Mega Foreign Firm's Entry and Productivity Spillovers

Evidence from Samsung Vietnam

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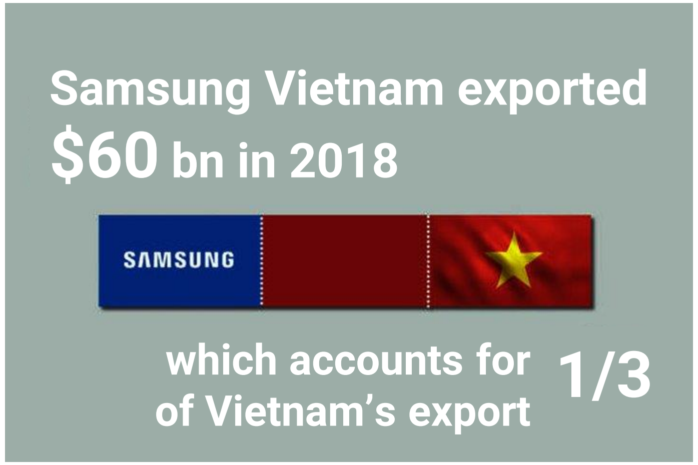
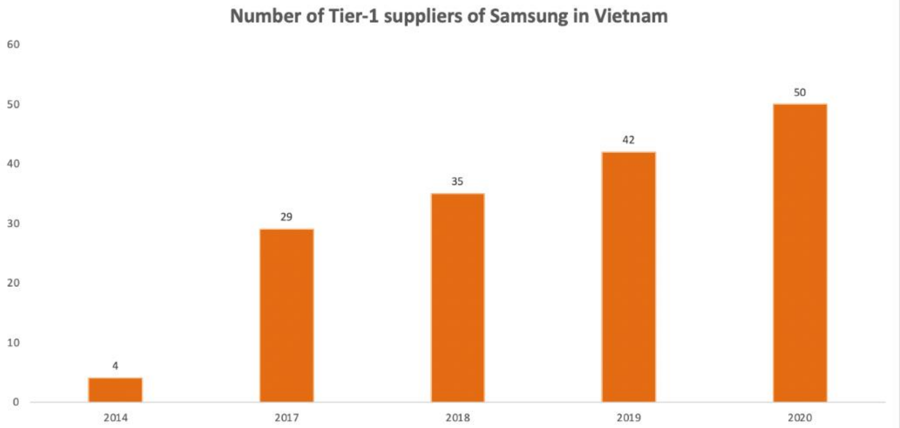
Motivation





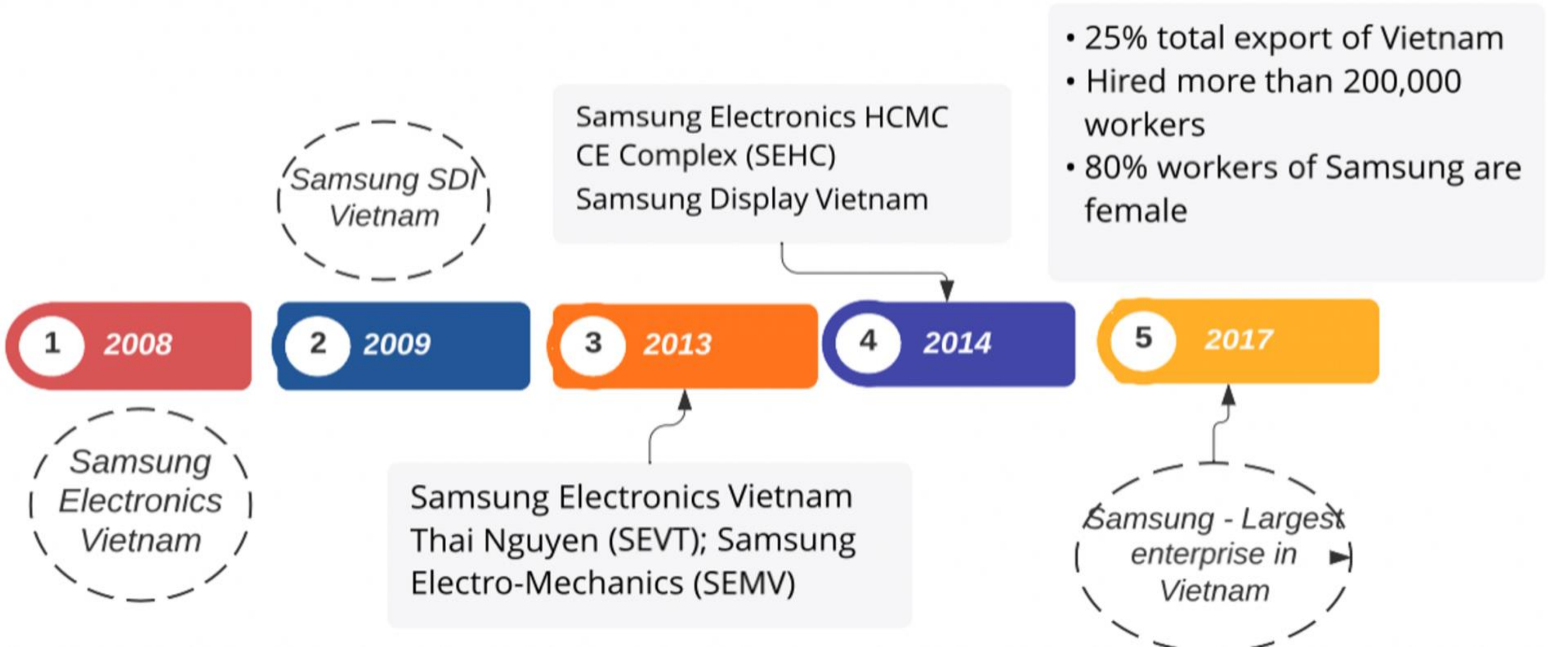
- **FDI is crucial in low-income countries' economic development**
- **Vietnam expected positive effects from FDI, such as:**
  - Job creation and income generation for local economies
  - Service industry development
  - Productivity spillovers
  - Incentives for human capital accumulation
- **Samsung invested a total of $22 bn since 2008 (> total FDI into Vietnam ($18 bn) and = total FDI into Indonesia in 2022).**

Related Literature

- **FDI on Local employment and productivity**
  - **U.S. employer-employee data to show that foreign-multinational employment expansion increases employment, value-added, and wages at domestic firms (Setzler & Tintlnot 2021)**
  - **For developing countries, previous literature highlights the importance of “absorptive capacity.”**
    - Foreign company presence negatively affecting domestic firm productivity in Spain (Fons-Rosen et al. 2017)
    - Walmart’s entry into Mexico attracted producers with high-appeal products (Iacovone et al. 2015).
    - Supplying to multinational corporations creates more benefits for better-managed firms in Costa Rica (Alfaro-Urena et al. 2022).

- **Large plant opening**
  - **Like FDI, evidence is mixed.**
  - **Large spillover from a big plant opening (Greenstone et al. 2010)**
  - **Patrick and Partridge (2019) find little empirical support.**

Background



- **2008: Samsung received first certificate of investment in Bac Ninh (SEV)**
  - **Samsung compared Gumi first, but decided to invest overseas.**
  - **To our knowledge, there was no other candidate cities – cannot employ Greenstone et a l. identification.**
- **2013: Samsung built second factory in Thai Nguyen, SEVT - the largest pho ne manufacturing facility of Samsung Group in the world**
- **Investment from Samsung accounts for 45% and 73% of total FDI in Bac Nin h and Thai Nguyen.**

Our Research Question(s)

- **How did Samsung's entry change the Vietnamese economy?**
- **Site visit for policy research motivated us to think of various testable questions.**
  - **Vietnamese policymakers recognized Samsung's contribution, but they did not have concrete ideas or estimates of its economic effects.**
  - **They also thought spillover effects into local industries were weak.**
  - **However, SEV management told that HC and management quality did not meet Samsung's standard yet, indicating VN's absorptive capacity is low**
  - **Samsung's consultation program kicks off in 2015**
    - Provided technical consultation/training
    - So we also examine before and after SCP

Data

- **Vietnam Enterprise Survey, 2006-2018**
  - Conducted by General Statistics Office of Vietnam.
  - Covers 3 years before and 10 years after Samsung's first investment
  - Includes usual firm information such as employment, capital, and output
  - Also provides Firm's ownership structure
  - Although VES also includes service industries, we focus on manufacturing
- **We drop Hanoi and Ho Chi Minh city**
  - Labor and Employment Survey underscores that Hanoi and Ho Chi Minh City consistently maintain a significantly higher proportion of skilled labor and individuals holding bachelor's degrees or higher.
  - These cities agglomeration effects can also be a confounding sector
- **We end up with 151,679 observations.**

Research Design and Measurement

Samsung Investment in Vietnam

Source: Vietnam General Statistics Office • Map data: [object Object] • Created with Datawrapper

- **We employ a TWFE model for firm *i* in industry *j*, province *p* and time *t*:**

  $$y_{ipt} = \beta_0 + \beta_1 Samsung_{pt} + \Theta X_{ipt} + \gamma_j + \alpha_t + \eta_p + \varepsilon_{ipt}$$

  – $Samsung_{pt} = 1$ if Samsung production facilities exist in that province and the time

- **We will estimate horizontal then vertical spillovers.**

- **VES does not report value added, so we constructed VA by**
  – Value Added = Labor compensation + (Depreciation + Profits)

- **For TFP, we employ Ackerberg, Caves and Frazer's method.**

Results: Effects on Domestic Firms

Time: 2006-2018

	Wage	TFP	Revenue per worker	Value added per worker	Labor	Female labor	Fixed assets
A. Basic regressions							
Samsung Investment	0.09***	0.02***	0.10**	0.11***	-0.07**	-0.04	0.03
	(4.83)	(3.17)	(2.01)	(2.86)	(-2.05)	(-0.96)	(0.64)
Control mean	3.32	0.8	5.32	3.48	3.25	2.33	6.84
B. Considering spillovers to the neighboring provinces							
Samsung Investment	0.10***	0.02***	0.11*	0.11***	-0.07*	-0.04	0.04
	(5.79)	(3.27)	(2.00)	(2.9)	(-1.95)	(-0.84)	(1.08)
Neighboring provinces	0.08*	0.01	0.05	0.04	0.02	0.05*	0.14**
	(1.96)	(0.82)	(1.13)	(0.78)	(0.63)	(1.77)	(2.41)
C. Additional effect by industry							
Samsung Investment	0.09***	0.01**	0.10*	0.10***	-0.08**	-0.04	0.04
	(5.12)	(2.25)	(1.97)	(2.76)	(-2.13)	(-1.02)	(1.11)
Samsung- Industry	0.34***	0.26***	0.23**	0.35***	0.27**	0.38***	-0.04
	(6.19)	(5.9)	(2.18)	(5.02)	(2.27)	(2.85)	(-0.84)
Neighboring provinces	0.09**	0.01	0.05	0.05	0.01	0.04	0.13**
	(2.04)	(0.88)	(1.19)	(0.87)	(0.4)	(1.49)	(2.36)
Neighboring - Industry	-0.12**	-0.01	-0.06	-0.17**	0.26*	0.31*	0.05
	(-2.40)	(-0.24)	(-0.85)	(-2.51)	(1.91)	(1.89)	(0.68)
Control mean	3.27	0.79	5.28	3.44	3.24	2.31	6.8
Number of provinces	53	53	53	53	53	53	53
Number of years	13	13	13	13	13	13	13
Observations	151,679	151,679	151,679	151,679	151,679	151,679	151,679

*Note: Standard error clustered at province level. t statistics are in parentheses. * p<0.10, ** p<0.05, *** p<0.01*

Time: 2006-2014

	Wage	TFP	Revenue per worker	Value added per worker
A. Basic regressions				
Samsung Investment	0.03	0.00	0.08*	0.05**
	(1.35)	(0.08)	(1.84)	(2.6)
Control mean	3.05	0.76	5.07	3.25
B. Considering spillovers to the neighboring provinces				
Samsung Investment	0.04*	0.00	0.08*	0.05**
	(1.73)	(0.22)	(1.76)	(2.66)
Neighboring provinces	0.07*	0.007	0.03	0.05
	(1.99)	(0.49)	(0.68)	(1.35)
C. Additional effect by industry				
Samsung Investment	0.03	-0.00	0.08*	0.05**
	(1.36)	(-0.71)	(1.68)	(2.42)
Samsung- Industry	0.29***	0.22***	0.19**	0.26***
	(8.02)	(7.53)	(2.45)	(4.06)
Neighboring provinces	0.07**	0.01	0.03	0.05
	(2.03)	(0.54)	(0.71)	(1.42)
Neighboring - Industry	-0.10***	-0.03	-0.07	-0.14***
	(-3.27)	(-1.07)	(-0.77)	(-2.75)
Control mean	3.02	0.76	5.04	3.22
Number of provinces	53	53	53	53
Number of years	9	9	9	9
Observations	95,524	95,524	95,524	95,524

- **Each panel reports the results from a set of regression**
- **TFP spillover in the same industry and the same province.**
- **Before Samsung’s consultation program (right panel), the effect is slightly weaker.**
- **We find regional spillovers in wages and investment in non-electronics; they increase in neighboring provinces.**

Results: Entrants and Incumbent Firms

New Entrants

	Wage	TFP	Revenue per worker	Value added per worker	Labor	Female labor	Fixed assets
A. Basic regressions							
Samsung Investment	0.08**	0.02**	0.08**	0.07**	-0.0811	-0.0422	0.0151
	(2.21)	(2.05)	(2.39)	(2.11)	(-1.55)	(-0.70)	(0.25)
Control mean	3.43	0.84	5.3	3.55	2.97	2.07	6.4
B. Considering spillovers to the neighboring provinces							
Samsung Investment	0.08**	0.02**	0.08**	0.07**	-0.0771	-0.0353	0.0301
	(2.45)	(2.02)	(2.37)	(2.16)	(-1.50)	(-0.60)	(0.52)
Neighboring provinces	0.061	-0.00506	0.0586	0.0322	0.0414*	0.0713***	0.155**
	(1.59)	(-0.30)	(1.25)	(0.62)	(1.88)	(3.02)	(2.04)
C. Additional effect by industry							
Samsung Investment	0.08**	0.01	0.08**	0.06*	-0.08	-0.04	0.03
	(2.08)	(1.38)	(2.3)	(1.98)	(-1.59)	(-0.70)	(0.55)
Samsung- Industry	0.31***	0.28***	0.20	0.34***	0.24*	0.30**	-0.05
	(4.82)	(4.89)	(1.62)	(3.87)	(1.96)	(2.11)	(-0.57)
Neighboring provinces	0.07*	-0.00	0.06	0.04	0.04	0.07**	0.15*
	(1.69)	(-0.20)	(1.28)	(0.72)	(1.55)	(2.60)	(2.00)
Neighboring - Industry	-0.13**	-0.01	-0.02	-0.18*	0.29*	0.30	0.04
	(-2.09)	(-0.23)	(-0.17)	(-1.87)	(1.69)	(1.41)	(0.36)
Control mean	3.38	0.84	5.27	3.51	2.94	2.04	6.36
Number of provinces	53	53	53	53	53	53	53
Number of years	13	13	13	13	13	13	13
Observations	94,515	94,515	94,515	94,515	94,515	94,515	94,515

*Note: Standard error clustered at province level. t statistics are in parentheses. * p<0.10, ** p<0.05, *** p<0.01*

Incumbents

	Wage	TFP	Revenue per worker	Value added per worker	Labor	Female labor	Fixed assets
A. Basic regressions							
Samsung Investment	0.05***	0.01*	0.11***	0.08***	-0.12***	-0.10**	0.05***
	(3.25)	(1.74)	(2.78)	(3.71)	(-2.79)	(-2.27)	(3.17)
Control mean	3.14	0.73	5.34	3.37	3.71	2.74	7.54
B. Considering spillovers to the neighboring provinces							
Samsung Investment	0.06***	0.01*	0.12**	0.09***	-0.12***	-0.10**	0.07***
	(4.06)	(1.84)	(2.67)	(3.79)	(-2.78)	(-2.19)	(4.92)
Neighboring provinces	0.07	0.01	0.07	0.06	-0.03	0.02	0.15***
	(1.61)	(1.39)	(1.34)	(1.23)	(-0.63)	(0.44)	(3.19)
C. Additional effect by industry							
Samsung Investment	0.06***	0.01*	0.11**	0.09***	-0.12***	-0.10**	0.07***
	(3.78)	(1.8)	(2.52)	(3.79)	(-2.80)	(-2.26)	(4.8)
Samsung- Industry	0.18***	0.04***	0.51***	0.10	0.01	0.27***	0.16*
	(3.49)	(3.25)	(4.17)	(1.66)	(0.21)	(3.44)	(1.75)
Neighboring provinces	0.08	0.01	0.08	0.06	-0.03	0.01	0.15***
	(1.63)	(1.46)	(1.43)	(1.3)	(-0.78)	(0.27)	(3.090
Neighboring - Industry	-0.11***	-0.01	-0.25**	-0.20***	0.19**	0.29***	0.14
	(-3.09)	(-0.18)	(-2.41)	(-3.77)	(2.13)	(2.69)	(1.37)
Control mean	3.1	0.73	5.3	3.33	3.69	2.71	7.47
Number of provinces	53	53	53	53	53	53	53
Number of years	13	13	13	13	13	13	13
Observations	57,150	57,150	57,150	57,150	57,150	57,150	57,150

*Note: Standard error clustered at province level. t statistics are in parentheses. * p<0.10, ** p<0.05, *** p<0.01*

- **TFP spillover is much stronger for entrants (left) than incumbents (right)**
- **We find little effects before Samsung's consultation program.**
- **Samsung's entry would have motivated more productive firms to enter, implying selection effect at work.**

Vertical Spillover Effect

- **We consider spillover effect into the same/upstream industries and the neighboring provinces:**

$$y_{ipt} = \beta_0 + \beta_1 Samsung_{pt} + \beta_2 Samsung_{pt} \times Industry_j + \beta_3 Neighbor_{pt} + \beta_4 Neighbor_{pt} \times Industry_j + \Theta \mathrm{X}_{\mathrm{ipt}} + \gamma_j + \alpha_t + \eta_p + \varepsilon_{ipt}$$

  - $Industry_j$ **indicate industry dummies for the same industry and upstream industries (5-digit)**
  - $Neighbor_{pt} = 1$ **if the firm operates in the neighboring provinces**

Identifying Upstream Industries

- **Samsung electronics' industry classification**
  - Manufacture and Communication Equipment (26300)
  - Batteries and Accumulators (27200)
- **Upstream industries**
  - I-O table of 2012 shows tha t most inputs come from th e same industries
  - However, we identify meani ngful shares of some indust ries, such as metal product s
  - We report results using all, but using only industries in blue returns similar results.

Manufacture ndustry	Industry code	26300	27200
Paper and paper product	17010-17090	0.39	**0.28**
Basic chemicals	20110	0.15	**0.72**
Plastic & synthetic rubber	20131, 20132	0.28	**0.01**
Other chemical products & man-made fibres	20210 - 20300	0.11	**0.34**
Rubber and plastic products	22110- 22209	0.13	**0.02**
Rubber and plastic products	22110- 22209	0.46	**0.39**
Basic precious and other non-ferrous metals	24200	0.23	**8.65**
Structural metal products, tanks, steam generators	25110, 25120, 25130	0.33	**39.52**
Wiring and wiring devices	27310-27330	0.35	**0.00**
Other electrical equipment	27900	0.12	**0.00**
Repair ans installation of machinery and quipment	33110-33190	0.26	**0.36**
Electronics components, computers and peripheral equipment	26100, 26200	65.58	**0.01**
communication equipment	26300	22.77	**0.00**
Batteries and accumulators	27200	0.07	**37.93**
All manufacture	10101 - 33200	91.36	**91.56**
Total		**160,625,450**	**36,326,098**

Source: Authors' calculation based on Vietnam Input-output table 2012

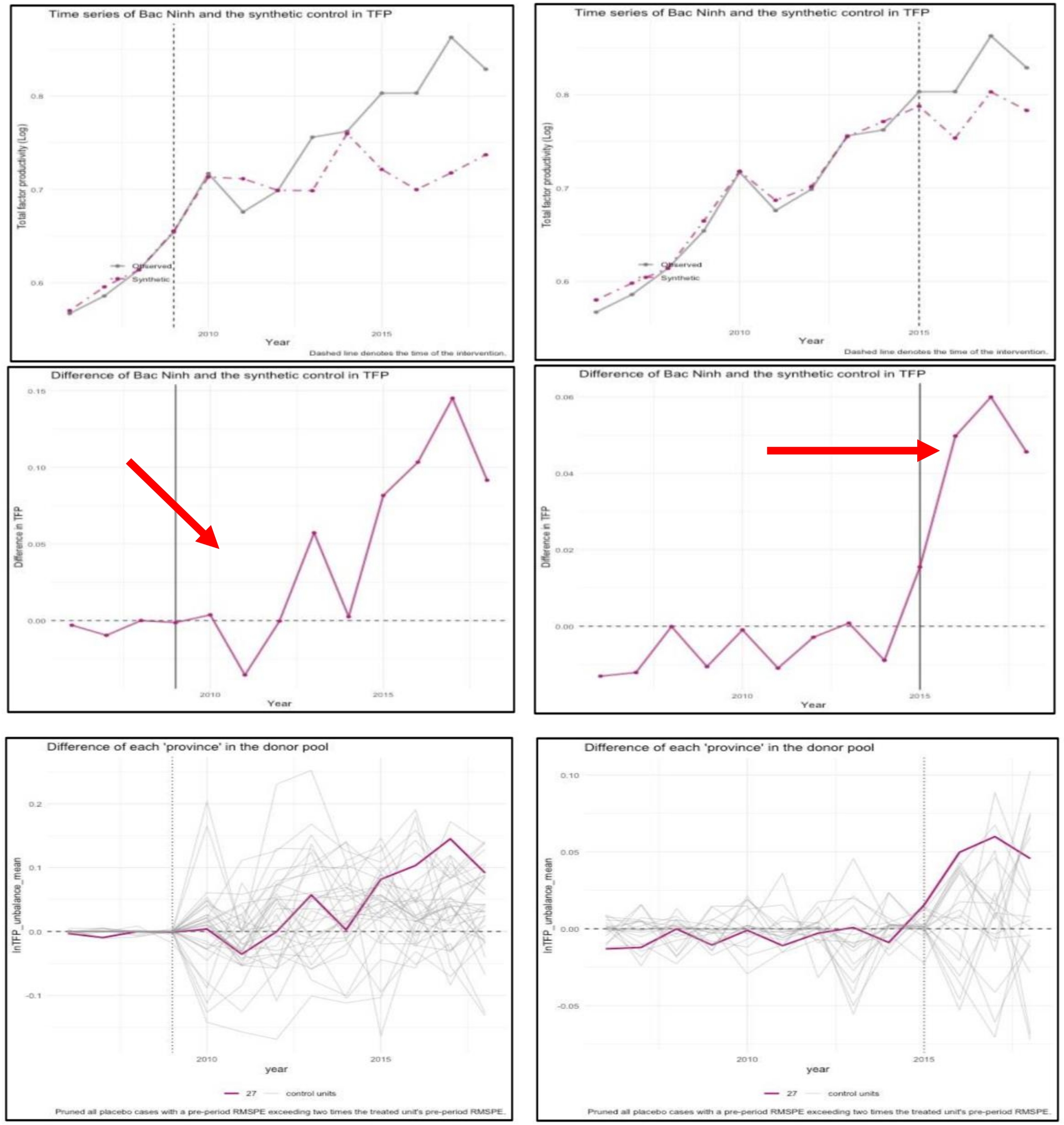
Results: Vertical Spillover into Upstream Industries

	Wage	TFP	Revenue per worker	Value added per worker	Labor	Female labor	Fixxed assets
Panel A. Additional effect for upstream industries (2006-2018)							
Samsung Investment	0.08***	0.01**	0.07	0.10***	-0.05	0.01	0.00
	(3.68)	(2.27)	(1.65)	(3.06)	(-1.60)	(0.39)	(-0.00)
Samsung- upstream	0.07***	0.02***	0.25***	0.04	-0.21***	-0.35***	0.26***
	(4.28)	(2.71)	(7.25)	(0.75)	(-3.28)	(-3.79)	(10.78)
Neighboring provinces	0.09**	0.01	0.06	0.05	0.01	0.04	0.14**
	(2.06)	(0.91)	(1.26)	(0.87)	(0.31)	(1.56)	(2.35)
Neighboring - upstream	-0.03	-0.01	-0.04	-0.01	0.06	0.04	0.02
	(-1.16)	(-0.93)	(-1.19)	(-0.34)	(1.57)	(0.65)	(0.37)
Control mean	3.27	0.79	5.28	3.44	3.24	2.31	6.8
Number of provinces	53	53	53	53	53	53	53
Number of years	13	13	13	13	13	13	13
Observations	150,738	150,738	150,738	150,738	150,738	150,738	150,738
Panel B. Additional effect by upstream industries (2006-2014)							
Samsung Investment	0.02	-0.00	0.03	0.04**	-0.05**	0.01	-0.05
	(0.52)	(-0.12)	(0.6)	(2.06)	(-2.39)	(0.44)	(-0.97)
Samsung- upstream	0.10**	-0.00	0.32***	0.04	-0.19***	-0.38***	0.26***
	(2.6)	(-0.69)	(8.19)	(0.59)	(-3.10)	(-3.73)	(8.25)
Neighboring provinces	0.07**	0.01	0.03	0.05	0.00	0.05**	0.11***
	(2.03)	(0.63)	(0.76)	(1.41)	(0.23)	(2.42)	(3.49)
Neighboring - upstream	-0.02	-0.02**	-0.05*	-0.00	0.14***	0.09	-0.02
	(-1.16)	(-2.10)	(-1.77)	(-0.05)	(3.09)	(1.28)	(-0.52)
Control mean	3.02	0.76	5.04	3.22	3.33	2.38	6.94
Number of provinces	53	53	53	53	53	53	53
Number of years	9	9	9	9	9	9	9
Observations	95,104	95,104	95,104	95,104	95,104	95,104	95,104

*Note: Standard error clustered at province level. t statistics are in parentheses. * p<0.10, ** p<0.05, *** p<0.01*
Communication equipment and Batteries and accumulators are exclude from the sample to avoid any endogeneity issues.

- **Positive spillover effects into wage, TFP, labor productivity are found in the same provin ces.**
- **However, TFP spillover is sm all and insignificant before S amsung Consultation progra m.**
- **But note that we have only th ree years after SCP. Recently , we acquired VES data for la ter years and will update the data**

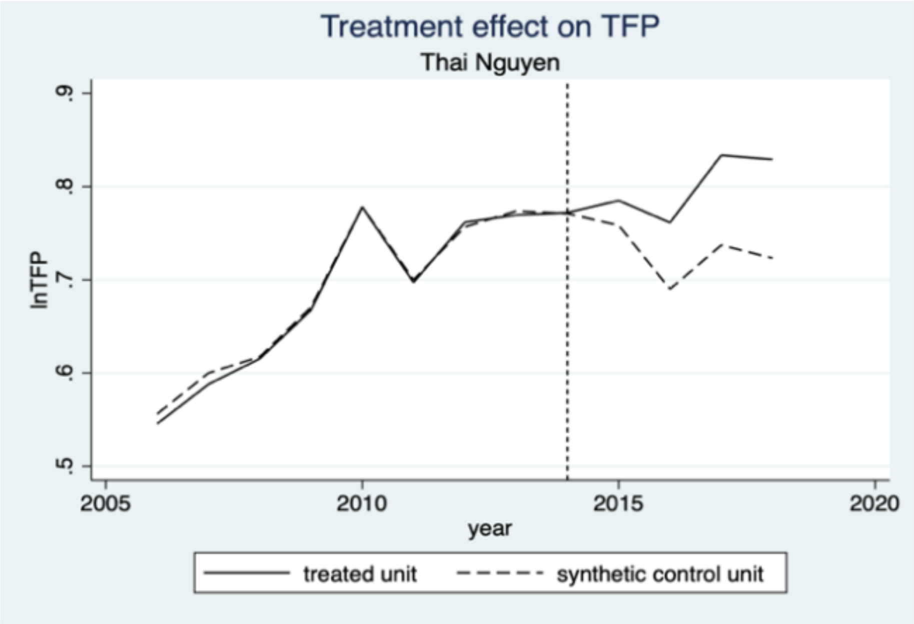
Results from Synthetic Control Method

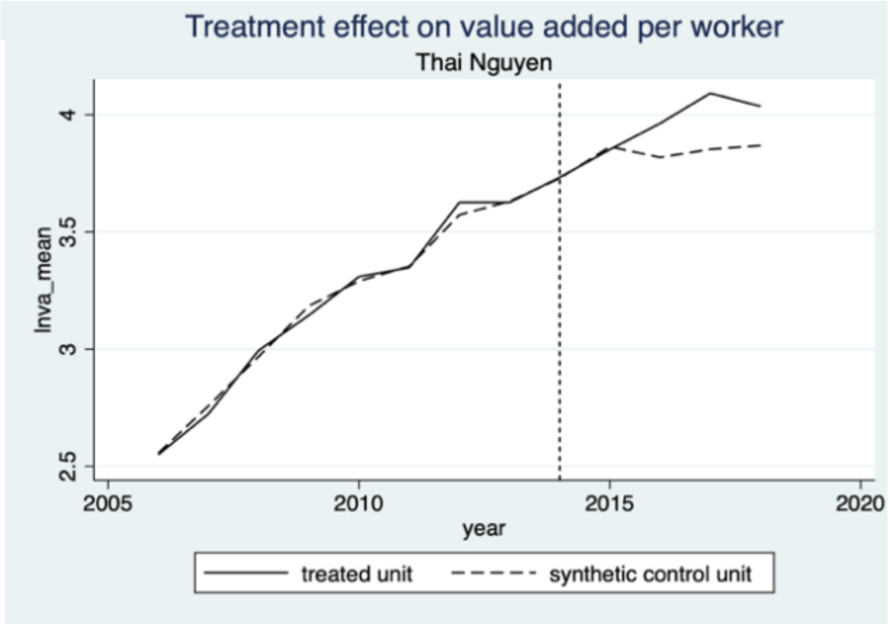


2008 Bac Ninh 2015

- **Our analysis relies on only two treated provinces, and they can have many co nfounding factors. Therefore, we cond ucted SCM for electronics firms.**
  - **We used pre-treatment total factor productivity, firm age, firm size, tangibility level, and market concentration.**
  - **Constructed control: Binh Dinh, Ninh Thuan, Quang Tri, and Lang Son**
- **Left panel compares before and after Samsung's entry in Bac Ninh. We find significant difference in TFP (middle).**
- **Right panel compares before and after Samsung's consultation program.**

Results from Synthetic Control Method





- **We find similar positive effects on TFP and labor productivity for Thai Nguyen, another Samsung's production base.**

Summary

- **This study explores the ramifications of foreign direct investment (FDI) by a MNC, Samsung Electronics in Vietnam.**

- **Our TWFE and SCM analysis indicate that Samsung's entry had positive TFP spillover effects in the same industry and vertical spillover into upstream-industry firms. The effects are stronger after Samsung started a consultation program for local vendors.**

- **TFP spillover effects are stronger for new entrants rather than incumbents. Samsung's entry would have facilitated the formation of new enterprises with new techniques and practices**

- **However, we do not find a positive regional spillover effect in TFP – but a positive effect on wages. This is consistent with our household study results.**

Way Forward

- Our goal is to better understand how a big foreign plant changes the local economy.

- In another study focusing on households, we find informal-to-formal employment reallocation.
  - We examined household survey (VHLSS) to show increases in HH income and consumption in durables, health, and education.
  - We find regional spillovers in employment & income – consistent with firm-level evidence
  - Samsung created numerous production jobs for young females, and the effects were much stronger for households with young women.

- Recent studies indicate that FDI firms bring a change in management practices and culture at work, including gender norm. We hope to explore managerial changes and employment composition of new and old firms.

THE WORLD BANK

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Thanks for Listening!

Q&A

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