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China and the World Economy

Can production subsidies foster export activity?
Evidence from Chinese firm level data

by

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Abstract

Using a unique firm level data set from the Chinese manufacturing sector, this paper analyses the impact of production subsidies on firms' export performance. It documents robust evidence that production subsidies stimulate export activity, although this effect is conditional on firm characteristics. In particular, the beneficial impact of subsidies is found to be more pronounced amongst profit-making firms, firms in capital intensive industries and those with previous exporting experience. Compared to firm characteristics, the extent of heterogeneity across ownership structure (SOEs, collectives and privately-owned firms) proves to be relatively less important.

JEL classification: F1, O2, P3

Keywords: Exporting, subsidies, China, endogenous tobit

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Non-Technical Summary

China's economic growth experience and particularly its emergence as one of the largest export nations has fuelled much recent debate. Dani Rodrik, for example, shows that China is now not only one of the world's largest trading powers but also that its export basket is significantly more sophisticated (in terms of containing more high tech goods) than would be expected on the basis of pure comparative advantage arguments. He also argues convincingly that China's industrial policies pursued since its opening up in 1978 have played an important part in shaping the current industrial structure and export activity.

Our paper examines in detail exporting activity at the level of the firm, and in particular the role production subsidies from either local or central government have had on this. Hence, we are attempting to provide an adequate evaluation of Rodrik's arguments, taking into account firm level heterogeneity and considering the potential endogenous selection when it comes to distributing subsidies. As concerns firm heterogeneity, an important aspect of China's industrial structure is the significance of state-owned enterprises (SOEs). Hence, we allow for differences between SOEs and other types of firms in China. But we also consider heterogeneity within ownership structure by exploring whether some firm level characteristics mediate the export-subsidy relationship.

In investigating the effect of subsidies on export activity it is important to recognise that subsidies are unlikely to be exogenous to exports. Rather it is more likely that governments select targets for subsidising based on certain firm characteristics which are systematically correlated with exporting. In our analysis we take particular account of the potential endogeneity of production subsidies using an instrumental variables Tobit estimator.

Our empirical analysis utilises an unbalanced panel dataset comprising of more than 98000 firms over the period 1999-2003, which includes the rare information of production subsidies received by Chinese firms. We find robust support that production subsidies can play a role in promoting export activity, even after controlling for a host of firm level determinants of export and the potential endogeneity of subsidies. In particular, we establish that the exporting effect of production subsidies is more pronounced among Chinese firms that are either in more capital intensive industries, are operationally efficient or have previous exporting experience.

1 Introduction

China's economic growth experience and particularly its emergence as one of the largest export nations has fuelled much recent debate. Rodrik (2006), for example, shows that China is now not only one of the world's largest trading powers but also that its export basket is significantly more sophisticated (in terms of containing more high tech goods) than would be expected on the basis of pure comparative advantage arguments. He also argues convincingly that China's industrial policies of "promotion and protection" pursued since its opening up in 1978 have played an important part in shaping the current industrial structure and export activity.

Our paper contributes to this debate by examining in detail exporting activity at the level of the firm, and in particular the role production subsidies from either local or central government have had on this.[1] Hence, we are attempting to provide an adequate evaluation of Rodrik's arguments, taking into account firm level heterogeneity and considering the potential endogenous selection when it comes to distributing subsidies. As concerns firm heterogeneity, an important aspect of China's industrial structure is the significance of state-owned enterprises (SOEs). While their importance has declined rapidly over the last two decades the share of industrial value produced by SOEs is still 34.1% in 2003 (Lui et al., 2006). Given their ownership structure SOEs are likely to operate differently from privately and collectively owned firms and may also be subject to different policy treatments (Branstetter and Feenstra, 2002). Hence, we allow for differences between SOEs and other types of firms in China. But we also consider heterogeneity within ownership structure by exploring whether some firm level characteristics mediate the export-subsidy relationship.

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[1] It is important to point out at the beginning that we are not considering export specific subsidies but general production related subsidies.

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In investigating the effect of subsidies on export activity it is important to recognise that subsidies are unlikely to be exogenous to exports. Rather it is more likely that governments select targets for subsidising based on certain firm characteristics which are systematically correlated with exporting. For example, Eckaus (2006) discusses Chinese policies of subsidising loss making SOEs, and a firm's profit or productivity performance is likely to be correlated with its exporting status. In our analysis we take particular account of the potential endogeneity of production subsidies using an instrumental variables Tobit estimator due to Blundell and Smith (1986).

Despite the potential importance of using explicit policies to promote exporting activity in many developed and developing countries, there are few empirical studies that have investigated this issue. One exception is the recent study by Bernard and Jensen (2004) on the determinants of exporting activity in the US which, amongst other things, investigates whether export promotion expenditures at the state level influence the decision of US plants to export or not. Their findings suggest little evidence of this factor encouraging participation in the global market by US manufacturers. Arguably, export promotion expenditures on their own may not have a significant effect on exporting, as the main aim of these policies is generally the provision of international market knowledge. However, information on foreign markets per se may not be sufficient to ensure that firms can successfully compete on the international markets.

We investigate in particular whether *production* subsidies can play a role in promoting export activity. Our empirical analysis utilises an unbalanced panel dataset comprising of more than 98000 firms over the period 1999-2003, which includes the rare information of production subsidies received by Chinese firms. We find robust support that production subsidies can play a role in promoting export activity, even after controlling for a host of firm level determinants of export and the potential endogeneity of subsidies. In

particular, we establish that the exporting effect of production subsidies is more pronounced among Chinese firms that are either in more capital intensive industries, are operationally efficient or have previous exporting experience.

The following section gives some overview of China's export performance and the use of production subsidies. Section 3 discusses some theoretical illustrations of possible effects of production subsidies on exporting and introduces our empirical approach to investigating this question. Section 4 describes the dataset while Section 5 presents the empirical results of our estimations. Finally, Section 6 concludes.

2 An overview of exports and subsidies

2.1 Exports

China's growing participation in international trade has been one of the most prominent features of its economic reform. Indeed, by now China's merchandise export is the third highest in the world and is the leader among the countries covered by the WTO in terms of export growth (WTO, 2006). As Figure 1 illustrates, exports grew by 28.4 percent in 2005, but the growth rate has reduced by 7 percent from a 2004 high.

[Figure 1 here]

Several new products entered China's list of top merchandise exports shown in Table 1, while some older members of the list increased more slowly compared with 2004. For example both automatic data processing machines and components, and parts of TV sets, are important high growth sectors, however, the growth rate for shoes and toys largely slowed down. Export categories that include high-tech products such as such as computers, electronics, aerospace technology and telecom equipment, grew 31.8 percent in 2005 accounting for 28.6 percent of all Chinese exports. However, labour-intensive products like textile, toys, and plastics articles did not increase as fast as during the year before.

Their export growth rates in 2005 were 22.9% (down from 171.6%), 2.9% (down from 10.2%) and 22.9% (down from 46.4%) respectively.[2] Although the extent of the impact of policy adjustment is not clear, there has been an increased emphasis of late on high-tech merchandise exports and it is likely that government policies and promotions have significantly helped to shape the structure of Chinese exports, as argued by Rodrik (2006).

[Table 1 here]

2.2 Subsidies

The concept of a subsidy varies largely in terms of its purpose and scope. In general, it is regarded as an unrequited transfer from government to a private entity. This is the definition used by the WTO and it includes direct payments, tax concessions, contingent liabilities and the purchase and provision of goods and services (WTO, 2006). In China, however, subsidies are defined as unrequited direct payments from government or an international organisation to enterprises, including returned value-added tax. In other words, subsidies are defined in a much more narrow sense by the Chinese government and can be broadly classified as production related subsidies.

It is difficult to find detailed information on which industries or what types of enterprises should be subsidised and by how much. However, the China Fiscal Yearbook (2005) provides some aggregate figures and general information on subsidies. Among the main items of national government budget expenditures, three are used for firms, especially for state-owned enterprises. They consist of additional appropriation for enterprises circulating capital, innovation and science & technology promotion funds and expenditures for loss making SOEs. Other than the innovation funds and science & technology

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[2] The US-China Business Council: China's Trade Performance 2004,
http://www.uschina.org/statistics/2005tradeperformance.html

promotion funds which are shared between state- and non-state owned enterprises, the other

two are all specifically for SOEs.[3]

Table 2 shows that between 1998 and 2004 subsidies amount to a total of 871.15

billion RMB, the majority of which is directed to SOEs.[4] There are generally several

reasons why governments subsidises enterprises: industrial development, export promotion,

supporting firms to innovate and securing a national advantage in leading industries (WTO,

2006). However, subsidies for additional appropriation for enterprises circulating capital

and for loss making SOEs that are solely used by SOEs, in particular those loss-making

SOEs, accounted for 43.7 percent of total subsidies since 1985. The motivation for

government to subsidise loss making SOEs is to avoid a worsening of unemployment rates

and social riots due to possible bankruptcies of SOEs (Luo and Golembiewski, 1996).

Table 2 also shows that over half of total subsidies are allocated to innovation funds and

science & technology promotion funds. There are two main types of firms receiving this

kind of subsidies – large firms and high-tech firms.

[Table 2 here]

By way of more specific examples of how subsidy policies work in practice, Jinshan

district in Shanghai implements a policy for attracting investment in the following way:

For a firm that invests more than 10 million RMB in their business park can get a subsidy

of 0.8% of its investment and can apply for subsidies of up to 800,000 RMB for any single

application.[5] Zhuhai policies offer much more, in addition to 3 years free land, free office,

30% discount for electricity and communication fees, favourable conditions for bank loans,

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[3] Other than these direct payments from government, there is a fiscal device for encouraging export – the export rebate. Since 2000, government pays more than 100 billion RMB each year for export tax rebate. However, export rebate is not included in the definition of subsidy in Chinese government expenditure and is therefore not part of our analysis, which only considers production related subsidies.
[4] Data from the China Statistical Yearbook (2005) show that over the same period, profits by SOEs reached 2292.9 billion RMB, implying that subsidies to SOEs accounted for over one third of the total profit of SOEs between 1998 and 2004.
[5] An announcement from Shanghai Jinshan district: http://www.zhaoshang-sh.com/jszs/zszc01.htm

they set up a special fund to encourage software exports, and offer 500,000 for all the firms that pass the CMM-2 certification.[6]

China's accession to the WTO in December 2001 was an important step towards economic liberalisation. T he Chinese government's commitment to eliminate subsidies had been one of main issues during China's negotiation with the WTO. China signed the Agreement on Subsidies and Countervailing Measure (SCM), in which the Chinese government agreed to substantially reduce state level subsidies to the SOE sector, in particular, subsidies for loss-making state owned enterprises. Although there are several notices issued by Ministry of Finance asking to gradually eliminate the subsidies to loss-making SOEs,[7] the Chinese Statistical Yearbook for 2004 still reported 21.79 billion RMB of such subsidies. The reason put forward by China is that central government faces the difficulties in tracking down all sources and types of subsidies and that a large proportion of the subsidies have come from local government.[8]

3 Theoretical illustration and empirical approach

The purpose of this paper is to try and establish whether there is a link between the policy of providing production-related subsidies and export performance at the firm level. In this section we firstly provide a very simple model to illustrate the effect of production subsidy on a firm's export decision and export intensity. In order to allow for a simple

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6 A notice from Zhuhai City: http://www.zhuhai.com.cn/otherview.asp?id=760

7 Ministry of Finance determines to examine subsidies to SOEs before the deadline of WTO, http://www.wtolaw.gov.cn/display/displayinfo.asp?iid=200309231449323843

[8] Eckaus (2006) is highly sceptical of this argument, but there is a certain justification behind it. First, local government has rather great freedom in offering money and favorable policies to firms that are located in their regions. Second, for a long while, one of the main performance appraisals for local government was local GDP growth rate. Local governors work under pressure of reaching certain targets which are set up by higher government levels for their promotions. Enlarging exports and attracting investments are regarded as two quick means to achieve GDP growth. With regional competition getting stronger, local government tends to maximize their own benefits by adopting fiscal devices to subsidise those competitive firms, for example by direct payments, free land, tax rebates etc. For example, a listed car company, Shenyang SongLiao, received a subsidy of 100 million RMB in 2003 because Shenyang city set out a development strategy of focusing on the car industry. Although the company had been loss-making for two years by then, local government defined the company as a leading car firm and subsequently the firm received the subsidies.

exposition we consider a profit-maximizing monopolistic firm that faces downward sloping demand curves at the home(H) and foreign(F) market:

$$D_j = 1 - p_j \quad , j=H,F \tag{1}$$

where D_j and p_j denote demand of a representative consumer and price set by a representative firm in market j, respectively. Let M_j and q_j denote the number of consumers and firm level output in market j, we have $q_j = M_j(1 - p_j)$. Production requires a fixed cost F and constant marginal cost c, and exports incur sunk exporting cost F_X and an extra per unit transportation cost τ. More importantly, we assume that the production subsidy S received by a firm is linear to its total output i.e. $S = s(q_H + q_F)$, where s denotes the constant subsidy rate per unit output. Profit maximizing leads to the following firm level optimal domestic profit and sales π_H, R_H, and export profit and sales π_F, R_F:

$$\pi_H = \frac{M_H}{4}\left[1 - (c - s)\right]^2 - F \tag{2}$$

$$R_H = \frac{M_H}{4}\left[1 - (c - s)^2\right] \tag{3}$$

$$\pi_F = \frac{M_F}{4}\left[1 - (c + \tau - s)\right]^2 - F_X \tag{4}$$

$$R_F = \frac{M_F}{4}\left[1 - (c + \tau - s)^2\right] \tag{5}$$

It is clear from [4] that π_F is increasing in s, as the effect of an increase in the per-unit subsidy rate is equivalent to a lowering of marginal cost, which raises a firm's incentive of exporting. A firm will be exporting, if c is sufficiently low or s is sufficiently

large so that $\pi_F > 0$. In other words, subsidy can have a positive effect on firm's export decision.

However, it is not immediately clear how increasing subsidy impacts on the export intensity ($\frac{R_F}{R_H + R_F}$) of an existing exporter, since an increase in *s* will raise both R_F and R_H. Let $\gamma = \frac{R_F}{R_H}$ denote the export-domestic sales ratio, it turns out that

$$\frac{\partial \gamma}{\partial s} = \frac{2 M_F \tau \left[(c - s)^2 + \tau (c - s) + 1 \right]}{M_H \left[1 - (c - s)^2 \right]^2} > 0 \qquad (6)$$

Hence γ is increasing in *s*, indicating a disproportional response of exports to rising production subsidy than domestic sales, which leads to a positive effect of production subsidy on export intensity. Note that the magnitude of this positive effect is greater, the higher the firm's marginal cost *c*, the greater trade costs τ, and the larger the foreign-home market size ratio M_F / M_H. Figure 1 shows a clear positive impact of the subsidy on domestic sales, exports, and export intensity.[9]

As shown in the upper panel of figure 1, although both exports and domestic sales respond positively to a rising subsidy rate, exports rise more sharply than domestic sales. As a result, the export intensity rises as shown in the lower panel[10]. To summarise, our simple theoretical model predicts a positive impact of production subsidy on both the

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[9] The parameter values based on which the figure is generated is $M_F = M_H = 100$, $c = 0.5$, $\tau = 0.3$, $s \in [0, 0.48]$.

[10] Note that since total subsidy S is increasing in s, it is straightforward that export intensity is also increasing in S.

propensity of exporting (probability of becoming an exporter) and export intensity (share of exports in total output) at firm level.[11]

[Figure 2 here]

We take the prediction that production subsidies can impact positively on exporting as a guide for our empirical work. In order to investigate this hypothesis we model the determinants of a firm's export activity, paying particular attention to the role of subsidies in this respect. Specifically, we start off with an empirical model where a firm i either exports at time t with a positive (log) export turnover ($S_{it} > 1$) or it does not ($S_{it} = 0$). To determine the relationship between state subsidies (*SUB*) and the level of exporting, defined as the share of exports in total output, we formulate a Tobit model in terms of a latent variable model as follows:

$$S_{it}^* = \beta'X_{it} + \gamma \, SUB_{it} + D_{it} + \varepsilon_{it}$$
$$S_{it} = 0 \qquad\qquad \text{if } S_{it}^* \leq 0 \qquad\qquad\qquad\qquad (7)$$
$$S_{it} = S_{it}^* \qquad\qquad \text{if } S_{it}^* > 0$$

where *SUB* is equal to the (log) value of the production subsidy firm i received from either local or central government and represents our main variable of interest. *X* is a vector of firm determinants of exporting intensity. The vector *D* consists of a full set of regional, two digit industry and time dummies.[12]

The choice of variables to be included in *X* is guided by the existing empirical literature on the determinants of exporting. Accordingly, we consider firm's export

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[11] Another justification for a positive effect of production subsidies on exporting may come from the recent theoretical and empirical literature on firm level export activity which argues that selling abroad involves sunk costs and it is only the "better" firms, i.e. those that are more efficient or productive, that are able to overcome these entry barriers and export successfully (Clerides et al., 1998; Bernard and Jensen, 1999; Melitz, 2003). Hence government support specifically targeted at improving productivity related aspects of the firms' operations can assist them in overcoming barriers to exporting. Hence, if there is "learning by doing" (Ohashi, 2005) policies that affect the level of output can also have positive effects on exporting. Our rationale discussed above does not rely on such learning by doing effects.

[12] Omitting base groups, there are in total 29 regional, 26 industrial and 4 year dummies.

experience, productivity, employment size, sales growth, as well as product innovation and training activity (the variables are defined in more detail below in Table 3). It is largely accepted in the literature that firms that are larger, more productive, more innovative and more skill intensive are more likely to export (e.g., Bernard and Jensen, 2004; Bleaney and Wakelin, 2002; Roberts and Tybout, 1997) and our choice of covariates reflects these findings. Furthermore, we include in the analysis two variables to capture the possibility that firms that have some level of foreign capital participation are more likely to export. These variables are defined as the share of capital held by foreign multinationals in firm's total capital. In line with Girma et al. (2006) who find important differences in performance between foreign capital participation from owners from an "Ethnic Chinese" background (Hong Kong, Macao, Taiwan) and those from other foreign countries, we calculate two variables of foreign capital participation labelled as "Ethnic Chinese MNE" and "foreign MNE" respectively.

There are a number of variables in the above specification that are arguably contemporaneously determined with, or indeed impacted upon by, exporting and hence are potentially endogenous. One example is innovation activity. Arguably, more innovative firms are more likely to export as they can differentiate their products, however, it is also possible that exporting allows firms to access and learn foreign technology, implement this in their own operations and hence improve innovative activity in the home country. In other words, the causality can run both ways (for a recent discussion, see Lachenmaier and Wößmann, 2006). Similar arguments can also be made regarding the potential endogeneity of employment size, productivity, employee training and foreign capital participation. Subsidies are also likely to be endogenous if governments select firms with certain characteristics and exporting is correlated with these characteristics. For example,

governments may choose either high or low productivity / profitability firms as their main recipients and exporting is likely to be correlated with these measures of firm performance.

In order to deal with the problem of endogeneity, we use the instrumental variables technique for Tobit models due to Blundell and Smith (1986). We also formally test whether the assumption of endogeneity is borne out by the data at hand. Lagged values of the potentially endogenous variables are used as instruments. In addition the share of the state sector in the industry and region are also used as extra instruments. The share of the state sector is a proxy for state dominance in the sector/region, and to the extent that firms in state-dominated sectors/regions are less efficient (due to, for example, insufficient competitive stimulus) this variable is a relevant instrument for innovation activity or investment in human capital. Furthermore, as there is to the best of our knowledge no formal test of the validity of instruments within the context of these endogenous Tobit specifications a Sargan test for the validity of the instruments is conducted by estimating the exporting equation using linear GMM techniques.

The estimation of Tobit models with endogenous regressors essentially involves two steps:[13] (i) generate residual terms from linear regressions of each endogenous variable on the instrumental variables and all other exogenous regressors, and (ii) estimate a standard Tobit model by including the residual terms from step (i) in the list of covariates. The residual terms are correction terms for the endogeneity problem, and jointly statistically significant coefficients can be taken as evidence in favour of the hypothesis that instrumented variables are indeed endogenous.

4 Description of the data

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[13] A one-step variant of this estimator involving stronger distributional assumptions is also available (see Newey, 1987). However, the estimator fails to attain convergence in our data. This type of convergence problem is frequently encountered when there are more than one endogenous regressors.

For the empirical estimation of equation (7) we draw on the Annual Report of Industrial Enterprise Statistics compiled by the State Statistical Bureau of China covering the population of state-owned enterprises and privately-owned and collectively-owned firms with annual turnover of over five million Renminbi (just above $600,000). It is estimated that the firms contained in this data set account for about 90% of total industry output. The Statistical Bureau performs several logic tests to ensure the accuracy of the information in the report and identify illogical data.[14]

The data set includes information on gross output, sales, value added, exports, employment, net fixed assets, product innovation (defined as the production of goods involving new technologies and new production processes), employee training expenditure, profitability, firm ownership structure, industry affiliation, geographic location, and, most importantly from our point of view, the level of production related subsidies. The raw data available to us cover the period 1999 to 2003, and comprises of more than half a million observations from nearly 127,000 firms.

Our data set also provides information on the extent of foreign capital participation at the level of the firm. Domestic-owned firms are defined as either private, state-owned or collective enterprises with less than 25 percent share of foreign capital.[15] The information on firm level foreign capital participation enables us to calculate the share of foreign ownership in the domestic enterprise and identify the direct effects of foreign capital on the export activity of domestic firms as captured in equation (7).

The econometric work is based on domestically owned firms with a least two years data on all of the variables of interest, and in the final analysis we ended up with a total of

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[14] Different versions (in terms of coverage) of this data set are currently being used by academics (e.g. Jefferson and Huamao, 2004; and Hu et al, 2005).

[15] The data set distinguishes between foreign capital participation in domestically owned firms from Ethnic Chinese sources and other foreign sources. Once foreign participation exceeds this 25 percent threshold firms are classified as being foreign-owned multinationals. Our analysis does not consider such foreign owned firms as the determinants of exporting can be expected to be quite different for those two types of firms (e.g., Kneller and Pisu, 2004), and because the focus of our paper is on the development of domestic exporters. Hence, we only use information on domestic owned firms in our analysis.

285,896 observations based on 98,637 firms. Of those, around 14% of firms received production subsidies at some stage during the sample period. Roughly 25 % of the observations come from SOEs, 39% from collectives and the remaining 36% relate to privately owned firms.

Table 3 includes the definition of the variables included in equation (7) and some summary statistics. A few points are noteworthy. Firstly, privately owned firms have the highest average level of exports compared to SOEs and collectively-owned firms. They are also, on average, the most productive (in terms of value added per worker), have the highest growth rate of domestic sales, and the highest level of labour training. By contrast, SOEs are on average the largest (in terms of employment) and the most active in terms of product innovation (measured as the share of output involving new products or processes). Finally, not surprisingly, SOEs are, on average, the largest recipients of production subsidies.

[Table 3 here]

Table 4 takes a closer look at the average growth of exports in our sample between 1999 and 2003 by two digit industry and ownership. A number of points stand out. Firstly, export growth in privately-owned firms has been remarkably strong in almost all sectors over that period, not only in more labour intensive sectors in which China may be expected to have a natural comparative advantage, but also in more high technology intensive sectors such as machinery and electronics (sectors 35 – 42). This is in line with the aggregate data presented in Table 1 above and Rodrik's (2006) view that China has not only become a significant player in export markets but also that its export basket is significantly more sophisticated than would be expected based on comparative advantage arguments.

The export performances of SOEs and collectively-owned firms are more diverse, however. While both types of firms show some positive export growth in high tech sectors, this performance is significantly less than that of private firms. Also, there are a large

number of sectors in which exports by those two types of firms declined over the five year period analysed. Given that SOEs are on average the largest recipients of production subsidies from local or central governments this, at first sight, does not suggest any strong relationship between export activity and subsidies. However, the summary statistics of course do not allow us to get to the bottom of this issue as we cannot allow for firm heterogeneity, endogeneity of subsidies and the conflating effects of other variables. This will be done in the econometric analysis in the next section.

[Table 4 here]

Given that our main interest is in the impact of production subsidies it is useful to get a better idea of which types of firms are likely to be recipients, before turning to estimating the empirical model described above. Therefore, Table 5 presents the results of an exploratory econometric analysis where we regress the log level of production subsidy received by firm i in time t on a number of firm characteristics which we may expect to be correlated with subsidy receipt. We find that, all other things equal, SOEs receive on average larger subsidies than collectively owned or private firms. The first result is in line with the summary statistics presented in Table 4 but now allows the conclusion that SOEs are more prominent recipients of subsidies even when controlling for some other firm characteristics. Irrespective of ownership structure the majority of enterprises in China are affiliated to some level of government administration (e.g. Lui et al, 2006). The function of the relevant government body (local, provincial or central) is to offer credit guarantees and political protection, in return for some "management fees". Our exploratory work suggests that government-firm relationship is important in attracting production subsidies, with firms under the control or associated with the central government benefiting disproportionately more in this respect.

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As to the other observables included in the model we find that, generally, larger firms receive higher absolute levels of subsidies and the profitability of the firm is negatively correlated with the level of the subsidy it receives. This is perhaps a reflection of the common policy of subsidising loss-making SOEs – a policy that China committed to end by 2005 with its accession to the WTO in 2001. Furthermore, we find for all types of firms, especially for SOEs, that exporting is positively correlated with the amount of subsidy received. It needs to be stressed this analysis is only exploratory and intended to shed some lights on the correlates of production subsidies in China. A fuller treatment of the issue is beyond the scope of this paper.

[Table 5 here]

5 Econometric results

We now turn to the more formal econometric modelling of firm level export based on equation (7). In order to establish some benchmark results, Table 6 presents the findings of estimating equation (7) using an OLS, linear GMM, standard Tobit and endogenous Tobit estimator, respectively, in columns (1) to (4). The results from the OLS estimator are potentially biased as it does not take account of the left truncation of the dependent variable and the problem of endogeneity. The GMM estimator accounts for the latter, but still neglects the truncation problem. This is taken into account in the standard Tobit estimator, however, this treats all covariates as exogenous; as discussed above this is not a reasonable assumption for our model. The endogenous Tobit estimator allows for the endogeneity of the suspected variables. The instrument validity test within the linear GMM framework confirms the validity of the instrumental variable candidates, and the test for the null that the covariates are exogenous is emphatically rejected in both linear and Tobit models. Hence we take the endogenous Tobit results as the most reliable. Still, comparing results

we find that the coefficients are similar in terms of sign and significance, though there are some differences in the magnitude of the estimates. In what follows we concentrate on the estimates from the endogenous Tobit model.

In terms of the coefficients on the control variables included in the model, we find they all turn out as expected. In line with the literature we find that export activity is highly persistent as indicated by the positive and statistically significant coefficient on the dummy variable indicating previous export experience. We also find that firms that are more productive, larger, innovative active and training intensive and those that receive larger inflows of foreign capital tend to export more. Furthermore, firms with larger growth on the domestic market export less, as would be expected since their expansion is on the domestic market.

The variable of most interest to us is, of course, the production subsidy and we find that this has a positive effect on the level of exports, as expected from our theoretical discussion. We find that doubling production subsidies would, on average, lead to a 3.2% increase in the level of exports. This result is, thus, in line with Rodrik (2006) who also stresses the important role policy has had on China's export performance. However, it contrasts somewhat with Bernard and Jensen (2004) who find that state support has had no significant effect on the probability to export of firms in the US. However, a number of differences in the analyses are worth pointing out. Firstly, our subsidy measure captures production subsidies to firms while Bernard and Jensen explicitly measure export promotion activities at the level of the state. These are likely to consist mainly of efforts to collect information on foreign markets to lower entry barriers, or a co-ordination role for current and future exporters, and are hence quite distinct from financial assistance related to actual production. Secondly, our data relate to an emerging economy which has a much

greater potential for new firms to enter export markets than in a mature economy like the US.

<div align="center">[Table 6 here]</div>

The results thus far constrain the effect of subsidies on exporting to be the same for all firms. This misses important aspects of heterogeneity in our sample. We attempt to explore some of these facets in further results in Table 7 where we allow the coefficient on subsidies to vary according to some given characteristic. In column (1) we interact the subsidy variable with a dummy equal to one if a firm operates in a sector that is judged to be relatively labour intensive. Rodrik (2006) argues that Chinese policy was in particular directed towards building up knowledge and export capability in high technology sectors (contrary to its natural comparative advantage in labour intensive products) and we may therefore expect that subsidies had a larger influence in those sectors. Our result on the interaction term is in line with this contention. While firms in less labour intensive sectors benefit from subsidies in terms of having larger exports, the impact of subsidies on exports in firms in labour intensive sectors is essentially less than half as important compared to firms in capital intensive firms[16].

In column (2) we interact subsidies with a dummy equal to one if a firm is loss making. This explores the impact of China's particular policy of granting subsidies to loss making SOEs which were an issue during WTO negotiations (Eckaus, 2006). Our results show that there is no evidence that such subsidies had any positive effect on export activity, while subsidies to firms with positive profits acted as stimulants for increasing exports. Finally, column (3) indicates that firms with previous export experience are the benefactors from subsidies in terms of being able to further improve exports, while firms without such previous experience show no such benefits. This also serves to reconcile our paper with

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[16] For firms in capital intensive sectors (the base group) the elasticity of exports with respect to subsidies is 0.050 , whereas this quantity is only 0.106 (.050 - .034) in labour intensive industries.

Bernard and Jensen (2004) as they only consider the probability to export for firms and find that export promotion does not increase this probability. We also find no effect on firms that previously did not export, but only find positive impacts for firms that are already experienced exporters.

[Table 7 here]

Another aspect of heterogeneity in our sample is ownership. In the analysis thus far we pool data for state-owned, collectively-owned and private firms. In order to capture possible differences in firms' benefits from subsidies, we split the sample into three sub-samples for each type of ownership and estimate the model separately on these. The results are reported in Tables 8 to 10. When considering the effect of our control variables the most striking difference is that labour training is only consistently positive for SOEs. Apart form this the impact of all other control variables is qualitatively similar across the ownership structure, while recognising that the magnitude of coefficients is also somewhat different in the three samples in a number of instances. Also when exploring the role of firm characteristics in the export-subsidy nexus, we fail to find statistically significant differentials across the ownership structure.

[Tables 8-10 here]

6 Conclusions

Using a unique data set from the Chinese manufacturing sector, this paper analyses the impact of production subsidies on firms' export performance. It documents robust evidence that production subsidies stimulate export activity, although this effect is conditional on firm characteristics. In particular, the beneficial impact of subsidies is found to be more pronounced amongst profit-making firms, firms in capital intensive industries,

and those with previous exporting experience. Compared to firm characteristics, the extent of heterogeneity across ownership structure proves to be relatively less important.

So it appears that the answer to the question posed in this paper is affirmative. But this answer raises a more challenging question: Do production subsidies have a significant trade distorting effects on China's trading partners? Answering this question has a serious implication in light of China's WTO commitment to stop subsidising domestic firms by 2005. Irrespective of the motive of local or central governments for extending production subsidies, the fact that subventions foster export activity might lead to suggestions of unfair trade practice. However, a more detailed analysis based on firm level export data by commodity and destination country is warranted in order to substantiate or refute such claims.

References

Bajona, C. and T. Chu (2004) "China's WTO accession and its effect on state-owned enterprises", East West Center Working Paper No. 70

Bernard, A. and Jensen, J. (1999), Exceptional exporter performance: Cause, effect or both?, *Journal of International Economics*, 47, 1-25.

Bernard, A. and Jensen, J. (2004). "Why Some Firms Export", *Review of Economics and Statistics*, 86, pp. 561-569.

Bleaney, M. and Wakelin, K. (2002). 'Efficiency, Innovation and Exports', *Oxford Bulletin of Economics and Statistics*, Vol. 64, pp. 3-15.

Blundell, R.W. and Smith, R. J., (1996) "An exogeneity test for a simultaneous equation Tobit model with an application to labor supply". *Econometrica*, 54:4, 679-686.

Branstetter, L.G. and R.C. Feenstra (2002) "Trade and foreign direct investment in China: a political economy approach", *Journal of International Economics*, 58, 335-358

Clerides, S.K., S. Lach and J.R. Tybout (1998), Is learning by exporting important? Microdynamic evidence from Colombia, Mexico and Morocco, *Quarterly Journal of Economics*, 903-948.

Eckaus, R.S. (2006) "China's exports, subsidies to state owned enterprises and the WTO", *China Economic Review*, 17, 1-13.

Girma, S., Y. Gong and H. Görg (2006) "Can you teach old dragons new tricks? FDI and innovation activity in Chinese state-owned enterprises", CEPR Discussion Paper 5838

Hu, A.G.Z, G.H. Jefferson and Q. Jinchang (2005). "R&D and technology transfer: Firm level evidence from Chinese industry", *Review of Economics and Statistics*, 87, 780-786.

Jefferson, G.H. and Huamao, B. (2004) "R&D performance in Chinese industry". *Economics of Innovation and New Technology*, 13:1/2.

Kneller, R. and M. Pisu (2004), "Export oriented FDI in the UK", *Oxford Review of Economic Policy*, 20(3), 358-371.

Lachenmaier, S. and L. Wößmann (2006) "Does innovation cause exports? Evidence from exogenous innovation impulses and obstacles using German micro data", *Oxford Economic Papers*, 58, 317-350.

Liu, X. and Shu, C, (2005), Determinants of export performance: Evidence from Chinese industries, Macroeconomics working paper, No. 213, East Asian Bureau of Economic Research

Lui, S., Sun, P, and Woo, W.T. (2006) "The political economy of Chinese-style privatization: motives and constraints". *World Development,* in press.

Luo, H. and Golembiewski, R (1996), Budget Deficits in China: Calculations, Causes, and Impacts, SPAEF: Public Administration and Management: An interactive Journal, 1(1)

Melitz, M. (2003), The impact of trade on aggregate industry productivity and intra-industry reallocation, *Econometrica*, 71, 1695-1725.

Newey, W.K. (1987) "Efficient estimation of limited dependent variables models with endogenous explanatory variables". *Journal of Econometrics* 36, 231-250.

Ohashi, H. (2005) "Learning by doing, export subsidies and industry growth: Japanese steel in the 1950s and 1960s", *Journal of International Economics*, 66, 297-323

Roberts, M.J. and Tybout, J.R. (1997). 'The decision to export in Colombia: an empirical model of entry with sunk costs', *American Economic Review*, Vol. 87, pp. 545-564.

Rodrik, D. (2006) "What's so special about China's exports?", NBER Working Paper 11947

WTO, (2006), World Trade Report: Exploring the links between subsidies, trade and the WTO

Figure 1: China's export growth rates

Export growth rates

Source: China's customs statistics

Figure 2 . Production subsidies and export intensity

Production subsidy , exports(R_F) and domestic sales(R_H)

Output

Per unit subsidy(s)

Production subsidy and export intensity

Per unit subsidy(s)
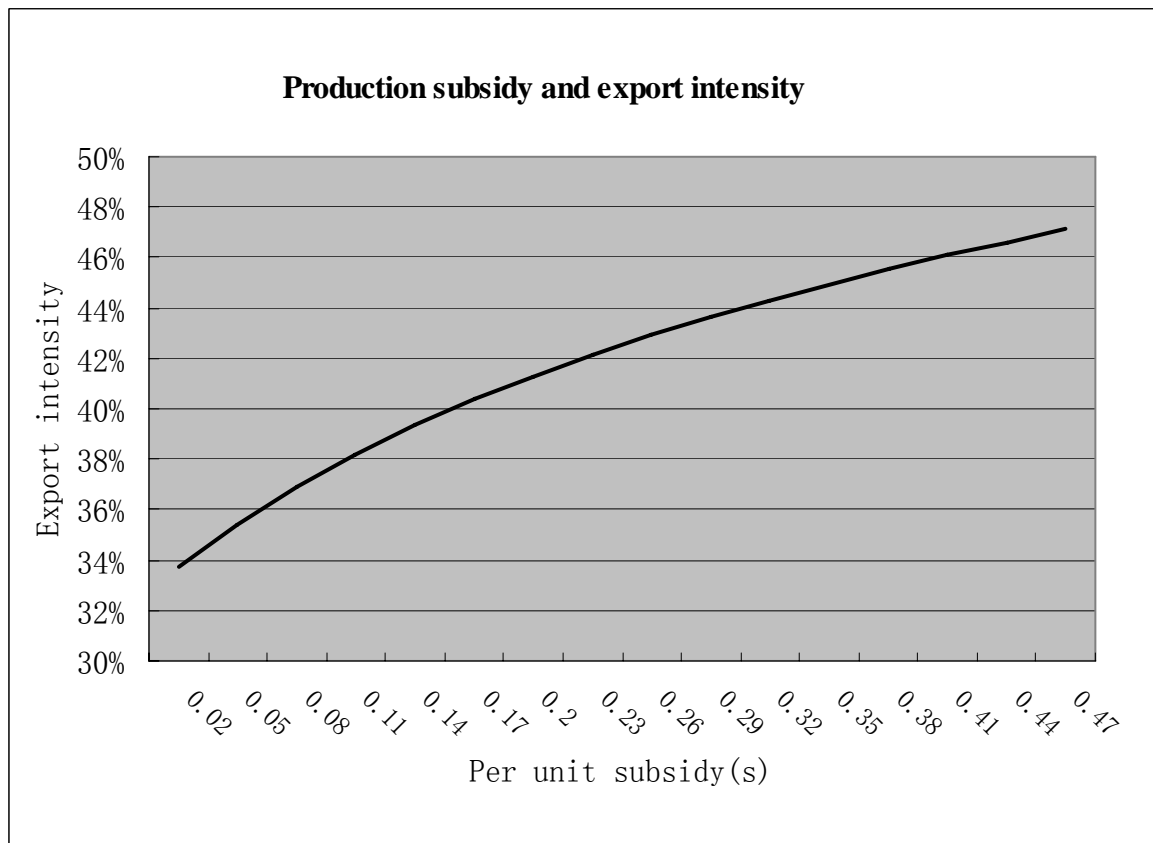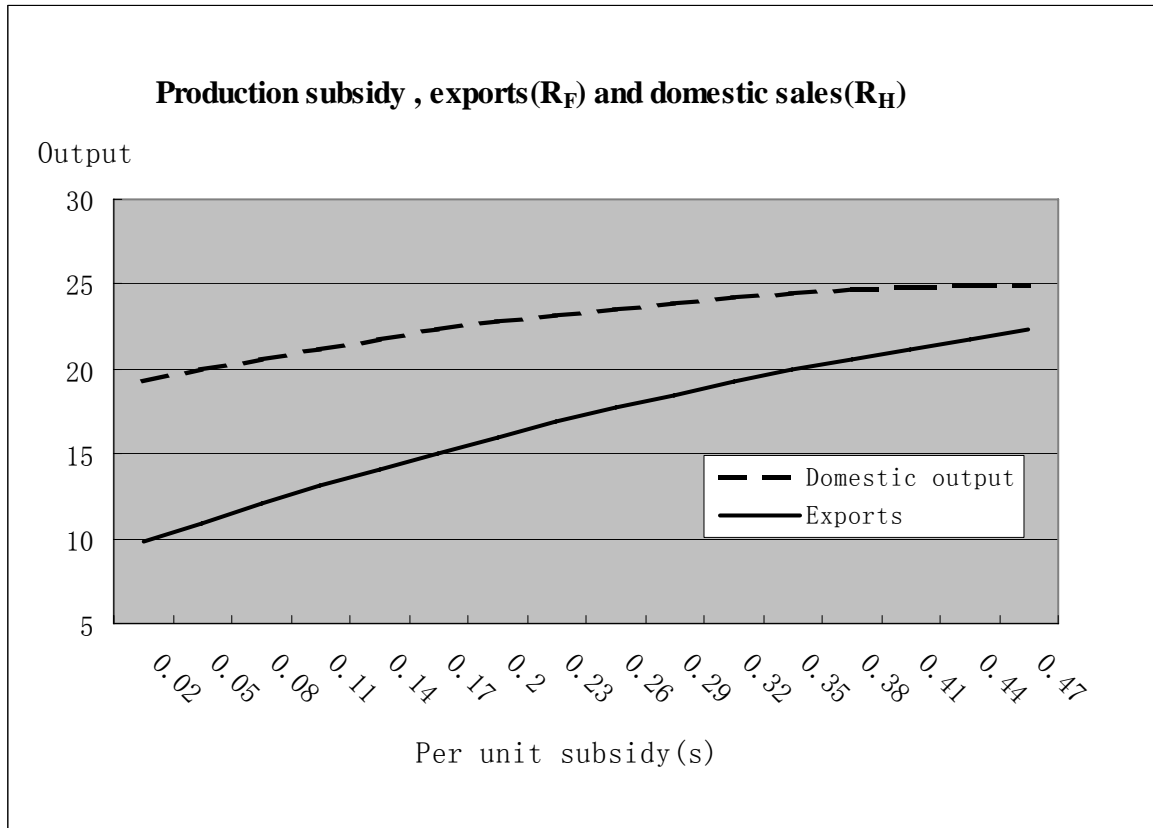
Table 1: China's top exports 2005 (US$ million)

Commodity Description	2005	% change
Electrical machinery & Equipment*	4267.5	32
High-Tech products*	2182.5	31
Automatic data processing machines and components	763.1	27.4
Garments	738.8	19.9
Textile	411.3	22.9
Parts of automatic data processing machines'	283.6	18.8
Telephone and mobile communications	206.4	45.7
Shoes	190.5	25.3
Parts of TV set, Sound Recording Apparatus	181.4	50.8
Integrated Circuit and microelectronics apparatus	143.9	30.9
Furniture	135	32.8
Iron&steel	130.8	56.9
Plastic articles	112.8	22.9
TV set (including a complete set of Spare parts)	84.1	53.3
Record and DVD player	76.5	3.2
Travelling appliance and suitcase	73.1	17.2
Parts of Motor Vehicles	65.8	49.2
Toys	65.6	2.9
Petroleum products refined	64.1	61.9
Play station	63.8	82.2

Source: China's customs statistics

Table 2 National Budgetary Expenditure on Industry (100 million RMB)

Year	Additional appropriation for enterprises' circulating capital	Innovation funds and science & technology promotion funds	Subsidies to Loss-making Enterprises	Total
1985	14.30	103.42	507.02	624.74
1986	9.94	129.85	324.78	464.57
1987	12.06	124.93	376.43	513.42
1988	9.59	151.01	446.46	607.06
1989	12.09	146.30	598.88	757.27
1990	10.90	153.91	578.88	743.69
1991	13.08	180.81	510.24	704.13
1992	10.63	223.62	444.96	679.21
1993	18.48	421.38	411.29	851.15
1994	17.33	415.13	366.22	798.68
1995	34.80	494.45	327.77	857.02
1996	42.93	523.02	337.40	903.35
1997	52.20	643.20	368.49	1063.89
1998	42.36	641.18	333.49	1017.03
1999	56.41	766.05	290.03	1112.49
2000	71.06	865.24	278.78	1215.08
2001	22.71	991.56	300.04	1314.31
2002	18.97	968.38	259.60	1246.95
2003	11.95	1092.99	226.38	1331.32
2004	12.44	1243.94	217.93	1474.31
Total	494.23	10280.37	7505.07	18279.67

Source: China fiscal yearbook, China statistical yearbook, 2005

Table 3
Definition and summary statistics
of key variables

Variable	Definition	SOEs		COLLECTIVES		PRIVATES	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Exports	Log of exports sales	1.390	3.299	1.823	3.706	2.275	4.039
Exporting experience	Dummy =1 if firms exported two years ago	0.156	0.363	0.194	0.395	0.231	0.422
Subsidy	Log of production subsidy from local and central governments	1.035	2.387	0.734	1.978	0.749	2.008
Domestic growth	Growth rate of firms domestic sales	-0.002	0.858	0.057	1.396	0.117	1.505
Productivity	Log of value added per workers	2.656	1.372	3.486	1.143	3.542	1.070
Employment	Total number of employees	5.154	1.509	4.843	1.065	4.968	1.102
Product innovation	Share of output involving new process or product innovation in total output.	0.039	0.139	0.018	0.104	0.034	0.145
Labour training	Log of employee training expenditure	1.275	1.907	0.793	1.440	1.089	1.691
Share of foreign MNE	Share of foreign multinationals capital in firm's total capital	0.003	0.035	0.006	0.063	0.006	0.058
Share of Ethnic Chinese MNE	Share of Ethnic Chinese multinationals capital in firm's total capital	0.002	0.036	0.009	0.082	0.008	0.076
Number of firms		23593		36565		38479	
Observations		71523		111701		102672	

Table 4
Average growth of exports between 1999 and 2003
by ownership and two-digit industry:

Two-digit industry	SOE	COLL	PRIV
13-Food Processing*	8.15%	-7.44%	36.22%
14-Food Production*	18.35%	-0.37%	33.17%
15-Beverage Industry*	18.39%	-25.12%	49.65%
17-Textile Industry*	-6.43%	-4.54%	37.32%
18-Garments and Other Fibre Products*	-22.49%	-0.57%	38.82%
19-Leather, Furs, Down and Related Products*	-15.33%	0.74%	52.61%
20-Timber Processing*	-25.31%	-1.54%	58.14%
21-Furniture Manufacturing*	5.24%	-1.41%	42.24%
22-Papermaking and Paper Products*	2.37%	3.04%	28.32%
23-Printing and Record Medium Reproduction*	-16.04%	-10.78%	52.89%
24-Cultural, Educational and Sports Goods*	2.29%	3.46%	43.90%
25-Petroleum Refining and Coking	-16.16%	-13.13%	39.07%
26-Raw Chemical Materials and Chemical Products	5.60%	1.84%	34.53%
27-Medical and Pharmaceutical Products	-4.58%	-5.31%	33.58%
28-Chemical Fibre	3.96%	48.58%	34.58%
29-Rubber Products*	9.49%	6.16%	34.65%
30-Plastic Products*	-8.08%	8.15%	46.18%
31-Nonmetal Mineral Products*	10.33%	10.05%	37.43%
32-Smelting and Pressing of Ferrous Metals	-8.60%	10.19%	10.84%
33-Smelting and Pressing of Nonferrous Metals	8.07%	13.49%	39.20%
34-Metal Products*	-3.36%	5.08%	47.08%
35-Ordinary Machinery	-5.58%	3.02%	38.63%
36-Special Purposes Equipment	9.70%	-14.70%	51.81%
37-Transport Equipment	13.95%	12.15%	73.61%
39-Other Electronic Equipment	-0.07%	24.45%	45.32%
40-Electric Equipment and Machinery	23.15%	-1.07%	58.98%
41-Electronic and Telecommunications	-3.24%	0.58%	16.68%
42-Instruments and meters	1.92%	7.11%	37.96%

Notes:
a. Authors calculations based on the database used in this paper.
b. The numbers preceding the industry description refer to the two-digit codes used by the State Statistical Bureau of China.
c. * indicates more labour-intensive industries.

Table 5
Who gets production subsidy?
An exploratory analysis

Dependent variable: log production subsidy

	(1)	(2)	(3)	(4)
	All firms	SOE	COLLECTIVE	PRIVATE
Exporter dummy	0.258	0.688	0.114	0.158
	(0.018)***	(0.049)***	(0.026)***	(0.026)***
Lagged log sales	0.329	0.305	0.255	0.431
	(0.006)***	(0.009)***	(0.012)***	(0.012)***
Lagged profit	-0.012	-0.012	-0.005	-0.103
	(0.004)***	(0.005)**	(0.001)***	(0.048)**
SOE dummy	0.346			
	(0.021)***			
Collective dummy	0.023			
	(0.014)			
Central government dummy	1.005	1.071	-0.261	0.749
	(0.068)***	(0.082)***	(0.162)	(0.218)***
Provincial government dummy	0.327	0.559	-0.297	0.408
	(0.038)***	(0.062)***	(0.099)***	(0.095)***
Local government dummy	0.203	0.256	0.113	0.320
	(0.014)***	(0.051)***	(0.019)***	(0.021)***
Observations	285890	71523	111701	102672
R-squared	0.11	0.14	0.11	0.12

Notes:
a. Profitability is defined as pre-tax profit/total sales
b. The central provincial and local government dummies indicate the level of the firms political affiliation. Firms no political affiliation constitute the base group.
c. Robust standard errors in parentheses
d. significant at 10%; ** significant at 5%; *** significant at 1%
e. All specification include the full set of time, two-digit industry and regional dummies.

Table 6
Exporting and production subsidy:
Baseline results

	(1)	(2)	(3)	(4)
	OLS	Exogenous tobit	Linear GMM	Endogenous tobit
Exporting experience	7.284	7.674	7.311	7.708
	(0.020)***	(0.012)***	(0.017)***	(0.012)***
Domestic sales growth	-0.404	-0.422	-0.387	-0.401
	(0.006)***	(0.003)***	(0.006)***	(0.003)***
Productivity	0.189	0.198	0.023	0.027
	(0.003)***	(0.004)***	(0.013)*	(0.013)*
Employment	0.302	0.329	0.225	0.252
	(0.005)***	(0.004)***	(0.007)***	(0.007)***
Product innovation	0.507	0.527	0.392	0.413
	(0.042)***	(0.033)***	(0.058)***	(0.050)***
Labour training	0.018	0.017	0.041	0.023
	(0.003)***	(0.003)***	(0.007)***	(0.006)***
Share of foreign MNE	1.593	1.602	2.386	2.402
	(0.104)***	(0.073)***	(0.173)***	(0.135)***
Share of Ethnic Chinese MNE	1.017	1.061	1.431	1.491
	(0.076)***	(0.057)***	(0.140)***	(0.110)***
Subsidy	0.026	0.028	0.032	0.032
	(0.002)***	(0.002)***	(0.004)***	(0.003)***
Exogeneity test (p-value)			0.000	0.000
Instrument validity test (p-value)			.271	
R-square	.74			
Observations	285896	285896	285896	285896

Notes:
a. Standard errors in parentheses
b. * significant at 10%; ** significant at 5%; *** significant at 1%
c. All specification include the full set of time, two-digit industry and regional dummies

Table 7
Exporting and production subsidy:
Instrumental variables Tobit estimates

	(1)	(2)	(3)
Exporting experience	7.705	7.706	7.299
	(0.012)***	(0.012)***	(0.016)***
Domestic sales growth	-0.401	-0.401	-0.395
	(0.003)***	(0.003)***	(0.003)***
Productivity	0.021	0.026	0.025
	(0.011)*	(0.014)*	(0.013)*
Employment	0.251	0.250	0.232
	(0.007)***	(0.007)***	(0.007)***
Product innovation	0.398	0.399	0.249
	(0.050)***	(0.050)***	(0.051)***
Labour training	0.022	0.022	0.011
	(0.006)***	(0.006)***	(0.007)*
Share of foreign MNE	2.404	2.401	2.319
	(0.135)***	(0.136)***	(0.136)***
Share of Ethnic Chinese MNE	1.494	1.490	1.655
	(0.110)***	(0.110)***	(0.111)***
Subsidy	0.050	0.059	-0.072
	(0.005)***	(0.004)***	(0.004)***
Subsidy*labour intensive	-0.034		
	(0.006)***		
Subsidy* loss making		-0.139	
		(0.014)***	
Subsidy* exporting experience			0.380
			(0.010)***
Observations	285896	285896	285896

Notes:
a. Standard errors in parentheses
b. * significant at 10%; ** significant at 5%; *** significant at 1%
c. All specification include the full set of time, two-digit industry and regional dummies

Table 8
Exporting and production subsidy :
SOEs

	(1)	(2)	(3)	(4)
Exporting experience	7.386	7.372	7.381	6.734
	(0.023)***	(0.023)***	(0.023)***	(0.034)***
Domestic sales growth	-0.259	-0.258	-0.255	-0.254
	(0.010)***	(0.010)***	(0.010)***	(0.010)***
Productivity	0.080	0.081	0.061	0.077
	(0.016)***	(0.016)***	(0.017)***	(0.016)***
Employment	0.163	0.163	0.164	0.168
	(0.009)***	(0.009)***	(0.009)***	(0.009)***
Product innovation	0.721	0.701	0.701	0.580
	(0.077)***	(0.077)***	(0.077)***	(0.077)***
Labour training	0.062	0.059	0.058	0.056
	(0.011)***	(0.011)***	(0.011)***	(0.011)***
Share of foreign MNE	3.162	3.194	3.127	2.875
	(0.324)***	(0.324)***	(0.324)***	(0.325)***
Share of Ethnic Chinese MNE	3.341	3.372	3.332	3.513
	(0.373)***	(0.372)***	(0.373)***	(0.373)***
Subsidy	0.061	0.088	0.095	-0.056
	(0.005)***	(0.006)***	(0.007)***	(0.007)***
Subsidy*labour intensive		-0.066		
		(0.009)***		
Subsidy* loss making			-0.098	
			(0.015)***	0.376
Subsidy* exporting experience				(0.015)***
Observations	71523	71523	71523	71523

Notes:
a. Standard errors in parentheses
b. significant at 10%; ** significant at 5%; *** significant at 1%
c. All specification include the full set of time, two-digit industry and regional dummies

Table 9
Exporting and production subsidy :
Collective enterprises

	(1)	(2)	(3)	(4)
Exporting experience	7.754	7.753	7.750	7.441
	(0.019)***	(0.019)***	(0.019)***	(0.025)***
Domestic sales growth	-0.429	-0.429	-0.429	-0.423
	(0.005)***	(0.005)***	(0.005)***	(0.005)***
Productivity	0.028	0.028	0.029	0.022
	(0.012)**	(0.013)**	(0.012)**	(0.014)*
Employment	0.270	0.270	0.268	0.241
	(0.015)***	(0.015)***	(0.015)***	(0.015)***
Product innovation	0.176	0.171	0.154	0.093
	(0.103)*	(0.103)*	(0.103)	(0.104)
Labour training	0.013	0.013	0.012	0.003
	(0.012)	(0.012)	(0.012)	(0.012)
Share of foreign MNE	2.185	2.185	2.192	2.182
	(0.184)***	(0.184)***	(0.184)***	(0.185)***
Share of Ethnic Chinese MNE	1.627	1.625	1.640	1.750
	(0.135)***	(0.135)***	(0.135)***	(0.136)***
Subsidy	0.025	0.036	0.041	-0.052
	(0.006)***	(0.008)***	(0.007)***	(0.007)***
Subsidy*labour intensive		-0.021		
		(0.010)**		
Subsidy* loss making			-0.154	
			(0.035)***	
Subsidy* exporting experience				0.354
				(0.018)***
Observations	111701	111701	111701	111701

Notes:
   a. Standard errors in parentheses
   b. significant at 10%; ** significant at 5%; *** significant at 1%
   c. All specification include the full set of time, two-digit industry and regional dummies

Table 10
Exporting and production subsidy :
Private enterprises

	(1)	(2)	(3)	(4)
Exporting experience	7.751	7.749	7.748	7.301
	(0.020)***	(0.020)***	(0.020)***	(0.028)***
Domestic sales growth	-0.417	-0.417	-0.417	-0.410
	(0.005)***	(0.005)***	(0.005)***	(0.005)***
Productivity	0.037	0.038	0.041	0.051
	(0.015)**	(0.015)**	(0.018)**	(0.026)**
Employment	0.337	0.337	0.331	0.308
	(0.017)***	(0.017)***	(0.017)***	(0.017)***
Product innovation	0.324	0.310	0.305	0.157
	(0.084)***	(0.084)***	(0.084)***	(0.085)*
Labour training	0.015	0.015	0.016	0.004
	(0.012)	(0.012)	(0.012)	(0.012)
Share of foreign MNE	2.326	2.324	2.334	2.086
	(0.256)***	(0.256)***	(0.257)***	(0.259)***
Share of Ethnic Chinese MNE	0.600	0.604	0.589	0.727
	(0.228)***	(0.228)***	(0.228)***	(0.230)***
Subsidy	0.033	0.048	0.064	-0.111
	(0.008)***	(0.011)***	(0.009)***	(0.010)***
Subsidy*labour intensive		-0.024		
		(0.013)*		
Subsidy* loss making			-0.261	
			(0.043)***	
Subsidy* exporting experience				0.490
				(0.021)***
Observations	102672	102672	102672	102672

Notes:
a. Standard errors in parentheses
b. significant at 10%; ** significant at 5%; *** significant at 1%
c. All specification include the full set of time, two-digit industry and regional dummies