

Import Competition from Neighbors: Impacts on Performances of Enterprises in Vietnam

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1. Introduction

Vietnam's exports have registered a growth of over 20%¹ year over year during the past decade, especially since it joined the World Trade Organization (WTO) in 2007. The drastic increase in Chinese exports preceded this, starting with a great surge in 2000. What made the development in Vietnam possible was the liberalization process of the Vietnamese market which started in the mid-1980s when Vietnam decided to switch from its centralized economy.

Figure 1 depicts how Chinese manufacturing imports are expanding as a share of total manufacturing imports in Vietnam. The significance is clear when compared to the declining shares of imports from high-income countries and the low, stagnant shares of imports from other low-wage countries.² It is also important to note that this increase in Chinese imports has been led especially by intermediate inputs, as opposed to final products during the past decade. According to Ha (2011), imports of intermediates from China have “increased 83-fold over 10 years, with an average growth rate of 63.65%.” In 2008, intermediate goods trade accounted for 65.2% while final goods trade amounted merely to 5.7% of total goods trade value. These statistics depict the growing trend in intermediate goods trade as a share of total imported goods, in contrast with the share of imported final goods.

In 2011, China became the second biggest economy in the world. Given its increasing prominence in international trade during the past two decades, a growing number of studies have

¹ Except for year 2009 due to the global financial crisis.

² The cut-off between high and low wage countries is 10% of US GDP per capita (in current US dollars) in 2008.

focused on Chinese competition and estimated its impact on other countries. For example, Jenkins, Peters and Moreira (2008) explore the effects based on sectoral analysis, and finds asymmetrical results, shedding light on the countries and sectors that would gain and lose from this competition. Using detailed plant-level data, Alvarez and Claro (2009) and Iacovone, Rauch and Winters (2013) estimate the impact of Chinese import competition on Chile and Mexico, respectively. Alvarez and Claro (2009) find that Chinese imports have a negative effect on firm survival and the surviving firms' employment growth. In addition to plant-level data, Iacovone, Rauch and Winters (2013) utilize plant-product-level data, enabling them to also analyze the impact across products within a plant. Their findings are that the increase in import competition from China does indeed lead to plant and product exit, as well as decrease in sales, especially for smaller plants. Bloom, Draca and Reenen (2011) match dataset on firms in 12 European countries with industry-level trade data, and find that imports from China decrease the chances of firms' survival and employment. By IT intensity, low-tech firms suffered from market exit and job losses, as opposed to high-tech firms, which were shielded from the import competition, and whose employment actually grew in all sectors. Autor, Dorn and Hanson (2013) and Acemoglu *et al.* (2014) investigate the impact of the rise in Chinese imports on the local labor markets in the U.S. Using U.S. employment data, their estimates show that Chinese import competition caused higher unemployment and reduced wages in exposed industries.

Moreover, by dividing countries into two big groups based on their income, others have analyzed the effects of increasing import competition from low-wage countries on other countries. For example, Bernard, Jensen and Schott (2006), Mayda *et al.* (2012) and Federico (2014) examine the impact on U.S., Japan, and Italian manufacturing plants, respectively. Bernard, Jensen and Schott (2006) finds that import competition from low-wage countries to the U.S. negatively affects plant survival, growth and employment, especially those in industries with higher exposure to competition. Estimation results from Mayda *et al.* (2012) show that increase in import penetration from low-wage countries is associated with a decrease in both the probability of survival and employment growth, and that these negative effects are driven mainly by imports from China. Federico (2014) also finds that the rise in import penetration decreases the number of firms, output, employment and wages in Italy. In this paper, we take into account the effects of import competition from both China and other low-wage countries, along with high-wage countries.

In previous empirical research, economists have typically assumed the traditional trade theories, in which countries with different opportunity costs of production engage in trade. This comparative advantage can arise from differences in productivities or technology (Ricardo, 1817), or from differences in relative factor endowments (Heckscher, 1919; Ohlin, 1924; translated, edited and published in Heckscher and Ohlin, 1991) between countries. This brings us to the question: what does this rise in Chinese import competition in Vietnam tell us about the case where two labor-abundant and technologically similar³ countries trade? It is important to note that Vietnam is also geographically proximate to China. Hence, the possible impact from Chinese competition should be different compared to aforementioned studies.

These traditional theories have their focus on ‘inter-industry trade.’ In order to explain trade within industries, however, we need to take into consideration ‘new’ trade models developed by Krugman (1980). This model incorporates economies of scale and consumer preferences of variety, allowing us to explore the case of ‘intra-industry trade.’⁴ According to this theory, trade will cause firms to exit in each country (selection effect) and surviving firms to expand their output (scale effect).

Seeking to quantify the effects of Chinese import competition on production activities of firms in Vietnam, enterprise type, firm size, capital intensity levels and key economic regions, as well as competition from low-wage countries and high-wage countries are taken into account. The remainder of this paper is organized as follows. In the next section, the dataset and estimation techniques will be explained, followed by the econometric regression results in section 3. The final section concludes.

2. Analytical Framework and Data

First, in order to control for the effects from countries other than China, other countries are grouped into either low-wage countries or high-wage countries. A country is classified as low-wage if its GDP per capita in current US dollars is less than 10% of US GDP per capita in

³ Vietnam ranked ninth in di Giovanni, Levchenko and Zhang (2012), which calculated the technological similarity of different countries to China.

⁴ Table 1 depicts the top five industries with two-way trade within them, calculated using Comtrade data based on the formula: $I = \frac{\min\{\text{exports}, \text{imports}\}}{(\text{exports} + \text{imports})/2}$. The levels of indices for these products have been increasing throughout the years especially since Vietnam’s accession to the WTO in 2007.

2008, the final year of our sample, in order to avoid noisy fluctuations due to countries crossing the threshold in either direction over the years. See Table 2 for the list of countries and their wage groups based on this classification. Second, for consistency over the sample years 2000-2008 in this enterprise survey, any firm with employees less than 10 people are dropped. For the same reason, we drop observations for Hanoi and Ho Chi Minh in 2009. Third, nominal values are converted into real values using appropriate deflators.

This study uses the instrumental variables estimation in order to avoid reverse causality which would potentially cause the estimation of the effect of import competitions to be inconsistent. There is a possibility of endogeneity problem where changes in import competition ($\mathbf{x}$) are associated not only with changes in firms' production activities ($\mathbf{y}$), but also changes in the error term u . In other words, since the growth of Chinese exports into Vietnam could be influenced by Vietnamese firms' behavior, we instrument the Chinese import share in ASEAN imports so as to obtain consistent parameter estimates. The instrument(s) $\mathbf{z}$ needs to satisfy the following two assumptions: $\text{Cov}(\mathbf{z}, u) = 0$, $\mathbf{z}$ is uncorrelated with the error u ; and $\text{Cov}(\mathbf{z}, \mathbf{x}) \neq 0$, $\mathbf{z}$ is correlated with the regressor(s) $\mathbf{x}$. Hence, following the strategy taken by Autor, Dorn and Hanson (2013), the choice of instrument here is share of imports from China in total ASEAN (less Vietnam) imports. The same applies for the imports from other low-wage and high-wage countries into Vietnam.

The firm-level dataset used in this study is from the Vietnamese Enterprise Survey (VES) for the period 2000-2008, provided by the General Statistical Office of Vietnam (GSO). This dataset covers annual information on economic activities by firms all over Vietnam. A number of studies have used this survey to conduct research on Vietnam (e.g., Vu, Yamada and Otsuki, 2014; Ha and Kiyota, 2014). We also use trade data on imports from Comtrade at the 4-digit level of the International Standard Industrial Classification of All Economic Activities, Rev.3 (ISIC Rev.3).

Further, the VES contains information regarding which industry each firm belongs to, in Vietnam Standard Industrial Classification (VSIC) 1993 and 2007. We manually matched each

VSIC code with ISIC Rev.3 using the industry description.⁵ Then we combined the Comtrade data at the ISIC Rev.3 level with the firm-level data. In this study, we limit our observations to manufacturing industries⁶. Descriptive statistics of the observations used are shown in Table 3.

Our main aim is to explain the dynamics of firms in Vietnam caused by the increasing imports from China, which could also mean rising competition. We quantify these effects of Chinese competition on firms' exit (survival), sales growth (from $t - 1$ to t), employment growth (from $t - 1$ to t), industry switching and total factor productivity (TFP). Hence, the equations to be estimated here are as follows:

$$\begin{aligned} Exit_{it} = & \beta_0 + \beta_1 Z_{it-1} + \beta_2 \Phi_{it-1} + \beta_3 \Psi_{it-1} + \beta_4 \ln Sales_{it-1} + \beta_5 \ln Employment_{it-1} \\ & + \beta_6 WTO_{t-1} + \beta_7 Age_{it-1} + \beta_8 CapInt_{it-1} + \beta_9 Ent_Type_{it-1} + \gamma_t + \delta_i + \varepsilon_{it-1} \end{aligned}$$

$$\begin{aligned} \Delta Sales_{it} = & \beta_0 + \beta_1 Z_{it-1} + \beta_2 \Phi_{it-1} + \beta_3 \Psi_{it-1} + \beta_4 \ln Sales_{it-1} + \beta_5 \ln Employment_{it-1} \\ & + \beta_6 WTO_{t-1} + \beta_7 Age_{it-1} + \beta_8 CapInt_{it-1} + \beta_9 Ent_Type_{it-1} + \gamma_t + \delta_i + \varepsilon_{it-1} \end{aligned}$$

$$\begin{aligned} \Delta Employment_{it} = & \beta_0 + \beta_1 Z_{it-1} + \beta_2 \Phi_{it-1} + \beta_3 \Psi_{it-1} + \beta_4 \ln Sales_{it-1} + \beta_5 \ln Employment_{it-1} \\ & + \beta_6 WTO_{t-1} + \beta_7 Age_{it-1} + \beta_8 CapInt_{it-1} + \beta_9 Ent_Type_{it-1} + \gamma_t + \delta_i + \varepsilon_{it-1} \end{aligned}$$

$$\begin{aligned} Switch_{it} = & \beta_0 + \beta_1 Z_{it-1} + \beta_2 \Phi_{it-1} + \beta_3 \Psi_{it-1} + \beta_4 \ln Sales_{it-1} + \beta_5 \ln Employment_{it-1} \\ & + \beta_6 WTO_{t-1} + \beta_7 Age_{it-1} + \beta_8 CapInt_{it-1} + \beta_9 Ent_Type_{it-1} + \gamma_t + \delta_i + \varepsilon_{it-1} \end{aligned}$$

⁵ We referred to the list of 4-digit VSIC manufacturing industries created by Nguyen (2013) for those we could not translate.

⁶ Manufacturing industries of ISIC Rev.3 are those that start their 4-digit codes with 15-37. See <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=2> for more information. There are 119 industries in our sample, and over 56% of imports from China into Vietnam are manufacturing products.

$$TFP_{it} = \beta_0 + \beta_1 Z_{it-1} + \beta_2 \Phi_{it-1} + \beta_3 \Psi_{it-1} + \beta_4 WTO_{t-1} + \beta_5 Age_{it-1} + \beta_6 Ent_Type_{it-1} + \gamma_t + \delta_i + \varepsilon_{it-1}$$

where $Exit_{it}$ takes the value 1 if the firm does not exist in the survey the following year, and 0 if it survives; Z_{it-1} is the IV that measures the Chinese competition shock; Φ_{it-1} is the IV for competition shock from low-wage countries other than China; Ψ_{it-1} is the IV for competition from high-wage countries; Ent_Type_{it-1} is the enterprise type; $\ln Sales_{it-1}$ and $\ln Employment_{it-1}$ are natural logarithm of sales and employment, respectively; $CapInt_{it-1}$ is capital intensity (capital-labor ratio); WTO_{t-1} is a WTO dummy that takes the value 1 post-2007; Age_{it-1} is how old the firm is; γ_t denotes year fixed effects and δ_i is firm fixed effects. Subscripts i and t respectively denote each industry and year.

Following Bernard, Jensen and Schott (2006), $Switch_{it}$ takes the value 1 for industry switching occurring between years $t - 1$ and t , and 0 otherwise. Table 4 compares the firm capital intensity and respective import competition across the old and new industries of firms that switch. Results show that destination industries are less capital-intensive, or more labor-intensive. Firms that switch industries move into industries that have less import competition from China and other low-wage countries, but to those that are more exposed to high-wage competition. All differences are statistically significant at the 1% level.

The Chinese competition shock is calculated by taking a share of Chinese imports to Vietnam in Vietnam's total imports. The instrumental variable Z_{it-1} for this will then be the share of imports to ASEAN (excluding Vietnam) from China in ASEAN (excluding Vietnam)'s total imports. In addition, capital intensity is measured as the ratio of a firm's fixed assets to the number of its workers. Furthermore, enterprises are categorized into four types (state-owned, domestic private, joint-venture and foreign-invested enterprises), since ownership of firms should also have influence on this outcome.

Table 5 depicts a detailed breakdown of firms' exit by their enterprise type, size, capital intensity level⁷ and region. Firm sizes are defined as small if the number of employees are

⁷ Category 1 of capital intensity consists of firms with capital intensity level under 16, 2 for those with capital intensity that is at least 16 but less than 17.2, and 3 for those greater than or equal to 17.2.

between 10 and 22, medium if there are 23-80 employees, and large for firms with over 81 employees. The Vietnamese government divides its regions into three Key Economic Zones (KEZs): Northern, Southern and Central.⁸ We grouped the provinces and municipalities that are not categorized as KEZs into Rural.

First, among the different types of enterprises, a higher percentage of domestic private enterprises and joint-venture enterprises have exited the market in our sample. Second, size-wise, the smaller the firm is, the higher the tendency of it having to exit. Third, firms that belong to industries that are labor-intensive exit more compared to those that are more capital-intensive, although there is not that much difference between the capital intensity categories 1 and 2. Fourth, firms in the rural region, where labor-intensive manufacturing is more likely to be located, are less likely to exit compared to northern and southern key economic zones.

3. Results

Table 6 shows the estimation results from the second stage of the standard IV model. First, based on the Kleibergen-Paap Wald rk test statistics, the instrumentation in this model is strong⁹. Under the null hypothesis that the specified endogenous regressors can actually be treated as exogenous, results from the endogeneity test show us that the import competition variables do need to be considered endogenous in these equations.

Chinese competition shock is statistically insignificant at the 10% level when the dependent variable is firms' exit from the market, however, the positive impact on industry switching is statistically significant at the 1% level. It also has a negative and statistically significant impact at the 1% level on both sales and employment growth. These results imply that while an increase in Chinese import competition does not increase the probability of Vietnamese

⁸ The Northern Key Economic Zone: Hanoi City, Hung Yen Province, Hai Phong City, Quang Ninh Province, Hai Duong Province, Ha Tay Province, Bac Ninh Province and Vinh Phuc Province;
The Central Key Economic Zone: Thua Thien Hue Province, Quang Nam Province, Quang Ngai Province, Binh Dinh Province and Da Nang City;
The Southern Key Economic Zone: Ho Chi Minh City, Binh Duong Province, Ba Ria – Vung Tau Province, Dong Nai Province, Tay Ninh Province, Binh Phuoc Province and Long An Province.
See <http://www.vietnam-briefing.com/news/vietnams-regions-key-economic-zones.html/> for the detailed context behind the categorization of key economic zones.

⁹ The “rule of thumb” is that that the F statistic should be at least 10 for weak identification not to be considered an issue (Staiger and Stock, 1997).

firms having to exit, these firms are actually surviving by switching industries when exposure to Chinese imports are high. The surviving firms are also likely to face a decline in sales and employment.

In contrast, competition shock from low-wage countries other than China has a positive impact on firm exit, statistically significant at the 5% level. For sales and employment growth, it has a positive effect statistically significant at the 10% level. This suggests that the an increase in imports from low-wage countries increases the probability of firms having to exit, and firms that do survive experience an increase in both sales and employment growth. This confirms Krugman's 'new' trade theory, briefly explained above, and the more productive firms survive, while the less productive firms exit the market.

Further, competition shock from high-wage countries have a positive effect on firm exit statistically significant at the 10% level, while posing negative effects on sales and employment growth at the 1% level. This implies that since products imported from high-wage countries tend to have high quality, firms in Vietnam cannot compete with these products, thus having to leave the market. This implication of import competition from high-wage countries is consistent with Martin and Mejean (2014). They find that there is a positive relationship between quality upgrading in imports from high-wage countries and increased competition from low-wage countries.

Finally, the effects of Vietnam joining the WTO are negative for firm survival, output and employment. Further estimation by firm size in Table 7 reveals that this WTO effect differs depending on firm size: WTO's negative effects on firm survival is greater for smaller-sized firms, and trivial for large-scale firms. The bigger and thus perhaps more productive the firm is, the higher the resistance against exit from the market becomes. At the same time, however, the negative impact on sales and employment growth becomes greater. Dutt, Mihov and Van Zandt (2013) state that WTO membership tends to reduce the fixed costs of trade as opposed to variable costs, indicating that the negative effect on output growth is mainly on already traded goods.

Results also show that large firms that are state-owned are more likely to cease operation while the surviving ones employ more workers, and smaller multinational enterprises are more

likely to let go of their workers. In addition, the less labor-intensive the firms are, the more likely they are to survive in the market and expand their output and employment.

4. Conclusion

This firm-level study applies the IV estimation method to consistently measure the impact of import competition on firms in Vietnam. Although the surge in Chinese imports seemingly has no impact on the probability for firms in Vietnam to exit from the market, the results show that firms systematically adjust their product mix in response to pressure from increasing import competition from China by switching their industries. It also had negative effects on the surviving firms' sales and employment growth. On the other hand, competition shock from low-wage countries other than China increased the probability of firms to exit, while also increasing the surviving firms' sales and employment growth. This is consistent with Krugman's 'new' trade theory. Furthermore, import competition from high-wage countries not only drives firms out of the market, but also negatively affects their output and employment. This could be explained by the differences in product quality. Finally, results from further estimation by firm size reveal that the effects from Vietnam's accession to the WTO differ depending on the firm size. The bigger the firm is, the higher the resistance against exit from the market becomes. At the same time, however, the negative impact on sales and employment growth becomes greater for the surviving firms.

There is scope for further research regarding the quality ladders model of product improvement (Grossman and Helpman, 1991). This comes from the notion that firms in the South seek to imitate the production techniques that were developed and improved in the North. This model predicts that the effects of import competition from low-wage countries will be smaller in sectors with a 'long' quality ladder. Khandelwal (2010) measures the extent of quality ladders, or vertical product differentiation, as the range of qualities within the product market. Additional calculation of vertical product differentiation may elucidate some more facts on the nature of increasing import competition in Vietnam.

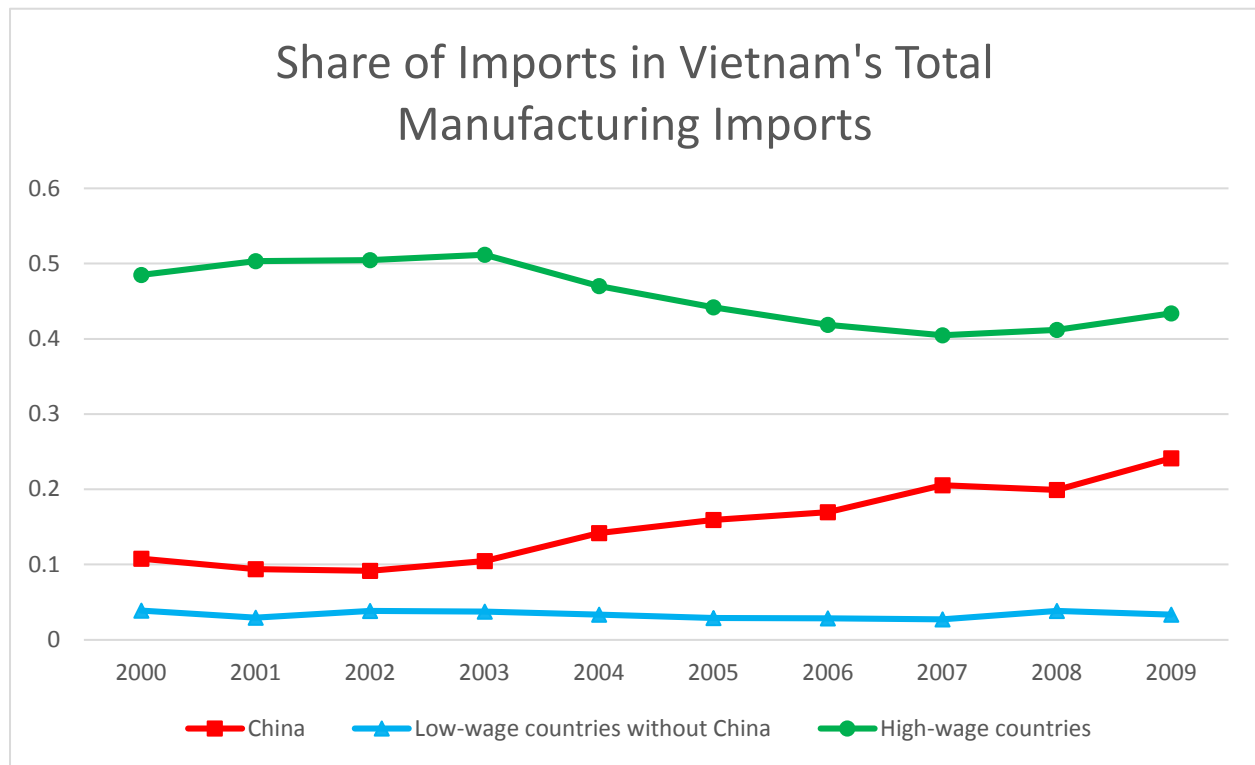
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Tables and Figures

Figure 1: Increase in import competition from China – There is an increasing trend in imports of manufactures from China as a share of total manufactures imports in Vietnam.



Source: Authors' calculation based on trade data from UN Comtrade.

Table 1: Vietnam's intra-industry trade index

	China			Low-wage			High-wage		
Rank	ISIC	Description		ISIC	Description		ISIC	Description	
1	3430	Manufacture of parts and accessories for motor vehicles and their engines	0.938	1520	Manufacture of dairy products	0.991	2520	Manufacture of plastics products	0.977
2	1810	Manufacture of wearing apparel, except fur apparel	0.920	2811	Manufacture of structural metal products	0.990	2610	Manufacture of glass and glass products	0.976
3	1544	Manufacture of macaroni, noodles, couscous and similar farinaceous products	0.864	1512	Processing and preserving of fish and fish products	0.974	3130	Manufacture of insulated wire and cable	0.964
4	2519	Manufacture of other rubber products	0.838	2411	Manufacture of basic chemicals, except fertilizers and nitrogen compounds	0.964	2893	Manufacture of cutlery, hand tools and general hardware	0.957
5	3511	Building and repairing of ships	0.804	2699	Manufacture of other non-metallic mineral products n.e.c.	0.956	2519	Manufacture of other rubber products	0.939

Source: Authors' calculation based on trade data from UN Comtrade.

Table 2: Low-wage and high-wage country groups

	lowwage		highwage	
freq.	97		89	
percent	52.15		47.85	
countries	Afghanistan	Malawi	Algeria	Maldives
	Albania	Mali	Antigua and Barbuda	Malta
	Angola	Marshall Islands	Argentina	Mauritius
	Armenia	Mauritania	Australia	Mexico
	Bangladesh	Micronesia	Austria	Montenegro
	Belize	Moldova	Azerbaijan	Netherlands
	Benin	Mongolia	Bahrain	New Zealand
	Bhutan	Morocco	Barbados	Norway
	Bolivia	Mozambique	Belarus	Oman
	Bosnia and Herzegovina	Myanmar	Belgium	Palau
	Burkina Faso	Namibia	Botswana	Panama
	Burundi	Nepal	Brazil	Poland
	Cabo Verde	Nicaragua	Brunei Darussalam	Portugal
	Cambodia	Niger	Bulgaria	Qatar
	Cameroon	Nigeria	Canada	Romania
	Central African Republic	Pakistan	Chile	Russia
	Chad	Papua New Guinea	Colombia	Saudi Arabia
	China	Paraguay	Costa Rica	Serbia
	Comoros	Peru	Croatia	Seychelles
	Côte d'Ivoire	Philippines	Cyprus	Singapore
	Democratic Republic of the Congo	Republic of Congo	Czech Republic	Slovak Republic
	Djibouti	Rwanda	Denmark	Slovenia
	Dominican Republic	Samoa	Dominica	South Africa
	Ecuador	Senegal	Equatorial Guinea	South Sudan
	Egypt	Sierra Leone	Estonia	Spain
	El Salvador	Solomon Islands	Finland	St. Kitts and Nevis
	Eritrea	Sri Lanka	France	St. Lucia
	Ethiopia	Sudan	Gabon	Vincent and the Grenadines
	FYR Macedonia	Swaziland	Germany	Suriname
	Fiji	Syria	Greece	Sweden
	Georgia	São Tomé and Príncipe	Grenada	Switzerland
	Ghana	Tajikistan	Hong Kong SAR	Taiwan Province of China
	Guatemala	Tanzania	Hungary	The Bahamas
	Guinea	Thailand	Iceland	Trinidad and Tobago
	Guinea-Bissau	The Gambia	Ireland	Turkey
	Guyana	Timor-Leste	Islamic Republic of Iran	United Arab Emirates
	Haiti	Togo	Israel	United Kingdom
	Honduras	Tonga	Italy	United States
	India	Tunisia	Jamaica	Uruguay
	Indonesia	Turkmenistan	Japan	Venezuela
	Iraq	Tuvalu	Kazakhstan	
	Jordan	Uganda	Korea	
	Kenya	Ukraine	Kuwait	
	Kiribati	Uzbekistan	Latvia	
	Kyrgyz Republic	Vanuatu	Lebanon	
	Lao P.D.R.	Yemen	Libya	
	Lesotho	Zambia	Lithuania	
	Liberia	Zimbabwe	Luxembourg	
	Madagascar		Malaysia	

Table 3: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
exit	116836	0.140	0.347	0	1
Δ sales	92506	0.172	0.825	-9.731	10.964
ln_sales	116372	21.637	2.038	12.708	29.800
Δ employment	92902	0.028	0.456	-6.303	5.370
ln_employment	116836	4.041	1.357	2.303	11.119
CapInt	112274	16.463	1.534	7.186	23.451
wto	116836	0.321	0.467	0	1
age	87093	6.342	7.843	0	97
switch	100525	0.117	0.321	0	1
tfp	96552	0.598	0.129	0.000	0.884
<i>in Vietnam</i>					
Chinese competition	115792	0.211	0.183	0.000	0.996
Other low-wage countires	103679	0.026	0.058	0.000	0.613
High-wage countries	116808	0.445	0.185	0.002	1
<i>in ASEAN</i>					
Chinese competition	116836	0.175	0.135	0.001	0.866
Other low-wage countires	116836	0.028	0.042	0.000	0.488
High-wage countries	116836	0.455	0.180	0.088	0.988

Table 4: Characteristics of old and new industries for firms that switch industries

Characteristics	Mean difference across plants between new and old industries (%)	T statistic (mean=0)	P value
Firm's capital intensity (K/L)	-9.68251	3.1059	0.00
Chinese competition	-2.29483	2.997	0.00
Low-wage competition	-7.55519	3.6425	0.00
High-wage competition	1.543572	-4.1374	0.00

Table 5: Breakdown of firm exits in numbers

	by enterprise type				
exit	state-owned	domestic-private	joint-venture	foreign-invested	Total
0	17,904	30,433	35,284	16,904	100,525
1	3,949 (18.07%)	8,829 (22.49%)	13,579 (22.79%)	2,206 (11.54%)	28,563
Total	21,853	39,262	48,863	19,110	129,088

	by size			
exit	1	2	3	Total
0	29,808	34,193	36,524	100,525
1	13,807 (31.66%)	8,904 (20.66%)	5852 (13.81%)	28,563
Total	43,615	43,097	42,376	129,088

	by level of capital intensity			
exit	1	2	3	Total
0	36,050	31,781	32,694	100,525
1	11,031 (23.43%)	9,933 (23.81%)	7,599 (18.86%)	28,563
Total	47,081	41,714	40,293	129,088

	by region				
exit	Central KEZ	Northern KEZ	Southern KEZ	Rural	Total
0	5,324	22,216	41,083	31,902	100,525
1	902 (14.49%)	8,325 (27.26%)	13,666 (24.96%)	5,670 (15.09%)	28,563
Total	6,226	30,541	54,749	37,572	129,088

Table 6: Estimation results

	(1) Exit	(2) Sales growth	(3) Employment	(4) Switching	(5) TFP
Chinese competition	0.002 (0.10)	-0.828*** (0.26)	-0.626*** (0.17)	0.558*** (0.16)	0.088*** (0.03)
Low-wage countries	0.496** (0.23)	0.960* (0.57)	0.582* (0.34)	0.097 (0.31)	-0.074 (0.08)
High-wage countries	0.226* (0.12)	-1.135*** (0.31)	-0.875*** (0.21)	0.310 (0.21)	0.066 (0.04)
ln_Sales	0.004 (0.01)	-0.760*** (0.01)		0.005 (0.01)	
ln_Employment	-0.052*** (0.01)	0.294*** (0.02)	-0.565*** (0.01)	-0.013 (0.01)	
WTO	0.456*** (0.01)	-0.056*** (0.01)	-0.096*** (0.01)	-0.419*** (0.01)	0.028*** (0.00)
Age	0.000 (0.00)	-0.002* (0.00)	0.001** (0.00)	0.001 (0.00)	0.000* (0.00)
Capital intensity	-0.010** (0.00)	0.073*** (0.01)	0.044*** (0.01)	-0.003 (0.00)	
SOEs	0.014 (0.01)	-0.018 (0.02)	0.049*** (0.02)	0.042*** (0.01)	0.005* (0.00)
Joint ventures	0.045*** (0.01)	-0.016 (0.01)	-0.007 (0.01)	0.012 (0.01)	-0.002 (0.00)
MNEs	0.069 (0.05)	-0.662** (0.33)	-0.458* (0.24)	-0.085 (0.06)	0.049** (0.02)
Firm and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	53,201	39,409	39,587	41,797	41,797
Number of id	17,712	13,286	13,345	14,135	14,135
Kleibergen-Paap Wald rk F statistic	66.839	44.145	44.548	44.931	45.130
Kleibergen-Paap rk LM statistic	177.220	116.995	118.027	120.655	120.994
p-value	0.000	0.006	0.000	0.000	0.045
Endogeneity test	53.630	12.593	20.263	28.055	8.037
p-value	0.000	0.000	0.000	0.000	0.000

Notes: Clustered standard errors are in parentheses. Chinese and other low-wage countries' competitions in ASEAN were used as IVs for the three endogenous regressors – Chinese and other low-wage countries competition in Vietnam. The baseline enterprise type is the domestic private enterprise.

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

Table 7: Estimation results by size

	Small-sized firms					Medium-sized firms					Large-sized firms				
	Exit	Sales growth	Employment	Switching	TFP	Exit	Sales growth	Employment	Switching	TFP	Exit	Sales growth	Employment	Switching	TFP
Chinese competition	0.325 (0.32)	-0.167 (1.08)	0.186 (0.47)	-0.341 (0.75)	0.412* (0.21)	-0.112 (0.21)	-0.621 (0.48)	-0.304 (0.29)	-0.035 (0.37)	0.033 (0.07)	0.292* (0.18)	-0.630 (0.44)	-0.554** (0.28)	0.994*** (0.31)	0.191*** (0.06)
Low-wage countries	1.428 (1.08)	2.406 (4.53)	-0.751 (2.02)	4.676** (2.27)	-1.063 (0.70)	0.063 (0.53)	-1.096 (1.12)	-0.372 (0.61)	0.205 (0.76)	-0.042 (0.15)	0.405 (0.26)	1.283** (0.61)	0.463 (0.39)	-0.653* (0.40)	-0.005 (0.07)
High-wage countries	0.444 (0.28)	-0.611 (0.89)	-0.020 (0.42)	-0.575 (0.71)	0.291* (0.18)	0.218 (0.29)	-0.976 (0.62)	-0.526 (0.39)	-0.157 (0.50)	0.019 (0.10)	0.373* (0.22)	-0.784 (0.54)	-0.852** (0.36)	0.581 (0.41)	0.171** (0.07)
ln_Sales	0.035* (0.02)	-0.813*** (0.02)		-0.026 (0.02)		-0.019 (0.02)	-0.767*** (0.02)		0.027 (0.02)		0.024 (0.02)	-0.739*** (0.02)		0.017 (0.02)	
ln_Employment	-0.092*** (0.03)	0.197*** (0.06)	-0.789*** (0.04)	0.019 (0.04)		-0.041* (0.02)	0.280*** (0.03)	-0.610*** (0.02)	-0.051** (0.02)		-0.064*** (0.02)	0.373*** (0.02)	-0.414*** (0.02)	-0.020 (0.02)	
WTO	0.510*** (0.02)	0.006 (0.05)	0.081*** (0.02)	-0.341*** (0.03)	0.010 (0.01)	0.496*** (0.01)	-0.029 (0.03)	-0.110*** (0.02)	-0.357*** (0.02)	0.025*** (0.00)	0.374*** (0.01)	-0.116*** (0.01)	-0.174*** (0.01)	-0.500*** (0.01)	0.028*** (0.00)
Age	-0.002 (0.00)	-0.000 (0.00)	0.001 (0.00)	0.001 (0.00)	-0.000 (0.00)	0.001 (0.00)	-0.000 (0.00)	0.001* (0.00)	0.001 (0.00)	0.000 (0.00)	-0.000 (0.00)	-0.002 (0.00)	0.001 (0.00)	-0.000 (0.00)	0.000 (0.00)
Capital intensity	-0.016* (0.01)	0.065*** (0.02)	0.023** (0.01)	-0.007 (0.01)		-0.007 (0.01)	0.061*** (0.01)	0.039*** (0.01)	-0.007 (0.01)		-0.020*** (0.01)	0.070*** (0.01)	0.024*** (0.01)	-0.003 (0.01)	
SOEs	0.045 (0.03)	-0.078 (0.12)	0.026 (0.05)	-0.046 (0.05)	0.023 (0.02)	0.027 (0.02)	-0.068* (0.04)	-0.018 (0.03)	0.008 (0.02)	0.001 (0.01)	0.026* (0.01)	-0.040 (0.03)	0.037* (0.02)	0.015 (0.02)	0.001 (0.00)
Joint ventures	0.045** (0.02)	0.080 (0.06)	0.021 (0.03)	0.059* (0.03)	-0.008 (0.01)	0.047*** (0.01)	-0.035 (0.03)	0.006 (0.02)	0.030* (0.02)	-0.004 (0.00)	0.032*** (0.01)	-0.019 (0.02)	-0.026** (0.01)	0.011 (0.01)	-0.004* (0.00)
MNEs	-0.188 (0.12)	0.035 (0.08)	-0.201*** (0.04)	0.411*** (0.09)	0.034 (0.03)	0.116 (0.15)	0.286 (0.20)	-0.087 (0.28)	-0.051 (0.16)	0.013 (0.08)	-0.013 (0.07)	-0.061 (0.20)	0.088 (0.14)	-0.115 (0.07)	-0.001 (0.02)
Firm and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,472	6,395	6,446	7,567	7,567	15,789	11,628	11,673	12,080	12,080	20,017	16,566	16,596	16,915	16,915
Number of id	4,283	2,648	2,671	3,119	3,119	5,974	4,461	4,479	4,637	4,637	6,301	5,321	5,332	5,426	5,426
Kleibergen-Paap Wald rk F statistic	5.431	1.807	1.860	1.805	1.712	11.316	8.326	8.519	8.004	8.078	18.378	12.449	12.422	12.972	13.147
Kleibergen-Paap rk LM statistic	14.855	5.092	5.233	5.134	4.874	32.810	23.891	24.370	23.135	23.327	46.782	32.606	32.544	33.847	34.315
p-value	0.000	0.853	0.022	0.013	0.027	0.000	0.000	0.000	0.847	0.848	0.000	0.000	0.160	0.000	0.000
Endogeneity test	6.313	0.785	0.879	10.702	11.951	20.089	7.577	5.577	0.809	0.806	14.176	5.715	5.171	97.530	10.846
p-value	0.097	0.024	0.831	0.023	0.008	0.000	0.056	0.134	0.000	0.000	0.003	0.126	0.000	0.000	0.013

Notes: Clustered standard errors are in parentheses. For (1), (2) and (3), Chinese, low-wage countries' and high-wage countries' competitions in ASEAN were used as IVs for the three endogenous regressors – Chinese, low-wage countries' and high-wage countries' competition in Vietnam. The baseline enterprise type is the domestic private enterprise. Firm sizes are defined as small if the number of employees are 10-22, medium if there are 23-80 employees, and large for firms with over 81 employees. *** p<0.01, ** p<0.05, * p<0.1