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Internal financial constraints and firm productivity in China: Do liquidity and export behavior make a difference?

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ABSTRACT

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Financial factors have been found highly important in influencing firms' real activities and in promoting aggregate growth. Yet, the linkage between finance and firm-level productivity has been overlooked in the literature. We fill this gap using a panel of 130,840 Chinese manufacturing firms over the period 2001–2007 to estimate a TFP model augmented with cash flow. We find that, especially for illiquid foreign and private firms, productivity is strongly constrained by the availability of internal finance. Furthermore, contrary to private firms, foreign non-exporters display higher dependence of productivity on cash flow than exporters. *Journal of Comparative Economics* 41 (4) (2013) 1123–1140. Nottingham University Business School, University of Nottingham, Nottingham NG8 1BB, UK; Department of Economics, University of Birmingham, UK.

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1. Introduction

“Productivity isn't everything, but in the long run it is almost everything”—Nobel Laureate Paul Krugman

A growing literature recognizes that a well-developed financial system can influence long-term economic growth at the country-level through its ability to mitigate information and transaction costs, and to impact on saving rates and investment decisions (see Levine, 2005, for a survey). At the firm-level, finance has been demonstrated to influence firms' real activities such as investment in fixed capital (Fazzari et al., 1988) and employment (Nickell and Nicolitsas, 1999), which are the main factor inputs for firm production.

The bulk of empirical evidence shows that cross-country differences in the level or growth of gross domestic product (GDP) per capita are not due to factor accumulation, but can be explained by differences in total factor productivity (TFP) (Hall and Jones, 1999; Easterly and Levine, 2001). It is therefore important to explore the extent to which finance fosters growth by directly promoting firm-level productivity, which is exemplified through technological innovation.¹ This could happen if the financial system is able to supply capital to innovative firms and to direct their operations to be more efficient (Ayyagari et al., 2011). Yet, productivity-enhancing research and development (R&D) activities commonly bear high risks

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¹ Solow's (1957) growth model establishes technological progress and skills as the prime drivers of increases in labor productivity.

and uncertainty, and require large investments. Furthermore, firms undertaking innovative activities typically hold relatively large R&D related intangible assets such as patents and knowledge, which cannot be used as collateral. Hence, these firms typically find it hard to obtain loans from banks to finance their activities (Brown et al., 2009).

Although this is obviously an important research question, very few studies in the literature have analyzed links between financial factors and firm productivity. Among these, Nucci et al. (2005), Gatti and Love (2008), and Moreno-Badia and Sloomakers (2009) find significant effects of financial variables on firms' total factor productivity for Italian, Bulgarian, and Estonian firms, respectively.

Our aim is to fill this gap in the literature, focusing on a large panel of 130,840 Chinese firms over the period 2001–2007. China is an ideal laboratory to study the relationship between finance and productivity, as despite being characterized by a poorly developed financial system, its firms have exhibited very high growth rates in the last three decades (Allen et al., 2005; Guariglia et al., 2011). Scholars have attributed this phenomenal development to productivity growth, rather than capital or labor accumulation (World Bank, 1997; Brandt et al., 2012; Zheng et al., 2009; Guariglia et al., 2011). Understanding the links between finance and productivity may help to further understand how Chinese firms were able to grow so fast despite severe financing constraints.²

Our second contribution is that contrary to the majority of papers in the literature, which focus on the links between the availability of external finance and productivity, we concentrate on the availability of internal finance.³ This choice is motivated by the importance of cash flow in determining Chinese firms' growth documented in Guariglia et al. (2011), and by the difficulties typically encountered by Chinese private firms (which make up the majority of firms in our sample) in obtaining external funds (Allen et al., 2005).⁴

Our third contribution is that we analyze the links between firm productivity and cash flow allowing for several dimensions of firm heterogeneity. In particular, we initially focus on whether the relationship differs among firms owned by different agents. We then look at how it differs among firms characterized by different levels of liquidity on the one hand, and among exporters and non-exporters, on the other.

To test the hypothesis that an increased availability of internal financial resources can raise firms' productivity, we derive a firm-level measure of TFP, which we subsequently regress on cash flow and a number of control variables. We find that firms' cash flow affects their productivity positively and significantly, which suggests that firms in China are financially constrained. In the presence of a negative cash flow shock, these firms will in fact be forced to reduce productivity-enhancing activities. This may be due to the direct effect of the internal financial constraint (i.e. to the fact that less internal funds are available for investment in productivity-enhancing activities), but also to an indirect effect in terms of enhanced external financing constraints (due to moral hazard and adverse selection considerations, the lower cash flow available to firms will make it more difficult for them to obtain external finance).

Differentiating firms on the basis of ownership, we find that both private and foreign firms' productivities are affected by their cash flow, while state-owned and collective firms, which are more likely to benefit from soft budget constraints, are not. Furthermore, our results suggest that both liquidity and export behavior are important determinants of the link between the availability of internal finance and productivity in the Chinese context. Specifically, for both private and foreign firms, the link is weaker for those firms characterized by high liquidity, suggesting that firms can use liquidity to smooth the effects of fluctuations in internal finance on productivity-enhancing activities. In addition, foreign non-exporters display higher sensitivities of TFP to cash flow than exporters, but the difference in the corresponding sensitivities for private firms is not statistically significant: being an exporter is therefore not always associated with better financial health.

The remaining part of the paper is organized as follows. Section 2 reviews and discusses the relevant literature. Section 3 introduces our productivity models and estimation methodology. Section 4 describes our data. Section 5 analyzes our results, and Section 6 concludes.

2. Economic background

2.1. Theoretical, cross-country, and county-level studies

A number of studies have looked at the links between finance and growth, taking place through improvements in productivity. From a theoretical point of view, King and Levine (1993) show that, by improving the probability of successful innovation, financial development has a positive effect on productivity and hence growth. This happens because well-developed financial markets can mobilize funds to finance the most efficient investment projects and diversify the risks associated with

² Several explanations have been put forward in the literature to explain this puzzle: among these are the use of informal financial sources (Ayyagari et al., 2010) or trade credit (Cull et al., 2009) by Chinese private firms, and their ability to team up with foreign firms (Poncet et al., 2010) and to generate large amounts of cash flow internally (Guariglia et al., 2011). However, with the exception of Ayyagari et al. (2010), who estimate some productivity growth equations, none of these papers has focused on firm productivity. Even in the case of Ayyagari et al. (2010), the main focus is on firm growth in general, not on productivity.

³ Following Guariglia (2008), we refer to a firm characterized by a limited availability of cash flow as an internally financially constrained firm. By contrast, a firm with limited access to external finance is referred to as an externally financially constrained firm. The two types of constraints are obviously related: firms facing internal financing constraints are in fact likely to find it more difficult to obtain external finance than cash flow-rich firms.

⁴ It should be noted that Schiantarelli and Sembenelli (1997) and Nucci et al. (2005) also use cash flow as a control variable in some of their specifications. However, contrary to our paper, their main focus is not the link between firm productivity and cash flow.

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