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Does rising import competition harm Vietnam's local firm employment of the 2000s?

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ABSTRACT

This study considers for the first time the role of rising import competition on employment in Vietnam. Using a time differenced and instrumental variables approach, our study shows that import competition results in employment contraction. Firms operating in industries that face greater import competition have reduced employment. We also find strong evidence of a negative impact of import competition for small and very small firms, as well as in the period before Vietnam's World Trade Organization (WTO) accession. Our results also reveal that previous studies at the industry-level can provide biased estimates because of not controlling for the heterogeneity of firm characteristics.

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1. Introduction

International trade in the early twenty-first century has been characterised by the boom in Chinese exports. As a result, customers around the world have enjoyed lower prices, especially for low-tech products. However, increases in Chinese exports may have adversely affected countries or industries that produce similar products.

Vietnam may have experienced more impact from cheap imports from China, as its neighbour. As shown in Appendix 2, Vietnam's imports through world trade increased from 0.22% in 1998 to 0.6% in 2009, but Vietnam's imports from China have risen even faster. They stood at 4% of total Vietnamese imports in 1998, but rose to almost 25% in recent years. The context of fast rising imports motivates us to consider whether and how local firm employment has adjusted to rising import penetration in Vietnam. If employment is negatively affected by import competition, it might raise some concerns about national economic security,[1] given the country's increasing economic integration.

The impact of rising imports on employment has been widely researched, particularly in labour-intensive tradable industries. Empirical studies on developed economies such as the US, UK and Belgium show consistent evidence of a negative impact of imports on employment (David, Dorn, & Hanson, 2013; Mion & Zhu, 2013); however, evidence for

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developing economies is limited. In addition, the commonality in such studies is that they often look at only import competition from China because, like Vietnam, imports from China into many countries have increased faster than any other country in recent decades.

Cross-industry comparisons show that rising imports lead to employment reduction (David et al., 2013; Revenga, 1992; Sen, 2009; Tomiura, 2003). They show that workers in industries facing higher competition from imports have a higher risk of losing their jobs. However, studies at the country- or industry-level may not detect the real impacts of imports on employment. Trade liberalisation may not necessarily lead to employment reduction because import employment contraction can be offset by export-driven employment expansion. More importantly, the studies using industry or country-level have shortcomings. First, controlling for the characteristics of heterogeneity of firms in the economy is impossible by using aggregated data (Kasahara & Rodrigue, 2008). Furthermore, Halpern, Koren, and Szeidl (2005) show that the studies at macro-level may suffer from the problems of omitted variable and reserve causality.

With the availability of micro data, the literature is turning to firm-level analysis to verify the mechanism of how import affects employment. However, findings are mixed. Some found a positive effect in some countries (e.g., Ibsen, Warzynski, & Westergård-Nielsen, 2009) but others indicated a negative effect in other countries (e.g., Edwards & Jenkins, 2015). The lack of clarity about the link between import penetration and firm employment at firm-level is another motivation for us to study this topic in Vietnam. Vietnam is an interesting case of a lower-level of economic advancement, but has experienced economic transition and strong growth in both imports and exports since signing the bilateral trade agreement with the US in 2001 and gaining World Trade Organization (WTO) accession in 2007. To the best of our knowledge, no work has been done about the impact of imports on employment at firm-level.

A common belief in Vietnam is that there is a positive but insignificant impact of import competition on employment growth (e.g., Kien & Heo, 2009). However, we argue that the studies based on aggregated data can be biased if the heterogeneity of firm characteristics is not controlled for. Hence, the present study is expected to have a number of unique contributions to the literature. First, it draws upon a unique panel data set to provide the first evidence at the firm-level of the impact of import competition on employment in Vietnam. Second, a challenge in empirical studies of the impact of imports on employment relates to biased estimates possibly due to unobserved characteristics and potentially endogenous imports. These are overcome by using a combination of time-differenced and instrumental variable estimations.

The remainder of the article is in four parts. Section 2 provides the background of import activities in Vietnam. Section 3 explains data sources and the methodology, while Section 4 discusses the empirical results. The final section summarises the main findings.

2. The background of import activities in Vietnam

This part will provide an overview of import activities in Vietnam. Figure 1 shows that Vietnam (in current US$) experienced a significant growth from nearly US$15.7 billion in 2000 to nearly US$85 billion in 2010. In addition, as shown in Figure 1, there are three important cornerstones affecting import growth of Vietnam through this period. The first was the trade agreement with US in 2001 which has boosted the trade relationship between Vietnam and the US since 2000. In addition, imports in Vietnam continued to boom in the

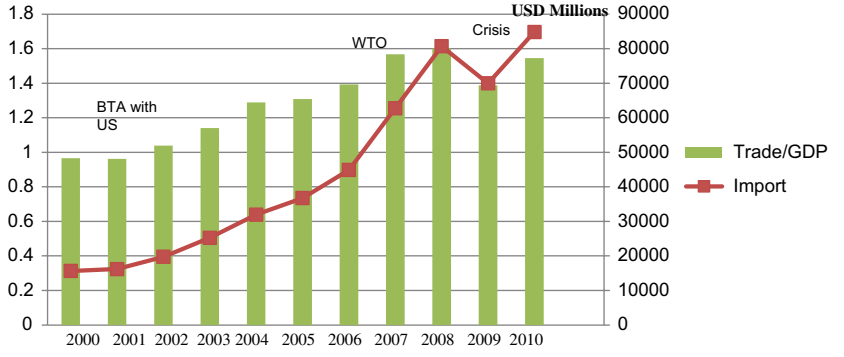

Figure 1. Import, and trade-GDP ratio. Source: GSO (2011) Statistical Year Book of Vietnam, 2010–2010. General Statistical Publisher, Hanoi, Vietnam.

period following admittance to be a WTO member in 2007. Although the value of import growth witnessed a drop in 2009 due to global crises, there are clear signs of a quick recovery in following years.

In terms of measuring the openness of the economy, the ratio of trade over GDP is a popular index measuring the integration of the economy. As displayed in Figure 1, this ratio increased nearly twice (from near 97% in 2000 to approximately 155% in 2010). This suggests that on one hand, the degree of integration of the Vietnamese economy is becoming greater, and the economic growth depends on the value of exports and imports. On the other hand, the economy can be easily vulnerable to external shocks.

Using Standard International Trade Classification (SITC) classification of the UN, as displayed in Table 1, the structure of using SITC classifications of import has not changed much through the research period. For example, primary products account for nearly 24% in 1995, while the share of goods in manufacturing sectors is over 76%. However, the picture is not much different after 15 years. The share of import manufacturing goods reached over 75% in 2010, while primary goods is nearly constant and occupied 23% in total import value at the same time. Taking a closer look, a striking feature within patterns of manufacturing import is to focus on machinery and tools goods. These are classified as Section 7 on the SITC, including manufacture and transport equipment that accounted for nearly 30% in

Table 1. Commodity compositions of imports according to SITC classification.

Year		1995	2000	2005	2010
Description					
Primary products	SITC	23.475	22.560	25.321	23.530
Food, foodstuff and live animal	0	4.658	4.007	5.319	7.338
Beverages and tobacco	1	0.992	0.657	0.478	0.345
Crude materials, inedible, except fuels	2	5.602	3.778	4.416	5.448
Mineral fuels, lubricants and related materials	3	11.055	13.564	14.596	9.595
Animal and vegetable oils, fats and wax	4	1.165	0.553	0.512	0.804
Manufactured products		76.525	77.391	72.449	75.332
Chemical and related products	5	15.759	15.360	14.444	14.724
Manufactured goods classified chiefly by materials	6	18.537	21.757	27.671	26.462
Machinery and transport equipment	7	28.733	30.128	25.169	29.130
Miscellaneous manufactured articles	8	13.495	10.145	5.165	5.017
Commodities not classified elsewhere in SITC	9	0.000	0.049	2.230	1.138
Total		100	100	100	100

Source: Author's calculation from Vietnam General Statistical Offices, *Statistical Yearbook* (Various issues).

the imported manufactured products. In contrast, the value of miscellaneous manufactured articles witnessed a significant decrease from nearly 14% to nearly 5% in 2010.

With regards to the geographical profile of imports, before renovation, the majority of Vietnam's trade was to countries in the Council for Mutual Economic Assistance (CMEA) (Athukorala, 2009). Since the reform period, Vietnam has developed trade relationships with many countries and territories. Specifically, Table 2 displays the import destination of Vietnamese goods to various countries and country groups. Imports from Association of Southeast Asian Nations (ASEAN) countries remained unchanged much between 1995 and 2005. Although the share of importing goods from ASEAN had a decreasing trend in the recent period, it still absorbed nearly a fifth of total imports. Vietnam absorbed the majority of goods from countries in Asia-Pacific Economic Cooperation (APEC). For example, Vietnamese imports from the US increased significantly from over 1% in 1995 to nearly 5% in 2010. This may be due to the bilateral trade agreement between Vietnam and the US (VN-US BTA) effective since 2001. Chinese goods into Vietnamese markets witnessed a significant increase in the period. Besides China, Japan still was one of largest exporters to Vietnam, in spite of a decreasing tendency in the research period.

Table 2. Exporting countries to Vietnam.

	Composition (%)			
Country/ country group	1995	2000	2005	2010
ASEAN	27.836	28.453	25.370	19.340
Cambodia	0.288	0.239	0.436	0.326
Indonesia	2.330	2.209	1.904	2.250
Laos	1.030	0.676	0.265	0.344
Malaysia	2.336	2.487	3.418	4.023
Myanmar	0.000	0.023	0.125	0.121
Philippines	0.303	0.402	0.571	0.825
Singapore	17.476	17.231	12.193	4.834
Thailand	5.393	5.186	6.458	6.603
APEC	79.623	84.692	83.476	82.421
Korea, Rep.	15.371	11.215	9.777	11.501
Japan	11.228	14.715	11.083	10.627
United States	1.599	2.324	2.347	4.440
Russian Federation	1.776	1.538	2.085	1.178
Canada	0.305	0.240	0.472	0.412
Australia	1.234	1.877	1.356	1.702
China	4.043	8.960	16.049	23.814
OPEC	2.620	3.363	3.539	1.697
Iran	0.001	0.186	0.060	0.118
Saudi Arabia	0.072	0.090	0.248	0.709
United Arab Emirates	0.183	0.056	0.188	0.263
Kuwait	0.000	0.719	0.976	0.439
Qatar	0.004	0.066	0.079	0.098
EU	8.711	8.425	7.022	7.499
United Kingdom	0.622	0.959	0.496	0.602
Norway	0.013	0.048	0.043	0.153
Finland	0.143	0.090	0.116	0.144
Sweden	0.277	0.279	0.379	0.374
Italy	0.657	1.089	0.784	0.969
Austria	0.188	0.202	0.139	0.145
Germany	2.152	1.888	1.801	2.054
Belgium	0.266	0.588	0.466	0.377
Netherlands	0.445	0.541	0.849	0.622
France	3.392	2.137	1.218	1.142
Switzerland	0.915	0.664	2.430	1.186

Source: Author's calculation from Vietnam General Statistical Offices, *Statistical Yearbook* (Various issues).

3. Data and econometric models

3.1. Data

The data used in this study are extracted from two sources. First, the Vietnam Enterprise Survey (VES) that has been conducted annually since 2000 by the Vietnam General Statistical Office (GSO) offers a panel data set spanning 2000–2009. Information on firm demographics, ownership, business activities, employment, wages, assets, capital, business performance, revenue, and profit are provided in the VES data. Second, the data on Chinese exports and Vietnamese imports are taken from the UN Comtrade database. This article uses the definition of industries by the Vietnam Standard Industrial Classification 1993 (VSIC1993) four-digit industry-level codes. Trade data is classified by SITC Revision 3. Then, the trade data and firm-level data from the VES are concorded to create a unique industry-firm data for this study.[2]

Because of the unavailability of services import data, this study focuses only on the manufacturing sector. In addition, the tax code is used as firm identifiers to merge the data, and hence firms without a tax code for some reason, such as missing data or infant firms, are removed.

3.2. Econometric strategies for the impacts of import penetration on firm employment

In order to investigate the impact of import penetration on the employment of firms, the empirical specification follows the standard theoretical model and is as follows:[3]

$$lnL_{ijt} = \alpha + \beta_1 imp\_pen_{jt} + \beta_2 lnQ_{ijt} + \beta_3 lnW_{ijt} + \beta_4 ownership_{ijt} + \lambda t + \lambda j + \lambda i + U_{ijt} \quad (1)$$

where lnL_{ijt} is natural log of employment, and import penetration (imp_pen_{jt}) is measured as the proportion of imports over sales of industry j at time t. Increased import penetration is a proxy for competitive pressure on domestic firms that may induce either technical changes such as Research and Development (R&D) and innovation, firm productivity or a crowding out effect, then firm employment. The term W_{ijt} is the average wage, while Q_{it} is real output. Model (1) also controls for variables such as firm ownership to control for employment differences among types of ownership, and dummies for Industry (λ_j), firms (λ_i) and year (λ_t) fixed effects which allow to account for unobservable technology shocks and other macroeconomic shocks.

Considering the role of import penetration on employment faces two potential biases, namely unobservable characteristics and the potential endogeneity of imports. As a result, besides the estimation of the benchmark, we use time-differenced specifications to remove the bias from unobserved characteristics or at least from time-invariant unobserved factors. The model is specified as below.

$$\Delta lnL_{ijt} = \alpha + \Delta\beta_1 imp\_pen_{jt} + \beta_2 \Delta lnQ_{ijt} + \beta_3 \Delta lnW_{ijt} + \beta_4 ownership_{ijt} + \lambda_t + U_{ijt} \quad (2)$$

Equation (2) is estimated in time-differenced specifications that regresses changes in the logarithm of firm employment against changes in log of factor inputs and (lagged) import penetration. The industry and firm-level variation are removed through the differencing process. It is noted that estimations on the basis of longer changes capture persistent changes

better and mitigate the effect by noise that biases the coefficients towards zero (Griliches & Hausman, 1986). Therefore, estimates using changes over two or three years will be conducted instead of one-year difference specification.[4]

However, the results from model (2) are still biased due to the potential endogeneity of imports. Our identification strategy to deal with the endogeneity is to exploit the exogenous shocks to Vietnam's imports. In the last decade Vietnam signed many foreign trade agreements (FTAs) with its key trade partners, particularly with China in 2004 when Vietnam was a member of ASEAN.[5] The event of China's accession to WTO in 2001 may have been a big shock to Vietnam's imports. These then motivates us to use China's export (to the world) as a suitable instrument candidate for our identification strategy, because China's export may meet two conditions for a good instrument, namely relevance, such that corrvariance (Vietnam *import*, China's *exports*) ≠ 0, and exclusion (validity), such that Corrvariance (Firm employment, China's *exports*) = 0.

China's *export* penetration may not be directly correlated with Vietnamese firms' employment. The increasing import share to Vietnam from China seems to be exogenous (to Vietnamese firm employment) and determined by the fast-growing exports of China to the world in the 2000s (see Appendices 1 and 2). Hence, we may model Vietnam's import penetration as a function of China's *exports*, either in levels or changes as seen in equations (3) and (4):

$$import_{j,t-k} = f\ (CNexport_{j,t-k},\ X_{j,t-k} \tag{3}$$

$$\Delta import_{j,t-k} = f\ (\Delta CNexport_{j,t-k},\ \Delta X_{j,t-k} \tag{4}$$

We also use a lag length (k) to allow for reverse causality and firms' dynamic response to import competition.

Finally, we further investigate by estimating equation 2, with all variables included as k-period changes, and import penetration variables lagged by m periods. Lagged changes are used to ensure that import penetration changes are predetermined relative to current planned employment changes, and to allow for the possibility that the effect on employment may take time to have an effect. In addition, it has the potential to reduce the reverse causality between import penetration and employment growth. We then combine level and time-differences with the instrument variable method to further consolidate our findings:

$$\Delta_k lnL_{ijt} = \alpha + \beta_1 \Delta_k imp_{pen_{jt}} + \beta_2 \Delta_k lnQ_{ijt} + \beta_3 \Delta_k lnW_{ijt} + \beta_4 ownership_{ijt} + \lambda_t + \Delta U_{ijt}. \tag{5}$$

All equations are estimated with standard errors clustered by industry and year to allow for the fact that measured import penetration does not vary within industry and year (Moulton, 1990).[6]

4. Empirical results and discussion

4.1. The basic estimation

The impact of import competition on the employment of firms is estimated by using ordinary least squares (OLS) for the entire sample. The estimated results from column 1 of Table 3 display that all estimated coefficients have their expected signs. For example, while output

has a positive impact on the number of employees created, average wages have a negative effect. In addition, all variables are significant at the 1% level.

In a first attempt to control for unobserved time-invariant characteristics, a fixed effect model is also estimated. The results from column 2 of Table 3 reveal that the statistical significance and expected signs of variables do not change compared to OLS estimates. However, the estimated coefficients of output fall, but the coefficients on both wages and import penetration show an increasing trend.

In order to explore further possible bias from unobserved time-invariant variables and to reduce the problem of serial correlation, the model of time-differenced specification is regressed. The results, reported in columns 3 and 4 of Table 3, reveal little change, although there are changes in the magnitude of the estimated coefficients. This implies that our reports are robust through various estimations.

Evidences of a negative linkage between wages and firm employment, and a positive impact of output in the level of labour demand are also recorded in other studies in various countries. For example, using the existence of panel data in the UK in the 1979–1991 period, Greenaway, Hine, and Wright (1999) examine the effects of output and wages on employments in the UK. They find that a decrease in outputs leads to a lower level of labour demand. However, reductions in employment couple with an increase in wages.

In terms of the impact of the main variable of interest, the empirical results indicate a statistically significant and negative influence of increased import penetration on employment change. The empirical evidence is also in line with recent studies (e.g., Edwards, 2004; Jenkins & Sen, 2006). They concluded that rising import penetration has a significantly negative impact on employment growth. A negative impact of imports on employment can be explained as follow. The Vietnamese economy is numerically dominated by SMEs, with 96% of the total number of enterprises that typically have limited technology and a low level of development (Cuong, Sang, & Anh, 2007; Doan, Nguyen, Vu, Tran, & Lim, 2016; Vu, Holmes, Tran, & Lim, 2016)). As a result, cheap imports with similar technology, especially from China, may create intensified competition within industries, and Vietnamese firms face higher direct competition

Table 3. Effects of import penetration on firm employment (2000–2009)[a].

	OLS (k=0)	Fixed effect (k=0)	Two-year difference (k=2)	Three-year difference (k=3)
VARIABLES	(1)	(2)	(3)	(4)
Δ_k lnQ$_t$	0.7562**	0.4632**	0.4320**	0.4774**
	(0.007)	(0.016)	(0.009)	(0.010)
Δ_k lnw$_t$	−0.6171**	−0.3788**	−0.3566**	−0.3754**
	(0.013)	(0.018)	(0.009)	(0.010)
Δ_k imp_pen$_t$	−0.0176**	−0.0051**	−0.0085**	−0.0022*
	(0.003)	(0.001)	(0.001)	(0.001)
Constant	0.2240**	1.3961**	0.0057	0.0162
	(0.049)	(0.092)	(0.011)	(0.012)
Observations	205,581	205,581	96,142	70,157
R-squared	0.856	0.473	0.409	0.456
Year effect	Yes	Yes	Yes	Yes
Ind2 controlled	Yes	Yes	Yes	Yes

[a]One may worry that multi-collinearity may be a problem for our model. However, the results reveal that the highest VIF is 3.1 and the average of VIFs is 1.30, implying that multi-collinearity may not be the problem in current study.

Notes: The dependent variable is the natural log of labour. Clustered (by year and ind4) standard errors are in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%. k represents time length-differences; 'k=0' indicates levels. All models control for year, two-digit industry dummies. Δ_k is k-year differences. Switching industry was corrected to allow for fixed effects within industry (ind4) and also correctly clustering.

Source: Authors' own calculation from GSO (2000–2009) and the UN Comtrade database.

pressure from imports especially from China. Consequently, Imports may displace domestic production, and this in turn may have negative effects on firm employment.

These findings, however, are inconsistent with the empirical evidence of Kien and Heo (2009), who suggest that import penetration has a positive and insignificant effect on employment. One reason for the different finding of Kien and Heo (2009) could be that their study results are based on industry-level data, which is more likely to suffer from bias by using aggregated data (Kasahara & Rodrigue, 2008). Meanwhile, our study is based on firm-level data that capture firm heterogeneity. The divergence in results between the current article and previous studies may be because of the difference in the sample periods. For example, this study is conducted in the period 2000–2009, while Kien and Heo (2009) employ a sample over the 1999–2004 period.

As discussed previously, the inclusion of *concurrent* import penetration variables in Table 3 may result in endogeneity bias. However, these results provide baseline estimates and also some first evidence of the impact of import penetration on employment. All regressions include industry and year effects, so the estimated impact of import penetration reflects the association between changes in employment and import penetration over time within industries. In the next section, we re-investigate the relationship by using the instrumental variable approach to consolidate our findings.

4.2. Instrumental variable approach

In a further investigation, in order to mitigate endogeneity bias and reduce the influence of volatile short-term fluctuations, our preferred specification for time differences uses lagged values of changes in import penetration to ensure that changes in import penetration happened prior to the changes in employment.

Using the OLS estimation for time-differenced specification, results in column 1 of Table 4 show that import penetration has a negative and statistically significant impact on employment

Table 4. Effects of import penetration on employment, 2000–2009.

	OLS	IV estimation-GMM method
VARIABLES	(1)	(2)
$\Delta_2 lnw_t$	−0.3166**	−0.3166**
	(0.010)	(0.010)
$\Delta_2 lnQ_t$	0.3473**	0.3473**
	(0.013)	(0.013)
$\Delta_2 imp\_pen_{t-3}$	−0.0028**	−0.0027**
	0.0007	0.0008
Constant	−0.0229*	−0.0687**
	(0.010)	(0.013)
Observations	34,463	34,463
R-squared	0.301	0.301
Instrumented variable		$\Delta_2$imp_pen_L3
Excluded instrument		$\Delta_2$expCN_pen_L3
1st stage Prob>F		0.0000
Partial R2		0.99
Test for instrument equal zero in the 1st stage, F-val (P-val)		1.2e+07 (0.0000)
AR test, Chi2(1) (P-value in bracket)		9.4** (0.002)

Notes: The dependent variable is the two-year difference in log of labour. Clustered (by year and ind4) standard errors are in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%. k represents time length-differences; 'k=0' indicates levels. All models control for year, two-digit industry dummies. Δ_k is k-year differences. Switching industry was corrected to allow for fixed effect within industry (ind4) and also correctly clustering.

Source: Authors' own calculation from GSO (2000–2009) and the UN Comtrade database.

growth. The results are robust to instrumental variable estimations (column 2 of Table 4). Using invalid and weak instrumental variables will lead to upward biased results (Stock & Yogo, 2002), and therefore, the econometric background for our instrumental variables is formed based on statistical tests. The first stage partial R-squared is 0.99 with P-value of 0.0000, rejecting the hypothesis of a weak instrument at the 1% level. In addition, the value of the Anderson and Robin (AR) statistic is 9.4, with a P-value of 0.002, As reported by IV estimations, we still find a negative impact of import penetration on employment growth. Specifically, if import penetration increases 1%, then employment will be reduced by 0.27%, keeping all other things constant.

4.3. Decomposing effects by firm size, before and after WTO accession

The effect of import penetration on employment may also be heterogeneous across firm size groups. Firm size can represent the differences in efficiency and firm competitiveness (Jovanovic, 1982). Hence, we consider the linkage between imports and firm employment in sub-samples according to firm size. Columns 1–3 of Table 3 show various estimations for different groups of firms: small, medium and large firms. The estimates are shown in Table 3 the overall negative estimated impact of import penetration is clearly evident. Meanwhile the estimates for larger firms with 200 or more employees have positive effects, but are statistically insignificant. This may be because larger firms with larger capital and

Table 5. Decomposing effects by firm size (employees); before and after WTO accession, 2000–2009 (IV estimation-GMM method)[a]

	Firm size fewer than			Firm size greater than or equal	WTO Accession	
VARIABLES	20	100	200	200	Before WTO	After WTO
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta_2$imp_pen$_{t-3}$	−0.0118*	−0.0071**	−0.0059**	5.2969	−0.0027*	0.2291
	(0.005)	(0.002)	(0.001)	(41.760)	(0.001)	(12.548)
$\Delta_2$lnQ$_t$	0.3363**	0.3642**	0.3614**	0.2770**	0.3426**	0.3523**
	(0.022)	(0.015)	(0.013)	(0.019)	(0.020)	(0.014)
$\Delta_2$lnw$_t$	−0.2522**	−0.3208**	−0.3244**	−0.2761**	−0.3096**	−0.3247**
	(0.018)	(0.013)	(0.012)	(0.016)	(0.015)	(0.012)
Constant	−0.1828+	−0.1316**	−0.1151**	−0.0738**	−0.0773**	−0.0356*
	(0.100)	(0.025)	(0.020)	(0.028)	(0.016)	(0.017)
Observations	8,847	21,259	25,705	8,758	18,610	15,853
Centred R-squared	0.287	0.309	0.309	0.282	0.296	0.307
Instrumented variable	D2imp_pen_L3	D2imp_pen_L3	D2imp_pen_L3	D2imp_pen_L3	D2imp_pen_L3	D2imp_pen_L3
Excluded instrument	D2expCN_pen_L3	D2expCN_pen_L3	D2expCN_pen_L3	D2expCN_pen_L3	D2expCN_pen_L3	D2expCN_pen_L3
1st stage Prob>F	0.000	0.000	0.000	0.000	0.000	0.000
Partial R2	0.99	0.99	0.99	0.215	0.99	0.118
Test for instrument equal zero in the 1st stage, F-val (P-val)	4.2e+06 (0.000)	8.3e+06 (0.000)	9.2e+06 (0.000)	2292.71 (0.000)	4.9e+08 (0.000)	1737.17 (0.000)
AR test for weak IV, Chi2(1) (P-value in bracket)	6.52* (0.0107)	18.36** (0.000)	31.86** (0.000)	0.02 (0.8902)	4.78* (0.028)	0.00 (0.98)

[a]We also investigate the impact of imports on firm employment on the different technology level sectors (see Appendix 4 for the classification). However, the results do not change much about the quality, and are available on requests.

Notes: The dependent variable is the two-year difference in log of labour. Clustered (by year and ind4) standard errors are in parentheses. * significant at 5%; ** significant at 1%. k represents time length-differences; 'k=0' indicates levels. All models control for year, two-digit industry dummies. Δ_k is k-year differences. Switching industry was corrected to allow for fixed effect within industry (ind4) and also correctly clustering. Tech levels are low, medium, and high technology.

Source: Authors' own calculation from GSO (2000–2009) and the UN Comtrade database.

resources can face better with competition in imports. However, small- and medium-sized enterprises in Vietnam often have limited capital, resources and technology (Cuong et al., 2007; Rand, 2007). Hence, small and very small firms might be crowded out by cheaper and better quality from imports.

Also, regressions for period before and after WTO accession are undertaken. As shown by column (5) and (6) of Table 5, the results of a negative impact of imports on firm employment are observed in the period before WTO accession period. However, the estimated coefficient of such impact becomes insignificant after Vietnam's accession into WTO. This may be explained by the fact that before WTO period, imports witnessed a strong growth, but there is an up and down variation of imports after WTO accession, and hence this may affect the role of imports in local firm employment.

5. Conclusion

This article examined how firm employment is affected by increasing import penetration in the Vietnam manufacturing sector. Based on an unbalanced panel data set spanning 2000–2009, we identify the effect of import penetration on employment growth by examining within-industry and within-firm variation. Our study shows that on average, firms' exposure to increasing import penetration leads to lower employment. This in turn might have negative effects on national economic security. The results are robust to different estimation approaches which allow us to address biases caused by omitted variables and the endogeneity of import penetration.

This article clarifies the impact of import competition on employment using unique micro data on Vietnamese firms. Many studies have dealt with the effects of import competition on employment, but most use macro-level data on the countries or industries. As a result, their results fail to clarify whether the effects on employment are positive or negative. Also, our results imply that the impact of import penetration on employment growth at an aggregated level (e.g., national- or industry-level) would be biased when failing to control for the heterogeneity of firm characteristics. This article demonstrates that the use of rare micro panel data set on Vietnamese firms, coupled with time-differenced instrumental variables methods, to consider the effects of import competition on employment brings about a result that overcomes the shortcomings of the previous studies by controlling for the heterogeneity of firms and endogeneity problems.

There are some caveats in this study. For example, the impact of imports on employment can be different depending on imports of final or intermediate goods. In addition, the impact of imports on employment may differ according to whether imports come from developing or developed countries. The impact also may be different if considering the impact of imports on employment through supply chains. However, the data limitations prevent us from doing such scenarios, and these are avenues for further study.

Notes

1. Unemployment is a component of national economic security, see more: http://ecocritique.free.fr/ilohappy.pdf
2. To replicate the results, concording programme and dofile are available on request.
3. The foundation for the theoretical model is set out in Appendix 4.

4. However, losing more observations is the cost of using of longer time differencing (e.g., three- and four-year difference). As a result, the main model for our time-differencing specification is two-year differenced estimation.
5. The agreement on Trade in goods of the China–ASEAN FTA entered into force in July 2005, and the agreement on trade in services came into effect in July 2007. In August 2009, the two parties signed the agreement on Investment.
6. Clustering may be still problematic if the number of clusters (industry-years) is small relative to the units per cluster. Cameron, Gelbach, and Miller (2008) suggest cluster bootstrapping techniques for inference. We tried both clustered and clustered bootstrapping for our main estimates and found very similar estimated standard errors. We report clustered standard errors in the article.

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Appendix 1. China export over time.

Year	Total world export ($US billion)	CN Export ($US billion)	Growth	
1998	5,158	184	1%	
1999	5,220	195	6%	
2000	6,010	249	28%	
2001	5,830	266	7%	(WTO accession)
2002	6,190	326	23%	
2003	7,240	438	34%	
2004	8,780	593	35%	
2005	9,940	762	28%	
2006	11,600	969	27%	
2007	13,200	1,220	26%	
2008	15,300	1,430	17%	GFC
2009	11,900	1,200	−16%	GFC
2010	14,400	1,580	32%	
2011	15,000	1,900	20%	
Average	10,047	808	19%	

Source: UN Comtrade database.

Appendix 2. Vietnamese imports from the world and China.

Year	Total VN import ($US billion)	VN import growth	VN import from China ($US billion)	%VN import in world trade	VN import from CN (% in total import)
(1)	(2)	(3)	(4)	(5)	(6)
1998	11.5	−0.9%	0.51	0.22%	4%
1999	11.7	1.7%	0.67	0.22%	6%
2000	15.6	33.3%	1.40	0.26%	9%
2001	16.2	3.8%	1.61	0.28%	10%
2002	19.7	21.6%	2.16	0.32%	11%
2003	25.3	28.4%	3.14	0.35%	12%
2004	32.0	26.5%	4.60	0.36%	14%
2005	36.8	15.0%	5.90	0.37%	16%
2006	44.9	22.0%	7.39	0.39%	16%
2007	62.8	39.9%	12.71	0.48%	20%
2008	80.7	28.5%	15.97	0.53%	20%
2009	69.9	−13.4%	15.41	0.59%	22%
2010	84.8	21.3%	20.20	0.59%	24%
2011	107.0	26.2%	24.59	0.71%	23%
Average	44.2	18%	8.3	0.41%	15%

Source: UN Comtrade and GSO website, column 3 is calculated from column 2 so it is nominal growth rates.

Appendix 3. Statistical description of main variables in the model.

		Mean			
Year	Observations	Output (VA)	Wages (W)	Employment (L)	Import penetration
2000	9,852	5,187	9.74	148	0.0017
2001	12,882	4,658	10.13	133	0.0001
2002	14,573	5,057	11.13	138	0.00002
2003	16,670	5,525	12.66	142	0.00003
2004	20,216	5,540	13.51	134	0.000036
2005	23,126	5,448	14.82	125	0.000043
2006	26,318	6,003	16.68	119	0.000027
2007	30,480	6,857	19.84	115	0.000031
2008	37,546	7,111	24.77	100	0.000028
2009	44,139	7,816	16.82	88	0.00004
Overall	235,802	6,335	16.7	116	0.00004

Note: VA is at current price, measured in VND million. Employment is labour count.
Source: Authors' own calculation from GSO (2000–2009) and the UN Comtrade database.

Appendix 4. Tech level industry groups.

Group 1: Low technology
D15: Food and beverages
D16: Cigarettes and tobacco
D17: Textile products
D18: Clothing, dressing and dying of fur
D19: Leather and products of leather; leather substitutes; footwear
D20: Wood and wood products, excluding furniture
D21: Paper and paper products
D22: Printing, publishing, and reproduction of recorded media
D23: Coke and refined petroleum products and nuclear fuel
D36: Furniture and other products not classified elsewhere
D37: Recycles products

Group 2: Medium technology
D24: Chemicals and chemical products
D25: Rubber and plastic products
D26: Other non-metallic mineral products
D27: Iron, steel and non-ferrous metal basic industries
D28: Fabricated metal products, except machinery and equipment

Group 3: High technology
D29: Machinery and equipment
D30: Computer and office equipment
D31: Electrical machinery apparatus, appliances, and supplies
D32: Radios, television and telecommunication devices
D33: Medical equipment, optical instruments
D34: Motor vehicles and trailers
D35: Other transport equipment

Appendix 5. Theoretical foundation of the model.

Following Greenaway et al. (1999), and Milner and Wright (1998), the model specification of the impact of import activities on employment begins by using a simple Cobb-Douglas production function for firm i at time t:

$$Q_{it} = A^{\lambda} K_{it}^{\alpha} L_{it}^{\beta} \tag{1}$$

where Q_{it}=real output, and two input factors, K_{it}=capital and L_{it}=labour.

$$\frac{\partial Q_{it}}{\partial K_{it}} = \alpha A^{\lambda} K_{it}^{\alpha-1} L_{it}^{\beta} \ (2), \frac{\partial Q_{it}}{\partial L_{it}} = \beta A^{\lambda} K_{it}^{\alpha} L_{it}^{\beta-1} \ (3)$$

A firm following a profit maximising strategy will choose the level of labour and capital where the marginal revenue of labour ($MRP_{L)}$ is equal to wage (w) and the marginal revenue of capital (MRP_K) is equal to the cost (c).

Multiply (2) to unit price (P): $MRP_L = p\beta A^{\lambda} K_{it}^{\alpha} L_{it}^{\beta-1} = w$ (4)

And (3) to unit price (P): $MRP_K = p\alpha A^{\lambda} K_{it}^{\alpha-1} L_{it}^{\beta} = c$ (5)

From equation (4): $K_{it}^{\alpha} = \frac{w}{p\beta A^{\lambda} L_{it}^{\beta-1}}$ (6)

From equation (5): $K_{it}^{\alpha-1} = \frac{c}{p\alpha A^{\lambda} L_{it}^{\beta}}$ (7)

From equation (7): $K_{it}^{\alpha} = \frac{cK_{it}}{p\alpha A^{\lambda} L_{it}^{\beta}}$ (8)

But equation (6) = equation (8), solving for K : $K_{it} = \frac{w\alpha}{c\beta}.L_{it}$ (9)

Substituting K_{it} in equation (9) into equation (10): $Q_{it} = A^{\lambda}\left(\frac{w\alpha}{c\beta}.L_{it}\right)^{\alpha} L_{it}^{\beta}$ (10)

From equation (10): $Q_{it} = A^{\lambda} w^{\alpha} L_{it}^{\alpha} L_{it}^{\beta} c^{-\alpha} \beta^{-\alpha}$ (11)

Taking logarithms and rearranging the terms on the right side of equation (11):

$$\ln L_{it} = \phi_0 + \phi_1 \ln(\tfrac{w}{c}) + \phi_2 \ln(Q_{it}) \tag{12}$$

Where: $\phi_0 = -(\lambda \ln A + \alpha \ln \alpha - \alpha \ln \beta)/(\alpha + \beta)$

$\phi_1 = -\alpha/(\alpha + \beta)$ ‘ $\phi_2 = 1/(\alpha + \beta)$

According to Greenaway et al. (1999), A is assumed to change with import activities (IM_{it}). Therefore, equation (12) is written as follows:

$$\ln L_{it} = \varphi_0 + \varphi_1 \ln(w/c) + \varphi_2 \ln(Q_{it}) + \varphi_3 IM_{it}$$