credit or overdraft facility and =0 otherwise. | 44% |
| | ***General Firm Characteristics*** | |
| Firm Age | Continuous variable equal to firm age | 16.08 |
| Micro | Dummy (0/1) = 1 if the firm has less than 10 employees and =0 otherwise. | 26% |
| Small | Dummy (0/1) = 1 if the firm has 10-49 employees and =0 otherwise. | 39% |
| Med/Large | Dummy (0/1) = 1 if the firm has 50 or more employees and =0 otherwise. (Excluded category). | 35% |
| Exporter | Dummy (0/1) = 1 if the firm exports more than 10% of its goods and =0 otherwise. | 23% |
| Corp | Dummy (0/1) =1 if the firm is registered as a corporation and =0 otherwise (partnerships and sole-proprietors are the excluded categories). | 49% |
| Audit | Dummy (0/1) =1 if the firm has audited financial statements and =0 otherwise. | 53% |
| Foreign Own | Dummy (0/1) = 1 if the firm has foreign ownership and =0 otherwise. | 5% |
| State Own | Dummy (0/1) = 1 if the firm has state ownership and =0 otherwise. | 4% |
| | ***Country Characteristics*** | |
| Rule of Law | Measurement of "the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" (Kaufmann, Kraay and Mastruzzi, 2007, p. 4) (WB-WDI). | -0.30 |
| Credit Information Index | Measurement of "the efficiency of rules affecting the scope, access, and quality of credit information" (World Bank Doing Business database; http://www.doingbusiness.org/). | 2.74 |
| Entry Cost | Cost of business registration, expressed as a percentage of per capita GNP (Doing Business). | 67.96 |
| Rigidity Employment | Index of labor regulations, where a higher score indicates that regulation is more protective of a worker, i.e. it is more difficult to hire and fire employees (Doing Business). | 40.41 |
| Contract Enf Cost | Cost in court fees and attorney fees, expressed as a percentage of the debt value (Doing Business). | 27.76 |
| Recovery Rate | Estimation of the number of cents on the dollar that claimants | 26.42 |

| | | |
|---|---|---|
| | (creditors, tax authorities, and employees) expect to recover from an insolvent firm (Doing Business). | |
| Low Income Group | Dummy (0/1) = 1 for countries with GNI per capita less than $766, and zero otherwise (WB-WDI). | 37% |
| Lower-Middle Income Group | Dummy (0/1) = 1 for countries with GNI per capita between $766 and $3,035, and zero otherwise (WB-WDI). | 36% |
| Upper-Middle Income Group | Dummy (0/1) = 1 for countries with GNI per capita between $3,036 and $9,385, and zero otherwise (WB-WDI). | 19% |
| High Income Group | Dummy (0/1) = 1 for countries with GNI per capita in excess of $9,385, and zero otherwise (WB-WDI). | 8% |