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Financial frictions and productivity: Evidence from Mexico

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ABSTRACT

Mexico exhibits a level of financial development much lower than other Latin American and upper middle income countries. I quantify the aggregate total factor productivity (TFP) losses from resource misallocation arising from financial frictions in Mexico, using a standard model of credit-constrained entrepreneurs with heterogeneous productivities, and detailed, publicly available, data on the entire universe of Mexican establishments. The implied TFP losses are 10%, which represent 23% of the observed TFP gap between Mexico and the United States. The results suggest that the standard model captures well the role of bank credit in allocating capital across small and medium sized firms, but potentially misses the role of equity markets in financing investments by the largest firms.

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1. Introduction

Efficient financial institutions are crucial for the accumulation of capital, as well as for the optimal allocation of resources across productive units. When financial markets do not operate efficiently, productive inputs are allocated to those with the deepest pockets, but not necessarily to those with the best ideas. This misallocation of resources is reflected in a lower TFP. The cross-country evidence also suggests that financial development matters for aggregate efficiency, as indicated by the strong correlation between private credit as a share of GDP and TFP seen in Fig. 1.

Mexico exhibits a level of financial development much lower than other Latin American and upper middle income countries. Table 1 shows private claims on the private sector by banks and other financial institutions, as a share of GDP, for a group of 151 countries, five sub-groups of countries, and Mexico.¹ Private credit-to-GDP in Mexico is 24%—less than half that of the average upper-middle-income country, and the same as the average country in Sub-Saharan Africa. The microeconomic evidence also indicates that Mexico's financial sector does not fare well against

comparable countries. According to the World Bank Enterprise Survey (2010), Mexican establishments have lower access to bank credit, and face more stringent collateral constraints and interest rates, compared to their counterparts in similar economies.

I study the role of financial frictions in determining resource misallocation in Mexico. To this end, I take a standard model of heterogeneous entrepreneurs subject to borrowing constraints, and calibrate it using highly detailed, yet publicly available, data on the entire universe of Mexican establishments. In the model, entrepreneurs operate a common technology with decreasing returns to scale, using capital and labor. They differ in their permanent managerial ability, as well as in transitory shocks to their productivity. These entrepreneurs can only borrow in proportion to their wealth, which is accumulated and depleted as they respond to the transitory productivity shocks. Thus, the amount of capital they can use is determined by the amount of funds they can raise in the market.

The baseline calibration implies TFP losses of 10%. These losses represent 23% of the observed TFP gap between Mexico and the United States, as estimated by Caselli (2005). Through a counterfactual exercise, I find that if Mexico had a level of private credit as a share of GDP comparable to Chile's (0.89), it would realize 90% of these potential TFP gains.

This article contributes to our understanding of the aggregate effects of a more efficient allocation of credit in countries with low levels of financial development. My findings suggest that the standard model does well at explaining the role of access to bank credit in the efficient allocation of capital, but misses the

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¹ These estimates correspond to the 2013 update of the database on the structure and development of the financial sector described by Beck et al. (2000).

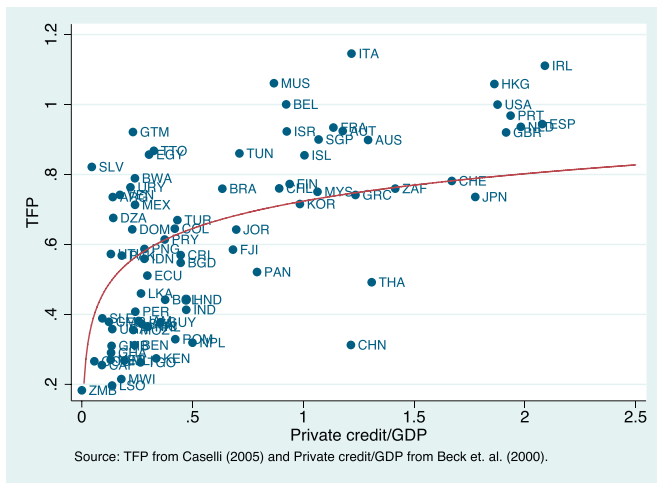


Fig. 1. Financial development and TFP around the world.

importance of access to equity markets for the most productive firms in the economy. Further, the evidence suggests that access to credit has a large impact on TFP at very low levels (much lower than Mexico's), but this effect starts to flatten out as access improves.

2. Relation to existing literature

Resource misallocation arising from firm-level distortions in the marginal products of capital and labor has been the subject of much academic inquiry, starting with the work of Restuccia and Rogerson (2008) and Hsieh and Klenow (2009). The latter estimate potential TFP gains of 30–50% for China, and 40–60% for India, if these economies were to experience the (lower) dispersion in marginal products of capital and labor observed in the United States. Machicado and Birbuet (2012), and Ryzhenkov (2016) use the Hsieh and Klenow (2009) methodology to estimate potential TFP gains from lower misallocation as high as 54% for Bolivia, and as high as 300% for Ukraine.

The methodology developed by Hsieh and Klenow (2009) has the advantage of being highly tractable and easily implementable, provided that one has a rich cross-section of firm-level data. Unfortunately, it cannot guide our understanding of the sources of misallocation, which can be many and varied, and often leads to very large estimates of potential TFP gains. For instance, Busso, Madrigal, and Pagés (2013) apply the Hsieh and Klenow methodology to several Latin American countries, and estimate overall potential TFP gains varying from 95 to 140% in the case of Mexico. These estimates account for every possible source of the observed dispersion in the marginal products of capital and labor. While there are many studies that apply the more general Hsieh and Klenow methodology, studies on the misallocation effects on aggregate TFP arising specifically from financial frictions using firm-level evidence from developing countries continue to be scarce.

Table 1
 Private credit (% of GDP)

Total	57.5
High-income OECD	132.9
High-income non-OECD	81.5
Upper-middle-income	54.1
Latin America	43.2
Sub-Saharan Africa	24.0
Mexico	24.0

Source: Beck, Demircug-Kunt, and Levine (2000), 2013 update. The bold entries reflect Mexico, which is the specific country under study.

The specific role of financial frictions in shaping the inefficient allocation of resources has been studied by Amaral and Quintin (2010), Buera, Kaboski, and Shin (2011), Midrigan and Xu (2014), and Moll (2014). Using a rich panel of firm-level data for South Korea to calibrate a quantitative model of credit-constrained entrepreneurs, Midrigan and Xu (2014) estimate TFP losses from resource misallocation between 5 and 10%. Further, they find that limited access to equity markets—a feature absent from the standard model—precludes entry into more productive sectors, leading to TFP losses of up to 40%. Therefore, the main losses come from the extensive, not the intensive, margin.

My estimates of TFP losses from misallocation—the intensive margin—are in the upper range of those by Midrigan and Xu (2014). This is not surprising, as Mexico exhibits a level of financial development much lower than that of South Korea, where private credit as a share of GDP is 98%. In a recent paper, López-Martin (2016) develops an equilibrium model of firm dynamics where improving access to credit induces firms to invest in “knowledge capital”, increasing TFP. His strategy is, however, different to the one in this paper: he calibrates the model to match U.S. data and then changes the exogenous parameter governing the degree of financial development so as to match the volume of credit observed in any hypothetical developing economy—he uses Mexico as an example, and the TFP gains he obtains are very close to those in the current paper, at 10.3%.² When taken together, my results and those in López-Martin (2016) suggest that the standard model used in this paper is enough to capture the role of conventional bank credit. Thus, these results can help researchers decide what extensions to the standard model are relevant and worth pursuing in future efforts.

Bergoenig, Kehoe, Kehoe, and Soto (2002) compare Chile's and Mexico's recoveries from their respective crisis in the early 1980s, and conclude that Chile's much faster recovery can be attributed to earlier policy reforms affecting the banking system and bankruptcy procedures, which had a direct effect on TFP growth. Indeed, as mentioned earlier, private credit as a share of GDP in Chile is 89%, higher than the average high-income non-OECD country, and over three times that of Mexico. My results are also consistent with Antunes and Cavalcanti (2013), who find that increased access to credit has larger effects on output than subsidized interest rates. More recently, Gopinath, Karabarbounis, Kalemli-Ozcan, and Villegas-Sanchez (2016) find strong evidence of capital misallocation due to financial frictions in southern Europe consistent with the main story of the standard model of credit constrained entrepreneurs: credit tends to be allocated to firms with higher net worth but not necessarily to the most productive.

3. The data

I use establishment-level statistics from Mexico's 2014 Economic Census, published by the country's main statistical agency (INEGI, by its Spanish acronym). The census covers all establishments with a physical address that operated in 2013. These statistics are publicly available via their webpage (<http://www.inegi.org.mx>).³ Table 2 shows the employment size distribution of establishments, along with INEGI's size classifications. Most of

² In other words, the question in López-Martin (2016) is “what would be the losses to the U.S. if it had a level of financial development similar to Mexico's”. The question in my paper is “taking other distortions as given, what are the potential gains to Mexico of improving its level of financial development?”. One of the useful insights from my results is that perfect access to credit is not necessary to realize most of those potential gains. This may be due, in part, because other distortions limit the potential gains from financial development.

³ Access to the raw micro data is also possible by filling a request form, also available online. With the exception of the size of the largest establishments—which I

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