

The Economic Impact of Special Economic Zones: Evidence from Chinese Municipalities

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Abstract

How large are the benefits of Special Economic Zones and what are the channels of these benefits? To shed light on these questions, I collect a unique dataset of Chinese municipal economic statistics from 1978 to 2007 and use it to evaluate the impact of a Special Economic Zone experiment aimed at attracting foreign direct investment. Guided by a conceptual framework, I find the Special Economic Zone policy: 1) increases per capita foreign direct investment by 58%, mainly in the form of foreign-invested and export-oriented industrial enterprises; 2) does not reduce domestic investment and domestically owned capital stock and 3) increases total factor productivity growth rate by 0.6 percentage points. The results suggest that creating Special Economic Zones not only brings capital, but also more advanced technology, and provide important policy implications for many countries.

Keywords: special economic zone, foreign direct investment, TFP growth

JEL Classification: O16; O47; F21.

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1 Introduction

Special Economic Zones (SEZs) are contained geographic regions within countries, adopting liberal laws and economic policies to encourage foreign-invested manufacturing and services for export¹. They are widely used around the world as part of a country’s overall economic development strategy. In 2008, there were approximately 3000 Special Economic Zones in 135 countries, accounting for over 68 million direct jobs and over \$500 billion of direct trade-related value added within the zones (World Bank, 2008). Unfortunately, despite the potentially positive effects of SEZs predicted by economic theory (due to the presence of foreign direct investment) and strong convictions by policymakers, we still lack a rigorous empirical understanding of the extent to which SEZs actually contribute to foreign direct investment (FDI) and how the resulting investment influences the local economy.

In this paper, I explore the gradual establishment of SEZs across Chinese municipalities since 1979², which constitutes a unique laboratory for the study of SEZs, to make three contributions to our understanding of the impact of SEZs on foreign direct investment and other outcomes. To do so, I collected a comprehensive new dataset on Chinese municipalities, the level at which the SEZ experiments were carried out. First, I estimate the effectiveness of the SEZ in attracting foreign direct investment, mainly in the form of foreign-invested and export-oriented industrial enterprises. Second, I estimate the effect of the SEZ on the domestic investment and capital stock of the municipality. Finally, I also check whether, in addition to physical capital, the SEZ brings more advanced technology measured by total factor productivity (TFP) growth.

The Chinese central government did not compile detailed information on the year and location of the creation of the SEZs until 2006. In 2008, in order to celebrate the 30th anniversary of “Open Door reform”³, China published brand new economic statistics on municipalities, mainly growth-accounting data. This is the first time that China prepared comprehensive statistics at the municipal level covering main economic indicators between 1978 and 2007. Based on these sources, I construct a

¹See Shah (2008).

²Since 1979, China has gradually created SEZs in its municipalities with property rights protection, tax breaks and a preferential land policy specifically for foreign investors. This SEZ experiment has transformed China into one of the largest FDI recipients, exporters and foreign exchange reserve holders in the world (Prasad and Wei, 2007; Feenstra and Wei, 2010). Figure 1 displays the significant correlation between the SEZ experiment and FDI outcome in China.

³Open Door reform basically means liberalization of trade and foreign direct investment.

new dataset for 326 Chinese municipalities⁴ containing information on GDP, investment, employment, foreign direct investment, exports as well as a digital GIS map of Chinese municipalities which is coded with the year the SEZ is created. This dataset allows me to track the evolution of China's municipal economies before, during and after the expansion of SEZs. Information on municipal GDP, investment and employment are particularly important, because they enable me to identify the channels through which municipalities gain from the SEZs (see below).

To guide my empirical analysis, I develop a simple framework mapping the foreign investor location decision to the municipal macroeconomic outcome. I use this framework to assess empirically the importance of the SEZ experiment for productivity, since having FDI increases not only capital stock but also total factor productivity growth (i.e., technology⁵). The conceptual framework generates three hypotheses that drive my three-step empirical analysis:

1. SEZs, by combining private property rights protection, tax breaks and preferential long-term land use fees, attract foreign direct investment;
2. SEZs, depending on possible crowding-out and crowding-in effects of domestic investment by FDI, may or may not change domestically owned capital formation;
3. SEZs, if bringing more advanced FDI, will boost the technological progress of the municipality measured by total factor productivity growth.

Because China gradually expanded the SEZ experiment to its municipalities, I am able to identify the effect by exploring cross time within-municipality and cross municipality within-year variations. Despite the fact that almost all Chinese municipalities (300 out of 326 in my sample) carried out the SEZ experiments by the end of 2007, there are still big concerns about the endogeneity of the SEZ experiment sequence and the validity of its estimated effects. I use three strategies to mitigate this concern. First, I add municipality-specific trends to control for unobserved changes in the local economic environment which might be correlated with the timing of the SEZ establishment. Second, the potential endogeneity of the timing of the SEZ

⁴My dataset includes 326 out of 333 municipalities in China. Details are given in the data appendix.

⁵An ideal variable to measure municipal technology is patents. However, there are no well-kept statistics on municipality level patents from 1978 to 2007. Therefore, I use TFP as a proxy.

establishment might make the municipalities that carried out the SEZ experiment later an unsuitable comparison group to those that carried out the SEZ experiment earlier and consequently cast doubt on the validity of the estimated effects. I collected data on geographical location, industrial condition and human capital, based on which the State Council of China authorized some municipalities to establish SEZs in earlier years. This allows me to match municipalities which experimented with SEZs earlier to municipalities which experimented with SEZs later that are comparable in these indicators considered relevant for the outcomes under analysis. In this matching exercise each municipality which established SEZs in earlier years is matched with its closest counterpart which established SEZs in later years along these three dimensions. This approach implies that I am comparing early treated municipalities to late treated municipalities that are similar in terms of these three indicators before the SEZ experiment was carried out in China. Third, to prevent the results from being largely driven by the municipalities which established SEZs in earlier years and potentially had the most serious selection problem, I also examine the estimates restricting my sample to those municipalities which established SEZs in later years.

Moreover, there are concerns that foreign firms anticipate the SEZ establishment and thus delay their investment projects to coincide with the opening of the SEZ. I therefore run a placebo test and find that there was no hike or dip before the SEZ experiment took place and that the increase in FDI related outcome started only after the experiment. As a result, there is no anticipation of SEZs by foreign firms, encouraging the interpretation that SEZs have attracted FDI, increased exports and industrial output by foreign invested enterprises. Furthermore, we might worry that the FDI SEZs attracted might not only come from a creation effect, but also from a diversion effect (from nearby municipalities). Thus, I run an empirical exercise to separately identify those two effects. The results indicate the existence of a sizable creation effect and a partial diversion effect by the Chinese SEZ experiment.

This paper contributes to the literature on SEZs⁶, as well as to the large litera-

⁶Current work on SEZs are mainly case studies including Willmore (1996) on Export Processing in the Caribbean; Kung (1985), Ge (1999) and Park (1997) on detailed descriptions of SEZ policy in China; Rolfe et. al. (2004) on incentives of Kenyan Special Economic Zones; Aggarwal, Hoppe and Walkenhorst (2008), Aggarwal (2005) on Comparative Analysis of Special Economic Zone performance in India, Sri Lanka, and Bangladesh. Litwack and Qian (1998) develop a theory for a transition economy (China) under which an unbalanced development strategy favors special economic zones.

ture on estimating the economic impacts of foreign direct investment⁷. My work to empirically examine the SEZ experiment under a cross-municipality framework is an important complement to current research on SEZ performance which consists mainly of case and theoretical studies⁸. My paper evaluates the impact of FDI brought by the SEZs at the municipal level and so builds a bridge between country level and firm level studies. Empirical work using cross country data had suffered from an omitted variable problem since different countries are characterized by very different institutional and cultural features, which may well correlate with FDI. Meanwhile, research using firm level data could provide cleaner estimates under a stronger identification strategy and pin down accurately how foreign multinational firms interact with domestic firms. However, these studies can say little about macro-level impact of FDI on the domestic economy. Because this paper uses the variation within Chinese municipalities, many of the institutional, cultural, and policy variables that confound the relationship between the SEZ experiment and macroeconomic outcomes at the country level are held constant, which increases the inferential validity. Another advantage of my study is that I can say more about the channels of causation from a macroeconomic perspective. In particular, I can distinguish between the effects of the SEZ experiment operating through increasing foreign owned capital in the municipality, and those operating through boosting total factor productivity growth.

There are of course disadvantages to my estimates on the SEZ experiment. Chinese SEZ experiment is a combination of private property rights protection, tax breaks and a preferential land policy for foreign investors. It is therefore difficult separately to identify the elasticity of FDI with respect to those three parts of the policy⁹.

⁷Some papers view the benefit of FDI as an important source of capital stock using country level data, such as Whalley and Xin (2010), McGrattan and Prescott (2009), Desai, Foley and Hines Jr. (2009); other work focuses on FDI as an important source of technology spillover, for example, Coe, Helpman and Hoffmaister (2009) [cross-country study], Liu (2008), Hale and Long (2007) and Abraham et al. (2010) [firm-level study].

⁸The only exceptions are Wei (1995) and Cheng et al. (2000). Wei (1995) has used Chinese city level data from 1980-1990 to examine a reduced-form relationship between the open-door (SEZ) policy proxied by FDI and exports, and Chinese growth. However, his dataset does not report investment, which prevents his study from using a complete growth accounting framework. Cheng and Kwan (2000) estimate the effects of the determinants of foreign direct investment (FDI) in 29 Chinese provinces from 1985 to 1995. They find that the preferential Special Economic Zone policy, large regional markets and good infrastructure had a positive effect but wage cost had a negative effect on FDI.

⁹Du et al. (2009) examine the impact of economic institutions, including property rights protection and contract enforcement, on the location choice of foreign direct investment from a data

The next section introduces the historical background of China’s SEZ experiment and provides a brief description of my dataset. Section 3 presents a conceptual framework mapping the foreign investor location decision to municipal macroeconomic outcomes which generates three predictions for empirical testing. Section 4 estimates the direct impact of the SEZ experiment on FDI-related outcomes. Section 5 estimates the effect of the SEZ experiment on the composition of municipal investments, therefore the impact on the physical capital stock. Section 6 calculates the effect of the SEZ experiment on total factor productivity growth. Section 7 concludes.

2 Background and Data

In this section I discuss some essential features of the SEZ experiment and the data that I have collected in order to analyze how the municipal economy changed with the SEZs.

2.1 Special Economic Zone Experiment Review

China’s administrative system has five hierarchical levels of government: (1) central; (2) provincial; (3) municipal; (4) county; and (5) township. In this paper, I focus on the municipal level where the SEZ experiment has been carried out.

In the late 1970s, approval was given by the State Council for small-scale SEZ experiments in four remote southern cities, including Shen Zhen, Zhuhai and Shantou in Guangdong Province, as well as Xiamen in Fujian Province. Importantly, given the fact that China started with virtually zero foreign direct investment and almost negligible trade before 1978, these zones were used as a “test base” for liberalization of trade, tax and other policies that were then gradually applied to the rest of the economy. In August 1980 the People’s Congress passed the first legal rule on the SEZs: “the Regulation for Guangdong SEZs.” This regional law was the first of its kind to be tested, drafted with the help of legal experts sent from the central government (Cai et al., 2008). When the experiment was expanded into other provinces, they adopted and modified this law accordingly¹⁰. The law of SEZs

set of 6,288 U.S. multinationals investing in China’s various regions; Devereux (2007) summarized the empirical literature on the impact of taxation on the location of FDI.

¹⁰See the Central Government Circular No.50, 1979, Zhongfa (1979) 50. The details of the political decision-making process are comprehensively summarized in Xu (2010).

explicitly provides the following policy package for foreign investors:

1) Private Property Rights Protection¹¹: the SEZs encourage foreign citizens, overseas Chinese, and compatriots from Hong Kong and Macau to set up enterprises and other establishments with their own investment or in joint ventures with Chinese partners. The SEZs guarantee to protect their assets, accruing profits and other rights in accordance with the law. This is a very important commitment by the Chinese government since there was no constitutional protection of private property rights outside SEZs until recently (the 2004 Constitutional Amendment).

2) Tax incentives: foreign investors can enjoy a reduced rate (15-24%) of corporate income tax compared to 33% paid by domestic firms. They bear virtually zero custom duties and can enjoy duty free allowances for production materials. There are income tax exemptions for foreigners working in SEZs as well¹².

3) Land use policy¹³: under Chinese law, all land is under state ownership. Foreign investors may lawfully obtain the rights for land development, use and business. They may also transfer and lease land rights, or put them up for mortgage in accordance with the law within the stipulated purposes and terms of the use. When foreigners invest in projects encouraged by the State for an operation term of more than 15 years, the construction land is exempt from land use fees for five years starting from the day when the enterprise obtains the use right, and the fee is collected at half price in the following five years. The land use right is guaranteed for projects that have a total investment of US \$10 million, or that are technologically advanced and have a major influence on the local economic development despite total investment below US \$10 million.

The government made clear the targets of SEZs using four principles: *“Construction primarily relies on attracting and utilizing foreign capital; primary economic forms are Sino-foreign joint ventures and partnerships as well as wholly foreign-owned enterprises; products are primarily export-oriented; economic activities are*

¹¹Besley (1995), Besley and Ghatak (2010): “Property insecurity acts much like a random tax on land, and thus reduces invest incentive.”

¹²World Bank (2008): “There has been a great deal of debate regarding the types of fiscal incentives and other privileges at the heart of an SEZ regime. Countries are under pressure to offer a generous package of tax and duty exemptions in order to keep pace with their competitors. The package of fiscal incentives has become almost standardized among zones internationally—corporate tax reductions or exemption; duty-free importation of raw material, capital goods, and intermediate inputs; no restrictions or taxes on capital and profits repatriation; exemption from foreign exchange controls (where applicable); no charges on exports; exemption from most local and indirect taxes; and so on.”

¹³Source: the government website of Zhejiang province.

primarily driven by market forces.”

Supported by the initial achievements of the first group of SEZs, in 1984, the central government expanded the SEZ experiment; fourteen other coastal cities were opened to foreign investment¹⁴. From 1985 to 1988, the central government included more municipalities along the coastal area in the SEZ experiment¹⁵. In 1990, the Chinese government decided to open the Pudong New Zone in Shanghai to foreign investment, as well as more cities in the Yangtze River Valley. The pattern of granting the SEZ status in earlier years is not purely random. According to state-council documents (1980-1990)¹⁶, the central government authorized municipalities to establish the SEZs based on their better geographical location, industrial condition and human capital.¹⁷ From 1992 to 1994, the State Council opened a number of border cities and all the capital cities of inland provinces and autonomous regions. In addition, 222 state-level economic zones and 1346 province-level economic zones¹⁸ were gradually established within the municipalities to provide better infrastructure and achieve agglomeration of foreign investors. As a result, a multi-level diversified pattern of opening and integrating coastal areas with river, border, and inland areas has formed in China. China’s SEZ experiment is described by the World Bank as a unique Zones-within-Zone case because a large opened economic zone (the whole municipality) hosted small economic zones (state-level and province-level economic zones) within its territory. Figure 2 displays the geographic evolution of the SEZ experiment.

In Table 1, I summarize the four big waves in the SEZ experiment: 1979-1985, 1986-1990, 1991-1995, 1996-2007. The ratio of the number of municipalities with SEZs to total municipalities starts from 0% in 1978, to 9% in 1985, 24% in 1990, 69% in 1995 and 92% in 2007. The SEZ experiment was expanded from coastal areas, beginning with municipalities with an average distance to the coast of 15 miles, and expanding to those with an average distance of 626 miles to the nearest coast. Also, the SEZ experiment used industrially more developed areas first, measured by higher

¹⁴Listed north to south: Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang, and Beihai.

¹⁵Listed north to south: Liaodong Peninsula, Hebei Province (which surrounds Beijing and Tianjin), Shandong Peninsula, Yangtze River Delta, Xiamen-Zhangzhou-Quanzhou Triangle in southern Fujian Province, Pearl River Delta, and Guangxi.

¹⁶See various State Council documents issued in 1984,1985,1987,1988,1991,1992,1993.

¹⁷China’s development strategy based on location is discussed in Démurger et al. (2002).

¹⁸State-level SEZs are authorized by the central government; province-level SEZs are authorized by provincial governments.

average initial industrial output, and later expanded to industrially less-developed areas. However, there are no significant statistical differences in human capital across the four groups of municipalities which established the SEZs at different times.

2.2 Dataset on Chinese Municipalities

In order to evaluate the impact of SEZs, I constructed a new panel dataset on 326 Chinese municipalities. The dataset tracks Chinese municipalities on GDP, investment, employment, foreign direct investment and exports. It also includes a digital GIS map of Chinese municipalities which is coded with its year of opening up and the SEZ establishment. Table 2 displays descriptive statistics for the variables that I use in this paper. The Data Appendix contains more details on the construction of these variables.

2.2.1 Special Economic Zone Index

In the dataset, I have detailed information that captures features of the SEZ experiment:

1. Lists of coastal and inland municipalities which were granted an open special economic area status and the year of granting;
2. Lists of state-level Economic and Technological Development Zones, New and High-technology Industrial Development Zones, Export Processing Zones, and Border Economic Cooperative Zones, the size of these zones and the year when the municipalities were authorized to establish these zones;
3. Lists of province-level Economic and Technological Development Zones, and New and High-technology Industrial Development Zones, the size of these zones and the year when the municipalities were authorized to establish these zones.

Being granted the status of open special economic area means the whole area of the municipality is a large SEZ for foreign investors. Being authorized to establish state-level or province-level economic zones means that within the municipality, a certain geographical area is used as a SEZ to host foreign investors. In the full sample, some municipalities were granted the status of open special economic areas as well as allowed to establish state-level and province-level economic zones in

later years, i.e., a large SEZ can contain multiple “specific” zones within its boundaries. For example, some coastal municipalities such as Shenzhen, Shanghai, Dalian, Tianjin and Guangzhou were allowed to construct more and larger zones within the municipalities after they as a whole were granted the status of open economic areas. Most inland municipalities were not granted the status of open economic areas. They just have relatively smaller and fewer economic zones constructed within their city areas. Therefore, the intensity of the SEZ experiment differs across municipalities and time. If I use three variables, including the open economic area dummy variable, the accumulated size of state-level economic zones and the accumulated size of province-level economic zones fully to explore the intensity of the SEZ treatment, the identification strategy is vulnerable to an endogeneity problem, since the fact that coastal municipalities were allowed to establish more and larger SEZs is highly correlated with their potential in attracting foreign direct investment. In order to alleviate the non-randomness regarding the treatment intensity and provide a much cleaner identification, I instead use a general SEZ dummy variable¹⁹,

$SEZdummy = 1$, if the whole municipality is granted the status of open economic zone area, or a state-level economic zone is allowed to be established in a certain geographical area within the municipality, or a province-level economic zone is permitted to be created in a certain geographical area within the municipality;

$SEZdummy = 0$, if otherwise.

Despite various types and different names for SEZs, I checked the SEZ law for open special economic areas, state-level economic zones and province-level economic zones. There are no systematic policy differences regarding property rights protection, tax breaks or land use policy, which justifies the validity of using a general SEZ dummy variable to capture this experiment.

2.2.2 Foreign Direct Investment

Data at the municipality level including utilized foreign direct investment, exports and industrial output by foreign-invested enterprises are used to capture the direct outcome of the SEZ experiment.

Figure 3 plots the sample mean of the log of per capita foreign direct investment

¹⁹To examine more closely the variation in the intensity of the SEZ experiment, I run regressions on three variables: open economic zone area dummy, land area of state-level economic zone, and land area of province-level economic zones as supplemental evidence. The results are consistent with using a single treatment variable, i.e., SEZdummy.

by year for four groups of municipalities classified based on the timing of the SEZ experiment. It reveals that the SEZ experiment boosts FDI significantly for every group. We observe that FDI increased significantly after each group of municipalities was authorized to establish the SEZs. However, the effect seems to be much stronger for the municipalities which carried out the SEZ experiment earlier. To prevent biased estimates due to the potential selection problem, I use more rigorous methods in the main specification.

2.2.3 Growth Accounting Data

The credibility of statistical data published by China's statistical office is under scrutiny in various studies (Young, 2003; Holz, 2008). Having acknowledged the potential bias, apart from annual revisions to the national income and product accounts data first published in the previous year, China's National Bureau of Statistics has so far conducted two benchmark revisions. The first occurred following the 1993 tertiary (service) sector census with adjustments to the 1978-93 tertiary sector value added and, by implication, to the sum of sectoral value added, i.e., gross domestic product (GDP). The second benchmark revision occurred in early 2006, following the 2004 economic census of the secondary sector (industry, construction) and of the tertiary sector using the OECD method. My dataset is based on the latest municipal statistics after these adjustments. Following Caselli (2005) and Young (2003), I have constructed Real GDP, Real Capital Stock, human capital augmented labor and share of labor income.

3 Conceptual Framework

Foreign Investment Decision:

Consider the decision of a foreign firm, seeking to invest in location i , $i = 0, 1, 2, \dots, 326$, where $i = 0$ denotes the outside option of investing in other countries; $i = 1, 2, \dots, 326$ denote the options of investing in Chinese municipalities. Its decision is a two-stage process: 1) location choice; 2) investment level. I proceed by calculating the profit that the foreign firm will make from the option of locating in municipality i . If the firm decides to invest in municipality i , it maximizes its

profits²⁰ specified as follows:

$$\begin{aligned} \underset{L_i, FDI_i, Land_i}{Max} \quad \pi_i &= (1 - \tau_i)(1 - t_i)(pq_i - w_i L_i - R_i Land_i - r FDI_i - F) \\ s.t. \quad q_i &= Q(FDI_i, Land_i, L_i), \end{aligned}$$

in which π_i is the profit of the firm if it invests in municipality i ; τ_i is the probability of expropriation; t_i is the corporate tax rate for the firm in municipality i ; p is the price of the product produced by the firm; q_i is the quantity of the product sold; w_i is the wage rate in municipality i ; L_i is the quantity of labor employed by the firm in municipality i ; R_i is the land use fee paid by the firm in municipality i ; $Land_i$ is the land the firm used for production in municipality i ; r is the opportunity cost of capital for the firm; FDI_i is the foreign direct investment by the firm in municipality i ; F is the fixed cost of production.

Derived from the first order conditions with respect to investment (FDI_i) and inputs decisions on land ($Land_i$) as well as labor (L_i), the maximized profit π_i^* will be a function of τ_i, t_i, R_i and w_i . Comparing profits π_i^* across all options i , the firm will choose the one with the highest payoff to locate its investment²¹. The FDI in municipality i can therefore be modelled as follows:

$$FDI_i^* = f(\tau_i, t_i, R_i, w_i | \{i : \pi_i^* > \pi_j^*, \forall j \neq i\}). \quad (1)$$

The policy set of the SEZ experiment including property rights protection (lower τ_i), tax breaks (lower t_i) and land fee discount (lower R_i), implies an estimating equation of the form leading to empirical step one²²:

$$\ln FDI_{it} = \alpha + \eta * SEZdummy_{it} + X_{it}\beta + \xi_{it}, \quad (2)$$

²⁰The maximization problem captures the intensive effect, i.e., how much to invest in municipality i conditional on locating there.

²¹This decision essentially captures the extensive margin, i.e., whether or not to invest in the municipality i .

²²See Zhang (2008): China's National Development and Reform Commission carried out a survey in 2007 regarding potential policy changes that foreign enterprises worried about. The results suggest that the incentive package the SEZ experiment provided, including tax incentives and favorable land policies, was among the key determinants of foreign investment.

Due to data availability, the paper is not able to estimate the extensive margin (whether or not to invest in municipality i) and intensive margin (how much to invest in municipality i conditional on locating there) separately. Therefore, the effect of SEZs on foreign direct investment is a combined intensive and extensive response.

in which X_{it} includes municipal control variables which would potentially influence the FDI decision in addition to the property rights protection, tax rate and land use fee.

Capital Formation:

If the SEZ attracts FDI, it will in turn influence the capital formation process in the municipality. In particular,

$$\text{directly, } K_{ift} = K_{ift-1} * (1 - \text{delta}) + FDI_{it}(SEZ)/\text{deflator}, \quad (3a)$$

$$\text{indirectly, } K_{idt} = K_{idt-1} * (1 - \text{delta}) + DomI_{it}(SEZ)/\text{deflator}. \quad (3b)$$

K_{ift} is foreign owned capital stock. FDI_{it} is foreign owned investment. delta is the depreciation rate. K_{idt} is domestically owned capital stock. $DomI_{it}$ is domestically owned investment. The interaction between domestic investment and foreign direct investment, i.e., a crowding-out or a crowding-in effect of domestic investment by FDI, will determine the net effect of SEZs on capital formation. This drives the empirical step two below:

$$\text{LnDomI}_{it} = \phi + \gamma * SEZ\text{dummy}_{it} + X_{it}\beta + \xi_{it}, \quad (4a)$$

$$\text{LnK}_{idt} = \phi + \gamma * SEZ\text{dummy}_{it} + X_{it}\beta + \xi_{it}. \quad (4b)$$

Technological Progress:

A very important policy motive behind subsidizing foreign investors is that FDI is believed to be an important channel through which the international transfer of technology takes place. To assess whether the SEZ experiment by attracting FDI facilitates such transfer and boosts technological progress, I model the municipal aggregate production function based on Young (2003). Let gross domestic output of the municipality be a constant return to scale function of capital and labor inputs (human capital augmented):

$$Y_{it} = A_{it}F(K_{it}, HL_{it}), \quad (5)$$

in which the appearance of total factor productivity A_{it} denotes the fact that the production function evolves over time due to technological progress. If the SEZ plays a role in increasing technological growth, it will influence A_{it} .

Totally differentiating and dividing by GDP, I find:

$$\frac{dY}{Y} = \left(\frac{AF_K K}{Y}\right) \frac{dK}{K} + \left(\frac{AF_{HL} HL}{Y}\right) \frac{dHL}{HL} + \frac{dA}{A}, \quad (6)$$

in which F_j represents the partial derivative of F with respect to argument j . With competitive markets, factors are paid their marginal products, so that the terms in parentheses on the right-hand side represent the share of each factor in total factor payments (θ_k and θ_l^{23}). Total factor productivity growth, the last term on the right-hand side, represents the proportional increase in output that would have occurred in the absence of any input changes and is calculated as a residual item by subtracting the contribution of capital and labor from output growth:

$$\frac{dA}{A} = \frac{dY}{Y} - \theta_k \frac{dK}{K} - (1 - \theta_k) \frac{d(HL)}{(HL)}. \quad (7)$$

Further assume that $A_{it} = A_i e^{\lambda_i t} e^{\beta(SEZ_{it})t}$, where A_i is the time-invariant component of total factor productivity in municipality i , λ_i is the existing TFP growth rate of municipality i , and the extra term $e^{\beta(SEZ_{it})t}$ denotes the potential contribution of the SEZ experiment to the TFP growth. If the SEZ boosts the technological progress of the municipality, the contribution will be captured by a positive coefficient ($\beta > 0$). This drives empirical step three below:

$$\frac{dA}{A}_{it} = \lambda_i + \beta * SEZdummy_{it} + \varepsilon_{it}. \quad (8)$$

To relate the basic model in Section 3 to my dynamic empirical setting, I run three empirical sections (Steps One - Three). In Step One, I evaluate the extent to which foreign direct investment responds to property rights protection, tax breaks and the land use fee discount embodied in the SEZ experiment. In Step Two, I check the effect of the SEZ experiment on domestic investment and domestically owned capital stock. In Step Three, I examine whether the presence of FDI attracted by the SEZ brings technological growth to the municipality.

²³The Chinese statistics only reports GDP by the income approach at the provincial level. Therefore, in the paper, I use provincial capital share as the proxy for municipal capital share. In a later empirical section, I compared estimates using provincial capital share and national capital share and show the results are not sensitive to the capital share indicator I used.

4 Empirical Step One: SEZs on FDI outcomes

4.1 Identification

The empirical test relies on the variation in the timing when SEZs were created across my sample of municipalities. As described in Section 2, the timing of the SEZ experiment across the Chinese municipalities provides a significant amount of variation both between and within municipalities during my sample period 1978-2007. I will exploit these different sources of variation in my identification strategy.

4.1.1 Baseline Specification

In the baseline specification, the econometric analysis makes use of the full sample of 326 municipalities. Thus, the effects of the SEZ experiment on the FDI outcome will be estimated both from the cross-sectional variation (municipalities with SEZs versus municipalities without SEZs) and from the time variation in the SEZ experiment among the 300 treated municipalities (a municipality before being treated versus after being treated). My econometric analysis is based on panel data regressions of the form:

$$Y_{ipt} = \alpha + \beta * SEZdummy_{ipt} + \delta_i + \gamma_t + \varepsilon_{ipt}, \quad (9)$$

$$Y_{ipt} = \alpha + \beta * SEZdummy_{ipt} + \delta_i + \delta_p * (t - 1977) + \gamma_t + \varepsilon_{ipt}, \quad (10)$$

$$Y_{ipt} = \alpha + \beta * SEZdummy_{ipt} + \delta_i + \delta_i * (t - 1977) + \gamma_t + \varepsilon_{ipt}, \quad (11)$$

in which Y_{ipt} is the outcome variable including foreign direct investment flow, exports and industrial output of foreign invested enterprises in municipality i of province p at time t . $SEZdummy_{ipt}$ is the key variable indicating the SEZ experiment and is defined in Section 2.2.1. δ_i is the municipality fixed effect. γ_t is the year fixed effect. δ_p is the province fixed effect. $(t - 1977)$ is the trend starting from 1978 which is the beginning of my sample²⁴.

In the first econometric setting (Equation 9), I use the municipality fixed effect to control for time-invariant municipal characteristics such as natural endowment and geographical location. The year fixed effect is used to control for macroeconomic shocks common to all Chinese municipalities in a particular year. In the second

²⁴As there are plenty of observations before the treatment (i.e., the SEZ experiment), linear trends are unlikely to pick up the post-treatment trends (Wolfers, 2006).

econometric setting (Equation 10), I use the municipality fixed effect to control for time-invariant municipal characteristics and the province-specific trend to control for the common path of municipalities in the same province. This setting controls for time-varying factors at the provincial level that potentially influence the timing of the SEZ experiment. In the third econometric setting (Equation 11), I use the municipality fixed effect to control for time-invariant municipal characteristics, the year fixed effect to control for macroeconomic shocks common to all municipalities at time t and municipality-specific trends to control for time-varying reasons that municipalities were allowed to establish SEZs. In this case, the identification of the effects of the SEZ experiment comes from whether such changes lead to deviations from municipality-specific trends. Standard errors are heteroskedasticity-robust and clustered by municipality to deal with potential problems of serial correlation (Bertrand, Duflo and Mullainathan (2004)).

4.1.2 Matching Specification

In the matching specification, the difference with respect to the baseline specification is that I no longer make use of the full sample of late treated municipalities. Instead, I take advantage of the cross-sectional variation found for several socioeconomic measures to restrict the sample of municipalities that experimented with SEZs in later years to the ones that more closely match the earlier treated municipalities in indicators considered relevant for the timing of the SEZ experiment and for the outcomes under analysis, as of 1978. This procedure restricts the sample to 247 municipalities that are substantially more comparable in terms of the indicators considered at the beginning of my sample period.

According to state council documents, by the early 1990s, the SEZ experiment was authorized mostly in coastal, more industrially developed and more educated areas. The selection criteria are likely to affect the propensity for a municipality to carry out the SEZ experiment earlier and are also likely to be instrumental in affecting FDI related outcomes. I create a $D = 1$ if the municipality had carried out the SEZ experiment by 1992, i.e., earlier treated; $D = 0$ if the municipality carried out the SEZ experiment after 1992, i.e., later treated. I use the per capita industrial output, the per capita number of secondary school students in 1978 and the distance

to the nearest coast to estimate the propensity score based on a probit model.

$$\Pr\{D = 1|X\} = \phi(X'\beta), \tag{12}$$

$X = (\textit{industrial output}, \textit{education attainment}, \textit{geographical location}).$

In the matching exercise, I rank all 326 municipalities based on the estimated propensity score, and for each earlier treated municipality I select its closest later treated municipality as a control group (nearest neighbor approach). In the matched sample, I have 247 municipalities, among which 167 municipalities established SEZs between 1979 and 1992 and 80 municipalities were allowed to create SEZs after 1992²⁵. Table 3 displays the probit regression results and the quality before and after using nearest-neighbor matching. Since I do not match the sample conditioning on all covariates but on the propensity score, I have to examine whether the matching procedure is able to balance the distribution of the relevant variables in both the control and treatment group. There are two measures to check whether there remain any differences after conditioning on the propensity score. First, the pseudo-R2: Sianesi (2004) suggests reestimating the propensity score on the matched sample, that is, only on participants and matched non-participants, and comparing the pseudo-R2s before and after matching. The pseudo-R2 indicates how well the regressors X explain the participation probability. After matching there should be no systematic differences in the distribution of covariates between both groups and therefore, the pseudo-R2 should be fairly low. Table 3a indicates that before matching the Pseudo-R2 is 0.10; after matching, the Pseudo-R2 reduces to 0.03. Second, T-test: in Table 3b, the T-test suggests that all three important selection criteria become insignificant after matching, which means there are no systematic differences in the distribution of covariates between the control group (the municipalities which had SEZs in later years) and the treatment group (the municipalities which had SEZs in earlier years). This matching procedure reduces the size of the sample available for econometric analysis, but increases my confidence that I am effectively tracking municipalities across time that are more comparable in aspects that are relevant for the effects I want to estimate.

²⁵See Caliendo and Kopeinig (2008) for practical guidance on propensity score matching, and Rosenbaum and Rubin (1983) for the principle of matching. I have checked the common support and the balancing properties, which were all satisfied in my matching exercise. Some municipalities in the control group were used more than once in the matching, i.e., matching with replacement.

4.1.3 Later SEZs Only Specification

The matching procedure described above does not completely eliminate concerns about the existence of unobservable factors that might systematically affect the likelihood of experimenting with the SEZ earlier and also affect the outcome variables of interest. It is possible, for instance, that the municipalities that established SEZs earlier could have very different abilities for attracting FDI compared to municipalities that established SEZs later on. These specific characteristics might have led them to experiment with SEZs earlier and to perform more successfully in FDI absorption. The positive correlation between the SEZ experiment and FDI related outcome observed in the full sample may be wrongly interpreted as capturing the impact of the SEZs, if only the group of earlier treated municipalities drove the main results. To address this concern I restrict the sample available for analysis to the group of municipalities which only had SEZs since the 1990s. The sample drops 79 municipalities which were allowed to construct SEZs between 1979 and 1990 and is therefore reduced to a group of 247 municipalities²⁶.

4.2 Empirical Results

Panel A of Table 4 reports the impact of the SEZ on per capita foreign direct investment, which is the first-order target of the experiment. Panel B reports the effect of the SEZ on per capita exports, as another stated objective of the experiment is to boost trade-related activities. Panel C illustrates the SEZ's impact on per capita industrial output of foreign invested enterprises, so as to confirm that foreign direct investment came to municipalities that experimented with the SEZs to produce and export its product.

Columns (1) to (3) of Panel A suggest that the results are robust to baseline specifications. In Column (3), after controlling for fixed effects and municipality-specific trends, the results suggest that the SEZ experiment increases per capita foreign direct investment by 58%. Column (4) reports the estimates for the restricted matched sample. The results suggest the SEZ experiment increases per capita FDI by 54%. In Column (5), where I only use the group of the municipalities that experimented with SEZs after 1990, the magnitude of the coefficient slightly decreases, but still suggests a 43% increase due to the SEZ experiment.

²⁶Though the number of the sample in matching is 247 municipalities as well, the composition of the matched sample and the later SEZs sample is different.

Column (3) of Panel B indicates that having the SEZ experiment increases municipal per capita exports by 84%. Column (4) reports the estimates for the restricted matched sample. The result suggests that the SEZ experiment increases per capita exports by 81%. In Column (5), where I only use the group of the municipalities that experimented with SEZs after 1990, the magnitude of the coefficient still suggests a 70% increase in exports due to the SEZ experiment. The estimates confirm the contribution of the SEZ experiment in attracting vertical FDI, which takes advantage of low-cost production in China for products to be exported and which is fueled mostly by China’s Asian neighbors²⁷.

Column (3) of Panel C indicates that having the SEZ experiment increases per capita industrial output of foreign invested enterprises by 64%. Column (4) reports the estimates for the restricted matched sample. The result suggests the SEZ experiment increases per capita industrial output of foreign-invested enterprises by 69%. In Column (5), where I use only the group of municipalities that experimented with SEZs after 1990, the magnitude of the coefficient still suggests a 45% increase due to the SEZ experiment.

4.3 Robustness Check

4.3.1 Placebo Test

There are concerns that foreign firms anticipate the SEZ establishment and thus delay their investment projects to coincide with the opening of the SEZ. If that were the case, the positive coefficient of *SEZdummy* in Equation (11) might just reflect foreign firm’s reallocation of investment across time, which is wrongly interpreted as the causal effect of SEZs on FDI. To validate the identifying assumption, I estimate the dynamics of FDI related outcome before and after the SEZ experiment. Specifically, I replace *SEZdummy* in Equation (11) with the set of year-wise dummy variables which equal one if n years have passed since the year of starting the SEZ experiment, where $-2 \leq n \leq 2$, and another dummy variable equal to one if three

²⁷See Whalley and Xin (2010) and Ekholm et al. (2007). Horizontal FDI, which involves the transfer of production (mainly from North America and Western Europe) to service the Chinese internal market is not the main form of FDI in China especially during the 1980s and 1990s when the SEZs were widely established. According to the National Statistical Bureau (2009), horizontal FDI accounts for approximately 40% of total FDI in 2002.

years or more have passed.

$$Y_{ipt} = \alpha + \sum_{n=-2}^2 \beta_n * D(T+n)_{ipt} + \beta_3 * D(T+3)_{ipt} + \delta_i + \delta_i * (t-1977) + \gamma_t + \varepsilon_{ipt} \quad (13)$$

Table 5 reports the estimates on the coefficient of the set of dummy variables. The point estimates suggest that there was no hike or dip before the SEZ experiment took place and that the increase in FDI related outcome started only after the experiment. As a result, there is no anticipation of SEZs by foreign firms, encouraging the interpretation that SEZs have attracted FDI, increased exports and industrial output by foreign invested enterprises.

4.3.2 Test for the Diversion Effect

There are concerns that the foreign direct investment SEZs attract is not from a creation effect, but from a diversion effect. When the SEZ experiment is in place, foreign investors might change their location decision from neighboring non-SEZ municipalities or neighboring non-SEZ provinces to municipalities with SEZs. If this were the case, SEZs would merely redistribute FDI within Chinese municipalities. As a result, I consider two possible diversion cases as follows:

Case I: Municipalities with SEZs divert FDI from neighboring municipalities with no SEZs, thus creating a change of distribution within the province. The prediction of full diversion story in Case I will be that at the provincial level, the number of municipalities with SEZs does not matter for the level of per capita FDI a province attracts. Figure 4 shows that there is a strong positive correlation between the proportion of municipalities with SEZs in the province and per capita provincial FDI, which contradicts the full diversion story.

Case II: Municipalities with SEZs divert FDI from other provinces with no SEZs, thus creating a change of distribution within China. It is possible that when some municipalities carry out the SEZ experiment, the FDI attracted is diverted from other provinces. The empirical prediction will be that at the national level, the number of municipalities with SEZs does not matter for the level of per capita FDI China attracts. This possibility of full diversion is ruled out by Figure 1, which shows a clear positive correlation between the number of municipalities with SEZs and the FDI China attracts.

Though the most extreme version of the diversion story, where there is no creation

at all, can be ruled out, there might be partial diversion. The ideal test to separately identify the creation effect and diversion effect is to regress the municipal FDI on its own *SEZdummy* and the indicator of other SEZ in the same province or nearby provinces.

$$Y_{ipt} = \alpha + \beta_1 * SEZdummy_{ipt} + \beta_2 * OtherSEZ_{ipt} + \delta_i + \delta_i * (t - 1977) + \gamma_t + \varepsilon_{ipt}. \quad (14)$$

We would expect a positive coefficient, β_1 , of its own *SEZdummy* to capture the creation effect and a negative coefficient, β_2 , of the dummy variable indicating if there is any other nearby SEZ for the diversion effect. $OtherSEZ_{ipt} = 1$ if there is any other SEZ in the same province or nearby provinces; $OtherSEZ_{ipt} = 0$ otherwise.

Panels A, B and C of Table 6 evaluate the creation effect and diversion effect of the SEZ experiment on FDI-related outcome. The coefficients of *SEZdummy* are all positive and the magnitude remains similar to those in Table 4. The results confirm that there is a significant creation effect by the SEZ experiment on the municipal FDI outcome. The coefficients of *OtherSEZ* are negative and significant, suggesting that there is indeed a sizable diversion effect by other nearby SEZs. The magnitude of the creation effect is larger than that of the diversion effect, which provides us with the relative importance of those two effects. In Panel C which tests the two effects for the foreign industrial output, the coefficients of *OtherSEZ* are larger than those of *SEZdummy*. The results might be due to the truncated sample size. The statistics of foreign industrial output only cover the years 1987-1991 and 1999-2008.

5 Empirical Step Two: SEZs and Domestic Capital Formation

In this section, I investigate the effect of SEZs on domestic capital formation. On the one hand, foreign direct investment flow may reduce domestic investment due to crowding-out and competition, which might decrease the impact of the SEZ experiment on domestically owned capital stock. On the other hand, the SEZs may bring benefits and spillovers to domestic firms. Complementary domestic investment may increase if the foreign investment projects become integrated into the domestic industrial chain and establish forward and backward linkages. The econometric specifications I use in this section to control for endogeneity are similar to those in

Section 4 (empirical step one).

Panel A of Table 7 contains regressions on domestic investment at the municipal level. Panel B contains regressions on municipal physical capital stock (domestically owned capital stock). Columns (1) to (5) of Panel A show that under different specifications, there is no significant evidence suggesting a sizable effect of domestically owned investment by the SEZs. According to the aggregate municipal data, each unit of FDI will contribute to the capital formation process without reducing domestic capital accumulation²⁸. However, the results cannot rule out the existence of either a crowding-out or crowding-in effect of domestic investment by the foreign direct investment. Since the data only reports the aggregate municipal investment rather than investment at a more disaggregated firm level, the insignificant coefficient of *SEZdummy* may reflect offsetting effects of crowding-out and crowding-in of domestic investment by FDI. Columns (1) to (5) of Panel B illustrate that having the SEZ experiment has no significant net effect on domestically owned capital stock, which is consistent with the pattern in domestic investments²⁹.

6 Empirical Step Three: SEZs and Total Factor Productivity Growth

6.1 Empirical Strategy

Based on the growth accounting approach (Young, 2003; Caselli, 2005), the total factor productivity is calculated³⁰. Recall Equation 7, $\frac{dA}{A} = \frac{dY}{Y} - \theta_k \frac{dK}{K} - (1 - \theta_k) \frac{d(HL)}{(HL)}$,

²⁸Yasheng Huang (2003), "the large absorption of foreign direct investment (FDI) by China is a sign of some substantial weaknesses in the Chinese economy. The primary benefits associated with China's FDI inflows are concerned with the privatization functions supplied by foreign firms, venture capital provisions to credit-constrained private entrepreneurs, and promotion of interregional capital mobility. Huang (2003) argues that one should ask why domestic firms cannot supply the same functions. China's partial reforms, while successful in increasing the scope of the market, have so far failed to address many allocative inefficiencies in the Chinese economy".

²⁹I also run regressions on total municipal capital stock and find no strong impact of the SEZs. A supporting fact is that the average ratio of foreign direct investment to total municipal investment is 0.04 during the sample period (1978-2007). This might explain why we do not observe a significant increase in total capital stock by the Special Economic Zone experiment. However, I do get strong results of the SEZs on the foreign owned capital stock.

³⁰Note that estimating TFP based on estimating a production function is heavily exposed to the endogeneity problem. All inputs, including capital and labor, are endogenous decisions, which are correlated with the unobserved error term. There is no good instrumented variable for them at the municipal level.

a very important step is to estimate labor and capital shares. The most disaggregated GDP data Chinese official statistics provide using the income approach is at the provincial level³¹. To calculate the municipal TFP growth, I use the provincial capital share as a proxy for the municipal capital share. As comparison groups, I also use national capital share $\theta_k = 0.4$ reported in Young (2003) and the international benchmark in Caselli (2005) $\theta_k = 1/3$ as a proxy for municipal capital share.

I proceed by linking the calculated TFP to the SEZ experiment, as elaborated in the analysis of Section 3: each municipality is assumed to have a time-invariant level of total factor productivity (A_i) and its own trend of technology progress ($e^{\lambda_i t}$); the SEZ experiment possibly changed the trend of its TFP growing path ($e^{\beta(SEZ_{it})t}$) due to the presence of FDI. The effect of SEZs on the TFP growth can be identified as follows:

$$\frac{dA}{A}_{it} = \lambda_i + \beta * SEZdummy_{it} + \varepsilon_{it}. \quad (15)$$

From 1978 to 2007, China also carried out other reforms. To control for common macroeconomic events which might influence the growth rate of TFP, I further add the year fixed effect into the regression.

$$\frac{dA}{A}_{it} = \lambda_i + \gamma_t + \beta * SEZdummy_{it} + \varepsilon_{it}. \quad (16)$$

6.2 Empirical Results

Column (2) of Table 8, with the most rigorous specification (Equation 16), shows that the SEZ experiment increases total productivity growth by 0.6 percentage points³². To compare this contribution with average TFP growth at the municipal level, 2.6%, during the sample period, SEZs (FDI) have therefore increased TFP growth rate by 23%.

The regression results from Column (4) where I use Young's (2003) national average capital share $\theta_k = 0.4$, and Column (6) where I use Caselli's (2005) international benchmark $\theta_k = 1/3$, are similar. The fact that the estimates are not sensitive to whether I use the provincial average share or national average share mitigates the concern that using upper level capital share would cause large measurement error.

³¹See Hsueh and Li (1999) for 1978-95, The National Statistical Bureau (2006) for 1993-2004.

³²I have run a placebo test for TFP growth using two dummies indicating one year, two years before the SEZ experiment as well as the reform variable, *SEZdummy*. The coefficients for the two pre-reform dummies are not significant, while the coefficient for *SEZdummy* does not change much.

7 Conclusion

Capital as well as advanced technology is typically desirable for development. Aiming to attract foreign capital, boost exports and absorb advanced technology, the SEZ has been a widely adopted development strategy. Despite the long-standing debates about its effectiveness, relatively few efforts have been devoted to rigorous empirical analysis. This paper tries to fill that. Methodologically, it exploits the extensive zone establishment across Chinese municipalities since 1979 and estimates the economic impact of SEZs on regional economies. After addressing the endogenous zone placement, the empirical findings provide a clear affirmative answer: first, the SEZ policy package, including private property rights protection, tax breaks and land use policy, increases per capita municipal foreign direct investment by 58% mainly in the form of foreign-invested and export-oriented industrial enterprises. Second, the SEZ experiment increases municipal foreign owned capital stock and does not reduce domestic capital (and investment). Due to data constraints, the result, however, can not rule out the coexisting offsetting effects of crowding-out and crowding-in of domestic investment by foreign direct investment. Third, the SEZ experiment, in addition to physical capital, increases municipal total factor productivity growth by 0.6 percentage points.

The findings of this paper provide an important insight into how a local economy gains from SEZs: one channel is through increasing physical capital stock; the other is via boosting total factor productivity growth. The results therefore support the policy initiative of using the SEZ as an effective tool to enhance regional development. Whether this prediction holds empirically in other countries, taking into account the institutional implementation of SEZs, awaits further work.

References

- [1] Abraham, F., J. Konings, AND V. Sloommaekers (2010), "FDI spillovers in the Chinese manufacturing sector," *The Economics of Transition*, vol. 18(1), 143-182.
- [2] Aggarwal, A., M. Hoppe, AND P. Walkenhorst (2008), "Special Economic Zones and Economic Diversification: Some Evidence from South Asia," in Richard Newfarmer, William Shaw and Peter Walkenhorst (eds.), *Breaking into New markets: Emerging Lessons for Export Diversification*, Washington DC: World Bank.
- [3] Aggarwal, A. (2005), "Performance of Export Processing Zones: A Comparative Analysis of India, Sri Lanka, and Bangladesh," Working Paper No. 155, Indian Council for Research on International Economic Relations, New Delhi.
- [4] Bertrand, M., E. Duflo, AND S. Mullanaithan (2004), "How Much Should We Trust Differences-in-Differences Estimates," *The Quarterly Journal of Economics*, MIT Press, vol. 119(1), 249-275
- [5] Besley, T. (1995), "Property Rights and Investment Incentives: Theory and Evidence from Ghana," *The Journal of Political Economy*, vol. 103(5), 903-937.
- [6] Besley, T., AND M. Ghatak (2010), "Property Rights and Economic Development," in Dani Rodrik and Mark Rosenzweig (eds.), *Handbook of Development Economics*, vol. 5, 4525-4595, North-Holland.
- [7] Cai, D. et al. (eds.) (2008), "Xi Zhongxun Governing Guangdong (Xi Zhongxun Zhuzheng Guangdong)," Beijing: Chinese Communist Party History Press.
- [8] Caliendo, M., AND S. Kopeinig (2008), "Some Practical Guidance for the Implementation of Propensity Score Matching," *Journal of Economic Surveys*, vol. 22(1), 31-72.
- [9] Caselli, F. (2005), "Accounting for Cross-Country Income Differences," in P. Aghion and S. Durlauf (eds.), *Handbook of Economic Growth*, vol. 1, 679-741, North-Holland Press.

- [10] Cheng, L. K., AND Y. K. Kwan (2000), “What are the Determinants of the Location of Foreign Direct Investment? The Chinese Experience,” *Journal of International Economics*, vol. 51(2), 379-400.
- [11] Coe, D. T., E. Helpman, AND A. W. Hoffmaister (2009), “International R&D Spillovers and Institutions,” *European Economic Review*, vol. 53(7), 723-741.
- [12] Desai, M. A., C. F. Foley, AND J. R. Hines Jr. (2009), “Domestic Effects of the Foreign Activities of US Multinationals,” *American Economic Journal: Economic Policy*, vol. 1(1), 181–203.
- [13] Démurger, S., J. D. Sachs, W. T. Woo, S. M. Bao, AND G. Chang (2002), “The relative contributions of location and preferential policies in China’s regional development: being in the right place and having the right incentives,” *China Economic Review*, vol. 13(4), 444-465.
- [14] Devereux, M. P. (2007), “The Impact of Taxation on the Location of Capital, Firms and Profit: A Survey of Empirical Evidence,” Working Paper, Oxford University Centre for Business Taxation.
- [15] Du, J. L., Y. Lu, AND Z. G. Tao (2008), “Economic Institutions and FDI Location Choice: Evidence from U.S. Multinationals in China,” *Journal of Comparative Economics*, vol. 36(3), 412-429.
- [16] Ekholm, K., R. Forslid, AND J. R. Markusen (2007), “Export-Platform Foreign Direct Investment,” *Journal of the European Economic Association*, vol. 5(4), 776-795.
- [17] Feenstra, R. C., AND S. J. Wei (2010), “Introduction to “China’s Growing Role in World Trade”,” published as NBER Chapters, in *China’s Growing Role in World Trade*, 1-31.
- [18] Ge, W. (1999), “Special Economic Zones and the Economic Transition in China,” Singapore and River Edge, NJ: World Scientific.
- [19] Hale, G., AND C. X. Long (2007), “Are There Productivity Spillovers from Foreign Direct Investment in China,” the Federal Bank of San Francisco Working Paper No. 2006-13.

- [20] Hall, R. E., AND C. I. Jones (1999), "Why do some countries produce so much more output per worker than others," *The Quarterly Journal of Economics*, vol. 114(1), 83-116.
- [21] Holz, C. A. (2006), "Response to Gregory C. Chow's *New Capital Estimates for China: Comments*," *China Economic Review*, vol. 17(2), 193-197.
- [22] Holz, C. A. (2008), "China's 2004 Economic Census and 2006 Benchmark Revision of GDP Statistics: More Questions Than Answers," *The China Quarterly*, no. 193: 150-63.
- [23] Hsueh, T. T., AND Q. Li (eds) (1999), "China's National Income: 1952-1995," Boulder: Westview Press.
- [24] Huang, Y. S. (2003), "Selling China: Foreign Direct Investment During the Reform Era," Cambridge University Press.
- [25] Kehoe, T. J., AND E. C. Prescott (2007), "Great Depressions of the Twentieth Century," the Federal Reserve Bank of Minneapolis, 1st edition.
- [26] Kung, K. S. (1985), "The Origins and Performance of China's Special Economic Zone," *Asian Journal of Public Administration*, vol. 7(1), 198-215.
- [27] Litwack, J. M., AND Y. Y. Qian (1998), "Balanced or Unbalanced Development: Special Economic Zones as Catalysts for Transition," *Journal of Comparative Economics*, vol. 26(1), 117-141.
- [28] Liu, Z. Q. (2008), "Foreign direct investment and technology spillovers: Theory and evidence," *Journal of Development Economics*, vol. 85(1-2), 176-193.
- [29] McGrattan, E., AND E. C. Prescott (2009), "Openness, Technology Capital and Development," *Journal of Economic Theory*, vol. 144(6), 2454-2476.
- [30] Park, J. D. (1997), "The Special Economic Zones of China and Their Impact on its Economic Development," London: Praeger.
- [31] Prasad, E., AND S. J. Wei (2007), "The Chinese Approach to Capital Inflows: Patterns and Possible Explanations," in Eswar Prasad & Shang-Jin Wei (eds.) *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences*, 421-480.

- [32] Rolfe, R. J., D. P. Woodward, AND B. Kagira (2004), “Footloose and Tax Free: Incentive Preferences in Kenyan Export Processing Zones,” *South African Journal of Economics*, vol. 72(4): 784-807.
- [33] Rosenbaum, P. R., AND D. B. Rubin (1983), “The Central Role of the Propensity Score in Observational Studies for Causal Effects,” *Biometrika*, vol. 70(1), 41–55.
- [34] Shah, S. (2008), “Special Economic Zones in South Asia: Comparative Analysis of Bangladesh, Sri Lanka, and India,” mimeo, Harvard University.
- [35] Sianesi, B. (2004), “An Evaluation of the Active Labour Market Programmes in Sweden,” *The Review of Economics and Statistics*, vol. 86(1), 133-155.
- [36] Wei, S. J. (1995), “The Open Door Policy and China’s Rapid Growth: Evidence from City-Level Data,” in Takatoshi Ito and Anne O. Krueger (eds.), *Growth Theories in Light of the East Asian Experience*, NBER-EASE vol. 4, University of Chicago Press.
- [37] Whalley, J., AND X. Xin (2006), “China’s FDI and Non-FDI Economies and the Sustainability of Future High Chinese Growth,” *China Economic Review*, vol. 21(1), 123-135.
- [38] Willmore, L. (1996), “Export Processing in the Caribbean: Lessons from Four Case Studies,” Working Paper No. 42, United Nations Economic Commission for Latin America and the Caribbean, Santiago.
- [39] Wolfers, J. (2006), “Did Unilateral Divorce Raise Divorce Rates? A Reconciliation and New Results,” *American Economic Review*, vol. 96(5), 1802-1820.
- [40] Xu, C. G. (2010), “The Fundamental Institutions of China’s Reforms and Development,” *Journal of Economic Literature*, forthcoming.
- [41] Young, A. (2003), “Gold into Base Metals: Productivity Growth in the People’s Republic of China during the Reform Period,” *Journal of Political Economy*, vol. 111(1), 1220-1261.
- [42] Zhang, Y. S. (2008), “Trade Development, FDI, and Special Economic Zones: China’s Experience,” World Bank Experience-Sharing Program on Development

between China and Africa Workshop, Foreign Economic Research Institute, National Development and Reform Commission.

- [43] OECD (2000), “Main determinants and impacts of foreign direct investment on China’s economy,” Working papers on international investment Number 2000/4.
- [44] World Bank (2008), “Special Economic Zones: Performance, Lessons Learned, and Implications for Zone Development”.

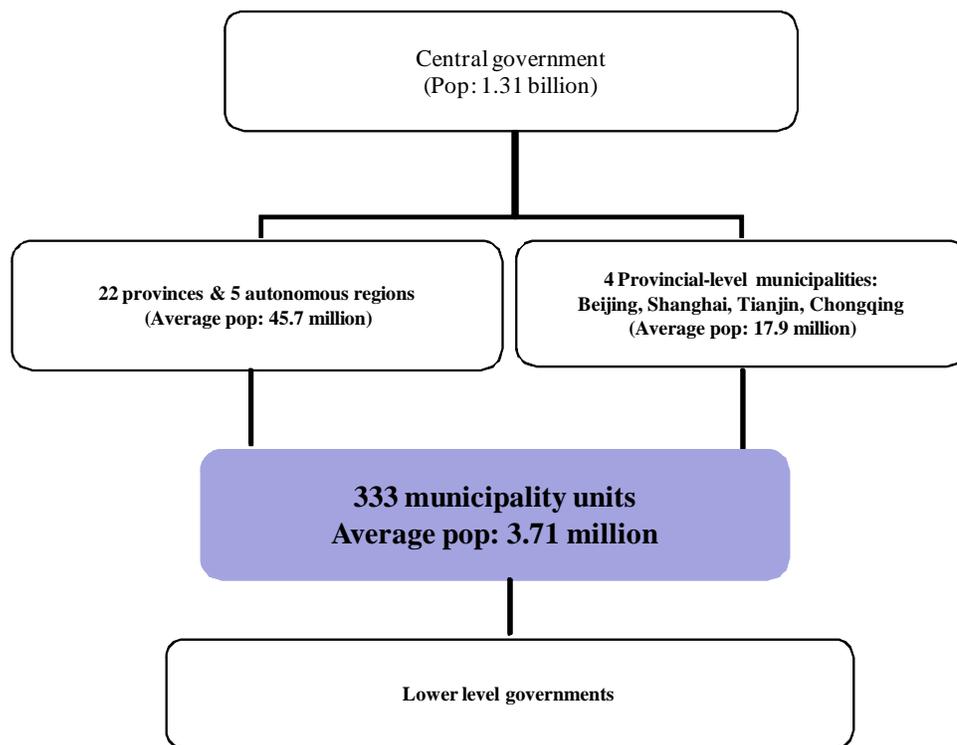
Data Appendix

This appendix provides information (supplementary to that in Section 2.2) on the variables used in this paper.

Sample of Municipalities:

The dataset includes 326 municipalities of 31 provinces in China. I combine Fuyang and Bozhou in Anhui Province into one municipality, and Baicheng and Songyuan into one municipality, due to statistical availability. I omit Laibin and Chongzuo of Guangxi Province since they were only established in the early 2000s. Due to statistical availability, I treat Tibet as a big municipality.

Government Organization Structure in China, 2005



Statistical Source:

1. 30th anniversary of opening up Reform statistical books 1978-2008 (Beijing, Chongqing, Fujian, Gansu, Guangdong, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Neimeng, Shandong, Shanghai, Shanxi, Sichuan and Tianjin).

2. 50th anniversary of People's Republic of China (1949-1999) statistical yearbooks (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hunan, Jiangsu, Jiangxi, Liaoning, Neimeng, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan, Zhejiang Province).
3. Province statistical yearbooks (1980s,1990s,2000s).
4. China city statistical yearbooks (1985-2008).
5. China city 50 years (1949-1999).
6. China regional statistical yearbooks (2000-2008).
7. China custom statistics (1994-2008).
8. Municipal statistical bureau website.
9. Tien-Tung Hsueh and Qiang Li (eds.) (1999), China's National Income: 1952-1995.
10. National Statistical Bureau, Data of Gross Domestic Product of China (1952-2004).

Growth Accounting Variable:

1. Deflator for GDP and Investment: Municipal GDP (investment) deflator

The statistical offices of most countries estimate real GDP by deflating nominal GDP using separate, independently constructed, price indices. However, this is not the procedure in China. Local statistical bureaus are called on to report the value of GDP in current and constant (base year) prices. The difference between the two series produces an implicit deflator, which is then used to deflate nominal value added. Based on GDP at current price and the GDP index at constant price (GDP index at 1978=100), I calculate the GDP deflator for most municipalities. For a few municipalities located in Gansu, Anhui, Shaanxi, Jilin and Liaoning Province whose municipal GDP indices are not available, I use the provincial GDP deflator as a proxy. This municipal deflator is for the first time applied to growth accounting work in China's studies and avoids measurement error by using the provincial deflator.

2. Real Physical Capital Stock

This is calculated based on the investment, investment deflator, depreciation rate and average geometric growth rate of investment. Following Caselli (2005), Caselli (2007) and Young (2003), the routine of calculating initial capital stock K_0 is $I_0/(\delta + g)$, Here, I use the initial investment in 1978 as I_0 , because complete investment series before 1978 are not available for most municipalities; Provincial 50 year statistics only reported investment data in 1952, 1962, 1970 and 1975, which makes imputing initial capital from 1952 inaccurate. δ is the depreciation rate set at 0.06, g is average geometric growth rate of investment between 1952 and 1978 for municipalities whose pre-1978 investment data are available, or the average geometric growth rate of investment between 1978 and 1980 for municipalities whose pre-1978 investment data are not available. Based on initial capital stock, investment series and GDP deflator, I get real capital stock in later years K_t using $K_t = K_{t-1} * (1 - \delta) + I_t/deflator$.

3. Labor and Human Capital

Labor (L): employment in the municipality, including the corporate and non-corporate sectors.

Human capital (H): Based on the Chinese Population Census 1982 and Young (2003), since the 1982 population census did not include municipal educational attainment statistics, I use provincial average years of schooling as proxy for municipal educational attainment. Following Hall and Jones (1999), this is turned into a measure of human capital in 1982 through the formula:

$$h = e^{\varphi(s)}$$

where s is average years of schooling, and the function.

$\varphi(s)$ is piecewise linear with slope 0.134 for $s \leq 4$, 0.101 for $4 < s \leq 8$, and 0.068 for $8 < s$. The rationale for this functional form is as follows: given our production function, perfect competition in factor and good markets implies that the wage of a worker with s years of education is proportional to his human capital. Since the wage-schooling relationship is widely thought to be log-linear, this calls for a log-linear relation between h and s as well, or something like $h = e^{\varphi_s * s}$. Based on population census and surveys of 1982,

1990, 1995, Young (2003) has estimated China's average LN human capital growth rate to be 0.011 from 1978-1995. I combine human capital in 1982 (based on population census 1982) and this growth rate to generate human capital series for all municipalities.

4. Labor and Capital share³³

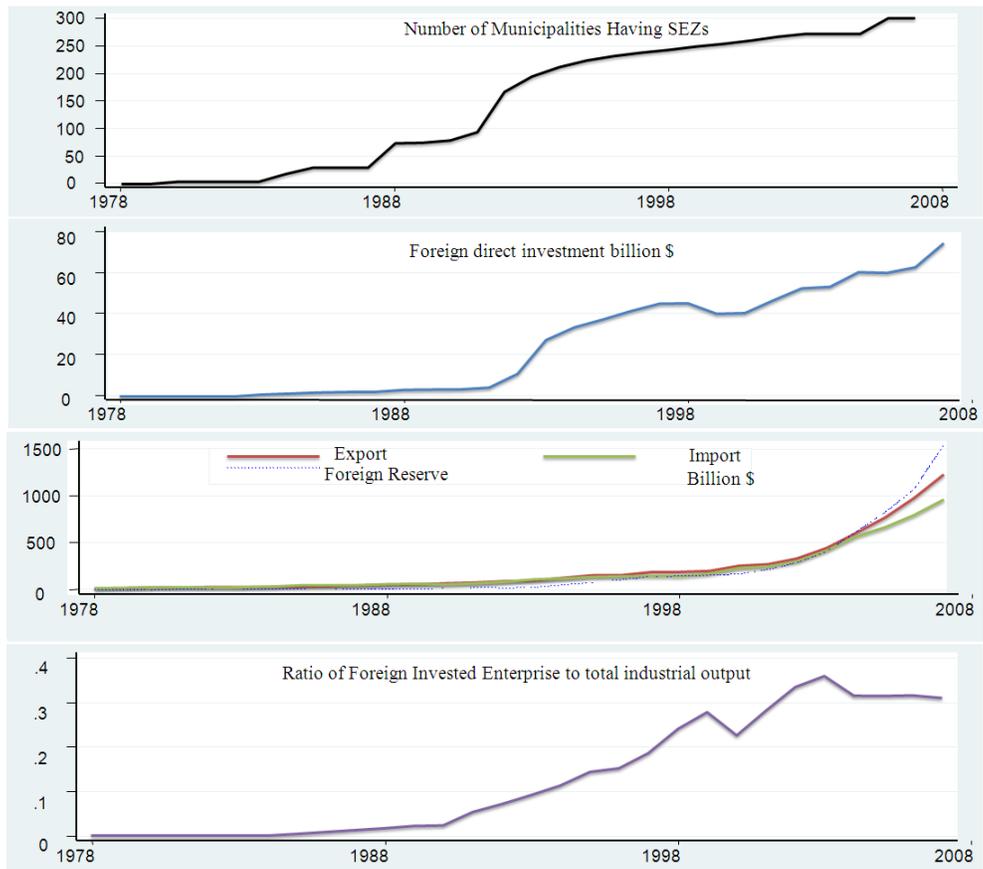
The most disaggregated GDP data Chinese official statistics provided using income approach is at the provincial level. There are four components including Compensation of Employees, Net Taxes on Production, Depreciation of Fixed Assets and Net Operating Surplus. I can directly measure α from the data, but I need to make some adjustments. I define the labor income share as unambiguous labor income divided by GDP net of the ambiguous categories (indirect taxes).

$$\text{Labor Share} = \frac{\text{Compensation of Employees}}{\text{GDP} - \text{Net Indirect Taxes}}$$

This procedure is equivalent to splitting the ambiguous categories between labor income and capital income in the same proportions as in the rest of the economy. The capital share, α , is then 1 - Labor Share. Since the income approach reports provincial statistics from 1978, I use the provincial capital share between 1978 and 2003 to be the capital share. I omit 2004 as there is a big change in the statistics on compensation of employees since 2004.

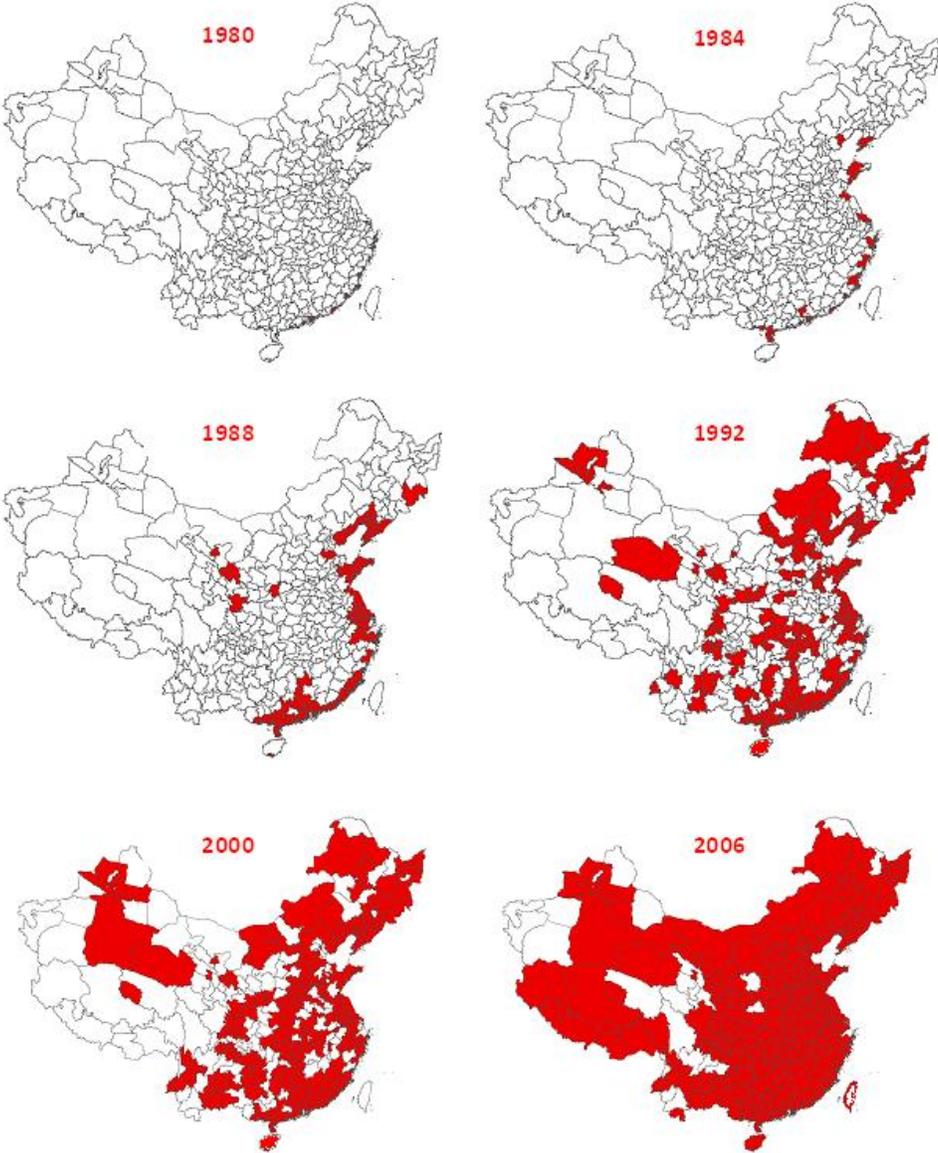
³³See Kehoe and Prescott (2007) and Holz (2006).

Figure 1: SEZs, FDI and Trade Outcome



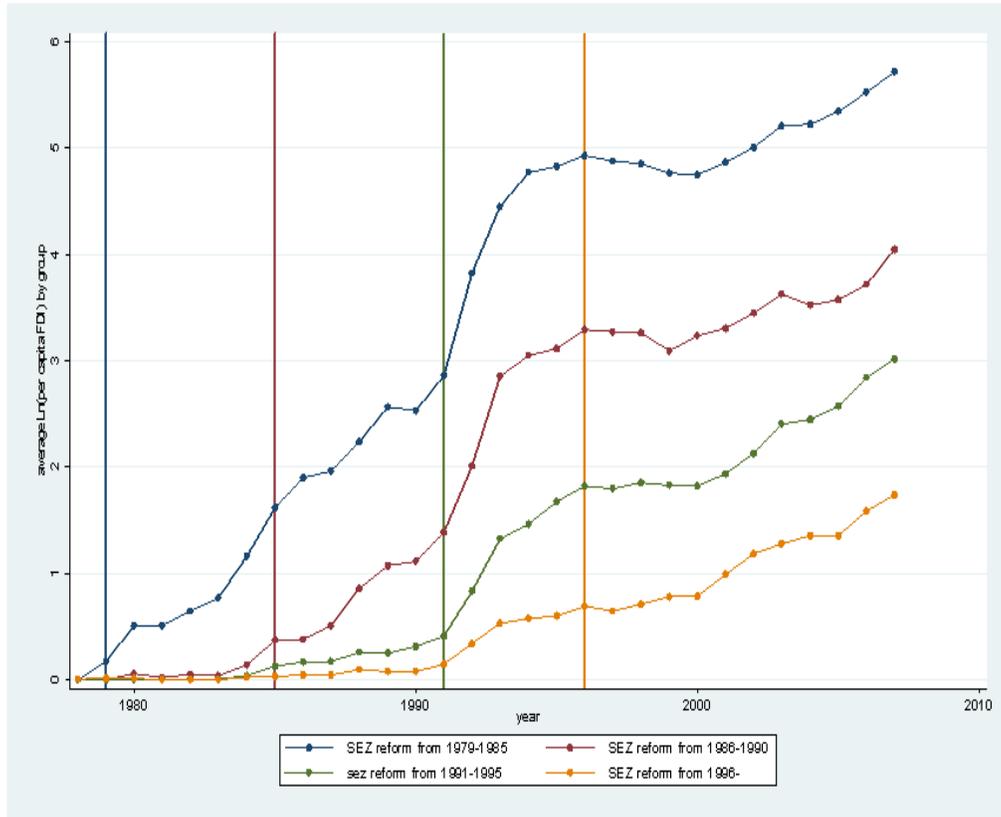
Note: the graph displays the significant correlation between the SEZ experiment and FDI outcome in China.

Figure 2: Geographic Evolution of the Special Economic Zone Experiment



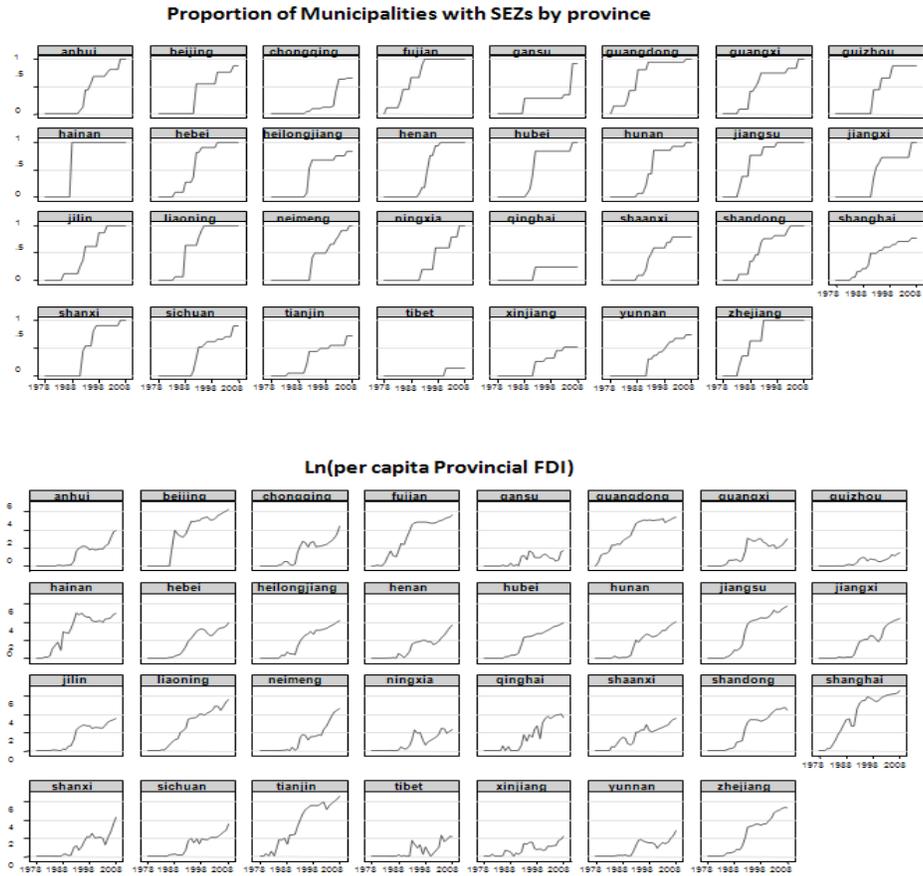
Note: if the whole municipality was granted the status of open economic area; or within the municipality, only a certain geographical area was allowed to establish state-level economic zones, or province-level economic zones, the municipality was entitled to use preferential policies (including property rights protection, tax breaks, cheaper land bills, etc.) to attract foreign direct investment. Therefore, I define the municipality to be a Special Economic Zone (SEZ) from a general prospective.

Figure 3: Difference-In-Difference Graph of the SEZs on FDI outcome



Note: 326 municipalities are classified into four groups based on their timing of carrying out the Special Economic Zone experiment. Group 1 is composed of municipalities which were exposed to the SEZ reform in the early 1980s (1980-1985); Group 2 is composed of municipalities which had the SEZ experiment in the late 1980s (1986-1990); Group 3 is composed of municipalities which had been granted the SEZ experiment in the early 1990s (1991-1995); Group 4 includes municipalities which had the SEZ reform since the late 1990s. The graph displays the sample mean of per capita FDI by year by group without controlling for any municipal characteristics and macroeconomic shocks.

Figure 4: SEZs and Provincial FDI



Note: the graph illustrates the proportion of municipalities with SEZs in each province and $\text{Ln}(\text{per capita provincial FDI})$. This is to address the concern that the FDI SEZs attracted at the municipal level comes from the diversion effect, i.e., redistribution of FDI across municipalities that have SEZs and those that have no SEZs (within the same province). There is a strong positive correlation between the proportion of municipalities with SEZs in the province and per capita provincial FDI, which should be null if it is merely a diversion effect.

Table 1: The Granting Sequence of SEZs

Variables	1978	1979-1985	1986-1990	1991-1995	1996-2007
1. Number of municipalities newly granted SEZs	0	30	49	145	76
2. Number of municipalities with SEZs	0	30	79	224	300
3. Total Number of municipalities	326	326	326	326	326
4. Ratio of municipalities with SEZs	0.0	0.09	0.24	0.69	0.92
5. Average Distance to the coast (in 100 miles)	-	0.15	1.34	3.75	6.26
6. Average per capita industry output in 1978 (in RMB)	-	806	611	429	263
7. Average per capita number of secondary students in 1978 (in person)	-	0.064	0.060	0.066	0.057

Notes: Based on the timing of experimenting with SEZs, the sample is classified into four groups. Average Distance to the coast, average per capita industry output in 1978 and average per capita number of secondary students in 1978 measure geographical location, industrial condition and human capital, based on which the State-council of China authorized some municipalities to establish SEZs in earlier years.

Table 2: Sample Descriptive Statistics

Variables	Number of Observations	Beginning of Available data	End of Available data
a. SEZ experiment			
Special Economic Zone Index	9778	0.00 (0.00)	0.92 (0.27)
b. FDI related outcome			
FDI per capita (US dollar)	9755	0.00 (0.03)	82.79 (162.38)
Exports per capita (US dollar)	9733	2.34 (17.59)	811.60 (2892.22)
FIE industrial output per capita (RMB)	3667	26.16 (232.98)	9930.44 (26940.67)
c. Growth accounting data			
RealGDP per capita (RMB)	9771	389.16 (314.11)	6467.79 (6242.15)
Domestic capital stock per capita	9677	355.96 (890.33)	13691.16 (11257.42)
Foreign capital stock per capita	9667	0.00 (0.04)	1295.41 (2834.58)
Labor (10,000)	9779	126.2 (112.95)	220.08 (174.88)
Average schooling year in 1982	325	5.12 (0.78)	

Notes: Robust standard errors in parentheses. Special Economic Zone index is a dummy variable which indicates whether or not the municipality carried out the SEZ experiment. Detailed construction procedure is described in Section 2.2.

Table 3: Propensity Score Matching: Nearest Neighbor Approach

a. Probit Regression Results	
Variable	Coefficient (std. error)
Industry output78 (in RMB)	0.0006*** (0.0002)
Secondary student78 (in person)	-3.0710 (3.3481)
Distance (in 100 miles)	-0.0930*** (0.0197)
Log Likelihood	-204.11
Pseudo R-squared	0.096
Number of Obs.	326

Notes: Robust standard errors in parentheses. * denotes significant at 10%, ** significant at 5% and *** significant at 1%. Industry output78 denotes the per capita industrial output in 1978; Secondary student78 denotes per capita enrolled secondary school students in 1978; Distance denotes the distance to the nearest coast.

b. Comparison Before and After Matching							
Variable	Sample	Mean		Percent Bias	Reduction in bias	t-test	
		Treated	Control			t	p> t
Industry output78 (in RMB)	Unmatched	565.26	307.43	46.0		4.13	0.000
	Matched	565.26	595.22	-5.3	88.4	-0.42	0.672
Secondary student78 (in person)	Unmatched	0.064	0.060	15.8		1.43	0.153
	Matched	0.064	0.065	-3.8	76.0	-0.34	0.734
Distance (in 100 miles)	Unmatched	2.69	5.06	-60.1		-5.44	0.000
	Matched	2.69	2.91	-5.7	90.4	-0.64	0.526

Notes: Matched denotes the case after propensity score matching is done; Unmatched denotes the case before propensity score matching is done. Treated denotes the group of municipalities which had carried out the SEZ experiment by 1992; Control denotes the groups which carried out the SEZ experiment after 1992.

Table 4: Step One: the SEZ Experiment on FDI Outcome

Panel A	Ln(foreign direct investment per capita)				
	(1)	Full Sample (2)	(3)	Matched Sample	Later SEZ Sample
SEZdummy	0.723*** (0.079)	0.478*** (0.056)	0.460*** (0.053)	0.434*** (0.061)	0.355*** (0.061)
Municipality FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province Trend	-	Yes	-	-	-
Municipality trend	-	-	Yes	Yes	Yes
Observations	9772	9772	9772	7405	7404
R-squared	0.761	0.845	0.891	0.898	0.845
Panel B	Ln(exports per capita)				
	(1)	Full Sample (2)	(3)	Matched Sample	Later SEZ Sample
SEZdummy	0.871*** (0.098)	0.719*** (0.080)	0.608*** (0.082)	0.595*** (0.096)	0.531*** (0.092)
Municipality FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province Trend	-	Yes	-	-	-
Municipality trend	-	-	Yes	Yes	Yes
Observations	9733	9733	9733	7391	7376
R-squared	0.833	0.877	0.922	0.927	0.898
Panel C	Ln(Industrial output of foreign invested enterprises per capita)				
	(1)	Full Sample (2)	(3)	Matched Sample	Later SEZ Sample
SEZdummy	0.307** (0.137)	0.275** (0.124)	0.497*** (0.128)	0.525*** (0.130)	0.375** (0.184)
Municipality FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province Trend	-	Yes	-	-	-
Municipality trend	-	-	Yes	Yes	Yes
Observations	3667	3667	3667	3055	2604
R-squared	0.906	0.922	0.943	0.946	0.935

Notes: Robust standard errors in parentheses. Standard errors are adjusted for clustering at municipality level. * denotes significant at 10%, ** significant at 5% and *** significant at 1%. Panel A evaluates the effect of the SEZ experiment on per capita FDI; Panel B examines whether the SEZ experiment promotes trade; Panel C checks the industrial output by foreign invested enterprises.

Table 5: Step One: Robustness Check A

Variable	Placebo Test		
	Panel A Ln(per capita FDI)	Panel B Ln(per capita exports)	Panel C Ln(per capita FIE output)
SEZ(-2)	-0.00594 (0.0395)	0.0395 (0.0591)	-0.123 (0.108)
SEZ(-1)	0.0464 (0.0470)	0.125* (0.0696)	0.0215 (0.163)
SEZ(+0)	0.150*** (0.0562)	0.354*** (0.0871)	0.205 (0.210)
SEZ(+1)	0.376*** (0.0678)	0.507*** (0.101)	0.631*** (0.201)
SEZ(+2)	0.445*** (0.0734)	0.630*** (0.112)	0.466* (0.250)
SEZ(3+)	0.880*** (0.0834)	1.024*** (0.123)	0.765*** (0.254)
Municipality FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Municipality trend	Yes	Yes	Yes
Observations	9772	9733	3667
R-squared	0.897	0.925	0.944

Notes: Robust standard errors in parentheses. Standard errors are adjusted for clustering at municipality level. * denotes significant at 10%, ** significant at 5% and *** significant at 1%. SEZ(+n) are dummies denoting n years after the SEZ experiment.

Table 6: Step One: Robustness Check B

Test for the Diversion Effect			
Panel A	Ln(foreign direct investment per capita)		
	Full Sample	Matched Sample	Later SEZ Sample
SEZdummy	0.452*** (0.052)	0.429*** (0.060)	0.352*** (0.061)
OtherSEZ	-0.271*** (0.043)	-0.319*** (0.054)	-0.141*** (0.035)
Municipality FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Municipality trend	Yes	Yes	Yes
Observations	9772	7405	7404
R-squared	0.892	0.899	0.845
Panel B	Ln(exports per capita)		
	Full Sample	Matched Sample	Later SEZ Sample
SEZdummy	0.600*** (0.081)	0.591*** (0.095)	0.529*** (0.092)
OtherSEZ	-0.255*** (0.047)	-0.278*** (0.060)	-0.089** (0.042)
Municipality FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Municipality trend	Yes	Yes	Yes
Observations	9733	7391	7376
R-squared	0.923	0.927	0.898
Panel C	Ln(Industrial output of foreign invested enterprises per capita)		
	Full Sample	Matched Sample	Later SEZ Sample
SEZdummy	0.491*** (0.127)	0.519*** (0.129)	0.378** (0.184)
OtherSEZ	-0.630*** (0.150)	-0.747*** (0.181)	-0.248 (0.159)
Municipality FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Municipality trend	Yes	Yes	Yes
Observations	3667	3055	2604
R-squared	0.944	0.946	0.935

Notes: Robust standard errors in parentheses. Standard errors are adjusted for clustering at municipality level. * denotes significant at 10%, ** significant at 5% and *** significant at 1%. Panels A, B and C evaluate the creation effect and diversion effect of the SEZ experiment on per capita FDI, trade and industrial output by foreign invested enterprises respectively. The coefficient of SEZdummy captures the creation effect. The coefficient of OtherSEZ dummy variable captures the diversion effect.

Table 7: Step Two: SEZs on Domestically Owned Capital Formation

Panel A	Ln(Real Domestic Investment)				
	Full Sample			Matched Sample	Later SEZ Sample
	(1)	(2)	(3)		
SEZdummy	0.044 (0.044)	-0.048 (0.039)	0.067** (0.033)	0.087** (0.037)	-0.017 (0.040)
Municipality FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province Trend	-	Yes	-	-	-
Municipality trend	-	-	Yes	Yes	Yes
Observations	9732	9732	9732	7364	7399
R-squared	0.931	0.942	0.960	0.961	0.960
Panel B	Ln(Real Domestically Owned Capital Stock)				
	Full Sample			Matched Sample	Later SEZ Sample
	(1)	(2)	(3)		
SEZdummy	0.027 (0.038)	0.012 (0.033)	0.067*** (0.022)	0.078*** (0.025)	0.023 (0.025)
Municipality FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Province Trend	-	Yes	-	-	-
Municipality trend	-	-	Yes	Yes	Yes
Observations	9669	9669	9669	7301	7379
R-squared	0.958	0.967	0.986	0.986	0.986

Notes: Robust standard errors in parentheses. Standard errors are adjusted for clustering at municipality level. * denotes significant at 10%, ** significant at 5% and *** significant at 1%. Panel A checks the effect of the SEZ experiment on domestically owned investment; Panel B checks the effect of the SEZ experiment on domestically owned capital stock.

Table 8: Step Three: SEZs on TFP Growth

	TFP Growth					
	K share=provincial average		K share=national average		K share=1/3	
	(1)	(2)	(3)	(4)	(5)	(6)
SEZdummy	0.035*** (0.002)	0.006** (0.003)	0.034*** (0.002)	0.006* (0.003)	0.035*** (0.002)	0.007** (0.003)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	-	Yes	-	Yes	-	Yes
Observations	9440	9440	9440	9440	9440	9440
R-squared	0.071	0.132	0.072	0.132	0.074	0.136

Notes: Robust standard errors in parentheses. Standard errors are adjusted for clustering at the municipality level. * denotes significant at 10%, ** significant at 5% and *** significant at 1%. In Columns (1) and (2), I use the most disaggregate capital share available, i.e., province level average capital share; in Columns (3) and (4), I use Young's (2003) national average capital share; in Columns (5) and (6), I use the international benchmark capital share as in Caselli (2005).