Psychometrics:
Putting Creditworthiness to the Test

The credit application, designed by the Entrepreneurial Finance Lab (EFL) based on psychometric tests, aims to help address the information asymmetry faced by financial institutions when screening micro, small, and medium businesses in environments where credit bureaus are not well developed or coverage is not universal. We find that the EFL tool can lower the risk of the loan portfolio when used as a secondary screening mechanism for already banked entrepreneurs, i.e. those with a credit history. For unbanked entrepreneurs, i.e. those without a credit history, using the EFL tool can increase access to credit without increasing portfolio risk.

Credit markets rely on two basic pillars to function effectively: sound information to be able to make accurate lending decisions and reduce risks, and a strong legal system to enforce debt contracts in the event of defaults. On the information front, small and medium-sized businesses tend to be at a disadvantage when they apply for loans. That's because the information that banks need to assess their growth potential and risk profile tends to be scarce, unreliable, and difficult to obtain at a low cost.

In the United States, banks have addressed this problem by shifting their focus away from business operations and toward the business owner. In the mid-1990s, large U.S. banks started developing credit scoring models based on small-business owners' personal data obtained from consumer credit bureaus. This approach made sense because these agencies essentially cover 100 percent of the adult population and follow best practices.

But not all countries have well-developed credit bureaus. The average credit bureau in a Latin American or Caribbean country complies with only half of best practices and covers 39.3 percent of the adult population, according to the World Bank's Doing Business 2014 report. (Credit bureau coverage is even lower for every other region of the world, except for high-income members of the Organisation for Economic Co-operation and Development (OECD).) Thus, even though credit scoring is a potential solution for non-OECD countries, it could take decades to pass legislation that would improve the quality and depth of information that credit bureaus collect, as well as increase their coverage.

One alternative to make more information available at a low cost is the use of psychometrics to measure abilities, attitudes, and personality traits. Psychometric tools have been used extensively in hiring, with strong results. Tests to gauge general intelligence, integrity, and conscientiousness, along with work sample tests, have proved to be the best methods for predicting overall job performance. Taken together, these tests are better predictors than the candidate's job experience, level of education, employment interview results, peer ratings, and reference checks.

Similar principles can be applied in the credit arena, to assess potential borrowers' ability and willingness to pay back loans. The IDB and MIF have been working with the Entrepreneurial Finance Lab (EFL) on
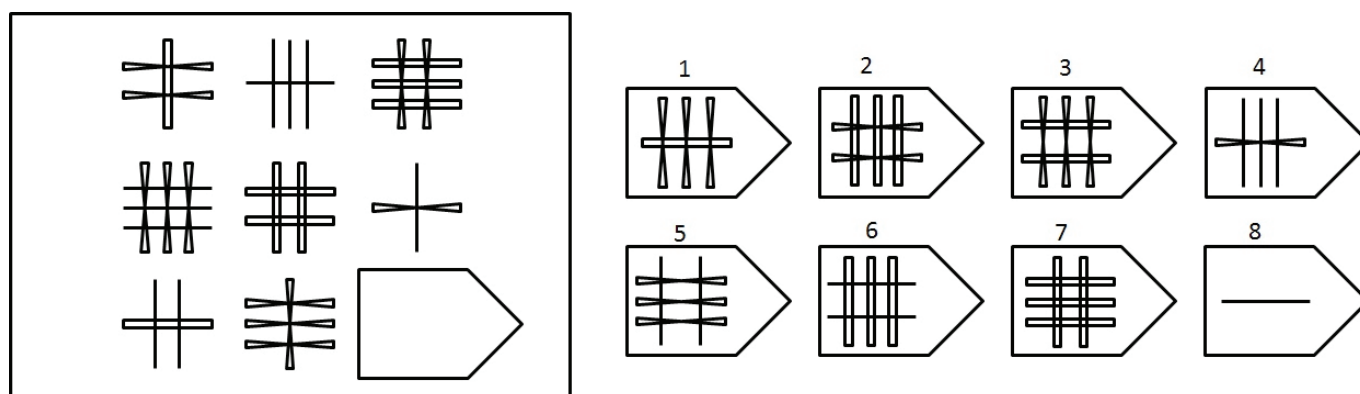
FIGURE 1. Are you credit worthy?

Figure for illustration purpose only. Not a question on the EFL application. EFL does not use this type of questions on its application.

pioneering efforts in Latin America and the Caribbean to make psychometric testing available to more lenders, with the goal of improving smaller businesses' access to credit.

EFL, a private company that grew out of an initiative at Harvard University's Center for International Development, created a low-cost credit application tool based on psychometrics. After identifying questions that could potentially predict credit risk and trying out a first prototype of their tool, EFL developed a commercial application based on the responses to their psychometric credit tool and subsequent default behavior. The commercial application is based on the same quantitative methods used to generate traditional credit scores. It contains psychometric questions developed internally and licensed by third parties relating to attitudes, beliefs, integrity, and performance, as well as traditional questions and the collection of metadata (i.e. how the applicant interacted with the tool).

The EFL credit application aims to help address the information asymmetry faced by financial institutions when screening smaller businesses in environments where credit bureaus are not well developed or coverage is not universal.

The EFL credit application takes, on average, 25 minutes to complete. To be approved for a loan, the entrepreneur has to earn a score above a threshold defined by the implementing institution.

The Study: Does it work?

Three economists—from the IDB, and the World Bank—teamed up to study the effectiveness of this screening tool in the real world, in the context of a pilot exercise conducted in Peru.

In March 2012, the implementing institution started to pilot EFL's psychometric credit scoring model, with the objective of expanding its commercial lending towards Small and Medium Enterprises (SMEs). Entrepreneurs who applied for a working capital loan (up to 18-month in duration with an average loan size of US$3,855) were screened by the EFL tool as part of the application process. Only entrepreneurs who were rejected under both screening methods were not offered a loan (figure 2). Since Peru has one of the most comprehensive credit bureaus in Latin America

FIGURE 2. Credit decisions based on EFL score and traditional method

		Traditional Method Decision (TM)	
		Accept	Reject
EFL Decision	Accept	(1) Accepted 659 entrepreneurs (20.6% unbanked) (23.5% got loan from the implementing institution)	(2) Accepted 158 entrepreneurs (10.1% unbanked) (24.7% got loan from the implementing institution)
	Reject	(3) Accepted 860 entrepreneurs (25.1% unbanked) (29.3% got loan from the implementing institution)	(4) Rejected 209 entrepreneurs (7.2% unbanked) (0% got loan from the implementing institution)

Source: Author's own calculations

and the Caribbean, covering 100 percent of the adult population, everyone has a credit score. However, for individuals who have not taken out a loan from a formal financial institution, that score is based on demographic information rather than credit history. The study carried out analyses for banked (individuals with credit history) as well as unbanked entrepreneurs (individuals without a credit history in the formal financial system).

The researchers obtained data collected through the EFL questionnaire that the implementing institution personnel administered during the loan application process to 1,993 entrepreneurs screened by the EFL tool between March 2012 and August 2013. These data include the EFL score and the date when the entrepreneur was screened by the EFL tool, as well as their age, gender, marital status, business sales, and sector of activity. The researchers also used credit history data from the public credit registry managed by the SBS. All financial institutions subject to credit risk—including credit unions not authorized to receive deposits—have to provide monthly data to this public credit registry. Each month the SBS reports maximum number of days in arrears (across all financial institutions), total debt, and a classification of debtors into one of five status categories: normal, with potential payment problems, poor payment, doubtful payment, and loss. Only "banked" entrepreneurs, i.e. those who have had a loan within the formal financial system in the past, appear in the public credit registry data. About 76% of the entrepreneurs in the sample were banked at the time they were screened by the EFL tool.

The researchers set out to discover how effectively the EFL tool could: 1) screen out high credit risk from a pool of entrepreneurs who had already been approved for a loan using a traditional credit score model; 2) rescue potential low-risk applicants from a pool of entrepreneurs who had been rejected using traditional screening methods; and 3) make loans accessible to entrepreneurs without a credit history.

Results

The researchers compared debt usage and repayment behavior among entrepreneurs who were offered loans based on traditional scoring methods, or on the EFL tool's results, or on both. The researchers found that in the context of this study, the psychometric tool can add value in different ways for entrepreneurs with and without a credit history. Here are some of the findings[1]:

- For entrepreneurs who already have a credit history, EFL's psychometric credit application can lead to reduced portfolio risk for banks, when the tool is used together with the traditional method to screen out high credit risk.

- When used as a method to rescue loan applicants with low credit risk from a pool of entrepreneurs who have a credit history and have been rejected using the traditional credit scoring method, the EFL tool has limited power and could even lead to

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1   Based on the study "Psychometrics as a tool to improve screening and access to credit" by Irani Arráiz, Miriam Bruhn, and Rodolfo Stucchi (2015), IDB Working Paper Series No. 625.

FIGURE 3. Increase in loan use from implementing institution at EFL threshold – for entrepreneurs without a credit history
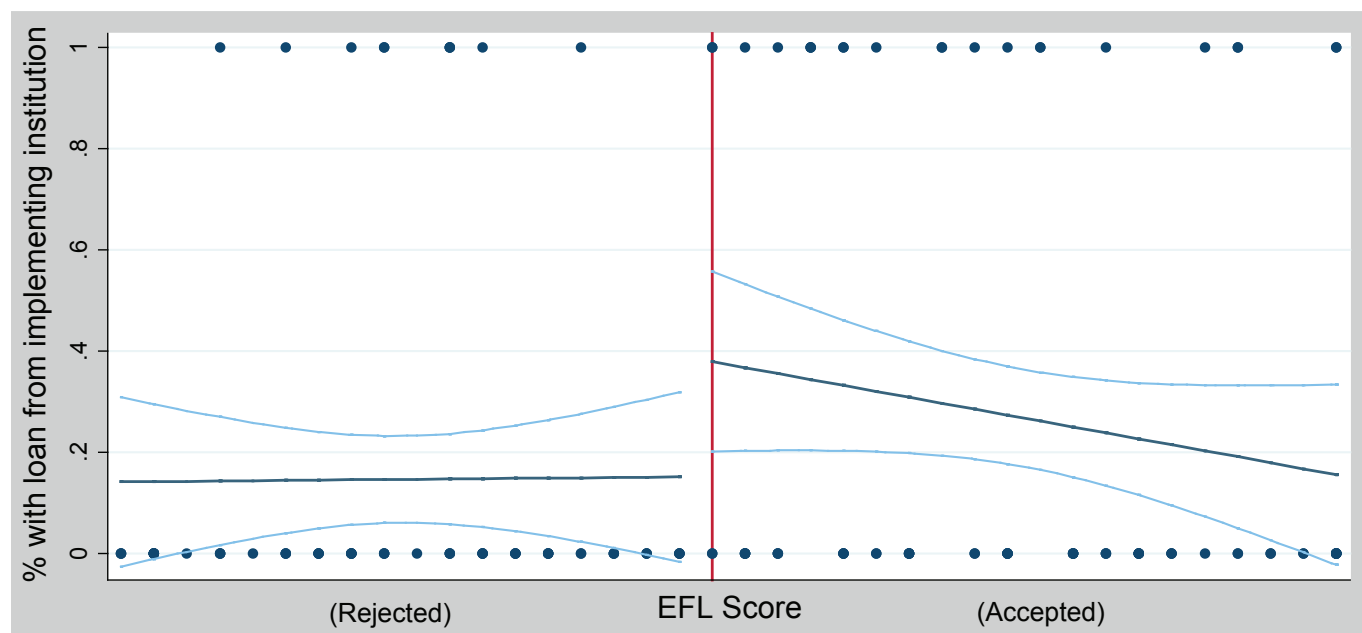
Source: Authors' own calculations
Note: The figure shows the predicted values from a linear regression of the indicator variable for having a loan from the implementing institution on the EFL score, run separately on each side of the cutoff, along with the 95% confidence intervals.

an increase in portfolio risk. In other words, with respect to portfolio risk, the EFL tool does well complementing credit history information, but not replacing it.

• For entrepreneurs without a credit history, the results suggest that the EFL tool can be used to make additional loans to these business owners without increasing the bank's portfolio risk.

Policy Considerations

The findings clearly show the importance of information for assessing credit risk, making accurate credit decisions, and expanding credit supply. They highlight the power of traditional screening methods to screen out applicants with a history of poor loan repayment. At the same time, the results illustrate that psychometric credit scoring is a viable tool, both to reduce risk on applicants with a credit history by combining it with traditional screening methods, and to reach applicants without credit history in a controlled way. Safely accessing this hard-to-reach population, which includes the large majority of MSME in Latin America, is not just a good business opportunity for lenders, given the MSMEs outsized contribution to employment, it can also foster economic development. Psychometric credit scoring

thus offers a practical solution in countries where well developed credit bureaus are in the process of consolidation.

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