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journal homepage: [www.elsevier.com/locate/jmacro](http://www.elsevier.com/locate/jmacro)Financial development and occupational choice<sup>☆</sup>Enoch Hill<sup>a,\*</sup>, David Perez-Reyna<sup>b</sup><sup>a</sup>Wheaton College, Department of Business and Economics, 501 College Avenue, Wheaton, IL 60187, USA<sup>b</sup>Universidad de los Andes, Department of Economics, Calle 19A # 1–37 Este, Bloque W., Bogotá, Colombia

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## ABSTRACT

In this paper we incorporate occupational choice in the style of Lucas (1978) with an additional dimension of heterogeneity in wealth into a model of banking. We use this model to better understand how development of the financial sector affects misallocation and occupational choice. Our model demonstrates three channels through which enforcement of credit contracts are tied to misallocation. Improvements in enforcement shifts the risks in variance of output from banks toward entrepreneurs; consequently, improved enforcement can serve as a form of risk sharing in the absence of state contingent loans. Second, reduction in the risk for bankers improves the appeal of banking and the general equilibrium effect shrinks the margin of intermediation, reducing the importance of initial wealth distributions. Finally, improved enforcement leads to more relaxed credit constraints, as banks are willing to lend more to entrepreneurs, further reducing the importance of initial wealth in occupational choice.

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## 1. Introduction

There is widespread agreement that differences in total factor productivity (TFP) are the main source for the difference in wealth across economies.<sup>1</sup> A large and growing body of empirical work suggests that misallocation can explain a large part of these differences in TFP across nations.<sup>2</sup> Given the strong empirical correlation between TFP and financial development, financial frictions are a natural suspect for the cause of these misallocations.

While much of the work in this line of research focuses on misallocation on the intensive margin (i.e. differences in marginal productivities across firms indicative of incorrect firm size), [Banerjee and Moll \(2010\)](#) suggest that even in the presence of inefficient financial markets, these types of misallocation should asymptotically disappear over time. Work by [Midrigan and Xu \(2014\)](#) aligns with this finding, suggesting that misallocation across firms may not be as important as distortions to occupational choice and technological adoption.<sup>3</sup> As pointed out by [Lloyd-Ellis and Bernhardt \(2000\)](#) and

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<sup>1</sup> See [Hall and Jones \(1999\)](#), [Klenow and Rodríguez-Clare \(1997\)](#) and [Prescott \(1998\)](#), among others.

<sup>2</sup> Specific examples include [Banerjee and Dufo \(2005\)](#), [Jeong and Townsend \(2007\)](#), [Restuccia and Rogerson \(2008\)](#), [Hsieh and Klenow \(2007\)](#), [Buera et al. \(2011\)](#), [Bartelsman et al. \(2013\)](#), [Hsieh and Klenow \(2014\)](#).

<sup>3</sup> In [Midrigan and Xu \(2014\)](#) this is the choice of sector.

Banerjee and Newman (1993), a lack of credit results in an additional dimension of heterogeneity which influence decisions of occupational choice, namely individual wealth. As individual wealth bears no relation to productive capability, any distortion of occupational decisions resulting from wealth reduces efficiency. Empirical support for this theoretical result is provided by Jeong and Townsend (2007), who find that 73% of the aggregate TFP growth in Thailand between 1976 and 1996 can be accounted for by financial deepening and occupational shifts.

In this paper we provide a simple two-period theoretical model which allows for a clear understanding of possible linkages between financial development and occupational choice which can affect measured TFP. Specifically we embed a traditional span of control model à la (Lucas, 1978) into a framework with a banking sector and aggregate risk. In addition to agents being heterogeneous in managerial ability, they also differ in terms of endowments of individual wealth. Agents endogenously choose whether to be a worker, to be an entrepreneur, or to be a banker. In the absence of fully developed financial markets, credit constraints compel those with low wealth to become workers. Agents with low managerial ability and high wealth choose to become bankers and agents with sufficiently high wealth and ability become entrepreneurs. It is of particular importance to note that wealth influences whether an agent prefers to be an entrepreneur or worker, as the efficient allocation would base this decision purely on entrepreneurial ability.

All risk in our model is aggregate. Banks lose money on deposits in the bad state and make up for it in the good state. Risk aversion provides a natural limit on the optimal size of banks as they balance additional profit against additional risk. Entrepreneurs pay workers in the first period and receive their revenue in the second. Consequently less wealthy entrepreneurs require working capital loans to finance production. Credit constraints as well as risk aversion on the part of entrepreneurs result in wealth influencing decisions of both occupational choice and firm size.<sup>4</sup>

As observed in economies with developing banking sectors such as India and China, it is difficult to enforce credit contracts in the case of default.<sup>5</sup> In the context of our model, development of the financial sector is represented by the fraction of a firm's assets which a bank is able to seize in the case of default.<sup>6</sup> This results in naturally arising credit constraints for borrowers.

Our model provides three clear channels through which improvements in the enforcement of credit contracts assists allocations of occupational choice and firm size; namely risk sharing, margin of intermediation and credit constraints. First, enforcement acts as a form of risk sharing between bankers and entrepreneurs and moves the market closer to completion in the absence of state contingent contracts. When development of the financial sector is low, most financial risk is borne by banks. When banks are able to recoup a larger share of a firm's assets upon default, the reduced output in the bad state is shared between bankers and entrepreneurs. Interestingly enough, risk sharing is not monotonically increasing in the development of the financial sector, rather financial risk is being shifted from bankers to entrepreneurs. In the limit, when banks are able to fully seize all of a firm's assets, risk is entirely borne by the entrepreneur.

Unlike banking models of optimal contract theory which are concerned with contracts at the individual banking-agent level, we abstract from the concept 'micro' risk in the form of 'good' and 'bad' borrowers. In our framework, all borrowers are 'good,' since micro uncertainty is ruled out, by assumption. The uncertainty that is present is macro uncertainty and changes in credit contract enforceability determines how macro uncertainty is shared between bankers and entrepreneurs. The novel contribution of our paper is that, while perfect contract enforcement under 'micro' uncertainty is optimal,<sup>7</sup> at the macro level perfect contract enforcement disrupts the optimal risk sharing between entrepreneurs and bankers.

Second, the margin of intermediation is monotonically decreasing in the enforcement of credit contracts. As enforcement improves, bankers bear less risk and experience smoother consumption. The reduction in risk increases the appeal of banking and general equilibrium effects drive the margin of intermediation to monotonically decrease in enforcement.<sup>8</sup> Additionally, reduced risk makes it possible for banks to increase their leverage ratio, improving the efficiency of intermediation. As banks approach perfect enforcement (ability to seize 100% of a firm's assets in the case of default), the margin of intermediation is reduced to nothing, there is no risk to the banker and a single, infinitely leveraged bank is able to provide all the intermediation desired in the economy.<sup>9</sup>

Finally, even though improvements in the enforcement of credit contracts hurt entrepreneurs ex-post, they allow for increased access to credit ex-ante. This improved access to credit increases the ability of poorer agents to take advantage of their entrepreneurial ability through increased credit and a larger firm size. Overall, developments in the financial sector result in improved allocations as occupational choice and firm size become less dependent on wealth and more dependent on ability.

<sup>4</sup> Regarding risk, in the bad state, marginal increases to the repayment of loans may be greater than the marginal production of additional workers. Hence, due to risk aversion, entrepreneurs of similar ability but differing wealth may choose to operate firms of different size even in the absence of a credit constraint.

<sup>5</sup> For example, Banerjee and Moll (2010) states, "The banking sector in India and China continues to be dominated by slow moving and badly managed public sector banks, and the system as a whole is notoriously ineffective in the enforcement of credit contracts, so that even the private sector is often unwilling to lend."

<sup>6</sup> In our analysis, we also consider improvements in the ability of the financial system to diversify aggregate risk across a wider range of states. We do this by reducing the severity and increasing the probability of the bad state while holding expected productivity constant.

<sup>7</sup> For instance, see Greenwood et al. (2010).

<sup>8</sup> The margin of intermediation is defined as the ratio of the interest rate on loans to the interest rate on deposits minus one.

<sup>9</sup> At zero consumption, modeled agents have infinite marginal utility. Consequently, with perfect enforcement, no entrepreneur will ever accept a contract which may result in default.

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