ECONOMICS

THE EFFECTS OF OWNERSHIP STRUCTURE AND INDUSTRY CHARACTERISTICS ON EXPORT PERFORMANCE

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DISCUSSION PAPER 10.09
The Effects of Ownership Structure and Industry Characteristics
On Export Performance
Evidence from Chinese Manufacturing Firms

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Abstract

Ownership structure and industry characteristics as internal and external factors respectively significantly impact the export performance of Chinese manufacturing firms. Three different yet related models, namely, logit, tobit and ordered probit models, that correspond to three different indicators of export performance are considered. It was found that the export performance of Chinese manufacturing firms is related not only to foreign capital involvement but also to the extent of foreign investors’ control. Foreign controlled enterprises are more likely to show better export performance than those controlled by domestic investors. Furthermore, the impact of industry concentration on export performance is unclear, while both industry export-orientation and industry capital intensity have a strong impact on the export performance of Chinese firms.

JEL classification: F1, L2, L6

Keywords: Export performance; Chinese firms; Ownership; Industry characteristics

* Dahai Fu gratefully acknowledges financial support from the China Scholarship Council (CSC) and the Business School of University of Western Australia.

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1. Introduction

Exports have been the primary engine of Chinese economic growth. Over the past three decades, China has enjoyed a phenomenal growth in exports at an annual rate of 18.6 percent. This has accounted for over 30 percent of Chinese output growth in recent years (Guo and N’Diaye, 2009). However, falling demand and rising labour costs have adversely affected Chinese exports, raising concerns among policy makers. Correspondingly, stimulus measures such as reducing a structural tax, raising export tax rebates, and providing financial support have been implemented to boost exports. However, these actions, which are targeted at specific industries and firms, are largely based on macroeconomic evidence that could create unreasonable expectations about the effects of export promotion policies (Bernard and Jensen, 1999). To reduce the risk that improper measures are taken, a firm-level analysis of export performance is thus necessary.

Recently there has been increased discussion of export performance at the firm level in the economics and business literature which has asked this basic question: what are the determinants of firms’ export performance? Though many studies have advanced our understanding of firms’ export behaviour, there are still few studies that simultaneously investigate the effects of the internal and external factors on export performance (Zhao and Zou, 2002). In particular, two questions remain relatively unexplored. First, how do the interactions between foreign-invested firms and domestic investors within the context of corporate governance influence their international activities (Filatotchev et al., 2008)? Second, how do industry characteristics affect the export performance of firms in large and open economies (Gao et al., 2009). This paper will contribute to answering these questions by examining the impact of ownership structure and industry characteristics on export performance using a panel data of 36,941 Chinese manufacturing firms for the period 1999-2003. This period corresponds to the pre- and post-WTO period in China.

China was chosen as the research subject for the following reasons. First, China, one of the BRICs, has undertaken enormous trade and FDI liberalisation in the pursuit of entry into the WTO since the early 1990s. As a result, China replaced the U.S. as the world’s largest exporter of manufactured goods by 2006. Meanwhile, China has become the largest recipient of FDI among the developing economies and inward FDI has further stimulated the success of China’s exports. The trade share of foreign-owned-enterprises over China’s total trade reached more than 60% in recent years while the share of state-owned-enterprises continuously decreased to below 20%. However, the effect of diverse patterns of ownership and control, especially the ownership structure of a joint venture, on the export performance of firms in transition countries has not been fully studied.

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1 Some comprehensive literature reviews have been made by Wagner (2007), Greenaway and Kneller (2007), Zou et al. (1998), and Sousa et al. (2008).
Second, the gradual reform and open process in China has created an uneven business environment across different industries and regions. In emerging economies, external environment, especially industry characteristics, plays an important role in firms’ strategic decision-making (Peng et al., 2008). However, studies about the impacts of industry characteristics on export performance of firms are relatively limited with a few exceptions (Zhao and Zou, 2002; Gao et al., 2009).

In this study, ownership structure and industry characteristics are considered to be important factors affecting export performance. Three indicators (i.e. export propensity, export intensity and export strategy) are used to capture export performance. Correspondingly three different models, namely, logit, probit and ordered probit models are employed. Furthermore, unlike previous studies, this study will not only distinguish domestic firms from foreign firms but will also distinguish wholly-owned enterprises from joint ventures with different dominant holders. This analysis will also consider industry characteristics including industry concentration, industry export-orientation and industry capital intensity.

The rest of the paper is structured as follows. Section 2 outlines the conceptual framework, together with several hypotheses. A discussion of data and method is followed in Section 3. Section 4 presents the econometric results, and the final part provides a summary and conclusions.

2. Conceptual Framework and Hypotheses

Firm-level analysis of export performance has been a hot topic both in economics and business literature due to its policy significance as well as the increasing availability of firm level data across countries. The existing economics literature mainly focuses on the relationship between firm heterogeneity, heterogeneous productivity, and export decision-making. Most of these studies found that due to the fixed entry costs, only firms with high productivity were profitable in foreign markets (Roberts and Tybout, 1997). However, some researchers from the international business field argue that it is insufficient to analyse the export behaviour of firms from a purely internal perspective. To overcome this weakness, Sousa et al. (2008) claim that “export performance should be assessed at the two broad levels - the external environment level and the internal level” (Sousa et al., 2008, p.363). In response to Sousa et al.’s call, this study adopts an integrative framework incorporating the governance-strategy-performance paradigm (GSP) and the structure-conduct-performance framework (SCP) to analyse the impact of ownership structure (as an internal factor) and industry characteristics (as external factors) on the export performance of Chinese manufacturing firms (Figure 1).
2.1 Ownership Structure and Export Performance

While the impact of corporate governance on firms’ strategic decision-making and performance has been well documented in the literature (Buck et al., 2003; Filatotchev et al., 2000), its effect on firms’ export performance has been relatively neglected until recently. Exporting strategy, as a risky adventure in the international markets, is highly associated with corporate governance factors such as ownership structure (Filatotchev et al., 2001, 2008). However, the traditional principal-agent theory cannot be directly applied to emerging economies like China since the majority of enterprises still have not adopted modern corporate governance. Nevertheless, enterprises usually have controlling shareholders (principals) and minority shareholders (principals), which allows the effect of corporate governance on export performance to be examined from another perspective (Lu et al., 2009).

The gradual reform of firm ownership and the liberalisation of FDI inflows in China have created a large pool of diverse ownerships and controlling structures, such as wholly foreign owned enterprises, joint ventures with foreign control, joint ventures with state or non-state control, and wholly locally owned firms, etc. The majority of empirical research has compared the export performance of foreign affiliates and domestic firms. Overwhelming evidence supports the argument that foreign firms in emerging economies are more likely to export than domestic enterprises (e.g. Huang et al., 2008; Fung et al., 2008). This is because multinational enterprises (MNEs) usually take emerging economies, like China, as the export platform to serve their home market or other markets by utilising the costs differences between host countries and their home countries. Moreover, MNEs tend to possess intangible firm-specific assets, such as advanced technology, marketing skills, brand name, and market networks; which could provide MNEs with a competitive advantage in the international market (Ge and Chen, 2008). According to Fung et al. (2008), foreign firms with cost-leadership advantages in China are more likely to export and have higher level of export intensity. Zhang and Song (2000) and Liu and Shu (2003) also find that
increased levels of foreign direct investment (FDI) are positively associated with manufacturing exports in China.

Although the existing literature has traditionally argued that the participation of foreign capital could increase the probability of domestic firms in emerging economies exporting, the structure of strategic control may make the export-decision complex, especially in the joint ventures involving foreign and local investors. In China, foreign affiliates are firms with 25 percent or more equity shares being held by foreign multinationals or firms from Hong Kong, Macau, and Taiwan. The remaining firms are called China’s domestic firms. Thus, a large proportion of foreign firms are controlled by local investors who own the majority of the equity shares. As this may result in strategic conflicts in relation to export-decision making between the investors, export performance may also be associated with the extent of foreign investors’ controls (Filatotchev et al., 2009). Some authors suggest that firms with foreign control are more likely to export, especially when the foreign investors take the joint ventures as a part of a global strategy (Yong and Tavares, 2004). In addition, local firms in emerging economies can be usually classified into state owned enterprises (SOEs) and non-state owned enterprises (NSOE), who are believed to behave differently in business. For instance, Chinese SOEs usually play a dominant role in the resources and energy industries, such as petroleum, coking, nuclear fuel, raw chemical material, mining and supply of electric and heat power, gas and water, which are less export-oriented industries in China (Lee, 2009). However, non-state enterprises tend to concentrate in export-intensive industries like textile and clothing, footwear, furniture, toys, and food processing. Thus, it is reasonable to expect that firms with state ownership are less export-oriented than those with non-state ownership.

Based on the above reviewed literature, we hypothesize the following:

**Hypothesis 1:** Foreign ownership is positively related to the export performance of Chinese manufacturing firms.

**Hypothesis 2:** Export performance is positively associated with the extent of foreign investors’ control.

**Hypothesis 3:** Firms with state ownership are less likely to export than those without state investors.

### 2.2 Industrial Characteristics and Export Performance

The paradigm of structure-conduct-performance (SCP), as a dominant theory in industrial economics, stresses that the conduct of a firm is determined by the characteristics of its external environment, which are mainly represented by its industry characteristics. Based on this framework, the export behaviour of a firm is expected to be highly dependent on the characteristics of the
industry it belongs to (Cavusgil and Zou, 2002). Previous studies have examined the influence of various industry factors on export performance. The industry factors previously examined include industry concentration (Zhao and Zou, 2002), industry export intensity (Naidu and Prasad, 1994), industry export orientation (Campa and Goldberg, 1997), industry import protection (Rojec et al., 2004), industry instability (Sakakibara and Poter, 2001), and industry technological intensity (Filatotchev et al., 2008). In this study we focus on the effects of industry concentration, industry export orientation and industry capital intensity on the export performance of the Chinese manufacturing firms.

Industry concentration is an important indicator which reflects the nature of competition in an industry. A highly concentrated industry is where a few large firms enjoy high market power (Zhao and Zou, 2002). There is no definitive predictive relationship between the level of industry concentration and export performance. On one hand, the dominant firm in a highly concentrated industry usually takes advantage of its strong market power to increase price discrimination and hence focus on the domestic market. On the other hand, the dominant firm is usually large and likely to possess some unique skills or technologies compared with other relatively small firms in the same industry, which could allow it to absorb the risks that come with exporting. However, in China, most highly-concentrated industries are dominated by state-owned enterprises that are protected by the government by high tariff and nontariff barriers (Zhao and Zou, 2002). Correspondingly, they usually possess less comparative advantages than the multinationals in the international markets and thus exhibit low export propensity and intensity. Thus, the relationship between industry concentration and firms’ export performance in China may be negative.

Besides industry concentration, the degree of industry export orientation may also influence the export performance of firms in that industry. Some recent studies confirm that export performance of firms is positively correlated with overall export orientation of the industry due to the demonstration and spillover effects (Rojec et al., 2004; Gao et al., 2009). First, firms often learn from each other’s actions, including their export behaviour. Exporting firms may provide a signal of export attractiveness to non-exporting firms within the same industry, encouraging them to pursue a follow-the-pioneer strategy. Second, an exporter-clustered industry may create a large pool of information about foreign markets and skilled employment, which would reduce the exporting costs of other firms. In particular, several recent studies have confirmed the existence of significant export spillovers from multinational enterprises (Kneller and Pisu, 2007; Sun, 2009). Therefore, we can expect that firms running business in an export-oriented industry are more likely to export and have a high level of export intensity.

The industry capital intensity measures the relative importance of factor endowments. Classical trade theory on trade patterns suggests that countries export those commodities which require
relatively more intensive use of those productive factors found locally in relative abundance (The Heckscher-Ohlin Theorem). It is generally agreed that China’s comparative advantage lies in its abundant labour endowments compared with other countries. This is why low labour cost has been conventionally considered the primary advantage of Chinese firms in the international markets (Liu and Shu, 2003). Thus, firms in labour-intensive industries are naturally more competitive than firms in capital-intensive industries (Huang et al., 2008), which could make them more likely to export.

The above discussion leads to the following hypotheses:

**Hypothesis 4:** The export performance of Chinese manufacturing firms is inversely related to their industry concentration.

**Hypothesis 5:** Firms operating in a highly export-oriented industry with many exporters are more likely to achieve better export performance.

**Hypothesis 6:** Export performance may be negatively related to industry capital intensity in China.

3. Data and Methods

3.1 The Dataset

The primary data set employed in this study is drawn from Annual Survey of Chinese Industrial Firms (ASCIF) from 1999 to 2003 by National Bureau of Statistics of China (NBSC). The database covers all firms with annual sales above 5 million yuan (RMB), providing detailed information on firm identification, four-digit industrial code, output value, value added, new product output, export value, and ownership information etc. More than 50 statistical indicators of the data set were classified into five categories: (i) output indicators; (ii) capital indicators; (iii) assets and liabilities; (iv) profits, and (v) remuneration indicators.

According to the classification of the NBSC, the total database covers three broad sectors: (1) mining; (2) manufacturing; and (3) utility industries. This study focuses on the manufacturing sector, which represents over 90 percent of Chinese exports. In the dataset, each firm is granted an invariant and unique corporation ID code. However, whether firms have exited or entered the market cannot be identified from their ID information. According to Jefferson et al. (2008), there are at least three causes leading to firms’ ID disappearance: closure of the firm; a decrease in sales that pushes the annual total sales below RMB 5 million; or a change in ID associated with some changes in organization. To deal with these unobservable shocks, this study will use a balanced panel dataset. The corporation ID will be used to match the firms in different years and get an
original balance panel data of 63,598 firms in five consecutive years. However, invalid and abnormal information due to non-reporting, misreporting, and obvious mistakes in data keypunching could to serious bias if treated them without “cleaning”. Therefore, following Jefferson, Rawski, and Zhang (2008) and Cai and Liu (2009), the data used will be subject to the following restrictions: (1) observations must not have missing or negative key variables (e.g. output, value-added\(^2\), export); (2) the number of employees hired for a firm must not be less than 8 people; (3) total assets must be greater than total fixed assets; (4) the ratio of value-added to sales value must lie between 0 and 1; (5) the firm’s identification number must be unique and cannot be missing; (6) the starting year of the firm must be valid and before 2003; (7) the export intensity is bounded between zero and one. We end up with a valid balanced-panel sample with 36,941 firms in the five consecutive years from 1999 to 2003.

3.2 The Econometric Model

To comprehensively examine the effects of ownership structure and industry characteristics on export performance, three different indicators of export performance (i.e. export propensity, export intensity and export strategy) are used as dependent variables. It is assumed that firms’ ownership structure and industry characteristics could affect firms’ export performance, together with other firm-specific covariates. The baseline specification can be presented as follows:

\[
Y_{it} = a + b_1 O_{ij(t-1)} + I_{ij(t-1)} b_2 + Z_{ij(t-1)} b_3 + X_{it} b_4 + e_{it}
\]

where subscripts \(i\), \(j\) and \(t\) denote firm, industry, and year; \(Y\) is the dependent variable representing the export performance, which can be binary, fractional or ordinal in this paper; \(O\) denotes ownership structure of firm \(i\), and \(I\) denotes a vector of industry characteristics variables that include industry concentration index, industry export-orientation index and industry capital intensity if firm \(i\) operates in industry \(j\), \(Z\) denotes a vector of control variables that include firm productivity, size and age. Some other variables (\(X\)), like region, industry and year dummies, are also included to control some unobserved macroeconomic shocks and fixed effects. Given the possible effects of exporting on firms’ characteristics, we follow the traditional method in the literature and lag all the independent variables one year to alleviate the problem of simultaneity. The heteroskedasticity resulting from unobserved firm heterogeneity will also be considered. In particular, the fixed effects model cannot be used here because the ownership structure as an

\(^2\)The information of added value in 2000 is not reported directly in our dataset. So we calculated it use the formula: added value equals total output value at the current price minus the total input and plus the tax of value-added.
independent variable may be constant over time and could be swept away by the fixed effects transformation. Therefore, the random effects model is preferred by assuming that unobserved firm heterogeneity is uncorrelated with each explanatory variable in all time period.

**Dependent Variable**

To examine the determinants of export propensity in Chinese manufacturing firms, the dependent variable in equation (1) is represented by a binary variable \( \text{EXPD}_{it} \), which equals one when the firm has positive exports values \( \text{EXP}^*_it \) in a specific year and zero otherwise.

\[
\text{EXPD}_{it} = \begin{cases} 
1 & \text{if } \text{EXP}^*_it > 0 \\
0 & \text{otherwise}
\end{cases}
\]  

(2)

As shown in Table 1, over one third of the considered firms were involved in exporting activities. If the export performance is represented by the export intensity (i.e. \( \text{EXPT}_{it} \), the ratio of export value to total sales), the dependent variable will be a fractional variable with a large number of zero value. We calculate the export intensity using the following formula:

\[
\text{EXPT}_{it} = \frac{\text{Exports}_{it}}{\text{Total Sales}_{it}}
\]  

(3)

The average export intensity in the sample is about one fifth, meaning that about twenty percent of the output of Chinese firms was sold in foreign markets. Besides the export propensity and export intensity, an ordinal dependent variable is also considered in this paper. In turn, three groups of firms in terms of export strategy \( \text{EXPS}_i \) are identified: non-exporters which are defined as firms who never exported in the investigated period; sporadic exporters, which were those that exported in some years of the period; and persistent exporters which were those that exported every year. The dependent variable in such occasion is defined as three categorical and ordinal numbers as follows:

\[
\text{EXPS}_i = \begin{cases} 
1 & \text{if sum(EXPD}_i ) = 0 \\
2 & \text{if sum(EXPD}_i ) \in [1,4] \\
3 & \text{if sum(EXPD}_i ) = 5
\end{cases}
\]  

(4)
Table 2 shows that more than half of the sampled firms never exported in the five years studied and 26.9 percent of the firms chose to export continuously. The remainder 16.9 percent of the firms exported occasionally.

**Independent variables**

Based on the information from the dataset, there are two ways to identify the firm’s ownership structure. The first method is to directly utilise the firms’ registration ownership type, which falls into the following ownership categories: state-owned-enterprises, collectively-owned enterprises, overseas joint ventures, foreign joint ventures, and limited liability companies, sharing holding firms, HMT enterprises, foreign invested enterprises and others. The second approach is to use the information on the sources of total registered capital (equity), which includes state capital, collective capital, private capital, HMT capital, foreign capital and capital from legal entity; to identify the firm’s ownership structure indirectly. However, the outcome of these two methods does not exactly match. This study follows Ge and Chen (2008) and uses the sources of the registered capital to identify the ownership structure.

The firms’ ownership structure is thus classified into eight categories: (1) wholly foreign-owned enterprises with non-HMT control; (2) wholly foreign-owned enterprises with HMT control; (3) joint ventures with non-HMT control; (4) joint ventures with HMT control; (5) joint ventures with non-state control; (6) joint ventures with state control; (7) wholly locally-owned enterprises with non-state control; (8) wholly locally-owned enterprises with state control. The “other type” of ownership structure will be a benchmark. A wholly foreign invested enterprise is an enterprise with all the registered equity from foreign investors, who are from Hong Kong, Macao and Taiwan (HMT) and other foreign countries (mainly OECD countries). A wholly locally-owned enterprise is one wholly-owned by local investors including state investors and nonstate investors. A joint venture is defined as a company with positive foreign capital and local capital. Non-state capital for these purposes includes collective capital, private capital and legal entities capital. A control structure means that the investor of that category enjoys a dominating capital share in a specific enterprise. Table 1 shows that more than half the firms were wholly invested by local investors with a non-state control structure and about 16.5 percent were controlled by state investors. The rest (about 30 percent) of the firms had foreign capital and 12 percent are totally owned by foreign investors.

Following the literature, we categorise industry characteristics of Chinese manufacturing industries using the following measures: (1) industry concentration, by calculating the Herfindahl index (HI), which is measured by the sum of the squares of the market shares of each firm competing in a specific industry; (2) industry export-orientation index (IEI), the percentage of
exporters in a specific industry; (3) industry capital intensity (ICI) index measured by the ratio of total fixed assets to total employee in a specific industry. The higher value of HI implies a more concentrated industry while the higher IEI implies a more export-oriented industry. The lower ICI represents a labour-intensive industry. These three variables are all calculated at the four-digit industry level.

**Control variables**

Three control variables are included in this study. The total factor productivity (TFP) was calculated by employing the Levinsohn and Petrin approach (2003) at the two-digit level. In the economic literature, numerous studies have provided consistent evidence that firm productivity plays a positive role in firms’ export behaviour (i.e. the self-selection hypothesis). We also controlled for firm Size, as measured by the number of employees and firm Age, as measured by the number of years since the establishment of the firm. Region, industry, and year effects are also incorporated in the estimate for robustness. The descriptive statistics of variables are presented in Table 1.

**4. Results and Discussion**

**4.1 The Determinants of Export Propensity and Export Intensity**

Following previous studies, such as Gao et al. (2009) and Fung et al. (2008), we employ Logistic (LOGIT) and TOBIT models for the estimation of export propensity and export intensity, respectively. We present three specifications with different sets of independent variables (i.e. ownership structure variables, industry characteristics variables and combined variables) for export propensity and export intensity to clarify the proposed hypotheses. The results for the determinants of export propensity and for the export intensity are displayed in Tables 3 and 4 respectively. The Wald $\chi^2$ statistics reveal that the null hypothesis that the regression coefficients are jointly equal to zero can be rejected at the one percent significance level for all regressions.

Foreign control structure has positive effects on export propensity and export intensity, regardless of the source of the foreign capital. In contrast, firms governed by local investors are less likely to enter foreign markets and more likely to show lower export intensity. In particular, firms wholly owned by foreign investors with non-HMT controls (mainly from the OECD countries) have the highest export propensity and export intensity, while wholly locally-owned enterprises with state controls are the least likely to export and have the lowest level of export intensity. As for the joint ventures, the dummy variables for JVs with HMT control or non-HMT control have positive coefficients, while JVs with non-state control or state control have negative coefficients.
These results imply that the export propensity and export intensity of Chinese manufacturing firms is positively associated with not only the volume of foreign capital but also the extent of foreign investors’ control over the decision-making within the enterprises. Hence both Hypotheses 1 and 2 are supported. It is also interesting to note that firms with non-HMT capital are more export-oriented and export-intensive than those with HMT capital, while firms involving state capitals are less export-oriented and export-intensive than those with non-state capital. These results indicate that Hypothesis 3 is also supported.

These findings are actually consistent with the changes in the modes of inward FDI into China in recent years. In the early stage of reform, contractual joint venture and joint exploration investment played a dominant role in the entry modes of FDI in China. These were later replaced by equity joint venture and wholly foreign-owned enterprises after 1986. Since the 1990s the share of wholly foreign-invested enterprises has gradually increased, and the foreign control in joint ventures has also increased. From 1998 onwards, the share of wholly foreign-owned enterprises exceeded that of equity joint ventures. By 2000, the share of wholly foreign-owned enterprises and contractual joint ventures had accounted for 80 percent of both total contractual and actual investment. Meanwhile, the contribution of foreign-invested enterprises to China’s exports also increased dramatically. The share of exports by FIEs in total exports had increased from 0.15 percent in 1981 to 58.30 percent in 2005. Even in the measurement period between 1999 and 2003, the record also increased from 45.47 percent to 54.84 percent. Recent related research by Feenstra and Hanson (2005) has also confirmed that multinational enterprises engaged in export processing in China are more likely to have the ownership of the factories.

The study also found that the estimated coefficient of Herfindahl index is positive but not statistically significant for export propensity, while the coefficient is negative but insignificant for export intensity. This implies that the impact of industry concentration on the export propensity and export intensity of Chinese firms is inconclusive. This is contrary to Zhao and Zou (2002), in which they found that industrial concentration has a negative influence on both export propensity and export intensity. On this basis, Hypothesis 4 can be rejected.

The coefficients of industry export orientation and capital intensity are statistically significant at one percent significance level, meaning firms operating in export-oriented and labour-intensive industries are more likely to export and have higher export intensity. This demonstrates that Chinese exporters are enjoying export spillovers and utilising the comparative advantage of the abundant cheap labour, thus supporting Hypotheses 5 and 6.

In relation to the effects of the control variables, the results show that firms with higher productivity are more likely to export and export more, which is evidence supporting the self-

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3 This paragraph relies entirely on Lai (2002, p.30)
selection hypothesis in China. The firm size in terms of total employees also exerts a positive influence on firms’ export propensity and export intensity. It could be argued that large firms usually own large amounts of equity, advanced technology, intangible assets, or brand name; which could give them a competitive advantage in foreign markets that small firms do not have. Meanwhile, the effect of firm age on export decision is not particularly significant for the export decision of firms but has a negative influence on export intensity. This implies that Chinese exporters with long history of operations have lower export intensities than those of the young.

4.2 The Determinants of Export Strategies

This section deals with the determinants of the choice of the export strategies, which are classified into three categories according to their export sequences during the observed period. As discussed above, firms can have three different kinds of export strategies: never export, occasionally export, and persistently export. Correspondingly, three groups of firms are identified based on their export strategies: non-exporters, sporadic exporters and persistent exporters. Given the categorical and ordinal nature of the dependent variable, an ordered probit (OPROBIT) model fits well.

According to the results in Table 5, the estimated coefficients of WFOEs with non-HMT control, WFOEs with HMT control and JVs with non-HMT control are positive and statistically significant. In particular, the ownership of WFOEs with non-HMT control increases the probability of them being persistent exporters by 8.7 percent. WFOEs with HMT control and JVs with non-HMT control have corresponding probabilities of about 1.9% and 4.5% respectively. This implies that Chinese manufacturing firms with these three kinds of ownership structures are more likely to export persistently.

In contrast, the other five categories of ownership structures (i.e. JVs with MHT control, JVs with non-state control, JVs with state control, WLOEs with non-state control, and WLOEs with state control) have a negative impact on firms’ improving their export status. Among these five categories, wholly locally-owned enterprises with non-state control are least likely to be persistent exporters, followed by WLOEs with state control. It is important to note that the sign of the JVs with HMT control dummy is negative, which is contrary to the results in export propensity and export intensity specifications. This means that joint ventures with HMT control are more likely to export and export more, but will not export persistently compared with other firms with foreign control. The results also show that wholly foreign owned enterprises with non-HMT control have the highest probability of exporting continuously. The joint ventures with non-HMT control are more likely to be persistent exporters than wholly foreign owned enterprises with HMT control. In addition, joint ventures with state control are more likely to be non-exporters than those with non-
state control. However, wholly locally owned enterprises with state control are less likely to be non-exporters than those with non-state control.

In relation to industry characteristics, industry concentration has a positive and statistically significant impact on the firms’ choice of export strategies. Thus, firms operating in a highly concentrated industry are more likely to export permanently. So are firms operating in the export-oriented and labour-intensive. Also, more productive firms are more likely to export continuously while less productive firms are more likely to export occasionally or not export at all. Firm size and age have the same influence on the firms’ export strategies as productivity. Thus, large and old firms are more likely to be persistent exporters.

5. Conclusions

The main contribution of this paper was to examine the effects of ownership structure and industry characteristics on the export performance in the context of Chinese manufacturing firms. To achieve this aim, three different yet related models were employed, namely, Logit model, Tobit model and Ordered probit model, to investigate the determinants of export propensity, export intensity and export strategies, respectively. Unlike previous studies which simply compare the export behaviour of foreign firms and domestic firms, this study distinguishes between wholly foreign owned enterprises, joint ventures and wholly locally owned enterprises, and between HMT (Hong Kong, Macao, Taiwan) and non-HMT (mainly OECD countries) control, and between non-state and state control within firms. Three industry characteristics at the four-digit level - industry concentration, industry export orientation, and industry capital intensity - are also incorporated in different specifications.

This methodology provided some new findings. First, three different specifications gave a consistent conclusion that the presence of wholly-owned firms and joint ventures with foreign control (non-HMT control or HMT control) have had a positive effect on export propensity and intensity. Firms with non-HMT control are more export-oriented than those with HMT control. Furthermore, firms with such characteristics are more likely to be persistent exporters, with the exception of joint ventures with HMT control, which less likely to export persistently. Joint ventures with domestic control (non-state or state control) and wholly locally owned enterprises are less likely to export or improve their export status, and have lower export intensity.

Second, the impact of industry concentration on export performance remains inconclusive, meaning further studies or the use alternative measurements are required. The results for the effects of industry export orientation and capital intensity are consistent across the three different models.
The results imply that firms operating in export-oriented and labour intensive industries are more likely to export, have high export intensities, and be persistent exporters.

Some additional comments are worth mentioning. First, the findings imply that the management of entry modes of foreign direct investment could also influence the country’s export performance. Any policy of restricting the entry of wholly foreign owned enterprises may not be beneficial for Chinese exports since they are the most export-oriented. Second, the effect of industry concentration on the export performance remains unclear and requires further investigation. Third, it should be noted that other determinants of the export performance not examined in this paper may exist. For example it would be interesting for future research to examine the role of research and development (R&D) in the China’s export success.

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Table 1 Summary Statistics about the Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
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<tbody>
<tr>
<td><strong>Dependent Variables</strong></td>
<td></td>
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<tr>
<td>Export propensity</td>
<td>0.355</td>
<td>0.479</td>
<td>0</td>
<td>1</td>
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<td>Export intensity</td>
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<td><strong>Ownership Structure (Dummies)</strong></td>
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<td>WFOEs with HMT control</td>
<td>0.068</td>
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<td>0.223</td>
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<td>JV with state control</td>
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<td>WLOEs with state control</td>
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<td>Industry export orientation</td>
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<td><strong>Control Variables</strong></td>
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<tr>
<td>TFP (log)</td>
<td>7.247</td>
<td>1.209</td>
<td>-1.919</td>
<td>13.958</td>
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<tr>
<td>Firm Size (log)</td>
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<td>1.150</td>
<td>2.079</td>
<td>12.025</td>
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<tr>
<td>Firm Age (log)</td>
<td>2.580</td>
<td>0.743</td>
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<td>7.602</td>
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<tr>
<td>Number of Firms</td>
<td>36,941</td>
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<tr>
<td>Total observations</td>
<td>184,75</td>
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*Note.* WFOEs=wholly foreign owned enterprises; HMT=Hong Kong, Macao, and Taiwan; JVs=Joint Ventures; LOEs=wholly locally owned enterprise.

*Source: The authors’ calculation.*
Table 2 Classification of Firms according to Export Strategy

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<tr>
<th>Groups</th>
<th>Number</th>
<th>Percent (%)</th>
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<tr>
<td>Nonexporters</td>
<td>20,744</td>
<td>56.2</td>
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<tr>
<td>Sporadic exporters</td>
<td>6,272</td>
<td>16.9</td>
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<tr>
<td>Persistent exporters</td>
<td>9,925</td>
<td>26.9</td>
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<tr>
<td>Total</td>
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*Source: The authors’ calculation.*
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<th>Industry Characteristics</th>
<th>Combined</th>
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<td>Model 2</td>
<td>Model 3</td>
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<tr>
<td><strong>Ownership Structure</strong></td>
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<tr>
<td>WFOEs with non-HMT control</td>
<td>2.388 (0.00)</td>
<td>2.064 (0.00)</td>
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<td>WFOEs with HMT control</td>
<td>1.605 (0.00)</td>
<td>1.297 (0.00)</td>
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<tr>
<td>JVs with non-HMT control</td>
<td>1.337 (0.00)</td>
<td>1.244 (0.00)</td>
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<tr>
<td>JVs with HMT control</td>
<td>0.649 (0.01)</td>
<td>0.514 (0.03)</td>
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<tr>
<td>JVs with nonstate control</td>
<td>-0.375 (0.11)</td>
<td>-0.447 (0.05)</td>
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<td>-3.171 (0.00)</td>
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<td>WLOEs with state control</td>
<td>-3.817 (0.00)</td>
<td>-3.387 (0.00)</td>
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<tr>
<td>Industry concentration</td>
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<td>Industry export orientation</td>
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<td>7.604 (0.00)</td>
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<tr>
<td>Industry capital intensity</td>
<td>-0.002 (0.00)</td>
<td>-0.003 (0.00)</td>
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<td><strong>Control Variables</strong></td>
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</tr>
<tr>
<td>TFP (log)</td>
<td>0.248 (0.00)</td>
<td>0.426 (0.00)</td>
<td>0.295 (0.00)</td>
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<td>Firm size (log)</td>
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<td>1.562 (0.00)</td>
<td>1.471 (0.00)</td>
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<tr>
<td>Firm age (log)</td>
<td>0.006 (0.88)</td>
<td>-0.343 (0.00)</td>
<td>0.041 (0.25)</td>
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<tr>
<td>Log likelihood</td>
<td>-39587</td>
<td>-40046</td>
<td>-38634</td>
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<tr>
<td>Wald $\chi^2$</td>
<td>14950.1(0.00)</td>
<td>13259.1(0.00)</td>
<td>13779.7(0.00)</td>
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<td>Number of observations</td>
<td>147,764</td>
<td>147,764</td>
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**Note.** All the independent variables are lagged one year. Province, two-digit industry, and year fixed effects are included and not shown. The p-values are reported in parentheses. WFOEs=wholly foreign-owned enterprises; HMT=Hong Kong, Macao, and Taiwan; JVs=Joint Ventures; LOEs=wholly locally-owned enterprise
Table 4 Determinants of Export Intensity

<table>
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<th>Independent Variables</th>
<th>Ownership Structure</th>
<th>Industry Characteristics</th>
<th>Combined</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Model 4</td>
<td>Model 5</td>
<td>Model 6</td>
</tr>
</tbody>
</table>

**Ownership Structure**

- WFOEs with non-HMT control: 0.119 (0.00) 0.123 (0.00)
- WFOEs with HMT control: 0.091 (0.00) 0.093 (0.00)
- JVs with non-HMT control: 0.066 (0.00) 0.071 (0.00)
- JVs with HMT control: 0.049 (0.00) 0.050 (0.00)
- JVs with nonstate control: -0.036 (0.02) -0.035 (0.02)
- JVs with state control: -0.078 (0.00) -0.074 (0.00)
- WLOEs with nonstate control: -0.217 (0.00) -0.212 (0.00)
- WLOEs with state control: -0.249 (0.00) -0.243 (0.00)

**Industry Characteristics**

- Industry concentration: -0.033 (0.21) -0.018 (0.48)
- Industry export orientation: 0.514 (0.00) 0.518 (0.00)
- Industry capital intensity: -0.0001 (0.00) -0.0002 (0.00)

**Control Variables**

- TFP (log): 0.008 (0.00) 0.014 (0.00) 0.010 (0.00)
- Firm size (log): 0.085 (0.00) 0.081 (0.00) 0.083 (0.00)
- Firm age (log): -0.022 (0.00) -0.035 (0.00) -0.021 (0.00)
- Log likelihood: -36246(0.00) -36378(0.00) -35208(0.00)
- Wald $\chi^2$: 19266.56 18396.24 22033.64
- Number of observations: 147,764 147,764 147,764

Note. All the independent variables are lagged one year. Province, two-digit industry, and year fixed effects are included and not shown. The $p$-values are reported in parentheses.

WFOEs=wholly foreign owned enterprises; HMT=Hong Kong, Macao, and Taiwan; JVs=Joint Ventures; LOEs=wholly locally owned enterprise
# Table 5 Determinants of Export Strategies

<table>
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<tr>
<th>Independent Variables</th>
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<th>Marginal Effects</th>
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<td>Estimates</td>
<td>Nonexporters</td>
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<tr>
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<td>Model 7</td>
<td>(=1)</td>
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</tbody>
</table>

**Ownership Structure**

- **WFOEs with non-HMT control**  
  - Model 7: 0.306 (0.00)  
  - Model 8: -0.121 (0.00)  
  - Model 9: 0.034 (0.00)  
  - Model 10: 0.087 (0.00)
- **WFOEs with HMT control**  
  - Model 7: 0.072 (0.04)  
  - Model 8: -0.028 (0.04)  
  - Model 9: 0.010 (0.03)  
  - Model 10: 0.019 (0.04)
- **JVs with non-HMT control**  
  - Model 7: 0.168 (0.00)  
  - Model 8: -0.066 (0.00)  
  - Model 9: 0.021 (0.00)  
  - Model 10: 0.045 (0.00)
- **JVs with HMT control**  
  - Model 7: -0.204 (0.00)  
  - Model 8: 0.077 (0.00)  
  - Model 9: -0.031 (0.00)  
  - Model 10: -0.046 (0.00)
- **JVs with state control**  
  - Model 7: -0.334 (0.00)  
  - Model 8: 0.124 (0.00)  
  - Model 9: -0.052 (0.00)  
  - Model 10: -0.071 (0.00)
- **WLOEs with nonstate control**  
  - Model 7: -0.993 (0.00)  
  - Model 8: 0.375 (0.00)  
  - Model 9: -0.118 (0.00)  
  - Model 10: -0.257 (0.00)
- **WLOEs with state control**  
  - Model 7: -1.077 (0.00)  
  - Model 8: 0.352 (0.00)  
  - Model 9: -0.167 (0.00)  
  - Model 10: -0.185 (0.00)

**Industry Characteristics**

- **Industry concentration**  
  - Model 7: 0.740 (0.00)  
  - Model 8: -0.288 (0.00)  
  - Model 9: 0.102 (0.00)  
  - Model 10: 0.186 (0.00)
- **Industry export orientation**  
  - Model 7: 2.562 (0.00)  
  - Model 8: -0.984 (0.00)  
  - Model 9: 0.349 (0.00)  
  - Model 10: 0.635 (0.00)
- **Industry capital intensity**  
  - Model 7: -0.002 (0.00)  
  - Model 8: 0.001 (0.00)  
  - Model 9: -0.000 (0.00)  
  - Model 10: -0.000 (0.00)

**Control Variables**

- **TFP (log)**  
  - Model 7: 0.043 (0.00)  
  - Model 8: -0.017 (0.00)  
  - Model 9: 0.006 (0.00)  
  - Model 10: 0.011 (0.00)
- **Firm size (log)**  
  - Model 7: 0.351 (0.00)  
  - Model 8: -0.137 (0.00)  
  - Model 9: 0.049 (0.00)  
  - Model 10: 0.088 (0.00)
- **Firm age (log)**  
  - Model 7: 0.060 (0.00)  
  - Model 8: -0.023 (0.00)  
  - Model 9: 0.008 (0.00)  
  - Model 10: 0.015 (0.00)

**Log likelihood**  
- Model 7: -127,493.8

**Wald $\chi^2$**  
- Model 7: 91067.4 (0.00)

**Pseudo R²**  
- Model 7: 0.2944

**Number of observations**  
- Model 7: 184,705

**Note.** All the independent variables are lagged one year. Province, two-digit industry, and year fixed effects are included and not shown. The $p$-values are reported in parentheses.

WFOEs=wholly foreign owned enterprises; HMT=Hong Kong, Macao, and Taiwan; JVs=Joint Ventures; LOEs=wholly locally owned enterprise
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<td>Le, A.T.</td>
<td>ENTRY INTO UNIVERSITY: ARE THE CHILDREN OF IMMIGRANTS DISADVANTAGED?</td>
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<td>ROYALTIES FOR REGIONS: ACCOUNTABILITY AND SUSTAINABILITY</td>
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<td>Chen, A. and Groenewold, N.</td>
<td>REDUCING REGIONAL DISPARITIES IN CHINA: AN EVALUATION OF ALTERNATIVE POLICIES</td>
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<td>Jones, C.</td>
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