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Can production subsidies explain China's export performance? Evidence from firm level data*

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Abstract: It is widely accepted that China has been experiencing an export-led growth approach. However, the question whether government can reshape industry structure through production subsidies to enhance export performance has not been answered. This paper analyses the impact of production subsidies on firms' export performance using a very comprehensive and recent firm level database and controlling for the endogeneity of subsidies. 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 located in non-coastal regions. Compared to firm characteristics, the extent of heterogeneity across ownership structure (SOEs, collectives and privately-owned firms) proves to be relatively less important.

Keywords: Exporting, subsidies, China, endogenous Tobit

JEL classification: F1, O2, P3…

Sourafel Girma
Nottingham University Business School
Nottingham NG8 1BB, UK
E-mail: sourafel.girma.@nottingham.ac.uk

Yundan Gong
Nottingham University Business School
Nottingham NG8 1BB, UK
E-mail: yundan.glng@nottingham.ac.uk

Holger Görg
Kiel Institute for the World Economy
24105 Kiel, Germany
E-mail: holger.goerg@ifw-kiel.de

Zhihong Yu
School of Economics
University of Nottingham
Nottingham NG7 2RD
Zhihong.yu@nottingham.ac.uk

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1 Introduction

China's economic growth experience and particularly its emergence as one of the largest export nations has fuelled much recent debate. Its rapid export growth is not only reflected in the expansion of its trade volume, but also in its steadily increasing export product sophistication. Schott (2008) argues that China's export structure has been increasingly upgraded and that there is a considerably overlap in terms of export products between China and developed economies, which is unusual given China's endowment and level of development. He indicates that China exports an astonishingly wide range of goods and many of these in high-tech sectors.[1] Rodrik (2006) also shows that China's export basket is significantly more sophisticated (in the sense of containing more high tech goods) than would be expected on the basis of pure comparative advantage arguments. He suggests 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.[2]

Some economists, like Bransteeter and Lardy (2006), argue that although China may export sophisticated products, the most sophisticated components of the product are imported from developed countries. Therefore, China does not add much of the value to the products they export. For example, only $3.70 of the Apple's ipod's value is produced in China, compared with about $80 in gross profit by Apple (Linden et al., 2007). However, it is difficult to deny that some Chinese firms are making their mark in high-tech industries and the Chinese government, at both central and local levels, has been trying to actively upgrade companies' product structure through tax and other policy incentives, like production subsides. According to the WTO 2007 report, China's export unit value index for manufactured goods rose by 3.6 % in 2006.

Our paper contributes to this literature 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

[1] For example, the share of all possible manufacturing products imported from China in US has increased from 9% in 1972 to an unprecedented 85% (Schott, 2008).

[2] Somewhat in line with this argument, Wang and Wei (2007) in their analysis of Chinese trade data also suggest that government policy in the form of high tech zones is one of the main drivers to upgrade China's export structure.

had on this.[3] Hence, we are attempting to provide an adequate evaluation of Rodrick's more general argument that export growth is largely due to industrial policies, focusing on one specific aspect such policies might take. We also account for firm level heterogeneity and consider 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. Furthermore, we 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. 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. We exploit firm level information on the level of employee social welfare benefits and the contribution of local and regional governments to a firm's paid up capital, which we judge (based on economic intuition and formal testing) to be good instrumental variable candidates. We implement the estimation 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. Bernard and Jensen (2004) investigate, amongst other things, whether export promotion expenditures at the state level influence the decision of US plants to export or not. Their findings

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

suggest little evidence of this factor encouraging participation in the global market by US manufacturers. Another related paper by Görg et al. (2008) investigates the causal relationship between firm level subsidies and export activity using firm level data for the Republic of Ireland. They do not find that subsidies encourage firms to start exporting, but only that receipt of subsidies encourages previous exporters to export more.

Our paper relates to this literature but looks at the issue in the specific context of China. This makes our paper particularly relevant to the on-going debate on China's export growth and the role of policy in this context. Specifically, we investigate whether *production* subsidies can play a role in promoting export activity in China's manufacturing sector. Our empirical analysis utilises an unbalanced panel dataset comprising of more than 140,000 firms over the period 1999-2005, which includes the rare information of production subsidies received by Chinese firms. We find robust support for the hypothesis that production subsidies can play a role in increasing export volumes, even after controlling for a host of firm level determinants of export volume and the potential endogeneity of subsidies. However, export subsidies seem to be less important in helping a non-exporting firm to participate in export markets. We also establish that the exporting effect of production subsidies is more pronounced among Chinese firms that are in more capital intensive industries and are profit making.

The following section gives some overview of China's export performance and the use of production subsidies. Section 3 introduces our research design, 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. As the world's third-largest exporter, China is also the leader among the countries covered by the WTO in terms of export growth (WTO, 2006). During China's economic reform period in the past three decades, the role of exports in promoting GDP growth is not marginal (See Figure 1). Lin and Li (2002) estimate that a 10 percent growth in exports may lead to a one

percent growth in GDP in China and suggest that, in order to maintain its rapid economic growth, a strong export tendency should be sustained. Therefore, the Chinese government has ample incentives to reshape the industrial structure to promote exporting activities.

[Figure 1 here]

Government policies in favour of high-tech product exports are reflected in the list of China's top export commodities. As shown in Table 1, the total export value of electrical machinery and high-tech products, including products such as computers, electronics, aerospace technology and telecom equipment, has risen steadily over time from 640 US$ billion in 2005 to 1048 US$ billion in 2007, while some labour-intensive products like toys and plastics articles show very modest or even negative growth rates in exports value. One interesting point from Table1 is that the values of some commodities which are widely understood as assembly products, such as "Parts of TV set", "Sound Recording Apparatus", "TV set" and "Record and DVD player", have largely shrunk, with "Record and DVD player" disappearing from the club of top export products. 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

Subsidies can be regarded as a tool government adopted to encourage activities that would otherwise not take place and are widely used around the world for specific purposes. Görg, Henry and Strobl (2007) find evidence for Ireland that production subsidies at the firm level positively influence exports of already existing exporters, although there is no evidence that they induce firms to enter export markets. Given the importance of exports in China's economic growth, it is not unreasonable to assume that there might be a link between the substantial amount of subsides that the Chinese government provides and China's remarkable export performance.

To the best of our knowledge, there is no public information for China on any direct export subsidies and it is also difficult to find any detailed information on which industries or what types of enterprises are subsidised and by how much. However, data on production-related subsidies for

encouraging innovation or high-tech products and subsidies flowing into SOEs are available from the China Fiscal Yearbooks. Among the main items of national government budget expenditures, three of them are specifically used at the firm level. While the innovation and science & technology promotion funds are shared between state- and non-state owned enterprises, the two other resources, additional appropriation for enterprises circulating capital, and expenditures for loss making SOEs, are specifically designated for SOEs.[4]

Table 2 shows that between 1995 and 2005 subsidies amount to a total of 310.1 billion US$. 151.1 billion US$ are directed at SOEs of which 95 per cent are for loss-making SOEs.[5] There are generally several reasons why governments subsidise enterprises: industrial development, export promotion, supporting firms to innovate and securing a national advantage in leading industries (WTO, 2006). The motivation for Chinese 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 and science & technology promotion funds. This is one indicator that the government is promoting innovation activities and focusing on developing firms with high-tech products.

[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: A firm that invests more than 10 million RMB (about 1.2 million US$) in their business park can get a subsidy of 0.8% of its investment and can apply for subsidies of up to 800,000 RMB (about 100,000 US$) in a single application.[6] Zhuhai city's 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, they set up a

[4] 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.

[5] 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.

[6] An announcement from Shanghai Jinshan district: http://www.zhaoshang-sh.com/jszs/zszc01.htm

special fund to encourage software exports, and offer 500,000 RMB (about 60,000 US$) for all the firms that pass the CMM-2 certification.[7]

China's accession to the WTO in December 2001 was an important step towards economic liberalisation. The Chinese government's commitment to eliminate subsidies had been one of the 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,[8] the Chinese Statistical Yearbook for 2005 still reported 2.3 billion US$ of such subsidies.[9]

3 Empirical model and estimation strategy

We aim to establish whether there is a link between the policy of providing production-related subsidies and export performance at the firm level. There are a number of theoretical reasons why such subsidies may play a role, and we illustrate two here. The first is a standard undergraduate textbook case. Consider a profit-maximizing monopolistic firm that faces the problem of allocating sales in domestic and foreign markets. The firm faces downward sloping demand schedules in both markets. We assume that the foreign market is more competitive than the domestic market, leading to a flatter foreign than domestic demand schedule.[10] In this case, one can easily show that a subsidy, which leads to a downward shift of the marginal cost curve, can induce a firm to start exporting. Furthermore, in this scenario a production subsidy can also lead to an increase of export sales for already existing exporters.

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

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

9 The official 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, although some researchers such as Eckaus (2006) are highly sceptical of this argument.

10 This seems a reasonable assumption for the case of China. Even though the economy has opened up to trade quite substantially and joined the WTO in 2001 the domestic market is still largely dominated by State-owned enterprises (e.g., Bajona and Chu, 2004) rendering the domestic market less competitive than international markets.

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 (Melitz, 2003). Hence government support specifically targeted at improving productivity related aspects of the firms' operations can assist them in overcoming barriers to exporting (Görg et al., 2008).

In order to investigate the hypothesis that production subsidies can impact positively on exporting we model the determinants of a firm's export activity, paying particular attention to the role of subsidies. To determine the relationship between firm level state subsidies (*s*) and the level of exporting *E*, we formulate a Tobit model in terms of a latent variable model,

$$\begin{aligned} E_{it}^{*} &= \beta' X_{it-1} + \gamma \ln S_{it-1} + D_{it} + \varepsilon_{it} \\ E_{it} &= 0 \qquad\qquad if\ E_{it}^{*} \le 0 \qquad . \qquad\qquad (1) \\ E_{it} &= E_{it}^{*} \qquad\qquad if\ E_{it}^{*} > 0 \end{aligned}$$

where the dependent variable is the level of exporting, defined as the log of export sales. A firm *i* either exports at time *t* with a positive (log) export sale ($E_{it} > 0$) or it does not ($E_{it} = 0$). *S* is equal to the 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 ownership and time dummies.[11]

The choice of variables to be included in *X* is guided by the existing empirical literature on the determinants of exporting. It is largely accepted in the literature that firms that are larger and more productive are more likely to export (e.g., Bernard and Jensen, 2004; Roberts and Tybout, 1997). Our choice of covariates reflects these findings. Furthermore, we include a foreign investment variable in the analysis to capture the possibility that firms that have some level of foreign capital participation are more likely to export. The variables in X are lagged by one period in order to address the possibility that many firm level characteristics are likely to be contemporaneously determined with, or indeed impacted upon, by their export

[11] Omitting base groups, there are in total 29 regional, 26 industrial and 5 year dummies.

activities (for a recent discussion, see Lachenmaier and Wößmann, 2006). Accordingly, we consider firm's export experience, productivity, size, foreign direct investment (FDI) at the firm level in X (these variables are defined in more detail below in Table 3).

An important empirical problem within the context of this paper is that subsidies are 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. Hence the accurate identification of the impact of subsidies requires the availability of exogenous instruments that are correlated with the level of subsidy, but do not directly affect exporting. We propose that two firm variables that are available in the data – the level of employee social welfare benefits and state capital—are exogenous instruments in this context. On the one hand, firms in receipts of high level of social benefits from local and central governments are likely to receive larger production subsidies too. On the other hand, it can reasonably be argued that provision of social welfare benefits such as housing and medical care, does not have a direct relationship with exporting conditional on subsidies and the vector of firm level characteristics, X. Similar arguments can be made about the contribution of local and regional governments to the firms paid up capital.

Accordingly, we use the instrumental variables technique for Tobit models due to Blundell and Smith (1986). Although we argue that the instrumental variable candidates are exogenous in this context, we also provide formal statistical tests of their validity. Firstly, the Hansen/Sargan test for instruments exogeneity is conducted by estimating the exporting equation using linear GMM techniques. Secondly, we provide evidence that the instruments are sufficiently correlated with subsidies, and hence our estimates do not suffer from weak instruments problem, by using the identification test suggested by Cragg and Donald (1993).

The estimation of Tobit models with endogenous regressors essentially involves two steps:[12] (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.

Since the Tobit model is a nonlinear model, the estimated coefficients cannot be interpreted as marginal effects, and further computations have to be performed to obtain the latter. Accordingly, after obtaining consistent estimates of the parameters of Model (1) via the instrumental variables Tobit estimator, we recover and report two sets of marginal effects. The first relates to the impact of a unit change in the level of subsidies on the *level* of export conditional on the firm being an exporter. Omitting firm and time indices for ease of presentation, this can be typically expressed as:

$$\beta_x - \frac{\partial(E \mid E > 0)}{\partial x} \ . \qquad (2)$$

The second set of marginal effects gives the impact of subsidies on the probability to export. Irrespective of the level of exporting. Recalling that the Tobit model is based on the normal distribution, a typical element of this set of marginal effects can be computed as

$$\pi_x - \frac{\partial(\Pr[E > 0])}{\partial x} \ . \qquad (3)$$

We also explore whether the exporting effect of subsidies on exports is mediated by firm level characteristics (whether the firm is a loss-making firm or not; whether it is in a capital intensive sector or not). We also investigate whether the effect of subsidies differs according to whether a firm is located in coastal regions or not, and whether this effect has changed since China's accession to WTO (i.e. after 2001). The justification for the latter two issues is to check whether subsidies impact firms differently in high or low trade cost regions (assuming that coastal regions have lower trade costs) or high and low trade cost regimes (i.e., before and after WTO accession). In all cases we conduct our

[12] 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.

analysis on the whole sample of domestic firms as well as for each of the main ownership categories—state, collective and private—separately.

4 Description of the data

Our econometric analysis draws on the Annual Report of Industrial Enterprise Statistics compiled by the National Bureau of Statistics of China (NBS). The report covers the population of state-owned enterprises and all non-state firms with annual turnover of over five million Renminbi (just above $600,000). It is estimated that the firms contained in the data set account for about 85-90% of total output in most industries. The NBS performs several logic tests to ensure the accuracy of the information in the report and identify illogical data.[13]

The data set includes information on firm ownership structure, industry affiliation, geographic location, establishment year, employment, gross output, product innovation, R&D, value added, net fixed assets, exports, R&D and employee training expenditures.[14] The data set available to us spans the period 1999 to 2005, and comprises of more than 1.3 million observations from about 446,000 firms. It is worth noting that the econometric work is confined to domestic-owned enterprises, in view of the objective of this paper.[15] In the final analysis, 142909 domestic firms (with more than half a million total observations) have the minimum information required for the econometric estimation. Of those, around 14% of firms received production subsidies at some stage during the sample period.

The NBS assigns to each firm in the database a categorical variable indicating its ownership status. Nevertheless, it is also possible to construct a continuous measure of

[13] In a recent OECD project Holz (2005) examines the validity of the Chinese dataset and concludes that the data are likely to be of high quality.

[14] Nominal values are deflated using industry-specific ex-factory price indices obtained from China Statistical Yearbook 2006.

[15] Firms are classified as foreign-owned multinationals once foreign participation exceeds 25 percent of ownership. 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., Girma et al., 2009), and because the focus of our paper is on the development of domestic exporters.

ownership composition from the database by looking at the fraction of paid-in capital contributed by the state, private domestic and foreign investors. Using this measure of ownership, we define a firm as being state-owned, collectively or private if the state, collectives or private individuals are the majority investors in the firm, respectively. The data set provides information on the extent of foreign capital participation at the level of the firm. This enables us to calculate the share of foreign ownership in the domestic enterprise and identify the direct effects of FDI on domestic firms' export activity.

Table 3 includes the definition of the variables included in equation (1) 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). By contrast, SOEs are on average the largest (in terms of employment). 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 2005 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 some 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 we present some data on average subsidies per firm across two digit industries in Table 5. In absolute values, subsidies were highest in the textiles (17) and ordinary machinery (35) sectors in 1999. This has shifted substantially in 2005, when firms in the instruments & meters industry (42) received by far the highest levels of subsidies. This perhaps reflects some shift of resources towards high tech industries in line with our conjecture. However, when considering the value of subsidies relative to output then no clear-cut picture emerges. The only noteworthy feature is that firms in the smelting and pressing of non-ferrous metals (33) industry receive by far the highest subsidies relative to output.

[Table 5 here]

In a next step in the analysis we attempt to get a better idea of which types of firms are likely to be subsidy recipients. Therefore, Table 6 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 3 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 the 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.

We also include our two instrumental variables candidates, the level of employee social welfare benefits and the contribution of local and regional governments to a firm’s paid up capital in this exploratory analysis. As can be seen, both are positively correlated with the receipt of subsidies.

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 exception of collectively-owned firms) 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 6 here]

5 Econometric results

We now turn to the more formal econometric modelling of firm level exports based on equation (1). In order to establish some benchmark results as well as to provide a statistical test of the validity of the instruments, Table 7 presents the findings of estimating equation (1) using the linear GMM estimator. In all specification, the instrument validity tests are in line with our expectation that the instrumental variable candidates are exogenous. It is also reassuring to note that the Cragg and Donald (1993) test emphatically rejects the null hypothesis that social welfare benefits and state capital are weak instruments for production subsidy. The linear GMM estimator suggests that a positive and significant relationship between production subsidy and exports exists. It also provides

suggestive evidence that effect of subsidies is conditional on firm level characteristics. The results from the linear GMM are potentially biased as it does not take account of the left truncation of the dependent variable. Therefore, we concentrate on the estimates from the endogenous Tobit model in the remainder of the paper.

[Table 7 here]

Production subsidies and the level of exports

Table 8 reports marginal effects of a unit change in the independent variable on the level of exporting given that the firm is an exporter (as in equation 2), from the instrumental variables Tobit model based on the whole data set. It worth noting that the test for the null hypothesis that the subsidies are exogenous is emphatically rejected all specifications. 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 and those that receive larger inflows of foreign capital tend to export more.

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. According to the baseline model in Column (1) we find that doubling production subsidies would, on average, lead to a 10.3% increase in the level of exports.[16] This result is, thus, in line with Rodrik (2006) and Wang and Wei (2007), who also stress the important role policy has had on China's export performance.[17]

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 facts in further results in Table 8 where we allow the coefficient on subsidies to vary according to

[16] Recall that this is a "pure" export effect as we control for productivity and firm size in the regressions.

[17] 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. 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.

some given characteristic. In column (2) we interact subsidies with a dummy equal to one if a firm operates in a sector that is judged to be relatively capital 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. We find that only firms in capital-intensive sectors benefit from subsidies.

To consider another aspect of heterogeneity, in column (3) 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 such subsidies had less effect on export activity. One explanation might be that subsidies could encourage these loss making firms to stay inefficient or loss making, in order to obtain subsidies for loss making firms again in the next year. Column (4) shows that the exports of firms in non-coastal (high trade cost) regions benefit more from subsidies indicating that the latter are playing a role in reducing trade costs and that government policy plays a larger role in less-developed (high trade cost) regions. Finally Column (5) of Table 8 indicates that the positive relationship between exports and subsidies continues in the post-WTO era (low trade cost regime), albeit at a less pronounced level.

[Table 8 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 9 to 11. The effects of our control variables are qualitatively similar across ownership structure, while recognising that the magnitude of coefficients is somewhat different in the three samples in a number of instances.

However, when exploring the role of firm characteristics in the export-subsidy nexus, there are some interesting differences across ownership structure: We fail to find an unconditional effect of subsidies on exporting for private owned firms (Table 11, column (1), although they still do benefit if

they are in capital intensive industries, profit making and in non-coastal regions. On the other hand, the profit making status of collectively-owned firms does not appear to affect the subsidy-export nexus. Finally, it is worth noting that the exports of state-owned enterprises benefit from production subsidies, irrespective of the firms' capital intensity.

[Tables 9-11 here]

Production subsidies and the probability of exporting

In the preceding paragraphs we discussed the marginal effects of production subsidies on the volume of exports, given that the firm is exporting. We now briefly discuss the impact of subsidies on the probability of exporting based on the marginal effects (as in equation 3) reported in Tables 12-15. Considering the results from whole sample (Table 12), a doubling of production subsidies increases the probability of exporting by two percentage points on average (Column(1)) and further analysis shows that this effect is confined to capital intensive industries, is relatively more pronounced amongst profit-making firms and firms in non-coastal regions. What is striking here is the fact that the magnitudes of the effects are quite small. This finding suggests that production subsides in China play a relatively minor role in helping new exporters. This lack of economic significance of the impact of subsidies on the probability of exporting remains intact as we analyse the model across the various ownership categories (see Tables 13-15). Based on this we conclude that subsidies can enhance the exporting capacity of firms that are already in the export market and perhaps help maintain their international competitiveness.

[Tables 12-15 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 activities of existing exporters, but have not been very helpful for a firm to enter the export market. However, we also find that the export-enhancing subsidy effect is conditional on firm characteristics. In particular, the beneficial impact of subsidies is found to be more pronounced amongst profit-making firms, firms that are in capital intensive industries, and those

located in non-coastal regions. 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 the title is affirmative. But this answer raises other challenging questions: 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. Another important question concerns the welfare implications of such subsidies. Is the use of subsidies to foster export activity (intentionally or unintentionally) a good use of resources? Tackling this question is beyond the scope of this paper but clearly deserves further theoretical and empirical investigation.

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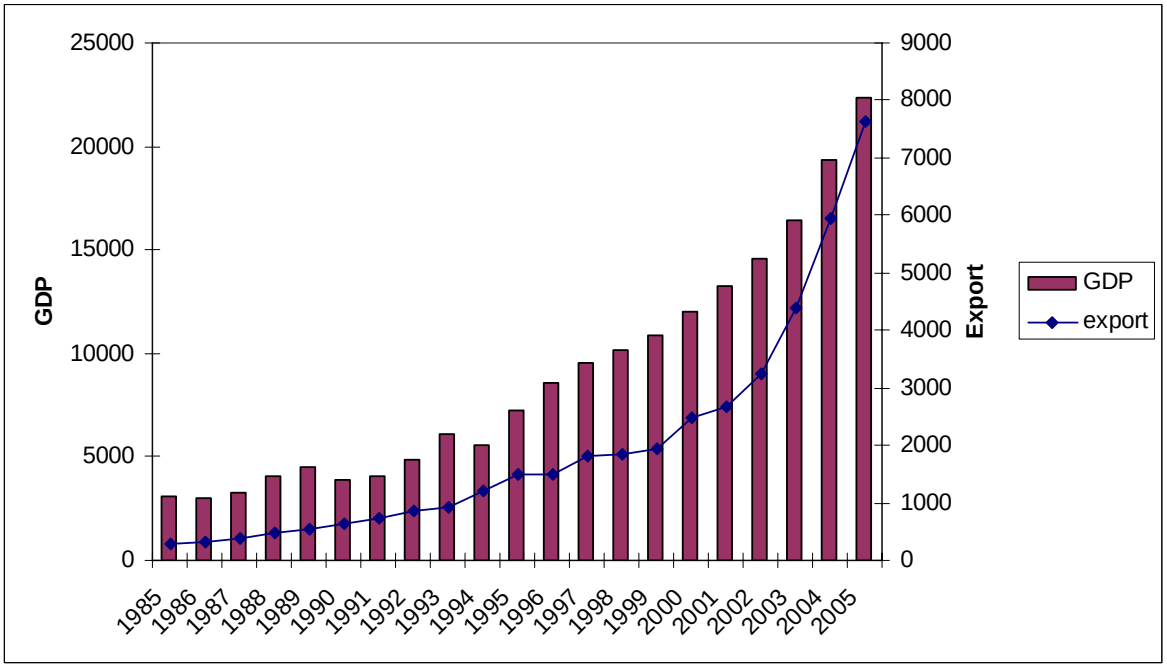
Figure 1: China's GDP and export



Source: PRC National Bureau of Statistics of China, *China Statistical Yearbook*

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Table 1: China's Top Export Commodities (in Value)

US$100million

Commodity Description	2005	2006	2007
Electrical machinery & Equipment*	4267.5	5494.4	7011.7
High-Tech products*	2182.5	2814.9	3478.3
Automatic data processing machines and components	763.1	930.2	1237.1
Garments	738.8	951.9	1150.7
Textile	411.3	488	561
Parts of automatic data processing machines'	283.6	326.2	322.9
Telephone	206.4	312.1	356
Footwear & parts thereof	190.5	218.1	253.1
Parts of TV set, Sound Recording Apparatus	181.4	251.6	108.1
Integrated Circuit and microelectronics apparatus	143.9	213.1	
Furniture	135	171.3	221.5
Iron & steel	130.8	262.4	441.3
Plastic articles	112.8	133	144.8
TV set (including a complete set of Spare parts)	84.1	129.6	90.4
Record and DVD player	76.5	77.7	
Travelling appliance and suitcase	73.1	87	108.2
Parts of Motor Vehicles	65.8	88.8	122.8
Toys	65.6	70.5	
Petroleum products refined	64.1	70.5	91.5
Play station	63.8	82.5	92.4

Source: PRC General Administration of Customs, *China's Customs Statistics*

* This category includes a wide variety of products including computers, personal digital assistants, power tools, and small appliances. It also includes such commodities in this table.

Table 2: National Budgetary Expenditure on Industry

100 million US$

Year	Innovation funds and science & technology promotion funds	Subsidies to Loss-making Enterprises	Additional appropriation for enterprises' circulating capital	Total
1985	35.22	172.66	4.87	212.74
1986	37.61	94.06	2.88	134.55
1987	33.56	101.13	3.24	137.94
1988	40.57	119.95	2.58	163.10
1989	38.86	159.06	3.21	201.13
1990	32.18	121.02	2.28	155.48
1991	33.97	95.85	2.46	132.27
1992	40.55	80.69	1.93	123.17
1993	73.13	71.38	3.21	147.72
1994	48.17	42.49	2.01	92.67
1995	59.21	39.25	4.17	102.62
1996	62.91	40.58	5.16	108.65
1997	77.59	44.45	6.30	128.34
1998	77.45	40.28	5.12	122.84
1999	92.54	35.03	6.81	134.39
2000	104.52	33.68	8.58	146.78
2001	119.80	36.25	2.74	158.79
2002	117.00	31.36	2.29	150.65
2003	132.05	27.35	1.44	160.85
2004	150.29	26.33	1.50	178.13
2005	182.45	23.59	2.22	208.26
Total	1589.60	1436.45	75.00	3101.06

Source: China fiscal yearbook, China statistical yearbook

Table 3: Definition and summary statistics of key variables

		SOEs		COLLECTIVES		PRIVATES	
Variable	Definition	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Exports	Log of exports sales	1.401	3.354	1.764	3.691	2.253	4.062
	Among exporters	8.928	2.117	9.205	1.615	9.297	1.608
Exporting experience	Dummy =1 if firms exported two years ago	0.146	0.353	0.166	0.372	0.202	0.401
Subsidy	Log of production subsidy from local and central governments	1.078	2.456	0.811	2.101	0.709	1.969
Size	Log of employment	5.240	1.488	4.807	1.092	4.840	1.074
Productivity	Total factor productivity generated from fixed effects translog production functions	-0.545	1.398	0.296	0.844	0.319	0.833
FDI	Share of foreign multinationals capital in firm's total capital	0.004	0.038	0.008	0.071	0.006	0.061
Welfare Benefit	Log of central and local governments social welfare benefits received by firms employees.	980.469	6275.917	252.775	1352.698	353.791	2580.847
State capital	Log of capital invested in the firm by local and central governments.	23522.540	256756.000	181.136	3663.699	2984.859	72775.590
Number of firms	142909 (total)	26502		44488		71919	
Observations	503651	103237		103237		231113	

Source: Authors calculations based on the database used in this paper.

Table 4: Domestic firms' average growth of exports between 1999 and 2005 by ownership and two-digit industry:

Two-digit industry	SOE	COLL	PRIV
13-Food Processing*	-2.12%	4.20%	7.21%
14-Food Production*	1.33%	5.58%	14.90%
15-Beverage Industry*	-0.21%	7.34%	7.33%
17-Textile Industry*	-17.96%	-1.09%	9.30%
18-Garments and Other Fibre Products*	-5.58%	8.16%	18.54%
19-Leather, Furs, Down and Related Products*	-24.38%	14.32%	22.99%
20-Timber Processing*	-1.91%	4.80%	19.62%
21-Furniture Manufacturing*	-5.95%	12.92%	31.88%
22-Papermaking and Paper Products*	-2.03%	5.04%	5.37%
23-Printing and Record Medium Reproduction*	1.89%	9.33%	12.02%
24-Cultural, Educational and Sports Goods*	-8.18%	12.98%	29.55%
25-Petroleum Refining and Coking	-16.78%	-4.09%	-6.98%
26-Raw Chemical Materials and Chemical Products	-2.10%	2.68%	11.10%
27-Medical and Pharmaceutical Products	-4.11%	4.63%	10.97%
28-Chemical Fibre	-21.49%	9.41%	10.65%
29-Rubber Products*	10.67%	6.57%	21.12%
30-Plastic Products*	-6.73%	4.81%	12.25%
31-Nonmetal Mineral Products*	1.71%	7.15%	14.85%
32-Smelting and Pressing of Ferrous Metals	6.13%	-1.21%	1.45%
33-Smelting and Pressing of Nonferrous Metals	-3.87%	0.56%	7.44%
34-Metal Products*	-2.00%	2.87%	17.83%
35-Ordinary Machinery	0.31%	10.93%	15.55%
36-Special Purposes Equipment	3.46%	7.24%	17.15%
37-Transport Equipment	5.53%	10.32%	19.34%
39-Other Electronic Equipment	-3.36%	8.91%	18.11%
40-Electric Equipment and Machinery	-8.79%	6.21%	19.36%
41-Electronic and Telecommunications	-10.28%	3.11%	16.70%
42-Instruments and meters	-15.16%	2.81%	30.51%

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: Average subsidy (US$) per firm and average ratio of subsidy to output

Two-digit industry	1999		2005	
	Subsidy	Subsidy-output ratio	Subsidy	Subsidy-output ratio
13-Food Processing*	10447	0.008	19366	0.006
14-Food Production*	45840	0.007	14873	0.004
15-Beverage Industry*	10703	0.005	19482	0.004
17-Textile Industry*	92410	0.003	10276	0.002
18-Garments and Other Fibre Products*	28800	0.002	69270	0.001
19-Leather, Furs, Down and Related Products*	48780	0.001	72960	0.001
20-Timber Processing*	17900	0.009	27475	0.007
21-Furniture Manufacturing*	48980	0.003	64600	0.004
22-Papermaking and Paper Products*	10713	0.004	17083	0.007
23-Printing and Record Medium Reproduction*	54460	0.007	10892	0.006
24-Cultural, Educational and Sports Goods*	77810	0.004	48370	0.002
25-Petroleum Refining and Coking	15165	0.002	22296	0.003
26-Raw Chemical Materials and Chemical Products	20268	0.005	24339	0.005
27-Medical and Pharmaceutical Products	10804	0.008	21218	0.003
28-Chemical Fibre	28425	0.002	35948	0.003
29-Rubber Products*	15144	0.005	13393	0.004
30-Plastic Products*	66250	0.003	10862	0.003
31-Nonmetal Mineral Products*	1.544	0.005	35910	0.010
32-Smelting and Pressing of Ferrous Metals	1.187	0.003	17424	0.003
33-Smelting and Pressing of Nonferrous Metals	17000	0.007	29892	0.015
34-Metal Products*	56130	0.004	10449	0.003
35-Ordinary Machinery	93100	0.005	14953	0.004
36-Special Purposes Equipment	14061	0.008	18806	0.005
37-Transport Equipment	15717	0.008	24177	0.007
39-Other Electronic Equipment	11748	0.005	19599	0.004
40-Electric Equipment and Machinery	14492	0.009	31711	0.005
41-Electronic and Telecommunications	11302	0.009	26885	0.006
42-Instruments and meters	38600	0.006	78590	0.002

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 6: The determinants of production subsidy receipt: An exploratory analysis

	(1)	(2)	(3)	(4)
	All firms	SOE	COLLECTIVE	PRIVATE
Exporter dummy	0.282***	0.497***	0.143***	0.294***
	(0.009)	(0.024)	(0.016)	(0.013)
Lagged log sales	0.316***	0.273***	0.261***	0.383***
	(0.003)	(0.005)	(0.006)	(0.004)
Lagged profit	-0.004***	-0.004***	0.579***	0.005
	(0.001)	(0.001)	(0.030)	(0.003)
Central government dummy	0.714***	0.699***	-0.205	0.470***
	(0.028)	(0.049)	(0.124)	(0.063)
Provincial government dummy	0.373***	0.526***	-0.047	0.247***
	(0.019)	(0.043)	(0.057)	(0.034)
Local government dummy	0.298***	0.168***	0.196***	0.388***
	(0.008)	(0.035)	(0.012)	(0.012)
Welfare benefits	0.007***	0.008***	0.021***	0.004***
	(0.001)	(0.001)	(0.003)	(0.001)
State capital	0.0001**	0.00001*	0.00001*	0.002**
	(0.00005)	(0.0000)	(0.0000)	(0.001)
SOE dummy	0.324***			
	(0.012)			
Collective dummy	0.095***			
	(0.008)			
Uncensored observations	506830	104004	170135	232691
Uncensored observations	77296	18563	24811	33922
Log likelihood	-3.96e+05	-9.30e+04	-1.26e+05	-1.72e+05

Notes:

a. Dependent variable: log production subsidy
b. Marginal effects from Tobit regressions with standard errors in parentheses
c. significant at 10%; ** significant at 5%; *** significant at 1%
d. Profitability is defined as pre-tax profit/total sales
e. The central, provincial and local government dummies indicate which level of government, firms are political affiliated with. Firms no political affiliations constitute the base group.
f. All specifications include the full set of time, two-digit industry and regional dummies.

Table 7: Production subsidy and exports:

Linear GMM estimates

	(1)	(2)	(3)	(4)	(5)
Subsidyt-1	0.856***	0.404***	0.849***	0.729***	0.928***
	(0.046)	(0.044)	(0.045)	(0.048)	(0.072)
Exporting experience	7.150***	7.151***	7.156***	7.153***	7.149***
	(0.018)	(0.017)	(0.017)	(0.018)	(0.018)
$Size_{t-1}$	0.002	0.066***	0.034**	0.006	-0.002
	(0.014)	(0.012)	(0.013)	(0.014)	(0.015)
$Productivity_{t-1}$	0.041***	0.071***	0.024**	0.037***	0.042***
	(0.009)	(0.007)	(0.009)	(0.009)	(0.009)
FDI_{t-1}	0.891***	0.936***	0.871***	0.865***	0.888***
	(0.079)	(0.076)	(0.079)	(0.081)	(0.080)
Subsidy* capital intensive sector		0.447***			
		(0.047)			
Subsidy* loss making firms			-0.370***		
			(0.030)		
Subsidy * coastal region				0.218***	
				(0.047)	
Subsidy * post WTO					-0.089
					(0.061)
Collectives	0.240***	0.198***	0.160***	0.204***	0.245***
	(0.017)	(0.015)	(0.015)	(0.018)	(0.018)
Private firms	0.516***	0.442***	0.434***	0.507***	0.518***
	(0.024)	(0.020)	(0.021)	(0.023)	(0.024)
Observations	503651	503651	503651	503651	503651
Hansen J test χ^2 statistic	0.507	0.118	1.916	3.209	2.156
p-value of Hansen test of instrument validity	0.476	0.732	0.384	0.201	0.340
Cragg-Donald test for weak instrument χ^2 statistic	2146.933	2587.550	2354.639	2034.221	2179.421
p-value of Cragg-Donald test	0.000	0.000	0.000	0.000	0.000

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: Production subsidy and the volume of exports: all firms

	(1)	(2)	(3)	(4)	(5)
$Subsidy_{t-1}$	0.103***	0.031	0.104***	0.119***	0.136***
	(0.017)	(0.017)	(0.016)	(0.015)	(0.015)
Exporting experience	4.980***	4.979***	4.983***	4.977***	4.979***
	(0.017)	(0.018)	(0.015)	(0.014)	(0.014)
$Size_{t-1}$	0.166***	0.176***	0.171***	0.168***	0.164***
	(0.007)	(0.006)	(0.007)	(0.006)	(0.005)
$Productivity_{t-1}$	0.167***	0.171***	0.163***	0.170***	0.168***
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
FDI_{t-1}	0.304***	0.310***	0.300***	0.310***	0.303***
	(0.033)	(0.033)	(0.039)	(0.034)	(0.045)
Subsidy* capital intensive sector		0.074***			
		(0.016)			
Subsidy* loss making firms			-0.055***		
			(0.009)		
Subsidy * coastal region				-0.041*	
				(0.017)	
Subsidy * post WTO					-0.042**
					(0.013)
Observations	503651	503651	503651	503651	503651
Uncensored observations	104643	104643	104643	104643	104643
Log likelihood	-4.25e+05	-4.25e+05	-4.25e+05	-4.25e+05	-4.25e+05
Subsidy exogeneity test (p-value)	0.000	0.000	0.000	0.000	0.000

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, ownership and regional dummies

d. See Equation (2) for formula used to calculate the marginal effects.

Table 9: Production subsidy and the volume of exports: state-owned enterprises

	(1)	(2)	(3)	(4)	(5)
$Subsidy_{t-1}$	0.068***	0.066*	0.065***	0.074***	0.078***
	(0.014)	(0.028)	(0.013)	(0.015)	(0.018)
Exporting experience	4.283***	4.285***	4.297***	4.281***	4.278***
	(0.040)	(0.044)	(0.039)	(0.042)	(0.046)
$Size_{t-1}$	0.126***	0.125***	0.132***	0.125***	0.124***
	(0.010)	(0.011)	(0.008)	(0.008)	(0.010)
$Productivity_{t-1}$	0.162***	0.162***	0.159***	0.163***	0.162***
	(0.007)	(0.007)	(0.005)	(0.006)	(0.007)
FDI_{t-1}	0.269***	0.269***	0.267***	0.279***	0.265***
	(0.079)	(0.081)	(0.081)	(0.076)	(0.078)
Subsidy* capital intensive sector		0.003			
		(0.021)			
Subsidy* loss making firms			-0.024**		
			(0.008)		
Subsidy * coastal region				-0.017	
				(0.013)	
Subsidy * post WTO					-0.011
					(0.013)
Observations	103237	103237	103237	103237	103237
Uncensored observations	16200	16200	16200	16200	16200
Log likelihood	-6.28e+04	-6.28e+04	-6.28e+04	-6.28e+04	-6.28e+04

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
d. See Equation (2) for formula used to calculate the marginal effects.

Table 10: Production subsidy and the volume of exports: collectively-owned enterprises

	(1)	(2)	(3)	(4)	(5)
$Subsidy_{t-1}$	0.095**	-0.255	0.098*	0.134	0.157***
	(0.034)	(0.164)	(0.045)	(0.110)	(0.048)
Exporting experience	5.134***	5.085***	5.135***	5.132***	5.135***
	(0.023)	(0.032)	(0.026)	(0.026)	(0.024)
$Size_{t-1}$	0.163***	0.182***	0.165***	0.164***	0.161***
	(0.007)	(0.011)	(0.008)	(0.007)	(0.006)
$Productivity_{t-1}$	0.142***	0.149***	0.139***	0.145***	0.145***
	(0.008)	(0.010)	(0.011)	(0.009)	(0.009)
FDI_{t-1}	0.324***	0.319***	0.321***	0.328***	0.325***
	(0.050)	(0.043)	(0.046)	(0.055)	(0.045)
Subsidy* capital intensive sector		0.529*			
		(0.258)			
Subsidy* loss making firms			-0.101		
			(0.059)		
Subsidy * coastal region				-0.055	
				(0.107)	
Subsidy * post WTO					-0.088
					(0.046)
Observations	169301	169301	169301	169301	169301
Uncensored observations	32436	32436	32436	32436	32436
Log likelihood	-1.33e+05	-1.33e+05	-1.33e+05	-1.33e+05	-1.33e+05

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
d. See Equation (2) for formula used to calculate the marginal effects.

Table 11: Production subsidy and the volume of exports: privately-owned enterprises

	(1)	(2)	(3)	(4)	(5)
$Subsidy_{t-1}$	0.093	0.012	0.094*	0.119***	0.104**
	(0.054)	(0.034)	(0.043)	(0.031)	(0.038)
Exporting experience	5.083***	5.083***	5.082***	5.084***	5.083***
	(0.027)	(0.023)	(0.027)	(0.023)	(0.025)
$Size_{t-1}$	0.233***	0.246***	0.237***	0.237***	0.233***
	(0.021)	(0.013)	(0.017)	(0.017)	(0.020)
$Productivity_{t-1}$	0.108***	0.116***	0.104***	0.113***	0.108***
	(0.014)	(0.010)	(0.012)	(0.012)	(0.012)
FDI_{t-1}	0.239***	0.246***	0.239***	0.243***	0.238***
	(0.065)	(0.066)	(0.069)	(0.062)	(0.064)
Subsidy* capital intensive sector		0.088*			
		(0.036)			
Subsidy* loss making firms			-0.119*		
			(0.049)		
Subsidy * coastal region				-0.059*	
				(0.027)	
Subsidy * post WTO					-0.014
					(0.027)
Observations	231113	231113	231113	231113	231113
Uncensored observations	56007	56007	56007	56007	56007
Log likelihood	-2.28e+05	-2.28e+05	-2.28e+05	-2.28e+05	-2.28e+05

Notes:

a. Standard errors in parentheses
b. significant at 10%; ** significant at 5%; *** significant at 1%
c. All specifications include the full set of time, two-digit industry and regional dummies.
d. See Equation (2) for formula used to calculate the marginal effects.

Table 12: Production subsidy and the probability exporting: all firms

	(1)	(2)	(3)	(4)	(5)
$Subsidy_{t-1}$	0.020***	0.006	0.020***	0.023***	0.026***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Exporting experience	0.740***	0.740***	0.740***	0.740***	0.740***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$Size_{t-1}$	0.032***	0.034***	0.033***	0.032***	0.031***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Productivity_{t-1}$	0.032***	0.033***	0.031***	0.032***	0.032***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FDI_{t-1}	0.058***	0.059***	0.057***	0.059***	0.058***
	(0.006)	(0.006)	(0.007)	(0.006)	(0.008)
Subsidy* capital intensive sector		0.014***			
		(0.003)			
Subsidy* loss making firms			-0.010***		
			(0.002)		
Subsidy * coastal region				-0.008*	
				(0.003)	
Subsidy * post WTO					-0.008**
					(0.002)
Observations	503651	503651	503651	503651	503651
Log likelihood	-4.25e+05	-4.25e+05	-4.25e+05	-4.25e+05	-4.25e+05

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 , ownership and regional dummies
d. See Equation (3) for formula used to calculate the marginal effects.

Table 13: subsidy and the probability exporting: state-owned enterprises

	(1)	(2)	(3)	(4)	(5)
$Subsidy_{t-1}$	0.011***	0.011*	0.011***	0.012***	0.013***
	(0.002)	(0.005)	(0.002)	(0.002)	(0.003)
Exporting experience	0.747***	0.747***	0.748***	0.746***	0.746***
	(0.005)	(0.006)	(0.005)	(0.005)	(0.007)
$Size_{t-1}$	0.021***	0.021***	0.022***	0.021***	0.021***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
$Productivity_{t-1}$	0.027***	0.027***	0.026***	0.027***	0.027***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
FDI_{t-1}	0.045***	0.045***	0.044***	0.046***	0.044***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Subsidy* capital intensive sector		0.001			
		(0.004)			
Subsidy* loss making firms			-0.004**		
			(0.001)		
Subsidy * coastal region				-0.003	
				(0.002)	
Subsidy * post WTO					-0.002
					(0.002)
Observations	103237	103237	103237	103237	103237
Log likelihood	-6.28e+04	-6.28e+04	-6.28e+04	-6.28e+04	-6.28e+04

Notes:

a. Standard errors in parentheses
b. significant at 10%; ** significant at 5%; *** significant at 1%
c. All specifications include the full set of time, two-digit industry and regional dummies.
d. See Equation (3) for formula used to calculate the marginal effects.

Table 14: subsidy and the probability exporting: collectively-owned enterprises

	(1)	(2)	(3)	(4)	(5)
$Subsidy_{t-1}$	0.017**	-0.046	0.018*	0.024	0.028***
	(0.006)	(0.030)	(0.008)	(0.020)	(0.009)
Exporting experience	0.751***	0.747***	0.751***	0.751***	0.751***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
$Size_{t-1}$	0.030***	0.033***	0.030***	0.030***	0.029***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
$Productivity_{t-1}$	0.026***	0.027***	0.025***	0.026***	0.026***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
FDI_{t-1}	0.059***	0.058***	0.058***	0.059***	0.059***
	(0.009)	(0.008)	(0.008)	(0.010)	(0.008)
Subsidy* capital intensive sector		0.096*			
		(0.047)			
Subsidy* loss making firms			-0.018		
			(0.011)		
Subsidy * coastal region				-0.010	
				(0.019)	
Subsidy * post WTO					-0.016
					(0.008)
Observations	169301	169301	169301	169301	169301
Uncensored observations	32436	32436	32436	32436	32436
Log likelihood	-1.33e+05	-1.33e+05	-1.33e+05	-1.33e+05	-1.33e+05

Notes:

a. Standard errors in parentheses
b. significant at 10%; ** significant at 5%; *** significant at 1%
c. All specifications include the full set of time, two-digit industry and regional dummies.
d. See Equation (3) for formula used to calculate the marginal effects.

Table 15: subsidy and the probability exporting: privately-owned enterprises

	(1)	(2)	(3)	(4)	(5)
$Subsidy_{t-1}$	0.019	0.021**	0.019*	0.024***	0.002
	(0.011)	(0.008)	(0.009)	(0.006)	(0.007)
Exporting experience	0.725***	0.725***	0.725***	0.725***	0.725***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)
$Size_{t-1}$	0.046***	0.046***	0.047***	0.047***	0.049***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
$Productivity_{t-1}$	0.021***	0.022***	0.021***	0.022***	0.023***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
FDI_{t-1}	0.048***	0.047***	0.048***	0.048***	0.049***
	(0.013)	(0.013)	(0.014)	(0.012)	(0.013)
Subsidy* capital intensive sector					0.018*
					(0.007)
Subsidy* loss making firms			-0.024*		
			(0.010)		
Subsidy * coastal region				-0.012*	
				(0.005)	
Subsidy * post WTO		-0.003			
		(0.005)			
Observations	231113	231113	231113	231113	231113
Uncensored observations	56007	56007	56007	56007	56007
Log likelihood	-2.28e+05	-2.28e+05	-2.28e+05	-2.28e+05	-2.28e+05

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
d. See Equation (3) for formula used to calculate the marginal effects.