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# Credit constraints and spillovers from foreign firms in China

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ABSTRACT

This paper examines whether credit constraints affect Chinese firms' absorption of productivity spillovers originating from the activity of foreign-owned firms. Using firm-level data for 2001–2005, we find evidence of positive spillovers originating from foreign-owned firms from countries other than Hong Kong, Macau and Taiwan for non-state owned Chinese firms operating in the same industry and province. Using an index of external finance dependence to measure credit constraints, we find that only non-state-owned firms operating in industries with external finance dependence below the index median exhibit significantly positive spillovers from the activity of foreign firms.



## 1. Introduction

In August 2012, Lenovo, the largest PC manufacturer in China, poached more than 40 laid-off employees from rival Motorola shortly after the latter announced its plan to cut 4000 jobs globally. The main objective behind this move, according to Chen Wenhui, Lenovo's general manager of phone R&D, was to take advantage of the former Motorola employees' vast experience in overseas markets. Similarly, Google's announcement that it was shutting down its search service Google.cn in 2010, resulted in a rush from its Chinese competitors to hire the company's best staff.[1] While a large number of Chinese companies have enjoyed the opportunity of tapping into a pool of workers trained in cutting-edge global corporations as well as adapting these multinationals' technology and management practices, a large number of firms, particularly privately-owned firms, are unable to take advantage of these type of positive external effects associated with the operation of foreign-owned firms, which we refer to from here on as spillovers from foreign activity.

In this paper we ask whether credit constraints hinder the ability of Chinese firms' to benefit from productivity spillovers arising from the operation of foreign-owned firms. To address this research question, however, we first need to establish whether domestically-owned Chinese firms in our sample actually enjoy benefits or positive spillovers from a greater level of activity of foreign-owned firms.[2] Our first set of results provides evidence in support of spillovers from foreign activity to Chinese-owned firms operating in the same industry and province. Further inspection reveals that this positive average effect hides significant heterogeneity in the response of domestic producers to foreign firm activity, which depend both on the origin of capital sources for foreign firms and the ownership status of domestic firms. In particular, we find that: (i) only the activities of foreign firms that do not originate in Hong Kong, Macau or Taiwan (HMT) have a significantly positive effect on the value-added of Chinese firms and (ii) only non-state-owned

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[1] http://www.chinadaily.com.cn/business/2012-12/03/content_16054002.htm.

[2] The surveys by Görg and Greenaway (2004) and Keller (2004) discuss in detail the problems associated with the empirical identification of spillovers from foreign direct investment; for the specific case of China, see Hale and Long (2011).

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firms, i.e. privately and collectively-owned enterprises, enjoy spillovers from foreign activity.[3] These results conform with the received wisdom that a substantial number of HMT-based firms are established by Chinese entrepreneurs primarily to take advantage of fiscal incentives available to foreign-invested enterprises and also that state-owned enterprises facing 'soft budget constraints' and pursuing multiple economic and social objectives are less likely to adopt productivity-enhancing techniques diffusing from multinational firms (Abraham et al., 2010; Prasad and Wei, 2007; Bajona and Chu, 2010; Xu, 2011).

Our main result shows that credit constraints present a significant obstacle to the absorption of productivity spillovers originating from foreign firms by Chinese firms. Using a sectoral index of credit constraints proposed by Rajan and Zingales (1998), we find that non-state-owned Chinese firms operating in industries with external finance dependence below the median of this index exhibit an elasticity of output with respect to foreign activity in the same industry and province of 0.047. On the other hand, credit-constrained firms, i.e. firms with external finance dependence above the median, do not benefit at all from the operation of nearby multinational firms in their own industry. This result has important policy implications. Governments in developing countries are keen on attracting foreign direct investment in technologically-intensive sectors. However, since these industries exhibit relatively high dependence on external finance, they might not provide the greatest benefits for local producers, unless financial markets are sufficiently developed to ensure the widespread absorption of productivity gains arising from the activities of foreign firms. Thus, this paper sheds light on the conditions that enable local firms to benefit from greater financial globalisation.

Our results are robust to alternative measures of credit constraints and firm-level performance measures, the use of lagged measures of inputs and foreign activity and various arrangements of clustering of standard errors. We also find that the negative relationship we establish between external finance dependence and spillovers from foreign activity is not capturing a relationship between the activity of foreign firms with sectoral characteristics other than credit constraints such as capital intensity or tradability.

Over the past two decades China has been one of the world's most important recipients of foreign direct investment (FDI), partly because of the size and growth of its internal market and its abundance of unskilled labour, but also because foreign firms have been attracted by a wide range of policies and incentives laid out by the Chinese government, e.g. generous fiscal schemes favouring foreign-invested enterprises and the establishment of special economic zones. The existence of positive spillovers arising as a by-product of the activities of multinational firms has frequently been used to justify the use of these policies. In this paper, however, we show that the presence and encouragement of foreign firms is not sufficient for domestic firms to benefit from the activities of foreign-owned firms.

Our finding that productivity gains from spillovers only accrue to local firms not facing credit constraints is of particular importance for China. The 2003 Investment Climate Survey carried out by the World Bank shows that privately-owned Chinese firms enjoy much less access to formal finance than firms in any other East Asian country. Several authors have pointed to the high level of state ownership characterising China's banking system as the main culprit behind this phenomenon, as a large share of credit is channeled towards state-owned enterprises to pursue political and social objectives (Brandt and Li, 2003; Cull and Xu, 2003; Allen et al., 2005). Consequently, as shown by Ayyagari et al. (2010), private Chinese firms are often forced to rely on small-scale, shorter-term sources of informal finance, which results in them experiencing slower growth than firms with access to bank credit. Our results show that lack of access to sources of external finance also hampers potential productivity gains for privately-owned firms arising from the operation of nearby foreign firms in the same industry.

Although this paper lies at the intersection of two well-established strands of literature, one exploring the impact of foreign direct investment in host economies and a second, investigating how financial development affects performance measures at the aggregate and microeconomic level, there are still relatively few papers focusing on the connections between these two research areas.[4] Our focus on firm-level implications of credit constraints complements the cross-country studies of Rajan and Zingales (1998) and Alfaro et al. (2004), which find that more developed financial markets act as a catalyst for the growth of industries that rely more on external finance and also boost the effect that foreign direct investment has on economic growth.

At a more disaggregated level, this paper is similar to Javorcik and Spatareanu (2009) and Du and Girma (2007), who find evidence that local firms' financial health affects their response to foreign activity across a wide range of outcomes. Javorcik and Spatareanu (2009) show that Czech firms that are less affected by liquidity constraints are more likely to self-select into becoming multinationals' suppliers. Du and Girma (2007) find that export-oriented FDI increases the likelihood of exporting for privately-owned Chinese firms, particularly those with access to bank credit, whereas domestic market-oriented FDI has a negative effect on the probability that these firms start to export. The paper most closely related to ours is Villegas-Sanchez (2009), which finds that large firms located in more financially developed regions in Mexico enjoy greater productivity spillovers from FDI. In contrast to her results, we do not find evidence that the way in which credit constraints affect domestic firms' ability to appropriate spillovers from foreign activity differs across the size distribution of firms.

Unlike the papers described above, all of which rely on firm-level financial indicators, we use the industry-level index of external finance dependence developed by Rajan and Zingales (1998) to identify credit constraints. The use of a 'frontier technology' measure, which reflects the outcome of efficient market conditions, has the attraction of being exogenously determined (i.e. unaffected by local decisions) which helps us in overcoming the endogeneity problem that might arise at the moment of identifying firms facing credit constraints.

The rest of the paper is organised as follows: Section 2 summarises the theoretical underpinnings for the existence of spillovers arising from the activity of foreign firms; Sections 3 and 4 describe our data and empirical methodology respectively; Our main results and robustness checks are presented in Section 5; Section 6 concludes.

## 2. Spillovers from foreign firms

Two central features that characterise ideas, defined in a very broad sense, are their non-rival nature and the fact that they are only imperfectly excludable.[5] These two characteristics imply that some of the benefits arising from the development of new ideas

[3] The elasticity of real value-added with respect to foreign activity is statistically significant and of similar magnitude to what previous studies have found (see Jordaan, 2005; Haskel et al., 2007; Abraham et al., 2010).

[4] The link between foreign direct investment and foreign firm activity on host country outcomes such as productivity, employment and industrial structure is summarised by Navaretti and Venables (2006) and Levine (2005) reviews the extensive body of work studying the link between finance and growth.

[5] This broad definition of ideas includes, but is not limited to, blueprints of new goods, innovations to production processes that reduce production costs, industry-specific 'trade secrets' such as lists of suppliers and clients, prices and terms of delivery and intangible managerial practices, e.g. the use of performance reviews and incentive schemes to motivate employees.

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