

From central planning towards a market economy: The role of ownership and competition in Vietnamese firms' productivity

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Abstract

This paper examines the role of ownership and market competition in Vietnamese firms' total factor productivity (TFP) from 2001 to 2011. Making use of a large panel dataset of manufacturing firms, we find that, on average, both foreign-owned enterprises (FOEs) and state-owned enterprises (SOEs) have performed better than privately owned enterprises (POEs) in terms of their TFP levels. However, while FOEs' TFP ranked the highest in the period 2001–2006, SOEs “closed the gap” in the period 2007–2011. Moreover, we find that market competition has been effective in enhancing average firm productivity and in reducing the gaps in efficiency across ownership types. SOEs' remarkable performance may be linked to several concurrent factors experienced during the period 2001–2011, namely, the process of restructuring the state sector during the 2000s, the increased economic integration due to the country's accession to the World Trade Organisation (2007) and, finally, the preferential access to financial capital and land granted to SOEs. While some evidence supports SOEs' equitization as an explanation for their remarkable productivity performance, WTO accession and cheaper access to inputs do not fully explain it.

Keywords: Ownership, market competition, TFP, Vietnamese manufacturing, transition economies

JEL classification: D24, L33, O53, N60, P27

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1. Introduction

Vietnam has achieved tremendous economic growth since the 1986 launch of the *doi moi* (“renovation”) programme, which set the country on a path to gradually turning away from central planning in order to transit towards a market economy (Pincus, 2016). In the period 1986–2010, the year-on-year growth rate of Vietnam’s gross domestic product (GDP) was, on average, around 7% (see Vo and Nguyen, 2007; Minh and Long, 2008; World Bank, 2011; Malesky and London, 2014; among others).

The *doi moi* policy is based on three main pillars (Pincus, 2016). The first pillar aims to achieve the mobilization of underutilized land and labour in the production of goods. Indeed, agriculture and labour-intensive manufacturing — conducted by small firms and household enterprises — have spurred Vietnamese growth during this period. Since the 1990s, the state has withdrawn from its former omnipresence in the economy; however, it has maintained strategic control over several industries (see Vu Thanh, 2014) via state-owned enterprises (SOEs), which constitutes the second pillar.¹ Finally, the third pillar aims at integrating the Vietnamese economy into the world market by fostering exports and through reduced import tariffs (Vietnam’s accession to the WTO occurred in 2007) and by expanding the scope of incoming foreign investment (World Bank, 2011).

Vietnam’s recent development has puzzled scholars for several reasons, making explaining the country’s success less than clear-cut. As for its institutions, the country’s political system is a communist, single-party regime, where participation in political decisions is limited to a few people (Malesky and London, 2014); the judicial and regulatory institutions are still not fully developed (Pincus, 2016); and the effectiveness of competition law and regulation authorities have been questioned, at least up to the second half of the 2000s (Vo and Nguyen, 2007).² As for the economy, the expansion of the private sector has gone hand in hand with the state-led development policy intended to consolidate several SOEs into “the main engine of the economy” (Malesky and

¹ Pincus (2016) lists these industries. By looking at the share of SOEs in the firms in our database (Table A.2 in the online Appendix), we observe that SOEs were relevant in 2001 in the following manufacturing sectors: tobacco products, printing, pharmaceuticals, other machinery and other transport equipment. The state held fewer but still significant shares in beverages, textiles, clothing apparel, leather processing, refined petroleum, chemicals, non-metallic minerals, computers and electronics and motor vehicles, among others. A quick look at the figures for 2011 shows that in the 2000s, SOEs were decreasing in number in most of these industries. Ngoc and Ramstetter (2004) confirm these figures.

² At the end of 2004, the Law on Competition was passed. However, Vietnamese competition authorities, i.e. the Competition Administration Department and the Competition Council, were still rather weak in the second half of the 2000s, both in terms of financial resources and independent legal status (Vo and Nguyen, 2007).

London, 2014).³ Moreover, the growth model followed by Vietnam since the mid-1980s has been based more on the accumulation of resources than on the growth of productivity (labour and capital accumulation accounts for around 80% of GDP growth during this period).⁴

Even if the less than impressive productivity figures, together with low wages, widespread underemployment and the relevance of the agricultural sector,⁵ may suggest that the *doi moi* model has not yet been fully exploited (see Malesky and London, 2014; Pincus, 2016), in the long run, Vietnam's growth will only be maintained through sound productivity dynamics. Given this, it is timely to enquire into the determinants of productivity in Vietnam.

Several features of the *doi moi* programme may have had an effect on Vietnamese firms' productivity. First, is the recognition and promotion of private domestic and foreign entrepreneurship. Since the early 1990s, but mostly after 2000, several changes in the legal environment (see Section 2) incentivized the establishment of many privately owned enterprises (POEs) and the entry of foreign-owned enterprises (FOEs) and applied a single unified legal framework to all firms. Second, during the same period, the equitization of several SOEs and changes in their governance took place (World Bank, 2011), together with state-led development policies aimed at establishing a few large state-owned groups able to exploit internal linkages and economies of scale and scope (Vu Thanh, 2014; Pincus, 2016). Third, the number of firms active in Vietnam, and therefore, market competition, has increased precisely because of these legal changes. Fourth, the accession of Vietnam to the World Trade Organisation (WTO) in 2007 has further enhanced market competition, both by boosting the exporting activities of Vietnamese firms and by reducing tariffs for foreign competitors (Vo and Nguyen, 2007; Baccini et al., 2019).

Despite the debate over Vietnamese firms' performance gaining momentum in the last 15 years thanks to the increasing availability of firm-level data (see Ngoc and Ramstetter, 2004; Nguyen and Le, 2005; Ha and Kiyota, 2014; Nguyen, 2017, among others), general evidence on the role of ownership and market competition in productivity remains sparse and inconclusive (Ramstetter and Ngoc, 2013; Huang and Yang, 2016; Baccini et al., 2019). This is unfortunate because at this

³ In terms of GDP, the private sector output consistently represented about 60% of the economy in 1995, 2005 and 2010 (Vo and Nguyen, 2007; Malesky and London, 2014).

⁴ For example, Nguyen (2004) calculated the total factor productivity (TFP) growth rate to be around 1.5% (on average) in the period 1985–2004 (with respect to an average GDP growth rate of 6.7%); in line with this result, Minh and Long (2008) have found that TFP growth contributed about 19.7% to the country's GDP growth during the period 1985–2006.

⁵ In 2012, almost 50% of Vietnamese total employment was in the primary sector (Pincus, 2016).

stage of Vietnam's development it is necessary to deepen our knowledge in terms of these two major determinants of firm productivity.

In this paper, we take advantage of a large panel dataset of Vietnamese manufacturing firms observed over an entire decade (from 2001 to 2011) to empirically assess the role of ownership and competition in firm productivity. The focus on manufacturing allows us to analyse the relative performance of different ownership types in sectors characterized by relatively low levels of regulation that are exposed to international competition.

This yields two main results. We find that once controlled for a large set of firm, industry and province characteristics, both FOEs and SOEs show, on average, higher total factor productivity (TFP) levels than POEs during the period 2001–2011. Moreover, SOEs, while lagging behind FOEs in the first sub-period (2001–2006), “closed the gap” with foreign-invested firms in the period 2007–2011. As a second result, we find that market competition has enhanced average firm productivity and reduced gaps in productivity across firms of different ownership types (*viz.*, FOEs, SOEs and POEs), providing some evidence of the role that competition has played in Vietnam's recent transition path (Vo and Nguyen, 2007; Pincus, 2016). The results are robust to Heckman's two-stage procedure to control for the possible selection (non-randomness) of businesses kept in the hands of the state.

The good performance of SOEs in the period under analysis may certainly be explained by multiple causes, and we discuss them at length in Section 5.2. First, several internal reforms may have operated in the direction of a superior average performance of SOEs with respect to POEs. Smaller and less efficient SOEs were forced to dissolve or merge with other units in the 1990s (World Bank, 2005), while a large share of SOEs still extant at the beginning of the 2000s were equitized a few years later (Vo and Nguyen, 2007; World Bank, 2011). Second, the New Enterprise Law enacted in 2000 favoured a boom in the number of POEs, with many young private businesses entering the market. These were, on average, characterized by a lack of commercial experience (Pincus, 2016) and the adoption of simple technologies (Nguyen and Le, 2005; Ramstetter and Ngoc, 2013), which may have mapped onto a lower average productivity level of POEs in comparison with SOEs. Third, Vietnam's joining the WTO in 2007 may have strengthened the process of restructuring and the reallocation of market shares and the selection of SOEs via both exporting activities (by favouring the expansion of the most productive firms) and import competition (by forcing the least productive firms to shrink or even exit the market). Finally, we

discuss the possibility that this result may have also stemmed from the easier access to factors of production (i.e. financial capital and land) granted to SOEs in the period under analysis.

Overall, while we find some evidence to show that the equitization process increased the efficiency in the governance of SOEs, neither the “liability of privateness”, due to the lack of commercial and technical capabilities, nor a larger effect of trade and economic integration for SOEs, with respect to POEs and FOEs, find strong support. Furthermore, we cannot exclude the possibility that part of the remarkable productivity performance shown by SOEs is linked to the favourable conditions granted to these firms in accessing land and financial capital.

This study contributes to the literature on Vietnam’s growth path and its determinants (see Minh and Long, 2008; Malesky and London, 2014; Pincus, 2016; among others) by providing a comprehensive overview of TFP in Vietnamese manufacturing during the period 2001–2011, when relevant institutional and economic changes took place. In addition, this work contributes to the empirical literature on the joint role of private ownership and market competition in firms’ productivity. Indeed, the two have long been considered by both scholars and policy makers as the major forces behind effective transitions from central planning to market economies.⁶ Finally, our paper relates to the literature on the role and evolution of state ownership in transition countries (see Hsieh and Song, 2016; Lazzarini and Musacchio, 2018; Baccini et al., 2019, among others).

The rest of this paper is organized as follows. Section 2 describes some of the major institutional reforms that have occurred in Vietnam in the last three decades. Section 3 defines the framework of analysis and the research hypotheses. Section 4 describes the data. Section 5 presents the econometric results, and finally, Section 6 discusses these results, offering a comparative perspective with regard to other countries’ experiences, and then it concludes the paper.

⁶ As underlined by Estrin et al. (2009), “The so-called Washington Consensus emphasized [...] that private ownership together with market forces would ensure efficient economic performance”. For an assessment of the impact of these two factors on Chinese firms’ efficiency, see Zhang and Zhang (2001); for an analysis of manufacturing establishments in Indonesia, see Bartel and Harrison (2005); for an enquiry into Romanian firms, see Asaftei et al. (2008); and for some evidence regarding Central and Eastern European countries, see Driffield et al. (2013).

2. Reform in the 1990s and 2000s: The rise of private firms, state-led development policies and the opening of Vietnam

Vietnam's "renovation" programme, launched in 1986, rested on three main pillars (Pincus, 2016): the promotion of private business initiatives, the implementation of policies aimed at targeting industries and firms with a "pivotal role" for the entire economy and, finally, an increased openness and integration of the country's economy in terms of trade and investment.

2.1 The role of the private sector

The first ingredient in the recipe for economic reform promoted through the *doi moi* plan was the increased liberalization of private economic initiatives — first in agriculture and later in the other sectors of the economy — which was strengthened by the formal acknowledgement of private ownership in the (third) Vietnamese Constitution of 1992 and later detailed in the Civil Code of 1995. This institutional change that furnished guarantees against nationalization encouraged foreign investment and allowed POEs entry into the market (Vo and Nguyen, 2007).

In parallel with this process, the government started to adopt an "open door" policy to attract foreign direct investment (FDI; the first law on foreign investment dates back to 1987). However, the relevance of both POEs and FOEs has increased since 2000. Indeed, the New Enterprise Law (enacted in 2000) simplified procedures and reduced obstacles to market entry for enterprises. It ensured that the state's behaviour was more transparent with respect to private firms and eliminated several burdensome business licences (Vo and Nguyen, 2007). Since the law has been in effect, the number of POEs in Vietnam has sharply increased, as Figure 2 shows. At the end of 2004, the first Law on Competition was approved and applied to all businesses. Around 2005, two further reforms were enacted. First, the (common) Law on Investment granted a single unified legal framework to all investors, whether Vietnamese or foreign. State intervention has been reduced while ensuring favourable conditions and protection for the capital invested, regardless of whether its origins are domestic or foreign (Vo and Nguyen, 2007). Therefore, the inflow of FDI increased significantly in the period 2005–2008 (World Bank, 2011).

Second, the Unified Enterprise Law came into effect in 2006 with the aim of further simplifying market entry for private enterprises. The law harmonized the legal rules for POEs, SOEs and FOEs by abolishing constraints on the maximum ownership share for foreigners and establishing a legal setting for the development of industrial groups. It harmonized the rules of governance to meet

international standards. In particular, areas of reform touched by the law included improvements in the transparency of business operations, the protection of minority shareholders' interests and the regulation of managers' activities (Vo and Nguyen, 2007). By reducing the administrative barriers to entry, all these laws prompted the establishment of new private businesses to develop in the country, which in turn fostered competition.

2.2 State-owned enterprise policies

The second ingredient in the transition process was the role assigned by the government to both SOEs and the sectors in which they were most relevant as tools to maintain “the commanding heights of the economy” (World Bank, 2011; Malesky and London, 2014; Pincus, 2016). A comprehensive process of modernizing SOEs began in the early 1990s. Many non-strategic enterprises were liquidated to the private sector in those years and several others — badly managed and running losses — were dissolved, all resulting in a 50% reduction in the number of SOEs from 1990 to 1994 (from about 12000 to about 6300) (Vo and Nguyen, 2007). At the same time, both government subsidies and cheap credit for SOEs were reduced (World Bank, 2011).

In 1995, the Law on State-Owned Enterprises made SOEs independent legal entities so that they could autonomously engage in transactions in the market with other companies. Moreover, SOE managers were given stronger decision-making powers to hire and fire employees (World Bank, 2005). However, this process later slowed down and then restarted in 2000 with the largest proportion of restructuring episodes taking place via equitization. Indeed, slightly less than half of the SOEs still extant in 2001 (about 5300) were equitized in the first five years of the 2000s. The Unified Enterprise Law of 2005 established that all SOEs should operate in the form of limited liability companies or joint stock companies to ensure a modern governance system.⁷ An interesting survey reported by the World Bank (2005) confirms that after equitization, the economic and financial performance of these companies improved and their managers became more sensitive to sound performance. Some SOEs have been also listed (Pincus, 2016) on the stock market. This may force them to follow stringent accounting principles and report their financial

⁷ When the state holds partial ownership, SOEs are organized as joint stock companies (JSCs). These companies could be listed or non-listed and they can be considered as “privatized” if the state holds a minority share. JSCs have four governing bodies, i.e. shareholders' meeting, board of management (or board of directors), a CEO and an internal auditing committee. Otherwise, SOEs are organized as limited liability companies (LLCs). These companies have three governing bodies: the member's council with a chairperson (with a similar role as the board of directors and the chair of the board), a CEO and an internal auditing member (or committee, depending on the company's scale).

statements like private firms do (Lazzarini and Musacchio, 2018), thus strengthening the market discipline for such companies.

Notwithstanding the changes brought about by these policies, in the face of three consecutive crises (in 2007, 2009 and 2011, respectively) and the exposure to tougher international competition imposed by the accession to the WTO (see Section 2.3), the Vietnamese government massively intervenes in the state industrial sector in order to preserve “the commanding heights of the economy”. A process of consolidation of several big SOEs and general corporations⁸ into holding–subsidiary companies and state economic groups (SEGs) has taken place, especially since 2005 (their numbers grew from 3 in 2005 to 13 in 2011). The aim has been to exploit internal linkages and achieve economies of scale and scope (Vu Thanh, 2014), but also to ensure macroeconomic adjustment and perform social functions (World Bank, 2011). Most SEGs have been active in natural resource exploitation and non-tradable industries.

The relative performance of SOEs versus private firms depends, among other things, on which of the two forces (restructuring via equitization versus consolidation and industry concentration) have played a stronger role in determining Vietnam’s transition path.

2.3 Trade liberalization and economic integration

The process of integrating the Vietnamese economy into the world market has been gradual since the launch of *doi moi*. Indeed, while the state held a monopoly on trade before 1989 (Vo and Nguyen, 2007), entry into trading activities was later relaxed. Since 1991, export-oriented firms were no longer required to pay trade taxes on their imported inputs (World Bank, 2005). Vietnam signed a trade agreement with the European Union in 1992, it joined the free trade area of the Association of Southeast Asian Nations (ASEAN) in 1995 and it established a bilateral trade agreement with the United States in 2001. In 1998, trade licences were abolished and since then all domestic enterprises have been allowed to trade freely in most commodities, with few exceptions.

Accession to the WTO in 2007 further prompted market liberalization (Vu Thanh, 2014). Indeed, Vietnam had to adjust its legal framework to suit the underlying values of the WTO such as free trade (i.e. via a reduction of tariff and non-tariff barriers), fair competition (i.e. via a promise

⁸ General corporations were established in the mid-1990s by several decisions made by the prime minister of Vietnam. The aim was to provide state-owned businesses with more management autonomy and better incentives to pursue profitability (World Bank, 2011).

to eliminate prohibited subsidies to SOEs and foster competition in domestic financial markets) and non-discrimination of domestic versus foreign companies (through the “national treatment” principle).⁹

It is well known that episodes of trade liberalization may have an effect on aggregate productivity via different channels (for a review of the empirical evidence on firm heterogeneity in international trade, see Bernard et al., 2012, among others). Due to tariff reductions and incoming competition from abroad, low-productivity firms exit the market while modestly productive firms that only sell at home shrink; conversely, high-productivity exporters experience increased revenue through greater export sales, and the most productive non-exporters find it profitable (due to lower trade costs) to enter the export market, thus increasing the share of exporting firms.

All these channels raise aggregate productivity through a change in industry composition. These channels may work differently across ownership types depending both on the degree of POEs’, SOEs’ and FOEs’ exposure to international competition and the mechanism of internal protection, thus the impacts of these channels on firm productivity differ depending on the type of firm ownership.

3. Framework of analysis and hypotheses

The framework of analysis draws on that of Park et al. (2006) and is based on the three main forces that reshaped the economic landscape of Vietnam throughout the 2000s, i.e. the recognition and protection of private property rights, state-owned enterprise policies and the enhanced openness of the country’s economy.

[Insert Figure 1 about here]

The promotion of private business initiatives in Vietnam may have had a direct impact on firm productivity via an ownership (*per se*) effect. Megginson and Netter (2001) and Estrin et al. (2009) review the advantages that private ownership offers to firms. Indeed, it reduces managerial discretion via better incentives (Morck et al., 1989), clearer monitoring chains (Driffield et al., 2013) and by exposing firms to the market for corporate control (Shleifer and Vishny, 1997).

⁹ Following this principle, the government cannot use certain “levers” (e.g. taxes and regulation) to protect domestic businesses from the competition exerted by foreign ones (Vu Thanh, 2014).

Furthermore, the state, as a firm's owner, may impose targets other than profit maximization (Estrin and Perotin, 1991; Shleifer and Vishny, 1994; Bai and Xu, 2005; Boubakri et al., 2008), such as protecting employment and wages, promoting regional development and providing specific underpriced goods and services. Finally, poorly performing SOEs may be granted easier access to financial resources (i.e. a "soft budget constraint") than their private counterparts (Brandt and Li, 2003; Kornai et al., 2003). All these factors may positively affect privately owned firms' efficiency with respect to that of their state-owned counterparts.

As a countervailing force (see Section 2.2), state-owned enterprise policies in the 2000s had the aim of strengthening SOEs along two main lines. First, the equitization process that involved a large share of SOEs in the first years of the 2000s had the aim of providing them with a more modern governance structure by not necessarily selling the majority or totality of their equity to private investors. Equitization is a way of restructuring an SOE's governance system by establishing rules on the formation of the board and monitoring bodies, by rebalancing the power of the state in selecting managers through the entry of private stock owners and (possibly) by better linking enterprise performance with the evaluation and remuneration of managers (Aivazian et al., 2005; Gupta, 2005). In principle, the managers of such companies should have been incentivized to foster efficiency and profitability (Zhang, 1997).

Second, there was a consolidation of several large companies owned by the state into groups (SEGs) where economies of scale and scope and internal linkages may have been better exploited. Several scholars are sceptical of the role of SOEs in Vietnam's development (Malesky and London, 2014; Pincus, 2016; Baccini et al., 2019), pointing out that these large and powerful enterprises may use their positions to neutralize trade and competition (Vu Thanh, 2014), both by exploiting cheaper access to land and financial capital (Vo and Nguyen, 2007) and by exerting market power, being active in more concentrated industries and gauging easier market access (Baccini et al., 2019).¹⁰

Overall, in the period 2001–2011, the co-occurrence of the liberalization of property rights and state-owned enterprise policies may have had uneven effects on the efficiency of firms characterized by different ownership types. On the one hand, a strengthened protection of private

¹⁰ Apart from the effect of state-owned enterprise policies, some authors have suggested that non-private ownership may be advantageous in the context of transition economies (such as China and Vietnam), where market transactions can be blocked due to government regulations (Li, 1996) and property rights are insecure (Che and Qian, 1998).

ownership may have granted POEs an advantage; on the other hand, SOEs may have improved (or not) their efficiency thanks to the government's actions. Thus, we propose a pair of contradicting hypotheses, allowing the empirical analysis to reveal which one is supported by the evidence:

***H1a.** POEs outperform SOEs in terms of TFP levels.*

***H1b.** SOEs outperform POEs in terms of TFP levels.*

Theoretical works have established foreign firms' advantages over domestic firms (Markusen, 1991; Dunning, 1993; Caves, 1996) in terms of firm-specific, knowledge-based and intangible assets that ensure FOEs' superior management practices and technological know-how. Indeed, several empirical papers have proved that FOEs are more productive than domestic firms (Griffith, 1999; Harris and Robinson, 2002; Takii, 2004; Benfratello and Sembenelli, 2006). Consequently, we expect FOEs to be more productive than both POEs and SOEs:

***H2.** FOEs outperform domestic enterprises (POEs and SOEs) in terms of TFP levels.*

Apart from the ownership effect, several internal reforms in the 2000s (see Section 2.1) gave rise to an increase of the number of POEs and FOEs across industries in Vietnam. More competitors in an industry may be related to higher productivity in several ways. First, in a more competitive industry, there may be more incentives for incumbent firms to reduce their costs (Backus, 2014). Indeed, more competitors allows the owner of a firm (principal) to better compare the performance of its manager (agent) to those managers of other firms in the same industry (Holmström, 1982). Moreover, the generation of a business-stealing effect creates the necessity to invest in cost reduction due to increased substitutability (Raith, 2003). Second, in a more competitive industry, a higher level of productivity is needed in order to successfully enter it and survive (Hopenhayn, 1992; Pieri and Zaninotto, 2013; Esteve-Pérez et al. 2018). This selection effect links tougher competition to higher productivity in an industry with a higher cut of the lower tail of the productivity distribution. Third, higher competition may induce incumbents to innovate. As a result of the increase in the number of firms, we expect that firms that are active in more competitive industries will be more efficient:

***H3.** In industries characterized by a higher degree of market competition, the productivity of the "average" firm is higher.*

Through exposure to fiercer competition, less efficient firms — regardless of their ownership type — will be forced to exit the market. Eventual sub-optimal choices linked to targets other than

profit maximization and specific types of ownership (Boubakri et al., 2008) should disappear (or at least be reduced) with the increase in the number of firms active in an industry. Consequently, a convergence in productivity by all firms belonging to the same industry is expected the higher the level of competition in the industry (Hopenhayn, 1992). We thus expect market competition to reduce gaps in productivity across ownership types:

H4. In industries characterized by a higher degree of market competition, the gaps in productivity across different ownership types is lower.

Admittedly, Vietnam's accession to the WTO in 2007 may have further bolstered managerial efforts to enhance firms' efficiency due to fiercer competition incoming from abroad. For this reason, it is interesting to explore how ownership and competition have worked both over the entire decade of the 2000s and before and after the country's accession to the WTO.

4. Data and descriptive analysis

4.1 Data

Since 2000, the General Statistics Office (GSO) has conducted the annual Survey on Vietnamese Enterprises (VES) that has essentially covered all Vietnamese firms operating in all economic sectors (census).¹¹ The VES survey is rich in terms of the demographic and balance sheet information it provides on firms, and these data have been used in a number of scientific papers (among others, see Ramstetter and Ngoc, 2013; Ha and Kiyota, 2014; Huang and Yang, 2016; Newman et al., 2017; Nguyen, 2017; Baccini et al., 2019).

Each firm in the VES is classified as belonging to an industry following the Vietnamese Standard Industrial Classification System (VSIC).¹² A time-invariant (modal) industry code is assigned to each firm. In order to clean the data and get the final sample, we take the following steps. We select manufacturing firms; we exclude duplicates, inactive enterprises and enterprises

¹¹ The VES surveys all SOEs and FOEs, no matter their size. As the population of private domestic enterprises has grown, since 2003, the GSO has surveyed all registered firms with more than 10 employees (increased to 20 employees in 2008) but surveyed only a selected representative sample of firms with fewer than 10 employees (20 employees from 2008 onwards). However, the GSO still includes a sample of micro-private firms in order to calculate annual summary statistical figures for administrative and regulatory purposes. The VES does not cover firms operating in the informal sector (Malesky and Taussing, 2009).

¹² In order to build our analysis on the longest time series feasible, we had to develop a probabilistic method to adjust the industrial classification before 2006 (VSIC 93) to the new industrial classification (VSIC 07). This has allowed us to exploit a longer panel of data than those employed in previous studies using the same survey. Section A.1 in the online Appendix furnishes additional details about the procedure.

with no tax code or missing values on key information; we exclude observations with illogical figures such as negative values on sales, total assets, total wages and material input costs; and only observations with a leverage ratio (total debts over total assets) of between 0 and 100 are maintained in the database. Thus, our final sample is an unbalanced panel of Vietnamese manufacturing firms and comprises 282,764 firm-year observations from 2001 to 2011.¹³ It essentially covers about 88.23% of the total population of manufacturing firms in Vietnam.

As for the information regarding ownership, each year, all Vietnamese enterprises are classified into 14 ownership types. We regroup these 14 types into three mutually exclusive categories: SOEs, POEs and FOEs. For the time being, we adopt the following definition: SOEs are firms with more than 50% state participation in equity. POEs are firms with either entirely private ownership or with state ownership that is less than or equal to 50%. FOEs comprise both wholly owned foreign subsidiaries and joint ventures established between foreign and local partners in Vietnam.¹⁴ Firms can shift from one category to another on a year-on-year basis.

As shown in Figure 2, there has been remarkable growth in the population of POEs in Vietnamese manufacturing since 2001. Meanwhile, the number of FOEs has increased fourfold, from 1096 firms in 2001 to 4595 firms in 2011, while the number of SOEs has halved from 1231 firms in 2001 to 622 firms in 2011.

[Insert Figure 2 about here]

4.2 Variables and descriptive analysis

4.2.1 Productivity

We employ firm TFP (in natural logarithm, tfp) as the dependent variable in the econometric model obtained by using the IV–GMM-modified Levinsohn–Petrin estimator (Levinsohn and Petrin, 2003) developed by Wooldridge (2009).¹⁵ Output in the production function is proxied by real

¹³ As entry (exit) is defined as appearance (disappearance) from the dataset, and entry (exit) rate is used as a regressor, the first (2000) and the last years (2012) of the panel are not usable.

¹⁴ Our classification (see Table A.1 in the online Appendix) is in line with those employed by Asafei et al. (2008) and Huang and Yang (2016). In Section 5.2.1, we also adopt a more refined taxonomy to enquire into the role of equitization levels in firm performance.

¹⁵ The estimation of firms' TFP is discussed at length in Section A.4 in the online Appendix. In order to prove that our main results are robust to a different definition of the dependent variable, we have also re-run the regressions by using labor productivity (value added per employee) as the dependent variable. This measure should be less sensitive to the omitted price bias in the inputs (see Section 5.3.2 and Tables A.3.3 and A.3.4 in the online Appendix).

value added, which is calculated using the addition method; specifically, it equals the sum of total wage, depreciation,¹⁶ operating profit before tax and indirect taxes. Capital input is proxied by the value of fixed assets in real terms, while labour is measured by the total number of employees — both at the end of the year. Material input is calculated by subtracting value added from deflated sales.¹⁷

4.2.2 Ownership and market competition

Two out of three mutually exclusive dummies for firm ownership (the omitted/comparison category is the dummy referring to POEs) are included in the empirical model to capture the differences in productivity levels across ownership types. We use two variables to measure the toughness of market competition in the 4-digit industry to which a firm belongs. First, the Herfindahl–Hirschman index (HHI) is included, which equals the sum of squares of market shares (in terms of sales) of all firms in the 4-digit industry. The higher the HHI, the more concentrated, and therefore less competitive, the industry. Second, the annual entry rate at the 4-digit level is included, which captures the threat from entrants. In order to test for the effect of competition in reducing the gaps in productivity across firms with different forms of ownership, we also include the interactions between ownership and competition by multiplying each dummy (SOEs and FOEs) with each proxy for market competition. Finally, in Section 5.2.3, in order to check for the role of increased international competition (especially after 2007) in productivity and its likely different role across ownership types, we have also built a measure of the tariff cuts applied to each 4-digit VSIC 07 industry.¹⁸ Most Favoured Nation (MFN) tariff cuts ($\Delta Tariff_{jt}$) in the j^{th} 4-digit VSIC industry in year t is defined as the difference between the tariff level in year $t-1$ and the tariff level in year t , $Tariff_{jt-1} - Tariff_{jt}$. A positive value of $\Delta Tariff_{jt}$ points to a tariff cut applied in that industry in year t .

¹⁶ Since the VES does not offer information about depreciation, by following Ha and Kiyota (2014), we approximate depreciation by the difference in accumulated depreciation between the end of the year and the beginning of the year.

¹⁷ We use different deflators to convert nominal values into real values (base year: 2010). Value added is deflated by using the producer price indexes (PPI) of each 2-digit industry (source: www.gso.gov.vn), while capital is deflated by using the gross fixed capital formation deflators (source: World Bank’s World Development Indicator). Finally, annual GDP deflators taken from the World Bank’s World Development Indicator are used to deflate material inputs. Real values in Vietnamese dong (VND) are then converted into US dollars (USD) using the official annual exchange rate in 2010: 18612.92 VND/USD.

¹⁸ See Appendix A.5 for details on building this measure.

4.2.3 Control variables

In order to minimize the risk of getting biased coefficients referring to ownership and market competition due to omitted variables, we extend the empirical model and include a vector of controls at the firm, industry and province levels.

Relying on the previous literature on the determinants of productivity at the firm level, we include, as controls, measures of firm age (see, among others, Jovanovic, 1982; Ericson and Pakes, 1995), firm size (Garicano et al., 2016) and firm export status¹⁹ (see, among others, Bernard and Jensen, 1999; Roberts and Tybout, 1997; Melitz, 2003). Firm leverage ratio (debt over total assets) is also included as a first attempt to control for the fact that SOEs might have benefited from “softer budget constraints” than their private counterparts in the period 2001–2011 (Kornai et al., 2003; Brandt and Li, 2003).

Industry and province heterogeneity have been also controlled for. Specifically, we include the exit rate of the 4-digit industry to which the firm belongs. Indeed, together with the entry rate, this variable captures the overall dynamism characterizing the industry in which the firm is active (Geroski, 1995; Bartelsman et al., 2005). Moreover, the annual provincial GDP growth rate is inserted into our empirical model in order to control for demand shocks and phases of the economic cycle that may have affected Vietnamese provinces²⁰ (in which the firms are located) in asymmetric ways. We have further included a vector (4-digit) industry and province dummies to account for unobserved and time-invariant factors affecting all firms belonging to the same industry and province in the same way. Finally, a vector of year dummies has been included to control for common shocks to productivity that may have affected all firms in each particular year.

[Insert Table 1 about here]

¹⁹ Firm export status is an indicator of whether a firm undertakes export activities in a specific year. For a few years, the VES did not survey this information, so we impute the information using the procedure suggested by Newman et al. (2017) in their article investigating the export–productivity nexus of VES firms. Specifically, a firm is identified as an exporting firm if the firm either (i) pays export tax or (ii) exports in both the previous year and the subsequent year.

²⁰ Since provincial boundaries were redrawn during the period and three new provinces were created during the period 2000–2003, starting from 2004 onwards, GSO has applied a new system of codes (referring to 64 provinces) that is different from the one used before (with 61 provinces). Following Santarelli and Tran (2012), we develop a harmonized province code (of 61 provinces) based on the old classification. We also follow Malesky et al. (2015) in treating Ha Tay and Hanoi provinces as separate.

4.2.4 Descriptive analysis

Table 1 defines all the variables employed and displays some general figures about the sample of firms considered. Huge heterogeneity is observable in Vietnamese manufacturing in the period 2001–2011: firms in the 75th percentile of the TFP distribution are about three times more productive than firms in the 25th percentile ($tfp^{75} - tfp^{25} = 1.12$). In terms of ownership, about 3% of observations are SOEs and about 11% are FOEs, with POEs representing more than 85% of the entire sample. The average HHI amounts to 0.06, pointing to an unconcentrated industry (US Department of Justice and Federal Trade Commission, 2010), but showing a rather skewed distribution. Entry rates are on average higher than exit rates, reflecting a period of heavy entry by private businesses. Heterogeneity in terms of size and age is remarkable: firms at the 75th percentile of the size (age) distribution are about eight (four to five) times bigger (older) than firms at the 25th percentile. Moreover, the relatively low median age (about 4 years) in the sample assures the effectiveness of the VES database in tracking the large number of young firms that entered the market in the period 2001–2011.²¹ The average debt-to-asset ratio is about 0.45, while 10% of observations in the sample correspond to yearly exporters. The annual provincial GDP growth rate has been, on average, around 12%, confirming the rapid expansion experienced by the Vietnamese economy in the 2000s (World Bank, 2011). The average MFN tariff cut amounts to 1.43 percentage points, and the percentiles of its distribution show a generalized reduction in tariffs across all industries in this period in Vietnam, which is consistent with the country's WTO accession in 2007.²²

Table 2 presents the basic characteristics of the firms in our sample by ownership type. In general, SOEs are about four times older than both POEs and FOEs. SOEs and FOEs are more comparable in terms of employment, and they are typically large firms, whereas POEs are more often small firms. From 2001 to 2011, the capital–labour ratio (expressed in terms of thousands USD per employee) of SOEs increased more than threefold (from 5.0 to 17.2); POEs only marginally increased their capital–labour ratio, while FOEs decreased it. This evidence is in line with the process of capital accumulation undertaken by SOEs since 2005 (see Vu Thanh, 2014), possibly boosted by the credit stimulus and easier access to capital granted by the government,

²¹ The reader is cross-referred to Coad (2018) for an analysis of the age distribution of firms.

²² See Appendix A.5 for the calculation of the measure of MFN tariff cuts.

especially to this group of firms, as a reaction to the 2008–2009 US mortgage loans crisis (Pincus, 2016).

Keeping in mind that from Table 2 we can only appreciate the unconditional (to other factors) differences in average productivity across ownership types, some interesting preliminary results emerge. During the period 2001–2011, the productivity level of SOEs is rather comparable to that of FOEs, whereas the productivity of POEs is far below that of the other two groups (in line with the results shown by Nguyen and Le, 2005; Ramstetter and Ngoc, 2013; Huang and Yang, 2016). Given that firms with different ownership types may also be different in other dimensions, we conduct a multivariate analysis in the next section, estimating regressions of firm *tfp* on ownership and market competition, controlling for a large vector of firm, industry and province characteristics.

[Insert Table 2 about here]

5. Econometric results

5.1. Baseline results

We estimate variants of the following model by ordinary least squares (OLS):

$$tfp_{ijpt} = \alpha + \beta' OWNERSHIP_{ijpt} + \gamma' COMPETITION_{jt} + \delta'(OWNERSHIP_{ijpt} * COMPETITION_{jt}) + \varphi' X_{ijpt} + \theta' V_{jt} + \vartheta' Z_{pt} + \mu_j + \rho_p + \tau_t + \varepsilon_{ijpt}, \quad (1)$$

where tfp_{ijpt} is a natural logarithm of the total factor productivity of the i^{th} firm, belonging to the j^{th} industry and located in the p^{th} province in year t ; $OWNERSHIP_{ijpt}$ stands for the types of ownership that characterize the i^{th} firm in year t ($OWNERSHIP = \{POE, SOE, FOE\}$); $COMPETITION_{jt}$ stands for the degree of market competition characterizing the j^{th} (4-digit) industry in year t and proxied by both the Herfindahl–Hirschman index and the entry rate ($COMPETITION = \{HHI, Entry Rate\}$); and coefficients δ' capture the interaction effects. We extend our baseline model by including a vector of firm-level (X_{ijpt}), industry-level (V_{jt}) and province-level (Z_{pt}) time-variant characteristics and vectors of industry, province and year fixed effects. Thus, the empirical model gives us information regarding the statistical relationships between the firm productivity level and ownership (coefficients β'), the degree of competition of the industry (coefficients γ') and their interplay (coefficients δ'), conditional on a large vector of

firm, industry and province characteristics. In all estimates, cluster-robust standard errors have been used and reported to account for within-cluster (firm) correlation.

Table 3 shows our first set of results. The specification in column (1) includes only ownership dummies, year, industry and province fixed effects. We then extend the empirical model by including proxies for market competition (HHI and entry rate) and the vector of controls, respectively, in columns (2) and (3). The results in column (3) show that, on average, both FOEs and SOEs exhibit significantly higher productivity levels than POEs (omitted category) during the period 2001–2011. On average, once a relevant vector of controls has been accounted for, while SOEs are 23% ($\exp(0.21)-1$) more productive than POEs, FOEs are 36% ($\exp(0.31)-1$) more productive than POEs and around 10% more productive than SOEs. Consequently, FOEs are, on average, the most productive firms in the period under analysis, but SOEs also show a good performance in terms of productivity.

As for market competition, the coefficient of HHI is negative (-0.13) and significant, thus pointing to a negative relationship between concentration and productivity: a one percentage point increase in the HHI leads to a 0.13% reduction in firm productivity, *ceteris paribus*. Looking at Table 1 and using the sample average value as a benchmark, if concentration halved (from 0.06 to 0.03) on average in the economy, this would yield a productivity improvement of 0.39% ($0.13*3$). This modest, albeit significant, effect is plausible given the already low value of HHI associated with the “average” industry in Vietnam. Nonetheless, gains may be more relevant for an industry at the 90th percentile of the HHI distribution: if concentration halved in those industries, from 0.13 to 0.065, the productivity improvements of firms active in those sectors would be around 0.845%. The coefficient of entry rate is negative and significant (-0.09): a one percentage point increase in the entry rate leads to a 0.09% drop in productivity. This suggests that, *ceteris paribus*, firms active in industries characterized by a higher entry rate are, on average, less productive. This result may be explained by the specific period under analysis. The period 2001–2011 witnessed heavy entry and experimentation by private businesses, several of which were characterized by low commercial abilities and simple technologies.

As for the control variables, the results shown in column (3) suggest that firms that are bigger, older and undertake export activities are more productive. Meanwhile, a higher leverage ratio is associated with higher productivity. This could be explained by the fact that firms need to be financed through debt in order to make productive investments. The coefficients on exit rate and

provincial GDP growth rate both show the expected positive sign, even though they are not significant.

Overall, the results in column (3) support hypotheses 1b, 2 and 3 (at least when market competition is proxied by the HHI), whereas hypothesis 1a is rejected. Given that the period from 2001 to 2011 has been characterized by institutional reforms aimed at improving the competitive environment of Vietnam, it is essential to study the role of market competition in reducing gaps in productivity across firms with different ownership. Thus, in columns (4) and (5), we separately add the interactions between ownership dummies and HHI and between ownership dummies and entry rate, while in column (6), both groups of interactions are included in the regression. The results support hypothesis 4, as the gaps in productivity between SOEs and POEs and between FOEs and POEs are smaller in industries characterized by a lower concentration (HHI) and a higher entry rate. We may quantify these relationships as follows. Looking at column (4) of Table 3, while SOEs (FOEs) active in one of the 10% least concentrated sectors ($HHI = 0.01$) show a productivity advantage with respect to POEs of about 18% (26%),²³ SOEs (FOEs) active in the 10% most concentrated industries ($HHI = 0.13$) show an advantage of about 30% (52%). Coherently with that, looking at column (5), SOEs (FOEs) active in the bottom 10% of the entry rate distribution show a productivity advantage of 29% (40%) with respect to POEs, while SOEs (FOEs) active in the top 10% of the entry rate distribution gain an advantage of 21% (33%). The results are confirmed when all interactions are jointly included in the empirical model (column [6] of Table 3).

[Insert Table 3 about here]

In Section 2, we sketched the main institutional and economic changes witnessed in Vietnam in the early 2000s. The first half of the decade has been characterized by rapid growth in the private sector (2001–2006) as the result of some relevant changes in the legal framework for businesses. In the second half of the decade, the continuing rise in the number of POEs has been flanked by both state-owned enterprise policies (equitization of a large part of SOEs and the consolidation of SEGs) and the accession of Vietnam to the WTO. Given that, it is relevant to check how those changes mapped onto different SOE, POE and FOE performances, so we repeat our regression

²³ The exact calculations of the productivity advantages are $\exp(0.16+0.01*0.77)-1$ for SOEs with respect to POEs and $\exp(0.22+0.01*1.54)-1$ for FOEs with respect to POEs. Similar calculations can be done to appreciate the role of the interaction between ownership and the entry rate.

analysis for the two sub-periods, i.e. 2001–2006 and 2007–2011. The results — as shown in Table 4 — are in line with those shown in Table 3, but some differences between the two periods are notable.

[Insert Table 4 about here]

The productivity advantage of SOEs, as compared to POEs, is greater in the period 2007–2011 (about 39%, in column [5]) than in the period 2001–2006 (about 9%, in column [1]). Furthermore, the results also show that while FOEs exhibit higher productivity levels than SOEs in the first sub-period, SOEs “closed the gap” with FOEs in the second sub-period. The control variables show coefficients that are consistent with those reported in Table 3.

Overall, our first set of results, which are in line with previous studies (Ngoc and Ramstetter, 2004; Nguyen and Le, 2005; Ramstetter and Ngoc, 2013; Huang and Yang, 2016), suggest that the Vietnamese state-owned sector’s productivity performance was good with respect to POEs, especially in the period 2007–2011, and therefore it deserves a more in-depth discussion.

5.2 An enquiry into the performance of SOEs

5.2.1 The role of equitization

The result shown in Section 5.1 that points to a good performance of SOEs in the period under analysis (and especially in the period 2007–2011) may be the result of the state-owned enterprise policies undertaken by the Vietnamese government during the 2000s with the aim of reforming the state sector. The transformation of SOEs into limited liability companies or joint stock companies (i.e. equitization) may have improved their internal incentive systems and positively impacted their productivity. To test this hypothesis, we first estimate the empirical model again by adopting a more refined taxonomy of ownership. In particular, firms are assigned to one of four categories according to their state ownership percentage: 1) lower than or equal to 25% (together with wholly private firms these form the omitted/comparison category: POE); 2) higher than 25% and lower than or equal to 50%; 3) higher than 50% and lower than or equal to 75%; and 4) higher than 75%. As a detailed record of equity composition is available only from 2004 onwards, the regression does not cover the overall period previously considered.²⁴

²⁴ We have also run an alternative (and more parsimonious) specification in which we simply separate wholly private firms (100% of private ownership) from firms with state ownership higher than 0% but less than or equal to 50%,

Equitized SOEs with both a minority (25–50%) and a majority (50–75%) equity share owned by state bodies show the highest levels of productivity in the sample, especially during the sub-period 2007–2011 when firms with a state ownership of between 25% and 75% perform better than POEs, and their performance is remarkable even with respect to FOEs. Conversely, levels of productivity are systematically lower in firms in which the state owns from 75% to 100% of equity. We also estimate an empirical model in which state ownership is introduced as a continuous variable together with its squared term. The results are shown in column (7) of Table 5 (FOEs are excluded from the analysis for the sake of simplicity). From the coefficients reported in column (7), it is possible to derive an “optimal” level of state ownership, which is around 56% ($\frac{\partial tfp}{\partial state\ ownership} = 0.0177 - 2 * (0.000157) * State\ ownership = 0$). Above this threshold, the productivity of firms with a certain amount of state ownership starts to decrease (Figure 3).

[Insert Figure 3 about here]

The results in Table 5 hint at the role played by the equitization policy for SOEs that was first undertaken by the Vietnamese government in the early 2000s, and they are in line with the results obtained for Chinese SOEs by Aivazian et al. (2005). Similarly, with respect to private firms in Vietnam, O’Toole et al. (2016) find that equitized firms with minority state shareholding have superior investment efficiency. Moreover, our results are more broadly consistent with the evidence provided by Boubakri et al. (2018) on the inverted U-shaped relationship between the extent of government ownership and market valuation in a sample of about 1400 publicly traded corporations from nine East Asian economies.

[Insert Table 5 about here]

5.2.2 POEs’ commercial experience and employed technology

The lagging behind of POEs may also be partially explained by the sizeable volume of entry by private businesses in the period 2001–2011, which may be characterized by a lack of commercial experience (Pincus, 2016). We can put this into perspective by referring to the evidence provided

leaving the other two categories (SOE and FOE) unchanged. This allows us to maintain in the estimation in the entire range of available years. The results are in line with those shown in Table 5 and are available from the authors upon request.

in Bloom and Van Reenen (2010) regarding China and by hypothesizing that there is an issue related to the relative youth of Vietnamese POEs and their corresponding inferior managerial practices or simpler adopted technologies (Nguyen and Le, 2005; Ramstetter and Ngoc, 2013). Entry can thus be considered as a way for firms to gather information about the chances they have to survive the market competition, given their productivity levels. Despite the increased competition, it may well be possible to observe, particularly among newly entrant POEs, low productivity firms that have not yet been sifted out by the market.

To test for this possibility, we have re-run our regressions on the sample of firms that stayed in the market at least three years after entry to partially clean our estimates for a likely post-entry churning effect. The results do not differ substantially from those shown in Table 3, and consequently, they offer little support to explain the observed advantage of SOEs.

[Insert Table 6 about here]

5.2.3 The role of exporters and import competition

Vietnam's accession to the WTO in 2007 may have further bolstered managerial efforts to enhance firms' efficiency due to the market opportunities that opened up for exporters and/or by the fiercer competition incoming from abroad. Firms of different ownership types may have reacted in different ways in the face of this major episode in Vietnamese trade liberalization. First, we enquire into the possibility that the remarkable performance of SOEs in the post-2007 period could be explained by the behaviour of exporters. In order to test this hypothesis, we run three regressions in which we interact the export status of the firm with the ownership type, both in the overall period and in each sub-period, i.e. pre- and post-accession to the WTO. The results are shown in Table 7. For the purposes of comparison, columns 1, 3 and 5 report the main results that were also shown in Table 4.

[Insert Table 7 about here]

Several interesting results emerge. First, being an exporter ensures a productivity premium for all firms. In the period 2001–2011 (column [2]), POEs that export have a productivity advantage of about 23% ($\exp(0.21)-1$) with respect their non-export counterparts. The productivity advantage of being an exporter is lower for SOEs (about 10.5%; $\exp(0.21-0.10)-1$) and FOEs (about 8%; $\exp(0.21-0.13)-1$), but it is still positive and significant. If SOEs had a productivity boost (due to

exporters) higher than POEs in the period 2007–2011, this may partially explain the remarkable performance of the state sector in that period. Nonetheless, the results shown in columns 4 and 6 of Table 6 do not support this hypothesis. Indeed, while the productivity premium of all exporters increased from the period 2001–2006 to the period 2007–2011 (being this a coherent effect of a trade liberalization, as expected in the trade literature on heterogenous firms; Bernard et al., 2012), confirmed by the rejection of the null hypothesis ($\varphi_{2001-2006}^{Export\ status} = \varphi_{2007-2011}^{Export\ status}$), this across-periods effect is not further differentiated among ownership types (as the statistical tests at the bottom of Table 6 show).²⁵

Alternatively, we may hypothesize that tougher import competition prompted by a reduction in MFN tariffs across industries after Vietnam’s accession to the WTO may have boosted the productivity of firms unevenly (Baccini et al., 2019), depending both on the degree of exposure of POEs, SOEs and FOEs to international competition and the mechanism of internal protection. We replicate in Table 8 the exercise conducted in Table 7 by now inserting the year changes in the level of tariffs applied in the industry in which the firm is active and by interacting it with the ownership categories.

[Insert Table 8 about here]

Again, while on average and in the overall period (2002–2010) tariff cuts are associated with higher productivity, this effect is stronger for POEs and SOEs ($\gamma_{2001-2011}^{\Delta Tariff * SOE} = 0$ cannot be rejected) than for FOEs ($\gamma_{2001-2011}^{\Delta Tariff * FOE} = 0$ is rejected, but it shows a negative sign, thus going in the opposite direction of the $\varphi_{2001-2011}^{\Delta Tariff}$ variable). However, this effect is not different across sub-periods ($\gamma_{2001-2006}^{\Delta Tariff} = \gamma_{2007-2011}^{\Delta Tariff}$ cannot be rejected) for any ownership type (indeed, neither for $\gamma_{2001-2006}^{\Delta Tariff * SOE} = \gamma_{2007-2011}^{\Delta Tariff * SOE}$ nor $\gamma_{2001-2006}^{\Delta Tariff * FOE} = \gamma_{2007-2011}^{\Delta Tariff * FOE}$ can the null hypothesis be rejected). Overall, neither the export behaviour nor the tariff cuts show differentiated effects across both sub-periods and ownership types that explain the remarkable performance of SOEs with respect to POEs after 2007.

²⁵ In order to perform statistical tests on the equality of coefficients across models (sub-periods 2001–2006 and 2007–2011), we have used the Stata package `suest`.

5.2.4 Preferential access to inputs by SOEs

It is possible that our measure of productivity — which cannot be corrected to account for prices of output and input at the firm level — may (partially) reflect the market power of the firm both in the product and the input markets (Van Beveren, 2012). The possibility that SOEs systematically charge higher prices in the product market should be rather low in this work, given that the analysis is restricted to manufacturing firms (which sell tradable goods). Conversely, there is evidence (see the discussion in Nguyen and Le, 2005) that SOEs in Vietnam have had preferential access to land and capital than private firms for a long period of time (Vu Thanh, 2014). In particular, after the WTO accession in 2007 and the 2008 mortgage crisis in the US, the state provided additional loans to help SOEs through state-owned banks (Pincus, 2016). This possibility may affect our main results in two ways. On the one hand, we may have simply over-estimated the TFP of SOEs due to price bias. On the other hand, a preferential credit allocation to SOEs could imply a “true” higher productivity with respect to POEs if the “cheaper” capital borrowed by SOEs is invested in more advanced technology (Nguyen and Le, 2005).

Obviously, the first possibility is more concerning. Unfortunately, we cannot properly test whether the results are robust to the price bias correction. We can instead rely on an indirect test by taking advantage of firm age variability in our sample. Indeed, firms may benefit from “soft budget constraints” depending on their age. On the one hand, following the hypothesis put forward by Li (2008), in the case of Chinese SOEs, the older the SOE, the more it loses its close ties with government officials (due to turnover) and the less relevant the “soft budget constraints” are in determining its performance. On the other hand, the younger the SOE, the lower the probability of having benefited from cheaper access to land and capital for a long period of time. We thus re-run the regressions in the sub-sample of firms that are under 10 years old. Interestingly, as shown in Table 9, the good performance of SOEs is confirmed and even strengthened in the sub-sample of younger firms (especially for the period 2007–2011), thus it is potentially coherent with the mechanism suggested by Li (2008). Nonetheless, the results in Table 3 show that even when we include all SOEs in the analysis (even the very old ones for which this mechanism should be less effective), the superior productivity of SOEs with respect to POEs does not disappear.

[Insert Table 9 about here]

Overall, even if this is a rather indirect test, we admittedly cannot ignore that our measure of productivity is partially affected by an omitted price bias, especially in the input markets. Thus, we submit that “gross of” the price bias, state-owned enterprise policies, in particular equitization, have played an important role in SOEs’ good productivity performance.

5.3 Robustness checks

5.3.1 Controlling for the selection of SOEs

Based on the literature on ownership in transition economies (Estrin et al., 2009) and the literature on the economic development of Vietnam (see, among others, Malesky and London, 2014; Pincus, 2016), it is reasonable to think that firms are not maintained as SOEs at random. Thus, the impressive productivity of Vietnamese SOEs observed in the period from 2007 to 2011 might reflect the selection of SOEs rather than the outcome of the equitization process undertaken by the government during the early 2000s. The Vietnamese government may have retained the firms that had better management, technology and human capital. Thus, our results so far might be biased, and we need to properly control for it.²⁶

As the probability of being maintained as SOEs is not random, we use Heckman’s two-stage procedure (Heckman, 1979) to correct for the selection of SOEs. The first stage is a probit model that predicts the probability that a firm will be retained as an SOE in year t (Table 10).²⁷ In the second stage, we include the inverse of Mills’s ratio retrieved from the first stage in the main empirical model. The results are shown in Table 11, and they are in line with those shown in Tables 3 and 4. After having taken selection into account, SOEs still exhibit higher productivity than POEs. Moreover, market competition is consistent in playing an effective role, as the gaps in TFP

²⁶ Some preliminary evidence based on our data is coherent with the view that some form of selection by the Vietnamese government (in terms of either firms or industries) may have taken place, and thus it is worth taking into account. Indeed, when comparing the average *tfp* of privatized SOEs (i.e. those that became POEs during the period 2001–2011) with those remaining SOEs over the entire period, the average productivity of privatized firms both before and after privatization is lower than that of the remaining SOEs. However, in a regression framework — i.e. controlling for a vector of firm, industry and province characteristics — the difference in *tfp* between firms that were always SOEs and privatized SOEs (before privatization) disappears when industry fixed effects are included in the regression. To save space, the results have been not included but are available from the authors upon request.

²⁷ The dependent variable in the probit model (first stage) is a dummy given a value of one if a firm is an SOE in year t and zero otherwise. The explanatory variables include (1-year lagged) firm, sector and province characteristics. Firm-level characteristics include dummies for whether the firm is managed by the central government, export status, *tfp*, number of employees, firm age, the leverage ratio, and their squared terms. As suggested by Bai et al. (2009), we also include year, industry and province fixed effects plus employment shares of SOEs in the 3-digit industry sector and province and the 1-year changes in these shares.

between POEs and SOEs and between POEs and FOEs are smaller in industries characterized by a lower concentration and a higher entry rate.

[Insert Tables 10 and 11 about here]

5.3.2 Further robustness checks

We run several additional robustness checks and present the results in the online Appendix A.6. First, we extend the empirical model and include the first lag of firm *tfp* as a further control (Table A.3.1). Indeed, we may have captured a spurious correlation if (i) a higher productivity level in the previous year is the reason for either being retained by the government or being acquired by a foreign investor, and (ii) there is a persistence in firm TFP over time. Second, in order to reduce the simultaneity issue, we estimate the model with all independent variables included as 1-year lags (Table A.3.2). Third, we estimate our baseline specification by employing a measure of labour productivity instead of TFP (Tables A.3.3 and A.3.4); this measure should be less sensitive to the input (omitted) price bias. The main results are robust to all checks.

6. Discussion and conclusions

In this paper, we empirically examined the role of ownership and market competition in Vietnamese firms' TFP in the period 2001–2011 and found two main results. First, both FOEs and SOEs have performed better than POEs in terms of their TFP levels. While FOEs exhibited the highest TFP level in the period 2001–2006, SOEs “closed the gap” with FOEs in the period 2007–2011. Second, market competition improves firm average productivity and reduces the gaps in productivity across firms of different ownership types.

Concurrent causes may have contributed to the remarkable performance of SOEs with respect to POEs, and we have discussed them at length. First, we explored the possibility of an improved board discipline for SOEs thanks to the state-owned enterprise policies undertaken by the Vietnamese government in the 1990s and 2000s. In particular, we gathered clues indicating that a key component of board discipline has been provided by the equitization process. The good performance of mixed SOEs (with both majority and minority state shareholding) supports this explanation. Second, we have discussed the possibility that the boom of many young POEs after 2000 (which were, on average, characterized by a lack of commercial experience and the adoption of simple technologies) may have also contributed to their low average productivity with respect

to SOEs, but we have not found strong support for this explanation. Third, we have assessed the role of opening Vietnam's economy up to external competition. Vietnam's accession to the WTO had a remarkable effect on Vietnamese firms' productivity. Exporters had a clear advantage over non-exporting firms, and the opening of the economy extended this advantage. However, there are no indications that this additional effect had a superior impact on SOEs. The same is true for increased import penetration consequent to the accession to the WTO: tariff cuts are associated with increased productivity, but again no differential effect on SOEs can be detected. Fourth, we recognize and discuss how our results may be partially due to the preferential access to land and financial capital granted to SOEs during the period 2001–2011. Notwithstanding the rather indirect tests conducted (replication of the analysis in a sub-sample of young firms and the use of labour productivity as the dependent variable), caution is advisable in this respect when interpreting our results.

This work contributes to the literature on Vietnam's growth path and its determinants by providing a comprehensive overview of TFP in Vietnamese manufacturing during the period 2001–2011. Tentatively, our results may also contribute to the general debate on the role of SOEs in the transition from central planning to market economies in developing countries. Traditionally, state ownership has been considered detrimental to productivity due to the many agency problems it implies. The state (principal) could be motivated by non-economic goals, and managers (agents) may direct their efforts to meeting objectives other than increasing their firm's value. In particular, for the case of Vietnam, Vu Thanh (2014) is critical of the policies undertaken to modernize SOEs. The author puts forward the idea that big SEGs were used to disable the effects of WTO accession and to disguise what amounted to national protection over wide sectors of the economy. Along the same lines, Baccini et al. (2019) show that SOEs — insulated from market selection and competition — have reduced the aggregate productivity growth that the country's accession to the WTO could have ensured, especially via a sub-optimal reallocation of resources in industries in which they represent a high share of total employment.

Since 2000, however, a critical view of the early approaches to privatization has taken hold. The problems consequent to rapid privatization in ex-communist European and Commonwealth of Independent State countries (Black et al., 2000; Estrin et al., 2009) have shown that the relative advantage of private property rights in aligning managerial incentives with efficiency goals significantly depends on the institutions that regulate the state's control over business and on the

functioning of a market for corporate governance. A more articulate view looking at the details of the exercise of power by the state is now taking hold, and more attention is being paid to the different varieties of state capitalism (Aivazian et al., 2005; Musacchio et al., 2015; Hsieh and Song, 2016; Lazzarini and Musacchio, 2018). The empirical analysis we have offered provides some evidence that is in line with this view.

However, further steps are necessary to understand better the particular variety of state ownership with which Vietnam is experimenting, along with its strengths and weaknesses. Specifically, more work must be done to understand the drivers of the “discipline of the board.” Consequently, management turnover and managerial practices are the next candidates for an in-depth exploration, which we will reserve for a future study.

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Tables and figures

Figure 1

Framework of analysis: institutional reforms and productivity (adapted from Park et al., 2006)

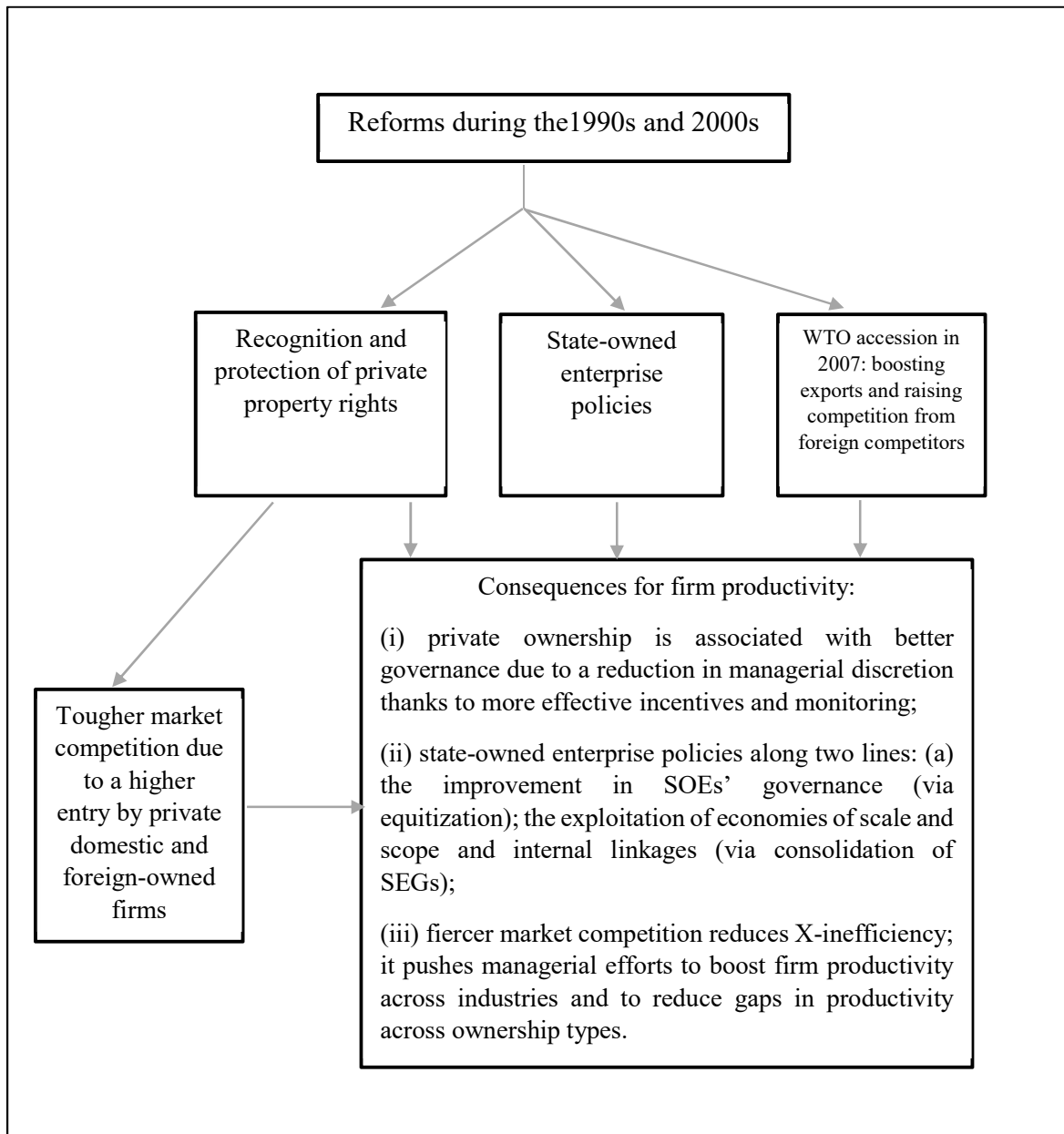


Figure 2

Number of firms by ownership type; Vietnamese manufacturing; 2001-2011

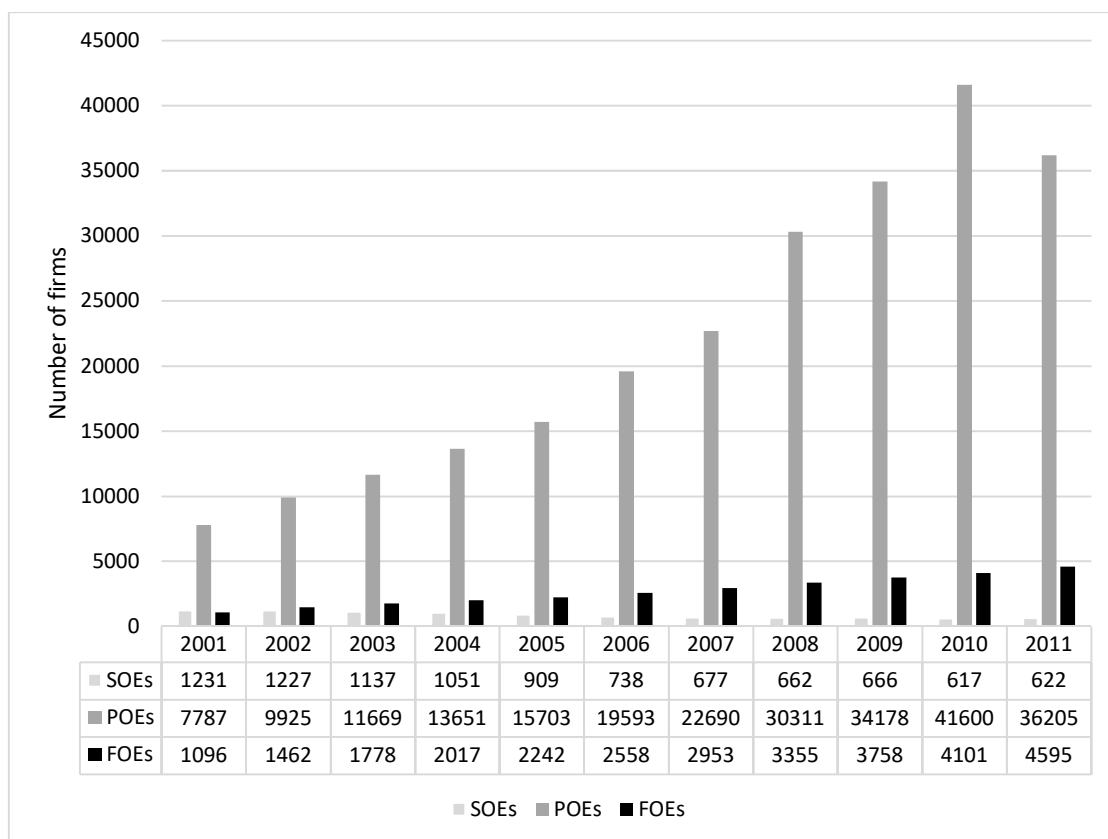


Figure 3

State ownership and predicted *tfp*; Vietnamese manufacturing (without FOEs); 2004-2011

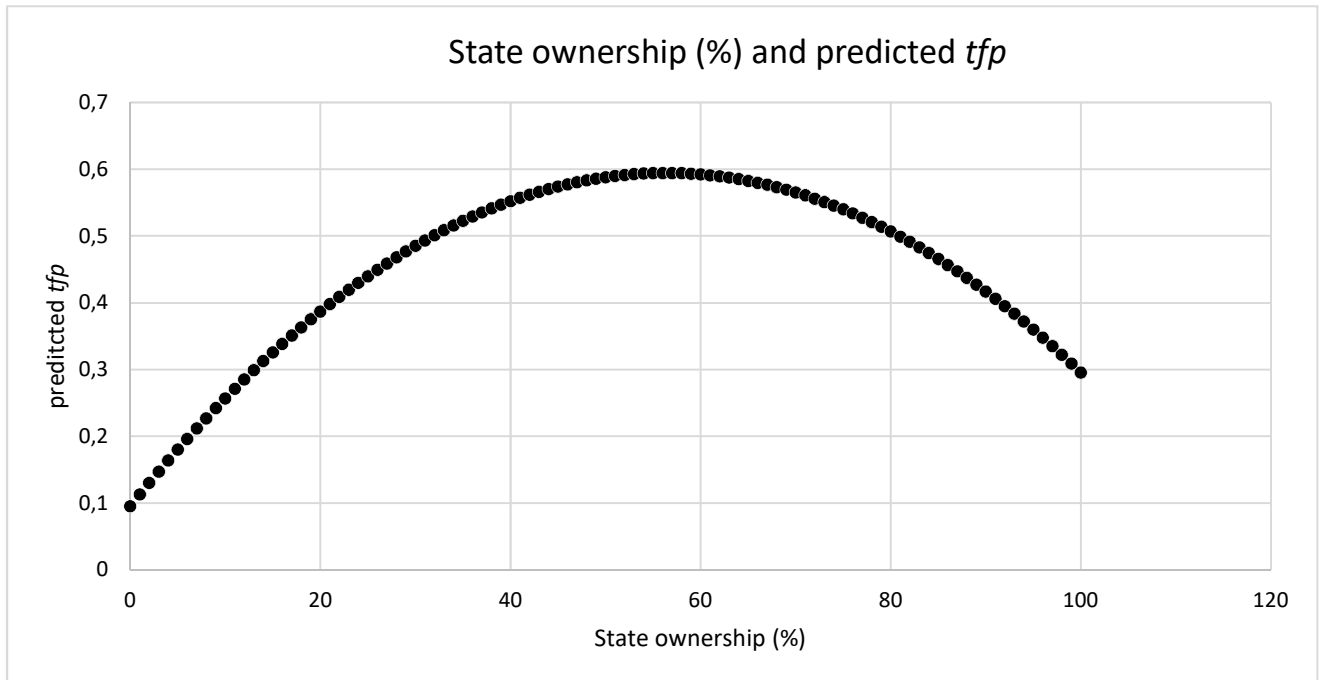


Table 1
Definition of variables and summary statistics

Variables	Definition	Mean	SD	p10	p25	p50	p75	p90	Observations
Productivity									
tfp_{ijpt}	Ln of the TFP of the i^{th} firm, belonging to the j^{th} industry and located in the p^{th} province in year t Modified Levinsohn and Petrin (2003) estimator developed by Wooldridge (2009). See Section A.4 in the on-line Appendix.	1.19	1.06	0.02	0.62	1.15	1.74	2.45	282764
Ownership and market competition									
SOE_{ijpt}	Dummy variable equal to 1 for state-owned firms in year t (and 0 otherwise)	0.03	0.18	0.00	0.00	0.00	0.00	0.00	282764
FOE_{ijpt}	Dummy variable equal to 1 for foreign-owned firms in year t (and 0 otherwise)	0.11	0.31	0.00	0.00	0.00	0.00	1.00	282764
HHI_{jt}	Sum of squares of market shares in year t of all firms in the j^{th} (4-digit) industry to which a firm belongs	0.06	0.08	0.01	0.01	0.03	0.07	0.13	282764
$Entry\ rate_{jt}$	Ratio of the no. of entering firms to the no. of existing firms in t in the j^{th} (4-digit) industry to which a firm belongs	0.23	0.11	0.13	0.17	0.22	0.27	0.34	282764
Control variables									
$Exit\ rate_{jt}$	Ratio of the no. of exiting firms to the no. of existing firms in t in the j^{th} (4-digit) industry to which a firm belongs	0.10	0.06	0.05	0.06	0.09	0.12	0.15	282764
$Leverage_{ijpt}$	Ratio of total debts to total assets of the i^{th} firm in year t	0.45	0.39	0.01	0.19	0.46	0.65	0.82	282764
$Firm\ size_{ijpt}$	Ln of the number of employees of the i^{th} firm in year t	3.23	1.55	1.61	2.08	2.94	4.17	5.49	282764
$Firm\ age_{ijpt}$	Ln of the number of years since establishment of the i^{th} firm +1	1.55	0.93	0.00	0.69	1.61	2.20	2.71	282764
$Exporter_{ijpt}$	Dummy variable equal to 1 if the i^{th} firm is an exporter in year t (and 0 otherwise)	0.10	0.30	0.00	0.00	0.00	0.00	1.00	282764
$Prov.\ GDP\ growth_{pt}$	1-year growth rate of the GDP of the p^{th} province in which a firm is located	0.12	0.04	0.08	0.10	0.11	0.13	0.15	282764
$Tariff_{jt}$	The tariff level (in percentage, %) applied to a specific 4-digit VSIC 07 industry	22.33	14.93	1.06	9.60	20.62	31.50	42.63	241342
$\Delta Tariff_{jt}$	$Tariff_{jt} - Tariff_{jt-1}$	1.43	4.26	0.00	0.00	0.00	1.66	3.43	231228

Notes: Data on tariff are available from 2001 to 2010 and $\Delta Tariff_{jt}$ can be measured from 2002 to 2010. See Appendix A.5 for details on how we have built measures of $Tariff_{jt}$ and $\Delta Tariff_{jt}$.

Table 2
Descriptive statistics

Firm-characteristics	2001						t-test on the equality of means between categories (p-value)	
	SOEs		POEs		FOEs			
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Firm age	21.4	13.4	6.5	8.4	5.0	3.7	SOEs versus POEs	
Value added	2156.1	8729.0	154.8	668.0	2597.6	10918.1		SOEs versus FOEs
No. of employees	510.9	807.2	79.1	282.8	367.3	1140.1		
Capital-labor ratio	5.0	9.0	5.2	73.3	34.0	134.3		0.00
<i>tfp</i>	1.6	1.1	0.7	1.0	1.8	1.5	0.00	
Firm-characteristics	2006						t-test on the equality of means between categories (p-value)	
	SOEs		POEs		FOEs			
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Firm age	23.9	15.4	5.7	7.6	5.7	4.4	SOEs versus POEs	
Value added	4249.0	15097.0	183.0	885.8	2311.1	9080.9		SOEs versus FOEs
No. of employees	630.8	956.5	72.4	262.3	493.4	1656.1		
Capital-labor ratio	9.0	21.4	4.8	23.3	14.6	29.5		0.00
<i>tfp</i>	2.0	1.1	0.9	0.9	1.8	1.3	0.00	
Firm-characteristics	2011						t-test on the equality of means between categories (p-value)	
	SOEs		POEs		FOEs			
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Firm age	23.5	17.0	6.2	7.1	7.1	5.1	SOEs versus POEs	
Value added	7089.9	35378.9	303.7	2657.0	3515.5	21823.2		SOEs versus FOEs
No. of employees	488.9	794.6	58.1	229.4	487.3	1843.2		
Capital-labor ratio	17.2	67.4	6.1	23.0	14.9	32.5		0.00
<i>tfp</i>	2.4	1.1	1.2	1.1	2.2	1.2	0.00	

Notes: Value-added in real terms is calculated as the sum of total wage, depreciation, operating profit before tax, and indirect taxes. Capital input is measured as real fixed assets while labor is measured as the number of firm employees, both at the end of the year. All monetary variables are expressed in constant 2010 value in units of 1000 USD.

T-tests on equality of means of *tfp* (H0: difference in *tfp* means between ownership categories equals zero; H1: difference in *tfp* means between ownership categories different from zero), allowing for unequal variance across categories, have been performed and reported (p-value) in the left panel of the Table.

Table 3

Ownership, competition and firm productivity; 2001-2011

	Coefficient	Dependent variable: <i>tfp</i>					
		1	2	3	4	5	6
Ownership							
SOE	β^{SOE}	0.99*** (0.02)	0.99*** (0.02)	0.21*** (0.02)	0.16*** (0.02)	0.30*** (0.03)	0.25*** (0.03)
FOE	β^{FOE}	0.79*** (0.02)	0.79*** (0.02)	0.31*** (0.01)	0.22*** (0.02)	0.37*** (0.02)	0.29*** (0.02)
Market competition							
HHI	γ^{HHI}		-0.13** (0.06)	-0.13** (0.05)	-0.37*** (0.05)	-0.13** (0.05)	-0.37*** (0.05)
Entry Rate	$\gamma^{Entry Rate}$		-0.05 (0.04)	-0.09** (0.04)	-0.08** (0.04)	-0.02 (0.04)	-0.00 (0.04)
Interactions							
SOE*HHI	$\delta^{SOE*HHI}$				0.77*** (0.25)		0.81*** (0.25)
SOE*Entry Rate	$\delta^{SOE*Rate}$					-0.32*** (0.07)	-0.35*** (0.07)
FOE*HHI	$\delta^{FOE*HHI}$				1.54*** (0.16)		1.56*** (0.16)
FOE*Entry Rate	$\delta^{FOE*Rate}$					-0.23*** (0.07)	-0.30*** (0.07)
Controls							
Exit Rate	$\varphi^{Exit Rate}$			0.07 (0.05)	0.08* (0.05)	0.06 (0.05)	0.06 (0.05)
Leverage Ratio	$\varphi^{Leverage ratio}$			0.15*** (0.02)	0.15*** (0.02)	0.15*** (0.02)	0.15*** (0.02)
Firm size	$\varphi^{Firm size}$			0.23*** (0.00)	0.23*** (0.00)	0.23*** (0.00)	0.23*** (0.00)
Firm age	$\varphi^{Firm age}$			0.13*** (0.00)	0.13*** (0.00)	0.13*** (0.00)	0.13*** (0.00)
Export status	$\varphi^{Export status}$			0.16*** (0.01)	0.16*** (0.01)	0.16*** (0.01)	0.16*** (0.01)
Province GDP growth	$\varphi^{Prov GDP growth}$			0.06 (0.04)	0.05 (0.04)	0.07 (0.04)	0.06 (0.04)
Constant	α	0.81*** (0.05)	0.89*** (0.06)	0.07 (0.05)	0.11** (0.05)	0.05 (0.05)	0.09* (0.05)
Observations		282,764	282,764	282,764	282,764	282,764	282,764
Adj. R ²		0.27	0.27	0.38	0.38	0.38	0.38
Year FE	τ	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	μ	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	ρ	Yes	Yes	Yes	Yes	Yes	Yes
H0: $\beta^{FOE} = \beta^{SOE}$; F-stat.				15.08			
p-value				0.00			

Notes: Omitted ownership category (comparison category): POE. Coefficients of year, province and industry dummies not reported to save space. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4
Ownership, competition and firm productivity; 2001-2006 and 2007-2011

		Dependent variable: <i>tfp</i>							
		2001-2006				2007-2011			
	Coefficient	1	2	3	4	5	6	7	8
Ownership									
SOE	β^{SOE}	0.09*** (0.02)	0.05* (0.03)	0.15*** (0.03)	0.11*** (0.04)	0.33*** (0.03)	0.27*** (0.03)	0.56*** (0.09)	0.52*** (0.09)
FOE	β^{FOE}	0.43*** (0.02)	0.32*** (0.03)	0.50*** (0.03)	0.39*** (0.03)	0.23*** (0.01)	0.15*** (0.02)	0.68*** (0.04)	0.59*** (0.04)
Market competition									
HHI	γ^{HHI}	-0.27** (0.11)	-0.56*** (0.12)	-0.28** (0.11)	-0.57*** (0.12)	0.02 (0.05)	-0.14** (0.05)	0.03 (0.05)	-0.13** (0.05)
Entry Rate	$\gamma^{Entry Rate}$	-0.06 (0.05)	-0.06 (0.05)	0.01 (0.05)	0.01 (0.05)	-0.37*** (0.06)	-0.36*** (0.06)	-0.07 (0.06)	-0.06 (0.06)
Interactions									
SOE*HHI	$\delta^{SOE*HHI}$		0.58* (0.30)		0.60* (0.31)		0.94*** (0.29)		1.04*** (0.28)
SOE*Entry Rate	$\delta^{SOE*Rate}$			-0.19*** (0.06)	-0.21*** (0.06)			-1.16*** (0.39)	-1.34*** (0.39)
FOE*HHI	$\delta^{FOE*HHI}$		1.52*** (0.25)		1.54*** (0.25)		1.44*** (0.16)		1.42*** (0.16)
FOE*Entry Rate	$\delta^{FOE*Rate}$			-0.21*** (0.07)	-0.23*** (0.07)			-2.26*** (0.20)	-2.22*** (0.19)
Controls									
Exit Rate	$\varphi^{Exit Rate}$	0.15** (0.06)	0.16*** (0.06)	0.12** (0.06)	0.13** (0.06)	0.13 (0.10)	0.14 (0.10)	0.20** (0.10)	0.21** (0.10)
Leverage Ratio	$\varphi^{Leverage ratio}$	0.13*** (0.02)	0.13*** (0.02)	0.13*** (0.02)	0.13*** (0.02)	0.15*** (0.03)	0.15*** (0.03)	0.16*** (0.03)	0.15*** (0.03)
Firm size	$\varphi^{Firm size}$	0.24*** (0.00)	0.24*** (0.00)	0.24*** (0.00)	0.24*** (0.00)	0.22*** (0.00)	0.22*** (0.00)	0.22*** (0.00)	0.22*** (0.00)
Firm age	$\varphi^{Firm age}$	0.17*** (0.01)	0.17*** (0.01)	0.17*** (0.01)	0.17*** (0.01)	0.10*** (0.00)	0.10*** (0.00)	0.10*** (0.00)	0.10*** (0.00)
Export status	$\varphi^{Export status}$	0.11*** (0.01)	0.11*** (0.01)	0.11*** (0.01)	0.11*** (0.01)	0.22*** (0.01)	0.22*** (0.01)	0.20*** (0.01)	0.20*** (0.01)
Province GDP growth	$\varphi^{Prov GDP growth}$	0.14*** (0.05)	0.14*** (0.05)	0.14*** (0.05)	0.14*** (0.05)	0.01 (0.09)	-0.00 (0.09)	0.06 (0.09)	0.05 (0.09)
Constant	α	-0.00 (0.09)	0.07 (0.09)	-0.02 (0.09)	0.04 (0.09)	0.37*** (0.05)	0.39*** (0.05)	0.28*** (0.05)	0.30*** (0.05)
Observations		95,774	95,774	95,774	95,774	186,990	186,990	186,990	186,990
Adj. R ²		0.38	0.38	0.38	0.38	0.37	0.37	0.37	0.37
Year FE	τ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	μ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	ρ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H0: $\beta^{FOE} = \beta^{SOE}$; F-stat.		137.60				9.74			
p-value		0.00				0.00			

Notes: Omitted ownership category (comparison category): POE. Coefficients of year, province and industry dummies not reported to save space. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 5

Ownership, competition and firm productivity; quartiles of state ownership and state ownership as continuous variable

	Coefficient	Dependent variable: tfp						Dependent variable: tfp	
		2004-2011		2004-2006		2007-2011		2004-2011	
		1	2	3	4	5	6	7	
Ownership									
State ownership (25%-50%)	$\beta^{SOE\ 25-50}$	0.39*** (0.03)	0.69*** (0.07)	0.34*** (0.05)	0.53*** (0.11)	0.40*** (0.03)	0.89*** (0.10)	State ownership	0.0177*** (0.000986)
State ownership (50%-75%)	$\beta^{SOE\ 50-75}$	0.45*** (0.03)	0.56*** (0.08)	0.43*** (0.04)	0.30*** (0.09)	0.44*** (0.04)	0.79*** (0.11)	State ownership ²	-0.000157*** (1.07e-05)
State ownership (75%-100%)	$\beta^{SOE\ 75-100}$	0.19*** (0.03)	0.21*** (0.07)	0.09*** (0.03)	0.07 (0.07)	0.25*** (0.04)	0.33** (0.13)		
FOE	β^{FOE}	0.30*** (0.01)	0.38*** (0.03)	0.43*** (0.02)	0.41*** (0.05)	0.24*** (0.01)	0.61*** (0.04)		
Market competition									
HHI	γ^{HHI}	-0.07 (0.05)	-0.29*** (0.05)	-0.31** (0.15)	-0.64*** (0.16)	0.02 (0.05)	-0.15*** (0.05)	HHI	-0.0718 (0.0459)
Entry Rate	$\gamma^{Entry\ Rate}$	-0.12*** (0.05)	0.01 (0.05)	-0.15 (0.11)	-0.05 (0.11)	-0.05 (0.06)	-0.37*** (0.06)	Entry Rate	-0.131*** (0.0478)
Interactions									
State ownership (25%-50%)*HHI	$\delta^{SOE\ 25-50*HHI}$		0.79** (0.33)		0.61 (0.64)		0.84** (0.33)		
State ownership (50%-75%)*HHI	$\delta^{SOE\ 50-75*HHI}$		1.43*** (0.34)		1.93*** (0.50)		1.40*** (0.33)		
State ownership (75%-100%)*HHI	$\delta^{SOE\ 75-100*HHI}$		0.86** (0.37)		0.99** (0.42)		0.72 (0.48)		
State ownership (25%-50%)*Entry Rate	$\delta^{SOE\ 25-50*Rate}$		-1.59*** (0.30)		-0.84** (0.35)		-2.75*** (0.48)		
State ownership (50%-75%)*Entry Rate	$\delta^{SOE\ 50-75*Rate}$		-0.96*** (0.31)		-0.02 (0.29)		-2.25*** (0.50)		
State ownership (75%-100%)*Entry Rate	$\delta^{SOE\ 75-100*Rate}$		-0.30 (0.22)		-0.13 (0.21)		-0.58 (0.59)		
FOE*HHI	$\delta^{FOE*HHI}$		1.66*** (0.16)		1.98*** (0.27)		1.46*** (0.16)		
FOE*Entry Rate	$\delta^{FOE*Rate}$		-0.80*** (0.12)		-0.39** (0.16)		-2.26*** (0.19)		
Constant	α	0.14*** (0.05)	0.15*** (0.05)	0.17* (0.10)	0.22** (0.10)	0.38*** (0.05)	0.31*** (0.05)	Constant	0.0953** (0.0473)
Controls									
Observations	δ', φ'	Yes	Yes	Yes	Yes	Yes	Yes	Controls	Yes
Adj. R ²		245,452	245,452	58,462	58,462	186,990	186,990	Observations	219,873
Year FE	τ	0.37	0.38	0.38	0.38	0.37	0.37	Adj. R ²	0.352
Province FE	μ	Yes	Yes	Yes	Yes	Yes	Yes	Year FE	Yes
Industry FE	ρ	Yes	Yes	Yes	Yes	Yes	Yes	Province FE	Yes
		Yes	Yes	Yes	Yes	Yes	Yes	Industry FE	Yes
H0: $\beta^{SOE\ 25-50} = \beta^{FOE}$; F-stat.		7.82		3.34		18.91			
p-value		0.0052		0.0678		0.0000			
H0: $\beta^{SOE\ 50-75} = \beta^{FOE}$; F-stat.		18.69		0.00		26.60			
p-value		0.0000		0.9914		0.0000			
H0: $\beta^{SOE\ 75-100} = \beta^{FOE}$; F-stat.		10.87		92.42		0.03			
p-value		0.001		0.0000		0.8563			
H0: $\beta^{SOE\ 50-75} = \beta^{SOE\ 75-100}$; F-stat.		41.29		53.89		12.99			
p-value		0.0000		0.0000		0.0003			
H0: $\beta^{SOE\ 25-50} = \beta^{SOE\ 75-100}$; F-stat.		24.43		22.88		8.20			
p-value		0.0000		0.0000		0.0042			
H0: $\beta^{SOE\ 25-50} = \beta^{SOE\ 50-75}$; F-stat.		1.75		2.44		0.67			
p-value		0.1857		0.1185		0.4114			

Notes: In cols. (1)-(6), omitted ownership category (comparison category): POE (firms that are wholly owned by private investors plus those with a state ownership lower than or equal to 25%); in col. (7) the percentage of state ownership is introduced as a continuous variable, together with its squared term. Coefficients of year, province and industry dummies and coefficients referring to the vector of control variables not reported to save space. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Ownership, competition and firm productivity; only firms that survive at least three years

	Coefficient	Dependent variable: <i>tfp</i>					
		2001-2011		2001-2006		2007-2011	
		1	2	3	4	5	6
Ownership							
SOE	β^{SOE}	0.21*** (0.02)	0.24*** (0.03)	0.08*** (0.02)	0.11*** (0.04)	0.33*** (0.03)	0.49*** (0.09)
FOE	β^{FOE}	0.32*** (0.02)	0.29*** (0.02)	0.43*** (0.02)	0.39*** (0.03)	0.23*** (0.02)	0.58*** (0.04)
Market competition							
HHI	γ^{HHI}	-0.17*** (0.05)	-0.40*** (0.06)	-0.24** (0.12)	-0.55*** (0.12)	-0.00 (0.05)	-0.15*** (0.06)
Entry Rate	$\gamma^{Entry\ Rate}$	-0.08** (0.04)	0.00 (0.04)	-0.07 (0.05)	0.00 (0.05)	-0.40*** (0.06)	-0.08 (0.07)
Interactions							
SOE*HHI	$\delta^{SOE*HHI}$		0.78*** (0.25)		0.54* (0.30)		1.07*** (0.29)
SOE*EntryRate	$\delta^{SOE*Rate}$		-0.33*** (0.07)		-0.20*** (0.06)		-1.16*** (0.40)
FOE*HHI	$\delta^{FOE*HHI}$		1.55*** (0.17)		1.54*** (0.25)		1.39*** (0.17)
FOE*EntryRate	$\delta^{FOE*Rate}$		-0.29*** (0.07)		-0.23*** (0.07)		-2.13*** (0.20)
Constant	α	0.08 (0.06)	0.09 (0.06)	-0.01 (0.09)	0.03 (0.09)	0.42*** (0.06)	0.35*** (0.06)
Controls							
	δ', φ	Yes	Yes	Yes	Yes	Yes	Yes
Observations		249,959	249,959	89,588	89,588	160,371	160,371
Adj. R ²		0.38	0.39	0.38	0.39	0.38	0.38
Year FE	τ	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	μ	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	ρ	Yes	Yes	Yes	Yes	Yes	Yes
H0: $\beta^{FOE} = \beta^{SOE}$; F-stat.		18.23		137.80		9.24	
p-value		0.0000		0.0000		0.0024	

Notes: Omitted ownership category (comparison category): POE. Coefficients of year, province and industry dummies and coefficients referring to the vector of control variables not reported to save space. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 7

Ownership, competition and firm productivity; the role of exporters

	Coefficient	Dependent variable: <i>tfp</i>					
		2001-2011		2001-2006		2007-2011	
		1	2	3	4	5	6
Ownership							
SOE	β^{SOE}	0.21*** (0.02)	0.23*** (0.02)	0.09*** (0.02)	0.10*** (0.02)	0.33*** (0.03)	0.34*** (0.03)
FOE	β^{FOE}	0.31*** (0.01)	0.35*** (0.02)	0.43*** (0.02)	0.47*** (0.02)	0.23*** (0.01)	0.28*** (0.02)
Competition							
HHI	γ^{HHI}	-0.13** (0.05)	-0.13** (0.05)	-0.27** (0.11)	-0.27** (0.11)	0.02 (0.05)	0.02 (0.05)
Entry Rate	$\gamma^{Entry Rate}$	-0.09** (0.04)	-0.09** (0.04)	-0.06 (0.05)	-0.05 (0.05)	-0.37*** (0.06)	-0.38*** (0.06)
The role of exporters							
Export status	$\varphi^{Export status}$	0.16*** (0.01)	0.21*** (0.01)	0.11*** (0.01)	0.16*** (0.01)	0.22*** (0.01)	0.28*** (0.01)
SOE* Export status	$\varphi^{Export status*SOE}$		-0.10*** (0.03)		-0.08** (0.03)		-0.06 (0.05)
FOE* Export status	$\varphi^{Export status*FOE}$		-0.13*** (0.02)		-0.12*** (0.03)		-0.16*** (0.02)
Constant	α	0.07 (0.05)	0.07 (0.05)	-0.00 (0.09)	-0.01 (0.09)	0.37*** (0.05)	0.38*** (0.05)
Controls							
	δ', φ'	Yes	Yes	Yes	Yes	Yes	Yes
Observations		282,764	282,764	95,774	95,774	186,990	186,990
Adj. R ²		0.38	0.38	0.38	0.38	0.37	0.37
Year FE	τ	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	μ	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	ρ	Yes	Yes	Yes	Yes	Yes	Yes

Statistical tests on the export premium for SOEs and FOEs in the period 2001-2011 (col.2)

H0: $\varphi_{2001-2011}^{Export status} + \varphi_{2001-2011}^{Export status*SOE} = 0$; F-stat.	14.89
p-value	0.00
H0: $\varphi_{2001-2011}^{Export status} + \varphi_{2001-2011}^{Export status*FOE} = 0$; F-stat.	33.26
p-value	0.00

Statistical tests on the export premium across the two sub-periods (col. 4 versus col. 6)

H0: $\varphi_{2001-2006}^{Export status} = \varphi_{2007-2011}^{Export status}$; $\chi^2_{(1)}$ stat.	47.19
p-value	0.00
H0: $\varphi_{2001-2006}^{Export status*SOE} = \varphi_{2007-2011}^{Export status*SOE}$; $\chi^2_{(1)}$ stat.	0.22
p-value	0.64
H0: $\varphi_{2001-2006}^{Export status*FOE} = \varphi_{2007-2011}^{Export status*FOE}$; $\chi^2_{(1)}$ stat.	1.21
p-value	0.27

Notes: Omitted ownership category (comparison category): POE. Coefficients of year, province and industry dummies and coefficients referring to the vector of control variables not reported to save space. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 8

Ownership, competition and firm productivity; the role of tariff cuts

	Coefficient	Dependent variable: <i>tfp</i>					
		2002-2010		2002-2006		2007-2010	
		1	2	3	4	5	6
Ownership							
SOE	β^{SOE}	0.248*** (0.0218)	0.248*** (0.0218)	0.0970*** (0.0235)	0.0970*** (0.0235)	0.365*** (0.0295)	0.378*** (0.0304)
FOE	β^{FOE}	0.326*** (0.0157)	0.355*** (0.162)	0.432*** (0.0210)	0.431*** (0.0210)	0.246*** (0.0161)	0.287*** (0.0168)
Competition							
HHI	γ^{HHI}	-0.0850 (0.0540)	-0.0873 (0.0539)	-0.284** (0.124)	-0.283** (0.124)	0.121** (0.0548)	0.121** (0.0547)
Entry Rate	$\gamma^{Entry Rate}$	-0.0818* (0.0457)	-0.0850* (0.0457)	-0.145* (0.0750)	-0.141* (0.0750)	-0.374*** (0.0632)	-0.371*** (0.0633)
The role of tariff cuts							
$\Delta Tariff_{(t-1,t)}$	$\gamma^{\Delta Tariff}$	0.00373*** (0.000477)	0.00668*** (0.000492)	0.00179 (0.00217)	0.00333 (0.00229)	0.000710 (0.000480)	0.00303*** (0.000497)
SOE* $\Delta Tariff_{(t-1,t)}$	$\gamma^{\Delta Tariff*SOE}$		-0.000746 (0.00275)		0.00128 (0.00798)		-0.00623** (0.00297)
FOE* $\Delta Tariff_{(t-1,t)}$	$\gamma^{\Delta Tariff*FOE}$		-0.0188*** (0.00145)		-0.00711 (0.00817)		-0.0149*** (0.00142)
Constant	α		0.0833* (0.0493)	0.0158 (0.0827)	0.0146 (0.0827)	0.445*** (0.0558)	0.432*** (0.0558)
Controls							
	δ', ϕ'	Yes	Yes	Yes	Yes	Yes	Yes
Observations		231,228	231,228	85,660	85,660	145,568	145,568
Adj. R ²		0.380	0.381	0.382	0.382	0.378	0.378
Year FE	τ	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	μ	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	ρ	Yes	Yes	Yes	Yes	Yes	Yes
Statistical tests on the tariff cuts effects for SOEs and FOEs in the period 2001-2011 (col.2)							
H0: $\gamma_{2001-2011}^{\Delta Tariff*SOE} = 0$; F-stat.						0.07	
p-value						0.7865	
H0: $\gamma_{2001-2011}^{\Delta Tariff*FOE} = 0$; F-stat.						167.65	
p-value						0.0000	
Statistical tests on the tariff cuts effects across the two sub-periods (col. 4 versus col. 6)							
H0: $\gamma_{2001-2006}^{\Delta Tariff} = \gamma_{2007-2011}^{\Delta Tariff}$; $\chi^2_{(1)}$ stat.						0.02	
p-value						0.89	
H0: $\gamma_{2001-2006}^{\Delta Tariff*SOE} = \gamma_{2007-2011}^{\Delta Tariff*SOE}$; $\chi^2_{(1)}$ stat.						0.78	
p-value						0.3757	
H0: $\gamma_{2001-2006}^{\Delta Tariff*FOE} = \gamma_{2007-2011}^{\Delta Tariff*FOE}$; $\chi^2_{(1)}$ stat.						0.87	
p-value						0.350	

Notes: Omitted ownership category (comparison category): POE. Coefficients of year, province and industry dummies and coefficients referring to the vector of control variables not reported to save space. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9

Ownership, competition and firm productivity; firms < 10 y.o.; 2001-2011 and sub-periods

		Dependent variable: <i>tfp</i>					
		2001-2011		2001-2006		2007-2011	
	Coefficient	1	2	3	4	5	6
<i>Ownership</i>							
SOE	β^{SOE}	0.43*** (0.02)	0.53*** (0.04)	0.31*** (0.03)	0.39*** (0.05)	0.55*** (0.03)	0.88*** (0.09)
FOE	β^{FOE}	0.27*** (0.01)	0.25*** (0.01)	0.38*** (0.01)	0.33*** (0.02)	0.19*** (0.01)	0.59*** (0.03)
<i>Competition</i>							
HHI	γ^{HHI}	-0.09** (0.04)	-0.27*** (0.04)	-0.28** (0.12)	-0.54*** (0.12)	0.07 (0.06)	-0.02 (0.06)
Entry Rate	$\gamma^{Entry\ Rate}$	-0.02 (0.04)	0.04 (0.04)	0.04 (0.06)	0.10 (0.06)	-0.34*** (0.07)	-0.07 (0.07)
<i>Interactions</i>							
SOE*HHI	$\delta^{SOE*HHI}$		1.48*** (0.22)		1.60*** (0.38)		1.35*** (0.28)
SOE*Entry Rate	$\delta^{SOE*Rate}$		-0.67*** (0.10)		-0.52*** (0.12)		-2.09*** (0.41)
FOE*HHI	$\delta^{FOE*HHI}$		1.32*** (0.07)		1.42*** (0.11)		1.08*** (0.08)
FOE*Entry Rate	$\delta^{FOE*Rate}$		-0.23*** (0.05)		-0.19*** (0.06)		-2.25*** (0.12)
Constant	α	0.02 (0.04)	0.03 (0.04)	-0.11 (0.08)	-0.07 (0.08)	0.33*** (0.05)	0.26*** (0.05)
<i>Controls</i>	δ', ϕ'	Yes	Yes	Yes	Yes	Yes	Yes
Observations		229,390	229,390	74,986	74,986	154,404	154,404
Adj. R ²		0.33	0.33	0.35	0.35	0.32	0.33
Year FE	τ	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	μ	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	ρ	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Omitted ownership category (comparison category): POE. Coefficients of year, province and industry dummies and coefficients referring to the vector of control variables not reported to save space. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 10

Selection model: first stage; the probability for firms to be maintained as SOEs (probit model)

Dependent variable: dummy =1 for SOEs and 0 otherwise	
Firm managed by central Gov. $_{(t-1)}$	2.48*** (0.07)
$tfp_{(t-1)}$	0.15*** (0.03)
$(tfp)^2_{(t-1)}$	-0.01** (0.01)
Firm size $_{(t-1)}$	1.38*** (0.09)
Firm size ² $_{(t-1)}$	-0.09*** (0.01)
Firm age $_{(t-1)}$	-0.43*** (0.06)
Firm age ² $_{(t-1)}$	0.21*** (0.01)
Leverage Ratio $_{(t-1)}$	0.42*** (0.06)
Leverage Ratio ² $_{(t-1)}$	-0.04** (0.02)
Export status $_{(t-1)}$	-0.18*** (0.03)
Employment share by industry $_{(t-1)}$	1.42*** (0.16)
Employment share by province $_{(t-1)}$	1.81*** (0.18)
Δ Employment share by industry $_{(t-1 \text{ to } t)}$	1.10*** (0.22)
Δ Employment share by province $_{(t-1 \text{ to } t)}$	1.08*** (0.20)
Constant	-7.76*** (0.31)
Observations	194,503
Year FE	Yes
Province FE	Yes
Industry FE	Yes

Notes: Coefficients of year, province and industry dummies not reported to save space. The specification includes industry fixed effects at the 2-digit level. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 11

Selection model: second stage; ownership, competition and firm productivity; 2001-2011; 2001-2006 and 2007-2011

	Coefficient	Dependent variable: <i>tfp</i>					
		2001-2011		2001-2006		2007-2011	
		1	2	3	4	5	6
Ownership							
SOE	β^{SOE}	0.43*** (0.03)	0.54*** (0.04)	0.44*** (0.04)	0.49*** (0.05)	0.66*** (0.05)	0.84*** (0.10)
FOE	β^{FOE}	0.37*** (0.02)	0.36*** (0.03)	0.52*** (0.02)	0.48*** (0.04)	0.29*** (0.02)	0.60*** (0.05)
Market competition							
HHI	γ^{HHI}	-0.12** (0.06)	-0.38*** (0.06)	0.03 (0.14)	-0.32** (0.15)	-0.03 (0.06)	-0.18*** (0.06)
Entry Rate	$\gamma^{Entry Rate}$	0.09* (0.05)	0.23*** (0.05)	0.09 (0.07)	0.20*** (0.07)	-0.34*** (0.07)	-0.03 (0.08)
Interactions							
SOE*HHI	$\delta^{SOE*HHI}$		0.71*** (0.27)		0.48 (0.33)		1.00*** (0.32)
SOE*Entry Rate	$\delta^{SOE*Rate}$		-0.61*** (0.09)		-0.30*** (0.08)		-1.34*** (0.41)
FOE*HHI	$\delta^{FOE*HHI}$		1.69*** (0.19)		1.68*** (0.28)		1.52*** (0.18)
FOE*Entry Rate	$\delta^{FOE*Rate}$		-0.40*** (0.10)		-0.29*** (0.11)		-1.95*** (0.21)
Inverse Mills's ratio	φ^{IMR}	-0.18*** (0.02)	-0.19*** (0.02)	-0.26*** (0.03)	-0.25*** (0.03)	-0.22*** (0.03)	-0.21*** (0.03)
Constant	α	0.11* (0.06)	0.13* (0.07)	0.16 (0.10)	0.21** (0.11)	0.45*** (0.06)	0.38*** (0.06)
Controls							
Observations		194,503	194,503	60,471	60,471	134,032	134,032
R-squared		0.41	0.41	0.43	0.44	0.40	0.40
Year FE	τ	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	μ	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	ρ	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Omitted ownership category (comparison category): POE. Coefficients of year, province and industry dummies and coefficients referring to the vector of control variables not reported to save space. Full tables are available from the authors upon request.

Cluster-robust SE in parentheses

*** p<0.01, ** p<0.05, * p<0.1