HOW DOES FOREIGN DIRECT INVESTMENT (FDI) AFFECT CHINA'S EXPORTS TO OECD COUNTRIES?

by

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ABSTRACT

This paper empirically investigates the impact of inward FDI on China's export performance to OECD countries, employing a panel dataset that incorporates 34 OECD members with the time-span from 1997 to 2012. The estimation is conducted by utilizing an augmented gravity model with country and year fixed effects. LSDV (Least Square Dummy Variable) regression results on FDI indicate a positive and significant effect of FDI inflows on China's exports to OECD members. This result suggests that inward FDI plays an important role in China's exports to its top trading partners, and enables China to take the leadership of the exporting rank in the world.

Keywords: FDI, China's exports, OECD countries, gravity model, fixed effects

LIST OF ABBREVIATIONS USED

FDI	Foreign Direct Investment
OECD	Organization for Economic Co-operation and Development
LSDV	Least Square Dummy Variable
OLS	Ordinary Least Squares
SEZs	Special Economic Zones
FIE	Foreign-invested Enterprise
GAC	General Administration of Custom
TFP	Total Factor Productivity
VAR	Vector Autoregression
ADF	Augmented Dickey Fuller
CPI	Consumer Price Index
GDP	Gross Domestic Product
FTA	Free Trade Agreement
WTO	World Trade Organization

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CHAPTER 1. INTRODUCTION

1.1 OVERVIEW OF CHINA'S EXPORTS

After the policy of reform and openness was implemented in 1978, China's exports experienced a great increase, and the proportion of China's exports in GDP has kept growing ever since. In 1990, the value of China's exports was 57 billion US dollars; after 1990, the value of exports surged swiftly and steadily to reach 2248 billion US dollars in 2012 (see Figure 1). China has been the largest exporter in the world since 2009, when the worldwide financial crisis happened and substantially dampened the world economy; this leading exporter position has been maintained until the present (Dias and Makalengva, 2013). The percentage of exports in GDP in China between 1980 and 2012 has been increasing rapidly overall (see Figure 2). These figures indicate that exports have been an important driving factor of China's economic growth. China has been well-known as the World Factory; because of the large supply of low-paid labor, manufactured exports always account for a large proportion of China's total merchandise exports. From Figure 3, the proportion of manufactured exports has kept increasing since 2003 and is over 90 percent. Meanwhile, the percentage of high-technology exports in manufactured exports has gradually gone up, the highest point reaching 30.84 percent in 2005 (see Figure 4). Moreover, high-income economies are major recipients of China's exports; although the proportion shows a decreasing trend, it still exceeds 70 percent in 2012 (see Figure 5). These figures show that the majority of China's exports flow into high-income countries since developed countries can benefit from China's comparative advantage in labor to reduce production costs. Over time since 2005, the proportion of China's exports to high-income countries starts to decrease slightly, it still remains to be seen what future holds.

One important aspect of trade in China is the growing role of exports from foreign-invested enterprises, which is the major channel of FDI in China. Based on statistics provided by the National Bureau of Statistics of China (2013), the number of registered foreign-invested enterprises in China was 20,190 in 1995; this number dramatically jumped to 440,609 in 2012. Additionally, the value of exports of foreign-invested enterprises (FIE) increased from 46.87 billion US dollars to 1.023 trillion US dollars between 1995 and 2012 (see Table 1). In other words, the share of exports of foreign-invested enterprises

went from representing 31.5 percent in 1995 to 53.93 percent of the total value of exports in 2012 (see Figure 6). These considerable changes would imply that the impact of inward FDI on China's export performance has been economically significant.

1.2 POLICIES TOWARDS FDI IN CHINA

Currently, the Chinese government is implementing a policy to further attract inward FDI, with the purposes of obtaining advanced technologies and managerial skills from foreign developed countries, as well as promoting export volumes. The way that the Chinese government has adopted to attract FDI is to offer preferential treatment for foreign enterprises in the cities that are open to FDI inflows. For example, the preferential treatment for foreign enterprises in the Special Economic Zones (SEZs) mainly lies in the concession and exemption of taxes. Foreign and domestic firms in the SEZs were levied levels of corporate income taxes starting in the 1980s; foreign firms pay the corporate income tax at the rate of 15%, while the regular rate for domestic firms is 33%. Moreover, foreign enterprises are exempt from tariffs if they import equipment, transportation facilities and raw materials that are required for production from abroad. Other than the tax concession, foreign enterprises in the SEZs also enjoy the cheaper expenses of land use and raw material procurement; foreign investors can obtain simplified Entry-Exit procedures from the SEZs' administration as well (Klitgaard and Rasmussen, 1983).

Strictly speaking, China started to pay attention to the attraction of FDI in the mid-1970s, which is when China's former president Deng Xiaoping urged economic cooperations with foreign countries and criticizing the current government-planned economic policy, and emphasizing the importance of export promotion to China's economic growth (Pomfret, 1991). Since then, China's FDI policies have experienced a series of reforms. Generally, the reforms of China's FDI policies can be summarized as three main phases: the initial phase (1979-1985), the continuous development phase (1986-1991), and the high-speed growth phase that started in 1992 (Zhang, 1999, Fu, 2000).

In the initial phase, four SEZs were established in Guangdong and Fujian provinces in 1980, and only these four SEZs received FDI inflows (Ho, 2004). Over the second stage, the open-door policy was extended and fourteen coastal cities across 10 provinces were opened to FDI inflows following the four SEZs (Li, 2005). The high-speed growth phase

was then marked by Deng Xiaoping's famous South Tour Speech that was delivered in 1992; his speech markd the point at which China's economy changed from a government-planned economy to a mixed economy with an increasingly market-oriented environment. In this stage, the government released the restrictions on foreign investors further by allowing the presence of joint ventures. In addition, the open policies of FDI started to expand to the inland areas, and more central and western cities were opened to get FDI inflows (Ho, 2004).

Figure 7 reflects the changes in China's inward FDI from 1982 to 2012. From this graph, it is clear that, from the year 1992, the inward FDI received by China dramatically surged, and, after a brief relapse in 2009, reached a peak in 2011, at roughly 116 billion real US dollars (in 1992, the figure of inward FDI was only 8.7 billion real US dollars). In the first half of the year 2012, China had even surpassed the United States to become the world's largest inward FDI recipient at 59.1 billion current US dollars (inward FDI in the US was 57.4 billion current US dollars at that time) (UNCTAD, 2013).

Apart from the policy factor, another important contributing factor to China's inward FDI boom is that the country's emerging market considerably attracts foreign investors to invest in China. Based on recent years' statistics, China's inward FDI has mainly come from high-income economies. Table 2 shows the major sources of China's inward FDI in 2012. The largest supplier is Hong Kong, which by itself accounts for 63.8 percent of total inward FDI. This phenomenon could be attributed to two reasons: One is the unique link between Hong Kong and the China Mainland, which is characterized by the same language, the similar culture background and geographic proximity; these characteristics are called Chinese connections (Zhang, 2006). The other reason is that some parts of FDI from Hong Kong are purposefully disguised; firstly, some of the FDI coming from Hong Kong is actually made by Taiwanese investors, and these investments are officially reported as from Hong Kong to avoid the political obstacles and inconvenience with Taiwanese government. In addition, investors in mainland China try to make their investments seem like "foreign investments" in order to benefit from the preferential treatment policy towards foreign capital in the mainland. As a result, they sometimes report that their investments are from Hong Kong (Wei, 1996). The other the top countries are Japan,

Singapore, Taiwan and the U.S. Overall, the top 10 source countries account for 90.4 percent of total FDI inflows.

1.3 REGIONAL AND INDUSTRIAL DISTRIBUTION OF FDI IN CHINA

The distribution of inward FDI in China varies across regions and industries. The regional distribution of inward FDI in China is extremely uneven; until recently, inward FDI was mainly concentrated around the relatively developed eastern coastal regions, the most developed economic zone of the country, and central metropolitan cities, such as Shanghai, Guangdong and Beijing. The relevant statistics show that roughly 90 percent of FDI flows into these developed areas of China's mainland. Figure 8 presents the percentages of FDI that went to each province in China in 2000 and 2012. In 2000, Guangdong province was the region that received the largest amount of FDI, which was 28 percent; other top recipient regions were Jiangsu, Shanghai and Fujian, which received 15.9, 7.8 and 8.5 percent of FDI, respectively. In 2012, Guangdong's leading position was replaced by Jiangsu province and became the second destination of FDI inflows, but it still accounted for a large proportion, which was 15.7 percent. Both Shanghai and Jiangsu provinces obtained relatively large increases in FDI inflows in 2012, and these three provinces were the top three China's FDI recipient regions in this year with 48.7 percent in total; by contrast, the central and western regions received small amounts of FDI. For example, the central provinces of Shanxi and Anhui, in 2012, each received 1.1 percent of FDI. Statistics on western regions show even lower levels of FDI; the provinces of Ningxia and Gansu only received 0.2 percent of FDI in 2012. The uneven regional distribution of FDI can be attributed to several reasons. The first one is related to FDI policy; at the early stage of FDI attraction, FDI was restricted to flow into four special economic zones only, and then the restriction was widened to 14 coastal cities that had developed infrastructure and higher level of economic development (Ali and Guo, 2005). This biased FDI policy gave rise to an overwhelmingly high concentration of FDI within eastern coastal areas (Li, 2005). Another factor is that foreign investors are discouraged by the underdevelopment of inland China, which is reflected in undeveloped telecommunication and transportation infrastructure (Broadman and Sun, 1997). Additionally, all of the harbor cities benefit from the coast, the geographical advantages associated with the location and thus eastern regions were able to export goods, and thus it is easy to attract foreign enterprises to invest.

However, it should be noticed that the distribution of FDI in central and western regions has obtained slow increases. Provinces such as Sichuan, Chongqing, Jiangxi and Tianjin (locations of these provinces see figure 9) received a larger proportion of FDI in 2012 than in 2000, even though the increases are slight. This evidence may indicate that inland regions will increasingly benefit from the expansion of open policies of FDI.

With respect to the industrial distribution of inward FDI in China, secondary industry, which mainly consists of manufacturing sectors, absorbs the largest proportion of FDI, since China has a comparative advantage in labour-intensive industry thanks to the lower cost of labour and an abundant supply of labour. This provides substantial incentives to foreign enterprises to invest and establish plants in China for the purpose of low production cost and higher profit. The proportion of FDI flowing into manufacturing sectors kept increasing until 2002. Since then however, the proportion of FDI utilized by manufacturing sectors started to decrease gradually. The two pie charts in Figures 10 and 11 describe how much inward FDI was utilized by different sectors in China in 2000 and 2012. In 2000, 64 percent of FDI went into the manufacturing sector; the second sector was real estate, which utilized 11 percent of FDI in that year. In 2012, the utilization of FDI in the manufacturing sector fell to 44 percent; conversely, the real estate sector utilized a larger proportion of FDI, which is 22 percent. The changes in the utilization of FDI implies that the distribution of inward FDI began to transition from the manufacturing sector to other sectors, such as the real estate. A plausible explanation for this change is that house prices in real estate kept skyrocketing due to a high level of demand over the last decade. Potential profits in China's real estate market considerably attracted foreign investors and thus have driven up the proportion of FDI in the real estate sector. The emergence of computer service sector need to be paid attention as well. In 2012, computer service sector received 3 percent of FDI inflows, this was a big change because in 2000 this sector only received a negligible proportion of FDI or even did not receive any FDI inflows. Computer service sector's emergence can be attributed to the boom of online shopping in China over recent years. Online shopping's boom also stimulates the growth of retail sector's transactions, which in turn allows retail trade sector obtain a larger percentage of FDI in 2012.

1.4 FDI AND CHINA'S EXPORTS

As outlined by Liang (2008) FDI plays an important role in China's export promotion. FDI has the potential to improve the level of technological sophistication of export goods that largely exceeds the current level of development of economy in China, as the income level still remains at a relatively low level in the world. This implies that FDI brings sophisticated technologies and managerial skills to China's enterprises and then enhances the quality of China's export goods. Cheap labour combined with sophisticated technologies brought by FDI allows China to export more high-technology manufactured products such as equipment, electronic devices and mobile phones (Zhang, 2005). FDI spillover effects on local companies' export activities are another driving factors of manufactured exports' promotion. The spillover effects are reflected in two aspects: first, local companies can learn from foreign-invested firms and take advantage of better transportation, communication and financial services to improve their exporting; second, the competition from foreign companies pushes local companies to adopt most efficient approaches to enhance their productivities (Zhang, 2005). This effect on local companies could be viewed as the indirect effect of FDI on China's export performance.

1.5 FDI AND EXPORTS TO OECD COUNTRIES IN PARTICULAR

The 34 OECD members are comprised of all high-income economies and emerging economies such as Mexico, Chile and Turkey (OECD, 2014). In 2013, four of China's top five export recipients (the U.S., Japan, South Korea and Germany) were OECD members; these four countries received 32 percent of China's total exports in 2013 (General Administration of Custom (GAC), 2014). The statistics show that China's exports to OECD countries accounted for 56.32 percent of total annual exports in 2012 (National Bureau of China, 2014). OECD countries are not only the major trading partners of China, but also the main providers of China's inward FDI, from Table 2 we can see that 7 of the top 10 FDI source countries are OECD members. Despite a number of studies investigating the relationship between FDI and China's export performance, research specifically examining the case of OECD countries is limited. In this paper, the effect of FDI on China's exports to OECD countries is investigated empirically by using the most recent years' data, and applying the augmented gravity model. The empirical results show that the effect of FDI inflows on China's exports to OECD countries is positive and significant.

Persistence in attracting FDI enables China to achieve further growth of exports to OECD members while the structure of China's exports is being changed.

The remainder of this paper is organized as follows: section 2 is a literature review, summarizing and discussing a number of existing studies; section 3 introduces the dataset with descriptive analysis; the empirical model and empirical results will be presented and analyzed in sections 4 and 5; the last section provides concluding remarks.

CHAPTER 2. LITERATURE REVIEW

There have been a number of papers that investigate FDI's effects in the case of China. Three significant papers that investigate the relationship between FDI and China's economic growth Graham and Wada (2001), Yao (2006) and Zhao and Du (2007). Zhang and Song (2001), Liu and Shu (2003), Zhang (2005), Gu et al. (2008) and Sun (2012) specifically focus on the impact of FDI on China's export performance.

2.1 FDI AND CHINA'S EXPORT PERFORMANCE

Among the studies that investigate FDI's impact on China's export performance, there are mainly two different methodologies that are used to conduct the estimations, which are cross-sectional analysis (Zhang, 2005; Liu and Shu, 2003) and panel analysis (Gu et al., 2008; Zhang, and Song, 2001; Sun, 2012), respectively.

Both Zhang's, Liu and Shu's estimations are at the sectoral level, but they examine FDI and China's exports to all countries, not bilateral. Zhang's estimation employs data on 187 industries in 1995 and estimates the model with two subsamples, which are capital-intensive (107 industries) and labour-intensive industries (79 industries), respectively. Liu and Shu's dataset incorporates 186 sectors. Similar to Zhang's research, Liu and Shu divide the whole sample into two sub-samples (high technological sectors and low technological sectors) as well. The main regression results obtained by Zhang on FDI indicate that inward FDI exerts a dominant impact on China's export performance across different industries, and its impact is much greater than domestic capital. The coefficients on FDI are both statistically significant and economically large; the magnitude of its effect is roughly three times as large as that of domestic capital. Moreover, the results indicate that FDI has a much stronger impact on exports in labour-intensive industries compared to capital-intensive industries. From Liu and Shu's results, the coefficients of FDI also show positive signs and strong statistical significance when the whole sample is used. Results from sub-samples also indicate that FDI is positively and significantly related to export performance. By summarizing the results from different samples, the author conclude that FDI and firm size are essentially the main driving forces of China's exports across all sectors despite the varied levels of technology, however, the magnitude of FDI's effect is much greater on high-tech sectors than low-tech sectors.

As for panel analyses, Gu et al. (2008) employ a panel dataset that contains China's disaggregated manufacturing sectors from 1995 to 2005. They focus on export performance in a variety of manufacturing sectors. They divide the whole sample into two different sub-samples, high-tech and low-tech sectors, respectively. The motivation is that these sectors dominate China's overall value of exports, and nearly 80 percent of FDI in China flows into these manufacturing sectors. Hence, the concentration on manufacturing sectors can capture the main effect of FDI on China's export performance. Sun's (2012) paper employs a firm-level and balanced panel dataset encompassing 3260 domestic firms over the period 2000 to 2007. Zhang and Song (2002) investigate this economic issue at the provincial level. Their dataset contains three central municipalities and 24 provinces over the period 1986 to 1997. Since the effect of FDI on exports might not be immediate, due to the establishment of new plants or upgrading of production technologies requiring more time to complete, the researchers use a lagged value of FDI in order to capture its non-immediate impact on export performance.

Gu et al. (2008)'s empirical results suggest that inward FDI positively and significantly influences China's export performance, as its positive impact remains in thirteen manufacturing sectors out of fourteen in the whole sample. Zhang and Song's regression results show that the previous year's FDI is significantly and positively related to the current year's exports, the magnitude of its effect is that a 1% increment of inward FDI corresponds to a 0.29% increase in exports across provinces. Sun shows that a 1 percent increase in the presence of foreign firms improves domestic firms' export values by 0.57 percent; this coefficient is strongly statistically significant. These important results indicate that FDI exerts a positive and significant impact on export improvement at both the firm level and the provincial level.

Seemingly, many extensive studies could be conducted in the field of FDI and China's exports. If we look at the papers focused on China's export performance, none of them use the most recent data to conduct the estimation; Sun's research is the most recent and only covers up to the year 2007. Apart from that, these studies investigate overall exports at different levels; however, studies that investigates China's export performance to particular groups of countries are quite limited. This should be considered as a new

direction regarding this research field, because on the one hand, the aggregate level of exports has already been tested by a large body of existing literature, and on the other hand, the concentration of country groups could enable us to acquire more detailed policy implications that target different trading partners. Additionally, despite the various theoretical frameworks used in the existing literature, the standard gravity model is rarely used in the estimation of FDI's effect on China's exports.

2.2 FDI AND CHINA'S ECONOMIC GROWTH

The three papers that examine FDI and economic growth in China have different research targets. Yao (2006) studies the effects of exports and FDI on China's economic performance. Zhao and Du's (2007) paper examines the causal relationship between FDI and economic growth in China. Graham and Wada's (2001) paper provides an augmented analysis based on the previous study made by Dayal-Gulati and Husain (2000) to check whether FDI indeed significantly contributes to China's income growth.

As Graham and Wada's study extends from Dayal-Gulati and Husain's research, it is necessary to briefly introduce Dayal-Gulati and Husain's study first. Dayal-Gulati and Husain employ a Mankiw, Romer and Weil version of a Solow growth model to achieve two goals. The first one is to examine whether FDI significantly contributes to China's economic growth by province; the other goal is to test whether the high growth rate of income per capita in the eastern coastal provinces could appropriately be attributed to the larger level of foreign direct investment obtained by these areas. Their main finding is that FDI is both significantly and positively related to the income per capita growth rate in each province. A province's income per capita growth rate is positively related to the amount of FDI received by this province, which can also explain the reason that coastal areas are more developed economically, as these areas obtain a larger amount of FDI inflows.

Based on the findings from Dayal-Gulati and Husain's research, Graham and Wada argue that total factor productivity (TFP) growth, caused by technology transfer that results from FDI inflows, is the driving factor causing the higher rate of income per capita growth in the coastal provinces. To solidify their argument, the researchers test whether TFP resulted in faster growth since FDI inflows swiftly increased in coastal provinces over the period of the 1990s. The results show that the TFP growth rate indeed swiftly rose from 1991 to

1997 in the coastal provinces, the main FDI-receiving regions, and increased by less in the northern areas. Hence, TFP growth enables coastal provinces to have better economic performance than other regions. This result supports Dayal-Gulati and Husain's finding, showing that FDI significantly contributes to the growth of income per capita in China by greatly enhancing the TFP growth rate.

Yao (2006) uses a large panel dataset containing China's 28 provinces with the time-span from 1978 to 2000 to conduct his estimation. Zhao and Du (2007) employ a time-series dataset, which covers the period 1985 to 2003. Empirically, an augmented Cobb-Douglas production model is employed by Yao that includes exports and FDI as the key explanatory variables. Firstly, the researcher uses the panel unit root test technique to test whether the variables are stationary. The researcher then uses dynamic panel data estimation to estimate the model. In Zhao and Du's study, the time-series examination is conducted by using the vector autoregression (VAR) method with three tests: Augmented Dickey Fuller (ADF) unit-root test, cointegration test and error-correction analysis.

The empirical results obtained by Yao indicate that exports and FDI are significantly and positively related to GDP growth. Both exports and FDI were critical factors for China's outstanding economic performance since 1978. The empirical results obtained by Zhao and Du reveal that two-way causality between FDI and economic growth in China is not significant. Specifically, economic growth causes the growth of FDI, but FDI does not necessarily improve China's economic growth. China's rapid economic growth and potential emerging market are attractive for foreign investors and thus attract more FDI inflows. However, FDI's contribution to China's economic development is not quite obvious, because the estimation results show that there is only a 72 percent certainty to demonstrate FDI has a positive impact on China's GDP growth. According to the empirical results from these two studies, Yao's research suggests that two development strategies, promoting exports and attracting FDI inflows, which are currently implemented by China should be taken into consideration by other developing countries to achieve strong economic performance.

Based on the existing literature that investigates the impact of FDI in China, most studies conclude that FDI significantly contributes to China's export performance and economic

growth. This fact can be reflected by the papers summarized above. With different methodologies and datasets utilized, the empirical findings from the above-mentioned studies reveal that FDI inflows significantly contribute to China's export growth at all levels: national, provincial and industrial. However, the controversial point lies in FDI's effect on China's economic growth. Even though Yao, Dayal-Gulati and Husain, and Graham and Wada found that FDI improves income levels in China, Zhao and Du in their research argue that the impact of FDI has been probably overestimated by previous studies, given that their research shows that FDI is not a quite essential factor that significantly contribute to China's economic performance.

In this study, I will concentrate on China's exports to OECD member countries, and I will exploit the data from the most recent available year, 2012; an augmented gravity model will be used as the empirical model. This study will shed more light on the relationship between FDI and China's export performance by providing some new empirical evidence.

CHAPTER 3. THEORETICAL FRAMEWORK

3.1 BACKGROUND OF GRAVITY MODEL

In this study, the empirical estimation is conducted based on the gravity model, which has been regarded as one of the most successful empirical models for economic research and analysis in the field of international trade (Anderson, 2011), and has been broadly applied to estimate the determinants of bilateral trade volumes between a pair of trading countries. In order to estimate the determinants of China's exports to OECD members, the gravity model is used as it allows me to investigate FDI's effect on China's exports directly. More importantly, the application of the gravity model has been shown to explain the variation of bilateral trade in a statistical sense with a high level of success, because it generates an R-squared that is usually above 0.70 in regression analysis (Keller et al; 2013).In general, the standard gravity model will be augmented by incorporating other variables that are predicted to have an impact on bilateral trade volumes (Chaney, 2013). The standard gravity equation is:

$$TRADE_{ij} = G(M_i^{\alpha} * M_j^{\beta}) / D_{ij}^{\theta}, \quad (1)$$

where i and j denote a pair of trading countries; TRADE denotes bilateral imports or exports between country i and its trading partner j; G is a gravity constant; M means the economic size or level of aggregate GDP in each country; and D represents the shipping distance between a pair of trading countries. The standard gravity equation indicates that a high level of aggregate GDP will increase a country's imports or exports, while a longer shipping distance will decrease a pair of countries' trade volumes. Economically, the term shipping distance does not only indicate the geographic distance; it should be interpreted as inducing the overall cost of transportation. Intuitively, a higher cost of transportation will hinder a country to trade with its trading partner. The coefficients on each gravity factor imply different magnitudes of effects on bilateral trade volumes. The expected signs on each coefficient should be: $\alpha>0$, $\beta>0$ and $\theta<0$, because each country's economic size should positively relate to the trade volume and a higher transportation cost will reduce the trade between each pair of countries. In order to obtain a linear relationship between bilateral trade volumes and gravity factors and to apply this gravity model in empirical estimations, natural logs will be applied into both sides of this equation as follows:

$$\ln(TRADE_{ij}) = \ln(G) + \alpha \ln(M_i) + \beta \ln(M_j) + \theta \ln(D_{ij}) + \varepsilon_{ij}, \quad (2)$$

where ln(G) is a constant; α, β and θ are coefficients on logged GDP and distance; and ε_{ij} denotes the error term (Head, 2003).

3.2 EMPIRICAL MODEL

Previous research suggests that FDI is positively related to economic growth (Zhao and Du, 2001); in this study, the gravity factor, GDP, is included as an independent variable along with FDI. In order to avoid econometric problems caused by correlation between independent variables, it is necessary to check the correlation coefficients among each independent variable. As expected, the value of the correlation coefficient on FDI and GDP is 0.7866, which implies these two variables are highly correlated. There is no obvious correlation among the rest of explanatory variables because of no other correlation coefficients that are higher than 0.5. The correlation between GDP and FDI suggests that an interaction term should be generated and incorporated into the model.

Based on the standard gravity model, the augmented gravity model with several additional explanatory variables that will be employed for empirical estimation is constructed as follows:

$$\ln(EXP_{CH,jt}) = \beta_0 + \beta_1 \ln(DIST_j) + \beta_2 \ln(GDP_{jt}) + \beta_3 EXC_{jt} + \beta_4 \ln(GDPpc_{jt})$$

$$+\beta_5 \ln(FDI_{jt}) + \beta_6 WTO + \beta_7 FDIGDP + \varepsilon_t + u_{jt} + \eta_j, \quad (3)$$

where:

$EXP_{CH,jt}$ is the real value of exports from China to country j in year t;

FDI_{jt} is the real value of inward foreign direct investment in China from country j in year t;

GDP_{jt} is the real GDP of country j in year t;

$DIST_j$ is the shipping distance between China and country j;

EXC_{jt} is the average exchange rate between the Chinese Yuan and country j's currency in year t;

$GDPpc_{jt}$ is the real GDP per capita of country j in year t;

WTO is a binary variable that takes value of 1 if the year is later than 2001, which is the year China joined the WTO;

FDIGDP is the interaction term of ln(FDI) and ln(GDP);

ε_t is the set of coefficients on the dummies representing year fixed effects;

η_j is the set of coefficients on the dummies representing country fixed effects;

and u_{jt} is the error term.

Briefly describing this model, the dependent variable is the logged value of China's exports (ln(EXP)). The variable of interest is logged FDI (ln(FDI)), because the research question focuses on the impact of FDI on China's exports. If FDI promotes China's exports to OECD countries, the coefficient β_5 should be significant and positive. To determine how much correlation exists between FDI and GDP, the interaction term FDIGDP is created by using ln(FDI) multiplied by ln(GDP). Apart from gravity factors, the rest of the explanatory variables included are GDP per capita, the yearly exchange rate, and the WTO dummy. The error term contains the unobserved factors that affect the value of China's exports.

GDP per capita measures a country's wealth level; it is the indicator of the level of income per capita. Aggregate GDP cannot indicate a country's wealth level, because aggregate GDP depends on a country's population size, not only its income level. In the case of China, in spite of having the second highest GDP in the world, China is not recognized as a wealthy country due to its large population size and relatively low level of income per capita. Hence, in addition to aggregate GDP, which indicates a country's economic size, GDP per capita is incorporated as well.

The economic theory regarding the link between the exchange rate and trade states that the appreciation of a country's currency will decrease the country's exports, because

domestic goods become more expensive relative to its trading partners. Conversely, a depreciation should facilitate exports as trading partners are able to purchase domestic products with a lower payment. Theoretically, the yearly average exchange rate should show significance and a negative sign, since China's trading partners will be discouraged to import from China if the Chinese Yuan appreciates.

A Free Trade Agreement (FTA) dummy variable has also been included as a determinant of trade by many studies; however, up to now, China has only signed an FTA with two OECD members, Chile and New Zealand, in 2005 and 2008, respectively. Given this scenario, creating a binary variable for FTA becomes unnecessary, since the impact of an FTA for China and the OECD countries is still too early to be measured. Instead, the effect of China's WTO membership is included in this study. The incorporation of a WTO dummy enables us to find out whether WTO membership significantly improved China's exports to OECD members and by what magnitude.

By keeping the same empirical framework, another regression model is constructed by using cumulative FDI inflows to replace annual inward FDI:

$$\ln(EXP_{CH,jt}) = \beta_0 + \beta_1 \ln(DIST_j) + \beta_2 \ln(GDP_{jt}) + \beta_3 EXC_{jt} + \beta_4 \ln(GDPpc_{jt})$$

$$+\beta_5 \text{In(CFDI jt)} + \beta_6 WTO + \beta_7 CFDIGDP + \varepsilon_t + u_{jt} + \eta_j, \qquad (4)$$

where $CFDI_{jt}$ represents the cumulative FDI inflows from OECD country j to China in year t. Cumulative FDI in each year is calculated by summing up the previous years' inward FDI starting from the year 1997, which is the initial year in this dataset. As cumulative FDI is highly correlated with GDP (with a correlation coefficient 0.769), the interaction term CFDIGDP is created by using ln(CFDI) multiplied by ln(GDP) as well. Other than the current year's FDI inflows, FDI already received by China from previous years might have a larger impact on China's exports. The results from these two regressions will be compared and analyzed in the empirical estimation section.

CHAPTER 4. DESCRIPTIVE ANALYSIS OF DATA

The data I exploit to construct my dataset come from four major sources:

- Statistics on China's annual exports and inward FDI (bilateral and total) collected from the China Statistical Yearbook issued in different years (1998-2013) by the National Bureau of Statistics of China (2014).
- Data on OECD members' GDP per capita and total population obtained from the World Databank (2014)-World Development Indicators. The World Databank collects data on total population based on each country's national demographic censuses.
- Data on shipping distance collected from the CIA World Factbook (2014).
- Statistics on exchange rates obtained from the Pacific Exchange Rate Service, provided by the Sauder School of Business, University of British Columbia (2014). (http://fx.sauder.ubc.ca/)

The data on China's annual exports and FDI are given in nominal U.S. dollars from the original source, and the original values of GDP per capita are measured in real U.S. dollars in 2005. Therefore, I convert the values of exports and FDI from nominal to real U.S. dollars in 2005 by using the GDP deflator. The method of conversion is obtained from Areppim (2014). The GDP deflator is applied because both exports and FDI belong to national accounts (FDI is in the balance of payments accounts but not in GDP), hence the application of the GDP deflator is a better option than the Consumer Price Index (CPI), since the latter is applied to deal with private consumption only. More specifically, the conversion is based on the U.S. Dollar Implicit Price Deflator for Gross Domestic Product provided by the U.S. Bureau of Economic Analysis; the deflator index equals 100 in 2009, which is the baseline of the deflator index for different years (Bureau of Economic Analysis, U.S.). Real aggregate GDP is calculated using population multiplied by real GDP per capita in 2005. The original unit of shipping distance is the mile; in this research I convert miles into kilometers. Statistics on exchange rates between the Chinese Yuan and OECD countries' currencies provided by the source website only have daily, weekly and monthly data. As this study needs yearly level statistics, I collect monthly average data and then calculate the yearly average statistics. Additionally, a binary variable called

WTO is included in the regression model. Given that China joined the WTO in 2001, this binary variable will take the value of one if the year is later than 2001.

Table 3 presents the descriptive statistics of the data on each variable before the natural log is taken into the model. The first and sixth row in this table present the descriptive information on the dependent variable, China's exports, and the variable of interest, FDI inflows from China's trading partners, respectively. The mean values of China's exports and FDI inflows are 13.5 and 0.509 billion U.S dollars in 2005. The maximum and minimum values of these two variables show quite large differences, which implies that values of China's exports have high level of variations across OECD members in different year, and values of China's FDI inflows from each country considerably differ as well. Among OECD countries, Iceland received the least amount of exports from China, and the U.S. is the largest recipient of China's exports over this time range. The minimum value of export is 5.55 million US dollars in 2005, which is for Iceland in 1997; the maximum value is 308.19 billion US dollars in 2005, which is for the U.S. in 2012. In general, except for the year 2009 that was stricken by the financial crisis, China's exports have increasing trends to each OECD countries over time, which has a similar changing pattern as China's total exports.

Japan is the largest origin of China's inward FDI, not the U.S., among OECD members. The highest value of FDI from Japan is in the year 2005, which is 6.53 billion real U.S. dollars; the lowest value of FDI is from Iceland in 1997, which is 11.49 thousand real U.S. dollars. Different from exports, FDI inflows do not show clear increasing trends in each OECD members; instead, FDI fluctuates over time. Figure 12 shows the trend of China's FDI inflows from Japan over this time range. Starting from 2000, FDI inflows from Japan kept increasing and reached a peak in 2005; then FDI sharply fell until 2007, quickly climbing up again from 2010. This indicates that China's inward FDI does not always increase over time from each OECD country, even though the overall FDI inflows show a steady increasing trend. Table 4 shows the descriptive statistics after natural logs are taken. The exchange rate and binary variable WTO are not included because of natural logs are not taken of these two variables.

CHAPTER 5. EMPIRICAL ESTIMATION

5.1 EMPIRICAL STRATEGY

Basically, there are three estimation methods that can be used for panel regression: pooled OLS, fixed effects and random effects. To decide which model is appropriate in conducting this estimation, a few tests need to be performed first. The first step is to check whether the simple OLS model is appropriate to use, and the corresponding test, the Breusch-Pagan LM test, enables us to find out if the OLS model performs better than the random effects model. The null hypothesis of this test is that there is no significant difference across individual entities (in this case, it means OECD countries). The result of this test from my data shows that the simple OLS method is strongly inappropriate (χ^2=627.66 and p<0.0001, null hypothesis is strongly rejected). Nevertheless, this result does not tell us that the random effects model should be chosen; it only proves that simple OLS should be excluded. To select between the random effects and fixed effects models, the Hausman test needs to be performed next. The result of the Hausman test indicates that the fixed effects model is a more appropriate choice compared to the random effects model (χ^2=98.33 and p<0.0001, strongly reject the null hypothesis). Furthermore, because this empirical model contains a time-invariant variable, which is distance, directly using a fixed effects regression strategy will lead to the omission of distance; thus, the alternative regression method for a fixed effect model, Least Squares dummy variable (LSDV) regression, is applied in this study. Originally, the fixed effects model only controls for individual (country) fixed effects. To decide whether year fixed effects are needed in this model, a joint test is performed to check whether all year dummies are equal to zero. If all of the coefficients on year dummies are equal to zero, then we do not need to include year fixed effects in the model since there is no unobserved variation that can affects the dependent variable over time (Torres-Reyna, 2007). The result of this joint test shows that year fixed effects need to be included in this model (F=14.82 and p<0.0001, reject the null hypothesis, thus not all year dummies are zero). Therefore, both year and country dummies are generated to account for fixed effects.

Given that this dataset contains more individual entities, which is 34 OECD members, and fewer time points (16 years from 1997 to 2012), then this panel is defined as a short panel.

Technologically, a short panel regression should be concerned about the presence of heterskedasticity, whereas, because this panel does not contain a long time series (over 20 to 30 years), then serial correlation is not a problem that needs to be taken into consideration (Torres-Reyna, 2007). Due to this is a short panel (with more entities and less time points), the data potentially have the problem of heteroskedasticity, which might result in inefficient estimates. Result of the Modified Wald test show that the heteroskedasticity is present in the model (χ^2=27532.52 and p<0.0001, H_0: that there is no presence of heteroskedasticity in the model). The solution to tackle this issue in the fixed effect model is to use a modified White estimator (this is easy to perform in Stata, including the option "robust" in the end of each command). Besides, this panel dataset is strongly balanced, which means that all countries in this dataset have data on each variable in every year of the time range.

5.2 EMPIRICAL RESULTS

Regression result indicates that a 1 percent increase in FDI inflows from OECD country j will lead to a 0.136 percent increase in China's exports to this country in each year. Table 5 presents the regression results after controlling for the problem of heteroskedasticity. Due to the effect of the interaction term, the coefficient on FDI itself does not uniquely reflect its impact on China's exports. The real impact of FDI on China's exports should be interpreted in this way: As the interaction term is created by ln(FDI)*ln(GDP), if we separate these three variables from the empirical model, we will get: β_5 ln(FDI) + β_2 ln(GDP) + β_7 ln(FDI)*ln(GDP). It could be transformed as: (β_5 + β_7 ln(GDP)) ln(FDI) + β_2 ln(GDP). Obviously, the real effect of FDI in this regression model depends on its own coefficient and the coefficient of the interaction term times ln(GDP) (the value of ln(GDP) will take the mean value from Table 4). Based on the results in column (3), the effect of FDI should be calculated as: 1.196-0.04*26.5=0.136. The coefficients on FDI and the interaction term are strongly significant (at the 1 percent significance level).

With respect to the coefficients on the other independent variables, the coefficients on shipping distance, aggregate GDP and GDP per capita all show strong statistical significance and expected signs: positive signs on aggregate GDP and GDP per capita, negative sign on distance. Specifically interpreting the results of the other explanatory

variables: firstly, the effect of GDP should be combined with the interaction term, by using the same approach as before; the effect of GDP is calculated as: $\beta_2+\beta_7$ ln(FDI)=1.56-0.04*17.59=0.856 (17.59 is the mean value of ln(FDI)). This value suggests that an increase in aggregate GDP by 1 percent in a trading partner will drive up the value of China's exports to this country by 0.856 percent. Comparing the results on GDP per capita, the effect of GDP is relatively small, since the coefficient on GDP per capita shows that exports from China to the recipient experiences a 2.04 percent enhancement after this recipient has a 1 percent increase in GDP per capita. This difference reveals the fact that a country's wealth level has a greater impact on China's exports than this country's economic size. The shipping distances between China and OECD members indeed significantly reduce the export volumes; a higher transportation cost discourages China's trading partners to import goods from China even though OECD members are high-income economies.

Since the WTO membership is a binary variable, the interpretation of its coefficient is different. The value of the coefficient on WTO membership is 0.658, implying that, on average, in the post-WTO period China exports to OECD countries roughly 1.93 times as much as in the pre-WTO period (the calculation is e^{β_6}=2.718^0.659=1.93). This result proves that WTO membership considerably facilitates and promotes China's exports with OECD countries despite the absence of an FTA. By comparing the magnitude of each variable's effect, GDP per capita appears to be the determinant with the largest impact on China's exports, because a higher level of GDP per capita brings the largest promotion on export volume. FDI inflows have a small impact on Chinese export performance with OECD countries, though its effect has been proved as positive and significant.

The coefficient on the exchange rate is not statistically significant, which is inconsistent with the expectation. The unexpected result on the exchange rate suggests that China's exports to OECD members do not depend on the exchange rates between the Chinese Yuan and member countries' currencies. This finding contradicts economic theory about trade and exchange rates. However, a plausible explanation could be proposed if we have a look at the variations in the Chinese Yuan's exchange rate over this panel time range. In the year 1994, China's exchange rate policy experienced an important reform, when the fixed

exchange rate was replaced by a flexible exchange rate. After this reform, the Chinese Yuan exchange rate was stabilized, with only slight variations over time. This scenario is reflected in Figure 13, which presents changes in the exchange rates between the Chinese Yuan and OECD countries' currencies from 1997 to 2012. From this figure, only Turkey shows obvious changes with the Chinese Yuan; overall, the Chinese Yuan's exchange rates nearly remained constant over this time range. The minor changes in the exchange rate make its influence on the prices of Chinese products in world markets become negligible and thereby unlikely to affect the demand for Chinese goods.

The new variable of interest, cumulative FDI, shows a positive sign and strong significance as well. Table 6 presents the regression results from the model with cumulative FDI. Overall, all of the explanatory variables' coefficients show the same signs and significance levels as the results from the first regression model. Results from the two regressions show a high level of consistency. The coefficient of cumulative FDI after combining with the interaction term is 0.31, which means that a 1 percent increase in cumulative FDI flows into China promotes exports to this country by 0.31 percent. This result does not show that cumulative FDI has a much greater impact than annual inward FDI.

Previous research suggested that China's exports at the sectoral level are significantly affected by the previous year's FDI as well, since the effect of FDI may have a lagged effect. Therefore, a robustness check is conducted to see whether the previous year's FDI inflows significantly affect current year's exports from China to OECD members. This robustness check is performed by including the lagged value of FDI for the previous year into the regression model. Tables 7 and 8 present the results of this robustness check from these two regression models. Both the results on lagged FDI and cumulative FDI show statistical insignificance, which implies that the previous year's FDI inflows received by China do not affect the current year's exports to OECD members.

Why does bilateral FDI from the OECD to China have a small effect on China's exports? Part of the reason may lie on the fact that more than 60 percent of total FDI comes from Hong Kong, as discussed previously. The inward FDI from OECD countries only accounts for a small proportion of the total amount of FDI inflows despite the fact that 7 out of the top 10 source countries are OECD members. China's exports to OECD countries are not

only affected by FDI inflows from OECD members, but are affected by other sources' FDI as well. In order to check this, I conducted a regression by only keeping the gravity variables and GDP per capita with total annual FDI. Table 9 displays this regression's results. The coefficient on total FDI shows strong significance and indicates a much larger magnitude of effect on China's exports to OECD countries. A 1 percent increase in total FDI promotes export volumes by 2.45 percent. This is even larger than the effect of GDP per capita.

Due to the number of countries in this dataset is 34, which is not quite larger than 30. Therefore, it is not necessary to use the cluster standard error in the regressions. However, in order to ensure that serial correlation indeed does not affect the main regression results, I rerun the regressions by using the cluster standard error option. The results do not show any significant changes across different regressions: The significance levels on each variables remain the same, and only some tiny changes for the coefficients on a few variables (such as the coefficient changes from 0.043 to 0.0425). The detailed regression results are not reported here since the current results with robust standard errors has proved to be valid.

When determining the relative importance of different independent variables, as each explanatory variable is measured by different units, it is difficult to directly use the coefficients on each explanatory variable to make the comparison. (Schroeder et al., 1989). To directly compare the relative contributions of each independent variable in a multiple regression analysis, statistically, a general approach is to calculate the standardized coefficients, which converts all variables' units in the model into the unit of standard deviation (Jacoby, 2005). The way to calculate standardized coefficients is:

$$\beta_x = \left(\frac{S_x}{S_y}\right) * \rho_x \,, \tag{5}$$

where: β_x is the standardized coefficient on independent variable x; S_x is the standard deviation of independent variable x; S_y is the standard deviation of the dependent variable; and ρ_x is the regression coefficient on independent variable x.

Table 10 presents the standardized coefficients on each independent variable in the first regression model that includes annual FDI from each OECD countries. The standardized coefficient on GDP per capita is the highest one with the value of 0.70, this indicates that an increase of 1 standard deviation will lead to China's exports increase by 0.70 standard deviations. The standardized coefficient on FDI is 0.13, which is lower than gravity variables (distance and GDP) and GDP per capita, but is similar to the effect of joining the WTO. This shows that FDI's contribution to China's exports is relatively smaller, since FDI increase by 1 standard deviation will make China's exports increase by a lower standard deviation.

Table 11 presents the standardized coefficients on each explanatory variables in the second regression model, that with cumulative FDI as the variable of interest. Overall, GDP per capita and the gravity variables still have relatively greater contributions to China's exports in this model, with relatively higher values of standardized coefficients; cumulative FDI's impact on China's exports remains less important, with a relatively lower value of the standardized coefficient.

Table 12 displays the standardized coefficients on independent variables in the regression with total FDI from all of sources. In this regression model, total FDI has a larger contribution to China's exports, compared to the magnitudes of effects of FDI and cumulative FDI in previous models. But despite having the highest regression coefficient, according to the standardized coefficients, total FDI's magnitude of effect is still lower than the effects of GDP and GDP per capita on China's exports.

In summary, GDP per capita seems to have the greatest effect on China's exports, as its standardized coefficients remain the highest among all of three regressions.

CHAPTER 6. CONCLUSION

The aim of this study was to investigate the relationship between inward FDI and China's export performance to OECD countries. The empirical estimation employs a panel dataset that encompasses 34 OECD members with a time range from 1997 to 2012 and uses an augmented gravity model. As the very limited literature examines the effect of FDI on China's exports to a specific trading partner group, this research provides new evidence about FDI's impact on China's exports to its major trading partners via exploiting recent statistics.

The empirical results indicate that bilateral annual and cumulative FDI inflows positively and significantly affect China's exports to OECD countries, but the magnitudes of these two variables' effects are relatively small compared to other significant factors, such as distance and GDP per capita of OECD countries. Furthermore, bilaterally, the previous year's FDI does not affect the current year's exports in the case of OECD countries. In addition to the effect of FDI, WTO membership is shown to be another important factor in China's export promotion to OECD members. However, the exchange rate is found to be an insignificant factor in this study; this could probably be attributed to the quite stable exchange rate of the Chinese Yuan after the critical reform in 1994.

Total FDI is shown to have a greater influence than bilateral FDI; this finding shows that a large proportion of FDI from Hong Kong stimulates China's exports to OECD countries along with bilateral FDI. Therefore, other than the contributions to the enhancement of high-technology exports, inward FDI plays an important role in China's exports to its top trading partners and thus helps China keep the leading position of exporter in the world.

This research suggests that in order to promote exports to its top trading partners, such as OECD members, and the overall exports to the world, persistence in attracting FDI is an advisable approach that the Chinese government should adopt. Specifically, the government should keep offering preferential treatment to foreign enterprises, especially in the inland regions of China.

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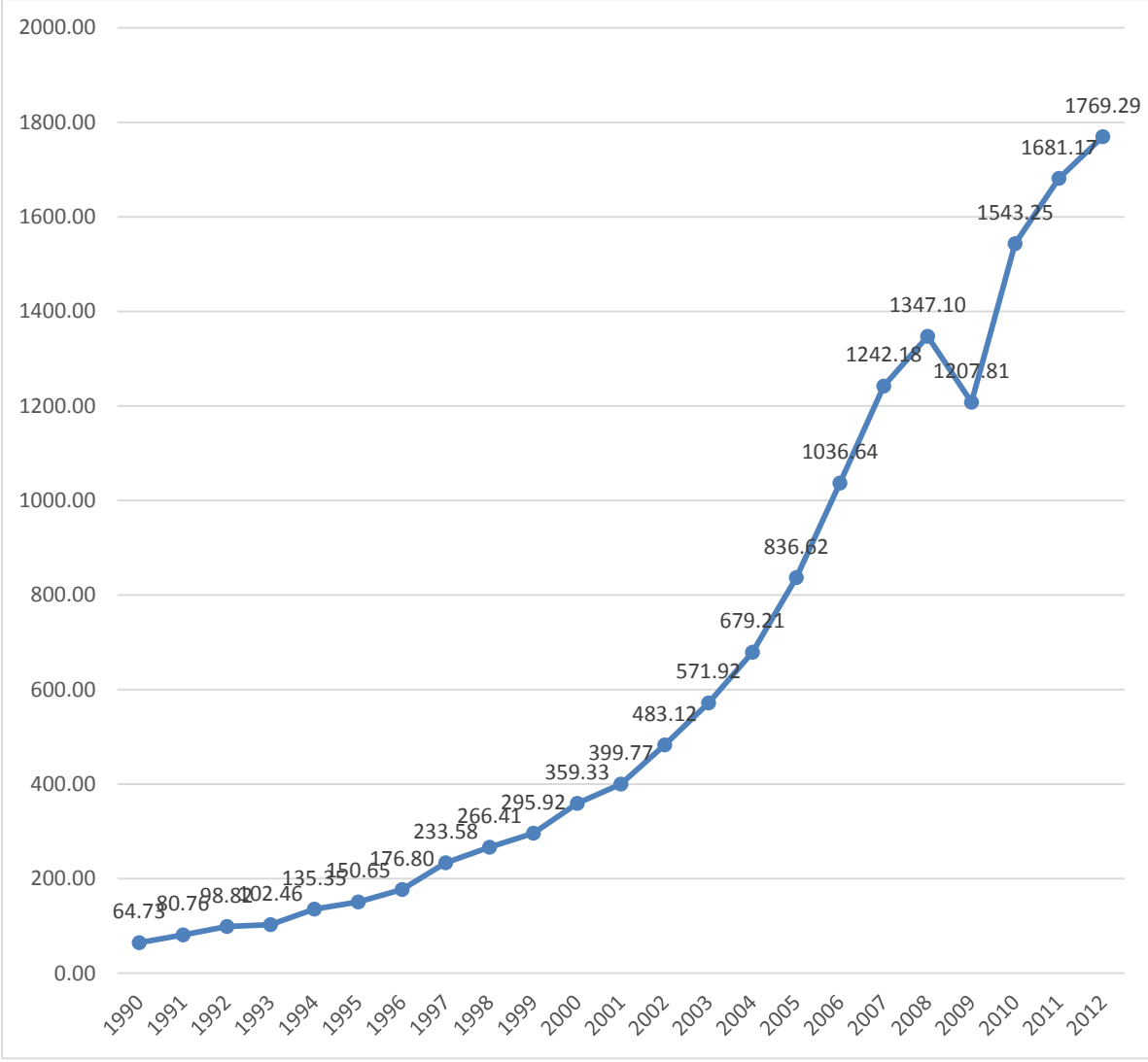
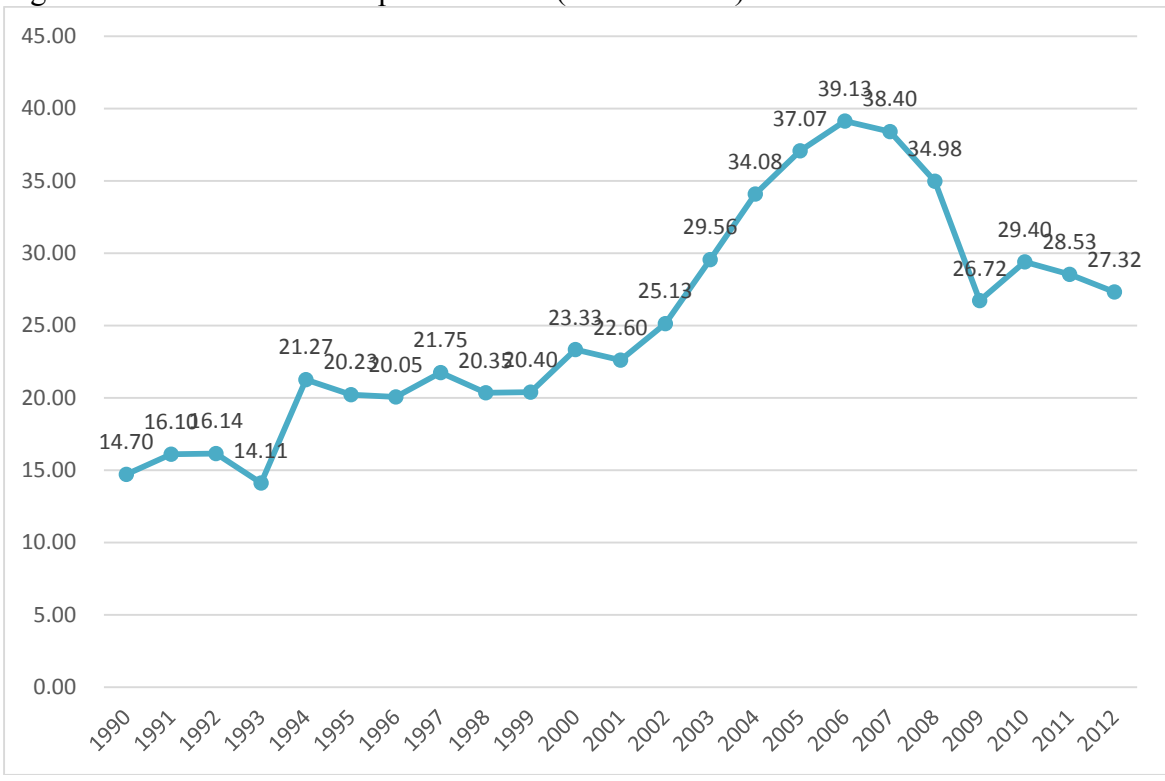
APPENDIX

Figure 1: Value of China's export from 1990 to 2012 Unit: billion constant US dollars in 2005



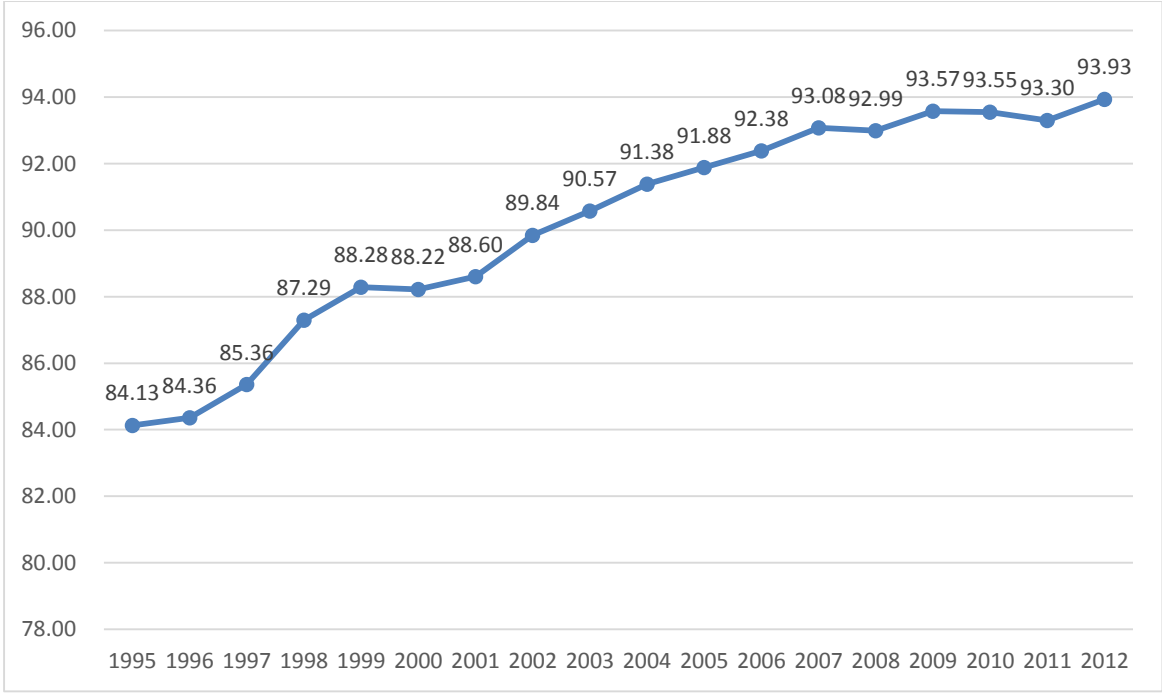
Source: World Databank (2014): World Development Indicators.

Figure 2: Ratio of China's exports in GDP (1990 to 2012)



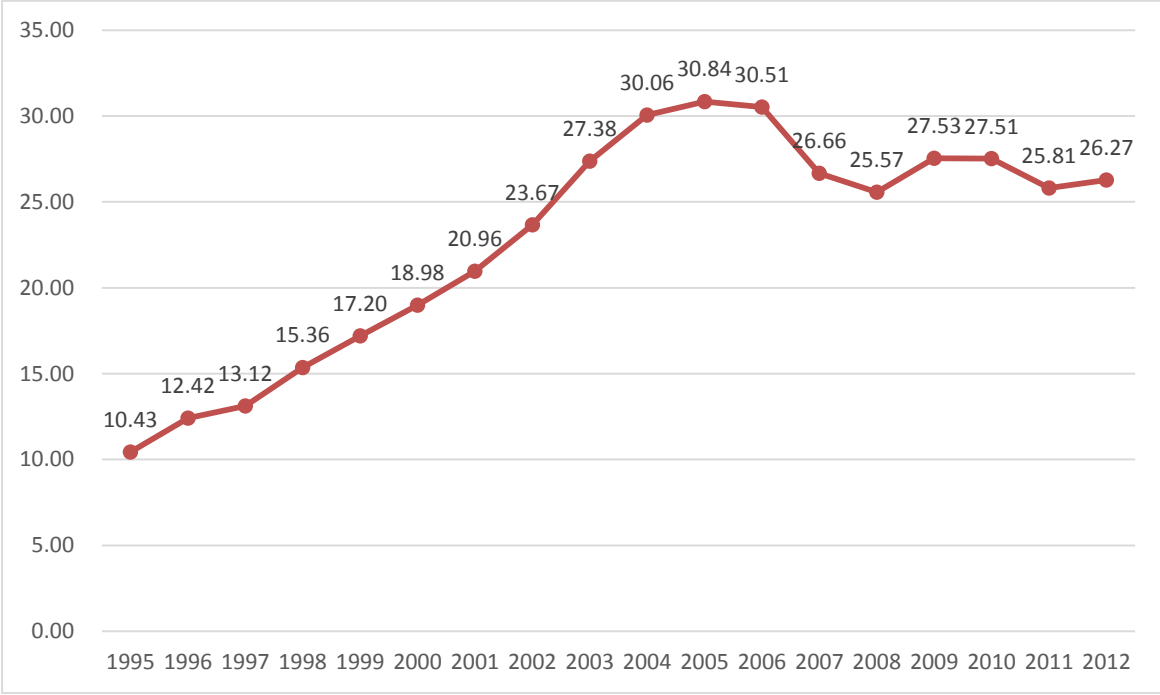
Source: World Databank (2014): World Development Indicators.

Figure 3: Proportion of manufactured exports in total exports (1995 to 2012)



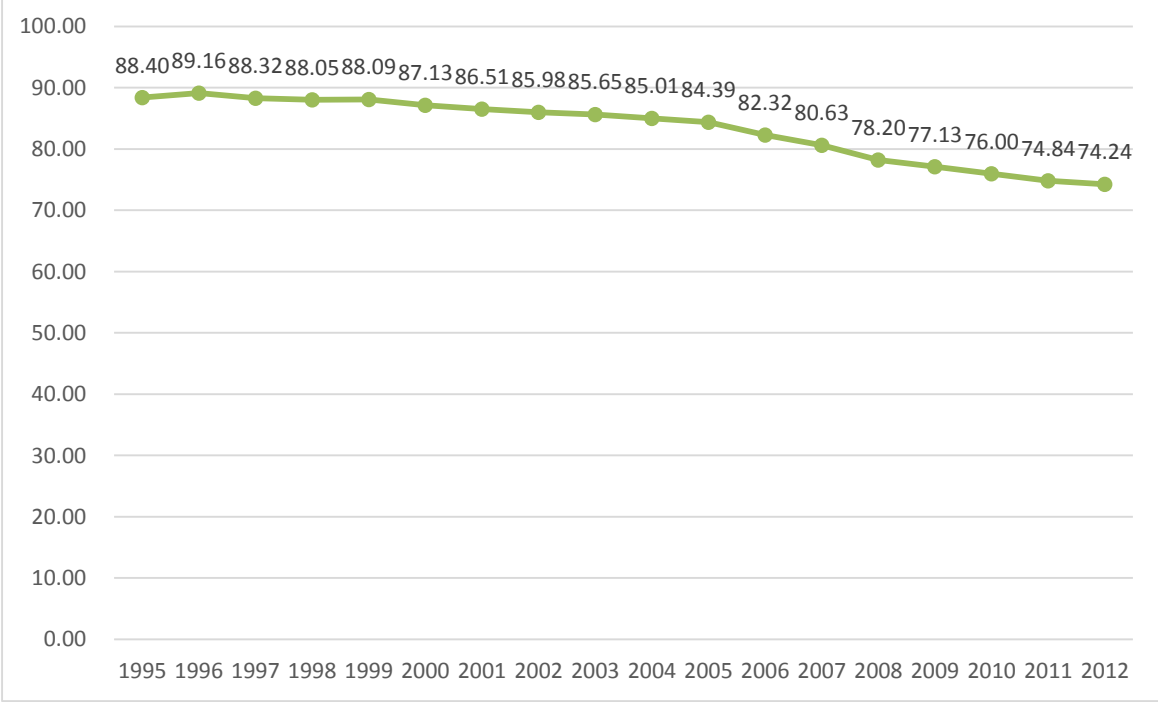
Source: World Databank (2014): World Development Indicators.

Figure 4: Proportion of high-technology exports in manufactured exports (1995-2012)



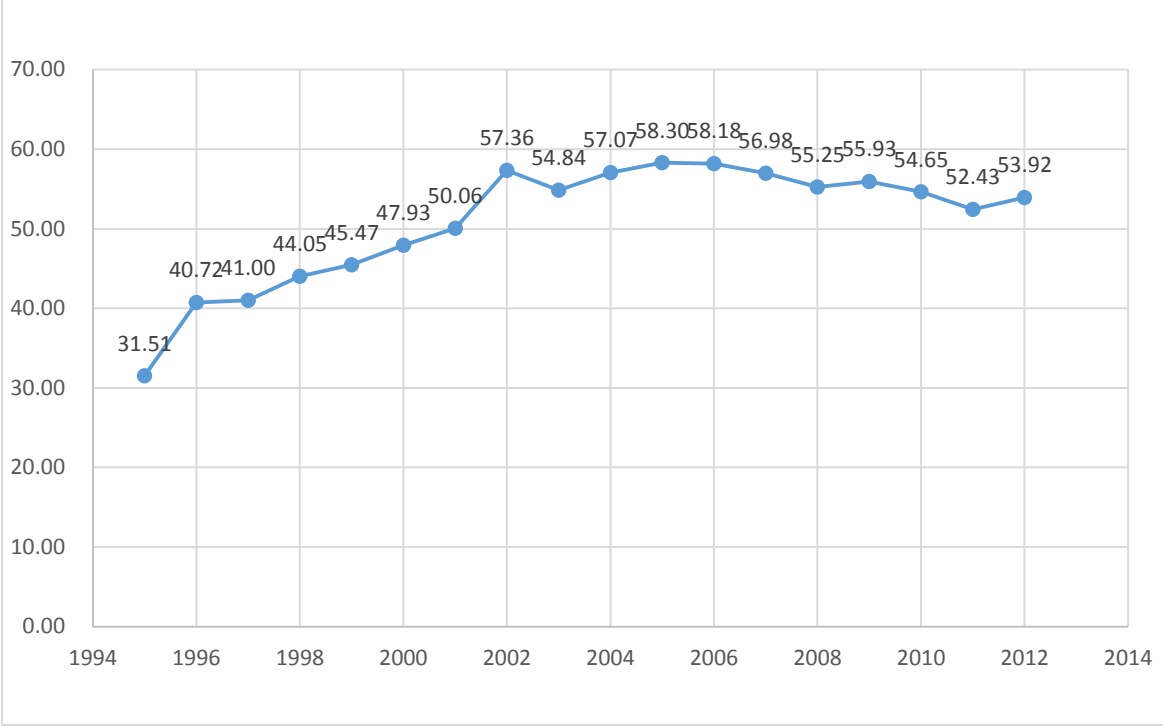
Source: World Databank (2014): World Development Indicators.

Figure 5: Proportion of exports to high-income economies (1995-2012)



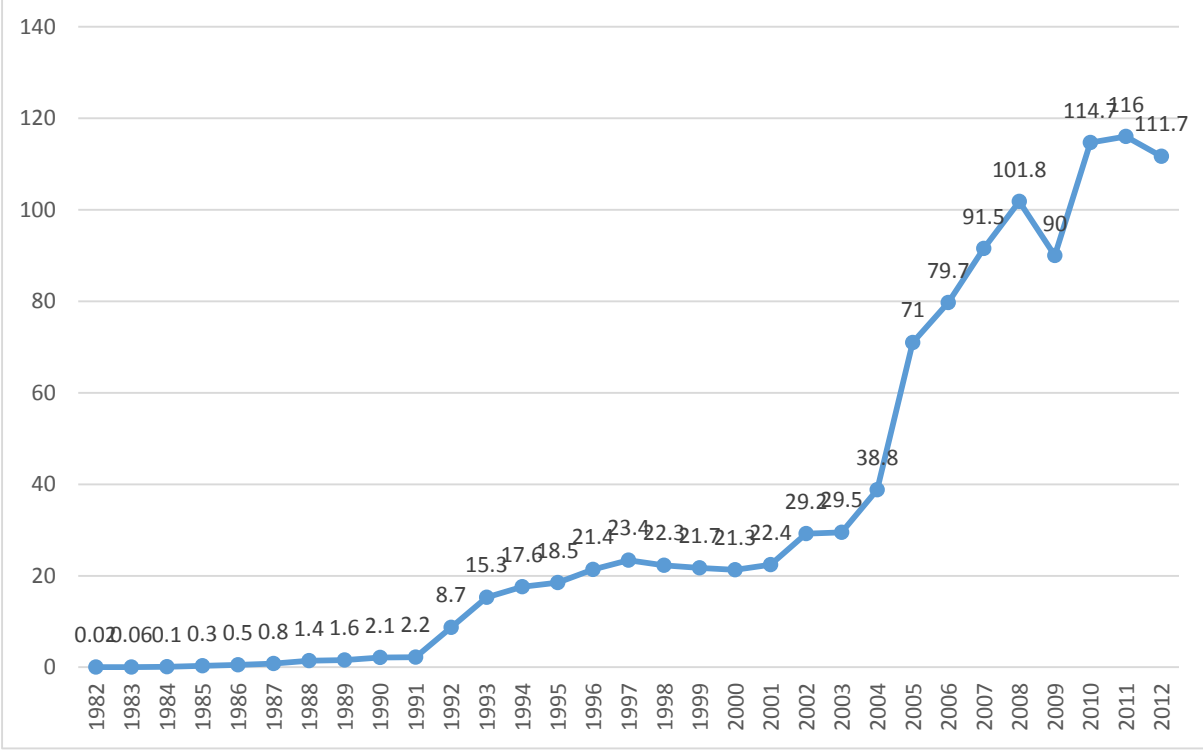
Source: World databank (2014): World development Indicators.

Figure 6: Share of China's exports of Foreign Invested Enterprises (FIEs)



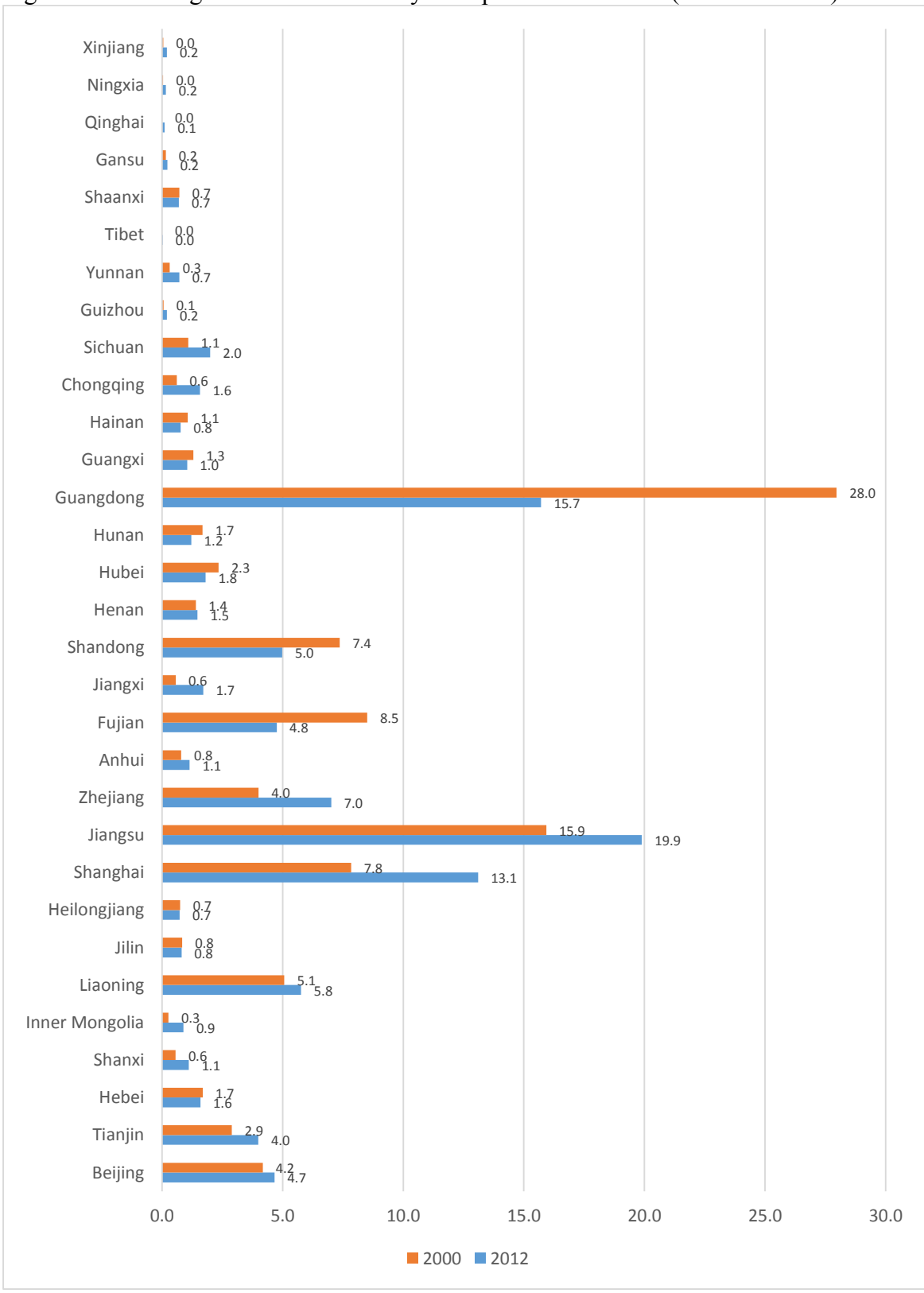
Source: China Statistical Yearbooks (1996 to 2013)

Figure 7: Value of China's inward FDI (1982 to 2012) Unit: billion constant US dollars in 2005



Source: World Databank (2014): World Development Indicators.

Figure 8: Percentages of FDI received by each province in China (2000 and 2012)

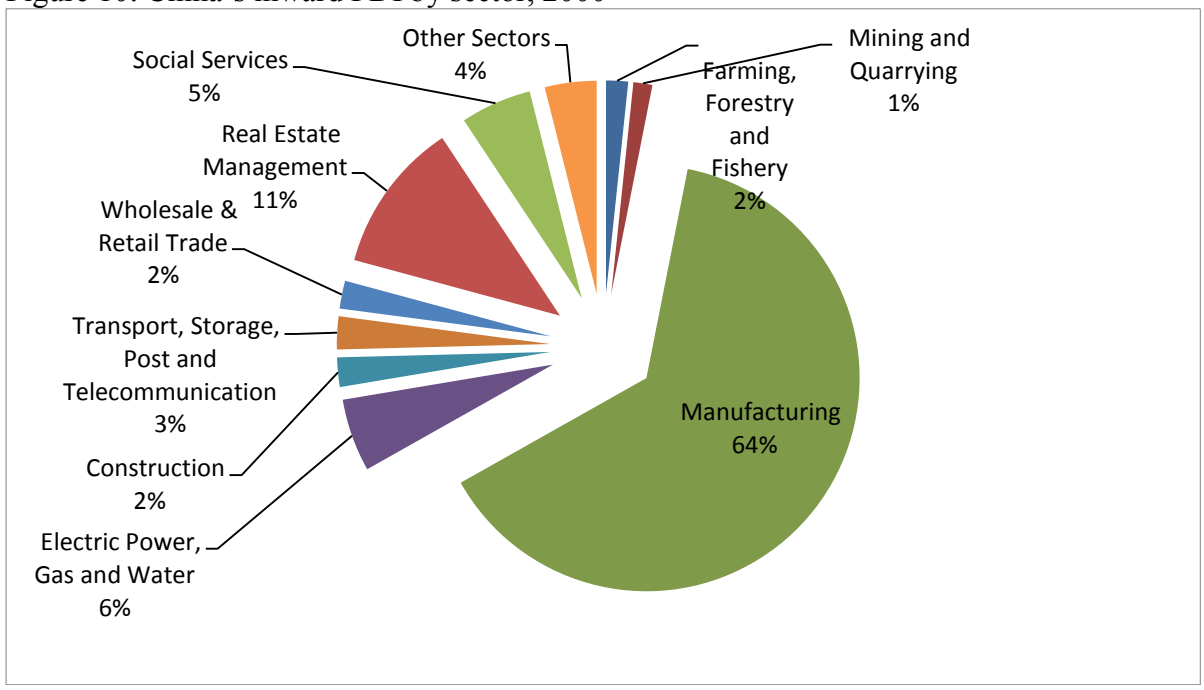


Source: China Statistical Yearbook (2001, 2013)

Figure 9: Map of China's provinces

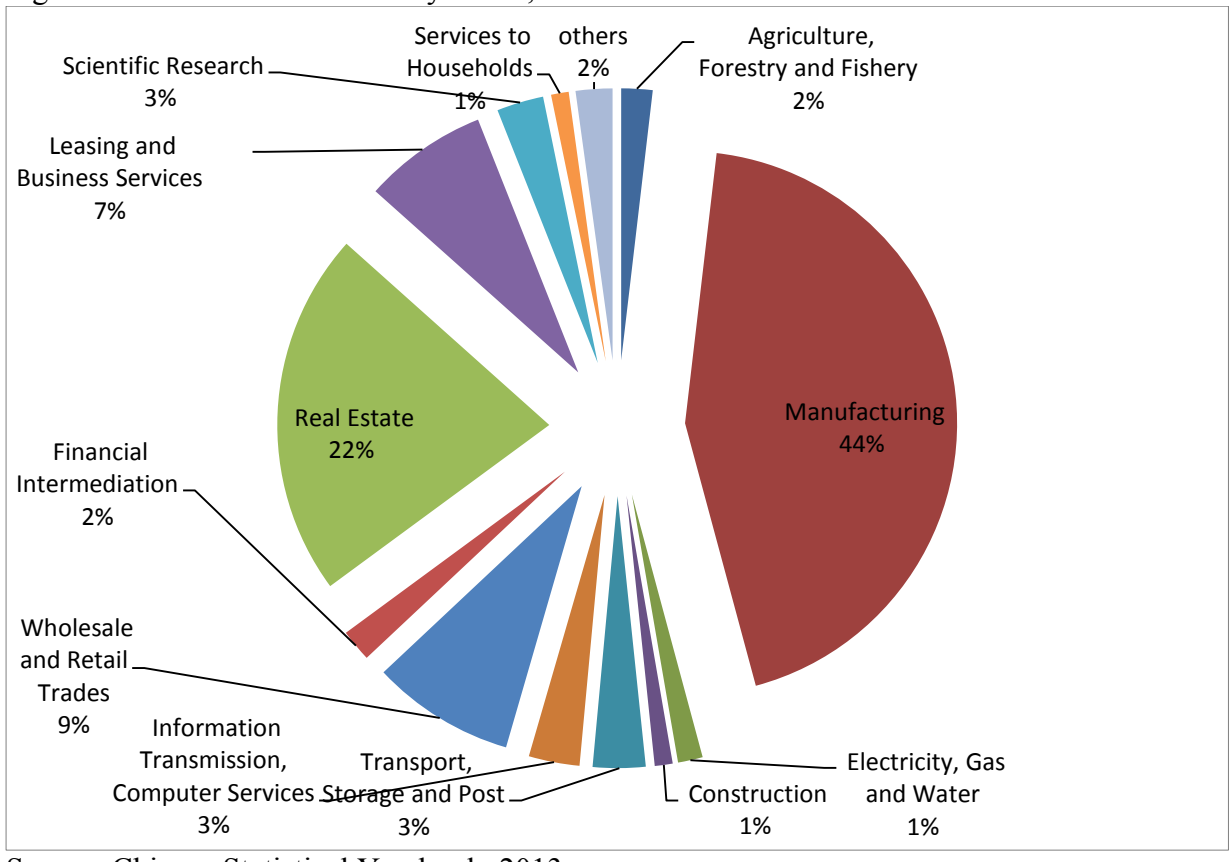
Source: Travel China Guide, 2014

Figure 10: China's inward FDI by sector, 2000



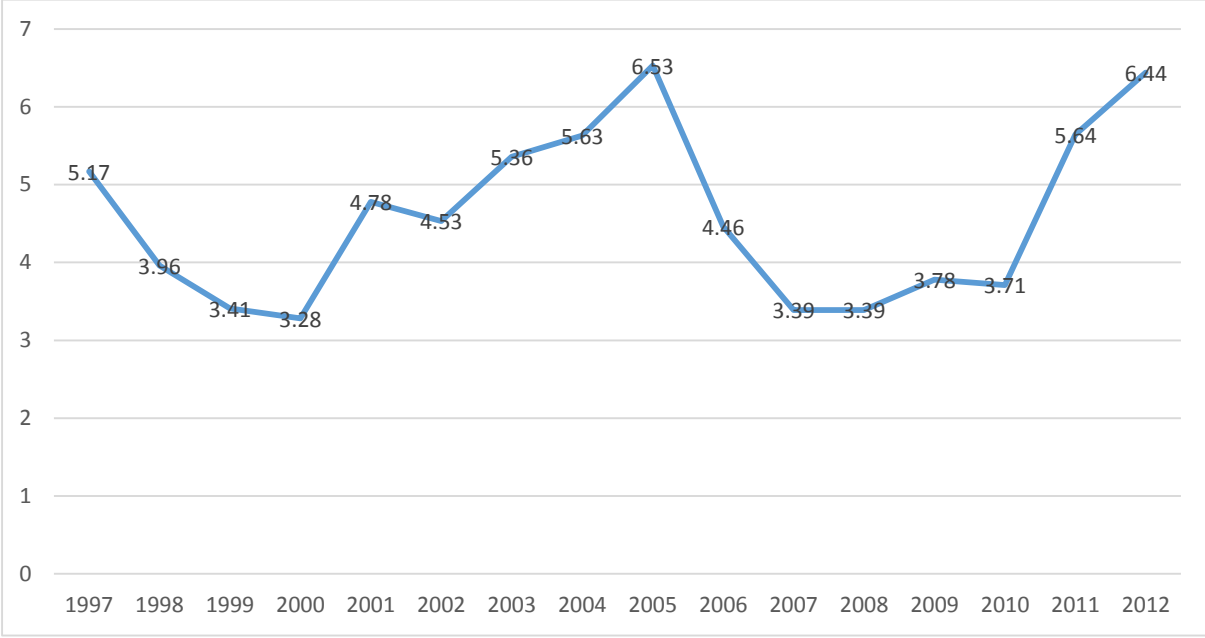
Source: China Statistical Yearbook, 2001

Figure 11: China's inward FDI by sector, 2012



Source: Chinese Statistical Yearbook, 2013

Figure 12: Value of China's FDI inflows from Japan (1997 to 2012) Unit: billion US dollars in 2005



Source: China Statistical Yearbooks (1998 to 2013)

Figure 13: Exchange rates between Chinese Yuan and OECD currencies

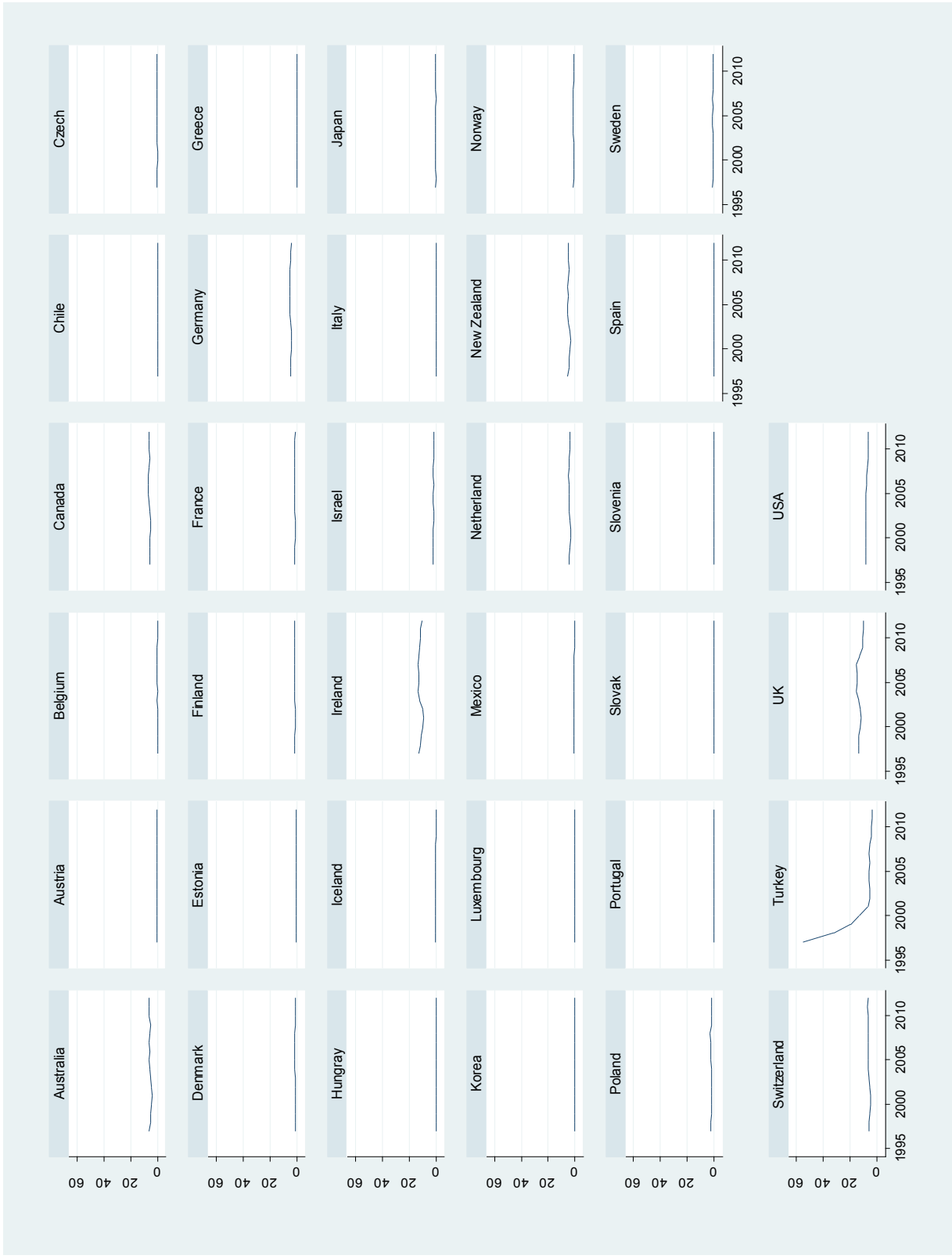


Table 1: Total and Exports of Foreign Invested Enterprises (FIEs) (1995-2012)
Unit: 10,000 US dollars

	Export of FIE	Total export	Share of export of FIE
1995	4687587	14878000	31.50
1996	6150636	15105000	40.72
1997	7489986	18270000	40.99
1998	8096189	18381000	44.05
1999	8862766	19493000	45.47
2000	11944100	24920000	47.93
2001	13323500	26615000	50.06
2002	18677300	32560000	57.36
2003	24030600	43823000	54.84
2004	33860700	59332000	57.07
2005	44418300	76195000	58.30
2006	56377900	96898000	58.18
2007	69537100	122046000	56.98
2008	79049300	143069000	55.25
2009	67207400	120161000	55.93
2010	86222900	157775000	54.65
2011	99522700	189838000	52.43
2012	112262000	204871000	53.93

Source: China Statistical Yearbook (1995-2013)

Table 2: Top 10 sources of China's inward FDI in % of total inward FDI

Rank	Country/Origin	2012
1	Hong Kong	63.8
2	Japan	6.6
3	Singapore	5.9
4	Taiwan	5.5
5	United States of America	2.8
6	South Korea	2.7
7	Germany	1.3
8	Netherlands	1.0
9	United Kingdom	0.9
10	Switzerland	0.8

Source: UNCTAD, 2013

Table 3: Summary Statistics
Number of observations: 544 Time-span: 1997-2012 Countries: 34 (OECD members)

Variables	unit	mean	Standard deviations	Minimum	Maximum
Annual Export from China to country j (dependent variable)	Billion US dollar in 2005	13.5	33.6	0.0055	308.2
Distance between China to j (independent variable)	Kilometers	7856.9	2791.5	2028.7	19318.4
Annual Real GDP of j (independent variable)	Billion US dollar in 2005	1040.0	2231.1	8.42	14232.4
Annual Real GDP per capita of j (independent variable)	Thousand US dollar in 2005	29.7	16.8	5.69	87.7
Exchange rate (independent variable)	Chinese yuan per country j's currency	2.61	4.30	0.0048	54.59
Annual inward FDI of China from country j (independent variable)	Billion US dollar in 2005	0.51	1.13	0.0000115	6.53
Annual total inward FDI of China (independent variable)	Billion US dollar in 2005	67.8	18.6	45.7	103.3
WTO (if the year > 2002) (binary variable)	Unit free (1 represents the year after 2002)	0.63	0.48	0	1

Table 4: Summary Statistics (variables in natural log form)

variable	mean	Standard deviation	Minimum	Maximum
ln(export)	21.72	1.97	15.53	26.45
ln(distance)	8.91	0.36	7.62	9.87
ln(bilateral FDI)	17.59	2.79	9.35	22.60
ln(total FDI)	24.90	0.26	24.55	25.36
ln(GDP per capita)	10.11	0.67	8.65	11.38
ln(GDP)	26.50	1.54	22.85	30.29

Table 5: Regression results (model with annual bilateral FDI)

	(1) ln(export)	(2) ln(export)	(3) ln(export)
ln(distance)	-1.556***	-1.812***	-1.826***
	(0.469)	(0.441)	(0.447)
ln(GDP per capita)	1.755**	2.005***	2.047***
	(0.738)	(0.704)	(0.720)
ln(GDP)	1.419**	1.596**	1.557**
	(0.620)	(0.677)	(0.691)
ln(bilateral FDI)		1.187***	1.196***
		(0.406)	(0.409)
ln(FDI)*ln(GDP)		-0.0439***	-0.0443***
		(0.0157)	(0.0158)
WTO			0.659***
			(0.0991)
Exchange rate			-0.00352
			(0.00249)
R-squared	0.975	0.977	0.977
Country fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
constant	-20.94	-25.92*	-25.12
	(13.96)	(15.22)	(15.53)
N	544	544	544

Robust Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Regression results (model with cumulative FDI)

	(1) ln(export)	(2) ln(export)	(3) ln(export)
ln(distance)	-1.556***	-1.537***	-1.554***
	(0.469)	(0.421)	(0.425)
ln(GDP per capita)	1.755**	1.612**	1.664**
	(0.738)	(0.701)	(0.714)
ln(GDP)	1.419**	1.468**	1.414**
	(0.620)	(0.706)	(0.719)
ln(cumulative FDI)		1.239***	1.249***
		(0.286)	(0.287)
ln(cumulative FDI)*ln(GDP)		-0.0434***	-0.0437***
		(0.0123)	(0.0123)
WTO			0.517***
			(0.190)
Exchange rate			-0.00464
			(0.00231)
R-squared	0.976	0.988	0.988
Country fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
constant	-20.94	-22.09	-20.98
	(13.96)	(15.12)	(15.40)
N	544	544	544

Robust Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Robustness check (annual bilateral FDI)

	(1) ln(export)
ln(distance)	-1.744***
	(0.468)
ln(bilateral FDI)	0.940**
	(0.387)
lagged ln(bilateral FDI)	0.0333
	(0.0220)
ln(GDP per capita)	1.958***
	(0.753)
ln(GDP)	1.470**
	(0.641)
WTO	0.702***
	(0.0708)
ln(FDI)*ln(GDP)	-0.0359**
	(0.0149)
Exchange rate	-0.00131
	(0.00458)
constant	-22.71
	(14.27)
N	510

Robust Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Robustness check (cumulative FDI)

	(1) ln(export)
ln(distance)	-1.391***
	(0.422)
ln(cumulative FDI)	1.308***
	(0.372)
lagged ln(cumulative FDI)	0.111 (0.0690)
ln(GDP per capita)	1.239*
	(0.672)
ln(GDP)	2.034***
	(0.613)
WTO	1.668***
	(0.157)
ln(cumulative FDI)*ln(GDP)	-0.0533*** (0.0144)
exchange rate	-0.00559
	(0.00416)
constant	-33.03*
	(13.37)
N	510

Robust Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Regression results (total FDI)

	(1) ln(export)
ln(distance)	-1.556***
	(0.469)
ln(GDP per capita)	1.755**
	(0.738)
ln(GDP)	1.419**
	(0.620)
ln(total FDI)	2.455***
	(0.182)
constant	-81.59***
	(13.81)
N	544

Robust Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Standardized coefficients from the first regression

Variable	Coefficient	Standard deviation	Standardized coefficient
ln(distance)	-1.83	0.36	-0.33
ln(GDP per capita)	2.05	0.67	0.70
ln(GDP)	0.86	1.54	0.67
ln(FDI)	0.14	1.79	0.13
Exchange rate	-0.0035	4.30	-0.0076
WTO	0.66	0.48	0.16

Standard deviation of ln(export) is 1.97

Note: The coefficients on ln(GDP) and ln(FDI) include the effects of the interaction term.

Table 11: Standardized coefficients from the second regression

Variable	Coefficient	Standard deviation	Standardized coefficient
ln(distance)	-1.55	0.36	-0.28
ln(GDP per capita)	1.66	0.67	0.56
ln(GDP)	0.64	1.54	0.50
ln(cumulative FDI)	0.31	1.22	0.19
Exchange rate	-0.0046	4.30	-0.010
WTO	0.52	0.48	0.13

Standard deviation of ln(export) is 1.97

Note: The coefficients on ln(GDP) and ln(cumulative FDI) include the effects of interaction term.

Table 12: Standardized coefficients from the third regression

Variable	Coefficient	Standard deviation	Standardized coefficient
ln(distance)	-1.56	0.36	-0.29
ln(GDP per capita)	1.76	0.67	0.60
ln(GDP)	0.71	1.54	0.56
ln(total FDI)	2.46	0.26	0.32

Standard deviation of ln(export) is 1.97