Standing by the Giants or Escaping the Battlefield

The Effect of FDI on Local Firm Creation - Evidence from China

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What's the effect of FDI on firms in cities receiving foreign investment? Agglomerating or crowding out? This paper tries to answer this question by studying local firm creation using Chinese Business Registration data. I use industry structure-based Bartik instruments to identify the effect of FDI. I find that agglomeration effect dominates locally: foreign investment facilitates firm creation, especially firms the same industry. More specifically, I find that a 10,000 yuan increase in foreign investment would induce 2.19 more firms to operate in a county, 1.3 of which are from the same industry. This agglomeration effect could provide an alternative explanation than vertical spillovers as to why local governments in developing countries are keen on introducing FDI.

1 Introduction and Literature Review

In the literature of international trade, there has been a long-time debate about whether businesses in host countries could really benefit from foreign investment. Two views compete here. Proponents appealing for FDI are supported by the evidence that positive spillover would happen through vertical linkages. Productivity of local suppliers substantially increase after doing business with foreign companies (*Javorcik and Spatareanu, 2011*) (*Smarzynska Javorcik, 2004*) (*Du et al., 2012*). Firms in downstream also benefit from immediate goods in better quality (*Chen et al., 1995*) (*Lu et al., 2017*). Competition brought by foreign entry induces selection and resource reallocation, improving market efficiency in long term (*Blalock and Gertler, 2004*). On the other hand, opponents against FDI worry that foreign entry would hurt local companies in the same industry (*Kugler, 2006*) (*Görg and Greenaway, 2004*). Compared to learning from foreign rivals (*Haskel et al., 2007*), shrinking in market share and decreasing in productivity seem more likely to happen. Horizontal spillover is usually insignificant or even negative. Negative effects are found in Moroco (*Haddad and Harrison, 1993*), Venezuela (*Aitken and Harrisonf, 1999*), Czech (*Djankov and Hoekman, 2000*), China (*Du et al., 2012*) and Eastern Europe (*Konings, 2001*).

Although previous literatures have provided us valuable insights to understand the effect of FDI, few of them pay attention to the fact that the impact of FDI might be spatially heterogenous. On one hand, foreign companies are generally bigger and more productive than local ones (literature in need). Big firms would generate agglomeration externalities benefiting local business (*Greenstone et al., 2010*). Such agglomeration effect would attenuate as distance increase (*Marshall, 2005*) (*Audretsch and Feldman, 1996*) (*Ellison et al., 2010*) (*Jaffe et al., 1993*). On the other hand, distance can protect firms from fierce competition and strengthen their local monopoly power. Firms could strategically escape the battlefield when there are

competitive rivals nearby. The two forces not only affect firms' productivity, which stands in the central of previous debate, but also their location pattern by affecting firm creation and expiration, which is less mentioned in the literature.

In the study, I try to zoom in our observation scope, studying the effect of FDI on firms in cities receiving foreign capital. Agglomerating or crowding out? Bartik instruments built on local industry structure help to identify the effect of foreign investment. Agglomeration effect is found to dominate locally: foreign investment facilitates firm creation, especially firms the same industry. More specifically, I find that a 10,000 yuan increase in foreign investment would induce 2.19 more firms to operate in a county, 1.3 of which are from the same industry. This might provide an alternative explanation than vertical spilling-over to why local governments in developing countries are keen on introducing FDI.

The rest of this paper is organized as follows: Section 2 introduces data sources; Sections 3 presents the identification strategy and empirical findings; Section 5 concludes this paper and discusses the future research plan.

2 Data

2.1 Business Registration Data

The Chinese Business Registration Data is crucial to this study. In mainland China, companies are required to apply for business license at local Administration for Industry and Commence (henceforth, "AIC"). Operating without a license is illegal. Since the license is associated with incorporate income tax and all registered firms are obligate to pay minimum tax, firm owners are incentivized to expire the license after closing us their businesses. Accordingly, the Business Registration Data covers all firms in formal sectors in mainland China. It provides abundant information including firms' creation and expiration date, operating location, initial capital, ownership structure, shareholders, operating industry, etc.

There are many advantages associated with the full-sampled data: (1) it provides us with detailed registration information about all firms in mainland China, not only big ones, but also small/medium firms, which are usually missing in studies using selected-sampled data; (2) it includes precise information about firm births and deaths. If only firms above some certain scale are selected, it is impossible for scholars to precisely detect firms' birth and death since firms are usually established before the first appearance in the dataset and when they leaves the sample pool, it doesn't necessarily mean their businesses are closed up. Such issues no longer bother us when use full-sampled registration data. In the Appendix, I compare the Business Registration Data with Chinese Manufacturing Census Data, a commonly used in previous studies. We can easily find their differences and the advantages of using Business Registration Data in this study.

In the Registration Data, firms' geographic location can be tracked to county level. An operating industry is defined as a 4-digit sector in the Current Status of Industrial Classification in China (henceforth, 4-digit CSIC sector). I define FDI as the the total initial capital of all foreign invested enterprises. Firm creation/expiration is defined as the number of new authorized/expired business license. The summary statistics of the key parameters are presented in the table below.

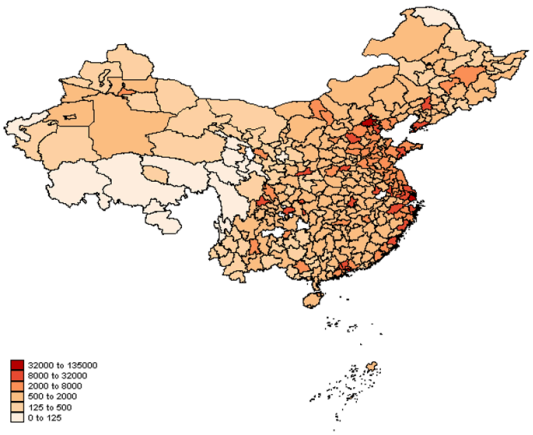
Table1. Summary Statistics of Key Variables

Number of counties	3,228			
Number of manufacturing industries	574			
Time range	1998-2006			
Number of county-industry pair	341,286			
Number of county-industry-year pair	2,149,500			
Number of manufacturing industries in one county	*Mean* 76.67		*sd* 75.80	
	County-Industry Level		County Level	
	Mean	*sd*	*Mean*	*sd*
Number of new firms	0.70	4.60	53.46	145.05
Number of dead firms	0.32	3.20	24.33	93.01
Net entry	0.38	4.41	29.13	111.58
log(FDI+1)	0.41	1.15	2.69	2.97

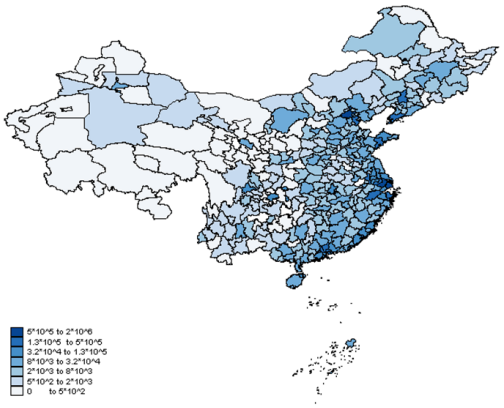
The dataset covers all $3,228$ counties in mainland China. Although I'd love to extend the research to service and non-manufacturing sectors in future studies, I only discuss manufacturing, that is 574 industries, presently. Considering data quality and policy consistency, I select records from 1998 to 2006. That gives us 341,286 county-industry pair and 2,149,500 observations. We could see the rapid growth of Chinese economy from the growth in the number of firm . On the average, there was more than 50 new registered firms in each county every year. Although around 25 established firms closed up at the same time, the average net growth is over 25. We should also notice big standard errors of the key variables, which indicates a wide dispersion in economic development across regions and industries.

Such dispersion is even more obvious on the map. Figures below is the distribution of new firms and FDI in 2005.

Figure 1: The Distribution of New Firms and FDI in 2005
(Aggregated to City Level)



(a) New firm established



(b) Foreig direct investment

We could find two trends from figures above (1) there is wide dispersion in economic development across regions: while some cities, most in eastern regions, receiving a huge amount of foreign investment and having a considerable number of new firms, other cities, usually in middle and western regions, appears less attractive to both foreign investors and domestic entrepreneurs; (2) Although we need more effort to claim causality rather than correlation, it is clear that the boost of local entrepreneurship is associated with intense foreign investment.

3 Estimation Models and Empirical Findings

What's the effect of FDI on local firm creation? This question can be divided to two subquestions: first, how foreign investment affect local firm creation in general? Second, how would it affect local firms in the same industry? Naturally, my empirical analysis is also organized in two subsection, county-level analysis and county-industry-level analysis.

3.1 County-Level Evidence

How would foreign investment affect local firm creation in general? Figure1 discussed in data section indicates a strong correlation between local entrepreneurship and FDI. To measure the effect of FDI, our basic regression model is :

$$y_{ct} = \beta_0 + \beta_1 log(FDI_{ct} + 1) + \beta_4 X_{ct} + \gamma_c + \gamma_t + \epsilon_{ct}$$

where subscript c stands for county and t stands for year. Dependent variables are firm entry, exit and net-entry. FDI_{ct} is total foreign investment in county c, year t. According to our definition, it is he total initial capital of all foreign invested enterprises in that county that year. Size-effect is controlled with total number of firms in the county in the previous year. County fixed effects γ_c and year fixed effects γ_t are also added in the regression.

3.1.1 OLS Regression

Results from OLS regression (in Table2 below) further strengthen our findings in Figure1.

Table2. FDI and Local Firm Creation - OLS Regression
(County-Level, All Manufacturing Firms)

	(1)	(2)	(3)
VARIABLES	new	exit	net entry
log(FDI+1)	2.708***	0.911	1.797*
	(3.702)	(1.250)	(1.714)
total firm	0.123***	0.0453***	0.0772***
	(7.292)	(3.754)	(3.963)
Observations	28,027	28,027	28,027
R-squared	0.876	0.723	0.560
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster at	county level	county level	county level

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Strong correlation between local firm creation and foreign investment stands after controlling the economic size, county-fixed effects and year-fixed effects.

Since FDI are associated with foreign entries, people may wonder the increase in total number of firms are driven by the establishment of foreign invested enterprises while domestic firms are still crowded out. To address the concern, we use the number of private firms as dependent variable and redo the regressions.

Table3. FDI and Local Firm Creation - OLS Regression
(County-Level, Private Manufacturing Firms)

	(1)	(2)	(3)
VARIABLES	new (private)	exit (private)	net entry (private)
log(FDI+1)	1.965***	-0.165	2.129***
	(2.820)	(-0.345)	(2.700)
total firm	0.112***	0.0362***	0.0757***
	(7.325)	(2.956)	(4.139)
Observations	28,027	28,027	28,027
R-squared	0.865	0.712	0.569
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster at	county level	county level	county level

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table3 represents the relation between foreign investment and the change in the number of local private firms. As shown in the table, local private firms have not been crowded out. Instead, increase in FDI is associated with more new firm and less dying firms, indicating a boost of local private economic activities.

3.1.2 IV Regression

However, the co-trend of local firm creation and FDI is nont enough to pin down causality. Omitted variables could easily bias OLS estimation. Factors affecting firms' location choice might also influence the distribution of FDI. For instance, counties with improving business environment are attractive to both foreign investment and domestic entrepreneurs, inducing estimations to bias up. On the contrary, if foreign firms try to avoid competition, strategically locate in places with less competitive domestic rivals, OLS regression would underestimate the

effect of FDI.

Accordingly, we need a valid instrument which is correlated with the change of local foreign investment but orthogonal to other local economic condition. Bartik IV is an ideal choice. The intuition behind the Bartik IV is that during the sample period, FDI in China vary across industries. Since such variation is exogenous to local economic conditions and places with better industry foundation for industries absorbing most FDI should receive more foreign investment, the combination of local industry structure and industrial FDI could be used as an instrument for local FDI. More specifically, the Bartik IV is constructed as below:

$$BaltikIV_{ct}^{1} = \sum_{j=1}^{N} s_{cjt} * \overline{lg(FDI_{-cjt})}$$

where subscript c stands for county, t is year and j indicates industry. s_{cjt} is the capital share of industry j in county c, year t. Indeed, the vector $(s_{c1t}, s_{c2t}, ..., s_{cNt})$ represents contemporary local industry structure. Just as shown in Table 4, the constructed Bartik IV is strongly correlated with local foreign investment.

Table4. First Stage Regression - FDI and Bartik IV
(County-Level)

VARIABLES	(1) log(FDI+1)
Baltik IV	1.121***
	(6.277)
total firm	0.000241***
	(4.495)
Observations	28,027
R-squared	0.945
County FE	Yes
Year FE	Yes
Cluster at	county level
Weak IV Test (F-stat)	39.17

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Regression results using this Bartik IV further strengthen our previous findings. Table5 and Table 6 indicate that foreign investment could largely facilitate local economic activities. It not only encourage firm creation but also decrease firm exits. On average, 10 percent increase in FDI would ”inhabits” 1.9 new firms and ”saves” 1.3 dying ones, increasing 3.2 firms in the county. Considering that average $log(FDI+1)$ on county level is 2.69, our estimation indicates every 10,000 yuan increase in foreign investment could increase 2.17 firms in total.

Table5. FDI and Local Firm Creation - 2SLS Regression with Barik IV
(All Manufacturing Firms)

VARIABLES	(1) new	(2) exit	(3) net entry
log(FDI+1)	19.01***	-13.45**	32.46***
	(3.240)	(-2.120)	(3.294)
total firm	0.118***	0.0491***	0.0691***
	(6.981)	(3.779)	(3.404)
Observations	28,027	28,027	28,027
R-squared	0.870	0.711	0.522
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster at	county level	county level	county level

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table6. FDI and Local Firm Creation - 2SLS Regression with Barik IV
(Private Manufacturing Firms)

VARIABLES	(1) new (private)	(2) exit (private)	(3) net entry (private)
log(FDI+1)	16.85***	-7.607	24.45***
	(3.043)	(-1.383)	(2.974)
total firm	0.108***	0.0382***	0.0698***
	(7.009)	(2.893)	(3.671)
Observations	28,027	28,027	28,027
R-squared	0.858	0.707	0.545
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster at	county level	county level	county level

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

One thing we need to notice is that compared to IV regression, OLS regression largely underestimates the effect of foreign investment to local economic activities. It might because foreign companies strategically locate in places with less competitive domestic rivals, which makes sense especially consider that foreign companies would also count their spilling over effect on neighboring companies.

Table7. FDI and Local Firm Creation - OLS V.S. IV Regression
(All Manufacturing Firms)

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS Regression			IV Regression		
VARIABLES	new	exit	net entry	new	exit	net entry
log(FDI+1)	2.708***	0.911	1.797*	19.01***	-13.45**	32.46***
	(3.702)	(1.250)	(1.714)	(3.240)	(-2.119)	(3.294)
total firm	0.123***	0.0453***	0.0772***	0.118***	0.0491***	0.0691***
	(7.292)	(3.754)	(3.963)	(6.981)	(3.779)	(3.404)
Observations	28,027	28,027	28,027	28,027	28,027	28,027
R-squared	0.876	0.723	0.560	0.870	0.711	0.522
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at	county level	county level	county level	county level	county level	county level

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table8. FDI and Local Firm Creation - 2SLS Regression with Balik IV
(County-Level, Private Manufacturing Firms)

	(1)	(2)	(3)	(4)	(5)	(6)
		OLS Regression			IV Regression	
	new	exit	net entry	new	exit	net entry
VARIABLES	(private)	(private)	(private)	(private)	(private)	(private)
log(FDI+1)	1.965***	-0.165	2.129***	16.85***	-7.606	24.45***
	(2.820)	(-0.345)	(2.700)	(3.043)	(-1.382)	(2.974)
total firm	0.112***	0.0362***	0.0757***	0.108***	0.0382***	0.0698***
	(7.325)	(2.956)	(4.139)	(7.009)	(2.893)	(3.671)
Observations	28,027	28,027	28,027	28,027	28,027	28,027
R-squared	0.865	0.712	0.569	0.858	0.707	0.545
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at	county level	county level	county level	county level	county level	county level

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Since the power of Bartik IV comes from local industry structure, one concern of Bartik is there are other factors affecting local industry structure and firm creation simultaneously. To address this concern, we substitute contemporary local industry structure with the historical one and repeat the analysis. The new Bartik instrument is constructed with local industrial structure in 1998. That is

$$BartikIV_{ct}^{1998} = \sum_{j=1}^{N} s_{cj1998} * \overline{lg(FDI_{-cjt})}$$

As shown in Table 9, he new Bartik instrument also strongly correlates with local FDI.

Table9. First Stage Regression - FDI and Bartik IV_{1998}
(County-Level)

VARIABLES	(1) log(FDI+1)
Baltik IV_{1998}	1.729***
	(5.951)
total firm	0.000205***
	(4.105)
Observations	28,027
R-squared	0.945
County FE	Yes
Year FE	Yes
Cluster at	county level
Weak IV Test (F-stat)	38.72

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Compared to Table 5 and 6, coefficients estimated with the new IV slightly decrease but it doesn't shake our conclusion that foreign investment could significantly facilitates local economic activities.

Table10. FDI an Local Firm Creation - 2SLS Regression with Bartik IV_{1998}
(All Manufacturing Firms)

	(1)	(2)	(3)
VARIABLES	new	exit	net entry
log (FDI+1)	12.435*	-8.469	20.90*
	(1.904)	(-1.229)	(1.937)
total firm	0.121***	0.0478***	0.0730***
	(6.827)	(3.622)	(3.492)
Observations	28,027	28,027	28,027
R-squared	0.875	0.718	0.549
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster at	county level	county level	county level

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table11. FDI an Local Firm Creation - 2SLS Regression with Bartik IV_{1998}
(Private Manufacturing Firms)

VARIABLES	(1) new (private)	(2) exit (private)	(3) net entry(private)
log(FDI+1)	12.237*	-8.679	20.92**
	(1.744)	(-1.514)	(2.177)
total firm	0.110***	0.0385***	0.0718***
	(6.846)	(2.865)	(3.643)
Observations	28,027	28,027	28,027
R-squared	0.863	0.706	0.559
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster at	county level	county level	county level

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3.2 County-Industry-Level Evidence

Why foreign investment could facilitate local economic activities? Are there more firms in the same industries agglomerating around foreign big firms? Or local competitors are crowded out but firms in other industries get benefited? To answer these question, we need to switch to our focus to firms in the same industry.

Our empirical model change to:

$$y_{cjt} = \beta_0 + \beta_1 log(FDI_{cjt} + 1) + \beta_4 X_{cjt} + \gamma_{cj} + \gamma_t + \epsilon_{cjt}$$

where subscript c and t still denotes county and year respectively and j is new added, standing for industry. County-fixed effect γ_{cj} substitutes county-fixed effect γ_c to control local comparative advantages.

3.2.1 OLS Regression

We still start our analysis with OLS regression. Table 12 and Table 13 present the correlation between FDI and firm creation in the same industry. No evidence suggests that crowding out happen locally. On the contrary, firms in the same industry seems develop quite well: more firms establish and less firms die. It is consistent to our finding in previous section. But are firms in the same industry more/less affected by foreign investment? We cannot simply draw our conclusion by comparing the coefficients in Table 2 and Table 3, we would save our answer after getting more precise estimation from IV regression.

Table12. FDI an Local Firm Creation in the Same Industry- OLS Regression
(All Firms)

	(4)	(5)	(6)
VARIABLES	new	exit	net entry
log(FDI+1)	0.221**	-0.212***	0.433***
	(2.525)	(-3.397)	(3.178)
total number of firms	0.132***	0.130***	0.00221
	(3.105)	(4.480)	(0.0339)
Observations	2,123,742	2,123,742	2,123,742
R-squared	0.708	0.645	0.425
County*Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster sd at ... level	County & Industry	County & Industry	County & Industry

Table13. FDI an Local Firm Creation in the Same Industry- OLS Regression (Private Firms)

	(1)	(2)	(3)
VARIABLES	new (private)	exit (private)	net entry (private)
log(FDI+1)	0.0475	-0.177***	0.225**
	(0.594)	(-4.782)	(2.082)
total firms	0.125***	0.101***	0.0240
	(3.135)	(6.318)	(0.455)
Observations	2,123,742	2,123,742	2,123,742
R-squared	0.693	0.622	0.426
County*Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster sd at ... level	County & Industry	County & Industry	County & Industry

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

3.2.2 IV Regression

Similarly, to address endogeneity concerns about OLS regression, we construct a Bartik instrument on county-industry level to identify the effect of FDI.

Similar to the identification strategy in county-level analysis, the new Bartik instrument is also dependent on local industry structure but it's no longer a multiplication of industrial average FDI with local industry share. We assume each industry has some effect on foreign investment in other industries. For example,*. Such effect should be uniform across counties, which is exogenous to each county's local economic conditions, and can be estimated with OLS regression. Accordingly, for each industry j, we regress $log(FDI_{*j*}+1)$ on local industry share using data from 3,228 counties. The regression function is

$$log(FDI_{cjt}+1) = \sum_{j'=1}^{N} \alpha_{j'}^{j} s_{cj't} + \gamma_c^j + \eta_t^j + \epsilon_{cjt}$$

Then we use coefficients got from the regression to predict $log(FDI_{cjt}+1)$. The predicted value $log(\widehat{FDI}_{cjt+1})$ is our new instrument. As shown in Table 14, the constructed Bartik instrument is strongly correlated with local industrial foreign investment, excluding concerns about weak IV.

Table14. First Stage Regression - FDI and Baltik IV_2
(County-Industry Level)

	(1)
VARIABLES	log(FDI+1)
total firm	0.00312***
	(3.341)
Baltik IV2	0.967***
	(47.06)
Observations	2,109,360
R-squared	0.916
County FE	Yes
Year FE	Yes
Cluster at	industry & county

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results of IV regression are presented in Table 15 and Table 16. Still no evidence suggests that local firms in the same industries are crowded out by their foreign rivals. On the contrary, every 10 percent increase in foreign investment would induce 0.037 more new firms and 0.024 less dying firms in the same industry the same county, bringing 0.06 increase in total firm number.

Now we could answer the question raised in the beginning of this section, do local firms in the same industry more/less affected by foreign investment? Comparing Table 15 and 16 to Table 5 and 6, it seems that the effect of horizontal spilling-over is minimal. However, the coefficient before FDI should be interpreted as the change of firm number when FDI doubles. On average, each county receive over 130,000 yuan foreign investment while each industry in the county only receive 5,000 yuan foreign capital (calculated from summary statistics in Table 1). It is misleading to directly compare the two coefficients since doubling county level foreign investment should certainly bring bigger effects than doubling county-industry level investment. Instead we should to estimate the effect of a 10,000 yuan increase IN foreign investment. How many more firms would operate in the county and how many of them are from the same industry? The effect of $10,000$ foreign investment should be close to $\frac{10\%*\hat{\beta}_{FDI}}{exp(Mean(log(FDI+1)))*10\%}$. According to our calculation, a $10,000$ yuan increase in foreign investment would could bring in 2.17 more firms operating in the county and 1.3 of them are from the same industry. The horizontal spilling-over is much bigger than we expect, at least locally speaking. Foreign investment has considerable agglomeration power, benefiting local economy.

Table15. FDI and Local Firm Creation in the Same Industry - 2SLS Results (All Firm)

	(1)	(2)	(3)
VARIABLES	new	exit	net entry
log(FDI+1)	0.368***	-0.236***	0.604***
	(5.833)	(-3.492)	(5.411)
total firm	0.131***	0.129***	0.00183
	(3.103)	(4.470)	(0.0281)
Observations	2,109,360	2,109,360	2,109,360
R-squared	0.709	0.645	0.425
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster at ... level	industry & county	industry & county	industry & county

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table16. FDI and Local Firm Creation in the Same Industry - 2SLS Results
(Private Firm)

	(1)	(2)	(3)
VARIABLES	new (private)	exit (private)	net entry (private)
log(FDI+1)	0.221***	-0.197***	0.418***
	(3.865)	(-5.445)	(5.198)
total firm	0.125***	0.101***	0.0235
	(3.126)	(6.313)	(0.446)
Observations	2,109,360	2,109,360	2,109,360
R-squared	0.693	0.623	0.426
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster at	industry & county	industry & county	industry & county

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4 Conclusion

In the study, I try to explore the effect of FDI on firms in cities receiving foreign capital. Will foreign investment boost local firm creation? How does it affect local firms in the same industry? Bartik instruments built on local industry structure help to identify the effect of foreign investment. Agglomeration effect is found to dominate locally: foreign investment facilitates firm creation, especially firms the same industry. More specifically, I find that a 10,000 yuan increase in foreign investment would induce 2.19 more firms to operate in a county, 1.3 of which are from the same industry.

FDI has considerable agglomerating power. Or from the aspect of domestic entrepreneurs, instead of escaping the battle field, strategically locating far away from foreign firms, they choose to stand by the competitive rivals and study from them. The agglomeration effect

of FDI has not been thoroughly studied yet. It offers an alternative explanation than vertical spilling-over to why local governments in developing countries are keen on introducing foreign investment while evidence for horizontal spilling-over is minimum, even negative.

Limited to time, a few questions have not been explored in this study: (1) How does the agglomeration effect of foreign investment attenuate as distance increases? (2) How does it affect firm creation in up/down stream sectors? (3) How different the effect would be in service sectors? And in market with different product properties? Answering these questions can help us to better understand the effect of FDI on local economy. They might also provide more clues to understand the mechanism behind my findings.

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Appendices

Comparison Business Registration Data and Chinese Manufacturing Census Data We compare firm number and exit/entry rate in census and registration data in figure1 and figure2.

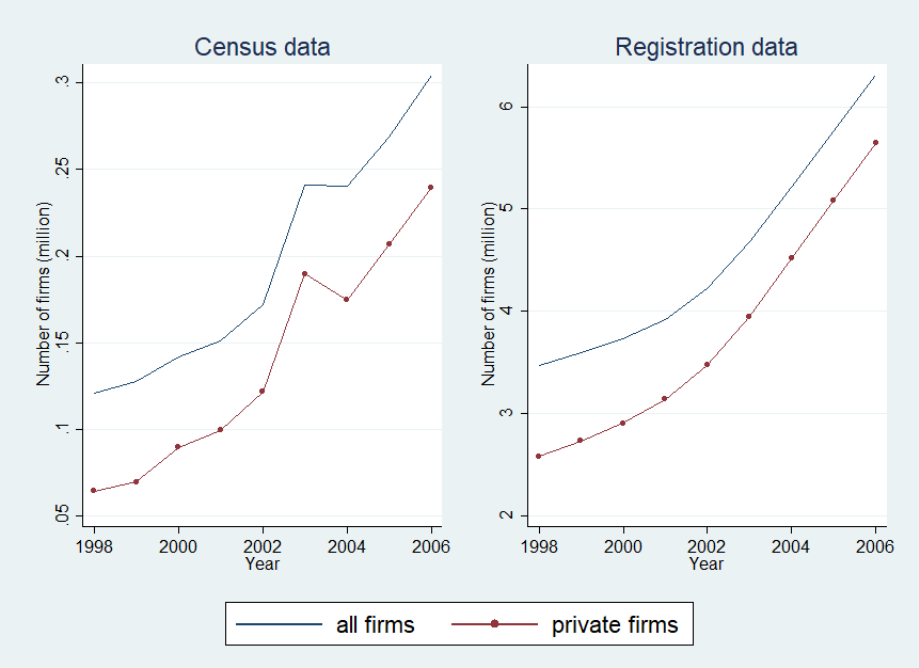

Figure 2: Numbers of firms in census and registration data

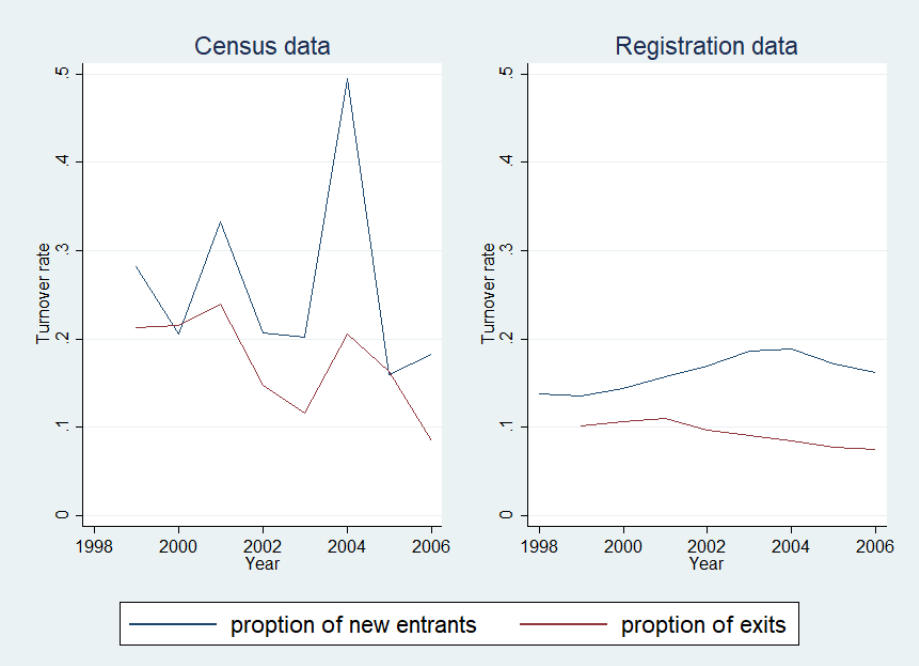

Figure 3: Exit and Entry Rate in Census and Registration Data

From Figure1, we could see that census data and registration data almost follow the same increasing trend. However, there are 2 major differences: (1)Firm number in registration data is almost 20 times more than that in census data. It is quite reasonable since census data only include state-owned enterprises and firms with annual revenue over 5 million yuan in manufacturing. Registration data includes all firms. There are far more small/medium firms in the economy than those above scale. (2)We could see a pike in firm number in census data in 2003. On the contrary, firm number smoothly increase in registration data. The differences between the two might due to 2 reasons. First, since census data only include firms above scale, it is possible that in 2003 the total number of firms are not increasing but the scales of them were expanded. It is also possible that the number of firm in manufacturing increased rapidly in 2003 but not in other sectors. Since registration data contains firms in all sectors, it cannot represent the change in manufacturing. The first reason might be dominant since firm number sharply

decrease in 2004 in census data. It is hard to believe that a considerable number of firms died in just one year. It is more reasonable that they just fell under the scale. This is one advantage of using registration data. It provides reliable information about firm births and deaths. Such advantage is more clear when we compare the exit/entry rate in the two datasets.

We could see from Figure2, there is a higher portion of firms entering and existing census data every year. The turnover rate is quite fuzzy compared to that in registration data. Accordingly, using census data to study exit\entry might be misleading.

However, there are also concerns about using registration data. Data quality before 1990s when market economy and private firms had not been officially admitted might be unreliable. Considering data quality and policy consistency, I only use data between 1998 to 2006 in this study. Furthermore, owners of small businesses, such as street vendors, might lack incentive to register, making observations from the left tail of the distribution very fuzzy. In the future, I will re-clean the data, set a minimum registered capital threshold to select firms into the sample.