Review of Economic Dynamics 18 (2015) 505–522

Contents lists available at ScienceDirect

Review of Economic Dynamics

www.elsevier.com/locate/red

Financial frictions, internal capital markets, and the organization of production

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ARTICLE INFO

Article history:
Received 16 November 2012
Received in revised form 2 October 2014
Available online 18 October 2014

JEL classification:
E23
E44
O16
L25

Keywords:
Misallocation
Credit constraint
Business conglomeration
TFP

ABSTRACT

This paper evaluates the role of internal capital markets in business groups for allocating capital to its most productive use. A quantitative model in which business groups arise endogenously as substitutes for imperfect credit markets explains several stylized facts about establishment size distribution and cross-firm productivity differences. The impact of internal capital markets on economic development is positive: shutting down business conglomeration in the model calibrated to the Canadian economy would lead to a 3 percent reduction in output per capita. These losses are higher in economies with less developed financial markets.

1. Introduction

Recent economic development literature documented substantial dispersion in the marginal products of resources across heterogeneous productive establishments in several countries and argued that misallocation of resources can account for a large part of cross-country differences in aggregate total factor productivity (TFP) and income per capita (Banerjee et al., 2003; Alfaro et al., 2008; Restuccia and Rogerson, 2008; Hsieh and Klenow, 2009; Bartelsman et al., 2013). One privileged explanation for resource misallocation is that financial market imperfections hinder the flow of capital to the most productive firms (see Jeong and Townsend, 2007; Amaral and Quintin, 2010; Buera et al., 2011, for quantitative evaluations of this mechanism).

However, allocation of capital to individual establishments is determined not only by financial markets but also by firm's internal organization. In fact, reshuffling capital among establishments *inside* the enterprise could, at least partially, overcome the (mis)allocative effects of financial market imperfections. Such internal reallocation is likely to play an especially important role in diversified conglomerates and business groups.[1] Although these forms of organizing production are

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[1] Conglomerates are broadly defined as firms under common ownership that operate in multiple, often unrelated industries. Business groups are groups of legally independent firms that are linked together by strong equity or family ties. In this paper, the distinction between the two concepts is not important,

http://dx.doi.org/10.1016/j.red.2014.10.001
1094-2025/

ubiquitous in countries with less developed financial markets (see Khanna and Yafeh, 2007; Masulis et al., 2011), existing macroeconomic literature has largely ignored the effects on economic development.

In this paper, I ask how important internal capital markets are for aggregate resource allocation and economic development. I build a quantitative general equilibrium model with heterogeneous establishments that explicitly allows for formation of business groups, which enable the affiliated partners to pool capital across their establishments. I calibrate the model to match selected moments from Canadian aggregate and plant-level data and use simulations to quantify the effects of business conglomeration on the cross-firm allocation of inputs and production outcomes, the determination of the average size and productivity of establishments, the level of entrepreneurship, and the country's output per capita.

My model embeds business group formation into an otherwise standard heterogeneous agents model of entrepreneurship with credit constraints, such as Evans and Jovanovic (1989), Cagetti and De Nardi (2006), and Buera et al. (2011). Agents of differing abilities and wealth decide whether to work for wages or become entrepreneurs. Entrepreneurs choose whether to operate a stand-alone (single-segment) business firm or to pay an additional cost and become part of a business group (conglomerate) with a randomly met partner. Because of credit market frictions, only wealthier individuals have full access to external finance. Business groups emerge endogenously as a way for firms to create an internal capital market, reducing their reliance on external funds. Internal markets therefore allow firms to avoid external credit market imperfections and reallocate the available capital across the affiliated productive units more efficiently.

The model with internal capital markets is fairly successful in reproducing several stylized facts concerning establishment size and productivity distribution. In particular, the model generates a concentration of establishments affiliated with business groups in large-size categories and a concentration of stand-alone establishments in small-size categories. The model is also consistent with the fact that low-productivity establishments are relatively smaller in business groups compared to their counterparts in stand-alone firms and high-productivity establishments are larger in conglomerates than in stand-alone firms.

I find that internal capital markets have a positive effect on economic development. Shutting down the possibility of business conglomeration in the model calibrated to the Canadian economy (an economy with well-developed financial markets) reduces the steady-state level of output per capita by 3 percent. This magnitude is relatively modest because of general equilibrium effects: although business groups better allocate resources among the affiliated establishments, their presence raises the prices of production inputs and leads to tighter credit constraints for non-affiliated establishments. However, the relative losses from a ban on business conglomeration are higher in economies with less-developed financial markets. For example, in an economy with the ratio of external finance to gross domestic product (GDP) that is half of the value observed in Canada, a ban on business conglomeration would imply decrease in the steady-state output per capita of 5 percent. Put together, my results indicate that business conglomeration is a potentially important additional margin along which the production sector may adjust in response to financial frictions. Previous literature did not take this adjustment margin into account and, as a result, overestimated the importance of misallocation resulting from financial frictions for economic development.

Indeed, the main mechanism curbing the misallocative effects of financing frictions recognized in the macroeconomic literature is self-financing: over time, productive entrepreneurs will accumulate a sufficiently large stock of assets to finance their firms internally. Most of this literature concluded that borrowing constraints have a large impact on resource misallocation across heterogeneous producers (Jeong and Townsend, 2007; Amaral and Quintin, 2010; Buera et al., 2011; Jones, 2013). Midrigan and Xu (2014) argued that financial frictions reduce aggregate TFP mainly by distorting entry and technology adoption decisions, but because of strong self-financing, the misallocation of capital across existing producers accounts for a relatively small fraction of aggregate TFP losses. Moll (2014) showed that if productivity shocks are persistent, entrepreneurs may overcome financial frictions in the long run by self-financing, but the transition period is very long and thus costly. My paper proposes a different, complementary mechanism that also curbs the impact of financial frictions on misallocation: organizing production in large conglomerates provides a substitute for the external financial market. This mechanism seems particularly relevant in economies with lower levels of economic and financial development where business groups and conglomerates are omnipresent.

1.1. Modeling business conglomeration

The principal aim of this paper is to quantify the allocative role of internal capital markets in business groups in the presence of constraints on external financing. In order to achieve this aim in a tractable and clear way, I focus on one particular aspect of business conglomeration: the capacity to reallocate resources across the affiliated establishments. The gains from this reallocation will be the sole reason for which two stand-alone entrepreneurs would merge and form a conglomerate in my model. In a nutshell, I embed Stein's (1997) theory of efficient internal capital markets in a full-fledged dynamic general equilibrium model.

Although internal capital markets are a well-recognized feature of conglomerates and business groups and most literature agrees that mergers and asset sales involve substantial reallocation (see below for relevant recent references), they are not

since they imply the crucial feature of enabling internal transfers of resources across affiliated divisions/subsidiaries. Notice that internal reallocation is also possible among the plants of non-diversified, multi-plant firms.