Graduate School ETD Form 9
(Revised 12/07)

PURDUE UNIVERSITY
GRADUATE SCHOOL
Thesis/Dissertation Acceptance

This is to certify that the thesis/dissertation prepared

By Meifang Xiang

Entitled THREE ESSAYS ON INTERNATIONAL FINANCE

For the degree of Doctor of Philosophy

Is approved by the final examining committee:

Dr. Sugato Chakravarty
Chair

Dr. Richard Feinberg

Dr. Chong Gu

Dr. Richard Widdows

To the best of my knowledge and as understood by the student in the *Research Integrity and Copyright Disclaimer (Graduate School Form 20)*, this thesis/dissertation adheres to the provisions of Purdue University's "Policy on Integrity in Research" and the use of copyrighted material.

Approved by Major Professor(s): Dr. Sugato Chakravarty

Approved by: Dr. Sugato Chakravarty 7/23/2008
Head of the Graduate Program Date

Graduate School Form 20
(Revised 10/07)

PURDUE UNIVERSITY
GRADUATE SCHOOL

Research Integrity and Copyright Disclaimer

Title of Thesis/Dissertation:

THREE ESSAYS ON INTERNATIONAL FINANCE

For the degree of Doctor of Philosophy

I certify that in the preparation of this thesis, I have observed the provisions of *Purdue University Executive Memorandum No. C-22,* September 6, 1991, *Policy on Integrity in Research.**

Further, I certify that this work is free of plagiarism and all materials appearing in this thesis/dissertation have been properly quoted and attributed.

I certify that all copyrighted material incorporated into this thesis/dissertation is in compliance with the United States' copyright law and that I have received written permission from the copyright owners for my use of their work, which is beyond the scope of the law. I agree to indemnify and save harmless Purdue University from any and all claims that may be asserted or that may arise from any copyright violation.

Meifang Xiang
Signature of Candidate

7/23/2008
Date

*Located at http://www.purdue.edu/policies/pages/teach_res_outreach/c_22.html

THREE ESSAYS ON INTERNATIONAL FINANCE

A Dissertation

Submitted to the Faculty

of

Purdue University

by

Meifang Xiang

In Partial Fulfillment of the

Requirements for the Degree

of

Doctor of Philosophy

August 2008

Purdue University

West Lafayette, Indiana

To my parents, Xulun Xiang and Kairong Li

To my brother, Dongsheng Xiang

To my husband, Hui Zhang

For their unconditional love and support

To my baby, Kevin

For his sweet smile

To my golden retriever, Tina

For her faithful and happiness to be my partner of hiking,

jogging, or just sitting quietly beside me whenever necessary and possible

ACKNOWLEDGMENTS

My deep appreciation goes first to my major professor Dr. Sugato Chakravarty. His research expertise, limitless understanding, and heart-warming support and encouragement have made my dissertation project a challenging, exciting, and fruitful experience. My dissertation would not have been accomplished without his sincere guidance and unconstrained assistance. It is him who brings me the interest and the enthusiasm in research. It is also his devotedness to his career that moves me a lot, making me to tell myself a lot of times from deep in my heart that I will try to be a respectable and supportive professor, just like him.

I acknowledge the assistance of all my committee members. I thank Dr. Richard Widdows for his always being willing to offer help throughout my years at Purdue. I thank Dr. Chong Gu for his suggestions on statistical models and valuable input on my study. And I thank Dr. Richard Feinberg for enriching my dissertation with his insightful suggestions. Thank you all for making my work easier and more interesting.

I own my gratitude to the Department of Consumer Sciences and Retailing. Special thanks go to Jeannie Navarre for her consideration and support throughout my graduate life.

As for my family, I just cannot thank them enough for their unconditional love and support. It is you and your love that give me the inspiration and strength to continue, to challenge myself, to work hard, and to improve.

TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

Appendix
Table

LIST OF FIGURES

ABSTRACT

Xiang, Meifang, Ph.D., Purdue University, August, 2008. Three Essays on International Finance. Major Professor: Dr. Sugato Chakravarty.

There is a paucity of research on discouraged small businesses, their reinvestment decisions, and the role of firm size and relationships on credit availability for small businesses internationally. The three essays included in this dissertation investigate these issues with a unique firm-level survey data set compiled by the World Bank.

The purpose of the first essay is to examine the drivers of discouraged small businesses in various economies around the world. Results show that level of competition and the relationships with banks and other financial institutions have significant impact on the probability of a firm to be discouraged. Results also show that there are significant differences among discouraged firms in relatively developed economies and those in relatively underdeveloped economies. An increase in firm size and having relationships with a greater number of banks decrease the likelihood of being discouraged among firms in underdeveloped economies. Having a greater number of competitors increases the probability of being discouraged among firms in underdeveloped economies. Finally, higher growth rate countries have a lower proportion of discouraged borrowers overall.

The second essay provides empirical evidence on profit reinvestment decisions by firms in various developing economies around the world. The study uses data from around 8,000 businesses in 35 countries. The results show that access to external financing, the level of competition, and the security of property rights are significant predictors of profit reinvestment decisions. Results also show that a higher level of a country's economic freedom is associated with greater profit reinvestment while a

country's transition status is associated with less reinvestment. In addition, the study provides evidence that the security of property rights, access to external financing, and the level of competition seem to affect small firms more than large firms. These findings complement those from China and a few Eastern European countries.

The third essay focuses on the role of firm size on credit availability for small businesses within six developing economies: Uganda, Tanzania, Pakistan, Brazil, Honduras and China. Results show that the probability of being credit constrained decreases with firm size and that relationships increase the probability of getting bank loans – especially if a firm has associations with other banks. The sensitivity of being credit constrained to firm size may be more acute in the relatively less developed economies (like Uganda) in our data and less so for the relatively developed economies (like Brazil). Also, the value of an ongoing relationship with another lender (at the margin) appears to be more valuable for firms in the least developed economies in our data (like Tanzania and Uganda). Corresponding analysis with data on small business lending from the United States has been done in order to compare the determinants of being credit constrained between developing and developed economies. Results show that relationships play a different role between firms in a developed economy and firms in developing economies, in that multiple resources of credit appears to increase the probability of obtaining credit for firms in the developing economies while it decreases the probability of getting loans for firms in a developed economy.

ESSAY 1: AN ANALYSIS OF DISCOURAGED SMALL BUSINESSES: AN INTERNATIONAL PERSPECTIVE

We use a unique firm-level survey database compiled by the World Bank in order to examine the drivers of discouraged small businesses in various economies around the world. We find that the level of competition and the relationships with banks and other financial institutions have significant impact on the probability of a firm to be discouraged. We also find that there are significant differences among discouraged firms in relatively developed economies and those in relatively underdeveloped economies. An increase in firm size and having relationships with a greater number of banks decrease the likelihood of being discouraged among firms in underdeveloped economies. Having a greater number of competitors increases the probability of being discouraged among firms in underdeveloped economies. Finally, higher growth rate countries have a lower proportion of discouraged borrowers overall.

1. Introduction

The purpose of the study is to use a unique firm-level survey database compiled by the World Bank in order to examine the characteristics of "discouraged" small firms in various countries around the world.[1] While there are extant studies of financing obstacles and credit constraints involving the U.S. and European economies (see, for example, Jappelli, 1990; Blanchflower, Levine, and Zimmerman, 2003; Grilli, 2005; and Levenson and Willard, 2000), there exists little research investigating discouraged firms across developing economies around the world -- a void this paper aims to fill.

It is generally well accepted that small businesses represent the overall engine of growth for any economy. And small businesses need cash infusions from banks and other financial institutions for their continued growth and sustenance. However, compared to larger publicly traded firms that have more ways of tapping into cash by approaching the capital markets and issuing stocks and bonds, small businesses often suffer from adverse selection issues and have limited sources of funds for growth (see, for example, Beck, Demirgüç-Kunt, Laeven, and Maksimovic, 2006). Exacerbating the problem of cash inflow is the fact that many small businesses feel alienated from banks and other lending institutions.[2]

We use data from the Investment Climate Surveys (ICS) launched by the Investment Climate Unit (ICU) of the World Bank to examine discouraged borrowing. As a unique firm-level survey database, ICS provides information on discouraged firms based on individual firm interviews conducted either by the World Bank staffers or by organizations sub-contracted by the World Bank. ICS also provides information of firms with different sizes (particularly a large number of small and medium size firms) in various countries. Hence, unlike previous studies that only focus on firms of a certain

[1] We define discouraged borrowers as borrowers desirous of a loan who nevertheless choose to not apply for a bank loan because they think their application would be rejected.

[2] For example, Cavalluzzo, Cavalluzzo, and Wolken (2002) report that nearly half of the small businesses avoid applying for credit because they think they would not able to get it due to poor financials, credit history, prejudice, or some other reasons. Chakravarty and Yilmazer (2008) shows that about one third of small businesses that have credit needs avoid applying for a bank loan for fear of being turned down. In addition, Levenson and Willard (2000) find that there are twice as many small firms that are discouraged as firms that are actually turned down by financial institutions based on their credit application.

size (for example, large or publicly traded firms as in Demirgüç-Kunt and Maksimovic, 1998) or on firms in developed countries like the United States, Canada or other European countries (for example, Blanchflower, et al., 2003; Orser, Riding, and Manley, 2006; and Angelini, and Generale, 2005), our data allow us to study discouraged firms based not only on firm size, but also on other firm characteristics, as well as firms across many different countries. In particular, we focus on ten countries spanning four continents: Brazil, China, Eritrea, Ethiopia, Honduras, India, Kenya, Pakistan, Tanzania, and Uganda.[3]

Our main findings can be summarized as follows. Older and larger firms are less likely to be discouraged. The greater the number of competitors a firm faces, the more likely it is that the firm would be discouraged. We also find that relationships with banks and other financial institutions are a key determinant of a firm being discouraged. Specifically, the greater the number of banks with which the firm has relationships, the less likely it is that such a firm would be discouraged. These variables not only enter significantly in all of the regressions, but also explain large variations in the probability of a firm being discouraged.

We uncover significant differences between discouraged borrowers in relatively developed economies versus those in less developed ones within our data.[4] For example, for firms in relatively developed economies, firm size is the main characteristic associated with the probability of a firm being discouraged. However, for firms in relatively underdeveloped economies, factors other than firm size play an important role. Namely, firm age, the relationships of firms with banks and other financial institutions, the level of competition, and financial status, are all determinants

---

[3] Our choice of countries is driven largely by the availability of small firm discouragement data in our database since not all questions were asked in all the surveyed countries by the World Bank. Our conversations with World Bank officials indicate no biases in terms of which countries were asked for which questions.

[4] According to the World Development Indicators, by using the World Bank Atlas Method, all of the economics are categorized into four groups (low income, lower middle, upper middle, and high income group). By this method of categorization, we have 7 countries in our data falling in the low income category while the remaining 3 are grouped either in the upper middle or lower middle category. Accordingly, in the current study, we group the 7 countries as relatively underdeveloped economies while the remaining 3 form the relatively developed economies.

of discouraged borrowers. For example, larger and older firms are less likely to be discouraged. Firms facing greater number of competitors are more likely to be discouraged. Also, the greater the number of financial institutions that a firm has relationships with, the less likely it is to be discouraged. In addition, a higher level of firm debt is correlated with a higher probability of firm discouragement.

Further examination reveals that smaller firms, if facing a greater number of competitors, display a higher probability of being discouraged. Additional analysis also shows that it is again smaller firms that report lower probability of being discouraged when having relationships with greater number of banks and other financial institutions. Firms in relatively underdeveloped economies report a higher probability of being discouraged if facing a higher level of competition. By contrast, large size and better relationship with banks and other financial institutions lower the probability of being discouraged among firms in relatively underdeveloped economies.

We also explore whether a country's level of economic development might help alleviate the probability of a firm being discouraged. To examine this issue, we use a country's *GDP PER CAPITA*, *INSITITUTIONAL DEVELOPMENT*, [5] *INFLATION*, [6] and *COUNTRY GROWTH RATE* [7] as proxies in order to examine the differences across discouraged borrowers within the various countries in our data. Our results show that the *COUNTRY GROWTH RATE* enters the regression negatively and significantly at the 1% level while all of the other variables are insignificant. Higher rate of growth of a country appears to be strongly associated with a lower likelihood of borrower discouragement.

---

[5] The data of *INSITITUTIONAL DEVELOPMENT* are from Beck, et al. (2004, 2006) and consist information on political stability, the rule of law, government effectiveness, the control of corruption, the quality of regulatory enforcement, and the voice and accountability in the political system. *INSTITUTIONAL DEVELOPMENT* is an aggregate indictor of the institutional where firms operate. It is an average of the six indicators measuring voice and accountability, control of corruption, regulatory quality, political stability, rule of law, and government efficiency (see Kaufman, Kraay and Mastruzzi, 2004 for a detail view about the six indicators).

[6] Logarithm difference of Consumer Price Index (International Financial Statistics, line 64) between 1997 and 2001.

[7] *COUNTRY GROWTH RATE* refers to the growth rate of GDP in current US dollars, averaged over the period 1997-2001.

Our study makes the following important contributions to the literature. We are among the first to focus exclusively on discouraged firms and provide empirical evidence about discouraged borrowers. While there are extant studies on financial obstacles and credit constraints involving the U.S. and European economies (see, for example, Blanchflower, et al., 2003; Grilli, 2005; Levenson and Willard, 2000), there are few studies focusing on discouraged small firms and even fewer on discouraged small firms within underdeveloped and relatively developed economies. Therefore, our findings will serve to guide international organizations like the World Bank and the International Monetary Fund (IMF) as they work to improve loan efficiencies in these regions around the world.

The remainder of the article is structured as follows: Section II describes the data and formalizes our definition of a discouraged borrower. Section III provides a review of the appropriate theoretical and empirical literature and outlines a framework for testing borrower discouragement. Section IV and V present a model of discouraged borrowers and formalizes our testable hypotheses. Section VI presents the results. Section VII summarizes our main findings and concludes.

2. Data Description

2.1 The Overall Data

We use the Investment Climate Surveys (ICS) data compiled by the World Bank in the current study. The Investment Climate Unit (ICU) of the World Bank launched the surveys in the late nineties and early two thousand from over 30,000 entrepreneurs in more than 50 countries around the world. The surveys are conducted in a consistent manner and the samples are randomly drawn and cover a number of sectors and regions. The purpose of the data gathering is to better understand conditions in the local investment environment and how these conditions might affect firm productivity, investment and growth.

Based on a standard set of core questions asked in every country, expanded by adding country specific questions, the ICS provided both quantitative and qualitative information on a wide range of investment climate conditions. Firm managers, human

resources managers, or firm accountants answered the surveys during face-to-face interviews. In particular, the ICS core collected a wide range of information about business productivity and investment environment, such as sales and supplies, infrastructure and services, business-government relations, legal environment, crime, capacity/innovation/learning, and labor relations.

A great advantage of this survey is that compared to its precursor, the World Bank Environment Surveys (WBES), the ICS has more in-depth questions and contains a large amount of in-depth firm-level financing information, including the composition of working capital and new investments, the use and cost of external finance, reasons for never applying for a loan, and reasons for being turned down when applying for credit. The ICS also collected basic balance sheet information for the past three years relative to the date of data collection. These include, for example, current assets, total assets, short-term/long-term liabilities, and figures of equity, by which researchers can estimate a firm's basic financial information and operational results. In addition to the detailed financial information, the database has information on firm age, firm employment, ownership, whether it is a multinational enterprise, and the percentage of its sales directly/indirectly exported. The ICS also provides information about firm's owner/top managers, such as their gender, education level and previous working experience in the same sector.

The current study focuses on ten countries: Brazil, China, Eritrea, Ethiopia, Honduras, India, Kenya, Pakistan, Tanzania, and Uganda. Spanning four continents, these countries represent a wide range of development status. Table 1 provides summary statistics for the country-level explanatory variables. Honduras has the highest GDP per capita ($4,407) while Ethiopia has the lowest ($100). The institutional development ranges from a minimum value of -0.78 for Kenya to 0.00 for Brazil and India. In addition, Eritrea has the lowest country growth rate (1.16%) while China and India have the highest (8% and 9%, respectively).

In Table 2 we report the composition of our sample according to firm age (start-up, middle-age, and old firms),[8] firm size, governance, ownership and other firm characteristics. From the table, we can see that 25% of the firms are start-up firms which are no more than 5 years old, another half of the firms age between 5 and 20 years, and only about 1/4 of the firms are older than 20 years old. Additionally, more than 90% of the firms in the survey are small (no more than 50 employees) and medium (51 to 500 employees).[9]

Table 2 also reports discouraged borrowers within each firm group. From the table, we see that younger, smaller, and non-government owned firms seem to be more likely to be discouraged. Specifically, the probability for a firm being discouraged is 28% for small businesses, 19% for medium-size firms, and 10% for large firms. The percentages for start-up, middle-age, and old firms to be discouraged are 28%, 24% and 20%, respectively.

2.2 Identifying Discouraged Borrower

In the labor market, a discouraged worker is defined as an individual who wants a job and is available for work but does not look for a job because he/she anticipates that he/she could not get one (see, for example, Benati, 2001; Finegan, 1981; and Kodrzycki, 2000). Similarly, in the credit market, Kon and Storey (2001) define discouraged borrowers as *good* borrowers who do not apply for a loan to a bank since they feel that they will be rejected. Their definition is hard to apply to an empirical analysis since "good" may be problematic to quantify and Kon and Storey do not provide us with any guidance on the matter. Cavalluzzo, Cavalluzzo, and Wolken (2002) define discouraged borrowers as business owners who avoid applying for credit for fear of being rejected and labels the process as a "prescreening and self-selection issue" (p. 659).

---

[8] Seung-Hyun (2007) uses 5 years as the margin for firms to be classified as young firms or old firms. Here, we further divide those firms older than 5 years into two groups: Firms between 5 and 20 years old and firms older than 20 years. Hence, start-up firms are defined to be less than 5 years old; middle-age firms have been in operation for 5-20 years; old firms have been in operation for more than 20 years.

[9] Small firms employ no more than 50 employees. Medium firms employ 51 to 500 employees, and large firms employ more than 500 employees. These classifications are consistent with those used in Beck et al. (2006).

Unlike Cavalluzzo et al. (2002), Diagne (1999) explores in greater detail how and why borrowers may be discouraged. He suggests that a potential borrower will face the maximum credit limit which is determined by events under a lender's or a borrower's control, or even out of the control of both. In fact, a borrower's behavior and her decision to apply for a loan are determined by two factors: her expectation about the likely value of the credit limit and its variability. Discouraged borrowers are borrowers who give up seeking loans because they expect either high costs for getting loans or they expect to face very low credit limits. Hence, these firms self-select into staying out of the credit markets even though they have a need for bank loans. Diagne indicates that these discouraged borrowers may be wrong in their expectations since they may get loans at reasonable costs. Such borrowers are defined as "falsely discouraged" in the recent work of Chakravarty and Yilmazer (2008), in which they lay out a multistage model to study the impact of relationships on firm loans. In their study, they define discouraged borrowers as small business borrowers that answered "yes" to the question "during the last three years, were there times when the firm needed credit but did not apply because it thought the application would be turned down?" and answered "zero-times" to the question "how many times did the firm apply for new loan in the past three years?" In the current study, we define discouraged borrowers as those who need a loan but do not apply formally for a loan because they expect to be rejected. Specifically, we operationalize discouraged borrowers as follows: Firms are considered to be discouraged borrowers if they answered "yes" to any of the reasons for never applying for a bank loan:

- Did not apply because it found the loan procedure too complicated,
- Did not apply because it found interest rates too high,
- Did not apply because collateral requirements were too high,
- Did not apply because it found corruption in allocation,
- Did not apply because it did not expect to get approved.

According to our definition of discouraged borrowers, only those firms who have a need for a loan may be discouraged borrowers. Thus, those firms who answered "yes" to the reasons for not applying a bank loan because they "do not need a loan" or "do not want

to incur debt" are not included in the study. This gives us a total of 2,122 discouraged firms over the 10 countries in our study.

Table 3 documents the frequency of the various reasons that firms provide for never applying for a bank loan across all ten countries in our data. From the table, we can see that "interest rate is too high" is the leading reason for firms to be discouraged in most of the countries. Far more than half of the discouraged firms in Eritrea (78%), Kenya (74%), Brazil (58%), and Honduras (59%) choose it as the main reason. In fact, for most countries (for example, India, Pakistan, Tanzania, and Uganda), three obstacles (interest rate is too high, loan application procedure is too complicated, and collateral requirements are too high) are the main reasons that firms in these countries are discouraged. Also from Table 3, we can see that about one third of the firms in Ethiopia, India and Pakistan indicate that "collateral requirements are too high" is the main reason for them to be discouraged while more than 30% of the firms in India, Pakistan and Uganda answer that they are discouraged because "loan application procedure is too complicated". Note that it is possible for firms choosing the answer "do not expect to be approved" as a reason to be discouraged because of any of the above four reasons. Unfortunately, we could not tell which one is the exact reason for them to be discouraged if the fifth choice for discouragement is selected by the firm. Our findings therefore have to be interpreted with care. However, our findings do indicate substantial differences in discouraged borrowers' experience across and within the various countries we examine.

3. Background

There are limited theoretical models available to understand discouraged borrowing. Stiglitz and Weiss (1981) provide a theoretical basis of understanding why a bank would deny credit to a potential borrower even when it has loanable funds and introduce the concept of credit rationing. However, since discouraged borrowers do not apply to the bank for a loan, they are not included within the scope of the Stiglitz and Weiss model. Kon and Storey (2001) provide a heuristic framework within which to understand discouraged borrowers. They hypothesize that the scale of borrower discouragement should depend on three factors: The scale of application costs, bank's

screening error, and the interest rate difference between banks and money lenders. Borrower discouragement should be at a minimum when banks have no information about firms such that they have to allocate funds by lottery. Contrarily, borrower discouragement is at a maximum when banks have some, but not perfect, information about firms. Note that this is the same adverse selection issue that drives credit rationing within the Stiglitz and Weiss framework. By the same token, when both banks and firms are perfectly informed, there is no borrower discouragement. Hence, Kon and Storey suggest that the level of a firm being discouraged is affected by the amount of information, application costs, and the sources of funding. The number of discouraged borrowers would increase with less information, with higher application costs, and with fewer alternative sources of funding. [10,11]

The extant empirical studies focusing on credit constraints and financing obstacles can be divided into two categories: One group measures credit constraints that consumers and households face (see Chakravarty and Scott, 1999; and Jappelli, 1990 for a review). The second group of studies focuses on the financial obstacles that

[10]Using data from the 1993 National Survey of Small Business Finances (NSSBF), Cavalluzo et al. (2002) find that a firm's financial characteristics (for example, assets, and sales/assets rate) and the firm's credit history are important factors affecting the level of firm discouragement.. While we follow a similar approach in the current paper, there are differences between their approach and ours. First, while discouraged borrowing is only incidental in their study, we focus exclusively on discouraged borrowers in various developing economies around the world. Second, unlike the data that Cavalluzzo et al. use, which focuses more on the demographic differences among business owners, our data enable us to analyze characteristics related to business operation and investment environment within various developing countries (for example, degree of corruption, unofficial payment of firms to "get things done" in that country, etc.). Such detailed information allows us to get deeper in our investigation of discouraged borrowers. Raturi and Swamy (1999) examine three questions about firm financing in Zimbabwe: Whether black-owned firms are more likely to want bank loans, are more likely to be credit constraint, and are more likely to be rejected. They find that black-owned firms are more likely to want bank loans since they have limited funding resources. However, despite their willingness, the black-owned firms are more likely to be credit constraint. Subsequent researchers (For example, Storey, 2004) get similar results by indicating that African American and female business owners are more likely to avoid applying for credit within the context of the United States.

[11] Chakravarty and Yilmazer (2008) also include discouraged borrowers when examining the impact of relationships on borrower's decision of whether applying for credit, on whether the financial institution will approve the borrower's application, and on the interest rate the borrower can get if the application has been approved. They indicate that relationships (number of financial institutions firms have relationship with, and variables measuring the existence of pre-existing relationships) increase the possibility of a firm applying for bank credit. Also, they find that financial characteristics (total assets and total liabilities) and the length of management under current manager also play an important role in a firm's loan application decision.

businesses and their owners face (see Blanchflower et al., 2003; Carpenter and Petersen, 2002; Grilli, 2005, Levenson and Willard, 2000; Orseret al., 2006; and Raturi and Swamy, 1999 for a review). By contrast, in the current study, we focus exclusively on discouraged small businesses. But, since very few past studies have examined discouraged borrowing by businesses and none on discouraged small firms across multiple economies around the world, we borrow from the parallel literature on discouraged households/families. In particular, Jappelli (1990), is among the first to include consumers in the United States who did not apply for a loan, since these consumers anticipated their application would be rejected, within the context of examining credit constrained households. Jappelli argues that when studying credit constraints, excluding the group of discouraged borrowers would lead to biased estimates (he also states that similar arguments can be applied to firms).[12] Using the 1983 Survey of Consumer Finances (SCF) data set where constrained consumers are directly observable, Jappelli examines the characteristics of credit-constrained households and finds that age, income and wealth are the most important factors in determining constrained families.

As to the second group of empirical studies, start-up firms have been shown to have shorter relationships with banks and other financial institutions and they have to commit great effort into accessing financing while mature and larger firms, more experienced in seeking funding, are more likely to have long, sturdy and well established relationship with their respective financial institutions. Age (see Beck, et al., 2006 for a review), and size (see, for example, Beck, Demirgüc-Kunt, & Maksimovic, 2004B, 2005) are factors affecting firms' financial obstacles. Levenson and Willard (2000) include both firms that applied for loans but had been denied and firms that never applied for bank loans in their study (about 4% of their sample comprise of discouraged borrowers). Their results show that, compared to larger and older firms, smaller and younger firms are more likely to be credit constrained.[13]

---

[12]Also, see Chakravarty and Yilmazer (2008) for similar suggestion.

[13] Levenson and Willard also infer that firms owned by their founders are more likely to be credit constrained.

Previous researches focus not only on credit constraint at the firm-level, but also identify some determinants of financing obstacles at the country-level. The work of Demirgüç-Kunt and Maksimovic (1998) shows that credit constraints are lower in countries with more efficient legal systems (legal systems score high on an efficiency index). Beck et al. (2006) find that institutional development is the most important country characteristics that can explain a lot of cross-country variation in financing obstacles. Love (2003) also shows that financial market development has impact on firm's investment via their ability to get external finance. Her results indicate that financing constraints are higher in countries with lower level financial development.[14] Beck, Demirgüç-Kunt , and Maksimovic (2005) support the findings and claim that financial and institutional development alleviates the constraining effect of financial obstacles.

4. Model

In this section, we present a simple regression model to assess the relationship between firm and country characteristics and the probability that firms are discouraged. We assume that the firms' underlying response can be described by the following equation:

$$\boldsymbol{DISCOURAGED\ BORROWER}_{i,k} = \alpha + \beta_1\, \boldsymbol{FIRM\ CHARACTERISTICS}_{i,k} + \beta_2\, \boldsymbol{COUNTRY}_{k} + \varepsilon_{i,k,} \qquad (1)$$

where *DISCOURAGED BORROWER* is a dummy variable defined as follows: If a firm *i* in country *k* is discouraged then it takes the value of 1; if not discouraged it takes the value of 0.

The vector of measures capturing *FIRM CHARACTERISTICS* refers to attributes related to a firm's general information, governance characteristics, corruption, competition, firm's relationship with financial institutions, financial status, and characteristics of firm owners. Similarly, *COUNTRY CHARACTERISTICS* include a

[14] The cost of capital in countries with lower level of financial development is twice as much as that in countries with average level of financial development.

vector of macroeconomic factors: *GDP PER CAPITA*, *INSTITUTIOINAL DEVELOPMENT*, *INFLATION*, and *COUNTRY GROWTH RATE*. Therefore, equation (1) can be expanded to:

$$\begin{aligned} \textbf{\textit{DISCOURAGED BORROWER}}_{i,k} = \alpha + \beta_1 \textbf{\textit{GENERAL}}_{i,k} + \beta_2 \textbf{\textit{GOVERNANCE}}_{i,k} + \\ \beta_3 \textbf{\textit{CORRUPTION}}_{i,k} + \beta_4 \textbf{\textit{COMPETITION}}_{i,k} + \\ \beta_5 \textbf{\textit{RELATIONSHIP}}_{i,k} + \beta_6 \textbf{\textit{FINANCIAL}}_{i,k} + \\ \beta_7 \textbf{\textit{OWNER}}_{i,k} + \beta_8 \textbf{\textit{COUNTRY}}_{k} + \varepsilon_{i,k.} \end{aligned} \quad (2)$$

Since the dependent variable *DISCOURAGED BORROWER* is a dichotomous variable, we use a logistic regression model to estimate equation (2).

5. Defining the Candidate Variables and Univariate Analysis

Following the extant literature related to credit constraints and financing obstacles of small and medium size businesses (see, for example, Beck, et al., 2005; Carpenter and Petersen, 2002; Cavalluzzo, et al., 2002; Chakravarty and Yilmazer, 2008; Guiso, 1998; Gelos and Werner, 2002; and Laeven, 2003), we use the following as explanatory variables to proxy for firm characteristics and country related variables.

AGE is defined as logarithm of the number of years the firm has operated in the country, and *SIZE* is defined as the logarithm of the number of employees. Both are control variables. In general, young and small firms have shorter relationship with banks and other financial institutions and fewer channels to obtain credits when compared to mature and large firms relative to larger and older firms. The young and small firms are likely to have different self-screening issues related to credit application and should therefore be controlled for. Several other factors are also included as control variables. Specifically, *MULTINATIONAL* is a dummy variable taking the value of 1 if the firm has holdings or operations in other countries (and 0 otherwise). *EXPORTER* is also a dummy variable that indicates if the firm is an exporting firm. Additionally, we include control variables that measure firm ownership. *GOV_OWNER* takes the value of 1 if the firm is owned by the government. *FOR_OWNER* takes the value of 1 if the firm is foreign owned.

We include variables that measure the level of corruption and competition. Mauro (1995) examines the relationship between corruption and growth. In his study, corruption is defined as "the degree to which business transactions involve corruption or questionable payments" (p684) and he finds that the existence of corruption lowers investment and also lowers economic growth. Following a similar intuition, we include a corruption variable, *GIFT_EXPECTED*, which is a dummy variable taking the value of 1 if a gift or an informal payment is asked for or expected in order to obtain basic services to run a business -- like telephone, water and electricity. We would expect the corruption variable to be associated with higher probability of being discouraged when a firm is considering applying for credit.

Maksimovic, Ayyagari, and Demirgüç-Kunt, (2007) investigate the relationship between competition and firm innovation using a vector of variables related to competition. They find that competition has a significant influence on firm innovation in emerging markets. However, the influence varies according to firm types. Specifically, there is a negative relationship between the level of competition and a firm's innovation.[15] An inverse relationship between the two is more likely when the firm is a small or medium sized one or is state-owned, while it is less likely when the firm is a corporation. Beck, et al. (2005) also include the number of competitors in their study when examining the impact of a country's legal origin on a firm's access to financing. They define the number of competitors as the natural logarithm of the number of competitors that a firm has. [16] Accordingly, in the current study, the competition variables are included as follows: *COMPETITOR-D* refers to the logarithm of the number of competitors in the domestic market. *COMPETITOR_F* refers to the number of competitors in the foreign market. We expect that a greater number of competitors is connected with a higher probability of being discouraged.

Following the relationship lending literature (see, for example, Petersen and Rajan, 1993, and Berger and Udell, 1995), another group of variables included in the

[15] Ayyagari et al. (2007) used "percentage of establishment sales that are sold domestically" (p25) here to measure competition level.

[16] Cavalluzzo, et al. (2002) also examine competition. However, their competition refers to the extent of competition among commercial lenders in the firm's local banking system.

current analysis are those related to bank borrower relationships. In particular, the relationship variables include *NUMBER_SOURCE*, defined as the number of banks the firm has association with, and *LENGTH*, defined as the logarithm of the length of time that a firm has conducted business with its main bank. We expect that the greater the number of banks and other financial institutions with which a firm has relationships, the less likely it is that the firm would be discouraged. We also expect that a longer relationship with banks and other financial institutions is associated with a lower probability of being discouraged.

We also include a firm's financial characteristics as follows. *LIABILITY* is defined as the logarithm of the total liabilities of the firm.[17] Cavalluzzo et al. (2002) argue that firms believe that they would be rejected upon applying for credit when their financial situation is poor. We also include a variable that measures whether a firm's financial statements were viewed by an external auditor (*AUDIT*). According to Kon and Storey (2001), the amount of information available on a firm is one of the factors that should affect the level of a firm's discouragement. Consistent with this intuition, we expect that firms that have their financial statements viewed by an external auditor would be less likely to be discouraged.[18]

Finally, we control for firm owner characteristics by *MALE*, which is a dummy variable taking the value of 1 if the principle owner is male and 0 otherwise; *HIGH_EDU* is a dummy variable taking the value of 1 if the top manager has university or higher level training and 0 otherwise; and *EXPERIENCE* refers to the logarithm of the number of years of work experience that a top manager has had in the same sector before running the current firm. We also include relevant country-level macroeconomic variables in our analysis. These variables include: *GDP PER CAPITA*, *INSTITUTIOINAL DEVELOPMENT*, *INFLATION*, and *COUNTRY GROWTH RATE*. *GDP PER CAPITA* is real GDP per capita in US dollars, averaged over the period 1997-

[17] Assets are not included here since it has strong and significant relationship with liabilities and other variables.

[18] We also experimented with variables such as days of inventory held on hand, and sales growth (a dummy variable indicating whether the sales increase over the previous year). None of these was significant in the discouraged borrower regressions, and thus we drop them from the results that follow.

2001.[19] *INSTITUTIONAL DEVELOPMENT* is an aggregate indictor of the institutions where firms operate. The data are from Beck, et al. (2004A, 2006) and consist information on political stability, the rule of law, government effectiveness, the control of corruption, the quality of regulatory enforcement, and the voice and accountability in the political system.[20] *INFLATION* refers to the logarithm difference of Consumer Price Index (International Financial Statistics, generally line 64) between 1997 and 2001. *COUNTRY GROWTH RATE* refers to the growth rate of GDP in current US dollars, averaged over the period 1997-2001.

Table 4 Panel A provides sample statistics of all variables mentioned above. From Panel A, we can see that there is a large variation in financial development and country growth rates across the countries we study here. For example, values range from India (9.02) to Eritrea (1.16) with regard to the country growth rate. Panel B provides the correlation matrix for the variables in the current study. From Panel B, we see that younger and smaller firms appear more likely to be discouraged. To the extent that firms have a greater number of competitors, they appear more likely to report being discouraged. By contrast, firms with longer relationships with banks and other financial institutions seem less likely to be discouraged. In countries with higher growth rates, and with relatively developed institutional systems, firms seem to be less likely to be discouraged. However, we also find that some firm characteristics are correlated with each other. For example, older firms tend to be larger, more likely to be foreign owned or owned by their respective governments. Multinational firms tend to be more likely to be exporters and more likely to have their financial statements audited by outsiders. Therefore, a multivariate analysis would be necessary to determine which firm characteristics explain significant variations in the probability of being discouraged.

Table 5 provides the univariate results of discouraged borrowers and non-discouraged borrowers of the ten countries analyzed in our study. The sample mean, standard deviation, and whether the sample mean is significantly different at 1%, 5%, or

---

[19] World Development Indicator from the World Bank website and UBC subscriptions.

[20] *INSTITUTIONAL DEVELOPMENT* is a much broader aggregate indicator than Law and Order, in that Law and Order focuses only on legal system efficiency.

10% level between discouraged borrowers and the corresponding non-discouraged borrowers, are also provided. With regard to the variables measuring general firm characteristics, for China, Eritrea, India, Pakistan, and Tanzania, firm age is significantly greater for non-discouraged firms than for discouraged firms. For Brazil, China, Ethiopia, Honduras, India, Pakistan, and Uganda, firm size is significantly larger for non-discouraged firms than it is for the discouraged ones. With regard to corruption, only for Kenya (significant at the 5% level), do a greater number of discouraged firms report that significant informal payments were asked or expected of them in order to obtain services such as telephone and electricity, relative to the non-discouraged firms. With regard to competition, for Ethiopia, Pakistan, Tanzania, and Uganda, the number of domestic competitors the discouraged firms report having are significantly higher than those related to the non-discouraged firms. With regard to the relationship variables, the number of banks the non-discouraged firms have relationships with is significantly higher than that of the discouraged firms and the results carry across all countries in our data set except for Kenya.

In sum, there are significant differences between discouraged and non-discouraged firms. Also, there appear to be significant differences between discouraged borrowers among the various countries we examine. Next, we conduct a multivariate analysis to explore the relationships between discouraged borrowers and the level of corruption and competition in the various countries in our data, controlling for firm general characteristics and the characteristics of firms top managers.

6. Multivariate Analysis

6.1 Which Firms Are Less Likely To Be Discouraged?

Table 6 provides the results of the logistic regression. The results in column 1 show that older and larger firms are less likely to be discouraged. Also, government-

owned firms and exporting firms are less likely to be discouraged. The results are consistent with the results of previous research.[21]

One important finding from the Table 6 seems to be the role of competition in the determination of the likelihood of being discouraged. In the regression of column 1, both of the proxies for competition (*COMPETITOR_D* and *COMPETITOR_F*) enter positively and significantly at the 1% level of significance. Specifically, greater numbers of domestic/foreign competitors are connected with higher probability of a firm being discouraged. And an extra competitor in its main product line leads to an increase of the probability of a firm being discouraged by 3-4%.

Another finding is the impact of relationships between firms and other financial institutions. *NUMBER_SOURCE* is negatively associated with the probability of being discouraged and it enters significantly at the 1% level. Thus, the larger the number of banks with which a firm has relationships, the lower is the probability of a firm being discouraged. An increase in association with an extra bank leads to a reduction of the probability of a firm being discouraged by 1.4%. This finding is consistent with the previous results of Chakravarty and Yilmazer (2008). They focus on businesses in the United States and they find that having relationships with greater number of financial institutions and longer relationships encourage firms to apply for bank loans.

Results in column 1 also show that all of the variables related to the firm owners enter negatively and significantly in the regression (both *MALE* and *HIGH_EDU* enter negatively and significantly at the 1%-level while *EXPERIENCE* enters negatively and significantly at the 10%-level). Specifically, when firm's principle owner is male and when the senior manager has a high level of education, a firm is less likely to be discouraged. In addition, the length of the top manager's previous working experience is negatively associated with the probability of a firm being discouraged.

The regression in column 2 of Table 6 uses samples restricted to relatively developed economies, while the regression in column 3 uses a sample restricted to the

[21] For instance, using data from the World Business Environment Survey (WBES, an earlier firm level survey also launched by the World Bank in over 80 developed and developing countries), Beck et al. (2006) examine the determinants of financing obstacles and find that age, size and firm ownership are important determinants of financing obstacles.

relatively underdeveloped economies. [22] These regressions indicate significant differences between firms in relatively developed economies and relatively underdeveloped economies. Specifically, the regression in column 2 shows that for firms in the relatively developed (high-income) countries, firm size and the number of competitors are the two most important predictors of the probability of a firm being discouraged. Firm size is negatively and significantly (entering at the 1% level) connected with the probability of being discouraged. An increase in firm size by every 3 times decreases the probability of a firm being discouraged by about 7%. We also find that for firms in relatively high income countries, the number of domestic competitors is significantly and negatively associated with the probability of a firm being discouraged. [23] The number of foreign competitors is positively and significantly associated with the probability of a firm being discouraged.

Table 6 column 3 provides the regression results for firms in low-income countries. Both firm age and firm size enter negatively and significantly at the 1% level and therefore are robust predictors of the probability of a firm being discouraged. In particular, government-owned firms and exporting firms appear less likely to be discouraged. Also for firms in low-income countries, the probability of a firm being discouraged decreases with the number of banks with which firms have ongoing relationships. Thus, an increase in association with an extra bank for firms in low income countries leads to a reduction of being discouraged by 5.1%. In addition, for firms in relatively underdeveloped economies, a higher level of liabilities is associated with an increased probability of being discouraged in that an increase in firm liabilities by every 3 times is associated with an increase in the probability of being discouraged by 1.2%. Our results also show that for firms in low-income countries, both domestic and foreign competitors enter positively and significantly at the 1% level. There is thus

[22] Countries are classified as relatively high-income countries and low-income countries according to the World Development Indicators (2006 GNI per capita). Low-income countries/relatively underdeveloped economies refer to countries categorized in low income group while high-income countries/relatively developed economies refer to countries categorized in groups of lower middle-income and up.

[23] This is contrast to what we have expected. Further analysis show that for the three countries categorized as high-income countries (Brazil, China, and Honduras), no firms in Brazil or China answered the questions related to domestic competitors. The rate of the missing data is about 90% of the total observations therefore leading to the biased results here.

indication that a greater number of competitors increases the probability of a firm being discouraged. As to the impact of firm owners in relatively underdeveloped economies, we find that firms are less likely to be discouraged when the senior manager has a high level education. [24] In fact, across all firms in our data, firms owned by males are less likely to be discouraged relative to firms owned by females. This is consistent with the results of Cavalluzzo et al. (2002) and the work of Storey (2004) in that they find female business owners and African American business owners are more likely to be credit constraint when applying for credit. Our results also show that compared to firms owned by business owners with a lower education level, firms owned by business owners with higher education levels are less likely to be discouraged. In addition, the length of a business owner's previous working experience is weakly correlated (at the 10% level of significance) with the probability of a firm being discouraged.[25]

In sum, the regressions in Table 6 show that older and larger firms are less likely to be discouraged. The level of competition and the relationships between firms and financial institutions are the two important determinants of discouraged borrowers. A greater number of competitors is connected with a higher probability of a firm being discouraged while a greater number of banks with which firms have relationships is associated with a lower probability of a firm being discouraged. In addition, when classifying countries into a relatively high-income group and a low-income group, our results show that there are significant differences between these two groups. Specifically, for firms in high-income countries, whether a firm is discouraged is determined mainly by firm size. However, for firms in low-income countries, the

[24] However, all of the above mentioned variables (except firm size and competition) do not enter significantly for firms in the relatively high-income countries. Another big difference is the effect of domestic competitors. For firms in low-income countries, both domestic and foreign competitors enter positively and significantly at the 1% level, which indicates the probability of a firm to be discouraged increases with the number of both domestic and foreign competitors. However, for the firms in high-income countries, domestic competitors enter negatively and significantly at the 1% level. Further analysis on relatively developed economies (Brazil, Honduras and China) show that no firms in Brazil or China answered the questions related to domestic competitors and thus the extremely high rate of missing data (about 90% of the total observations) leads to the biased results here.

[25] The result is in somewhat consistent with that of Chakravarty and Yilmazer (2008) who report that the length of management under the current manager is negatively correlated with the probability of a firm being credit constrained in the United States.

probability of a firm being discouraged is determined by many factors other than firm size, like firm age, firm ownership, financial status, and the number of banks it has relationships with. These findings are further indicative of the fact that a closer examination is necessary to investigate the differences in firm discouragement between those in relatively underdeveloped economies and relatively developed economies. Since we find that firm size appears to be more sensitive in relatively underdeveloped economies as a predictor of the likelihood of borrower discouragement. Specifically, firm size enters significantly at the 1% level in the regression and an increase in one (log) unit of firm size is associated with an increased likelihood of being discouraged by about 4.3% compared in low-income countries while the same percentage for the whole sample is about 1.0%. Therefore, we now turn to investigating the joint impact of firm size and relative economic development on the probability of firm discouragement.

6.2 The Effect of Firm Size and Economic Status on Discouraged Borrowers

Our basic results show that level of competition and the relationships with financial institutions are the two key determinants of discouraged borrowers. Based on those findings, we now further explore the role of firm size when such firms make their credit application decisions.

In column 2 of Table 7, we report specifications where we interact key determinants in our basic model with firm size dummies. In particular, our three firm size dummies are *SMALL* (with no more than 50 employees), *MEDIUM* (with employees of 51-500) and *LARGE* (with more than 500 employees).[26] These dummy variables take the value of 1 if the firm is small, medium or large, respectively, and 0 otherwise. In column 2 we see that the interaction term comprising the level of competition and the small firm dummy variable has a positive sign and is significant at the 1% level, suggesting that a marginal increase of the number of competitors worsens the probability of being discouraged reported by small firms. In contrast, the interaction term of the number of banks firms have relationships with and the small firm dummy variable has a negative sign and is also significant at the 1% level, suggesting that a

[26] We follow Beck, Demirguc-Kunt, and Maksimovic (2005) in dividing firm size into three size dummies variables.

marginal increase in the number of financial institutions firms have relationships with translates into a decrease in the probability of being discouraged for small firms.

Column 3 of Table 7 shows specifications of interacting key determinants in our basic model with the economic status of the respective country within our data. The two economic status dummies are *UNDERDEVELOPED* (categorized as low income countries according to the World Bank country classification based on GNI) and *DEVELOPED* (categorized as the upper/lower middle income or high income countries according to the World Bank country classification based on GNI). Both dummy variables take the value 1 if the firm is underdeveloped or developed, respectively, and 0 otherwise. From column 3, we see that the interaction term of *LARGE* and the *UNDERDEVELOPED* dummy variable has a negative sign and is significant (at the 5% level), which indicates that large firms in relatively underdeveloped economies have a lower probability of being discouraged. Similarly, the interaction term of the number of financial institutions firms have relationships with and the *UNDERDEVELOPED* dummy variable has a negative sign (entering at the 1% level). The implication is that firms having ongoing relationships with a greater number of financial institutions in underdeveloped economies have a less likelihood of being discouraged. The regression results reported in column 3 also indicate that marginal increase of the number of competitors increases the probability of being discouraged among firms in underdeveloped economies.

In sum, the results in Table 7 show that an increase in the number of competitors increases the probability of being discouraged among small firms while stronger relationships with financial institutions lower the probability of discouragement among small firms. Similarly, large firms or firms having ongoing relationships with a larger number of banks have a lower likelihood of being discouraged in underdeveloped economies. Finally, a greater number of competitors increase the likelihood of being discouraged among firms in underdeveloped economies.

6.3 Discouraged Borrowers and Country Characteristics

So far we have investigated the relationships between firm-level characteristics and discouraged borrowers, and also further investigated the impact of firm size and

economic status on the probability of being discouraged at a firm level. As we have described in Section III, previous research shows that financial, legal and institutional development weakens the constraining effects of financing obstacles. To control for the fact that firms' response may be affected by country specific characteristics, we now include some country related characteristics into our regression so as to examine whether the probability of a firm being discouraged can be explained by cross-country variation like institutional development. In fact, including country-level variables not only acts as a robustness test for the firm-level regression, but also allows us to test the impact of specific country characteristics on the probability of a firm being discouraged.

We use *GDP PER CAPITA*, *INSTITUTIONAL DEVELOPMENT*, *INFLATION*, and *COUNTRY GROWTH RATE* as the proxies to examine the differences of discouraged borrowers in various countries. The first four columns of Table 7 show that when the country proxies are entered one by one, both *INFLATION* and *COUNTRY GROWTH RATE* are negatively associated with the probability of a firm being discouraged and they are both significant at the 1% level. It is especially interesting to note that inflation is negatively related to discouraged borrowers, which could be because firms in countries with higher level of inflation have to rely more on external finance so as to keep the normal operation and growth. The column on the right end of Table 7 also indicates that when all of the country variables are concluded simultaneously, only *COUNTRY GROWTH RATE* enters negatively and significantly at the level of 1% while the other country variables are not significant. In addition, when we include country-level variables, the firm characteristics that we previously found to be significant in predicting the probability of a firm being discouraged continue to enter significantly. Particularly, larger, government-owned firms are less likely to be discouraged. The greater the number of financial institutions that a firm has relationships with, the less likely it is that the firm is discouraged. The number of domestic/foreign competitors is positively and significantly related with the probability of a firm being discouraged. Results also show that firms that have their financial statement reviewed by external auditors would be less likely to be discouraged.

In summary, when country variables are added, the firm characteristics which are significant in previous regression are still significant here. And country growth rate is the only country-level proxy that is negatively and significantly related with the probability of a firm being discouraged, indicating that a higher growth rate of a country is significantly correlated with a lower likelihood of borrower discouragement.

7. Concluding Summary

We use data from the Investment Climate Surveys (ICS) launched by the Investment Climate Unit (ICU) of the World Bank to examine discouraged borrowing. The contribution of our study rests on the fact that there is a paucity of research in understanding the drivers of discouraged borrowing – both within the context of the United States and internationally across the world.

We have three main findings. Our results also show that the number of competitors and the number of banks that firms have relationship with are significantly correlated with the probability of a firm being discouraged. Specifically, the greater number of competitors a firm has, the more likely it is to be discouraged. In contrast, the greater the number of banks that a firm has business associations with, the less likely it is to be discouraged.

The second finding is that there are significant differences between discouraged borrowers in relatively developed countries and those in relatively underdeveloped countries. For instance, for firms in relatively developed economies, firm size is the main determinant in explaining the probability of a firm being discouraged. However, for firms in relatively underdeveloped economies, factors other than firm size, like firm age, whether it is an exporter, and whether it is government owned, its financial situation, and the number of banks it has an ongoing relationship with, are all determinants of the likelihood of being discouraged. We also show that the greater the number of competitors that a firm faces the higher the likelihood of being discouraged is. Also, firms are less likely to be discouraged if they have ongoing relationships with a greater number of banks or other financial institutions. An increase in firm size and having relationships with a greater number of banks are both associated with a lower likelihood of being discouraged among firms in underdeveloped economies while

having a greater number of competitors is associated with higher likelihood of being discouraged among firms in underdeveloped economies.

Third, firms in countries with a relatively lower country growth rate are more likely to be discouraged. Among all of the country characteristics potentially explaining the likelihood of firm discouragement, the country growth rate seems to be the most important one that can explain a significant proportion of cross-country variation among discouraged borrowers.

While the current study takes a modest step in furthering our understanding of discouraged borrowers in different economies around the world, we have little to say about comparisons between discouraged borrowers in a developed economy like the United States and Great Britain and countries further down the chain of economic development. Another potential criticism of the current research is the possible limitation with the data. For instance, our results show that corruption is not an important predictor of discouraged borrowers. A closer inspection of the data on a country-by-country reveals that firms in China report that corruption in the allocation of resources is one of the main reasons for being discouraged while no firms in India report corruption as the main reason for being discouraged. Does it really mean corruption is not a problem for firm operation in India? Or, does it reveal a bias in reporting sensitive information in some countries over others? Further research will have to delineate such issues.

List of References

Angelini, P., & Generale, A. (2005). *Firm size distribution: Do financial constraints explain it all? Evidence from survey data* (Bank of Italy, Economic Research Department working paper 549). Retrieved July 6, 2008, from http://ssrn.com/abstract=1015094

Beck, T., Demirgüç-Kunt , A., Laeven, L., & Maksimovic, V. (2006). The determinants of financing obstacles. *Journal of International Money and Finance, 25(6),* 932-952.

Beck, T., Demirguc-Kunt, A., & Levine, R. (2005). Law and firms' access to finance. *American Law and Economics Review, 7(1),* 211-252.

Beck, T., Demirgüç-Kunt , A., & Maksimovic, V. (2004A). Bank competition and access to finance: International evidence. *Journal of Money, Credit, and Banking, 36(3),* 627-648.

Beck, T., Demirgüç-Kunt , A., & Maksimovic, V. (2004B). *Financing patterns around the world: Are small firms different?* (World Bank Policy Research working paper) Retrieved July 6, 2008, from http://www.microfinancegateway.org/content/article/detail/24214

Beck, T., Demirgüç-Kunt , A., & Maksimovic, V. (2005). Financial and legal constraints to growth: Does firm size matter? *Journal of Finance, 60(1),* 137-177.

Benati, L. (2001). Some empirical evidence on the 'discouraged worker' effect. *Economics Letters, 70(3),* 387-395.

Berger, A. N., & Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *The Journal of Business, 68(3),* 351-382.

Blanchflower, D. G., Levine, P. B., & Zimmerman, D. J. (2003). Discrimination in the small-business credit market. *Review of Economics and Statistics, 85(4),* 930-943.

Carpenter, R. E., & Petersen, B. C. (2002). Capital market imperfections, high-tech investment, and new equity financing. *Economic Journal, 112(477),* F54-72.

Carpenter, R. E., & Petersen, B. C. (2002). Is the growth of small firms constraint by internal finance? *Review of Economics & Statistics, 84(2),* 298-309.

Cavalluzzo, K. S., & Cavalluzzo, L. C. (1998). Market structure and discrimination: The case of small businesses. *Journal of Money, Credit, and Banking, 30(4),* 771-792.

Cavalluzzo, K. S., Cavalluzzo, L. C., & Wolken, J. D. (2002). Competition, small business financing, and discrimination: Evidence from a new survey. *Journal of Business, 75(4),* 641-679.

Chakravarty, S., & Scott, J. S. (1999). Relationships and rationing in consumer loans. *Journal of Business, 72(4),* 523-544.

Chakravarty, S., & Yilmazer, T. (2008). A multistage model of loans and the role of relationships. Forthcoming: *Financial Management*. Retrieved July 6, 2008, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=519822

Demirgüç-Kunt, A., & Maksimovic, V. (1998). Law, finance, and firm growth. *Journal of Finance, 53,* 2107.

Diagne, A. (1999). *Determinants of household access to and participation in formal and informal credit markets in Malawi* (International Food Policy Research Institute FCND discussion paper 67). Retrieved July 6, 2008, from http://ideas.repec.org/p/fpr/fcnddp/67.html

Finegan, T. A. (1981). Discouraged workers and economic fluctuations. *Industrial and Labor Relations Review, 35(1),* 88-102.

Gelos, R. G., & Werner, A. M. (2002). Financial liberalization, credit constraints, and collateral: Investment in the Mexican manufacturing sector. *Journal of Development Economics, 67(1),* 1-27.

Grilli, L. (2005). Internet start-ups access to the bank loan market: Evidence from Italy. *Applied Economics, 37(3),* 293-305.

Guiso, L. (1998). High-tech firms and credit rationing. *Journal of Economic Behavior & Organization, 35(1),* 39-59.

Jappelli, T. (1990). Who is credit constraint in the U.S. economy? *Quarterly Journal of Economics, 105(1),* 219-234.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2004). Governance Matters III: Governance Indicators for 1996, 1998, 2000, and 2002. *World Bank Economic Review, 18(2),* 253-287.

Kodrzycki, Y. K. (2000). Discouraged and other marginally attached workers: Evidence on their role in the labor market. *Federal Reserve Bank of Boston New England Economic Review*, 35-40.

Kon, Y., & Storey, D. J. (2003). A theory of discouraged borrowers. *Small Business Economics, 21(1),* 37-49.

Laeven, L. (2003). Does Financial Liberalization Reduce Financing Constraints? *Financial Management (2000), 32(1),* 5.

Levenson, A. R., & Willard, K. L. (2000). Do firms get the financing they want? Measuring credit rationing experienced by small businesses in the U.S. . *Small Business Economics, 14(2),* 83-94.

Love, I. (2003). Financial Development and Financing Constraints: International Evidence from the Structural Investment Model. *The Review of Financial Studies, 16,* 765.

Maksimovic, V., Ayyagari, M., & Demirgüç-Kunt , A., (2007). *Firm Innovation in Emerging Markets: The Roles of Governance and Finance* (World Bank Policy Research Working Paper 4157). Retrieved July 6, 2008, from http://ssrn.com/abstract=969234

Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics, 110(3),* 681.

Orser, B. J., Riding, A. L., & Manley, K. (2006). Women entrepreneurs and financial capital. *Entrepreneurship: Theory & Practice, 30(5),* 643-665.

Petersen, M. A., & Rajan, R. G. (1994). The benefits of lending relationships: Evidence from small business data. *Journal of Finance, 49,* 3-37.

Raturi, M., & Swamy, A. V. (1999). Explaining ethnic differentials in credit market outcomes in Zimbabwe. *Economic Development & Cultural Change, 47(3),* 585.

Seung-Hyun, L. E. E., Peng, M., W. , & Barney, J., B. (2007). Bankruptcy law and enterpreneurship development: A real options perspective. *Academy of Management. The Academy of Management Review, 32(1),* 257.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *American Economic Review, 71(3),* 393.

Storey, D. J. (2004). Racial and gender discrimination in the micro Firms credit market? Evidence from Trinidad and Tobago. *Small Business Economics, 23(5),* 401-422.

Table 1

Country level explanatory variables.

Country	NO. of Firms	NO. of DB	Firms Discouraged (%)	Income Group (2006 GNI per capita)	GDP/Capita	Institutional Development	Inflation	Country Growth Rate (%)
Brazil	1,634	497	30.42%	Upper middle	2,487.43	0.00	2.43	1.98
China	2,397	492	20.53%	Lower middle	923.53	-0.20	-0.03	8.04
Eritrea	78	9	11.54%	Low income	176.01	.	.	1.16
Ethiopia	427	87	20.37%	Low income	100.57	-0.12	0.41	4.73
Honduras	448	102	22.77%	Lower middle	4,407.14	-0.43	5.02	4.53
India	1,826	220	12.05%	Low income	1,380.81	0.00	3.5	9.02
Kenya	284	27	9.51%	Low income	271.56	-0.78	7.43	5.29
Pakistan	958	425	44.36%	Low income	2,039.01	-0.59	2.45	2.03
Tanzania	409	177	43.28%	Low income	265.70	-0.13	3.94	4.42
Uganda	298	86	28.86%	Low income	245.84	-0.34	1.53	5.87
Average	876	212	21.37%	Low income	1,229.76	-0.29	2.67	4.71

Table 2

Discouraged borrowers across different groups of firms.

Variable	Observations	% of total obs.	Number of DB	Percentage of DB (%)
Total Obs.	8,759		2,122	24.23
Start-up	2,151	24.56%	607	28.21
Middle-age	4,290	48.98%	1,044	24.33
Old	2,318	26.46%	471	20.31
Small	5,599	63.92%	1,560	27.86
Medium	2,575	29.40%	503	19.53
Large	585	6.68%	59	10.08
Multinational	379	4.33%	76	20.05
National	8,380	95.67%	2,046	24.42
Exporter	994	11.35%	149	14.99
Non-exporter	7,765	88.65%	1,973	25.41
Government-owned	749	8.55%	96	12.82
Non government-owned	8,010	91.45%	2,026	25.29
Foreign-owned	706	8.06%	131	18.56
Non foreign-owned	8,053	91.94%	1,991	24.72

Table 3

Reasons firms provided for never applying for bank loan even though they need credit.

Reasons	Loan application procedure is too complicated	Interest rate is too high	Collateral requirements are too high	Corruption exists in allocation	Do not expect to get approved
Brazil	16.52%	57.89%	13.25%	1.09%	1.45%
China	26.27%	17.57%	26.79%	10.34%	19.04%
Eritrea	11.11%	77.78%	11.11%	0.00%	0.00%
Ethiopia	19.65%	28.32%	35.26%	16.76%	0.00%
Honduras	17.65%	58.82%	20.59%	0.00%	2.94%
India	30.33%	34.97%	34.70%	0.00%	0.00%
Kenya	3.70%	74.07%	14.81%	0.00%	7.41%
Pakistan	34.49%	34.29%	31.22%	0.00%	0.00%
Tanzania	22.22%	35.19%	27.55%	5.32%	9.72%
Uganda	30.23%	36.05%	20.93%	0.00%	12.79%

Table 4

Summary of statistics and correlations.

Panel A						
Variable	Mean	Median	SD	Max	Min	Observations
Discouraged borrowers	0.24	0.00	0.43	1	0	8,759
AGE	2.46	2.40	0.91	4.97	0	8,759
SIZE	3.56	3.43	1.74	10.16	0	8,418
MULTINATIONAL	0.04	0.00	0.20	1	0	8,759
EXPORTER	0.11	0.00	0.32	1	0	8,759
FOR_OWNER	0.08	0.00	0.27	1	0	8,759
GOV_OWNER	0.09	0.00	0.28	1	0	8,759
GIFT_EXPECTED	0.04	0.00	0.20	1	0	8,759
COMPETITOR	0.82	0.00	1.56	7.60	0	8,759
COMPETITOR_F	0.20	0.00	0.70	6.40	0	8,759
LIABILITY	2.62	1.61	3.06	13.82	0	8,759
AUDIT	0.39	0.00	0.49	1	0	8,759
NUMBER_SOURCE	2.78	2.00	2.63	60	0	5,291
LENGTH	4.01	4.11	1.31	6.48	0	3,549
MALE	0.47	0.00	0.50	1	0	8,759
HIGH_EDU	0.76	1.00	0.43	1	0	8,759
EXPERIENCE	1.56	1.79	1.21	4.03	0	5,952
GDP PER CAPITA	1329	598	1530	4407	100	10
INSTITUTIONAL DEVELOPMENT	-0.29	-0.20	0.27	0	-0.78	9
INFLATION	2.96	2.45	2.33	7.43	-0.03	9
COUNTRY GROWTH	4.71	4.63	2.55	9.02	1.16	10

Table 4, continued

Panel B: Correlation matrix of main variables.

	DB	GIFT	COMPE_D	COMPE_F	LN_LIA	AUDIT	NUM	LENGTH	GDP/CAP	INS DEVE	INFLA
GIFT	-0.025**										
COMPE_D	0.151***	0.102***									
COMPE_F	0.066***	0.073***	0.134***								
LN_LIA	0.034***	-0.096***	0.396***	0.062***							
AUDIT	-0.047***	0.126***	0.122***	0.058***	0.143***						
NUM	-0.107***	0.001	-0.150***	0.062***	0.325***	0.116***					
LENGTH	-0.072***	-0.226***	-0.311***	-0.115***	0.364***	0.078***	0.152***				
GDP/CAP	0.072***	-0.071***	-0.083***	0.198***	-0.026**	-0.237***	0.192***	0.508***			
INS DE	-0.088***	-0.183***	-0.599***	-0.093***	-0.410***	-0.329***	0.135***	0.374***	0.112***		
INFLA	-0.015	0.180***	0.206***	0.164***	-0.065***	-0.229***	-0.004	-0.533***	0.301***	-0.196***	
GROWTH	-0.190***	-0.033***	-0.407***	-0.279***	-0.182***	0.015	-0.084***	0.488***	-0.567***	0.273***	-0.203***

Table 5

Univariate statistics for discouraged borrower and non-discouraged borrower by country.

	Brazil		China		Eritrea		Ethiopia	
	DB	Non-DB	DB	Non-DB	DB	Non-DB	DB	Non-DB
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
Firm characteristics:								
AGE	17.21 (16.90)	18.60 (17.16)	13.77 (13.79)	15.24** (14.50)	14.22 (14.27)	33.55** (24.45)	15.32 (14.47)	16.98 (15.05)
SIZE	99.21 (343.69)	136.68** (319.77)	208.51 (617.21)	391.70*** (886.60)	71.11 (103.12)	111.07 (203.79)	41.26 (149.94)	170.73** (568.84)
MULTINATIONAL	10.40%	13.22%*			0.00%	8.70%	0.00%	0.29%
EXPORTER	14.60%	20.67%***					3.45%	6.18%
FOR_OWNER	3.80%	4.20%	11.79%	12.53%	11.11%	10.14%	2.30%	5.29%
GOV_OWNER	0.00%	0.26%	17.48%	25.94%***	11.11%	21.74%	2.30%	16.47%***
GIFT_EXPECTED	2.60%	3.06%	2.24%	3.09%				
COMPETITOR_D					4.67 (3.67)	16.09 (60.93)	69.52 (247.59)	32.52* (130.58)
COMPETITOR_F	5.93 (39.76)	3.34 (26.28)			0.22 (0.44)	0.10 (0.43)	1.02 (5.80)	0.75 (4.81)
LIABILITY	6.12 (2.60)	6.68*** (2.89)	7.80 (2.71)	8.90*** (2.71)	2.73 (4.10)	3.17 (4.58)	5.33 (2.44)	6.98*** (2.63)
AUDIT	16.20%	20.23%*	65.04%	70.39%**	88.89%	88.41%	21.84%	38.24%***
NUMBER_SOURCE	2.89 (2.18)	3.67*** (3.22)	2.26 (1.46)	2.95*** (2.56)			1.37 (1.16)	176*** (1.17)
LENGTH			120.38 (116.19)	133.12** (120.01)			107.86 (103.31)	117.06 (122.26)
MALE	82.40%	78.20%*			44.44%	44.93%	71.26%	57.35%**
HIGH_EDU	62.60%	67.34%*	81.50%	82.60%	77.78%	63.77%	27.59%	48.24%***
EXPERIENCE	7.19 (9.52)	6.69 (8.87)			18.33 (14.15)	6.29*** (9.54)	6.55 (7.88)	7.39 (9.05)
N	499	1139	491	1898	9	69	85	337

*** (**, *) indicates that the difference in the means or frequencies between those discouraged firms and non-discouraged firms is significant at the .01 (0.05, 0.10) levels.

Table 5, continued

	Honduras		India		Kenya		Pakistan	
	DB	Non-DB	DB	Non-DB	DB	Non-DB	DB	Non-DB
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
Firm characteristics:								
AGE	11.27 (9.33)	13.31 (12.58)	14.52 (15.67)	17.06** (15.32)	23.52 (20.94)	25.98 (19.64)	14.24 (10.16)	15.95** (10.16)
SIZE	66.37 (265.06)	153.17*** (329.09)	13.69 (27.08)	44.99** (216.35)	38.04 (51.72)	177.41 (654.52)	46.44 (101.18)	128.91*** (465.77)
MULTINATIONAL	11.76%	17.00%	0.00%	0.06%	22.22%	25.29%		
EXPORTER	19.61%	37.75%***	11.36%	18.42%***	22.22%	37.74%		
FOR_OWNER	9.80%	17.87%*	0.91%	2.05%	11.11%	17.51%	0.94%	2.60%*
GOV_OWNER			0.00%	1.93 %**	0.00%	7.39%		
GIFT_EXPECTED	9.81%	8.36%			18.52%	40.47%**		
COMPETITOR_D	24.18 (65.33)	21.52 (96.93)			30.96 (72.63)	41.23 (189.68)	98.76 (207.28)	75.98* (172.12)
COMPETITOR_F	2.83 (10.85)	1.88 (5.71)			6.22 (20.56)	5.73 (37.13)	2.89 (16.73)	2.58 (12.19)
LIABILITY	1.19 (2.28)	2.82*** (3.86)	8.50 (1.67)	9.25*** (2.05)			15.92 (1.95)	16.64*** (2.67)
AUDIT	27.45%	47.26%***			100.00%	85.21%**	32.39%	48.79%***
NUMBER_SOURCE					1.70 (1.26)	2.04 (1.65)		
LENGTH					15.32 (11.20)	15.06 (14.33)		
MALE	72.55%	73.78%	90.91%	89.42%	62.96%	67.70%		
HIGH_EDU	55.88%	69.45%***	82.27%	88.55%***	59.26%	72.76%	74.65%	84.79%***
EXPERIENCE	5.70 (8.44)	10.05** (8.28)	7.99 (7.51)	9.10* (8.38)	7.17 (7.24)	5.50 (8.44)	6.44 (5.37)	7.00 (6.92)
N	102	346	220	1607	27	252	426	539

*** (**, *) indicates that the difference in the means or frequencies between those discouraged firms and non-discouraged firms is significant at the .01 (0.05, 0.10) levels.

Table 5, continued

	Tanzania		Uganda		TOTAL	
	DB	Non-DB	DB	Non-DB	DB	Non-DB
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
Firm characteristics:						
AGE	9.70 (11.90)	12.43** (15.51)	8.78 (8.62)	13.64 (15.98)	14.21 (14.06)	16.56*** (15.80)
SIZE	85.84 (289.59)	127.31 (251.76)	13.99 (19.85)	101.63** (3670.07)	103.91 (525.70)	243.33*** (1,792.7)
MULTINATIONAL	3.91%	5.17%	0.00%	5.63%**	3.62%	4.61% **
EXPORTER	10.06%	11.64%	5.81%	17.84%***	7.05%	12.71%***
FOR_OWNER	11.73%	15.95%	5.81%	29.58%***	6.25%	8.69%***
GOV_OWNER	1.68%	7.76%***	2.33%	4.23%	4.51%	9.89%***
GIFT_EXPECTED	11.17%	11.64%	12.79%	20.19%	3.29%	4.46%**
COMPETITOR_D	185.16 (273.34)	126.04** (235.2)	54.16 (156.55)	19.71*** (47.77)	41.95 (148.32)	15.72*** (90.01)
COMPETITOR_F	28.36 (121.52	35.44 (133.17)			5.08 (46.87)	2.83** (35.95)
LIABILITY	4.46 (5.86)	5.95** (6.69)			7.97 (5.32)	28.03 (14.63)
AUDIT	49.72%	54.74%	37.21%	67.61%***	34.87%	40.31%***
NUMBER_SOURCE	1.67 (1.29)	2.76*** (4.81)	1.33 (0.91)	1.86*** (1.22)	2.30 (1.79)	2.94*** (2.84)
LENGTH	48.42 (83.86)	49.12 (94.07)	6.39 (5.98)	7.58 (6.43)	92.19 (111.42)	108.39*** (120.09)
MALE	48.04%	40.09%*	84.88%	72.77%**	43.61%	48.60% ***
HIGH_EDU	74.30%	81.47%*	19.77%	47.89%***	68.94%	77.71%***
EXPERIENCE	14.18 (9.58)	16.9** (9.97)	4.01 (5.64)	5.45 (9.14)	7.29 (8.22)	7.95** (8.85)
N	177	231	84	213	2104	6622

*** (**, *) indicates that the difference in the means or frequencies between those discouraged firms and non-discouraged firms is significant at the .01 (0.05, 0.10) levels.

Table 6

Discouraged borrowers and firm characteristics.

Variable	(1) All	(2) High	(3) Low
Firm characteristics			
General			
ln_ AGE	-0.094 (0.039)**	0.024 (0.067)	-0.123 (0.051)**
ln_ SIZE	-0.045 (0.026)*	-0.265 (0.061)***	-0.239 (0.038)***
MULTINATIONAL	0.194 (0.161)	0.001 (0.187)	-0.488 (0.460)-
EXPORTER	-0.398 (0.106)***	-0.193 (0.150)	0.392 (0.167)**
Governance Characteristics			
FOR_OWNER	-0.156 (0.165)	0.404 (0.254)	-0.251 (0.233)
GOV_OWNER	-1.606 (0.355)***	0.165 (1.113)	-1.271 (0.383)***
Corruption			
GIFT_EXPECTED	-0.219 (0.170)	0.004 (0.258)	-0.186 (0.232)
Competition			
ln_ COMPETITOR_D	0.159 (0.022)***	-0.152 (0.058)***	0.230 (0.027)***
ln_ COMPETITOR_F	0.215 (0.037)***	0.139 (0.055)**	0.200 (0.051)***
Relationships			
ln_ NUMBER_SOURCE	-0.060 (0.025)**	-0.039 (0.027)	-0.289 (0.065)***
ln_ LENGTH	0.018 (0.053)		-0.093 (0.060)
Financial Characteristics			
ln_ LIABILITY	0.013 (0.012)	-0.063 (0.061)	0.068 (0.017)***
AUDIT	-0.205 (0.083)**	-0.139 (0.138)	-0.144 (0.108)
Firm Owner			
MALE	-0.308 (0.086)***	0.218 (0.131)	-0.535 (0.125)***
HIGH_EDU	-0.394 (0.073)***	-0.084 (0.110)	-0.328 (0.104)***
ln_ EXPERIENCE	-0.046 (0.026)*	-0.039 (0.040)	0.056 (0.038)
R^2-max	0.09	0.06	0.18
Observations	8,759	4,479	4,280

Table 7

Discouraged borrowers: Firm size and national differences.

Variable	(1)	(2)	(3)
Size			
ln_ SIZE	-0.045 (0.026)*		
SMALL		2.287 (1.652)	
MEDIUM		0.950 (1.727)	
SMALL * UNDERDEVELOPED			0.031 (0.438)
MEDIUM * UNDERDEVELOPED			-0.731 (0.453)
LARGE * UNDERDEVELOPED			-1.500 (0.604)**
SMALL * DEVELOPED			0.411 (0.347)
MEDIUM * DEVELOPED			0.142 (0.328)
LARGE * DEVELOPED			0.000 (0.000)
Competition			
ln_ COMPETITOR	0.159 (0.022)***		
ln_ COMPETITOR * SMALL		0.181 (0.023)***	
ln_ COMPETITOR * MEDIUM		0.027 (0.057)	
ln_ COMPETITOR * LARGE		-0.255 (0.196)	
ln_ COMPETITOR * UNDERDEVELOPED			0.249 (0.025)***
ln_ COMPETITOR * DEVELOPED			-0.112 (0.054)**
Relationships			
ln_ NUMBER_SOURCE	-0.060 (0.025)**		
ln_ NUMBER_SOURCE * SMALL		-0.175 (0.044)***	
ln_ NUMBER_SOURCE * MEDIUM		0.001 (0.028)	
ln_ NUMBER_SOURCE * LARGE		-0.110 (0.080)	
ln_ NUMBER_SOURCE * UNDERDEVELOPED			-0.285 (0.063)***
ln_ NUMBER_SOURCE * DEVELOPED			-0.043 (0.027)
R^2-max	0.09	0.10	0.13
Observations	8,759	8,759	8,759

Table 8

Discouraged borrowers and country characteristics.

Variable	(1)	(2)	(3)	(4)	(5)
Firm characteristics					
General					
ln_ AGE	-0.0459	-0.085	-0.079	-0.076*	-0.063
	(0.040)	(0.039)**	(0.039)**	(0.040)	(0.041)
ln_ SIZE	-0.131	0.045	-0.057	-0.272	-0.285
	(0.028)***	(0.026)*	(0.026)**	(0.032)***	(0.033)***
MULTINATIONAL	0.053	0.194	0.255	0.016	-0.021
	(0.164)	(0.163)	(0.163)	(0.161)	(0.163)
EXPORTER	-0.394	-0.391	-0.344	-0.144	-0.174
	(0.107)***	(0.107)***	(0.107)***	(0.109)	(0.110)
Governance Characteristics					
FOR_OWNER	-0.069	-0.130	-0.154	0.084	0.116
	(0.168)	(0.168)	(0.168)	(0.167)	(0.170)
GOV_OWNER	-1.119	-1.606	-1.731	-1.079	-1.029
	(0.358)***	(0.377)***	(0.377)***	(0.358)***	(0.382)***
Corruption					
GIFT_EXPECTED	-0.173	-0.217	-0.032	-0.124	-0.191
	(0.171)	(0.172)	(0.174)	(0.169)	(0.175)
Competition					
ln_ COMPETITOR_D	0.185	0.157	0.169	0.114	0.130
	(0.022)***	(0.024)***	(0.022)***	(0.022)***	(0.026)***
ln_ COMPETITOR_F	0.182	0.206	0.212	0.144	0.127
	(0.037)***	(0.037)***	(0.037)***	(0.037)***	(0.037)***
Financial Characteristics					
ln_ LIABILITY	0.034	0.002	0.004	0.018	0.020
	(0.013)***	(0.014)	(0.013)	(0.013)	(0.015)
AUDIT	-0.148	-0.166	-0.113	-0.234	-0.185
	(0.084)*	(0.086)*	(0.086)	(0.083)***	(0.087)**
Relationships					
ln_ NUMBER_SOURCE	-0.101	-0.062	-0.058	-0.062	-0.063
	(0.028)***	(0.026)**	(0.025)**	(0.024)***	(0.025)**
ln_ LENGTH	-0.123	0.094	0.099	-0.016	-0.010
	(0.052)**	(0.048)**	(0.047)**	(0.047)	(0.055)
Firm Owner					
MALE	-0.220	-0.282	-0.268	0.049	0.020
	(0.088)**	(0.089)***	(0.088)***	(0.093)	(0.096)
HIGH_EDU	-0.352	-0.409	-0.362	-0.109	-0.133
	(0.073)***	(0.073)***	(0.074)***	(0.076)	(0.077)*
ln_ EXPERIENCE	-0.020	-0.050	-0.043	0.013	0.004
	(0.027)	(0.027)*	(0.027)	(0.027)	(0.028)

Table 8, continued

Variable	(1)	(2)	(3)	(4)	(5)
Country Characteristics					
GDP PER CAPITA	0.000 (0.000)***				-0.0003 (0.00005)
INSTITUTIONAL DEVELOPMENT		-0.220 (0.199)			0.362 (0.252)
INFLATION			-0.109 (0.027)***		0.062 (0.041)
COUNTRY GROWTH				-0.234 (0.016)***	-0.262 (0.025)***
R^2-max	0.109	0.093	0.093	0.143	0.147
Observations	5812	5734	5734	5812	5734

ESSAY 2: REINVESTMENT DECISIONS OF FIRMS IN EMERGING MARKETS

The purpose of the study is to provide empirical evidence on profit reinvestment decisions by firms in various developing economies around the world. We use data compiled by the World Bank from around 8,000 businesses in 35 countries. Our results show that access to external financing, the level of competition, and the security of property rights are significant predictors of profit reinvestment decisions. We also find that a higher level of a country's economic freedom is associated with greater profit reinvestment while a country's transition status is associated with less reinvestment. In addition, we provide evidence that the security of property rights, access to external financing, and the level of competition seem to affect small firms more than large firms. Our findings complement those from China and a few Eastern European countries.

1. Introduction

The goal of the study is to provide empirical evidence on the reinvestment of profits by firms in various developing economies around the world. The microeconomic evidence on firm reinvestment is limited to the studies of Johnson, McMillan and Woodruff (2002, henceforth JMW) and of Cull and Xu (2005, henceforth CX). Using micro data from five post-communist countries (Poland, Romania, Russia, Slovakia, and Ukraine), JMW investigate the relationship between the security of property rights and firm reinvestment decisions. They find that the security of property rights is associated with greater reinvestment. In other words, when the security of property rights is weak, firms are unwilling to reinvest their profits. Following a similar intuition, CX analyze data from a single country, China. In particular, they focus on small businesses from China and divide the security of property rights into two parts: the risk of government expropriation, and the reliability of contract enforcement. The results show that at the current stage of Chinese development, the risk of government expropriation, the reliability of contract enforcement, access to external financing and the extent of private ownership are associated with reinvestment decisions. Given that both of these papers focus on relatively few countries (JMW focus on five European and former Soviet Union countries, while CX focus solely on China), it is not clear if the results from these studies can, and should, be generalized to other economies around the world.

By contrast, in the current study, we use a sample of around 8,000 firms in nearly 40 developing countries in order to examine the reinvestment decisions of firms across a wide range of emerging economies. Specifically, we seek to answer the following questions to which there appear to be no satisfactory answers in the reinvestment literature: can the results from the above mentioned extant research using a few countries be generalized to other developing economies? Are there any differences for investment decisions of firms within various developing countries (for example, countries with relatively high level of economic freedom versus countries with low level of economic freedom)?

In this paper, we use data from the Investment Climate Surveys (ICS) launched by the Investment Climate Unit (ICU) of the World Bank to examine firm reinvestment in various emerging economies around the world. As a unique firm-level survey database, ICS has collected data from over 30,000 firms in about 60 countries and provided information on reinvestment decisions based on firms' own perception. The ICS data also provides information about the environment in which firms operate: the reliability of the legal system, the corruption obstacles firms report confronting, the resources of working capital and new investment, and the number of competitors that firms face. Therefore, unlike previous research focusing only on certain parts of the local investment climate (for example, focusing mainly on the security of property rights, as in JWM) or on a specific country or regions (for example, on China as in CX, or on five Eastern European transition countries as in JMW), our data enable us to study firm reinvestment based not only on the security of property rights and access to external financing, but also on other firm characteristics like the level of competition, for firms in various countries around the world.

We find that access to external financing is one of the key determinants of firms' profit reinvestment decisions. When retained earnings alone are not able to support efficient investments in new projects, it is necessary for firms to undertake new ventures not only with internal funds, but also with external funds like banks loans. Trade credit (in the form of credit from suppliers or customers) matters for profit reinvestment when viewed as a substitution for bank loans. We find that the level of competition that firms face plays an important role on profit reinvestment decisions. We also find that the security of property rights is significantly associated with firms' reinvestment decisions.

Our results also show that a higher level of economic freedom is associated with higher probability of profit reinvestment while countries lower down in transition status are associated with a lower probability of reinvestment[27]. In addition, upon partitioning the countries in our database according the Gross National Income (GNI) and the index of economic freedom, we find that even though there are some differences within groups, access to external financing and the level of competition remain the main

determinants of reinvestment decisions. We also provide evidence that access to external financing, the level of competition, and the security of property rights affect small firms more than the larger firms.

The remainder of the paper is organized as follows. In Section II, we review the theoretical and empirical literature. We describe the data and define reinvestment in Section III. In Section IV, we introduce variables used and lay out an empirical model. Section V and Section VI provide empirical results. Section VII concludes.

2. Background and Theory

2.1 A Theoretical Framework For Reinvestment Decisions

JMW provide a framework for reinvestment decisions to examine the impact of property rights on reinvestment decisions within a few transitional countries. We follow a similar approach in our analysis. Investable funds come from two sources: Internal funds from profits, and external funds from borrowing or other methods. Also, the investable funds that a firm demands are a function of: (1) the firm's profits; (2) the firm's expenses due to corruption or criminal activities; (3) the interest rate of internal funds as an opportunity cost which the firm could receive by investing its profits in outside projects (R^I); and (4) the interest rate for external funds that the firm faces in order to borrow funds from outside (R^E). Since firms have more information about their own businesses relative to their outside investors or lenders, the outsiders would naturally demand a premium to compensate themselves for the informational disadvantage. Therefore, there would be a discontinuity between the cost of using internal funds (R^I) and the cost of using external funds (R^E). We would expect R^I to be generally less than R^E and a hierarchy of fund usage is naturally established when firms make investment decisions. Accordingly, firms would exhaust their internal funds first when making their investments in new projects and then turn to using external funds.

[27] We argue that the operational environments in those transition countries are usually chaotic and that the legal and financial institutions are in a state of flux (CX, 2005; MaMillan, and Woodruff, 2002)

This is consistent with the pecking order theory of Myers and Majluf (1984).[28] In fact, firms in transition and developing economies, have more reasons to use internal funds first relative to firms in developed economies like in the United States. This is because the political climate in many developing economies around the world dictates firms being reticent about providing confidential business information to lenders or other outsiders (see Kon and Storey, 2003; Lotspeich, 1996) for fear of reprisals and shake downs. The work of Meyendorff and Thakor (2002) also shows that firms in Russia avoid using external funds first since the firms have difficulty in hiding their activities from taxing agencies if they apply for loans from external credit markets.

In fact, the maximum amount that a firm can reinvest is its current total profits. Therefore, the two following cases are possible. First, if the demand in investable funds is less than the firm's total profits, the firm would invest a part or all of its profits first to meet the investment demand according to the pecking order theory. Second, if the demand of investable funds is greater than what the firm's total profits can support, the firm would have to get some external funds after exhausting its available internal funds. In both cases, the available internal funds are a function of the firm's profits, the firm expenses resulting from corruption or criminal activity related to payoffs, and the interest rate of internal funds as an opportunity cost which the firm receives by investing its profits in outside projects (R^I).

The main assumption underpinning the above is that the decision to invest with internal funds is made independent of the decision to invest with external funds. If the assumption of independence is violated, however, then investments with both internal and external funds would have to be examined simultaneously. There are at least three reasons for the investment with internal funds to be correlated with external fund resources.[29] First, a firm could be subsidized by the government or state to the degree that R^E is less than R^I. Second, if property rights of the country itself are not secure enough, firm owners would be encouraged in investing only external funds in the

[28] Specifically, Myers and Majluf (1984) show that firms are more willing to use internal funds than external funds. When they exhaust internal funds and have to issue securities, they prefer bonds to stocks. In other words, firms tend to rely first on internal financing and prefer debt over equity if external funds are deemed necessary.

[29] CX also mention the three possible reasons in their study.

growth of their businesses inside the country while investing internal funds to much safer projects located outside the country in question. Third, investment in new projects is lumpy when internal funds alone are not able to support the demands of efficient investment. If that happens, both internal funds and external funds would be necessary for firms to undertake a new investment. Interestingly, JMW argue that none of the three possibilities are valid in their sample. Therefore, they assume that the investment of internal funds is independent of the investment of external funds. This same assumption allows JMW to estimate an equation in which the profit reinvestment is independent of the demand for external financing. However, some of the explanations that JMW provide might not hold as strongly as they might want them to do. For example, related to the issue of lumpy investment, JMW allude to the fact that nearly 40% of firms without external funds still reinvest at least half of their profits and, therefore, the lack of external funds does not preclude their investment in new projects with internal funds. However, the firms that JMW use in their study are extremely small (the number of employees ranges from 7 to 270). Contrarily, the mean number of employees of the firms in the current study is 170, the maximum number is over 20,000, and more than 10 percent of our sample businesses employ more than 300.[30] Therefore, we could reasonably expect the reinvestment rate to be positively related to the access to external financing due to reasons related to lumpy investment. In fact, all of the three possibilities cited above could reasonably hold in one or more of the 38 countries examined in the current study. Hence, contrary to JMW, we include access to external financing in our study in order to investigate the reinvestment decisions by firms in various emerging economies.

2.2 Relationship Between Investment And Reinvestment

There is a large body of research that concentrates on firm investment and development (see, for example, Besley, 1995; Demirguc-Kunt & Maksimovic, 1998; and Svensson, 1998) while relatively few studies focus on firm reinvestment and

[30] The firm size studied here is very similar to that of CX. On average, the sample of CX has 133 employees and more than 10% of the firms employ more than 1,000 employees.

growth. Additionally, some researchers focus on community/neighborhood development and reinvestment (see, for example, Immergluck, 1999; Newman, 2004) based on the revision of the Community Reinvestment Act (CRA).[31] Others focus on the Dividend Reinvestment Plans (DRIPs)[32] (See, Saporschenko, 1998 for a review)[33] or on permanently reinvested earnings (PRE). [34] [35]

The work of Froehlich (1948) appears to be the first to investigate the differences between investment and reinvestment. From an accounting purview, Froehlich analyzes the difference between investment and reinvestment through examining the different income concepts used by accountants. He claims that investment and reinvestment are independently related and may not always have a positive relationship with each other. [36] In fact, these two measures may change simultaneously but in different directions. He also states that, in general, people prefer

[31] Enacted by Congress in 1977 (12 U.S.C. 2901) and implemented by Regulations 12 CFR parts 25, 228, 345, and 563e, the Community Reinvestment Act (CRA) is to encourage depository institutions to help meet the credit needs of the communities where they operate. (http://www.ffiec.gov/cra/about.htm).

[32] Ranging from very small amounts to large amounts, Drips are offered by companies to the shareholders so that they can buy stock directly from the company. According to this plan, companies can reinvest part or all dividends paid into more stock. Drips have many advantages. The very typical advantages are that shareholders do not have to have large amount of money to start and it is a very effective way to put stock dividends into a better use.

[33] For example, Saporschenko (1998) investigate whether the DRIPs add any value to its investors and find that larger firms are more likely to use DRIPs. However, as to the firm's valuation, no big difference has been found between the DRIPs firms and non-DRIPs firms.

[34] In APB Opinion No.23 , PRE is defined as earnings of foreign subsidiaries invested abroad indefinitely or earnings will be remitted in a tax-free liquidation (Krull, 2004).

[35] For example, using data from U.S. multinational corporations, Krull (2004) investigates whether PRE has been used by large firms as a tool to manage their retained earnings and whether the amount of PRE claimed by large firms reflects their investment and tax incentives to reinvest abroad. The results of his study confirm his expectation. However, his study focuses exclusively on PRE from accounting review under APB Opinion No. 23 [35] and the reinvestment is much narrower than what we study here.

[36] The result is consistent with the framework that JMW built based on the pecking order theory.

profit reinvestment to making new investments out of their pocket. A similar idea can be found in Myers and Majluf's (1984) pecking order theory.[37]

2.3 What Do We Learn From The Literature?

A number of previous researchers have argued that the security of property rights and access to external financing promote economic development and growth (see, for example, Besley, 1995; Demirguc-Kunt and Maksimovic, 1998; Mauro, 1995; Rajan and Zingales, 1998; Svensson, 1998). Some (like Claessens and Laeven, 2003; Mauro, 1995; and Svensson, 1998) have focused more on the significance of the property rights while others (see, for example, Levine, 1997; Levine, Loayza, and Beck, 2000; and Rajan and Zingales, 1998) have emphasized the importance of external financing. A typical question that has been debated in the literature is whether both property rights and external financing are important for business investment and growth or whether only one of them is enough.

While most of the previous studies have concentrated exclusively on investment, firm growth and development, JMW are the first to focus on firm reinvestment by empirically investigating the relative importance of property rights and external financing. JMW argue that the insecurity of property rights is the central impediment to firm investment and reinvestment at an early stage of development of a transitional economy. They find that when property rights are secured, firms reinvest more of their profits. Contrarily, firms reinvest a very small share of their profits when property rights are weak, even if bank loans are available. Their results show that the security of property rights is an important factor that can explain significant firm reinvestment behavior while the ability to obtain external financing is much less important relative to the security of property rights. Therefore, JMW claim that the security of property rights is both the necessary and sufficient factor for profit reinvestment, especially in

[37] Khanin (2006) tries to answer the same question from the point of venture capital market. However, his work does not give satisfactory answer of the differences between investment and reinvestment. He investigates venture capitalists' financial decision on investment and reinvestment at different stages and finds that when facing the same positive information, venture capitalists would have even more positive attitude toward the information at the post-investment stage than at the pre-investment stage. Even though he claimed that he would investigate the differences between investment and reinvestment, most of the

the earliest stages of development of a market economy. The study of Knack and Keefer (1995) supports the claim by showing that the security of property rights has significant impact on both the amount of investment and the efficiency of the resources invested and allocated.

However, the results of JMW should be viewed within the context of the countries they examine: All are transition countries of Europe and the former Soviet Union which underwent a "big bang" transformation of economic development in the early nineties. These countries also suffered from a poor infrastructure of financial institutions that were themselves going through rapid but chaotic transformations. Hence, the firms that JMW examine have a high level of retained earnings (many firms in industries with either entry forbidden or protected by competition) which made it possible for those firms to depend much less on the financial support from the credit market. Therefore, it is not surprising that the security of property rights turns out to be the most important precondition of a firm's development and growth. In fact, as the transition from planned economy to market economy moves along, the development of financial institutions and a firm's access to external financing become more and more important (McMillan and Woodruff, 2002).[38] Following the intuition of JMW, CX reexamine the relative importance of the security of property rights and access to external financing initiated by JMW. CX focus on firms in China and they find that both the security of property rights and access to external financing are important determinants of reinvestment decisions. CX also show that, at China's current stage of development, four factors are significant predictors of reinvestment decisions of Chinese firms: the risk of government expropriation, the reliability of contract enforcement, access to external financing, and the firm ownership structure.

---

time, he focuses on investment behavior at pre-investment stage and post-investment stage instead of on telling the difference between investment and reinvestment.

[38] The work of Demirguc-Kunt and Maksimovic (1998) also supports the claim: Using data from 30 developed and developing countries (none of which was in the process of transition from planned economy to market economy), they find that in countries with fair and efficient legal systems, large bank sector, and an active stock market, firms would need more long-term finance and thus access to external financial resources would be necessary for firm development and growth.

However, the literature on the effect of competition on firm development and growth does not be consistent. For instance, analyzing data from 670 companies in the United Kingdom, Nickell (1996) finds that industry concentration is correlated with a higher growth level of business productivity. However, Allen and Gale (2000) find an inverse relation between competition and firm development and growth: as the intensity of competition increases, a firm is willing to deviate from an efficient investment strategy.

Extant research also shows that country-level characteristics have an effect on development and growth. Using data within the period of 1960-1989 from 80 countries, King and Levine (1993) provide cross-country evidence that the development of financial systems[39] stimulate economic growth by improving the efficiency of capital and by increasing the return on investment. Levine and Zervos (1998) further investigate the empirical relationship between stock market, bank systems, and economic growth. Their results show that, even after controlling for many economic and political factors associated with economic growth, the development of both stock market and banking systems are important in facilitating economic growth, productivity growth, investment return and capital accumulation. Rajan and Zingales (1998) support the claim by showing that financial development has a significant supportive effect on investment and economic growth by using aggregate industrial data from a large number of countries. Following their intuition, Demirguc-Kunt, and Maksimovic (1998) provide firm-level evidence for the proposition that both financial market development and institutional development are important factors in facilitating economic growth, as advanced by King and Levine (1993), Levine and Zervos (1998), and Rajan and Zingales (1998). In particular, using data from thirty developed and developing countries, Demirguc-Kunt, and Maksimovic (1998) investigate whether the development of legal and financial systems stimulate firms to investment in potentialy

[39] For example, the ratio of credit issued to private firms to GDP, the percentage of credit that private firms get, the relative importance of banks to their central bank, and the rate of the former financial intermediary sector to GDP.

profitable opportunities and therefore facilitate faster growth.[40] They find that a well developed financial system (for example, an active stock market) and legal system (for example, higher ratings for compliance with legal norms) are associated with a higher firm growth rate.

In this study, we reexamine the issue of whether the findings of JMW and CX from a specific country or a region can be generalized to encompass a larger cross section of disparate developing countries spanning the globe. Additionally, we include more firm level characteristics such as information on the level of completion, to investigate reinvestment decisions.[41] We also include some country-level characteristics (for example, transition status to market economy of a country) to investigate the impact of macroeconomic difference on profit reinvestment decisions.

3. Data description

We use data from the Investment Climate Surveys (ICS) launched by the World Bank. Following a uniform and stratified random sampling methodology and using standardized survey instruments, the ICS collects information on the investment environment of individual economies across the world (over 30,000 firms in more than 50 countries). These surveys are conducted in a consistent manner and sample from a wide range of registered businesses in many developing economies around the world. The specific countries included in the survey are chosen according to the development of their financial markets so as to represent different levels of financial development at a variety of regions. Specific firms chosen to be surveyed within each country are drawn randomly and cover numerous sectors and regions. The purpose of the surveys is to know more about the investment conditions within the local climate and to better understand the effect the firms themselves have on firm-level productivity.

---

[40] Demirguc-Kunt, and Maksimovic mention that for firms whose financing needs exceed their internal resources, the development of legal and financial systems will have direct and severe effect on those firms. Even for those firms that can finance themselves with internal funds, the development of legal and financial systems still has indirect effect on those firms (see King and Levine (1993) and Levine and Zervos (1998) for a review).

[41] JMW collect detail information about firm's profit and firm expenses because of corruption or criminal. They also include country and industry control variables to capture differences across firms in R^I (the cost of using internal funds) Following JMW, CX include more firm-level proxies (firm age, firm size, etc).

The ICS collects both qualitative and quantitative information about business investment environment at numerous countries. Specifically, the survey collects firm-level data on business information during the past three years, including general information about business, manager/owner characteristics and demographic variables, finance information, simple financial statement, business-government relations, legal environment, labor relations, productivity, and other information about business's governance and management. A large part of the information collected in the ICS is related to investment and access to external financing including the component of working capital and new investment, a firm's access to credit, and the cost and use of finance (both internal and external). In addition, the survey provides information about the security of property rights including questions related to the level of corruption, the reliability of legal systems, and the reliability of contract enforcement. The survey also collects data on a firm's organization and ownership structure, the degree of corruption and policy uncertainty, the level of competition, and characteristics related to the prevailing legal system in that country.

In the current study, we examine profit reinvestment decisions with a sample of around 8,000 firms from 35 countries. Appendix A1 provides a list of the countries used in our study. Our dependent variable is a dummy variable indicating the probability of firms reinvesting any profits in their business. It takes the value of one if the surveyed firm reports reinvesting some profits in the business and zero otherwise.[42]

4. Defining the Candidate Explanatory Variables, and Univariate Analysis

The focus of the current study is to examine the determinants of firms' profit reinvestment decisions. To do so, we control for a vector of general firm characteristics, such as firm age and firm size. We also control for manager characteristics, such as the highest education level of top manager. We focus specially on the security of property

[42] The dependent variable is captured by the following question in the survey: "Approximately what share of net profits were re-invested in your establishment last year (that is, not distributed to owners or shareholders)?"[42] A summary of the responses to this question is provided in Appendix A1. From the table, we see variations in profit reinvestment decisions among the various countries included in our data. For example, firms in Brazil, Honduras, Kenya, Nicaragua, Peru, and Serbia appear to reinvest more than half of their profits while the corresponding rates for firms in Azerbaijan and Russia are only a little over 10%.

rights, access to external financing, and the level of competition. As mentioned in Section II, country level characteristics like the development of legal and financial systems are important in facilitating firm development and growth. Thus, we also include some country level variables in our study.

The following specific variables are used in our study to examine profit reinvestment decisions. Here, our goal is to use measures similar to those used by extant research (for example, CX and JMW) as much as possible in order to facilitate comparisons between our findings and theirs.[43] A comparison of the survey questions (related to security of property rights, and access to external financing) between JMW, CX and the current study is provided for the interested reader in Appendix A2.

We include some firm characteristics variables as control variables. *AGE* refers to the (natural) log of the number of years the firm operated in the country. *SIZE* refers to the (natural) log of the number of years of both permanent and temporary employees of the firm during the year previous to the year of the survey. *EXPORTER* is a dummy variable measuring whether the firm export directly or indirectly, taking the value of one if export directly/indirectly and zero otherwise. *MULTINATIONAL* is a dummy variable taking the value of one if the firm has holdings or operations in other countries and zero otherwise. We proxy for firm ownership structure with a variable denoted as *PRIVATE*, representing the percentage of a firm owned by private sectors.[44]

Our proxies for the risk of government expropriation include two variables. The first variable, denoted as *INFORMAL_PAYMENTS*, refers to the percentage of expense as total sales on making gifts or informal payments to public officials. It is the manager's response to the question: "We've heard that establishments are sometimes required to make gifts or informal payments to public officials to 'get things done' with regard to customs, taxes, licenses, regulations, services, etc. On average, what percent

[43] In fact, the variables used in the current study are not only based on previous studies of CX and JMW, but also on previous studies of firm development and growth (Acemoglu and Johnson, 2005; Beck, et al., 2005; Claessens and Laeven, 2003; and Demirguc-Kunt and Maksimovic, 1998).

of annual sales value would such expenses cost a typical firm like yours?" The second variable, denoted as *GOV_INTERPRETATION*, refers to the manager's perception on the impact of government official's interpretations of regulations on the firm, taking the value of one if the firm manager agrees that government official's interpretations of regulations have had an effect on the firm's operation and zero otherwise.

We proxy the reliability of contract enforcement include two variables. The first one, denoted as *JUDI_ENFORCE_CONTR*, is a dummy variable measuring manager's confidence on the judicial system. It equals to one if the manager has confidence on the judicial system and zero otherwise. The second contract enforcement variable, denoted as *DISPUTES_RESOLVED*, is also a dummy variable, taking the value of one if the firm has some disputes over payment resolved by court action during the past two years and zero otherwise.

Following CX and JMW, we include three variables to measure access to external financing. The first variable, denoted as *BANK_LOAN*, is a dummy variable measuring whether the firm has had at least one loan from its related banks over the past year, taking the value of one if has at least one bank loan, zero otherwise. *TRADE_CREDIT*, is a dummy variable taking the value of one if the business has had some share of its input/source of financing via trade credit and zero otherwise. The third variable for access to external financing is denoted as *COLLATERAL*, which measures the percentage of collateral required by banks for the most recent loan when applying for loans.

We also include one variable to measure the level of competition faced by firms, *TECH_COMPARED*, which refers to a firm manager's response to "my firm's technology (main product line or main line of services) is less advanced than/about the same as /more advanced than that of its main competitor." In addition, we include a

[44] According to Shleifer (1998), government/state ownership tends to face political or social objectives, like providing benefits to bureaucrats for political reasons. Therefore, the rights of the owners/managers of the government/state owned firms are greatly weakened. Unlike government/state ownership, private ownership faces less interfere from government or politicians and the owners/managers have more freedom in controlling their properties. Hence, it is reasonable for private owned firms to expect more investment return.

dummy variable, *HIGH_EDU*, which equals one if the top manager has a bachelor's, or higher, degree and zero otherwise.

Finally, to examine the differences between firms' reinvestment decisions in various countries, we include two country-level variables. One, *ECONOMIC FREEDOM*, is an index ranging from 0 to 100 to measure the degree of economic freedom of various countries in 2002. Economic freedom represents the right of property ownership, and the freedom of movement for capital, goods, as well as labor. Provided jointly by the Heritage Foundation and the Wall Street Journal, the Index of Economic Freedom provides a global portrait of economic freedom among various countries around the world.[45] The equally weighted index measures a number of specific factors (business freedom, trade freedom, fiscal freedom, freedom from government, monetary freedom, investment freedom, financial freedom, property rights, and freedom from corruption).[46] The other country variable, *TRANSITION*, is a dummy variable taking the value of one if the country is in the process of making the transition to a market economy and zero otherwise.[47]

In sum, the regression model for profit reinvestment decisions takes the following form:

[45] The Heritage Foundation and the Wall Street Journal offer the index of economic freedom yearly after 1995. The 2002 index of economic freedom is used in the current study so as to be consistent with the period the ICS data was compiled (2000-2002). The 2002 index of economic freedom consists of information from 156 countries.

[46] More detail of index of economic freedom can be obtained from: http://www.heritage.org/research/features/index/search.cfm. The index also uses a scale of 1-5: Free: 80-100; mostly free: 70-79.9; moderately free: 60-69.9; mostly unfree: 50-59.9; Repressed: 0-49.9, and NR (not ranked).

[47] According to OECD, UNFCCC, and USAID, all of the countries included in our data set, can be grouped into transition and non-transition countries. More details on transition countries can be obtained from: http://www.oecd.org/document/53/0,3343,en_2649_34359_2346101_1_1_1_1,00.html, http://www.usaid.gov/locations/europe_eurasia/country_progress/, www.ebrd.com/pubs/factsh/themes/etc.pdf, and http://www.eeassoc.org/transition_countries_list.asp. Retrieved February 16th, 2008.

$$REINVESTMENT_{i,k} = \alpha + \beta_1 GENERAL_{i,k} + \beta_2 OWNERSHIP_{i,k} + \beta_3 GOVERNMENT\ EXPROPRIATION_{i,k} + \beta_4 CONTRACT\ ENFORCEMENT_{i,k} + \beta_5 EXTERNAL\ FINANCING_{i,k} + \beta_6 COMPETITION_{i,k} + \beta_7 MANAGER_{i,k} + \beta_8 COUNTRY_k + \varepsilon_{i,k,} \quad (1)$$

where the dependent variable *REINVESTMENT* is a dummy variable taking the value one if the surveyed firm *i* in country *k* reinvested some of its profits back in the business and zero otherwise.

Table 1 presents summary statistics for all of the above introduced variables. The means and stand deviations show a large variation in firms' responses to the security of property rights, access to external finance, and the level of competition. For example, the mean response to *GOV_INTERPRETION* is 2% and the standard deviation is 5%. *BANK_LOAN*, the variable measuring whether the firm has at least one bank loan over the past year, has an average value is 0.26, with a standard deviation of 0.44. *TECH_COMPARED*, one proxy to measure the level of competition, has an average value of 2, with a standard deviation of 0.65.

Table 2 further provides sample statistics of the main variables from every country. From Table 2, we can see that a substantial variation also exists in the responses regarding the risk of government expropriation, the reliability of contract enforcement, access to external financing, and the level of competition across countries. For example, firms in Brazil paid 12% of their total sales on gifts or informal payments to government officials while firms in countries like Estonia, Poland, Turkey and Uzbekistan have spent much less on similar expenses (less than 1% of their total sales). Besides the risk of government expropriation, the difference in responses to the reliability of contract enforcement is also large. For instance, the likelihood for firms in Azerbaijan and Croatia to have confidence in judicial system is over 60% while the similar probability for firms in Kyrgyzstan and Moldova is less than 30%. Responses to external financing also differ by a wide margin. For example, the proportion of firms

that report having at least one bank loan is more than 50% in Brazil and Honduras, while the corresponding number for firms in Azerbaijan and Tajikistan is less than 10%. As to the percentage of collateral required for the most recent loan, firms in Georgia and Nicaragua were required to provide more than double the loan amount as collateral while the corresponding percentage for firms in Cambodia is less than half of the loan amount.

Table 3 shows the correlation matrix between the reinvestment decisions and the firm/country characteristics considered in this study. JMW point out that if the correlation between variables measuring property rights and those measuring access to external financing is high, it could be a warning signal that the lack of security of property rights may be proxied for with a lack of access to external financing (or vice versa). From Table 3, we can see that the correlation between the variables related to the risk of government expropriation and the variables related to access to external finance is either insignificant or significant but low in magnitude. The same is true with the correlation between the variables related to the access to external financing and those related to the reliability of contract enforcement. Hence, it appears reasonable to include variables measuring both the security of property rights and access to external financing in our regressions. Table 3 also shows that the probability of profit reinvestment increases in the size of the enterprise and in the percentage of private ownership. The probability of profit reinvestment is negatively and significantly correlated with the percentage of informal payments to public officials. Firms with access to external financing are more likely to reinvestment their profits in the business. Profit reinvestment decisions also increase with the level of competition. However, stylistically we observe the presence of systematic correlations across certain characteristics. For example, older firms tend to be larger. Larger firms tend to be more likely to have holdings or operations in other countries (multinational). Private-owned firms tend to pay higher percentage of expense on making gifts or other informal payments to public officials. Our multivariate analysis, therefore, is meant to tease out the characteristics that explain firms' profit reinvestment decisions when simultaneously controlling for all possible determinants of profit reinvestment.

5. Determinants of Reinvestment

5.1 Base Results

Since the dependent variable is a dichotomous one, logistic regression would be appropriate for the data analysis. Table 4 provides the results of logistic regression estimation on firms' reinvestment decisions. The first column provides the results when all firm-related characteristics are analyzed in one regression (the base model) while the second column shows the results when country-related variables are included to the base model.

The base results in Table 4 (column 1) show that larger firms tend to reinvest their profits while firm age enters negatively and significantly into the regression. This is consistent with the findings of CX. Specifically, firms would be more likely to reinvest at the beginning stages of their operation in order to obtain higher marginal efficiency. As they grow older, it would be more difficult for them to upgrade their dated technology and therefore older firms tend less likely to pursue reinvestments. From our base results, we can see that the security of property rights has a strong effect on firms' profit reinvestment decision. Specifically, both the share of informal payments to government officials and *GOV_INTERPRETATION* are negatively and significantly correlated with the probability of profit reinvestment, showing that firms tend to restrict their reinvestment when they anticipate making informal payments to government officials or when they expect that government officials' interpretation of laws and regulations will have adverse effects on their operation and growth. Our findings related to the security of property rights are consistent with those of CX and JMW.

In terms of the impact of external financing on profit reinvestment, *BANK_LOAN* enters positively and is generally significant in all regressions, showing that firms report to have at least one bank loan are more likely to reinvest their profits. In other words, compared to firms without any bank loans, firms with at least one bank loan tend to be more likely to reinvest their profits. *COLLATERAL* is also positive and generally significant in all regressions, showing that higher collateral is associated with higher probability of profit reinvestment. This would follow if a higher collateral

requirement is correlated with a restrictive borrowing environment leading firms to rely more on their internal funds to finance reinvestment. Similar to both *BANK_LOAN* and *COLLATERAL*, *TRADE_CREDIT* also enters positively and significantly into the regression, which could indicate that trade credit is a complement to internal funds or even serves as an alternative to bank loans. In general, our results related to external financing are unlike those of JMW but consistent with those of CX. JMW find that property rights are the only significant factors having strong impact on firms' reinvestment decisions while CX show that access to finance is also an important factor. Our results also show that competition is also a key determinant of profit reinvestment decisions. Specifically, *TECH_COMPARED* enters positively and significantly in the regression at the 1% level.[48]

When the country variables are added to the base regression model (column 2), the main determinants of profit reinvestment remain significant, implying that the proxies of the security of property rights, access to external financing, and the level of competition still have a strong impact on profit reinvestment decisions. What is different from the base results is that the firm ownership measure becomes statistically significant here. *PRIVATE* enters positively and significantly in the regression (at the 10% level), showing that higher level of private ownership facilitates firms to make positive reinvestment decisions. When country variables are added, *ECONOMIC FREEDOM* enters positively and significantly (at the 1% level) in the regression while *TRANSITION* enters negatively and significantly in the regression (also at the 1% level). The latter findings are consistent with the fact that firms operating in transition countries tend to be more conservative in their profit reinvestment decisions. The operational environment in those transition countries is usually chaotic and that the legal and financial institutions are in a state of flux (CX, 2005; MaMillan, and Woodruff, 2002).

[48] CX did not include proxy of competition in their study. One possible reason for that may be the following: Since 1990s, many Chinese firms shifted from majority-state-owned firms to private-owned firms. However, even after the privatization, many firms were still associated with their previous "mother-in-law" (the government agencies with which they were affiliated) in many potential ways and still took advantage of the association. For example, they may have much better chance in getting a

In sum, our results show that the security of property rights, access to external financing, and the level of competition are the key determinants of firm reinvestment decisions. Firms tend to reinvest more of their profits when their property rights are secured, and when they have access to external finance. Firms with more advanced technology than its main competitors tend to be more likely to reinvest their profits. Our base results also show that the probability of profit reinvestment increases with the index of economic freedom while firms in transition countries tend to be more conservative in their profit reinvestment decisions.

5.2 The Effect of Firm Size on Profit Reinvestment Decisions

From our base results, we know that three factors (the security of property rights, access to external financing, and the level of competition) matter to profit reinvestment decisions by firms. Our base results also show that firm size is an important proxy for profit reinvestment decisions (firm size enters positively and significantly into both regressions at the 1% level). Does it mean the key determinants (the security of property rights, access to external financing, and the level of competition) from the base results have different impact on firms with different sizes? We now further explore the role firm size on profit reinvestment decisions.

In column 2 of Table 5, we report the regression results of interacting the key determinants of profit reinvestment (the security of property rights, access to external financing, and the level of competition) in our base results with firm size dummies. In particular, our three firm size dummies are *SMALL* (with no more than 50 employees), *MEDIUM* (with employees of 51-500) and *LARGE* (with more than 500 employees). [49] These dummy variables take the value of 1 if the firm is small, medium or large, respectively, and 0 otherwise.[50] Our results from column 2 show that the interaction term comprising *INFORMAL_PAYMENTS* and *SMALL* has a negative sign and is

---

disproportionally large share of loans from Chinese banks, most of which are state-owned (Cull and Xu, 2000; and Lin and Zhu, 2001).

[49] We follow Beck, Demirguc-Kunt, and Maksimovic (2005) in dividing firm size into three size dummies variables.

[50] With *LARGE* excluded when doing the regression analysis.

significant at the 5% level, suggesting that it is with the small firms in particular where a marginal increase in the expense as a percentage of total sales related to making gifts or informal payments to public officials decreases the probability of profit reinvestment. With regard to the interaction results of access to external finance and firm size dummies, our results show that the interaction terms comprising *BANK_LOAN* and the size dummy variables have positive signs and are significant in the regression (with *BANK_LOAN*SMALL* and *BANK_LOAN*MEDIUM* enters at the 1% level and *BANK_LOAN*LARGE* enters at the 5% level[51]) As to the impact of input/source of financing via trade credit, we find that the interaction terms comprising *TRADE_CREDIT* and *SMALL* and *MEDIUM* dummy variables both have positive signs and are both significant at the 1% level, indicating that small and medium firms with external financing via trade credit tend to be more likely to make positive profit reinvestment decisions relative to large firms. In addition, our results of the interaction term (*COLLATERAL*SMALL)* enters positively and significantly at the 5% level, showing that a marginal increase of the percentage of collateral requirements implies more difficulty for small firms in getting external funds and therefore they have to rely more on their own/internal funds when making reinvestment decisions.

As to the interacting impact of competition, our results show that the interaction terms comprising *TECH_COMPARED* with *SMALL* and with *MEDIUM* dummy variables have positive signs and are both significant in the regression (with *TECH_COMPARED*SMALL* enters at the 1% level and *TECH_COMPARED*MEDIUM* enters at the 10% level). We conclude that it is the small and medium sized firms that reinvest their profits in order to gain a marginal increase in the level of competition.

In sum, our interaction results in Table 6 show that the risk of government expropriation and access to external financing (*COLLATERAL*) seem to affect small firms more than large firms. Table 6 also shows that the level of competition and access to external financing (*TRADE_CREDIT)* tend to have impact on small or medium firms than large firms.

[51] This is also consistent with the general significance of *BANK_LOAN* in the base results.

6. Difference of Reinvestment Decisions among various Countries

Our base results in the previous section show that security of property rights, access to external financing, and the level of competition are significantly associated with profit reinvestment decisions of firms. In Section II, we mentioned that previous researches show that country-level characteristics (for example, economic growth, the development of financial systems, and the development of legal systems) are important in facilitating firms' development and growth. In fact, our base results also verify that country characteristics (for example, economic freedom, and country's transition status) have significant impact on profit reinvestment decisions. To further examine whether there are differences in profit reinvestment across different country groups, in this section, we now classify the 35 countries into different groups according to two scales. Detail information about the category of each country is shown in Appendix A3.

The first scale we use here is *INCOME GROUP*. According to the 2002 Gross National Income (GNI) per capital,[52] calculated using the World Bank Atlas method, countries are classified into four groups: lower income ($735 or less), lower middle income ($736 - $1,415), upper middle income ($1,416 - $2,935), and high income ($2,936 or more). According to this scale, we can classify the 35 countries into 2 groups: Low Income Group (lower or lower middle income group), and relatively High Income Group (upper middle or high income group). Twenty-three countries belong to the former group and 12 countries belong to the latter group.

ECONOMIC FREEDOM is the second scale we use.[53] *ECONOMIC FREEDOM* is a product of the Heritage Foundation and Wall Street Journal. According to this scale, all of the countries are evaluated as Free: 80-100; mostly free: 70-79.9; moderately free: 60-69.9; mostly unfree: 50-59.9; Repressed: 0-49.9, or NR (not ranked). Accordingly, we group the 35 countries into two groups: High Level of Economic Freedom Group (with the index of economic freedom ≥ 60, including countries evaluated as free, mostly free or moderately free), and Low Level of Economic Freedom Group (with the index

[52] http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html. Retrieved February 20th, 2008.

[53] http://www.heritage.org/research/features/index/about.cfm. Retrieved February 20th, 2008.

of economic freedom < 60, including countries evaluated as repressed or mostly unfree). For the countries studied here, there are 11 countries in the High Level of Economic Freedom Group and 24 countries in the Low Level of Economic Freedom.

Column (1) of Table 6 shows that for firms operating in Low Income Group countries, both proxies for the risk of government expropriation enter negatively and significantly in the regression. The results in column (1) also show that access to external financing and the level of competition are important determinants of profit reinvestment decisions by firms in the Low Income Group. As to the reinvestment decisions of firms operating in relatively High Income Group countries (see results from column (2) of Table 6), there are two big differences: The first is that the reliability of contract enforcement now plays an important role in the profit reinvestment decisions for firms in the relatively High Income Group; the second is that *TRADE_CREDIT* is not significant anymore, showing that for firms in relatively High Income Group, supplier or customer credit play a far less important role than for firms in Low Income Group.

From column (3), we know that for firms operating in the Low Level of Economic Freedom countries, access to external finance and the level of competition are the two main determinants of profit reinvestment. However, for firms in the High Level of Economic Freedom Group, the percentage of private ownership and the risk of government expropriation also significantly impact profit reinvestment decisions. Specifically, *PRIVATE* has a positive sign and is significant at the 5% level while *INFORMAL_PAYMENTS* and *GOV_INTERPRETION* have a negative sign and are significant at the 1% and 5% level, respectively.

In sum, we find that different proxies do show some difference in affecting profit reinvestment in various country groups: the risk of government expropriation seems to affect firms in countries within the Low Income Group and firms operation in countries with High Level of Economic Freedom more than firms in other groups. The reliability of contract enforcement plays an important role only in firms within relatively High Income countries. In addition, the extent of private ownership seems to affect firms operating in countries with a High Level of Economic Freedom. However,

even though there are some differences between country groups, our results show that proxies of access to external financing and the level of competition are generally associated with profit reinvestment decisions of firms in all country groups.

7. Robustness Check

In this section, we explore the robustness of the results reported above by re-estimating the regressions through selective partitioning of the data. For example, we limit our sample to the similar size of those studied in JMW (with fewer than 270 employees) to check whether our findings are still similar to the base results. We also check our results on available data of firms in China (similar sample to those of CX). In addition, we run regression to check whether access to external financing is directly associated with firms' performance instead of other political related factors.

Column 1 in Table 7 shows the results using a similar sample to that of JMW, in which they use firms with no more than 270 employees. It reduces our sample by around 10% and the results are very similar to the base results, with proxies for access to external financing and the level of competition playing an important role in explaining firm reinvestment decisions (generally significant at the 1% level). In addition, *INFORMAL_PAYMENTS* also play a role in the reinvestment decision (significant at the 10% level).

The profit reinvestment decisions results for Chinese firms are given in column (2). Since there is no information available about the risk of government expropriation and the level of competition, we run the regression using all of the other available variables. Our results show that the extent of private ownership, the reliability of contract enforcement, and access to external finance are important determinants of profit reinvestment decisions by Chinese firms. These are consistent with the results of CX.

In our base results, we find that access to external financing is positively and significantly associated with the reinvestment rate, the premise of which is that financial institutions have to perform reasonably well to make sure that funds are allocated to

firms mainly based on their performance.[54] Following CX, we do a robustness check on financial institutions' resources allocation so as to prove that their funds are allocated based on firms' performance.[55] We use two firm performance variables, one is denoted as *PROFIT/SALES*, the rate of current profit to current sales; and the other is denoted as *PRODUCTION*, the logarithm of market value of production in 2001. Results in column 1 of Table 8 show that *PROFIT/SALES* is positively and significantly (at the 1% level) related to the probability of having at least one bank loan, indicating that financial institutions tend to allocate fund resources according to firms' performance. In Table 8, column 2 shows that firms tend to be denied by loan applications when they face more corruption or with lower reliability of contract enforcement. From column 3, when all of the performance variables and proxies for property rights are included, *PROFIT/SALES* is still positive and significant at the 1% level, while the existence of corruption decreases the probability for firms to get loans from financial institutions, which corroborates the notion that financial institutions allocate funds according to firms' performance.

In sum, our robustness check verifies our basic results. In particular, estimations using data from Chinese firms and a similar sample to JMW demonstrate convincingly that access to external financing is a key determinant of profit reinvestment decisions.[56] Our robustness results show that the security of property rights and the level of competition also have strong effects on firm's profit reinvestment. We also verify that access to external financing has a strong effect on profit reinvestment decisions based on the prerequisite that financial institutions work reasonably well when allocating their fund resource.

---

[54] Review the study of CX for more details.

[55] Not all of the 35 countries have available data about their using bank credit. In fact, firms in 14 countries answered the question asking whether they have at least one bank credit. These 14 countries are: Brazil, Cambodia, Honduras, Kenya, Kyrgyzstan, Moldova, Montenegro, Nicaragua, Poland, Serbia, Tajikistan, Tanzania, Uganda, and Uzbekistan.

[56] We also experimented with regression deleting all of the missing values in our database, which reduces the number of active observations to about one-fifth of our total observations, but access to external financing is still positively and significantly associated with profit reinvestment decisions.

8. Conclusions

Following previous research of JMW and CX, we examine firms' profit reinvestment decisions using an unique database including firm samples from various countries around the world. We focus on proxies of the risk of government expropriation, the reliability of contract enforcement, the ownership structure, access to external financing, the level of competition, and some country characteristics.

We have the following main findings. We find that access of external financing and the level of competition are the key determinants of profit investment decisions for firms in developing countries. In fact, as transition goes along, the complexity of firms' profit reinvestment increases. Therefore, not only resources from internal but also funds from external like banks, or other financial institutions, would be necessary for firm growth. In addition, firms need to consider the challenge from their competitors while making decisions on reinvestment. We find that the security of property rights also plays an important role in profit reinvestment decisions. The results are consistent with that of JMW and CX, thus providing complements to the study of China and other former Soviet Union countries. Our results also show that country transition status and the level of country economic freedom also affect firms' profit reinvestment decisions. Specifically, firms operating in countries with more economic freedom tend to reinvestment more while firms in transition countries are more conservative in their profit reinvestment decisions.

Our findings also show that the risk of government expropriation, access to external resource, and the level of competition seem to affect small firms more than large firms. Our estimation over different country groups also shows that there are differences in making profit reinvestment decisions among various groups: the extent of private ownership seems to affect firms of High Level of Economic Freedom countries more than it does to other firms. The risk of government expropriation has more impact on firms in relatively low income countries and firms within countries with higher level of economic freedom. However, despite the differences, access to external financing and the level of competition seem to have generally significant impact on profit reinvestment decisions of all firms.

As we have mentioned before, our results show that access to external financing seems to have a very significant impact on firms' reinvestment decisions while the security of property rights does not seem to have so strong an impact relative to access to external financing. Does it mean that firms in developing countries rely a lot on funding from external sources, no matter what the level of the security of property rights is? Or is it because firms use external funds on more risky projects while using internal funds on safer ones? Or, is part of the reason that firms in some countries hesitate to answer questions related to corruption of government or public officials? Unfortunately, at present, we do not have detailed information to help us solve these problems. In fact, our study is just a first of step in understanding profit reinvestment of firms in developing countries. Further analysis would still be needed in this area.

List of References

Acemoglu, D., & Johnson, S. (2005). Unbundling institutions. *Journal of Political Economy, 113(5),* 949-995.

Acemoglu, D., Johnson, S., & Robinson, J., A. (2001). The colonial origins of comparative development: An empirical investigation. *The American Economic Review, 91(5),* 1369.

Allen, F., & Gale, D. (2000). Corporate governance and competition. In X. Vives (Ed.), *Corporate Governance: Theoretical and Empirical Perspectives* (pp. 23-94). New York: Cambridge University Press.

Beck, T., Demirguc-Kunt, A., Laeven, L., & Maksimovic, V. (2006). The determinants of financing obstacles. *Journal of International Money and Finance, 25(6),* 932-952.

Beck, T., Demirguc-Kunt, A., & Levine, R. (2005). Law and firms' access to finance. *American Law and Economics Review, 7(1),* 211-252.

Beck, T., Demirguc-Kunt, A., & Maksimovic, V. (2005). Financial and legal constraints to growth: Does firm size matter? *Journal of Finance, 60(1),* 137-177.

Besley, T. (1995). Property rights and investment incentives: Theory and evidence from Ghana. *Journal of Political Economy, 103(5),* 903-937.

Brown, M., Jappelli, T., & Pagano, M. (2007). *Information sharing and credit: Firm-level evidence from transition countries* (SSRN working paper 178). Retrieved July 6, 2008, from http://www.csef.it/WP/wp178.pdf

Claessens, S., & Laeven, L. (2003). Financial development, property Rights, and growth. *Journal of Finance, 58(6),* 2401-2436.

Cull, R., & Xu, L. C. (2000). Bureaucrats, State Banks, and the Efficiency of Credit Allocation: The Experience of Chinese State-Owned Enterprises. *Journal of Comparative Economics, 28(1),* 1-31.

Cull, R., & Xu, L. C. (2005). Institutions, ownership, and finance: The determinants of profit reinvestment among Chinese Firms. *Journal of Financial Economics, 77(1),* 117-146.

Demirguc-Kunt, A., Love, I., & Maksimovic, V. (2006). Business environment and the incorporation decision. *Journal of Banking and Finance, 30(11),* 2967-2993.

Demirguc-Kunt, A., & Maksimovic, V. (1998). Law, finance, and firm Growth. *Journal of Finance, 53(6),* 2107-2137.

Diamond, D. W. (1991). Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy, 99,* 689-721.

Djankov, S., McLiesh, C., & Shleifer, A. (2007). Private credit in 129 countries. *Journal of Financial Economics, 84(2),* 299-329.

Finnerty, J. D. (1989). New issue dividend reinvestment plans and the cost of equity capital. *Journal of Business Research, 18(2),* 127-139.

Froehlich, W. (1948). The role of income determination in reinvestment and investment. *The American Economic Review, 38(1),* 78-91.

Immergluck, D. (1999). Intrametropolitan patterns of small-business lending. What do the New Community Reinvestment Act data reveal? *Urban Affairs Review, 34(6),* 787-804.

Jacoby, H., G. , Li, G., & Rozelle, S. (2002). Hazards of expropriation: Tenure insecurity and investment in rural China. *The American Economic Review, 92(5),* 1420.

Johnson, S., McMillan, J., & Woodruff, C. (2002). Property rights and finance. *American Economic Review, 92(5),* 1335-1356.

Khanin, D., M. (2006). *Venture capitalists' investment and reinvestment decisions.* Unpublished PhD dissertation. College Park: University of Maryland.

King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics, 108(3),* 717.

Knack, S., & Keefer, P. (1995). Institutions and economic performance: Cross-country tests using alternative institutional measures. *Economics and Politics, 7(3),* 207-227.

Kon, Y., & Storey, D. J. (2003). A theory of discouraged borrowers. *Small Business Economics, 21(1),* 37-49.

Krull, L., K. (2004). Permanently reinvested foreign earnings, taxes, and earnings management. *The Accounting Review, 79(3),* 745.

Levine, R. (1997). Financial development and economic growth: Views and agenda. *Journal of Economic Literature, 35(2),* 688-726.

Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics, 46(1),* 31-77.

Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *American Economic Review, 88(3),* 537-558.

Lin, Y.-m., & Zhu, T. (2001). Ownership Restructuring in Chinese State Industry: An Analysis of Evidence on Initial Organizational Changes. *The China Quarterly*(166), 305-341.

Lotspeich, R. (1996). An economic analysis of extortion in Russia MOCT-MOST. *Economic Policy in Transitional Economies, 7(4),* 21-53.

Maksimovic, V., Ayyagari, M., & Demirgüç-Kunt , A., (2007). *Firm Innovation in Emerging Markets: The Roles of Governance and Finance* (World Bank Policy Research Working Paper 4157). Retrieved July 6, 2008, from http://ssrn.com/abstract=969234

Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics, 110(3),* 681.

McMillan, J., & Woodruff, C. (2002). The central role of entrepreneurs in transition economies. *The Journal of Economic Perspectives, 16(3),* 153-170.

Meyendorff, A., & Thakor, A. (2002). Tax avoidance and the allocation of credit. In A. Meyendorff (Eds.), *Designing financial systems in transition economies: Strategies for reform in Central and Eastern Europe* (pp. 101-110). Cambridge: MIT Press.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economic, 13*, 187–221.

Newman, K. (2004). Newark, decline and avoidance, renaissance and desire: From disinvestment to reinvestment. *Annals of the American Academy of Political and Social Science, 594,* 34-48.

Nickell, S. J. (1996). Competition and corporate performance. *Journal of Political Economy, 104(4),* 724-746.

North, D. C., & Thomas, R. P. (1973). *The rise of the western world: A new economic history*. Cambridge: Cambridge University Press.

Rajan, R. G., & Zingales, L. (1998). Financial dependence and growth. *American Economic Review, 88(3),* 559-586.

Roden, F., & Stripling, T. (1996). Dividend reinvestment plans as efficient methods of raising equity financing. *Review of Financial Economics, 5(1),* 91-100.

Saporoschenko, A. (1998). Do dividend reinvestment plans contribute to industrial firm value and efficiency? *Financial Services Review, 7(4),* 273.

Shleifer, A. (1998). State versus private ownership. *Journal of Economic Perspectives, 12(4),* 133-150.

Svensson, J. (1998). Investment, property rights and political instability: Theory and evidence. *European Economic Review, 42(7),* 1317-1341.

Tamule, H. B., Bubnys, E. L., & Sugrue, T. F. (1993). Dividend reinvestment plans and pecking order capital structure behavior: An empirical investigation. *Journal of Economics and Finance, 17(1),* 91-101.

Villalonga, B., & Amit, R. (2006). How do family ownership, control and management affect firm value? *Journal of Financial Economics, 80(2),* 385-417.

Table 1

Summary statistics.

Variable	Mean	Median	SD	Max	Min	Observations
REINVESTMENT	0.291	0	0.454	1	0	7,581
Ln__AGE	2.331	2.302	0.789	5.313	0.000	7,581
Ln_SIZE	3.323	3.091	1.437	8.134	0.693	7,475
EXPORTER	0.271	0	0.444	1	0	7,581
MULTINATIONAL	0.104	0	0.305	1	0	7,126
PRIVATE	0.892	1	0.270	1	0	6,394
INFORMAL_PAYMENTS	0.021	0	0.054	1	0	6,731
GOV_INTERPRETATION	0.403	0	0.490	1	0	7,581
JUDI_ENFORCE_CONTR	0.494	0	0.500	1	0	7,581
DISPUTES_RESOLVED	0.037	0	0.146	1	0	7,407
BANK_LOAN	0.268	0	0.442	1	0	7,581
TRADE_CREDIT	0.178	0	0.382	1	0	7,581
COLLATORAL	1.443	1.300	0.937	9	0	2,031
TECH_COMPARED	2.157	2	0.652	3	1	7,220
HIGH_EDU	0.618	1	0.485	1	0	7,581
PROFIT/SALES	0.098	0.000	0.180	0.999	0.000	2,092
Ln_PRODUCTION	7.313	7.384	2.240	20.501	0.247	1,648
ECONOMIC FREEDOM	56.314	57.760	7.971	77.60	37.40	35
TRANSITION COUNTRY	0.627	1	0.483	1	0	35

Table 2

Security of property rights, access to external financing, and level of competition across countries.

Country	Risk of Government Expropriation		Reliability of Contract Enforcement		Access to External Financing			Level of Competition
	Percentage of sales on making gifts or informal payments to officials	whether government official's interpretations of regulations have impact on firms' operation	Whether manager has confidence on judicial system	Whether having any disputes resolved by court action	Whether the firm has at least one bank loan	Whether having input/source of financing via trade credit	Percentage of collateral required for the most recent loan	Degree of technology compared with its main competitor
Albania	0.034	0.447	0.482	0.024	0.129	0.100	1.299	2.230
Armenia	0.010	0.463	0.481	0.008	0.094	0.113	1.798	1.854
Azerbaijan	0.031	0.446	0.643	0.014	0.045	0.121	1.156	2.152
Belarus	0.015	0.220	0.496	0.043	0.112	0.088	1.309	2.283
BiH	0.011	0.488	0.548	0.031	0.280	0.137	0.811	2.137
Brazil	0.120	0.327	0.605	0.008	0.628	0.408	1.274	2.091
Bulgaria	0.019	0.362	0.487	0.040	0.175	0.100	1.749	2.225
Cambodia	0.046	0.412	0.393	0.001	0.157	0.574	0.360	1.965
Croatia	0.006	0.465	0.633	0.121	0.325	0.087	1.477	2.184
Czech	0.008	0.402	0.457	0.056	0.179	0.117	1.253	2.073
Estonia	0.003	0.518	0.631	0.029	0.225	0.050	1.515	2.215
FRYOM	0.007	0.531	0.462	0.054	0.101	0.075	0.782	2.028
Georgia	0.026	0.266	0.418	0.012	0.206	0.090	2.637	2.115

Table 2, continued

Country	Risk of Government Expropriation		Reliability of Contract Enforcement		Access to External Financing			Level of Competition
	Percentage of sales on making gifts or informal payments to officials	whether government official's interpretations of regulations have impact on firms' operation	Whether manager has confidence on judicial system	Whether having any disputes resolved by court action	Whether the firm has at least one bank loan	Whether having input/source of financing via trade credit	Percentage of collateral required for the most recent loan	Degree of technology compared with its main competitor
Honduras	0.048	0.345	0.423	0.018	0.509	0.317	1.582	2.111
Hungary	0.010	0.582	0.578	0.078	0.223	0.063	1.750	2.013
Kazakhstan	0.020	0.470	0.475	0.018	0.195	0.066	1.272	2.136
Kenya	0.040	0.545	0.517	0.000	0.603	0.316	1.791	-
Kyrgyzstan	0.019	0.346	0.297	0.017	0.188	0.316	1.772	2.051
Latvia	0.009	0.283	0.457	0.025	0.204	0.078	1.162	2.000
Lithuania	0.007	0.380	0.380	0.029	0.255	0.072	1.383	2.143
Moldova	0.010	0.242	0.232	0.009	0.343	0.363	1.609	2.000
Montenegro	0.021	0.416	0.708	0.062	0.291	0.250	1.240	-
Nicaragua	0.055	0.360	0.379	0.012	0.338	0.394	2.342	2.071
Poland	0.003	0.252	0.320	0.055	0.281	0.233	1.471	2.043
Romania	0.025	0.453	0.534	0.039	0.214	0.105	1.573	2.045

Table 2, continued

Country	Risk of Government Expropriation		Reliability of Contract Enforcement		Access to External Financing			Level of Competition
	Percentage of sales on making gifts or informal payments to officials	whether government official's interpretations of regulations have impact on firms' operation	Whether manager has confidence on judicial system	Whether having any disputes resolved by court action	Whether the firm has at least one bank loan	Whether having input/source of financing via trade credit	Percentage of collateral required for the most recent loan	Degree of technology compared with its main competitor
Russia	0.013	0.234	0.322	0.022	0.146	0.112	1.485	2.163
Serbia	0.032	0.469	0.586	0.042	0.265	0.191	1.336	-
Slovakia	0.017	0.442	0.455	0.075	0.170	0.027	1.434	2.169
Slovenia	0.008	0.500	0.534	0.078	0.195	0.051	1.299	2.019
Tajikistan	0.016	0.230	0.259	0.000	0.038	0.259	1.825	2.075
Tanzania	0.018	0.406	0.412	0.037	0.309	0.212	1.058	2.105
Turkey	0.003	0.575	0.622	0.053	0.110	0.031	0.564	2.159
Uganda	0.023	0.561	0.642	0.045	1.000	0.144	1.086	-
Ukraine	0.021	0.319	0.496	0.113	0.136	0.082	1.745	2.224
Uzbekistan	0.004	0.570	0.690	0.000	0.020	0.020	1.275	2.115

Table 3

Correlation matrix of main variables.

	REIN	PRI	INFOR	GOV-INTE	JUDI	DISPU	BANK	TRADE	COLLA	TECH	ECOFREE
PRI	-0.209										
INFOR	-0.059***	0.031**									
GOV_INTE	-0.023**	-0.033***	-0.064***								
JUDI	0.002	-0.033***	-0.048***	0.245***							
DISPU	0.006	-0.055***	-0.026**	-0.020*	0.013						
BANK	0.174***	-0.038***	0.075***	-0.013	0.043***	0.024**					
CREDIT	0.111***	0.029**	0.103***	-0.026**	-0.039***	-0.042***	0.134***				
COLLA	0.098***	0.031	0.003	-0.089***	-0.048**	0.023	0.058***	0.019			
TECH	0.065***	-0.083***	-0.005	0.029**	0.043***	0.024**	0.112***	-0.032***	-0.033		
ECOFREE	0.144***	0.047***	0.034***	0.040***	0.004	-0.040***	0.146***	0.092***	0.042*	-.030***	
TRANSI	-0.208***	0.082***	-0.160***	-0.047***	-0.059***	0.069***	-0.275***	-0.243***	0.083***	-0.071***	-0.224**

Table 4

Determinants of reinvestment.

Variable	(1)	(2)
Firm characteristics		
General		
ln_ AGE	-0.093 (0.037)**	-0.131 (0.037)***
ln_ SIZE	0.113 (0.022)***	0.114 (0.023)***
EXPORTER	0.309 (0.065)***	0.314 (0.066)***
MULTINATIONAL	-0.022 (0.091)	-0.095 (0.095)
Firm ownership		
PRIVATE	0.115 (0.122)	0.210 (0.126)*
Government Expropriation		
INFORMAL_PAYMENTS	-1.048 (0.535)**	-2.008 (0.582)***
GOV_INTERPRETATION	-0.093 (0.056)*	-0.145 (0.058)**
Contract Enforcement		
JUDI_ENFORCE_CONTR	-0.003 (0.055)	-0.045 (0.057)
DISPUTES_RESOLVED	-0.036 (0.184)	0.196 (0.186)
External Financing		
BANK_LOAN	0.668 (0.059)***	0.426 (0.065)***
TRADE_CREDIT	0.556 (0.068)***	0.333 (0.071)***
COLLATORAL	0.161 (0.043)***	0.187 (0.033)***
Competition		
TECH_COMPARED	0.144 (0.041)***	0.143 (0.042)***
Other Controls -Manager characteristics		
HIGH_EDU	-0.155 (0.059)**	0.074 (0.062)
Country Characteristics		
ECONOMIC FREEDOM		0.030 (0.003)***
TRANSITION COUNTRY		-0.809 (0.064)***
Number of Observations	7,581	7,581
R^2	0.07	0.12

Table 5

Determinants of reinvestment: Firm size differences.

Variable	(1)	(2)
Firm characteristics		
Size		
ln_ SIZE	0.113 (0.022)***	
SMALL		-0.847 (0.692)
MEDIUM		-0.718 (0.675)
Government Expropriation		
INFORMAL_PAYMENTS	-1.048 (0.535)**	
INFORMAL_PAYMENTS * SMALL		-1.175 (0.609)**
INFORMAL_PAYMENTS * MEDIUM		-0.295 (0.743)
INFORMAL_PAYMENTS * LARGE		-2.350 (4.340)
GOV_INTERPRETATION	-0.093 (0.056)*	
GOV_INTERPRETATION * SMALL		-0.100 (0.065)
GOV_INTERPRETATION * MEDIUM		-0.053 (0.101)
GOV_INTERPRETATION * LARGE		-0.176 (0.285)
External Financing		
BANK_LOAN	0.668 (0.059)***	
BANK_LOAN * SMALL		0.655 (0.072)***
BANK_LOAN * MEDIUM		0.820 (0.101)***
BANK_LOAN * LARGE		0.634 (0.289)**
TRADE_CREDIT	0.556 (0.068)***	
TRADE_CREDIT * SMALL		0.561 (0.077)***
TRADE_CREDIT * MEDIUM		0.534 (0.127)***
TRADE_CREDIT * LARGE		-0.231 (0.377)
COLLATORAL	0.161 (0.043)***	
COLLATORAL * SMALL		0.110 (0..044)**
COLLATORAL * MEDIUM		0.092 (0.063)

Table 5, continued

Variable	(1)	(2)
External Financing		
COLLATORAL * LARGE		0.208 (0.362)
Competition		
TECH_COMPARED	0.144 (0.041)***	
TECH_COMPARED * SMALL		0.187 (0.049)***
TECH_COMPARED * MEDIUM		0.134 (0.078)*
TECH_COMPARED * LARGE		0.018 (0.224)
Number of Observations	7,581	7,581
R^2	0.07	0.07

Table 6

Difference of reinvestment among country groups.

Variable	Low Income Group (1)	High Income Group (2)
Firm characteristics		
General		
ln_ AGE	-0.076 (0.042)*	-0.099 (0.076)
ln_ SIZE	0.114 (0.028)***	0.082 (0.040)**
EXPORTER	0.408 (0.082)***	0.254 (0.110)**
MULTINATIONAL	-0.173 (0.110)	0.253 (0.167)
Firm ownership		
PRIVATE	0.134 (0.138)	0.183 (0.247)
Government Expropriation		
INFORMAL_PAYMENTS	-1.780 (0.599)***	-0.855 (2.072)
GOV_INTERPRETATION	-0.133 (0.069)*	0.043 (0.101)
Contract Enforcement		
JUDI_ENFORCE_CONTR	0.028 (0.066)	-0.091 (0.101)
DISPUTES_RESOLVED	-0.298 (0.250)	0.606 (0.274)**
External Financing		
BANK_LOAN	0.646 (0.071)***	0.559 (0.114)***
TRADE_CREDIT	0.520 (0.076)***	0.105 (0.173)
COLLATORAL	0.134 (0.041)***	0.239 (0.081)***
Competition		
TECH_COMPARED	0.120 (0.047)**	0.169 (0.081)**
Other Controls -Manager characteristics		
HIGH_EDU	-0.181 (0.072)**	-0.051 (0.110)
Number of Observations	4,850	2,731
R^2	0.08	0.05

Table 6, continued

Variable	Low Level of Economic Freedom (3)	High Level of Economic Freedom (4)
Firm characteristics		
General		
ln_ AGE	-0.176 (0.054)***	-0.018 (0.053)
ln_ SIZE	0.081 (0.031)***	0.153 (0.035)***
EXPORTER	0.475 (0.087)***	0.078 (0.103)
MULTINATIONAL	0.061 (0.122)	-0.140 (0.146)
Firm ownership		
PRIVATE	-0.153 (0.164)	0.341 (0.176)**
Government Expropriation		
INFORMAL_PAYMENTS	0.453 (0.986)	-2.056 (0.624)***
GOV_INTERPRETATION	-0.020 (0.080)	-0.158 (0.082)**
Contract Enforcement		
JUDI_ENFORCE_CONTR	0.026 (0.079)	-0.022 (0.082)
DISPUTES_RESOLVED	0.163 (0.226)	-0.159 (0.349)
External Financing		
BANK_LOAN	0.809 (0.090)***	0.317 (0.086)***
TRADE_CREDIT	0.676 (0.105)***	0.257 (0.090)***
COLLATORAL	0.263 (0.036)***	0.078 (0.062)
Competition		
TECH_COMPARED	0.144 (0.056)**	0.185 (0.064)***
Other Controls -Manager characteristics		
HIGH_EDU	0.016 (0.087)	-0.146 (0.085)*
Number of Observations	4,720	2,861
R^2	0.08	0.04

Table 7

Robustness check.

Variable	Using Firms similar to JMW Sample (with 270 or fewer employees)	China
General		
ln_ AGE	-0.098 (0.040)**	-0.250 (0.093)***
ln_ SIZE	0.117 (0.028)***	0.037 (0.050)
EXPORTER	0.288 (0.069)***	
MULTINATIONAL	-0.049 (0.101)	
Firm Ownership		
PRIVATE	0.158 (0.141)	0.551 (0.177)***
Government Expropriation		
INFORMAL_PAYMENTS	-1.074 (0.569)*	
GOV_INTERPRETATION	-0.068 (0.059)	
Contract Enforcement		
JUDI_ENFORCE_CONTR	0.011 (0.058)	
DISPUTES_RESOLVED	-0.152 (0.207)	1.136 (0.657)*
External Financing		
BANK_LOAN	0.672 (0.063)***	0.493 (0.138)***
TRADE_CREDIT	0.569 (0.071)***	0.129 (0.181)
COLLATORAL	0.144 (0.044)**	0.230 (0.248)
Competition		
TECH_COMPARED	0.165 (0.043)***	
Other Controls -Manager characteristics		
HIGH_EDU	-0.140 (0.061)**	-0.017 (0.170)
Number of observations	6,921	1,983
R^2	0.06	0.04

Table 8

Robustness check: Determinants of external financing - bank loans.

Variable	(1)	(2)	(3)
Performance			
PROFIT/SALES	2.084 (0.290)***		2.018 (0.295)***
ln_PRODUCTION	-0.039 (0.035)		-0.035 (0.035)
Government Expropriation			
INFORMAL_PAYMENTS		-3.184 (1.639)**	-6.520 (2.272)***
GOV_INTERPRETATION		-0.246 (0.102)**	-0.445 (0.121)***
Contract enforcement			
JUDI_ENFORCE_CONTR		0.433 (0.099)***	0.185 (0.115)*
DISPUTES_RESOLVED		0.898 (0.2526)*	0.585 (0.724)
Other controls			
ln_AGE	0.369 (0.073)***	0.298 (0.062)***	0.358 (0.074)***
ln_SIZE	0.373 (0.055)***	0.263 (0.039)***	0.368 (0.056)***
Number of observations	2,092 [57]	2,092	2,092
R^2	0.12	0.07	0.13

[57] Fourteen countries (Brazil, Cambodia, Honduras, Kenya, Kyrgyzstan, Moldova, Montenegro, Nicaragua, Poland, Serbia, Tajikistan, Tanzania, Uganda, and Uzbekistan) have available data about getting bank credits.

ESSAY 3: THE ROLE OF RELATIONSHIPS AND FIRM SIZE IN DETERMINING WHO IS CREDIT CONSTRAINED IN DEVELOPING ECONOMIES

There is a paucity of research on the role of relationships and, to a lesser extent, on the role of firm size on credit availability for small businesses internationally. This paper investigates these issues with a proprietary-level data set including six developing economies: Uganda, Tanzania, Pakistan, Brazil, Honduras, and China. We find that, across all countries in our data, smaller firms are more likely to be constrained from bank loan while larger firms are more likely to obtain credit from banks. We also show that relationships increase the probability of getting bank loans – especially if a firm has associations with other banks. Put differently, the greater the number of banks (other than a firm's main bank) that a firm has business association with, the more likely it is that the firm receives a loan from its main bank. And the sensitivity of being credit constrained to firm size may be more acute in the relatively less developed economies (like Uganda) in our data and less so for the relatively developed economies (like Brazil). Also, the value of an ongoing relationship with another lender (at the margin) appears to be more valuable for firms in the least developed economies in our data (like Tanzania and Uganda). We also do the corresponding analysis with data on small business lending from the United States in order to compare the determinants of being credit constrained between developing and developed economies. Our results show that relationships play a different role between firms in a developed economy and firms in developing economies in that multiple resources of credit appears to increase the probability of obtaining credit for firms in the developing economies while it decreases the probability of getting loans for firms in a developed economy.

1. Introduction

The health of small businesses reflects the overall health of any economy. It is, therefore, not surprising that the growth of small businesses is an important indicator for addressing unemployment, narrowing income gaps and, overall, increasing the well-being of citizens. Hence, the importance of access to credit for small businesses cannot be overemphasized. Even in the United States (arguably the most advanced economy in the world), small businesses have long complained about the difficulty of obtaining credit from banks and other lending institutions.[58] Underpinning such credit constraineds is the existence of a severe informational asymmetry between small businesses and their potential lenders. While relatively larger firms (especially those that are publicly traded) have numerous channels through which to publicize company specific news (in the United States, this includes financial analysts who research the current and future prospects of companies), smaller companies have a tougher time directing relevant information to the relevant parties. In fact, it seems reasonable to argue that, within a given economy, firm size should be inversely proportional to the degree of adverse selection associated with a firm.

In a stream of literature spearheaded by Petersen and Rajan (1994, 1995) and Berger and Udell (1995), the emergent intuition, at least as far as small businesses in the United States go, is that relationships lower adverse selection problems between borrowers and lenders, improve loan efficiencies such that banks make higher expected profits, resulting in loans that are made at more favorable rates.[59, 60] Such relationship

[58] The U.S. Congress responded to a growing cry from small business owners by passing the Small Business Administration Act in July 1953 (SBA, 2003). The primary function of the SBA was (and still is) to "aid, counsel, assist and protect, insofar as is possible, the interests of small business concerns." Between 1991 and 2000, the SBA helped 435,000 small businesses secure more than $94.6 billion in loans (SBA, 2003). Thus, the SBA appears to be alive and well fifty years after its formation.

[59] Chakravarty and Scott (1999) report the role of relationships in increasing credit availability and lowering mortgage loan rates for individual families in the United States.

[60] A recent paper by Chakravarty and Yilmazer (2008) finds that relationships matter in a borrower's decision whether to apply for a loan and in the loan approval/rejection decision by the financial institution. However, the effect of relationships on loan rate depends on the prevailing economic climate. While firms with pre-existing relationships obtain credit at lower rates during periods of economic expansion, loan rates are not negatively correlated with pre-existing relationships during periods of economic recession.

proxies have typically been captured by the length of the relationship between borrower and the lender as well as by the number of other banks with whom the (potential) borrower may have an ongoing relationship.[61] While most of the work related to firm size and informational asymmetry, as well as those related to the role of relationships in credit availability, have been restricted to the United States and other developed economies of Western Europe, the lesser developed economies around the world lie largely unexamined. Put differently, we have very little knowledge of the mechanics of credit approval/denial and the underlying factors driving such decisions among lenders in the underdeveloped and emerging economies around the world. This is concern is further underscored by a recent survey, the Investment Climate and Productivity Study, done by the Asian Development Bank and the World Bank, where around a third of the firms surveyed cited limited access to credit as a serious constraint to doing business and growth (ADB, 2007; and ADB-WB, 2005).

Specifically, three questions emerge that have no satisfactory answers in the international credit literature. Does the association between firm size and being credit constrained (vis-à-vis not receiving bank loans) extend beyond the borders of the United States into the developing economies around the world where the information asymmetry is significantly more acute that it is in the United States? Do relationships play a similar role in improving credit availability in these underdeveloped economies as the available evidence involving both small businesses and individual families in the United States seems to indicate? Is there, in fact, an association between the location of the country on the developemental scale (i.e., less versus more developed economies) and the size and relationship proxies?

To investigate the above questions, we use data compiled by the Investment Climate Unit of the World Bank from surveying small business in different underdeveloped and relatively developed economies around the world. Other details pertaining to the data and its compilation are discussed in section III B. In particular, in

---

[61] Interestingly, this latter measure of relationship on the one hand serves to provide the firm with a stamp of high worth since so many lenders want to maintain a relationship with this firm and, by the same token, also provides the element of competition among lenders in order to provide the firm with a loan under favorable terms.

the current study, we focus attention on six countries spanning three continents: Tanzania, Uganda, Pakistan, Brazil, Honduras and China. While Tanzania and Uganda lie at one end of the development scale, China lies at the other end of the same scale. We discuss our ranking procedure with the remaining four countries later in the paper. In order to provide a benchmark of our findings with a developed economy, we also use data from the 2003 version of the National Survey of Small Business Finances (NSSBF) of small businesses in the United States in order to examine the relative importance of the determinants of credit availability between developing and developed economies.

We find that firm size is significantly correlated with the probability of a firm being credit rationed and that this finding is robust across the vista of countries in our data from the most developing to the least developing economy, and from the developing economies to the developed economy. Smaller firms are more likely to be constrained from bank loan while larger firms are more likely to obtain credit.

We also find that, for firms in developing economies, relationship measures increase the probability of obtaining bank loans– especially if a firm has associations with other banks. In particular, for firms in developing economies, the greater the number of banks (other than a firm's main bank) that a firm has business association with, the more likely it is that the firm will receive a loan from its main bank. We show that sensitivity of being credit constrained to firm size may be more acute in the least developed economies in our data (like Uganda) and less so for the relatively developed economies (like Brazil and China). We also show that the value of an ongoing relationship with another lender (in the margin) is significantly more valuable for firms at the bottom of the developemental scale than it is for firms residing in more relatively developed economies in our data – like Brazil. These findings are consistent with the notion that the most underdeveloped nations also have the highest prevalent informational asymmetries and any kind of credible certification that firms may be able to provide to signal their quality improves the likelihood of obtaining credit.

Upon comparing our results with those from the small businesses in the United States, we find that the proxy for relationship (the number of banks that a small business has relationships with) plays a different role between firms in a developed economy and

firms in developing economies. Specifically, while having relationships with more lending institutions increases the likelihood of obtaining credit for small businesses in the developing countries, the same proxy for relationships has a negative effect on the likelihood of obtaining credit among small businesses in the United States. One way of explaining our findings is to underscore the importance of "certification" versus "competition" in developing versus developed economies. While a certification that other lenders have lent to a given business is an important signal in getting a loan with a lender in developing countries, the same can work against you in receiving further loans in the competitive lending milieu of developed countries. Our results also show that the relationship measure captured by the length of association with a given lender is not a significant factor in explaining the probability of being credit constrained in developing economies. By the same token, the same measure does help explain the likelihood of obtaining credit in a developed economy.

The plan of the rest of the paper is as follows: Section II provides a literature review and discusses the motivation and theoretical background of our empirical analysis. Section III presents the empirical methodology and describes the data. Section IV identifies the credit constrained. Section V and VI define candidate variables and present the results. The last section concludes.

2. Background

Our research falls under the rubric of credit rationing within less developed economies. While research involving such economies is scarce largely due to the paucity of reliable data, there are more studies involving the United States economy where the relevant data is available. In particular, the recent empirical research on relationships and credit rationing can be divided into two groups. One group examines how the existence of a firm-lender relationship increases the value of a firm (see, for example, James, 1987; Lummer and McColl, 1989; Hoshi, Kashyap and Scharfstein, 1991; Slovin, Sushka and Poloncheck, 1993; and Billett, Flannery and Garfinkel, 1995). The other group measures the strength and the various facets of the relationship between borrower and lender which serve to reduce credit rationing (see, for example, Peterson and Rajan, 1994; 1995; Berger and Udell, 1995; Blackwell and Winters, 1997;

and Cole, 1998). But while the research of the second group cited above focuses exclusively on the relationship between lenders and small businesses in the United States, a recent study by Chakravarty and Scott (1999) is the first to provide evidence of the strong role that (lender/borrower) relationships play in lowering the probability of credit rationing in consumer loans. It is also worth noting that the borrower profiles of families in the United States (from a net worth standpoint) might be closer to those of small businesses in Africa and other emerging world economies.

On the international front, related to the current research is the paper by Fishman and Raturi (2003), that empirically examines the relationship between monopoly power and credit provision. To do so, the authors use the Regional Program on Enterprise Development (RPED) data collected by the World Bank during 1992-1995 in five former British colonies (Ghana, Kenya, Zambia, Tanzania and Zimbabwe). Fishman and Raturi report that monopoly power is negatively associated with credit provision and that this correlation is stronger for older supplier relationships. However, the paper focuses on firm-supplier interactions and, specifically, uses supplier credit as the dependent variable unlike the current research where we focus on (the demand for) bank loans and examine the determinants of credit constrained firms including the possible role of relationships on credit.

Using data collected by the World Bank's Regional Program for Enterprise Development (RPED) between 1992 and 1996, Bigsten et al. (2003) find that more than half of manufacturing firms in seven African countries had no demand for credit. Of the firms demanding credit, only 25% had loans from formal sources. They also show that there were no detectable differences in the credit constraints faced by firms in the seven African countries. Most lending is highly collateralized with few differences between countries. Overdrafts appear to be the source of more finance to African small businesses than formal bank loans. Trade credit is also an important source for working

capital for many firms in the data.[62] In addition, they find that larger firms are much more likely to get bank loans.

Finally, using a firm level survey that is a precursor to the Investment Climate Surveys (ICS) data used in the current paper, Beck, Demirguc-Kunt and Maksimovic (2003, hereafter BDM) investigate if differences in financial and legal environments affect the way firms finance their investments. Specifically, the focus of BDM is on internal, versus external, financing and on whether a Myers and Majluf (1984) type of pecking order in financing exists in international markets. The authors find that external financing of investments is not a function of institutions although the form of the external finance is. The authors explain their findings by arguing that large firms with financing needs are more apt to use external financing than smaller firms. And this effect is greater the more developed the financial system of a given economy in their data.

In sum, the empirical evidence documenting the nature of firm-lender relationships and their effect on credit delivery to small businesses as well as the role of firm size in determining whether a firm is credit constrained, in transition economies, is particularly scarce. This may be attributed partly to a scarcity of publicly available datasets especially those containing the relevant measures at the firm level. To the best of our knowledge, ours is the first study to propose such investigations on an international scale and across economies varying in the development scale. Furthermore, we benchmark our findings with small business data from the National Survey of Small Business data set based in the United States. To the best of our knowledge, the current study is the first to compare the differences in the role of the determinants of credit availability for small businesses in underdeveloped and developed economies.

[62] Petersen and Rajan (1997) have investigated the role of trade credits as a way to obtain credit when conventional credit from financial institutions in unavailable or limited. They find evidence suggesting that firms use more trade credit when credit from financial institutions in unavailable. Also, firms with better access to credit appear to offer more trade credit. Demirguc-Kunt and Maksimovic (2001) find that firms in countries with better developed legal systems use more bank credit relative to trade credit.

3. Empirical Model and Data

3.1 A Simple Model for Identifying the Credit Constrained

In this section, we present a simple model to capture firms who may be credit constrained. Assume that a firm is credit constrained if $y_{1i}^{*} = x_{1i}\beta_1 + \varepsilon_{1i} > 0$, where x_{1i} are vectors of independent variables; β_1 is a vector of parameters; σ_1 is the standard deviation of ε_1. The variable y_{1i}^{*} is a latent variable representing the lender's decision to approve the loan. The firm is credit rationed ($y_{2i} = 1$) if $y_{2i}^{*} > 0$, and not credit rationed ($y_{2i} = 0$) otherwise. Therefore, the probability that a firm is credit constrained conditional on cross sectional variables x_{1i} is $P = F(X'\beta_1)$ where $F(.)$ is assumed to be a logistic distribution function and X' is the vector of explanatory variables. Specifically, in our analysis, we have broadly identified 3 groups of explanatory variables: firm characteristics, manager characteristics and relationship proxies. Overall, with all groups of variables, we would expect P to be decreasing with "better" firm characteristics and with better relationship proxies. We discuss the specific measures used under each category later. [63]

3.2 Data

3.2.1 Investment Climate Surveys (ICS)

The Investment Climate Unit in the World Bank recently launched an initiative to conduct ICS in numerous countries throughout the world in a consistent manner. The surveys are based around a standard core that is then expanded by adding country

[63] It should be underscored that the realities of our data constrain us to examine the demand for loans. Since we do have any lender specific information available to us, we are unable to capture the supply for loans. Whether or not a lender ultimately provides loans to businesses or denies them their loans is also a function of the supply of loanable funds to lenders. Thus, a firm may have a large size, and low current debt and other favorable firm-specific proxies that would, ceteris paribus, make it an attractive candidate for a loan. But if the lenders do not have adequate loanable funds, then even such a firm could be credit constrained. Hence, our observable dependant variable, of whether a firm was credit constrained or not is a net of supply and demand effects for loans, while the independent variables capture the demand for loans. However, to the extent that a constraint on the supply of loans would impact all lenders more-or-less evenly for a given economy, and over the same time period, we do not expect our findings to be biased as a result.

specific questions. Surveys focus on a few countries drawn from a number of different regions with financial markets at different levels of development. Within each of the chosen countries, the samples are randomly drawn and cover a number of sectors and different regions. The idea is to take a "bore hole" approach to size and drill down through all size strata of formal firms in that country.

The ICS is designed to be administered through face to face interviews with company managers, accountants and human resources specialists. The questionnaire is larger and more in-depth than the World Business Environment Survey (WBES), a precursor also complied by the World Bank. The ICS core collects a wide range of both qualitative and quantitative information on the business environment along with basic balance sheet data for the last three years, which enables researchers to estimate productivity and other performance measures. A large section of the survey instrument is given over to collecting variables related to the use and cost of external finance. The finance variables available within this survey include the composition of finance for working capital and new investments, credit terms including trade-credit measures, firm-lender relationship variables, reasons for not applying for a loan and reasons for being rejected. The balance sheet information includes figures for liabilities, assets and investment expenditures. Other owner characteristics and demographic variables were collected and may be used in the analysis as necessary.

In the current paper, we focus on six countries for which data has been collected: Tanzania, Uganda, Pakistan, Brazil, Honduras and China. These countries, spanning three continents, are chosen for the breadth they bring with regard to their economic development. Specifically, at the bottom of the developmental scale lies Tanzania with private credit as a percentage of GDP (PC/GDP)[64] at 4.66, a creditor's rights index of 2 (out of 4)[65] and with no public credit registry.[66] Next up in the scale is

[64] Private credit (% of GDP) is the ratio of domestic credit provided by deposit money banks to GDP, average for 1997-2001. Higher private credit to GDP ratios indicate greater financial market development and are associated with economic growth.

[65] The computation of the creditor's rights index is based on the methodology of La Porta et al. (1998). The indicator measures four powers of secured lenders in liquidation and reorganization:

Uganda, also in the same continent, with a PC/GDP at 5.45, a creditor's rights index of 2 and also with no pubic credit registry. Next is the development scale is Pakistan, in Asia, with a PC/GDP ratio of 26.4, with a creditor's rights index of 1 and with a public credit registry. Even up lies Brazil in South America with a PC/GDP ratio of 30.24, with a creditor's right index of 1 and with a public credit registry present. Further up the scale lies Honduras, also in South America, with a PC/GDP ratio of 35.37, with a creditor's rights index of 2 and a public credit registry present. Finally, we have China, arguably the most dominant economy in Asia, with a PC/GDP ratio of 120.55, a creditor's rights index of 2 and with a public credit registry. See Table 1 for detail.

In sum, the six countries in our current study represent a breadth of economies with Tanzania and Uganda at the bottom, Pakistan, Brazil and Honduras in the middle, and China at the top.

- Restrictions on entering reorganization: whether there are restrictions, such as creditor consent, when a debtor files for reorganization-as opposed to cases where debtors can seek unilateral protection from creditors' claims by filing for reorganization.
- No automatic stay: whether secured creditors are able to seize their collateral after the decision for reorganization is approved, in other words whether there is no "automatic stay" or "asset freeze" imposed by the court.
- Secured creditors are paid first: whether secured creditors are paid first out of the proceeds from liquidating a bankrupt firm, as opposed to other parties such as government (e.g., for taxes) or workers.
- Management does not stay in reorganization: Whether an administrator is responsible for management of the business during the resolution of reorganization, instead of having the management of the bankrupt debtor continue to run the business.

A value of 1 is assigned for each variable when a country's laws and regulations provide these powers for secured creditors. The aggregate creditor rights index sums the total score across all four variables. A minimum score of 0 represents weak creditor rights and the maximum score of four represents strong creditor rights.

[66] A public credit registry is defined as a database managed by the public sector, usually by the Central Bank or Superintendent of Banks, that collects information on the standing of borrowers (persons and/or businesses) in the financial system and makes it available to financial institutions.

3.2.2 National Survey of Small Business Finances (NSSBF)

We use data from the 2003 NSSBF (the most comprehensive data source for small business financing in the United States) to examine the determinants of credit availability in the developed economy. The survey, conducted by the Board of Governors of the Federal Reserve System during 2004-2005, collects information of the United States small businesses (with fewer than 500 employees) that were for profit, non-farm, non-financial, non-government, and non-subsidiary businesses in operation as of December 2003 and on the date of the survey. The 2003 NSSBF database contains data for 4,240 surveyed firms and the purpose of the survey is to provide national representation of 6.3 million small firms of the United States

The 2003 data set provides the most comprehensive and detailed information about small business and their owners like, for example, firm ownership, financial characteristics, the use of credit and other financial services, firm relationship with lenders, credit application and denials, and characteristics of firm owners. Compared to the previous versions of the data (published in 1987, 1993, and 1998), [67] the 2003 NSSBF uses Rubin (1987)'s method of multiple imputation to producing sets of missing estimates of the missing values. It produces five implicates for each selected variables.[68] The advantage of adopting the multiple imputation method is to allow us to get better estimates by adjusting the estimated standard errors and confidence intervals to account for additional variance that imputations may incur.

4. Identifying the Credit Constrained

4.1 The Credit Constrained in Developing Economies

Formally, for developing economies, we define a firm to be credit constrained if the following conditions were met. If a firm answered "no" to the question: Do you currently have bank credit; and then, in the follow-up, mentioned any one of the following reasons for not having a bank loan:

[67] The previous versions calculate imputed values in the place of missing value and the accuracy of the imputed value is in doubt.

a) The firm applied but was rejected for the loan
b) The firm did not apply because it found the interest rates too high
c) Did not apply because it did not expect to be approved
d) Did not apply because collateral requirements were too high
e) Did not apply because it found loan procedures to be too complicated,

they were considered to be credit constrained. At first blush, this may seem contradictory. The fact that a firm did not apply for a loan for any of the above reasons might be interpreted by some as these firms, in fact, not being credit constrained. But that would not be an appropriate assumption simply because a firm may not want to take the trouble of applying and incurring the costs if they suspect they would not get the loan anyway.[69] By contrast, if a firm answered "yes" to the question: Do you currently have bank loan ; or, if they answered "no" to the question, but then in the follow up said they have not applied for bank loan because they did not need a loan, then they are considered not credit-constrained for our study. Among the 6,105 firms that reported their credit application information, 4,430 were defined as credit constrained while the other 1,675 were not credit constrained.

4.2 The Credit Constrained in a Developed Economy

Fortunately, the 2003 NSSBF database enables us to directly infer credit constrained small businesses in the United States. Accordingly, we define firms to be credit constrained as being denied their loan applications during the past three years. Of the 1,845 firms reporting they applied for financial credit, 1,648 reported always being

[68] Therefore, the total size of the sample is 21,240 observations. Across the five implicates, only the values of imputed variables may change while the values for reported variables remain constant.
[69] The current definition of credit constrained firms is consistent with Bigsten et al. (2003) who use RPED data based in Africa over the early to mid-nineties in order to study if the firms in the manufacturing sector in Africa are credit constrained.

approved to obtain the credit they applied for, while the remaining 197 firms reported being denied for the credit they applied for.[70]

5. Defining the Candidate Explanatory Variables and a Univariate Peek

5.1 Possible Candidates to Explain a Firm being Credit Constrained

5.1.1 Possible Candidates of being Credit Constrained in Developing Economies

For the developing economies we examine, we use the following firm specific characteristics as explanatory variables. These variables have all been used (wherever available and appropriate) in studies involving credit rationing of small businesses and individual families. Formally, these are defined by *SIZE*, the average number of temporary and permanent workers in the firm during the previous year; *AGE*, the age of the firm; *EXPORTER*, a dummy variable taking value 1 if at least 10% of the firm's sales are exported directly or indirectly (through a distributor) and zero otherwise; *FOR_OWNER/GOV_OWNER*, a dummy variable taking value 1 if at least 5% (10%) of the firm is owned by foreign interests (the government) and zero otherwise; *CAPACITY UTILIZATION*, defined as the firm's average capacity utilization over the past year (varies between 0 and 100%);[71] *INVENTORY*, defined as the number of days of inventory a firm maintains at the time it receives delivery of its most important input or supply; *COLLATERAL*, defined as the percentage of land and buildings that is owned by the firm; *SALES_GROWTH* is a dummy variable taking the value of one if the firm's total sales during the surveyed year were more than its total sales during the previous

[70] Our definition of credit constrained firms is consistent with that of Cole (1998). He used 1993 NSSBF and got 1,695 firms got the credit they applied while the other 312 firms were credit constrained. There are other previous study use the price and non-price terms of lines of credit (for example, Berger & Udell, 1995) and there is a similar question asking about the availability of lines of credit ("Does the firm have any lines of credit used for business purposes?"). However, if the surveyed firm answered "no" to the question, we do not know whether it is because the firm has been rejected for the application or it is because the firm does not apply for credit since it has no credit need.

[71] Note that capacity utilization is defined as the amount of output actually produced relative to the maximum amount that could be produced with the firm's existing machinery and regular shifts. Capacity utilization might give an indication for the need for finance. Firms that are at low levels of capacity do not need much working capital and are not going to invest.

year and zero otherwise;[72] *LIABILITY/ASSETS* defined as the firm's ratio of long and short term liability over total assets over the previous year**;** and *AUDIT***,** a dummy variable taking value 1 if the firm's books were audited by an external auditor and zero otherwise. We also use manager characteristics captured by *MGR_PRIOR_EXP***,** defined as the years of experience for the manager in this sector**;** and *MALE***,** a dummy variable taking value 1 if the principal owner is male and zero otherwise.

Finally, wherever available, we also use two relationship proxies: These are given by *LENGTH*, length of the relationship with the main bank in months; and *NUMBANKS*, the number of banks other than the main bank that the firm has an ongoing relationship with. Table 2 Panel A shows the sample statistics of the above mentioned variables. The average age of firms in developing economies is 15 years, with a standard deviation of 13. From Panel A, we can see substantial variation exists in the response of firm characteristics like firm age and size, and of the relationship proxies firms report to have with their financial institutions. For example, the mean of the (natural) logarithm of firm size is around 4, with a standard deviation of 1.61. On average, firms in developing economies have relationship with 3 financial institutions, and the maximum number of financial sources is 47. As to the length of the relationship, it has an average value of 107 months, with a standard deviation of 116.

5.1.2 Possible Candidates of being Credit Constrained in the United States[73]

Running parallel to the discussion of explanatory variables in the previous section, for small businesses within the United States, we use the following firm specific characteristics as explanatory variables. The two relationship proxies are *NUMBANKS* and *LENGTH. NUMBANKS* refers to the number of financial institutions the firm deals with. *LENGTH* refers to the total length of relationship in months with its main bank. In addition, *AGE* is the age of firm in years. *SIZE* is the total number of

[72] Sales growth has proven useful in the past as a measure of the need for capital and also credit worthiness.

employees of the firm in 2003. *LIABILITY/ASSETS* defined as the firm's ratio of total liability over total assets. *SALES_GROWTH* is a dummy variable taking the value of one if the firm's total sales during the surveyed year were more than its total sales during the previous year, and zero otherwise. *MGR_PRIOR_EXP* is defined as the years of experience for the manager in this sector**;** and *MALE***,** a dummy variable taking the value of one if the principal owner is male and zero otherwise. We have to mention that the ICS and the NSSBF are not completely the same in collecting business information. Different questions were asked to obtain the information about some firm characteristics. For example, in the ICS, only the percentage of land and buildings that is owned by the firm is available. However, in the NSSBF, the exact net book value of the buildings, and other depreciable assets is available. Our strategy of choosing the variables in NSSBF is trying to make the candidates to be consistent with the variables that have used in the ICS. Therefore, we transfer the sales information in the ICS (in dollars in each year) to a dummy variable indicating whether the sales amount is greater than that of the previous year. We also exclude *INVENTORY* and *COLLATERAL* in our model of the developed economy since no data are available in the NSSBF.

Table 2 Panel B shows the sample statistics of the above mentioned variables related to small firms in the U.S. market. The mean of the firm age is 18, with a standard deviation of 13. Firm age is similar for the surveyed firms in both developing countries and in the United States since the corresponding firm age for developing countries are 15 (mean) and 13 (standard deviation), very similar to those of USA. In the United States, the mean of the firm size is 52, with a standard deviation of 72. Compared to that of developing countries (with the corresponding average firm size number is 151 and the standard deviation of 312), the average size of firms surveyed in

[73] The ICS and NSSBF are not completely the same in collecting business information. Different questions were asked even for the same information. For example, in ICS, only the percentage of land and buildings that is owned by the firm is available. However, in NSSBF, the exact net book value of the buildings, and other depreciable assets is available. Our strategy of choosing the variables in NSSBF is trying to make the candidates to be consistent in both developing economies and in the developed economy.

the United States is smaller.[74] As to the relationship proxies, we can see that, on average, similar to firms in developing economies, firms in the United States also keep relationship with around 3 financial institutions. The average length of their relationship with their financial institutions is 131 months (with a standard deviation of 116), a little bit longer than the average length of developing economies (the average is 107, also with a standard deviation of 116). We also notice that firms in developing countries seem to be more likely to have their financial statements audited by externals than firms in the United States (0.47 vs. 0.08).

In sum, our statistical summary of developing economies and of the United States shows that the surveyed firms in these two groups are similar in many firm characteristics like firm age, and the number of banks with which they have a relationship. However, big differences exist for surveyed firms in these two economic groups, especially in firm size. Therefore, we will control firm size while doing a comparative analysis between the developing economies and the developed economy later in Section VI.

5.2 Univariate Results

Table 3 columns (1) – (7) provides the univariate results across credit constrained and non-credit-constrained firms and across each of the six developing countries and the United States. The six developing countries are arranged from low to high in the development scale as discussed before. The sample means and standard deviations are provided as well as whether the means are significantly different at the 1%, 5%, or 10% level across constrained and non-constrained firms within each country of analysis.

The first six columns (column 1-6) of Table 3 show the univariate analysis of the developing countries. For Tanzania and Uganda, we can see that the number of banks the non-constrained firms have relationship with is significantly higher than the number of banks with whom the credit-constrained firms have relationship. Even for a

[74] We would control firm size while doing a comparative analysis later because of the relatively big differences in the average firm size of the surveyed firms in the developing countries and the United States. Please see Section VI for more detail.

relatively developed economy like Brazil or China we see the same trend: non-constrained firms have a significantly higher number of banks they do business with relative to constrained firms. [75]

With regard to the length of relationship with their main banks, it shows mixed impact on constraining effect. Specifically, for Uganda and China, non-constrained firms seems to have longer relationships relative to constrained firms (with the means are significantly different at the 10% and 5% level, respectively). However, for firms in Tanzania, constrained firms have significantly longer relationships relative to non-constrained firms (significant at the 5% level). This is distinct from what is observed in the United States both in the small business sector as well as with individual families where non-constrained firms (or families) have a significantly longer relationship with their main banks relative to constrained firms (or families) (Berger and Udell, 1995; and Chakravarty and Scott, 1999). This could mean that the *LENGTH* metric is not a useful measure to capture relationships in developing economies.[76] Unfortunately, we do not have the *LENGTH* measure available in the relatively developed economies of Pakistan, Brazil and Honduras to test our hypothesis.

With regard to the proxies measuring firm characteristics, *AGE* and *SIZE* stand out. Specifically, firm age is significantly greater for non-constrained firms relative to constrained firms for all countries (both developing countries and the United States). Also, firm size is significantly greater for non-constrained firms and holds across the board for all economies in our data, regardless of their position on the development scale.

In addition, the Columns (1)-(6) of Table 3 also show that a higher percentage of non-constrained firms possess higher percentage of land and property as collaterals for their loan (for Pakistan, Brazil, and Honduras). By the same token, a higher percentage of non-constrained firms open their books to external audit. Finally, with regard to the

[75] This finding is consistent with results reported in the United States context both for small businesses and with individual families (see, for example, Petersen and Rajan, 1994; and Chakravarty and Scott, 1999).

manager characteristics, non-constrained firm managers have a significantly longer experience in Tanzania, Uganda, and Pakistan while there is no significant difference between the two groups in Brazil and Honduras.

Column (7) of Table 3 shows the univariate results of the United States firms. For the United States firms, we also see significant difference between the constrained group and the non-constrained group. Specifically, the number of banks the non-constrained firms have relationships with is significantly lower than the number of banks the constrained firms have relationships with. And non-constrained firms seem to have longer relationships compared with constrained firms. In addition, constrained firms see to be generally younger and smaller than non-constrained firms. And the liability/assets ratio is much lower for non-constrained firms than for constrained firms.

When the firms (credit constrained and non-constrained firms) in the developing economies and the developed economy are compared, we can see that for firms in both developing countries and the United States, non-constrained firms tend to be older and larger than constrained firms. However, we find the following differences. First, the number of banks with whom non-constrained firms in the United States have relationship is lower than that of constrained firms. For the developing economies, non-constrained firms seem to have relationships with a greater number of financial institutions than those firms that have been credit constrained. Second, in the USA, non-constrained firms have much longer relationships with their financial institutions than for credit-constrained firms while the measure of length seems to be not a useful measure to capture relationships in developing economies.[77] Third, for firms in developing economies (for example, Honduras, and Brazil)[78], non-constrained firms

---

[76] In fact, further multivariate analysis show that the length of relationship with their main banks is not significant in any of the regressions, therefore corroborating that the LENGTH metric is not a useful measure to capture relationships in underdeveloped economies.

[77] Specifically, non-constrained firms in China and Uganda have slightly longer relationship with their financial institutions (significant at the 5% level for China and 10% level for Uganda) than credit-constrained firms while for firms in Tanzania, non-constrained firms have much shorter relationships than their peers. And this effect of Tanzania firms on *LENGTH* also has effect on our analysis later, making the length of relationship for firms in developing countries is positively correlated with the probability of being credit constrained.

[78] With Pakistan an exception with non-constrained firms in Pakistan have a slightly lower liability /assets ratio (0.22 vs. 0.24).

seem to have higher liability/assets ratio than credit constrained firms. However, in the USA, the liability/assets ratio is much lower for non-constrained firms and the means are significantly different at the 1% level across constrained and non-constrained firms.

In summary, univariate analysis shows that there are big differences between credit constrained and non-credit constrained firms. When firms in developing economies and developed economy are compared, we also find differences between these two groups. Next, we further explore the difference of credit constrained firms and non-constrained firms with logistic regression.

6. Determinants of Being Credit Constrained and Differences between the Developing Economies and the Developed Economy

According to the model introduced in Section III.A, three groups of explanatory variables (relationship proxies, firm characteristics and manager characteristics) are included in our study as explanatory variables.[79] Specifically, we assume that the probability of a firm being credit constrained can be described by the following equation:

$$\begin{aligned} CREDIT\_CONSTRAINED = {} & \alpha + \beta_1 NUMBANKS + \beta_2 LENGTH \\ & + \beta_3 AGE + \beta_4 SIZE + \beta_5 FOR\_OWNER \\ & + \beta_6 GOV\_OWNER + \beta_7 EXPORTER \\ & + \beta_8 CAPACITY\ UTILIZATION \\ & + \beta_9 INVENTORY + \beta_{10} COLLATERAL \\ & + \beta_{11} AUDIT + \beta_{12} SALES\_GROWTH \\ & + \beta_{13} LIABILITY/ASSETS \\ & + \beta_{14} MGR\_PRIOR\_EXP + \beta_{15} MALE \\ & + \varepsilon, \end{aligned} \qquad (1)$$

where *CREDIT_CONSTRAINED* is a dummy variable taking the value of one if a firm is credit constrained and zero otherwise.

[79] All of the explanatory variables used here have been used in previous credit constrained studies, for example, in the credit rationing studies of the United States.

Table 4 provides the results of a logistic regression based on all six developing countries included in this study. One important finding from this table appears to be the power of the variable *SIZE*. Relatively smaller firms have a significantly higher probability of being credit constrained. In particular, an increase in firm size by a factor of around 3 (to be exactly, 2.718 times since natural logarithm is used in our analysis) decreases the probability of being credit constrained by 4%.[80] Another finding is the significance of the relationship proxy, *NUMBANKS*. From Table 4, we know that, *NUMBANKS* enters negatively and significantly (at the 1% level) into the regression, showing that the larger the number of banks with whom a firm has an ongoing relationship, the smaller is the likelihood of the firm being credit rationed by its main bank. Our marginal analysis also shows that an increase in association with an extra bank leads to a reduction of being credit constrained by about 4%. Additionally, our results from Table 4 show that the probability of being credit constrained decreases with the level of the liability/assets ratio of the firm.

Table 5 provides the results of the logistic regression on a country-by-country basis. From Table 5, we can see that the determinants of being credit constrained seem to be distinct across countries (with the exception of *SIZE* and *NUMBANKS* which we discuss later). The length of relationship is negatively and significantly related with the probability of being credit constrained in the United States. However, it seems that it is not an important measure for firms in the developing economies[81]. For firms in the United States, the probability of being credit constrained increases with greater liability/assets ratio. In the developing economies (for example, Honduras), the probability of being credit constrained decreases with greater liability/assets ratio. Despite the differences between the two economics, we also find some similarities in the determinants of the probability of being credit constrained. For example, firms in Pakistan, Honduras, China and the United States are less likely to be credit constrained

[80] These marginals are calculated by holding all other variables at their sample averages.

when they open their books to external audit. In addition, the probability of a firm being credit constrained decreases with the years of manager's previous experience in Tanzania, Pakistan, and the United States.

From Table 5, two other factors (*SIZE* and *NUMBANKS)* seem to be the key determinants of the probability of a firm being credit constrained. Our results show that firm size (*SIZE*) is negatively and significantly correlated with the probability of a firm being credit constrained and this result holds across all countries (both the developing countries and the United States) in our data set. Thus, for example, an increase of size by around 3 times decreases the probability of being credit constrained by about 7% in Uganda, and by about 3% in Brazil and China.

We also find that *NUMBANKS*, the number of banks a firm has an ongoing relationship with, is negatively and significantly correlated with the probability of a firm being credit constrained for all of the developing countries in our study. Thus, an increase in association with an extra bank leads to a reduction of the probability of being credit constrained by about 10% in Uganda, 4% in Brazil and 2% in China. The implication here is that the value of having a relationship with an additional bank declines as the specific country moves up in the developmental scale. The underlying intuition may be driven by the fact that as a country becomes more developed, its overall adverse selection problem diminishes as alternative institutional mechanisms of information dissemination are developed. One example of such an institution is a public credit registry. Our results bring out this gradual decline in the value of a relationship with increasing development of the developing countries.

At the other end of the scale lies the US economy which arguably is the most dominant economy in the world. Here, our results show a significant difference in the effect of the number banks on the probability of being credit constrained for firms. Namely, the number of banks with whom the firms in the United States have relationships is positively and significantly correlated with the probability of the firm

[81] Our results show that only three of the six developing countries have available length information. For these three countries, only in Tanzania, the length of relationship is positively and significantly correlated with the probability of being credit constrained. While the other two, Uganda and China, the length of relationship has a negative and positive sign, respectably, but neither is significantly in these two countries.

being credit constrained. This finding is consistent with Cole (1998), and Petersen and Rajan (1994). For example, using the 1987 version of the NSSBF data, Petersen and Rajan (1994) examine the determinants of credit availability to small businesses and find that older and larger firms are more likely to have bank loan extended to them. They also find that the greater the number of financial institutions with whom firms have relationships, the more likely it is that they will be credit constrained.[82] Based on a later (1993) version of the NSSBF data, Cole (1998) shows that increasing the number of banks firms have relationship with increases the probability of being credit constrained.

The difference of the impact of the number of banks with whom firms have relationships between the developing economies and the developed economy encourages us to further compare the differences in the role of relationships between the two types of economies and the likelihood of being credit constrained. We do so by estimating a pooled regression with data from both the ICS and the NSSBF. We define *NUMBANKS_USA* as the number of banks with whom firms in the United States have relationships and *NUMBANKS_DEVELOPING* as the number of banks with whom firms in developing countries have relationships. *LENGTH_USA* and *LENGTH_DEVELOPING* are similarly defined as the length of bank relationships in months for the firms in the United States and for firms in developing countries, respectively. Similarly, the ratio of liability/assets, the sales growth rate, and gender information of firm managers are also divided into groups of the United States and the developing countries. These variables are chosen to be a focus for the firms in the United States and for the firms in the developing economies according to the importance shown in the base results in Table 4. For example, in our base results, *LIABILITY/ASSETS* is found to be negatively and significantly related with the probability of being credit constrained. In addition, some information available in the ICS is not available in the NSSBF (for example, the percentage of the land and buildings owned by the business). To better compare the developing economies and the

[82] It should be underscored however, that in the data used by Petersen and Rajan (1994), the availability or lack thereof of credit is not directly observed in the data. Rather, the authors use the percentage of trade credit repaid late as a proxy for being credit constrained.

developed economy, we therefore only include variables available in both the ICS and the NSSBF.[83]

Results in Table 6 show the difference in the probability of being credit constrained for firms in the developing economies and for firms in the United States after controlling for firm characteristics like age and size.[84] We find that larger firms are less likely to be credit constrained.[85] Similar to the results in Table 5, we see that the proxies for relationships play an important role in determining the probability of a firm being credit constrained but very distinctly across firms in developing economies versus those in the United States as discussed earlier. The results from Table 6 verify the notion that, in a developed economy, having relationships with multiple lenders hinders a firm from getting further loans while in developing countries having multiple relationships signals a form of a "certification" to other lenders that it may be okay to lend this firm money since other lenders have found it with worth lending to.

Another difference in relationship measures between firms in the United States and those in developing countries is that, for firms in the United States, the longer the length of time that firms have had relationships with their main banks, the less likely it is that these firms will be constrained. This is also consistent with Berger and Udell (1995) who show a negative and significant relationship between length and the likelihood of being credit constrained. By contrast, relationship length does not appear

[83] Formally, our estimated model is as follows:CREDIT_CONSTRAINED= $\alpha + \beta_1$ AGE + β_2 SIZE + β_3 NUMBANKS_USA +β_4 NUMBANKS _DEVELOPING + β_5 LENGTH_USA + β_6LENGTH_DEVELOPING + β_7LIABILITY/ASSETS_USA + β_8LIABILITY/ASSETS_DEVELOPING + β_9SALES_GROWTH + β_{10} MGR_PRIOR_EXP + β_{11}MALE_USA + β_{12} MALE_DEVELOPING + ε, where CREDIT_CONSTRAINED is a dummy variable taking the value of one if the firm's recent loan applications has always been denied, and zero otherwise.

[84] We have known that the size of the surveyed firms in developing countries is larger than that of firms surveyed in the United States (please see Section V. A2 for detail).

[85] We also did a further check on the relative importance of firm size in the developing economies and developed economy. We find that firm size enters negatively and significantly at the 1% level for firms in the United States, while enters negatively and significantly at the 10% level for firms in the developing economies.

to be significantly correlated with the likelihood of being credit constrained in developing countries.[86]

To fix ideas more clearly, we present, in Figure 1, the predicted probabilities associated with increasing firm size for each country. From Figure 1, we see that for all countries (both developing and developed), the greatest decline in predicted probabilities is for firms with relatively fewer employees. For such firms, even the slightest increase in the hiring of employees brings about a big decrease in the probability of being credit constrained. Yet another feature from the graph is that, for the developing economies, the sensitivity of being credit constrained as a function of firm size may be greater in the relatively more underdeveloped countries (like Uganda in our data) and less so for the relatively developed economies (like Brazil). This would be consistent with the level of informational asymmetry between borrower and lenders being more severe in the relatively less developed countries.

We also present in Figure 2, the predicted probabilities of being credit constrained plotted against *NUMBANKS* for the four developing countries[87] (Tanzania, Uganda, Brazil and China) and the United States. It is clear from the graph that, for the developing countries, the slope of the predicted probabilities corresponding to an increase in the number of banks with whom a firm may have ongoing relationship is significantly flatter for Brazil and China than it is with both Tanzania and Uganda. The implication here is that the value of having an ongoing relationship with an extra bank is significantly more valuable for a firm in the more underdeveloped economies than it is in a relatively more developed economy. As to the predicted probabilities of being credit constrained for the firms in the United States, the graph shows that the slope of the predicted probabilities is in the direction opposite to those in the developing countries: An increase in the number of banks with whom a firm has ongoing relationship is correlated with higher probability of being credit constrained.

[86] As showing in Table 5, relationship is positively and significantly related with the probability of being credit constrained only in one developing country (Tanzania).
[87] Pakistan and Honduras are not included here because *NUMBANKS* information is missing in these two countries.

In summary, our results show that, overall, firm size and the relationship proxy, *NUMBANKS*, appear to be the most important determinants of the probability of being credit constrained for firms in both developing and developed economies. Our analysis within each country and the pooled regression further show that, for firms in both developing and developed economies, the probability of being credit constrained decreases with firm size. However, for these two types of economies, relationship plays a different role in helping firms to get the credit they applied for: The greater number of banks a firm having relationship with helps the firm to get the credit it applies for in the developing economies. However, in the United States, the attempt to widen the circle of relationships with multiple lenders increase the probability of being credit constrained.

7. Conclusions

While a relatively rich literature exists showing that relationships improve credit availability for small businesses and individual families within the United States, no similar evidence exists for underdeveloped countries. Also, it has been argued within the context of the United States that firm size is inversely correlated with the degree of adverse selection associated with a firm. We investigate these two premises across six countries representing a breadth of economies on the developmental scale. We use the Investment Climate dataset complied under the auspices of the World Bank. We also use NSSBF as a robustness check to investigate credit constrained of firms in developed countries like USA so as to catch the difference in the determinants of credit constrained for firms in developed and developing economies.

We have two main findings for firms in developing economies. We find that firm size is significantly correlated with the probability of a firm being credit rationed and that this finding is present in the most underdeveloped countries in our data to the least underdeveloped countries. Smaller firms are more likely to be constrained from bank loan while larger firms are more likely to obtain credit. We also find that relationships increase the probability of getting bank loans – especially if a firm has associations with other banks. In particular, the greater the number of banks (other than a firm's main bank) that a firm has business association with, the more likely it is that the firm receives a loan from its main bank.

When the determinants of credit constrained of firms in developing economies and in the United States are compared, our results show that the impact of the number of banks that a firm has relationship with is different between firms in developing economies and firms in the United States in that greater number of banks a firm has relationship with helps the firm in developing economies to obtain credit while keeps the firm in developed economies from obtaining credit.

Our findings have important policy implications. On the one hand, we show the benefits of competition (through multiple relationships with lending institutions) on credit availability from banks. Regulators would do well to foster these connections for improving the efficiency of the loan markets in these countries. The tremendously robust finding of larger size firms having a lower probability of being credit constrained by lending institutions is also a potent reminder to regulators of the benefit of growth and its correlation with efficient credit markets in particular and the overall economy in general.

List of References

ADB Asian Development Bank (2007). *Country Diagnostics Studies. Philippines: Critical Development Constraints*. Retrieved May 15, 2008, from http://www.adb.org/Projects/Country-Diagnostic-Studies/country-studies.asp

ADB-WB Asian Development Bank and World Bank, Manila (2005). *Investment Climate and Productivity Study*. Retrieved May 15, 2008, from http://www.adb.org/Statistics/ics/default.asp

Beck, T., Demirgüç-Kunt , A., & Maksimovic, V. (2004). Bank competition and access to finance: International evidence. *Journal of Money, Credit, and Banking, 36(3),* 627-648.

Beck, T., Demirgüç-Kunt , A., & Maksimovic, V. (2004B). *Financing patterns around the world: Are small firms different?* (World Bank Policy Research working paper) Retrieved July 6, 2008, from http://www.microfinancegateway.org/content/article/detail/24214

Berger, A. N., & Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *The Journal of Business, 68(3),* 351-382.

Bigsten, A., Collier, P., Dercon, S., Fafchamps, M., Gauthier, B., Gunning, J. W., et al. (2003). Credit constraints in manufacturing enterprises in Africa. *Journal of African Economies, 12(1),* 104.

Billett, M. T., Flannery, M. J., & Garfinkel, J. A. (1995). The effect of lender identity on a borrowing firm's equity return. *The Journal of Finance, 50(2),* 699.

Blackwell, D. W., & Winters, D. B. (1997). Banking relationships and the effect of monitoring on loan pricing. *Journal of Financial Research, 20,* 275.

Chakravarty, S., & Scott, J. S. (1999). Relationships and rationing in consumer loans. *Journal of Business, 72(4),* 523-544.

Chakravarty, S., & Yilmazer, T. (2008). A multistage model of loans and the role of relationships. Forthcoming: *Financial Management*. Retrieved July 6, 2008, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=519822

Cole, R. A. (1998). The importance of relationships to the availability of credit. *Journal of Banking & Finance, 22(6-8),* 959-977.

Fisman, R., & Raturi, M. (2004). Does competition encourage credit provision? . *Review of Economics & Statistics, 86,* 345-352.

Hoshi, T., & Kashyap, A. (1991). Corporate structure, liquidity and investment: evidence from Japanese industrial groups. *Quarterly Journal of Economics, 106,* 33-60.

James, C. (1987). Some evidence on the uniqueness of bank loans. *Journal of Financial*

Economics, 19, 217-235.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of Political Economy, 106,* 1113.

Lummer, S. L., & McConnell, J. J. (1989). Further evidence on the bank lending process and the capital market response to bank loan agreements. *Journal of Financial Economics, 25,* 99-122.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13(2),* 187-221.

Petersen, M. A., & Rajan, R. G. (1994). The benefits of lending relationships: Evidence from small business data. *Journal of Finance, 49,* 3-37.

Petersen, M. A., & Rajan, R. G. (1995). The effect of credit market competition on lending relations. *The Quarterly Journal of Economics, 110(2),* 407.

Petersen, M. A., & Rajan, R. G. (2002). Does distance still matter? The information revolution in small business lending. *Journal of Finance, 57,* 2533-2570.

Donald, R. (1987). *Multiple imputation for nonresponse in surveys*. New York: Wiley.

Slovin, M. B., Sushka, M. E., & Polonchek, J. A. (1993). The value of bank durability: Borrowers as bank stakeholders. *Journal of Finance, 48,* 247-266.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *American Economic Review, 71(3),* 393-410.

Table 1

Country specific information.

Country	private credit as a percentage of GDP (PC/GDP)	Creditor's Index	With/WT Public Credit Registry
Tanzania	4.66	2	No
Uganda	5.45	2	No
Pakistan	26.4	1	Yes
Brazil	30.24	1	Yes
Honduras	35.37	2	Yes
China	120.55	2	Yes

Table 2

Summary statistics.

Panel A: Summary Statistics of ICS Data

Variable	Mean	Median	SD	Max	Min	Observations
CREDIT_CONSTRAINED	0.72	1	0.44	1	0	6,105
AGE	15.36	10	13.88	92	0	6,105
Ln_AGE	2.47	2.39	0.82	7.60	0	6,015
SIZE	151	47	312	3,000	0	6,105
Ln_SIZE	3.92	3.76	1.61	11.32	0	6,105
FOR_OWNER	0.09	0	0.29	1	0	6,105
GOV_OWNER	0.10	0	0.30	1	0	6,105
EXPORTER	0.08	0	0.28	1	0	6,105
NUMBANKS	2.89	2	2.54	47	0	4,690
LENGTH	107.20	72	116	648	0	3,063
Ln_LENGTH	4.06	4.29	1.27	6.47	0	3,063
CAPACITY UTILIZATION	0.73	0.71	0.19	1	0	6,105
INVENTORY	21.76	15	30.83	365	0	6,105
Ln_INVENTORY	2.49	2.39	1.05	6.59	0	6,105
COLLATERAL	1.46	2	0.82	0	0	3,705
AUDIT	0.47	0.00	0.49	1	0	6,105
LIABILITY/ASSETS	0.45	0.37	0.49	8.47	0	3,405
SALES GROWTH	0.66	1	0.44	1	0	6,105
MGR_PRIOR_EXP	7.63	5	8.59	50	0	6,105
Ln_MGR_PRIOR_EXP	1.50	1.79	1.23	3.93	0	3,705
MALE	0.86	1.00	0.31	1	0	2,740

Table 2, continued

Panel B: Summary Statistics of NSSBF Data.

Variable	Mean	Median	SD	Max	Min	Observations
CREDIT_CONSTRAINED	0.10	0	0.30	1	0	1,845
AGE	17.87	16	12.87	103	1	1,845
Ln_AGE	2.69	2.83	0.75	4.64	0.69	1,845
SIZE	51.80	22	72.16	482	1	1,845
Ln_SIZE	3.07	3.13	1.42	6.18	0.69	1,845
NUMBANKS	3.59	3	2.08	20	0	1,845
LENGTH	131.17	96	115.89	600	1	1,845
Ln_LENGTH	4.48	4.57	0.97	6.39	0.69	1,845
AUDIT	0.08	0	0.27	1	0	1,845
LIABILITY/ASSETS	0.79	0.59	1.02	9.92	0	1,822
SALES GROWTH	0.50	1	0.50	1	0	1,845
MGR_PRIOR_EXP	23	22	11.52	65	0	1,797
Ln_MGR_PRIOR_EXP	3.02	3.13	0.61	4.18	0	1,797
MALE	0.81	1	0.39	1	0	1,845

Table 3

Univariate statistics for credit-rationed, and non-rationed by country.

	Tanzania (1)		Uganda (2)		Pakistan (3)		Brazil (4)	
	Const	Non-Const	Const	Non-Const	Const	Non-Const	Const	Non-Const
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
Relationship variables:								
NUMBANKS	1.76 (1.34)	2.74*** (2.21)	1.39 (0.86)	2.50*** (1.41)			2.92 (2.10)	4.39*** (3.95)
Ln_LENGTH	55.59 (95.50)	29.25** (54.80)	6.76 (5.85)	8.33* (7.14)				
Firm characteristics:								
Ln_AGE	17.06 (12.95)	16.03 (16.13)	19.72 (137.26)	17.02 (18.07)	14.51 (10.66)	18.06*** (14.06)	2.52 (0.94)	2.69*** (0.84)
Ln_SIZE	86.30 (250.08)	183.98** (316.23)	26.48 (92.38)	203.02*** (549.16)	50.90 (96.33)	265.59*** (763.85)	3.83 (1.06)	4.21*** (1.20)
FOR_OWNER	12.93%	17.65%	13.15%	45.98%***	1.67%	2.67%	5.16%	5.44%
GOV_OWNER	4.42%	7.84%	2.35%	6.90%*	0.90%	1.60%	0.19%	0.88%**
EXPORTER	9.52%	15.69%*	9.86%	26.44%***			16.42%	23.51%***
CAPACITY UTILIZATION	0.57 (0.23)	0.60 (0.24)	0.56 (0.22)	0.64** (0.23)	0.87 (0.12)	0.87 (0.12)	0.73 (0.16)	0.74 (0.17)
INVENTORY	60.33 (96.32)	56.79 (80.98)	24.76 (53.90)	35.61 (44.95)	24.17 (27.14)	37.92*** (39.56)	20.62 (29.07)	18.75 (21.07)
COLLATERAL	1.42 (0.84)	1.63 (0.70)	1.34 (0.87)	1.39 (0.80)	1.84 (0.50)	1.93** (0.33)	1.26 (0.95)	1.40*** (0.89)
AUDIT	52.04%	59.80%	46.95%	88.51%***	37.40%	58.82%***	16.98%	22.98%***
LIABILITY/ASSETS	0.89 (01.36)	0.79 (0.90)			0.24 (0.20)	0.22** (0.20)	0.49 (0.58)	0.54* (0.46)
SALES GROWTH	56.10%	73.58%**	63.89%	71.43%	67.93%	74.05%	70.57%	72.69%
Manager variables:								
MGR_PRIOR_EXP	14.77 (9.50)	19.11*** (10.44)	3.98 (6.49)	7.72** (11.50)	6.29 (6.27)	8.65*** (5.98)	1.55 (0.50)	1.51 (0.50)
MALE	92.16%	92.11%	94.92%	93.75%			85.05%	82.30%
No. of Firms	267	96	213	87	778	187	1,060	567

*** (**, *) indicates that the difference in the means or frequencies between those credit rationed and non-credit rationed is significant at the .01 (0.05, 0.10) levels.

Table 3, continued

	Honduras (5)		China (6)		USA (7)	
	Const	Non-Const	Const	Non-Const	Const	Non-Const
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
Relationship variables:						
NUMBANKS			2.55 (2.07)	3.80*** (3.22)	3.67 (1.90)	3.409** (1.75)
Ln_LENGTH			127.17 (117.36)	138.90** (118.41)	98.42 (103.97)	139.47*** (130.05)
Firm characteristics:						
Ln_AGE	11.19 (10.93)	14.46*** (12.63)	14.58 (14.17)	16.51*** (15.11)	2.3 (0.79)	2.72*** (0.74)
Ln_SIZE	44.56 (82.59)	58.73* (79.92)	425.71 (3147.9)	797.62*** (1851.4)	2.26 (1.25)	3.12*** (1.41)
FOR_OWNER	26.61%	6.03%***	11.35%	16.21%***		
GOV_OWNER			22.76%	29.64%***		
EXPORTER	37.16%	30.17%				
CAPACITY UTILIZATION	0.72 (0.21)	0.68** (0.24)	0.70 (0.25)	0.77*** (0.22)		
INVENTORY	23.91 (66.56)	20.51 (44.23)	14.80 (21.33)	17.01** (17.42)		
COLLATERAL	1.01 (0.96)	1.52*** (0.80)				
AUDIT	35.32%	49.57%***	66.74%	78.85%***	5.58%	8.74%
LIABILITY/ASSETS	0.33 (0.45)	0.52** (0.97)			2.50 (11.94)	1.03*** (3.90)
SALES GROWTH	77.97%	59.21%	61.73%	63.93%	52.25%	50.52%
Manager variables:						
MGR_PRIOR_EXP	7.19 (8.77)	8.45 (10.53)			2.77 (0.67)	3.05*** (0.59)
MALE	85.96%	90.64%			73.10%	81.79%***
No. of Firms	218	232	1,894	506	197	1,648

*** (**, *) indicates that the difference in the means or frequencies between those credit rationed and non-credit rationed is significant at the .01 (0.05, 0.10) levels.

Table 4

Logistic results for being credit rationed.

	All Developing Countries	
	Coeff. Est	Marginal Eff.
Relationship:		
NUMBANKS	-0.092***	-0.028
Ln_LENGTH	0.116***	0.036
Firm characteristics:		
Ln_AGE	-0.053**	-0.016
Ln_SIZE	-0.127***	-0.039
FOR_OWNER	0.113*	0.035
GOV_OWNER	0.125	0.039
EXPORTER	-0.318***	-0.099
CAPACITY UTILIZATION	0.008	0.002
Ln_INVENTORY	-0.033	-0.010
COLLATERAL	-0.031	-0.009
AUDIT	-0.041	-0.012
LIABILITY/ASSETS	-0.113**	-0.035
SALES GROWTH	-0.053	-0.016
Manager variables:		
MGR_PRIOR_EXP	0.002	0.001
MALE	0.150*	0.046
Intercept	1.162***	
No of firms	6,105	
R^2-max	0.10	

Table 5

Logistic results for being credit constrained.

	Tanzania		Uganda		Pakistan	
	Coeff. Est	Marginal Eff.	Coeff. Est	Marginal Eff.	Coeff. Est	Marginal Eff.
Relationship:						
NUMBANKS	-0.108***	-0.030	-0.422***	-0.099		
Ln_LENGTH	0.237***	0.066	-0.041	-0.009		
Firm characteristics:						
Ln_AGE	0.191	0.053	0.019	0.004	-0.129	-0.028
Ln_SIZE	-0.265***	-0.074	-0.300***	-0.070	-0.405***	-0.089
FOR_OWNER	0.171	0.048	-0.520**	-0.122	0.262	0.058
GOV_OWNER	-0.268	-0.075	0.380	0.089	0.119	0.026
EXPORTER	0.100	0.028	0.471	0.111		
CAPACITY UTILIZATION	-0.189	-0.053	-0.383	-0.090	0.046	0.010
Ln_INVENTORY	-0.013	0.004	-0.073	-0.017	-0.152***	-0.033
COLLATERAL	-0.181	-0.050	0.040	0.020	-0.125	-0.027
AUDIT	-0.092	-0.025	-0.378	-0.089	-0.258**	-0.057
LIABILITY/ASSETS	0.074	0.020			0.406	0.090
SALES GROWTH	-0.396	-0.111	-0.492*	-0.116	-0.101	-0.022
Manager variables:						
Ln_MGR_PRIOR	-0.444**	-0.124	-0.014	-0.0053	-0.009***	-0.060
MALE	-0.478	-0.134	0.113	0.026		
Intercept	3.040***		3.134***		3.801***	
No. of firms	363		300		965	
R^2-max	0.21		0.44		0.27	

***, **, * indicates that the coefficient is significant at the 0.01, 0.05, or 0.10 level, respectively.

Table 5, continued

	Brazil		Honduras		China		SSBF(USA)	
	Coeff. Est	Marginal Eff.			Coeff. Est	Marginal Eff.	Coeff. Est	Marginal Eff.
Relationship:								
NUMBANKS	-0.106***	-0.037			-0.075***	-0.020	0.293***	0.020
Ln_LENGTH					0.018	0.004	-0.173**	-0.012
Firm characteristics:								
Ln_AGE	0.001	-0.001	-0.055	-0.017	-0.028	-0.007	-0.239**	-0.017
Ln_SIZE	-0.069**	-0.024	-0.331***	-0.107	-0.120***	-0.032	-0.407***	-0.028
FOR_OWNER	0.185	0.064	1.237***	0.400	-0.038	-0.010		
GOV_OWNER	-0.334	-0.116			-0.073	-0.020		
EXPORTER	-0.068	-0.023	0.239	0.077				
CAPACITY UTILIZATION	0.053	0.018	0.214	0.069	-0.552***	-0.147		
Ln_INVENTORY	0.020	0.007	0.033	0.010	-0.095**	-0.025		
COLLATERAL	-0.049	-0.035	-0.309***	-0.100				
AUDIT	0.025	0.008	-0.442***	-0.143	-0.132*	-0.035	-0.404**	-0.027
LIABILITY/ASSETS	-0.048	-0.016	0.178***	0.057			0.026***	0.001
SALES GROWTH	0.002	0.001	0.411	0.133	-0.017	-0.005	-0.030***	-0.002
Manager variables:								
Ln_MGR_PRIOR	0.024	0.008	-0.005	-0.001			-0.215***	-0.014
MALE	0.193**	0.067	-0.038	-0.012			-0.322***	-0.022
Intercept	0.858***		1.280***		2.679***		0.240***	
No. of firms	1,627		450		2,400		1,845	
R^2-max	0.09		0.29		0.12		1.000	

***, **, * indicates that the coefficient is significant at the 0.01, 0.05, or 0.10 level, respectively.

Table 6

Comparison of small businesses in developing and developed countries.

	All Countries
Relationship:	
NUMBANKS_USA	0.109*** (0.021)
NUMBANKS_DEVELOPING	-0.086** (0.037)
Ln_LENGTH _USA	-0.057** (0.023)
Ln_LENGTH _DEVELOPING	0.386*** (0.066)
Firm characteristics: Ln_AGE	-0.188 (0.028)
Ln_SIZE	-0.171*** (0.014)
AUDIT	-0.127* (0.070)
LIABILITY/ASSETS_USA	0.012* (0.006)
LIABILITY/ASSETS_DEVELOPING	0.232 (0.189)
SALES GROWTH_USA	-0.005 (0.081)
SALES GROWTH_DEVELOPING	-0.121 (0.208)
Manager variables:	
Ln_ MGR_PRIOR_EXP	-0.145*** (0.034)
MALE_USA	-0.197** (0.095)
MALE_DEVELOPING	1.155*** (0.238)
Intercept	0.154***
No. of Firms	7,950
R^2-max	0.217

***, **, * indicates that the coefficient is significant at the 0.01, 0.05, or 0.10 level, respectively.

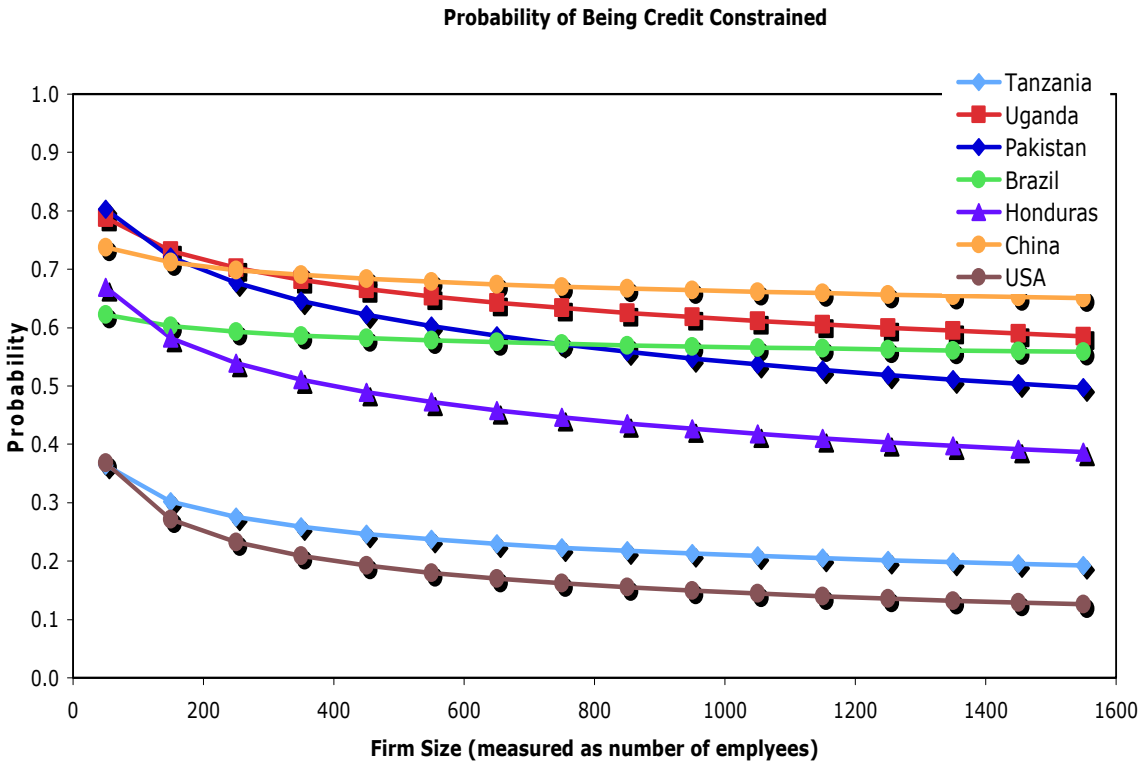

Figure 1. Effect of firm size on probability of being credit constrained.

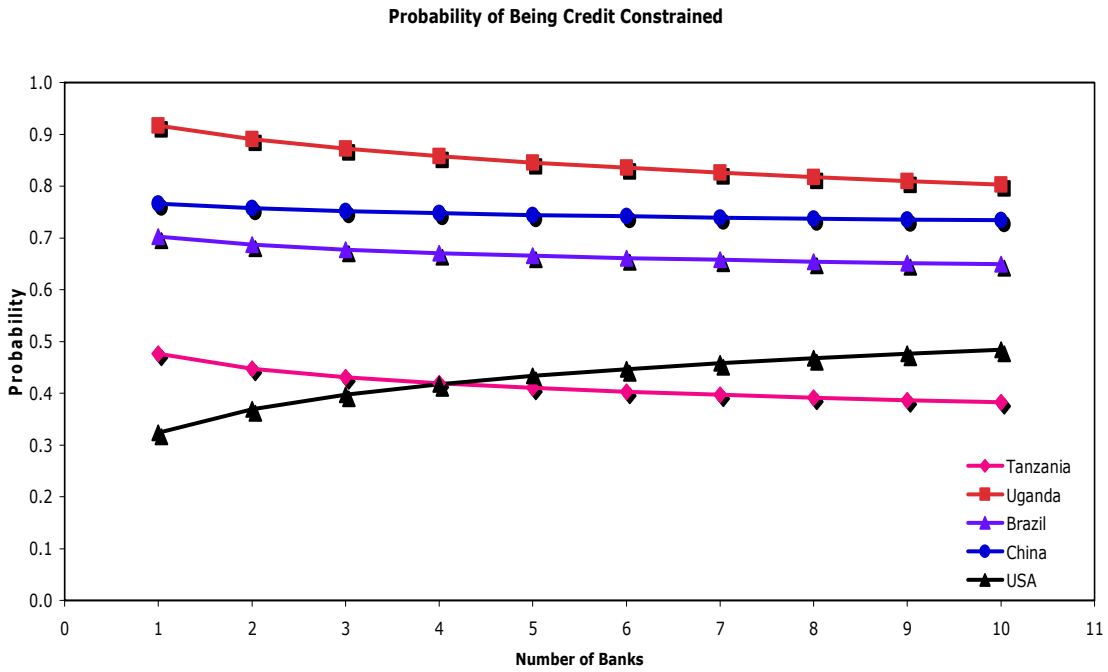

Figure 2. Effect of number of banks on probability of being credit constrained.

APPENDICES

Appendix A1

Summary Statistics of Share of Reinvestment.

		Mean (%)	Median (%)	Standard Deviation (%)	Maximum (%)	Minimum (%)	Observations
1	Albania	39.76	37.5	35.06	87.5	0	170
2	Armenia	28.08	5	33.70	87.5	0	160
3	Azerbaijan	11.23	0	21.48	87.5	0	157
4	Belarus	19.72	5	29.07	87.5	0	250
5	BiH	18.48	5	27.94	87.5	0	168
6	Brazil	62.22	80	37.65	100	0	1,048
7	Bulgaria	32.71	5	36.83	87.5	0	240
8	Cambodia	42.96	30	34.75	100	0	402
9	Croatia	24.20	5	34.28	87.5	0	172
10	Czech	13.32	0	24.42	87.5	0	256
11	Estonia	34.51	5	38.28	87.5	0	160
12	FRYOM	16.49	5	22.71	87.5	0	158
13	Georgia	13.73	0	27.53	87.5	0	165
14	Honduras	80.66	100	29.45	100	1	255
15	Hungary	43.93	37.5	37.39	87.5	0	237
16	Kazakhstan	9.78	0	22.73	87.5	0	240
17	Kenya	51.24	50	45.16	100	0	174
18	Kyrgyzstan	34.98	20	39.84	100	0	101
19	Latvia	27.26	5	36.81	87.5	0	166
20	Lithuania	21.39	5	33.68	87.5	0	192
21	Moldova	45.59	50	37.35	100	0	99
22	Montenegro	45.46	23.5	37.96	100	5	24
23	Nicaragua2003	72.72	90	34.21	100	0	266
24	Poland	45.06	30	40.84	100	0	103
25	Romania	34.90	17.5	35.29	87.5	0	247
26	Russia	11.04	5	20.06	87.5	0	443
27	Serbia2003	52.78	50	40.08	100	0	162
28	Slovakia	24.29	5	31.20	87.5	0	147
29	Slovenia	24.02	5	32.88	87.5	0	174
30	Tajikistan	20.28	5	30.69	100	0	104
31	Tanzania	46.08	25	43.85	100	0	165
32	Turkey	17.17	5	23.40	87.5	0	514
33	Uganda	41.96	30	40.51	100	0	235
34	Ukraine	24.36	5	32.00	87.5	0	463
35	Uzbekistan	22.15	0	39.94	100	0	100
	Total						8,117

Appendix A2

Comparison among Survey Questions of JMW, CX, and current Study[88].

	JMW, 5 Eastern European countries	CX, China	38 Developing Countries in Current study
Risk of Government Expropriation	1. Do firms in your industry make extralegal payments for government services? 2. Do firms in your industry make extralegal payments for licenses? 3. Do firms in your industry make payments for protection? 4. Do firms in your industry make unofficial payments for ongoing registration?	1. What percentage of total sales is spent on informal payments to government officials in any of the following agencies: tax, labor and social security, fire and construction safety, health and infectious disease control, police station, environmental agency, and the standards bureau?	1. We've heard that establishments are sometimes required to make gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. On average, what percent of annual sales value would such expenses cost a typical firm like yours?
	5. Do firms in your industry make unofficial payments for fire/sanitary inspection? 6. Do firms in your industry make unofficial payments for tax inspection?	2. Among government officials that your firm regularly interacts with, what share of their contact is oriented toward helping rather than hindering firms?	2. In general, government official's interpretations of regulations affecting my establishment are consistent and predictable.
Reliability of Contract Enforcement and Legal System	1. Can firms in your industry use courts to enforce an agreement with a customer or supplier?	1. On a scale of 0-100, what is the likelihood that the legal system will uphold your construct and property rights in business disputes?	1. I am confident that the judicial system will enforce my contractual and property rights in business disputes.
		2. Has your firm signed at least one formal contract with a client?	2. On the last 2 years, does the firm has any disputes over payments were resolved by court action?
		3. What is the actual percentage of business disputes that were resolved by court action?	

[88] The table is based on the similar table of CX, see their study for a detail review (P144).

Appendix A2, continued

	JMW, 5 Eastern European countries	CX, China	38 Developing Countries in Current study
Access to External Financing		1. The firm has at least one loan from a bank.	1. Does the firm have a bank loan?
		2. The manager's assessment of the collateral required on a typical loan, expressed as a percentage of the loan's face value.	2. For the most recent loan or overdraft, did the financing require collateral or a deposit?
		3. The share of input purchased via trade credit reported by the manager.	3. Whether having any share of input over the last year via trade credit (supplier or customer credit).

Appendix A3

Classification of 35 Countries.

		Gross National Income (GNI)		Economic Freedom	Transition	
		Lower Middle or Lower	Upper Middle or Higher	1-100	Transition	Non-transition
1	Albania	X		61.4	X	
2	Armenia	X		69.4	X	
3	Azerbaijan	X		55.4	X	
4	Belarus	X		47.4	X	
5	BiH	X		54.7	X	
6	Brazil	X		60.9		X
7	Bulgaria	X		62.2	X	
8	Cambodia	X		56.5		X
9	Croatia		X	55.3	X	
10	Czech		X	69.7	X	
11	Estonia		X	78.1	X	
12	FRYOM	X		60.8	X	
13	Georgia	X		68.7	X	
14	Honduras	X		60.3		X
15	Hungary		X	66.2	X	
16	Kazakhstan	X		60.4	X	
17	Kenya	X		59.4		X
18	Kyrgyzstan	X		59.9	X	
19	Latvia		X	68.2	X	
20	Lithuania		X	72.0	X	
21	Moldova	X		59.5	X	
22	Montenegro	X		NR	X	
23	Nicaragua2003	X		62.7		X
24	Poland		X	58.8	X	
25	Romania		X	61.3	X	
26	Russia		X	54.0	X	
27	Serbia2003	X		NR		X
28	Slovakia		X	68.4	X	
29	Slovenia		X	63.6	X	
30	Tajikistan	X		56.9	X	
31	Tanzania	X		56.4		X
32	Turkey		X	59.3		X
33	Uganda	X		63.4		X
34	Ukraine	X		53.3	X	
35	Uzbekistan	X		52.6		

VITA

VITA

Born in June, 1975, Meifang Xiang got her bachelor degree in Accounting from Central University of Finance and Economics, Beijing, China in 1997 and her master degree in Accounting from the same university in 2000. She then worked for an investment company in Beijing for two years. In 2004, she joined the Ph.D. program of the Department of Consumer Sciences and Retailing at Purdue University. She is now an assistant professor at the College of Business and Economics of University of Wisconsin, Whitewater.