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Are Investment Promotion Agencies Doing the Thing Right? Evidence from China

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【Keyword】China, investment promotion agency, firm-level data, sample selection

【Abstract】This paper tries to verify how the establishment of investment promotion agencies (IPAs) affects the decisions of foreign firms regarding their subsequent investment by combining firm-level data from the World Bank's Enterprise Survey with city-level information on (IPAs) in China. After correcting for potential endogeneity problems, the result confirms the IPAs' role in promoting incremental foreign direct investment (FDI) into China. Furthermore, it is shown that Hong Kong, Macau, and Taiwan (HMT) firms are less sensitive to IPAs' efforts in making further investment than are non-HMT foreign firms. In addition, IPAs are found to be more successful in enhancing foreign firms' investment in high-tech than in low-tech industries.

【JEL Classification】F21, F23

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I. Introduction

The past three decades have witnessed a considerable expansion in inward foreign direct investment (FDI) into China[1], in tandem with China's fast economic growth. Apart from a favorable investment environment, the strategic efforts made by the Chinese government are thought to have played an important role in inviting FDI, one being the establishment of investment promotion agencies. The first China Investment Promotion Agency (CIPA) was established in the 1980s to facilitate the promotion of foreign investment. Unlike special economic zones (SEZs), which use tax incentive to invite FDI, IPAs are local organizations aimed at assisting the investment activities of foreign investors, including both incumbents and newcomers. Even though a few empirical studies have attempted to examine the relationship between government policy and FDI in the context of China (Dean *et al.*, 2009; Wang, 2013), none has focused on the impact of IPAs.

Theoretically, IPAs are expected to raise FDI because compared with developed countries, developing countries lack detailed information on the prevailing business environment, and the cost of acquiring information is quite high (Harding and Javorcik, 2007). Several studies have empirically investigated IPAs' influence on FDI in countries other than China. Morisset (2003) and Morisset and Andrews-Johnson (2004) use country-level data to indicate that the presence of IPAs exerts a positive influence, a hypothesis supported by Charlton and Davis (2006) together with Harding and Javorcik (2007). However, no research has used micro-level data, though such data can control firm heterogeneity and better capture the direct effect of how foreign firms react to incentives provided by IPAs.

This study contributes to the previous literature in several ways. To the best of my knowledge, it is the first paper to use micro-level data to analyze IPAs' effect on attracting FDI in China[2]. Rather than focusing on the location choice of new entrants or on the amount of "greenfield" investment, this paper takes a different perspective by examining the so-called "agglomeration effect"[3]. Using advanced methodologies of instrumental variable and a sample selection model to alleviate the potential endogeneity problem of IPAs, the approach reveals that the impact of IPAs on attracting FDI is positive. The results also indicate that Hong Kong, Macau and Taiwan (HMT) firms are not as sensitive to the presence of IPAs in investment decision-making as for other non-HMT foreign firms, and IPAs have different impacts between low-tech and high-tech industries.

II. Estimation Strategy and Data

Estimation strategy

The baseline empirical specification in the firm-level analysis takes the following reduced form:

$$\ln FDI_{ict} = \alpha + \beta_1 IPA_{ct} + \beta_i x_{it} + \beta_c w_{ct} + g_t + \varepsilon_{ict} \qquad (1)$$

The dependent variable is the log of new fixed assets for firm i in city c at time t. I only focused on firms with foreign ownership confirmed by the actual foreign share in capital. Since 86 per cent of IPAs target investors that are already present in the host country (UNCTAD, 2001), I chose to focus on the incremental FDI, i.e. the investment of the existing investors, in this paper. IPA is a

[1] By year 2011 inward FDI in China had reached US$712 billion, second only to that of the United States (World Invest Report, 2012).
[2] Amiti and Javorcik (2008), Liu *et al.* (2010) have applied firm-level data to investigate the determinants of entry of foreign investment in China.
[3] Agglomeration effect indicates that existing FDI attracts further FDI. Head *et al.* (1995), Head and Ries (1996) and Guimaraes *et al.* (2000) all verify this effect.

dummy variable that specifies whether the city has an IPA at time t[4]. Since there existed very few newly established IPAs during the analysis period (2002–2004), it is assumed that the city had an IPA either before or after 2004 when conducting the estimation[5]. x_{it} is a vector of firm characteristics that might affect firm i's decision-making on subsequent investment. To be consistent with previous firm-level research on the micro determinants of FDI, sales revenue, wage rate, and research and development (R&D) expenditure are included as control variables. Following Devereux and Rachel (1998), tax rate is also included. Export customs clearance time is added as a proxy for trade barriers.

w_{ct} represents a vector of city characteristics, including non-policy characteristics and policy incentives. As for policy incentives other than IPAs, Cheng and Kwan (2000) prove the positive influence of the creation of SEZs[6] on attracting FDI. Foreign firms located in certain SEZs, which had long been established before the establishment of IPAs, enjoy various treatment levels concerning tax reduction. It is likely that foreign firms attempt to establish their subsidiaries in areas with tax incentives[7]. This factor is controlled by extending the concept of the SEZ to create a new variable of the Investment Incentive Zone (IIZ), following Cho and Tung (1998). The action accords with the focus on each city instead of the entire province and follows the same methodology used to construct the IPA dummy. Year dummy g_t is added to control the change over time. The error term captures all the unobserved elements that might affect the analysis.

Econometric Concerns and Solutions

The use of a random effects model alone is not a sufficient solution to the potential endogeneity problems that arise from two sources. The first source is reverse causality. However, it appears to be a minor concern in the model used here because the dependent variable is incremental FDI at the firm level, and it is unlikely to affect a city's decision to establish an IPA. Still, this possibility is addressed later for the sake of robustness check[8].

The second source of the endogeneity problem comes from the possibility that IPAs might "self-select" into some cities. This kind of bias can also be summarized as one of the omitted variable problems, which requires great care. Apart from the four special municipalities directly under the control of the central government (Shanghai, Beijing, Tianjin, and Chongqing), the development of IPAs has been uneven across China. Judging from the fact that most IPAs are clustered along the coastal areas (mainly South and East China) or located in the capital city of each province, I find that IPAs are more likely to be established in areas with relatively higher GDP per capita or with a better business environment. The criteria used to select cities for IPA establishment is not publicized. Thus, if unobserved city characteristics affect the criteria, they are correlated with foreign firms' investment decisions, and the estimation of the IPA coefficient is likely to be biased.

To address this second type of endogeneity, I employed a treatment-effect model. If a foreign firm is located in a city that has IPAs, it is defined as "treated", otherwise as "control". I modelled the establishment of IPA as a function of a vector of city level characteristics, such as GDP per capita, infrastructure investment, trade volume, etc. The investment decision of the firm can be modeled as a two-step procedure. I omitted the subscripts for simplicity.

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[4] Since every province already has the provincial IPAs, this study focuses on city-level IPAs only. And according to CIPA's definition, it is assumed that city IPAs have jurisdiction over all the foreign firms located in that city.

[5] I also excluded IPAs set up during 2002-2004 for double check.

[6] See Cheng and Kwan (2000) for full description of the Zone.

[7] The new industry tax law of China has been applied since 2008. Thus the change of tax rate doesn't affect my estimation.

[8] As argued by Cheng and Kwan (2000), apart from IPAs, FDI inflow can also drive up wage rate, R&D, and sales of the firm. Thus I used system GMM proposed by Blundell and Bond (1998) to correct for the possible estimation bias. The results remain consistent and are available upon request.

$$\ln FDI = \alpha + \beta_{ipa} IPA + \beta X + \varepsilon \qquad (2)$$

$$IPA^* = \delta Y + u \qquad (3)$$

where

$$IPA = \begin{cases} 1, if\ IPA^* > 0, which\ means\ the\ city\ has\ at\ least\ one\ IPA \\ 0, otherwise \end{cases}$$

X in Equation 2 is supposed to capture all the firm-level characteristics that are assumed to influence the foreign firm's investment. In addition, Y in Equation 3 includes the determinants of IPA in the city level.

Different estimation methods are used depending on different assumptions on the relationship between ε and u in the above equations. It is possible that the unobserved micro-level elements are independent of the city-level factors that promote the construction of more IPAs, to be specific, $\varepsilon \perp u$. If this assumption holds, then the consistent estimation of β_{ipa} can be obtained and I can apply corresponding estimation strategies such as control function[9] or instrumental variable (IV)[10] regression. See Wooldridge (2010) for a detailed discussion. Recent application of the control function can be found in Petrin and Train (2010), and Liu *et al.* (2010). In contrast, it is also likely that some cities' cultural advantage (e.g., Shanghai's close business ties with Japanese partners) will lower the investment costs for some foreign firms, which can not be controlled using the information in the dataset. In the case when ε is correlated with u, the conditional mean independence assumption is violated and the causal effect using the control function will be biased. Thus I have to resort to other methods, such as the Heckman two-stage sample selection model. In accordance with Wooldridge (2010, Chapter 21), I now assume that Equation 2 will take a more generalized form by allowing both observable and unobservable heterogeneity:

$$\ln FDI_1 = \alpha_1 + \beta_1 X + \varepsilon_1, \quad E(\varepsilon_1 | X) = 0 \qquad (4)$$

$$\ln FDI_0 = \alpha_0 + \beta_0 X + \varepsilon_0, E(\varepsilon_0 | X) = 0 \qquad (5)$$

$$\ln FDI = IPA * (\ln FDI_1 - \ln FDI_0) \qquad (6)$$

when u in Equation 3 is correlated with ε^1 and ε^0 above, it is shown that consistent estimation can be achieved by conducting the following OLS[11]:

$$E(\ln FDI | X, IPA) = f(IPA, X) + \rho_1 \cdot IPA \cdot \frac{\phi(\delta Y)}{\Phi(\delta Y)} + \rho_0 \cdot (1 - IPA) \cdot \frac{\phi(\delta Y)}{1 - \Phi(\delta Y)} \qquad (7)$$

where ρ_1 is the correlation between u and ε^1, ρ_0 for u and ε^0. $\phi(\cdot)$ and $\Phi(\cdot)$ are the density and cumulative normal distribution respectively, which can be obtained by running Equation 3 using probit in the first step. By so doing the potential bias due to correlation between ε and u (or selection-on-unobservables) can be alleviated. In practice I used the Heckman selection model as the benchmark model and other options as robustness check[12].

[9] Control function regression relies on conditional mean independence (CMI) assumption, which refers to the exogenous impact of the "treatment" on outcome ln*FDI* once firm characteristics *X* is controlled in this paper.

[10] Here I am referring to the standard IV models such as two-stage least square (2SLS).

[11] See Wooldridge (2010, P949).

[12] I chose "ivtreatreg" when running the estimation, as suggested by Cerulli (2014). By changing the option of model type, it can fit into IV models or Heckman selection model flexibly.

Data

The data on three types of variables examined in this paper—the *ipadummy*, firm characteristics, and city-level factors—were collected from three main sources. A list of 141 city-level IPAs was constructed by combining two sources. To identify the several city-level IPAs not listed on the "Invest in China" website, I made reference to the information of the China Council for International Investment Promotion (hereafter referred as CCIIP)[13].

Data regarding firm characteristics was taken from the China 2005 Investment Climate Survey of World Bank. The survey reports three-year balanced panel data covering all manufacturing industries for the period 2002–2004, while several variables remained constant throughout this period, e.g., ownership share. The data was originally collected by administering a questionnaire to 12,400 firms in 123 cities throughout China, ranging from company information to to financing, to be answered qualitatively or quantitatively. When it comes to the ownership of the firms, 990 are HMT-invested, 1398 are other foreign-invested, and 365 are foreign–domestic shared firms.

"New fixed asset investment" is used to represent FDI volume; sales revenue is set to equal the sum of "core business" and "other business income"; R&D is defined as the annual value invested in the R&D department while the wage rate is equal to the average wage of a permanent worker. The tax rate equals the income tax/total sales revenue. I assume it is reasonable to have negative figures for tax rate in the dataset because in China, if a foreign company operates at a loss in a given year, the loss will be deducted from the total tax liability of the following year. All variables are presented in the units of thousand yuan[14] and "customs clearance time" measured by day is used as a proxy for trade time.

Table 1. Statistical Summary

Variables	N	Mean	S.D.
ln_FDI	7963	9.804423	2.17919
ipadummy	36921	0.4427562	0.4967191
iizdummy	36921	0.3701958	0.4828635
trade_time	36921	1.872284	5.471339
ln_sale	36857	10.71119	2.050383
ln_taxra	21514	-3.167929	1.539815
ln_wage_rate	36921	-0.1160097	0.4858685
ln_rd	20256	5.960377	2.609501
ln_frei	36721	8.646856	0.8609946
ln_city_gdp	36821	15.50882	0.8553658
ln_gdp_per	36821	9.352639	0.6857158
ln_trade_vol	36821	14.52381	1.350243
ln_infra_inv	36024	11.16436	1.528503
ln_edu_exp	36326	10.54858	1.261787
ln_ave_wage	36426	9.305477	0.4850426
ln_post	36326	9.837893	0.9748189
ln_tele	36326	11.89652	1.184367
ln_tot_save	36426	14.60622	1.258158

Note: See Appendix Table A1 for the detailed description of the variables.

Data on city-level factors was extracted from the Chinese Statistical Year Book. Idiosyncratic city characteristics include: GDP per capita, average wage for workers, total annual savings, total expenditure for postal mail and telecommunications, and expenditure on education, etc.

[13] The CCIIP website does not list the establishment year for all city-level IPAs. However, as a city usually has either multiple IPAs or no IPAs, the available information is sufficient for me to determine whether the city had IPAs during 2002-2004.

[14] The unit for wage rate is yuan. I divided it by 1000 to make it consistent with others.

Meanwhile the IIZ dummy was constructed based on the information collected from the "Invest in China Agency" website. Table 1 presents the statistical summary of the main variables.

III. Estimation Results

Table 2. The amount of FDI (logarithm) by year

	Control (ipadummy=0)		Treated (ipadummy=1)		
Year	No. of firms	Mean	No. of firms	Mean	Mean-difference
2002	1001	8.988336	1651	10.05577	1.067434
2003	1002	9.187138	1652	10.21541	1.028272
2004	1002	9.302308	1655	10.31477	1.012462

Source: Enterprise Survey, World Bank.

The simple statistical analysis can give us some intuition concerning the potential impact of IPAs. As shown in Table 2, when a comparison of incremental investment is conducted between IPA-supervised foreign firms and non-IPA-supervised firms, it is easy to identify the difference. Even though the investment of the control group also witnesses a stable annual growth, the average amount of investment of the treated group is higher than that of the comparison group.

Table 3. Estimation Result

	(1) Baseline	(2) Baseline	(3) IV (OLS)	(4) IV (2SLS)	(5) Heckman
VARIABLES	lnFDI	lnFDI	lnFDI	lnFDI	lnFDI
ipadummy	0.262**	0.316**	1.349***	1.094***	0.765***
	(0.119)	(0.133)	(0.206)	(0.171)	(0.224)
trade_time	0.00201	0.00169	0.0116	0.0221**	0.0213**
	(0.00622)	(0.00600)	(0.00851)	(0.0107)	(0.00968)
ln_sale	0.646***	0.642***	0.946***	0.908***	0.849***
	(0.0287)	(0.0287)	(0.0281)	(0.0287)	(0.0289)
ln_tax_rate	-0.00834	-0.0126	0.00133	0.0191	-0.000665
	(0.0133)	(0.0130)	(0.0296)	(0.0309)	(0.0308)
ln_wage_rate	-0.0207	-0.0379	-0.324***	-0.322***	-0.218***
	(0.0534)	(0.0536)	(0.0703)	(0.0717)	(0.0745)
ln_rd	0.0714***	0.0744***	0.0524***	0.0591***	0.0339*
	(0.0152)	(0.0154)	(0.0192)	(0.0202)	(0.0204)
ρ1					-0.0911
					(0.189)
ρ0					0.599***
					(0.129)
City characteristics	No	Yes			
Random Effects	Yes	Yes			
Observations	2,808	2,771	2,771	2,771	2,573

Notes: Baseline city characteristics include iizdummy, freight, gdp_perca, infra_invest, edu_exp, average_wage.
For column (3)(4)(5), the first stage city characteristics are the same as the ones used in baseline estimation.
Year dummies are included. Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

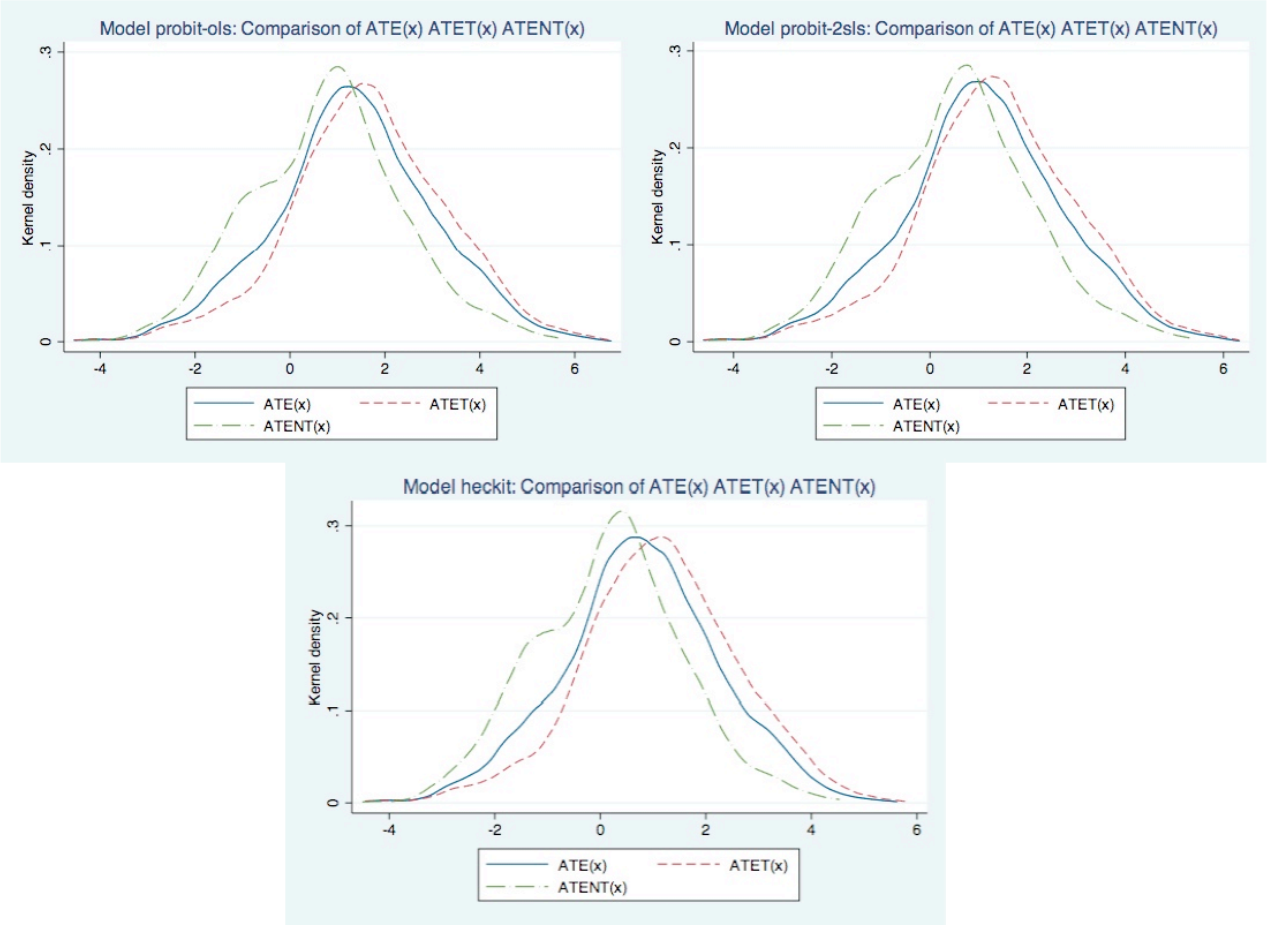
The estimation results using Equation 1 confirm the aforementioned hypothesis. In Table 3, the first column shows the results of RE model without city characteristics. *ipadummy* is positively significant and increases the firm's investment by 26%. This verifies the role of IPAs in attracting more FDI into the region, which is consistent with previous literature. Meanwhile *tax_rate* and *wage_rate* have the expected sign, though they are not statistically convincing. The positive signs of *Sales* and *R&D* indicate that these variables positively affect existing foreign firms' decision on their subsequent investment. The second column shows the results when city-specific factors are

added as control variables (γ_{ct} in Equation 1). *ipadummy* remains positively significant[15], though the magnitude increases by more than 5%. The remainder of the control variables shows a similar tendency as in the first set of specifications.

Columns (3) and (4) show the results using IV methods. Both apply to probit *ipadummy* on covariates *Y,* as in Equation 3. It shows that the coefficient of *ipadummy* varies by 25% but its positive significance remains. The reliability of this finding is strengthened by the result of using the Heckman two-step selection model, as presented in the 5th column—even when potential bias is controlled, IPAs still, to a great extent, increase the investment amounts of the existing foreign firms. Compared with the baseline result, all three models lead to an upward estimation of the coefficient for *ipadummy* despite the fluctuation, which indicates that the unobserved city factors (those entering the selection equation) might be negatively correlated with foreign firms' investment decision. To confirm the existence of the selection bias, I calculated average treatment effect (ATE), ATE on the treated (ATET), and ATE on the nontreated (ATENT) for (3), (4) and (5) respectively[16]. In this paper, ATE refers to the impact of IPAs on all foreign firms while ATET measures the impact of IPAs on foreign firms that located in the cities with IPAs.

As Fig. 1 indicates, all three models follow a similar distribution of treatment effect. ATE in all cases are approximately subject to normal distribution and the range is in between ATET and ATENT. This predicts that the untreated foreign firms would have invested more, had they been assisted by IPAs.

Fig. 1. Distribution of ATE, ATET and ATENT for different models



[15] I tried various combinations of the city variables. For example, I replaced gdp_percapia with city_gdp, tele_expenditure with post_expenditure and add total_savings. All these do not change the significance of IPA, thought the coefficient of IPA varies from 30%-32%.

[16] ATET=E[($\ln FDI_{1i}$-$\ln FDI_{0i}$)|IPA_i=1].

After running the Heckman model, I tested the hypothesis of no correlation between unobserved city and firm characteristics by examining the null $H_0: \rho_1 = \rho_0 = 0$. The result rejects the null, implying the appropriateness of using this specification[17]. Next I performed the simple difference-in-mean test by putting the ATE results in all models together (Table 4). Based on the consistent results, the conclusion can be drawn that IPAs do promote foreign firms to invest more.

Table 4. T test for ATE

Variable	ttest	probit_ols	probit_2sls	heckit
ipadummy	1.03***	1.35***	1.09***	0.76***

Note: * p<0.05; ** p<0.01; *** p<0.001

IV. Further Issues

Does the origin of FDI matter?

According to National Bureau of Statistics of China, HMT firms have been the leading investors in China since the opening-up reform, with these regions comprising more than half of China's inward FDI during 1990-2004. Because of this skewed allocation of FDI, I would like to take a step further to examine whether IPAs have different impact on investors of different origin. To do this, samples were divided into HMT and non-HMT subgroups, and Equation 1 was re-estimated for each group. Such type of categorization has been used in previous studies (Lin *et al.*, 2009; Ito *et al.*, 2012). The results are presented in Table 5. IPAs clearly play a positive role in attracting non-HMT foreign firms to invest more in China, whereas their impact on HMT firms is not as obvious. This indicates that non-HMT foreign firms benefit more from IPAs' assistance since they have less access to local information than HMT firms do (such as quality of suppliers).

Table 5. Comparison between HMT and Non-HMT firms

	HMT group		Non-HMT group	
Model	OLS	Heckman	OLS	Heckman
VARIABLES	lnFDI	lnFDI	lnFDI	lnFDI
ipadummy	0.210	0.508	0.355*	0.834***
	(0.189)	(0.354)	(0.181)	(0.281)
trade_time	-0.00512	0.0189	0.00877	0.0250*
	(0.00520)	(0.0136)	(0.00960)	(0.0144)
ln_sale	0.619***	0.895***	0.656***	0.823***
	(0.0507)	(0.0455)	(0.0351)	(0.0389)
ln_tax_rate	-0.0304	0.00150	-0.00627	-0.0227
	(0.0231)	(0.0469)	(0.0153)	(0.0422)
ln_wage_rate	-0.00703	-0.425***	-0.0471	-0.0952
	(0.0828)	(0.126)	(0.0654)	(0.0964)
ln_rd	0.127***	0.101***	0.0478***	-0.00297
	(0.0265)	(0.0312)	(0.0181)	(0.0270)
Observations	859	856	1,912	1,645

Notes: City chracteristics include iizdummy, freight, gdp_perca, edu_exp, infra_invest, average_wage.
Random effect option is used for OLS estimation. Year dummies are included.
Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Does the industry matter?

Liu and Daly (2011) explore the determinants of FDI inflow into different industries, namely high-tech and low-tech industries. The motivation behind their study is the great increase in FDI in the manufacturing industry in reaction to China's Open Door policy. In their paper, it shows that

[17] Since ivtreatreg does not provide post-estimation test option when "IV" model is chosen, I used ivreg2 to re-estimate and run endogeneity test. Durbin-Wu-Hausman statistics show that ipadummy is not exogenous.

between 1997 and 2008, FDI in the manufacturing industry represented 63.2 per cent of all utilized FDI in China and reached US $49.89 billion in 2008. Since China is undergoing the transition from an agriculturally centered society to an industrialized country, the desired sector for FDI inflow has been shifting from traditional low-tech industries to high-tech manufacturing industries. As realized by the Chinese government, technology advancement is an inevitable factor in a country's economic growth. Thus it would be interesting to determine whether government policy has had its intended effect.

Table 6. Comparison between high-tech and low-tech firms

	High-tech		Low-tech	
Model	OLS	Heckman	OLS	Heckman
VARIABLES	lnFDI	lnFDI	lnFDI	lnFDI
ipadummy	0.408**	1.101***	0.264	-0.0817
	(0.180)	(0.273)	(0.221)	(0.467)
trade_time	0.00871	0.0281**	-0.00914	0.00669
	(0.00773)	(0.0127)	(0.00701)	(0.0171)
ln_sale	0.640***	0.814***	0.646***	0.869***
	(0.0366)	(0.0347)	(0.0487)	(0.0614)
ln_tax_rate	-0.00320	-0.0238	-0.0253	-0.0629
	(0.0150)	(0.0374)	(0.0248)	(0.0658)
ln_wage_rate	-0.0697	-0.203**	0.0297	-0.0511
	(0.0563)	(0.0916)	(0.137)	(0.192)
ln_rd	0.0752***	0.0173	0.0773***	0.122***
	(0.0214)	(0.0248)	(0.0205)	(0.0425)
Observations	1,731	1,399	1,040	1,014

Notes: City chracteristics include iizdummy, freight, gdp_perca, edu_exp, infra_invest, average_wage.
RE option is included in OLS estimation. Year dummies are included. Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

According to Holz (2013), the sectoral classification in China has undergone four periods of reform. In consideration of the period of estimation, GB2002 (guobiao in Chinese, representing the standard regulated in year 2002) was used for conducting further analysis. After all 30 industries have been classified as either low-tech or high-tech industries based on the classification in Liu and Daly (2011), regression was performed on each subgroup in order to determine the impact of the presence of IPAs.

The estimation results in Table 6 provide strong evidence that IPAs are more successful in encouraging high-tech foreign firms to increase the amount of their investment, which indicates the potential "screening" function of IPAs to invite foreign investors with higher quality. This is in accordance with the finding in UNCTAD (2001, P20). Nevertheless, future study should take a step further to look into the specific industries which are "preferred" to others, as well as the reason behind this phenomena.

V. Conclusion

The aim of this paper is to address the research gap regarding the empirical study of how a government policy, namely IPAs, can affect inward FDI into China. Despite data limitations, I attempted different methodologies to correct for the potential econometric problem, and showed that the presence of IPAs has a significantly positive effect on attracting incremental FDI into China. This indicates that IPAs, as an FDI-inviting policy tool, do fulfill their expected responsibilities. Consistent with previous literature, other factors such as sales volume, R&D, wage rate, and tax rate are also found to be important in the decision-making process of foreign investors.

The results also confirm that IPAs play a more important role in encouraging non-HMT foreign companies than HMT firms to invest in China. Owing to the advantage of location, HMT firms are familiar with the business patterns in mainland China and have easier access to resource information, which thus increases the ease with which they make investment decisions, regardless of the assistance of IPAs. As such, policies regarding IPAs and similar entities have only slight impact on HMT firms. Based on this finding and on a consideration of the close connection between HMT firms and China, as well as HMT firms' great influence on the mainland in terms of employment, technological exchange, and even cultural communication, the Chinese government should develop more creative policy tools that will allow it to work more closely with its HMT partners.

Lastly, it is shown that IPAs are more efficient in increasing the investment of foreign firms in high-tech industries compared with low-tech industries. One possible explanation for this is that the Chinese government uses IPAs to screen FDI, as advanced technology is preferred to promote industrial productivity.

Due to insufficient information, neither the quality of IPAs nor the impact of firm heterogeneity can be examined. Further study should thus be undertaken to determine the best means of evaluating IPAs in terms of their qualities and functions.

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Appendix

Table A1. Description of the variables

Variable	Description	Source
y (FDI)	new fixed assets for firm i (1000 yuan)	Enterprise Survey
ipadummy	whether the city has ipa or not	CCIIP
iizdummy	whether the city is iiz or not	Invest in China
Wage Rate	average wage rate for firm i (yuan)	Enterprise Survey
Sale	sales revenue for firm i (1000 yuan)	Enterprise Survey
Taxra	tax rate for firm i	Enterprise Survey
RD	R&D expenditure for firm i (1000 yuan)	Enterprise Survey
trade_time	customs clearance time for firm i (days)	Enterprise Survey
gdp_percapita	gdp per capita of the city (yuan)	China Statistical Yearbook
city_gdp	GDP of the city (10,000 yuan)	China Statistical Yearbook
infra_inv	infrastructure investment value of the city (10,000 yuan)	China Statistical Yearbook
frei	freight volume of the city (10,000 ton)	China Statistical Yearbook
trade_volume	trade revenue of the city (10,000 yuan)	China Statistical Yearbook
ave_wage	average wage of the city (yuan)	China Statistical Yearbook
tot_save	total savings of the city by the end of year (10,000 yuan)	China Statistical Yearbook
edu_exp	education expenditure of the city (10,000 yuan)	China Statistical Yearbook
post	total postal expenditure of the city (10,000 yuan)	China Statistical Yearbook
tele	total telecommunication expenditure of the city (10,000 yuan)	China Statistical Yearbook

Table A2. Cities with IPAs in China (by 2009)

Province	City	Province	City	Province	City
anhui	hefei	hebei	shijiazhuang	shandong	jinan
anhui	wuhu	hebei	tangshan	shandong	qingdao
beijing	beijing	heilongjiang	haerbing	shandong	weihai
chongqing	chongqing	henan	zhengzhou	shandong	yantai
fujian	fuzhou	hubei	hankou	shanghai	shanghai
fujian	xiamen	hubei	qianjiang	shanxi1	taiyuan
gansu	lanzhou	hubei	wuhan	shanxi3	xi'an
guangdong	dongguan	hunan	changsha	sichuan	chengdu
guangdong	foshan	jiangsu	nanjing	sichuan	yibin
guangdong	guangzhou	jiangsu	nantong	tianjin	tianjin
guangdong	huizhou	jiangsu	suzhou	xinjiang	wulumuqi
guangdong	shenzhen	jiangsu	taicang	xizang	lasa
guangdong	zhanjiang	jiangsu	lianyungang	yunnan	kunming
guangdong	zhuhai	jiangxi	nanchang	zhejiang	cixi
guangxi	nanning	jilin	changchun	zhejiang	hangzhou
guizhou	guiyang	liaoning	dalian	zhejiang	ningbo
hainan	haikou	liaoning	shenyang	zhejiang	wenzhou
hebei	baoding	neimenggu	huhehaote	zhejiang	xiaoshan
hebei	langfang	ningxia	yinchuan		
hebei	qinhuangdao	qinghai	xining		

Notes: 58 cities in total. shanxi1 is the province in North China. The capital city is Tai Yuan. While shangxi3 is the province in North-West China. The capital city is Xi'an.