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Access to credit, natural disasters, and relationship lending

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ABSTRACT

This paper analyzes the effect of unpredictable aggregate shocks on loan demand and access to credit by combining client-level information from an Ecuadorian microfinance institution with geophysical data on natural disasters, more specifically volcanic eruptions. The results of this 'natural experiment' show that while credit demand increases due to volcanic activity, access to credit is restricted. Yet, we also find that bank-borrower relationships can lower these lending restrictions and that clients who are known to the institution are about equally likely to receive loans after volcanic eruptions occurred.

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1. Introduction

What determines access to credit in developing economies? And how does credit availability change in times of unpredictable aggregate shocks? These are the questions we address in this paper by making use of a unique dataset combining client-level information from a self-sustainable Ecuadorian microfinance institution (MFI) with geophysical data on natural disasters, more specifically volcanic eruptions.

How easily and at what costs firms in emerging and developing economies receive access to external finance depends on a wide range of factors both internal and external to the firm. External factors are mainly connected to the institutional and regulatory environment. Important aspects include, among others, the enforceability of contracts, the protection of property rights, and the availability of credit registries (Beck et al., 2004, 2008; Brown et al., 2009). With respect to factors internal to a

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¹ The findings, interpretations, and conclusions are entirely those of the authors and do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent.

² The views expressed in this paper are entirely those of the authors and do not necessarily represent those of KfW.

firm, not only is the availability of own financial resources and collateral important, but also 'soft' information on the potential borrower. Whether banks base their lending decision mainly on 'hard' quantitative data such as financial accounts, denoted usually as transaction lending, or more on qualitative information, which is mainly referred to as relationship lending, depends on the types of clients and the environment in which the banks operate (Boot, 2000; Boot and Thakor, 2000). For instance, if clients cannot offer high collateral or if public information about the creditworthiness of potential borrowers is limited due to asymmetric information, relationship lending may be the only suitable option (Sharpe, 1990; Berger and Udell, 1995). Indeed, in such environments, Petersen and Rajan (1995) have shown that relationship lending may increase access to credit especially for small firms.

Until today, no analysis has been undertaken regarding the question whether and to what extent access to credit changes after unpredictable aggregate shocks such as natural disasters. While Del Ninno et al. (2003) analyze credit demand after a major flood in Bangladesh in 1998 and find that the demand for loans increases, they cannot answer the question whether lending was restricted for some borrowers as they do not have bank-internal information. Apart from this study, there exists a wide literature on the potential micro-effects of credit-constraints arguing that access to credit can dilute the negative effects of aggregate shocks on consumption and similar outcomes (Jacoby and Skoufias, 1997; Beegele et al., 2006; Gitter and Barham, 2007; Khandker, 2007; Shoji, 2010; Becchetti and Castriota, 2011). However, for measuring access to credit, mostly proxy variables are used as the data that would be needed for analyzing the loan approval decision of a bank is usually not available. Khwaja and Mian (2008) analyze the effect of unforeseen liquidity shocks on access to credit and find that banks experiencing larger drops in liquidity are more restrictive in terms of lending afterwards and that smaller firms are less able to compensate this loss through additional borrowing. While this study shows that banks pass their liquidity shocks on to firms, they are not analyzing the question in which way a destruction of the capital stock of a firm affects the lending decision of a bank.

With this paper, we attempt to close this gap by analyzing a unique dataset including information on all loan applications and subsequent approvals for ProCredit Ecuador between January 2002 and August 2007. As we combine this data with information on volcanic eruptions in Ecuador during the same time, we are able to exploit a 'natural experiment' allowing us to clearly identify the determinants of access to credit in response to unpredictable aggregate shocks. In that regard our paper is also related to an emerging literature studying loan applications, most recently as affected by the financial crisis (Puri et al., 2010; Berg and Kirschenmann, 2012; Jimenez et al., 2012, among others).

In order to come up with testable propositions for our empirical analysis, we present a simple theoretical model based on relationship lending that highlights the effect of volcanic eruptions on credit demand and access to credit. The concept of relationship lending best reflects the focus of the MFI we study and the setting of a developing country characterized by high degrees of asymmetric information. The predictions of our model are the following: First, after unforeseen aggregate shocks, the number of loans demanded will increase. Second, due to the higher risk involved, the fraction of credit applicants actually receiving a loan after aggregate shocks will decrease. And third, as the bank will attempt to differentiate between lower- and higher-risk clients, heterogeneous effects will be observable in a way that repeat clients will face less lending restrictions compared to new credit applicants who are unknown to the institution.

Within our empirical analysis we first analyze the demand for loans and in a second step access to credit. The results show that credit demand increases significantly after volcanic eruptions which implies that there exists a need for additional financing after shocks occurred. When analyzing access to credit on the level of the individual credit applicant, the results suggest that high volcanic activity in the last months before the credit application leads to significant decreases in the probability to be approved for a loan. Yet, we also find that being a repeat client lowers these lending restrictions. More specifically, the results show that returning clients do not only have a higher probability to receive a loan in general, but that they are about equally likely to be approved for a loan after volcanic shocks occurred.

Given that repeat clients are less risky due to the fact that the MFI has gathered relevant information on them during previous interactions, they face lower lending restrictions. New customers, however, are unknown to the institution and thus, in times of crises, it becomes even more difficult for them to receive financing, a result which can be directly associated with asymmetric information. The results are of particular interest as it is usually assumed that the existence of credit markets

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