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Induced Foreign Capital and Economical Impact through China's Pilot Free Trade Zones to Mainland

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Abstract

Based on panel data between 2012 and 2016, this article compares two groups of samples, which we call experimental group and controlling group, according to whether there are FTZs located. FTZ is natured by high institutional standards, facilitate trade and investment, financial innovation and open service. We empirically examine effect of FTZs on foreign direct investment. We find obvious and positive effect of consumption pull, element agglomeration and trade-driven. Regulatory innovation fosters market vitality with less reliance on government financing. However, phenomenon of "finance deviates from the real economy" and "net capital outflow" weaken pilot FTZ's attraction to overseas capital. More domestic capitals flow into FTZ to avoid risks caused by institutional regulation. Imported electronic business should be limited by government because it heavily squeezes out local business. Financial innovation in FTZ should better support regional industrial development.

Keywords: Pilot FTZs, FDI, trade-driven effect, consumption-pull effect

1. Introduction

Since the financial crisis, the world's economic recovery has been slow, and countries have tried to seek a new path to stimulate economic and employment growth. With the rise of China, the Obama administration has advocated the return to the Asia-Pacific region, consulting with the European countries and Pacific Rim countries to form the Trans-Pacific Partnership Agreement (TTP), the Trans-Pacific Trade and Investment Partnership (TTIP) in order to contain China. This series of agreements involve high standards of investment rules. It is difficult for China to achieve its open standards in the short term, triggering domestic concerns on TTIP trade transfer from china to TTIP member nations, which will weaken China's "powerful manufacturing status". To this end, China has experienced a strategy development from the Free Trade Zone→Export Processing Zone→Bonded Zone→Bonded Logistics Park→Bonded Port Area→Comprehensive Bonded Zone→Pilot Free Trade Zone. Since 2015, China has established national FTZ strategy, approving to set up pilot free trade zones in Shanghai, Tianjin, Fujian and Guangdong. In 2016, seven new pilot free trade zones were set up in Liaoning, Zhejiang, Henan, Hubei, Chongqing, Sichuan and Shaanxi to explore the establishment of high standard investment rules, which provided replicable experience and reference for deepening reform and opening up.

So what's the difference of Chinese Pilot FTZ and traditional FTZ? What tasks are beard by PFTZ? How the PFTZ induce overseas capital and what their impact on inland economy? We will discuss these problems in four sections. In the second and third section we analyze attraction of Chinese PFTZ towards overseas capital as well as their industrial Siphon and Competitive Effect. In the fourth section, we quantitatively exam the impact of PFTZ business environment on capital inflow as well as their economical influence on inland China. And further, we propose some political suggestion in the last section.

2. The Status of China's Pilot Free Trade Zones Attracting External Capital

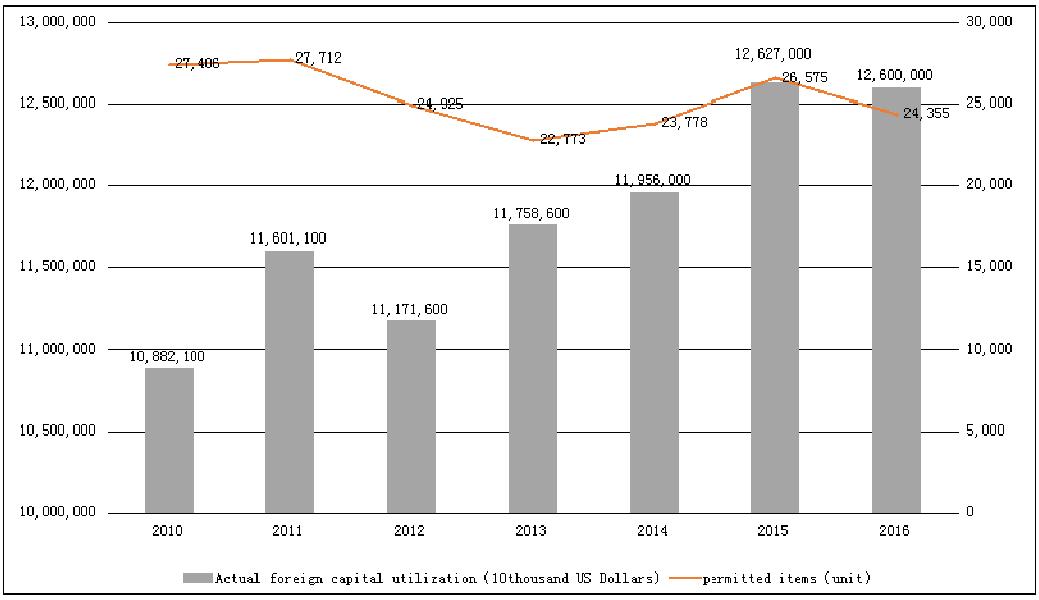

Figure 1. National permitted items and actual foreign capital utilization in 2010-2016

Data source: China National Statistical Bereave. Source: National Bureau of Statistics.

In the early days of the twelfth five years (2011-2015), the number of foreign-invested enterprises and the amount of foreign investment attracted by China were affected by the financial crisis, continuing to decline. Since 2013, when Shanghai Pilot Free Trade Zones established, the number of foreign-invested enterprises and registered capital growth-rate shaped by "V" reversal (see Figure 1). In the first industry and secondary industry, number of foreign-invested companies decreased annually by 2.2% and 3.1%, and registered capital increased annually by 9.1% and 5.4% respectively. The number of foreign-invested enterprises and registered capital in the tertiary industry increased by 4.9% and 17.7% seperately. In largest four major areas where foreign capital agglomerated, say financial industry, wholesale and retail trade, technical services, leasing and business services, foreign enterprises increased by 16.2%, 11.3%, 10.2% and 7.8% respectively in numbers, while registered capital increased by 30.5%, 22.7%, 18.7% and 29.7% (Note 1). In the first half of 2016, the service sector accounted for 94.39% in the total foreign investment in Shanghai; the Shanghai Free Trade Zone accounted for 65.9% in the foreign contractual amount and occupied 53.9% in added foreign investment projects (see Figure 2 and Figure 3). Obviously FTZs drive agglomeration of servicing capital (especially financial capital).

Four pilot free trade zones, natured by facilitation and convenience in investment and trade, efficient supervision, and transparent legal system, have remarkably attracted investors with optimistic anticipation. Foreign investment projects and amount increase significantly in Guangdong PFTZ formed in December 2014 and Shanghai PFTZ established in September of 2013, resulting radiation effect on the regional economy and inductive effect on external capital. PFTZ occupies 51.7%, 59.31% and 58.05% respectively in national numbers of newly established foreign-funded enterprises, approved foreign-funded projects and the actual utilization of foreign capital in 2015 (see Table 1). In 2016, the four free trade zones actually used 87.96 billion yuan of foreign investment, increased by 81.3%, accounting for 10.8% of the whole country (Note 2).

Table 1. Percentages of approved foreign investment projects and actual utilization of foreign capital in places where Pilot Free Trade Zones located (Unit: %)

Year	Percentages of approved foreign investment projects					Percentages of actual utilization of foreign capital				
	Guangdong	Fujian	Tianjin	Shanghai	Nation	Guangdong	Fujian	Tianjin	Shanghai	Nation
2010	21.97	4.16	2.16	14.25	100	19.32	9.48	9.97	10.22	100
2011	26.30	3.75	2.29	15.62	100	19.25	9.52	11.25	10.86	100
2012	25.13	3.68	2.54	16.22	100	21.58	10.91	13.44	13.59	100
2013	25.21	3.69	2.48	16.42	100	21.54	5.68	14.31	14.27	100
2014	25.97	4.39	2.83	19.75	100	22.81	5.95	15.78	15.19	100
2015	26.46	6.36	3.89	22.60	100	21.40	5.29	16.74	14.62	100
2016	33.17	9.67	-	21.16	100	20.57	-	-	16.27	100

Description: (1) Do the summary calculation according to the "Statistical Yearbook", "National Economic and Social Development Statistical Bulletin", etc. released by the local Bureau of Commerce, the Commerce Committee and the Bureau of Statistics. (2)"-" indicates data's defect.

There are differences in the structure of attracting foreign investment for the zones. Shanghai PFTZ attracts mostly Hong Kong-based capital, mainly concentrating in the wholesale and retail and business services. At the beginning, trade and service enterprises account for 95% of the new enterprises in the zone. As of the first half of 2016, the zone has added 6046 foreign investment projects; attracted foreign investment of 66.907 billion US dollars, accounting for 53.56% of the whole city. In 2016, Shanghai owned 18.514 billion US dollars of actual foreign capital, accounting for about 15% of the country (Note 3). Guangdong PFTZ mainly attracts Hong Kong and Macao capital especially in financial and business services. In the period from 2015 to 2016, there had been more than 5900 foreign-invested enterprises newly set in Guangdong PFTZ, in which Hong Kong-owned enterprises accounted for nearly 80%. Overseas capital of US$ 73.747 billion accounting for 51.63% of the whole province flows into the zone (Note 4). The foreign capital of Tianjin free trade zone focuses on the leasing industry. From 2015 to the first half of 2016, Tianjin Free Trade Zone has set up 1119 new foreign-funded enterprises, and the actual foreign investment is 6.04 billion US dollars, accounting for 22.92% of the actual absorption of foreign investment in Tianjin. In the first half of 2016 alone, the financial leasing industry realized a foreign investment of US$ 1.38 billion, accounting for 23% of the zone in the same period (Note 5). In Fujian Free Trade Zone, Taiwan-funded enterprises' agglomeration is obvious. From January 2015 to May, the number of new foreign-invested enterprises is 146, accounting for 71.57% of the province, in which the number of Taiwan-funded enterprises is 87, accounting for 59.56% (Note 6). It is clear that attracting productive service capital's agglomeration to promote the manufacturing industry is one of the strategic objectives for the FTZ. As the establishment period of free trade area is short, FTZ is still based on geographical advantages and policy advantages to attract the capital agglomeration of Hong Kong, Macao and Taiwan, while the inductive effect on the long-range countries is not obvious.

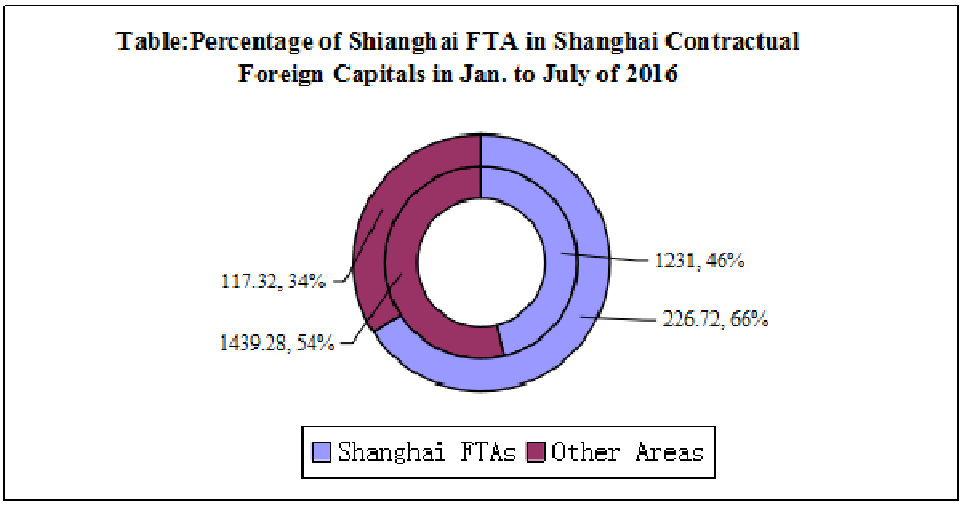

Figure 2. The distribution of new foreign-funded projects number and contract amounts in Shanghai in the first half of 2016

Description: Outer Circle: New foreign-funded Contract Amounts (100 million US Dollars); Inner Circles: New Foreign-funded Project numbers.

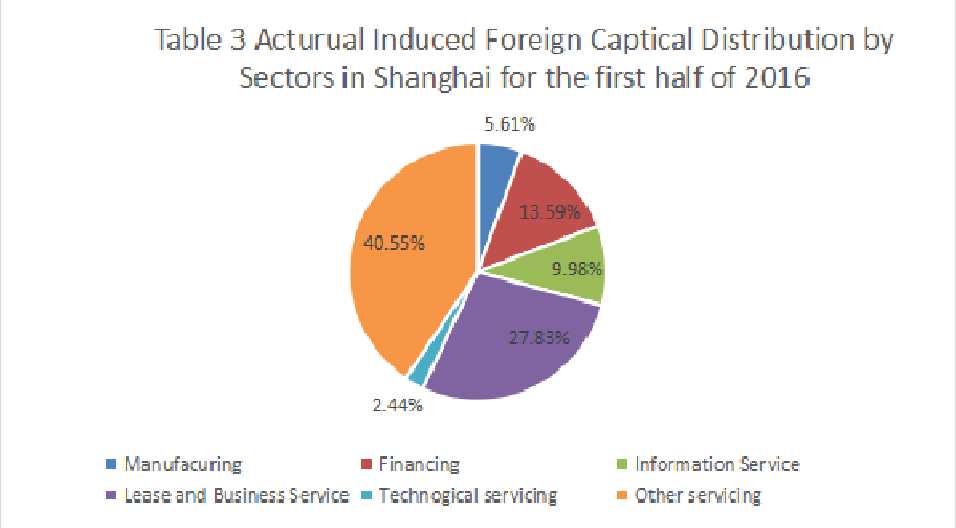

Figure 3. The actual FDI's industry distribution map of Shanghai in the first half of 2016

Considering security and political independence, China imposes strict restriction in 13 capital projects (Note 7). Since joining the World Trade Organization (WTO) in 2001, China has benefited from financial regulation and successfully developed an export-oriented economy with an average annual GDP growth of 10%. Foreign exchange reserves rose from $220 billion to $3.88 trillion in 2013, three times that of Japan. But the increase in foreign exchange reserves means that liabilities also increase. In recent years, the country put more money into the economy, leading possibly to inflation and asset prices rising. As the world's second largest economy, it becomes a trend for China to open capital account and achieve the marketed interest rate and exchange rate. But the 1997's Asian financial crisis showed that the blind implementation of financial liberalization in the absence of risk prevention is dangerous. PFTZ was established in this context, bearing the task of institutional reform and aiming at innovation through institutional mechanisms to promote financial openness, trade and investment facilitation, to build a transparent, open, simple and standardized business environment. The reform of the Free Trade Zone has provided the path and opportunity for overseas enterprises to avoid the institutional barriers in mainland China and to enter the Chinese market. With the help of measures of investment facilitation in the zone, enterprises can not only facilitate customs clearance, but also open up domestic and foreign financing channels to achieve global capital allocation and reduce production and circulation costs. Fujian FTZ upgrades "single

window", so the declaration time reduces from 4 hours to 5 to 10 minutes, the ship entry declaration time from 36 hours to 2.5 hours, departure time from 36 hours to 1 hour, greatly improving the efficiency of customs clearance. The FTZ becomes an alternative to the Bilateral Investment Treaty and is the preferred choice for multinationals to invest overseas based on its specific location advantages.

3. Analysis on the Siphon Effect and Competitive Effect of Industry's Opening in Free Trade Zone

Attracting productive service companies to agglomerate is one of the main objectives of the FTZ. According to the definition of UNCTAD (20115), productive service companies mainly include design, research and development, transportation, insurance, finance, information and other services related to goods manufacturing, and they are an important source of profit and value-added end. Fulvio (2014) pointed out that the companies with higher knowledge content face higher relation distance cost and favor FDI strategy to achieve a high return through getting close to the served object to facilitate service provision and innovation. Davies and Guillin (2014) emphasized that productive service companies favor areas with low-cost and highly-skilled factors. China's free trade zones open derivatives services, innovate e-commerce, financial leasing, shipping insurance and other service type, and make use of E-Commerce to simplify government processes, facilitate trade and do other investment initiatives which are conducive to eliminating information barriers, reducing cost in connection with Guanxi construction, knowledge access, commodity circulation, which greatly attract external service capital to inflow.

Due to the small number, small scale, low professional and technical level and low operational capacity, it is difficult for China's ship management enterprises to take the important task of building an international shipping center. In 2013, the Shanghai Free Trade Zone allowed foreign-owned enterprises to set up ship management enterprises. In 2015, the world's largest ship management company V-SHIP set up a wholly owned subsidiary-Shanghai Wei Lion Shipping Management Co., Ltd. in the Shanghai Free Trade Zone, which will help to form a siphon effect, attracting up-and-down stream enterprises into the zone, and effectively promote the development of the shipping industry. In 2013, the State Council allowed foreign investors to set up medical institutions in Shanghai Free Trade Zone. In July 2014, Germany Artemed Group (Note 8) and Yinshan Capital (Note 9) set up Artemed Hospital in Shanghai Free Trade Zone. In June 2016, the pharmaceutical giant Novartis spent $1 billion in building the world's third largest research and development center in the Pudong Zhangjiang Hi-Tech Park, which is China's largest pharmaceutical research and development platform. It can be expected that the entry of numerous foreign medical institutions will break monopoly in domestic medical industry, promoting reform of pharmaceutical procurement mechanism, and forcing the government to address such international docking problems as the registration of foreign doctors, the introduction of high-end equipment, international medical insurance. To June 2016, Shanghai has set up 558 regional headquarters of multinational companies, including 49 Asia Pacific headquarters; established 320 investment companies; accumulatively certified 402 research and development centers, in which the world's top 500 enterprises' R&D centers accounted for 1/3 (Note 10).

Qianhai accelerates institutional cooperation between Guangdong and Hong Kong in the financial and insurance fields, further deepens CEPA, allowing attracting foreign capital to jointly set up financial institutions by using geographical advantages of being adjacent to Hong Kong, the "special zones in SAR" and favorable policy. Hang Seng Bank (Note 11) (70% share) and Shenzhen Qianhai Holding Co., Ltd. (30% share) jointly set up public fund companies. The government leads construction of common service platform and promotes enterprises in the free trade zone to issue 1 billion yuan bonds in Hong Kong, which get access to 12 times the overseas subscription funds. To June 2016, there have been more than 45000 financial enterprises, ranking first in the service sector.

Financial leasing business, which is innovated by the Tianjin FTZ first, has now become an important model for the major free trade zones to raise funds and promote the economic development. To August 2014, the Shanghai Free Trade Zone has added 124 new financial leasing companies and 161 SPV companies; has added 32.3 billion yuan of new registered capital, attracted CALS, Haier, Everbright, China Communications Construction and others at home and abroad to settle. Tianjin Dongjiang Free Trade Zone accounted for 1/4 in the scale of the national financial leasing business in which light ship, machine projects accounted for more than 80%, so that agglomeration effect is significant. Guangdong FTZ set up 90 million yuan fund to attract 700 financial leasing enterprises to settle in the Qianhai. Fujian FTZ used the financial leasing business to help the medical equipment operators reduce the cost and upgrade over 8600 private hospitals.

In 2016, the State Council decided to suspend implementing Catalog for the Guidance of Industries for Foreign Investment within the four pilot free trade zones, and allowed foreign wholly-owned investment in steel production enterprises, performing brokerage agencies, international shipping enterprises, entertainment, salt

wholesale institutions and air transport sales agents, suspended restriction on foreign investment in grain purchasing, grain and cotton wholesale, the construction and operation of large-scale agricultural products market, and lessen regulation on aircraft maintenance. In January 2017, the State Council issued Notice of Several Measures to Expand Opening-up and Actively Use Foreign Capital, further liberalizing foreign investment in finance, Internet, telecommunications and cultural industries, and required the combination of relaxation and control, improving the business environment and reducing the institutional transaction costs.

Industry's opening-up attracts a group of world giants to invest in China, inevitably forming the crowding-out effect on the domestic enterprises. But at the same time it also attracts enterprises in upstream and downstream to settle, forming siphon effect, market competition effect, knowledge spillover effect, then promoting restructuring and upgrading of the local enterprises.

4. Empirical Test of Impact of New Business Environment on Capital Inflow in PFTZs

The production, infrastructure, legal and other factors within the FTZs are significantly better than those of other regions. Relying on the huge and rapid growth of the market size in the hinterland, abundant labor supply, perfect infrastructure, and unique geographical location, FTZs have greater advantages over other regions and have become the preferred location for multinational investment (Shahm, 2009). Companies use the FTZs to get global resources and supply chain network and use FTZs as a platform to achieve global marketing strategies. They invest in FTZs in different economic regions to effectively avoid institutional barriers from the host country, reduce production and distribution costs and gain a competitive advantage (Seyoum & Ramirez, 2012). Qu Tao, Luo Man (2017) compared and studied the characteristics of the regulation reform of China's four major free trade zones from four aspects: government facilitation, investment facilitation, trade facilitation, financial innovation and service's opening-up. It is found that the reform of FTZs is aimed at the company rather than the goods. Although the FTZs have effectively promoted the regional economic development, there are still problems such as lack of investor protection system, lack of commercial coordination and mutual assistance, fragmentation of management and unstableness of financial openness policy. The key to attracting foreign direct investment is to further relax entry standards for foreign capital, strengthen international regulatory cooperation and create a more equitable, transparent and predictable environment for foreign investment.

Different from the international free trade zones, China's four major free trade zones not only have the "inside frontier while beyond customs barrier" features, but also bear the "financial innovation" function. Under the strict financial control in China, what impact does the uniqueness of the free trade zone have on the capital agglomeration? This part tries to test the influence of the improvement of the business environment of the FTZ on the decision-making of foreign investment, in order to find the utility factors which play the key role. According to the definition of the OECD, the so-called foreign direct investment (FDI) refers to the companies or subsidiaries which hold more than 50% of the voting power, or associates who hold 10%-50% of the voting rights, or quasi-corporations who hold 10% of the voting rights. The purpose of direct investment is to establish a long-term relationship with the target enterprise, or to influence the control right of the target enterprise.

4.1 Variables' Selection, Definition and Their Economic Implication

Cai Yi, etc. (2009) introduced six factors in the attracting investment model: regional GDP, export value, income tax of foreign-owned enterprises, wage level, total retail sales of social consumer goods and government expenditure on science and technology. It was found that corporate taxation was the main factor affecting Fujian's attracting investment. The study of Bai Jinhui (2015) showed that the impact of market size, economic solvency and the development of tertiary industry on China's attracting foreign investment is significantly positive, and the impact of wage level on the scale of investment is significantly negative. Based on the study of such seven factors as wage level, scale of economy, convenience of transportation, FTZ's area, government scale, degree of industrialization and openness degree of trade, Ye Xiuqun (2015) confirmed that the Free Trade Zone would help attract foreign direct investment.

This study takes the FTZ as important change factor under business environment. Taking into account the radiation effect of the FTZ on the regional economy, we take the provinces or municipalities as the research samples to further distinguish the regional samples with FTZ (as control group) and the regional samples without FTZ (as experimental group). This paper studies the inductive effect and their influencing factors of the two sample groups, and further tests the agglomeration effect of the service industry, the expansion effect of market scale, the trade driving effect, the consumption pulling effect and the inductive effect of foreign capital. Considering limited data scale for newly borned PFTZs, we use quarterly data of 2012-2016, applying ΔFDI as the independent variable, ΔCDE, ΔGDP, ΔSIA, ΔTRC as the independent variables, and RRN, ROF as the control variables. The definition and the economic connotation of each variable and the expectation of inductive

effect of foreign capital are shown in Table 2.

Table 2. Definition of variables and their economic connotations

Variables	Definition of variables	Economic connotations	Expectation
Dependent variable			
ΔFDI	Refers to the quarterly change in the actual payment amount of foreign direct investment contract relative to the previous quarter.	Reflects the dynamic changes of overseas capital stationed in China. If the indicator is positive, it indicates that external capital injection increase; if the indicator is negative, it indicates that external capital injection decrease, and may even have foreign capital outflow.	/
Independent variable			
ΔCDE	Refers to the quarterly changes in the number of regional consumption of wholesale and retail, catering, clothing, daily necessities and others relative to the previous quarter.	Reflects the inductive effect of regional consumption on foreign direct investment. It is generally believed that the faster the expansion of regional consumption, the greater the gravity of external capital.	+
ΔGDP	Refers to quarterly changes in the region's GDP relative to the previous quarter.	Reflects the inductive effect of the regional economic level on foreign direct investment. It is generally believed that the faster the regional economic growth, the greater the gravity of external capital.	+
ΔSIA	Refers to the changes in proportion of the tertiary industry in the total regional output compared to the previous quarter.	Reflects the contribution of service industry to production and its inductive effect on external capital. It is generally believed that high-end service industry is conducive to driving capacity expansion, and then attracting external production capital; low-end service industry has small contribution to the production and its inductive effect on external capital is not significant.	+/-
ΔTRC	Refers to the change in proportion of total imports and exports in total regional output compared to the previous quarter.	Reflects the relationship between trade and investment. If the expansion of trade is conducive to investment growth, it indicates that there is a complementary relationship between the two. If the expansion of trade inhibited the investment growth, it indicates that there is an alternative relationship between the two.	+/-
Control variable			
ROF	Refers to the ratio of total regional output and regional fiscal expenditure in the previous quarter.	Reflects the extent to which regional output depends on financial capital. The higher the value, the higher the dependence of the regional economy on financial support is; the lower the economic activity, the worse the inductive effect on foreign investment is.	-

4.2 An Empirical Test on the Factors Affecting Foreign Capital's Inductive Effect

According to the availability of data, nine regions such as Anhui Province, Guangxi Zhuang Autonomous Region, Hainan Province, Hebei Province, Hubei Province, Jiangxi Province, Ningxia Hui Autonomous Region, Zhejiang Province and Chongqing Municipality were included in the sample group without FTZs in the study (control group). And Shanghai, Tianjin, Fujian Province, Guangdong Province were included in the sample group with FTZs (experimental group), a total of 13 samples. Use panel data from the first quarter of 2012 to the first quarter of 2016. During the period from 2012 to 2014, due to shortage, some data about foreign direct investment (FDI) in Fujian Province and Tianjin City were estimated through OLS regression between the two regional data and the national data. Since the numbers of individuals (n ≦ 13) of the experimental and control groups are both less than the time dimension (T = 16), the model is listed by the long panel data:

$$\Delta FDI_{it} = \alpha + \beta_1 \Delta GDP_{it} + \beta_2 \Delta SIA_{it} + \beta_3 \Delta CDE_{it} + \beta_4 \Delta TRC_{it} + \beta_5 \Delta ROF_{it} + \mu_{it}$$

4.2.1 Descriptive Statistical Analysis of Variables

Table 3. Descriptive statistical analysis

Variable's name	Total sample (13)			Sample group without FTZ(9)			Sample group with FTZ (4)		
	Observed values	Mean	Standard deviation	Observed values	Mean	Standard deviation	Observed values	Mean	Standard deviation
ΔFDI	208	0.308	11.00	144	0.35	10.12	64	0.20	12.85
ΔCDE	208	61.07	1492	144	53.1	1791	64	78.92	198.00
ΔGDP	208	105.6	4796	144	81.16	5613	64	160.5	2013.5
ΔSIA	208	0.006	0.17	144	0.0055	0.202	64	0.006	0.043
ΔTRC	208	-0.004	0.026	144	-0.0002	0.018	64	-0.01	0.037
ROF	208	5.352	3.01	144	4.95	3.41	64	6.25	1.49

Table 3 shows that for the three sample groups, the share change of trade in GDP (ΔTRC) is negative, indicating a decline in the overall contribution of trade to output. The ΔTRC's mean of the experimental group (sample group with FTZs) is smaller relative to the control group (sample group with no FTZs), suggesting that the contribution of the experimental group (sample group with FTZs) to the output decreases more, and FTZs are more qualified to make trade an alternative to investment. The economic growth (ΔGDP) and regional consumption scale (ΔCDE) of the experimental group (sample group with FTZs) are much higher than those of the control group (sample group with no FTZs) and the total sample, but the standard deviation is huge, suggesting that the FTZs effectively stimulate the regional economy and consumption growth, but the degree of contribution to different regions are very different.

4.2.2 An Empirical Test on the Inductive Effect of Foreign Capital and Its Influencing Factors in Experimental Group and Control Group

In order to test the effectiveness of the regression model, we first use the VIF to test whether there is multiple collinearity in each group of data: When 0 < VIF < 10, it is considered that the multiple collinearity is weak; when VIF > 10, it is considered that there is a serious multiple collinearity problem; and then use the LLC test method for unit root test. When T value is significantly negative, it indicates that there is no unit root problem. The results (see Table 4 and Table 5) show that there is no multiple collinearity in the data, and there is no pseudo-regression problem in the model.

Table 4. VIF test results

Independent variable	Total sample	Sample group without FTZs	Sample group with FTZs
ΔCDE	VIF = 1.33	VIF = 1.48	VIF = 2.39
ΔGDP	VIF = 2.28	VIF = 4.77	VIF = 2.70
ΔSIA	VIF = 1.13	VIF = 1.16	VIF = 1.42
ΔTRC	VIF = 1.44	VIF = 3.44	VIF = 1.69
RRN	VIF = 1.20	VIF = 1.28	VIF = 1.27
ROF	VIF = 1.50	VIF = 1.68	VIF = 1.26

Table 5. LLC unit root test results

Independent variable	Total sample			Sample group without FTZs			Sample group with FTZs		
	Unadjusted t	Adjusted t^*	p	Unadjusted t	Adjusted t^*	p	Unadjusted t	Adjusted t^*	p
ΔCDE	-17.3483	-5.4716	0.0000	-14.5828	-3.8268	0.0001	-29.8620	-23.4919	0.0000
ΔGDP	-20.3152	-4.1316	0.0000	-13.1366	-4.7653	0.0000	-50.9619	-45.7481	0.0000
ΔSIA	-22.9603	-18.0092	0.0000	-16.2641	-10.9959	0.0000	-14.2859	-10.5643	0.0000
ΔTRC	-19.5381	-9.3296	0.0000	-15.9455	-11.2578	0.0000	-18.2385	-16.7463	0.0000
ROF	-11.6221	-5.9782	0.0000	-8.6831	-4.5282	0.0000	-10.3464	-7.4369	0.0000

The long-panel estimation strategies contain LSDV estimation, FGLS estimation which is only to solve the intra-group autocorrelation, and comprehensive FGLS estimation, in which LSDV estimation is most steady and comprehensive FGLS estimation is most effective. Considering that the random perturbation term (μ_{it}) may exist the intra-group autocorrelation, inter-group heteroskedasticity and inter-group correlation, we respectively test the intra-group autocorrelation, inter-group heteroskedasticity and inter-group correlation of three groups of data. The results show that there are inter-group heteroskedasticity and inter-group correlation in the three groups of data. There is no intra-group autocorrelation in the total sample data, and there is internal autocorrelation between the sample group with FTZs (experimental group) and sample group without FTZs (control group) (see Table 6).

Table 6. Test of Inter-group Heteroskedasticity, Intra-group Auto-correlation and Internal Auto-correlation

	Total sample	Sample group with FTZs	Sample group without FTZs
Inter-group heteroskedasticity	exist	exist	exist
Intra-group autocorrelation	non-existence	exist	exist
internal autocorrelation	exist	exist	exist

Thus, a comprehensive FGLS estimation was used for all three samples, and the intra-group autocorrelation was not considered in the total sample. The intra-group autocorrelation was considered in both the control group (sample group without FTZs) and the experimental group (sample group with FTZs) and the regressive coefficients of the groups were considered to be the same.

Table 7. Estimated results of each model

	Total sample	Sample group without FTZs		Sample group with FTZs	
		(1)	(2)	(1)	(2)
ΔCDE	-0.0010***	-0.0008***	-0.0008***	-0.0290**	-0.0321***
	(-12.88)	(-3.27)	(-4.02)	(-5.00)	(-6.94)
ΔGDP	0.0005***	0.0004***	0.0004***	0.0027*	0.0029***
	(9.03)	(3.08)	(4.69)	(3.84)	(5.99)
ΔSIA	0.7640***	2.2825***	2.5477***	-175.441***	-173.5781***
	(6.70)	(4.36)	(5.73)	(-7.12)	(-7.91)
ΔTRC	13.5338***	-25.8710		-84.7182**	-86.3158**
	(3.81)	(-1.34)		(-2.04)	(-2.31)
ROF	-0.3391***	-0.1352*	-0.1300*	0.35433	
	(-11.10)	(-1.73)	(-1.74)	(0.39)	
Observations	208	144	144	64	64
Wald-chi	413.55	46.19	65.81	63.84	71.69
P > chi	0.0000	0.0000	0.0000	0.0000	0.0000

*p < 0.10, **p < 0.05, ***p < 0.01.

The model estimation results (see Table 7) show that the regression model of each group is ideal, and the influencing factors of foreign direct investment (FDI) in different regions are different. ΔCDE is negatively correlated with ΔFDI, indicating that the increase in regional consumption will significantly reduce the amount of foreign direct investment. This negative effect is greater for the experimental group (sample group with FTZs). Hu Hanjun, Wang Jiliang (2005) redeemed that: multinational companies can also use modern logistics to promote social consumption growth. In January 2016, the State Council approved the 12 cities of Tianjin, Shanghai, Chongqing, Hefei, Zhengzhou, Guangzhou, Chengdu, Dalian, Ningbo, Qingdao, Shenzhen and Suzhou (covering experimental group and control group) to establish cross-border e-commerce integrated test area, which greatly promoted the development of cross-border electric business and international multimodal transport business, made long-distance cross-border consumption possible, and greatly weakened the importance of investing somewhere close to the consumption .

The pulling effect of GDP on regional foreign direct investment (FDI) is positive, and the pulling function on experimental group (FTZ) is more effective. Ln (2004) argued that economic size and degree of trade liberalization are important factors influencing the location transfer of FDI. As the business environment in FTZs is better than other regions, thus attracts domestic capital to transfer to FTZ, then expands regional economic scale and income, and further causes the attractive effect for foreign direct investment. This pulling effect is greater in provinces (municipalities) which establish FTZ. On one hand, the preferential investment policies of these regions have been tilted from labor-intensive industries to capital-technology-intensive industries, and foreign investors have paid more attention to the growth potential of consumption caused by regional economic development. On the other hand, the establishment of a FTZ provides a platform for foreign investors to hit the domestic market. Free trade logistics, financing and trade facilitation in the FTZs can effectively reduce the cost of circulation and financing costs, have a greater radiation effect on the regional economy, effectively boost regional capacity growth, and thus attract external capital to settle. Foreign direct investment is changing from the export-oriented type (Qu Tao, 2012) to the market-seize type, so the Chinese market has become a key incentive to attract foreign direct investment. Wang Fa-yuan, Chang Chunhua (2010) showed that GDP is the Granger reason for FDI, and GDP growth will inevitably lead to an increase in foreign direct investment.

The pulling effect of output proportion change of the tertiary industry (ΔSIA) (Note 12) on the FDI of the total sample and the control group (sample group with no FTZs) is significantly positive, while the pulling effect represented by ratio change of the tertiary industry output (ΔSIA) on the FDI is significantly positive in overall sample and controlling group (sample group with no FTZs), while the effect on FDI in the experimental group

(FTZs) is significantly negative. On the one hand, FTZs relax restrictions on foreign equity, simplify the approval of foreign projects, and reduce restriction on financing (leasing), insurance, ship operations, RMB cross-border flow, foreign investment, financing and other high-end services and other social services (Note 13), in order to attract capital flow into productive servicing. However, due to the short time of FTZs' establishment, capital account's open policy is still in the trial stage and in the lack of stability, so that some foreign investors hold wait-and-see attitude. FTZs are still mainly absorbing domestic capital. In 2016, Guangdong pilot FTZ set up 70,600 enterprises, in which only 4070 foreign-funded enterprises occupy. As of the end of March 2017, Tianjin pilot FTZ has set up new enterprises 53,500, in which there are only 3375 (Note 14). Based on spreads between inclonal Renminbi (CNH) and offshore Renminbi (CNY) as well as Granger causality test between China's money supply and overseas interest rates, Yao and Whalley (2015) found that China (Shanghai) FTZ's financial innovation and reform have small impact on capital controls. FTZ's systematic innovation provides an opportunity for the domestic capitalists to avoid institutional barriers. Domestic enterprises grab FTZs, aiming at using "bonded import", "beyond custom frontier" and other special customs supervision policies and the systematic advantages such as funds' free exchange, the goods' fast customs clearance, financing facilitation to save circulation costs and tax costs. Servicing resources such as finance and insurance accumulate into PFTZs while failed to attract external industrial capital. Outflow of domestic capital is greater than inflow of foreign capital. For the sample group with no FTZs (control group), due to policy stability and the tertiary industry concentrating in the traditional medium- and low-end service industry, the increase in output is conducive to attracting medium- and low-end external industry capital to agglomerate.

The impact of ΔTRC on total sample's FDI was significantly positive, but the impact on the experimental group's FDI was significantly negative, indicating complementary relationship in overall, while alternative relationship in experimental group (sample group with FTZs) between trade and investment. This is consistent with the previous descriptive statistical analysis, probably because the FTZs more greatly motivate the innovation of the cross-border electric business model. Cross-border electric business enterprises use "bonded import" to bring the overseas warehouse to the bonded port area and take the approach of "Goods imported into the zone in batch and claims customs out of zone by paying personal postal article taxes in B2C forms", changing cross-border trade into domestic trade. To some extent, it weakens the need for cross-border production investment.

The impact of ROF on the control group (sample group with no FTZs) was significantly negative, while the impact on the experimental group (sample group with FTZs) was not significant. This shows that the low activity of regional economy in provinces (municipalities) with no FTZs is not conducive to stimulating economic growth.

4.2.3 Empirical Study on the Inductive Effect of PFTZS on Regional Foreign Capital

The establishment time of all FTZs is relatively short: the Shanghai FTZ was set up only 3 years ago, FTZs in Guangdong, Fujian, Tianjin were set up less than 2 years ago, and the FTZs' major data's disclosure caliber and time varies. In order to further study the radiation effect of the free trade zone on the regional economy in the experimental group, we introduce the virtual variable "FTZ". If there is no FTZ during the assessment period, FTZ = 0; if there is FTZ, FTZ = 1. In this research, we use ΔCDE * FTZ, ΔGDP * FTZ, ΔSIA * FTZ and ΔTRC * FTZ to respectively reflect the consumption pulling effect, the economic pulling effect, the agglomeration effect of service industry and the trade magnification effect of the regional trade on the regional economy, and examine the improvement effect of the four paths on the business environment and the inductive effect on the external capital.

$$\Delta FDI_{it} = \alpha + \beta_{1} \Delta \text{λ} P_{it} + \beta_{2} \Delta SIA_{it} + \beta_{3} \Delta CDE_{it} + \beta_{4} \Delta TRC_{it} + \beta_{6} \Delta ROF_{it} + \beta_{7} FTZ$$
$$+ \alpha_{1} \Delta GDP_{it} \times FTZ + \alpha_{92} \Delta SIA_{it} \times FTZ + \alpha_{92} \Delta CDE_{it} \times FTZ + \alpha_{924} \Delta TRC_{it} \times FTZ + \mu_{it}$$

The test results about multicollinearity and unit root show that there is no multicollinearity problem in the data set, and there is no unit root phenomenon between the all factors (see Table 8). The test results about inter-group heteroskedasticity, intra-group autocorrelation, and inter-group correlation show that the original hypothesis of "no first-order intra-group autocorrelation" is accepted and the original hypothesis of the same variance and "no intra-group correlation" is rejected. So we take a comprehensive FGLS method for regression analysis.

Table 8. Unit root test results

	ΔCDE	ΔSIA	ΔTRC	ΔGDP	ROF	ΔCDE * FTZ	ΔSIA * FTZ	ΔTRC * FTZ	ΔGDP * FTZ
Unadjusted t	-5.87	-13.84	-4.61	-33.89	-2.76	-6.95	-14.34	-2.01	-14.79
p	0.0000	0.0000	0.0000	0.0000	0.0029	0.0000	0.0000	0.0223	0.0000
Adjusted t*	-5.63	-13.22	-4.42	-32.35	-2.64	-6.65	-13.69	-1.94	-14.12
p	0.0000	0.0000	0.0000	0.0000	0.0041	0.0000	0.0000	0.0264	0.0000
Result	non-existent	non-existent	non-existent	non-existent	non-existent	non-existent	non-existent	non-existent	non-existent

Table 9. Model regression results of the experimental group

	(1)	(2)	(3)	(4)	(5)
ΔCDE	-0.0319***	-0.0387***	-0.0307***	-0.0333***	-0.0336***
	(-5.16)	(-6.52)	(-6.06)	(-6.79)	(-6.80)
ΔSIA	-170.6466***	-167.7775***	-178.5997***	-166.253***	-168.8888***
	(-7.13)	(-7.89)	(-7.20)	(-7.8)	(-7.97)
ΔTRC	-42.2824	-28.7021	-5.4512	-19.2346	-40.7413
	(-0.95)	(-0.67)	(-0.12)	(-0.45)	(-0.92)
ΔGDP	0.0032***	0.0033***	0.0034***	0.0034***	0.0030***
	(4.36)	(6.70)	(6.64)	(6.45)	(5.28)
FTZ	1.2437	-0.0180	1.0278	0.9595	1.007
	(0.52)	(-0.01)	(0.48)	(0.45)	(0.50)
ΔCDE * FTZ		0.0125**			
		(2.07)			
ΔSIA * FTZ			39.7928		
			(1.40)		
ΔTRC * FTZ				-6.4035	
				(-0.16)	
ΔGDP * FTZ					0.0006
					(1.46)
_cons	3.012	3.9300	4.2280	3.7344	3.8966
	(0.37)	(1.15)	(1.63)	(1.21)	(1.25)
N	64	64	64	64	64
Wald-chi	62.29	73.07	69.43	71.27	72.40
p > chi	0.0000	0.0000	0.0000	0.0000	0.0000

Description: t statistics in parentheses.

*p < 0.10, **p < 0.05, ***p < 0.01.

The regression degree of each group is ideal. The results show that the inductive effect of trade openness (ΔTRC)

on foreign direct investment change from being significantly negative to being in non-obvious correlation after considering the influence of FTZs. The consumption's pulling effect (ΔCDE * FTZ) generated by the FTZ on the regional economy has led to an increase in foreign investment. Other paths such as trade amplification effect (ΔTRC * FTZ), industrial agglomeration effect (ΔSIA * FTZ), economic growth effect (ΔGDP * FTZ) caused by FTZs on attracting capital is little, showing that the current FTZs are still mainly strengthening the inductive effect of foreign capital by stimulating the hinterland's consumption.

The purpose of foreign direct investment includes occupying market share, seeking complementary resources, reducing production costs and so on. The total retail sales of social consumer goods reflects the regional consumption's potential. In the economic downturn, the trade facilitation measures implemented by the FTZs make a large number of overseas goods flow into China through alternative channels such as cross-border electric business (B2C and B2B2C) and parallel imports, enriching consumer goods and promoting consumption growth. When trade barriers are cut faster than investment barriers, ΔCDE will further drive import growth and create alternative effects on investment, thereby dampening foreign direct investment in China (ΔFDI).When investment barriers are cut faster than trade barriers, consumption growth's inductive effect on foreign investment will be further strengthened.

FTZs, most of which are located in the cross-border electric business comprehensive pilot area, develop bonded trade to reduce storage costs and customs costs to offset the adverse effects of labor costs' rising, promote regional economic and trade development. This B2B2C model can effectively attract marketing headquarters of multinational group or regional logistics center to settle, driving the growth of service-oriented investment. On the other hand, the FTZs lower the access threshold of investment in production services for foreign enterprises, implement reform of investment and financing facilitation , carry out deregulation, being conducive to attracting foreign capital from medical care, insurance, finance, ship management and other high-end services to inflow and driving the trade development of equipment, raw materials and other goods. This makes the trade enlargement effect of the FTZs can effectively offset the alternative relationship between trade and investment, which has a positive impact on the inductive effect of foreign capital.

5. Political Recommendation

The significance of FTZ's establishment is not about the FTZ itself, but to boost the real economy's development through the reform of high standards regulation and with service industry's opening-up, financial innovation, government facilitation, trade and investment facilitation. Compared with the control group, the experimental group (the provinces and cities with free trade zones) is relatively well developed with complete infrastructure. The preferential policies focus on high-end industries instead of low- and medium-end industries. Results indicate that:

(1) Through establishing high standards of trade and investment regulation, FTZs attract capital agglomeration and drive the regional economic and trade growth. While FTZs at this stage is still mainly to attract domestic capital's agglomeration, and the inductive effect on foreign capital is not significant. Foreign direct investment is changing from "processing export" to "market grab", and the huge domestic market is the key factor to attract foreign direct investment.

(2) FTZs emphasize more on regulatory innovation, so that the market in the zones becomes more dynamic and the dominant role on the FTZs played by the government finance is no longer significant.

(3) Electronic business imports has big crowding-out effect on the external capital. Government should supports more on electronic business exports with aim to drive exports of national goods and strictly restrict commodity categories to be imported from cross-border electric business and tiggerly regulate competition behavior of cross-border electric business.

(4) Apital mainly by pulling domestic consumption. The problems of "finance seperating from the real economy" and "unstable policy" in FTZs have exacerbated the cautious and wait-and-see attitude towards investment from the foreign-funded enterprises. The government should focus on relying on the manufacturing hinterland, so that the financial innovation within the FTZs can more serve the regional industrial development strategy, effectively promote regional trade expansion, capital accumulation and economic growth, and thus attract external capital's agglomeration. All regions should combine the advantages of local resources to impose PFTZ's function. For example, PFTZ can facilitate investment and trade, provide preferential tax policies to attract regional headquarters of multinational companies. PFTZ can also open servicing towards build cultivation and incubation base for international talent, to attract cross-border research and development, design, engineering consulting and other productive service resources to gather, and to create "intelligent center". In areas with relatively developed manufacturing, through financial innovation and tax reform, it can attract foreign

banks, foreign factoring companies to gather or attract business financial center to settle in order to use the FTZs to open up the internal and external financial pools to achieve global capital's allocation.

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Notes

Note 1. Data from: National Bureau of Statistics.

Note 2. Data from: the conference speech of Chinese Ministry of Commerce spokesman's Sun Jiwen on February 9, 2017.

Note 3. Data from: udc-consulting, in 2016 free trade zone helps to improve China's FDI quality and efficiency, February 20, 2017.

Note 4. Calculating as per data published by "Nanfang Daily", "Guangdong Bureau of Statistics" and other media.

Note 5. According to the data published by Tianjin Business Network.

Note 6. Source: www.askci.com.

Note 7. According to the IMF's assessment report.

Note 8. Artemed Group: the world's leading medical and pension services.

Note 9. Yinshan Capital: an investment platform established in Hong Kong, mainly investing in China's high-end health projects.

Note 10. Data from: Shanghai Municipal Commission of Commerce.

Note 11. Hang Seng is one of the largest securities investment fund distributors in Hong Kong and has $160 billion in assets.

Note 12. The tertiary industry includes finance, insurance, telecommunications, transportation, leasing, education, medical and other industries.

Note 13. The high-end services mentioned here include productive services (such as finance, insurance, transportation, leasing) and other social services (such as telecommunications, education, health care).

Note 14. Data from: (1) 21st century economic report, what kind of transcripts does Guangdong Free Trade Zone in 2016 produce? (January 18, 2017) (2) China (Tianjin) free trade pilot zone's press conference.