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Services Imports and Labour in Viet Nam

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This paper draws on detailed firm-level and worker-level information to explore the link between services imports and employment dynamics in the case of Viet Nam. The econometric analysis consists of two parts. First, data covering formal firms are exploited to investigate the relationship between sector-level services import intensity and firm-level employment and firm-level average wages. The second part is conducted at the level of workers and also covers informal workers. The results show that sector-level services import intensity positively affects firm-level average wages of Vietnamese formal services firms, whereas a small negative effect on firm-level employment is observed. For manufacturing firms, there is no conclusive evidence regarding the association between services import intensity and firm-level employment. The worker-level analysis identifies a positive wage effect of occupation-level exposure to services imports on domestic workers in foreign-owned businesses in all sectors. The results also suggest that higher skilled workers might be more likely to benefit from services imports. This paper provides support for an approach that combines an emphasis on lowering firms' costs of sourcing foreign services inputs with efforts to strengthen SMEs' capabilities and improve workers' skills.

Keywords: Trade, employment, individual and firm-level data, wages, worker heterogeneity

JEL Codes: F14, F16, F61, J21, J30, C26

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Executive summary

The share of global services trade accounted for by developing countries increased from 28% in 2005 to 34% in 2017. However, little is known about the employment implications of the growing services imports of emerging economies. This paper addresses this gap by exploring the case of Viet Nam.

In the late 1970s, Viet Nam was among the world's poorest countries. The Vietnamese economy has since undergone profound changes and has displayed remarkable dynamism following the introduction of a set of liberal policies in 1986 known as “Đổi Mới” (renovation). This reform package paved the way for the country's opening to trade and foreign investment.

Since its WTO accession in 2007, the country has established itself as a hub for export-oriented manufacturing activities. At the same time, services imports grew, on average, by 12% between 2005 and 2017. Viet Nam, therefore, provides a fruitful setting for an analysis aimed at improving our understanding of the link between services imports and labour dynamics in emerging economies.

The econometric analysis in this paper consists of two parts. First, data covering virtually the universe of formal firms in Viet Nam are analysed to investigate the link between sector-level services import intensity and firm-level employment and firm-level average wages. The second part of the analysis is conducted at the level of workers. Exploiting the rich information on workers' characteristics provided by the Vietnamese labour force surveys (LFS), this step provides insight into wage effects of occupation-level exposure to services imports across different types of workers, including those in the informal sector.

The findings of this study provide support for an approach that combines an emphasis on lowering firms' costs of sourcing foreign services inputs with efforts to strengthen SMEs' capabilities and improve workers' skills. Imports of foreign services may enable firms in emerging economies to overcome bottlenecks. Thus, trade facilitation measures and the removal of regulatory burdens can enable Vietnamese SMEs to exploit untapped potential by making better use of foreign services.

Key findings

- Sector-level services import intensity positively affects firm-level average wages of Vietnamese formal services firms.
- The results show a small negative effect of sector-level services import intensity on firm-level employment in formal services firms.
- When considering formal manufacturing firms, the association between sector-level services import intensity and firm-level average wages is not statistically significant for the full sample of firms located in all parts of Viet Nam. Yet, a positive significant effect of sector-level services import intensity on firm-level average wages is observed when the sample is restricted to manufacturing firms located in Hanoi or Ho Chi Minh City.
- For formal manufacturing firms, there is no conclusive evidence regarding the association between sector-level services import intensity and firm-level employment.
- Worker-level analysis (including the informal sector) of wage data identifies a positive wage effect of occupation-level exposure to services imports on domestic workers in foreign-owned businesses in all sectors.
- Econometric analysis at the worker-level suggests that higher skilled workers might be more likely to benefit from services imports

1. Introduction

This study is part of the OECD Trade Committee's project on services trade policy, structural transformation and labour market adjustment (Lassmann, 2020). The project employs micro, sectoral and macro-level analysis to explore the impact of services trade policy, with the objective of supporting governments in designing services sector reforms that produce economy-wide gains and ensure benefits that are widely shared.

Traditionally, the literature on the labour market effects of trade has prioritized trade in goods. However, a nascent stream of literature is starting to shed light on the role of trade in services in shaping employment patterns, mainly focusing on advanced economies (Crinò, 2010; Liu & Trefler, 2019; Eppinger, 2019). However, so far little is known about the links between trade in services and employment dynamics in developing countries. While a few studies have explored questions related to the services export activities of countries such as the Philippines and India (Beerepoot & Hendriks, 2013; Kleibert, 2015; Nayyar, 2011; Eichengreen & Poonam, 2013), the labour market implications of foreign services imports of emerging economies remain largely underexplored. This paper addresses this lacuna by examining the case of Viet Nam, a rapidly growing economy that is deeply integrated in international trade and investment flows.

The Vietnamese economy has undergone profound changes and displayed remarkable dynamism since the introduction of a set of liberal policies known as “Đổi Mới” (renovation) in 1986. This reform package transformed the agricultural sector and paved the way for the country's opening to trade and foreign investment. It marked the beginning of a prolonged period of structural change, poverty reduction and trade-fuelled economic expansion (McCaig & Pavcnik, 2018; Kozel, 2014). Average annual GDP growth amounted to 6.1% during 2010–2017 and the country's total trade corresponded to 200% of GDP in 2017. A WTO member since 2007, Viet Nam has established itself as a hub for export-oriented manufacturing activities (Athukorala & Tien, 2012). At the same time, services imports have grown, on average, by 12% between 2006 and 2017. Viet Nam therefore provides a fruitful setting for an analysis aimed at enhancing the understanding of the link between services imports and labour dynamics in emerging economies.

The literature is still at an early stage regarding studies on the labour market effects of the imports of services.¹ Studies exploiting occupation-level data often highlight pronounced heterogeneity across different levels of skill intensity and tradability. For example, it has been shown that services imports benefit employees in licenced, i.e. relatively less tradable, occupations in the United Kingdom (Criscuolo & Garicano, 2010). Similarly, in the United States employment by occupation, at a given skill level, seems to be negatively affected by services offshoring in more tradeable occupations relative to less tradeable occupations (Crinò, 2010). Services imports from The People's Republic of China (hereafter “China”) and India, in particular, have been identified as the cause of a 1% decrease in average US white-collar earnings over a ten-year period (Liu & Trefler, 2019). On the other hand, firm-level evidence suggests that imports of services may contribute to the creation of employment opportunities. Such an effect has been demonstrated for both German and British firms where foreign services inputs had a positive effect on firms' employment (Magli, 2019; Eppinger, 2019).

¹ In contrast, a relatively large body of literature examines the effects of the foreign sourcing of intermediate goods (Feenstra & Hanson, 1999; Hummels, Jørgensen, Munch, & Xiang, 2014; Baumgarten, Geishecker, & Görg, 2013; Ebenstein, Harrison, McMillan, & Phillips, 2014). For a recent survey of the literature on the labour market effects of offshoring, see Hummels, Munch and Xiang, (2018).

There is a lack of similar econometric analyses focused on the relevance of services trade to labour dynamics in emerging economies. Studies exploring related aspects often concentrate on countries that have become specialised in services exports, such as India (Chamarbagwala, 2006). Patterns of services upgrading in India have been contrasted with the case of the Philippines, with insufficient skills of the local labour force emerging as a constraint limiting the Philippines' chances of moving to higher-value-added service activities (Kleibert, 2015). In Mexico, the arrival of global retail chains had no effect on average municipality-level employment and income (Atkin, Faber, & Gonzalez-Navarro, 2018).²

Several academic contributions stress the importance of trade in services as a channel providing emerging economies with access to valuable expertise and specialised intermediate inputs (Markusen, Rutherford, & Tarr, 2005). The sourcing of foreign services may enable firms in developing countries to overcome bottlenecks caused by the limited local availability of essential inputs (Nordås, 2010). This reasoning suggests that services imports allow firms to enhance their competitiveness and move up the quality ladder (Nordås, 2011). In the case of Southeast Asia sourcing of foreign services has been shown to display a stronger link with domestic value added in exports than sourcing of foreign manufacturing inputs (Lopez Gonzalez, 2016). This resonates with recent work showing that services play a crucial role in global value chains as key inputs that are closely intertwined with manufacturing activities (Miroudot & Cadestin, 2017; Andrenelli, et al., 2018). The empirical approach chosen in this paper therefore attributes special importance to backward linkages between industries.

The econometric analysis in this paper consists of two main parts. First, data covering virtually the universe of formal firms in Viet Nam are analysed to investigate the link between sector-level services import intensity and firm-level employment and firm-level average wages. Since firm-specific data on trade flows is unavailable, firms' sectoral affiliation is used to link firms to services imports. According to the intensity of inter-industry supply linkages captured in input-output tables, greater weight is given to the imports of services that provide inputs to a given firm's sector of operation. As the dataset lacks information on worker characteristics at the firm level, this analysis is mostly exploratory in nature. However, it does shed some light on the connection between sector-level services imports and firm-level employment outcomes in Viet Nam.

The second part of the analysis is conducted at the level of workers. Exploiting rich information on worker's characteristics provided by the Vietnamese labour force surveys (LFS), this step explores the relationship between services trade and worker heterogeneity along multiple dimensions. Constructing a measure of import exposure on the occupational level, this part draws on recent contributions highlighting occupation-specific trade effects (Ebenstein, Harrison, McMillan, & Phillips, 2014; Liu & Trefler, 2019). Whereas the firm-level investigation in the first part of the analysis only covers the formal sector and lacks information on workers' characteristics, this second step at the worker level provides insight into wage effects across different types of workers, including those in the informal sector.

The firm-level results show a relatively small negative effect of sector-level services import intensity on employment in services firms. This effect is smallest for mid-sized firms. The positive effect on average firm-level wages is smaller for micro and small firms. In contrast, the firm-level findings do not provide evidence of a significant effect of sector-level services import intensity on employment in Vietnamese manufacturing firms. A positive and significant effect on average wages is observed only for a subsample of manufacturing firms located in the country's two main cities. The worker-level analysis with wage-setting controls such as education reveals that occupation-level services import exposure is associated with higher wages in foreign businesses. These positive wage effects are mainly attributed to higher skilled workers. For workers in private domestic businesses, the findings do not show any wage effects of services imports.

² The corresponding study (Atkin, Faber, & Gonzalez-Navarro, 2018) does, however, observe negative effects on employment and labour income in the traditional retail sector. Yet, the traditional retail sector only employs a fraction of the Mexican labour force and the arrival of global retailers generates reductions of the cost of living that benefit all income groups.

This paper is structured as follows. Section 2 provides an overview of Viet Nam's recent economic development and describes the country's trade profile. Section 3 presents the data used for the empirical analysis. Section 4 discusses the results and Section 5 concludes with policy implications.

2. Trade and economic context

In the late 1970s, Viet Nam was among the world's poorest countries, with a level of per capita income comparable to that of the least developed African countries (Miguel & Roland, 2011). In 1986, the government launched a series of reforms aimed at gradual economic liberalization. Agricultural reforms, such as the elimination of price controls and the relaxation of restrictions on trade in rice, led to rapid improvements in agricultural productivity (Benjamin & Brandt., 2004; McCaig & Pavcnik, 2017). Enterprise reforms opened the country to foreign direct investment and initiated major steps towards a more equal regulatory treatment of firms of different ownership categories (Glewwe, 2004; Fforde & de Vylder, 1996).

Since the early 1990s, these domestic policy changes have been accompanied by efforts to accelerate Viet Nam's integration into the global economy. Having signed a textile and clothing trade agreement with the European Economic Community in 1992, Viet Nam joined ASEAN in 1995 and APEC in 1998. The bilateral trade treaty with the United States that entered into force in December 2001 provided a powerful stimulus to the country's economic development. It boosted Vietnamese exports to the United States, particularly in textiles, and contributed to poverty reduction (McCaig B. , 2011) and simultaneously promoted the reallocation of workers from informal activities to formally registered firms (McCaig & Pavcnik, 2018).

Marking an important milestone in Viet Nam's economic reform process, the 2007 accession to the WTO spurred growth in inward foreign direct investment (FDI) and deepened the country's participation in global value chains (Amendolagine, Presbitero, Rabellotti, Sanfilippo, & Seric , 2017). In recent years, the country has continued to embrace trade liberalization. Thus, Viet Nam signed and ratified in 2018 the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). In 2019, a new trade agreement and an investment protection agreement with the European Union were signed.³

The economic reform process launched in 1986 is now widely considered as the starting point of the transformation of a very poor country into a dynamic lower middle-income economy. Indeed, income per capita in purchasing power terms increased from USD 970 in 1990 to roughly USD 6 000 in 2015 (World Bank, 2016).⁴ The country is now deeply integrated in global trade and investment networks. Agricultural exports, such as rice and coffee, continue to play an important role. Yet, the country has successfully established itself as a hub for labour-intensive export-oriented manufacturing activities. In the 1990s and 2000s, Viet Nam's participation in global value chains was primarily shaped by light manufacturing products, such as apparel, footwear and furniture. Particularly since the WTO accession in 2007, investments by large multinational enterprises, e.g. Intel, have fuelled the rapid growth of electronics exports (OECD/The World Bank, 2014).

³ Note that this section only mentions a limited set of examples of the trade treaties signed by Viet Nam. Further information on Viet Nam's involvement in bilateral and multilateral trade agreements is provided, for example, by the WTO (https://www.wto.org/english/tratop_e/region_e/region_e.htm) as well as the Asian Development Bank (<https://aric.adb.org/fta-country>).

⁴ China is the only large economy (i.e. disregarding economies with a population of less than one million as well as Bosnia and Herzegovina) to have achieved a higher per capita GDP growth during that period (World Bank, 2016).

OECD countries play a crucial role in Viet Nam's trade relations. In 2016, they accounted for 38% of gross imports and 56% of gross exports. Important trading partners include China, Korea, United States, Japan, and Chinese Taipei.⁵ Figure 1 shows how the relationship with these trading partners have evolved since 2000, showing particular changes with Korea and China. In terms of trade and investment flows, the country has particularly strong links with Korea and Japan.⁶ Japanese and Korean multinational enterprises are important drivers of Viet Nam's integration in global value chains and FDI from those two countries accounted for nearly 30% of total FDI in 2015.

Figure 1. Trade in goods by trading partner

The ratio of Vietnamese exports and imports in goods, by trading partners

Note: Current USD.

The OECD TiVa database provides insight into the relevance of services to Viet Nam's export performance. In 2015 foreign services value added contributed 17% to gross Vietnamese exports.⁷ Several OECD member countries accounted for substantial shares of the total foreign services added contribution to Vietnamese exports: Japan (5.3%), Korea (5.1%), United States (4.6%), Germany (1.5%), and Australia (1.1%). Domestic services value added accounted for only 13% of gross exports in that year, less than in OECD countries with significant GVC-shaped manufacturing activities, such as Mexico (29%) or Hungary (26%). It is also below the level observed in Malaysia (22%) and China (27%).

The limited contribution of domestic services to gross exports reflects Viet Nam's comparative advantage in labour-intensive manufacturing and low-skilled assembly activities as well as the relatively low level of sophistication of Vietnamese services firms. Despite having grown faster than the economy as a whole in recent years, Viet Nam's services sector is only slowly moving to higher value-added activities (World

⁵ In 2017, imports from China accounted for 27.8% of total Vietnamese imports, while China was simultaneously the destination of 14.5% of Viet Nam's exports. Trade flows with Korea represented 6.8% of Viet Nam's exports and 22% of Viet Nam's imports.

⁶ In the case of Korea, the strong presence of Samsung in Viet Nam contributes to the recent growth of trade flows between the two countries. In 2017 the company employed approximately 160 000 workers in Viet Nam and exported goods worth more than USD 50 billion (UNCTAD, 2018).

⁷ This level of foreign services value added share of gross exports is similar to the levels observed in OECD countries that are deeply integrated in GVCs, such as Hungary (20%), Mexico (14%) or Poland (13%).

Bank, 2018). The relative weakness of domestic services in sub-sectors that support participation in GVCs, such as logistics, transport, insurance and finance, has been highlighted as an obstacle to Viet Nam's efforts to move to the higher stages of GVCs (OECD/The World Bank, 2014).

Given the scarcity of domestic providers of advanced, knowledge-intensive services, the sourcing of foreign services might enable Vietnamese firms to overcome important bottlenecks. As seen in Figure 2, transport (51%) and travel services (21%) were the main services imports in 2015, followed by insurance and financial services (9%), other business services (5%), construction (4%) and telecommunications and information services (1%).

Figure 2. Services imports in 2015

Services imports in 2015 broken down by industry

Note: Other services include Personal, cultural, and recreational services (0.1%), Government services, n.i.e.(1.2%) and Communications services (0.5%).

Source: UN COMTRADE.

Although Viet Nam does not publish information on services trade by partner economy, the total imports declared by Viet Nam can be combined with data released by other countries in order to identify important trading relationships. The United States declare services exports to Viet Nam corresponding to 13% of all services imports registered by Viet Nam. In addition, Japan (12%), the European Union (11%), Australia (7%) and Hong Kong, China (2%) are important exporters of services to Viet Nam. Figure 3 further shows that 25% of foreign services value added in Vietnamese gross exports are derived from OECD countries, with Japan being among those that contribute the most. However, Viet Nam is increasingly sourcing from Korea and the United States.

Figure 3. Foreign services value added in Vietnamese gross exports

Note: Current USD.

Source: UN COMTRADE.

3. Data description

The analyses presented in this paper rely on several data sources. First, data on services trade were collected from the WTO Trade in Commercial Services dataset.⁸ Information on trade in goods was obtained from the OECD Bilateral Trade in Goods by Industry and End-use (BTDixE) database. Additionally, information on each Vietnamese sector's total output and on the sale and purchase relationships between different sectors in Viet Nam were obtained from the OECD input-output tables for Viet Nam.

Second, firm-level data was obtained from the Vietnamese Enterprise Survey (VES), which provides three-digit sectoral identifiers (ISIC3) for the years 2004–2016. Administered by Viet Nam's General Statistical Office (GSO), the VES includes the universe of formal firms with at least ten employees and a random sample of firms with fewer than ten employees encompasses information on firms' employment, sales, and

⁸ The WTO services trade data used for this paper rely on officially reported Vietnamese imports. While the information with respect to Viet Nam included in the WTO services trade data set encompasses estimations, those data points (which refer to recent years and quarterly information) are not included in the empirical analysis presented in this paper.

ownership (Baccini, Impullitti, & Malesky, 2019). A unique tax code allows for the creation of an unbalanced panel dataset. For the purpose of the analysis, the dataset is divided into a services and a manufacturing sample.

After dropping firms that do not appear in more than one year as well as firms operating in the primary sector, the remaining dataset includes 351 922 firms operating in services sectors⁹ and 65 507 firms in manufacturing industries.¹⁰ Regarding the distribution of services firms across size categories, micro firms with less than ten employees account for 65% of the observations in the services sector. Small (10–49 employees, 28%), medium-sized (50–249, 6%) and large (more than 249 employees, 1%) enterprises account for the remaining 35% of the observations. Among manufacturing firms, micro firms represent 44% of all observations, with the remaining sample composed of small (22%), medium-sized (6%) and large (27%) firms.

Worker-level data on individual characteristics, geographical location, workplace characteristics and wages are obtained from the Vietnamese labour force survey (LFS) starting from 2011, and ends in 2016, also produced by GSO. The LFS sample is a two-stage stratified sample, with the first sampling on province, and the second on household. All individuals, who are over 15 years, belonging to the household are surveyed. The final sample is also restricted to an upper age of 65, and military personnel is excluded. As the analysis is focused on wages, unpaid family workers were also removed from the final sample. There are 508 different occupations (Annex A) which are classified according to International Standard Classification of Occupations (ISCO) – 08 and 441 industries.

Variables on worker characteristics, subsequently used in the worker-level analysis, are presented in Table 1. The average monthly wage is around VND 3 million or around EUR 120. The average age of workers is 38 years and average work experience in the current job is around four years. The majority of workers (70%) are married. Contract types appear to be quite evenly distributed across permanent contracts, fixed-term or informal contracts and working without any contract. Almost half of workers have finished secondary school but barely 10% hold a university degree. The overwhelming majority work in private domestic businesses, with little under 5% working in foreign businesses.

Table 1. Worker characteristics

Variable		Mean	Median	Percentage
Monthly wages		VND 3 million	VND 3 million	
Log hourly wage		2.57	2.84	
Woman				48.44
Tenure		3.76	4.00	
Married				69.75
Age		38	38.00	
Contract type				
	Indefinite-term contract			36.56
	1–3 years contract			18.96
	Less than 1 year contract			4.13
	Contract (Verbal agreement)			9.46
	No contract			30.88

⁹ The main services sectors in terms of share of the total number of observations are wholesale and retail trade, repair of motor vehicles (50.9%), construction (17.8%), other business sector services (8.5%), transportation and storage (7.7%), real estate activities (5.27%) and accommodation and food services (5%).

¹⁰ The main manufacturing industries in terms of the share of the total number of observations are food products, beverages and tobacco (15.8%), textiles, apparel and leather products (15.3%), fabricated metal products (14.6%), paper products and printing (10.33%), other manufacturing (9%) and wood products (7.2%).

Variable		Mean	Median	Percentage
Education				
	No education			13.00
	Primary school			21.24
	Secondary school			48.25
	Vocational training			9.54
	University			7.97
Business type				
	Private domestic business			83
	State-owned business			12.04
	Foreign-owned business			4.63

Note: Averages calculated using survey weights.

Source: Vietnamese labour force survey, 2011–2016.

4. Results

4.1. Firm-level analysis

The firm-level analysis examines the link between sector-level services import intensity and two dependent variables: firm-level total employment and firm-level average wage per worker. The regressions reported below exploit the panel dimension of the dataset: The inclusion of firm fixed effects controls for time-invariant firm characteristics, such as a firm's location or average managerial quality. Similarly, year fixed effects control for shocks affecting all firms in a given year.¹¹ The regressions control for firm characteristics such as age, foreign ownership and state ownership, employment size, and whether a firm directly engages in international trade.¹² In addition, sector-level variables are added to control for the MNEs' share of total revenue, SOEs' share of total revenue and the concentration of revenue across firms.

The dataset includes a variable that assigns every firm to a sector. This identifier is used to link firms to a measure of sector-level services import intensity. The latter is the key variable of interest and combines three elements: (a) the sum of Viet Nam's total annual imports of financial services and insurance services, transport services, travel services, as well as telecommunications and IT services; (b) information on input-output linkages between sectors; and (c) the total domestic output of the sector in which the firm operates.

We first calculate a sector-specific weighted sum of Viet Nam's imports of the above-mentioned services, with the weights assigned to a specific type of services (e.g. transport services) corresponding to its share of the total sourcing of inputs of the sector in which the firm operates. This weighted sum is then divided by the total domestic output of the sector in which the firm operates. Linked to each firm via its sectoral identifier, this sector-level services import intensity measure captures the imports of services that are most likely to be used by the firm in its production process – based on input-output linkages between industries. The normalisation by the sector's domestic output takes into account that imports corresponding to a smaller share of the sector's total economic size are likely to have a smaller effect on the firms operating in that sector.

¹¹ The full list of firm-level controls encompasses the logarithm of total revenue, dummies for foreign ownership and state ownership, firm size dummies, dummies for age categories as well as a dummy equalling one if a firm is an exporter or importer.

¹² While the information contained in the dataset reveals whether a firm is involved in cross-border trade, it does not provide details on the composition and volume of that trade activity.

As services firms and manufacturing firms are different in many regards, all regressions are run separately for manufacturing and services. Regressions focused on manufacturing firms also control for the net export of goods in the corresponding manufacturing sector in order to take into account the relevance of manufacturing exports to Vietnam's recent economic development (López González, 2017). As firms' exposure to trade shocks cannot be considered as random, an instrumental variable strategy relying on trade flows in the rest of the world (Hummels, Jørgensen, Munch, & Xiang, 2014) is employed to address endogeneity concerns regarding the sectoral services import variable as well as the control for net sectoral goods exports. More details on the methodological approach and the calculation of key variables are provided in Annex B.

Table 2 displays the findings of regressions using employment as the dependent variable for services firms (columns 1 and 2) and manufacturing firms (columns 3 and 4). The first and third column show the estimates based on ordinary least squares (OLS), whereas columns 2 and 4 report the results of instrumental variable (IV) regressions. For services firms the link between firm-level employment and sector-level services import intensity appears to be negative. The coefficient of the key variable of interest indicates that an increase in services import intensity of 10 percentage points (relative to domestic output and weighted by backward linkages as explained in Annex B) is associated with a reduction in employment by 3.7%.¹³ The results of the regressions focused on manufacturing firms are inconclusive (columns 3 and 4 of Table 2). There is no statistically significant evidence of a link between sector-level services imports and firm-level employment.¹⁴

Table 2. Firm-level results: Employment

	Services firms		Manufacturing firms	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	-0.401***	-0.370**	1.515***	-0.150
	(0.113)	(0.170)	(0.559)	(1.397)
Lagged sector-level net exports of goods			0.001	0.039*
			(0.010)	(0.022)
N	1 652 077	1 652 077	327 494	327 494
R-squared	0.091		0.133	
Number of firms	351 922	351 922	65 507	65 507
Kleibergen-Paap F		1006		234.0

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of employment. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls.

This negative effect obtained in columns 1–2 (services firms) is in line with a situation where Vietnamese services firms making use of opportunities to source foreign services have a lower demand for labour dedicated to specific business functions. For a subset of the tasks performed within Vietnamese services firms, the availability of foreign services may therefore induce a substitution effect. For example, a Vietnamese firm that starts purchasing services from a foreign provider of transport and logistics services might subsequently limit its recruitment of new employees dedicated to the corresponding functions.

¹³ Put differently, moving from the average level of services import intensity observed during the period of analysis (0.06 relative to domestic production) to the highest level (0.17 in other business services in 2012) is associated with a predicted reduction in firm-level employment by 4.1%.

¹⁴ The OLS estimation (column 3) indicates a strongly statistically significant positive effect, but the coefficient of the services import variable is not statistically significant in the IV regression (column 4). These estimates therefore only allow for a cautious comparison with the picture observed for services firms.

While studies focused on the labour market effects of services trade in the context of advanced economies often highlight differences in wages across countries (Liu & Trefler, 2019), the foreign providers' ownership of advanced technology and management knowledge is likely to play a key role in the case of Viet Nam. Given the limited sophistication of domestic services firms (OECD/The World Bank, 2014), the sourcing of foreign services inputs can be expected to offer Vietnamese firms the opportunity to achieve efficiency gains. Such improvements are likely to spur firm growth and contribute to the creation of new employment opportunities. Yet, the patterns emerging from this exploratory analysis suggest that such positive effects are smaller than the substitution of in-house services workers, resulting in a small negative effect of services imports on firm-level employment.

A set of ancillary regressions suggests that the association between sector-level services import intensity and employment is very similar across firms of different employment size categories (Table A D.2). Only medium-sized firms appear to be affected by services imports differently. For this size category (50 to 249 employees), there is no clear evidence of a negative link between employment and sector-level services import intensity.¹⁵ This pattern of heterogeneity, with micro, small and large firms showing a reduction in employment whilst no such effect is identified for mid-sized firms, could reflect competition dynamics within the Vietnamese services sector. In light of the debate about smaller firms' limited participation in international trade (López González & Sorescu, 2019), it appears plausible that medium-sized firms use opportunities to source foreign services inputs in an efficiency-enhancing way more successfully than small and micro firms.

The second part of the firm-level analysis examines the relationship between sector-level services import intensity and the firm-level average wage per employee. Due to the lack of information on employees' characteristics in the dataset used for this investigation, this part of the analysis cannot take into account potential trade-induced changes in the composition of employees regarding level of education or age.¹⁶ In addition, the large number of missing values for the wage variable substantially reduces the sample size. The results are therefore mainly exploratory.

The regressions based on services firms indicate a positive link between sector-level services import intensity and average wages (Table 3). A 10 percentage point increase in services import intensity is associated with an increase in average wages by 2.2 to 3.8%. This finding can be interpreted in several ways. On the one hand, the sourcing of foreign services inputs may allow Vietnamese services firms to achieve efficiency gains that are at least partly passed on to their employees. At the same time, a composition effect could also be driving this result, i.e. services imports might increase firms' demand for workers with higher skills.¹⁷ A shift towards greater reliance on more high-skilled workers can be expected to lead to an increase in the firm-level average wage.¹⁸

¹⁵ While the OLS result does indicate a negative effect of roughly a quarter of the effect found for the overall services sample, the IV estimate for this size category indicates that firms' employment increases by 0.7% in response to a 10% increase in sector-level services import intensity.

¹⁶ At the same time, this means that key variables (e.g. years of schooling and experience) highlighted in the labour economics literature on determinants of individual-level wages (Card, 1999; Grenet, 2013) cannot be controlled for in this exploratory analysis. While similar limitations apply to several recent trade studies (Utar & Ruiz, 2013; Eppinger, 2019) using firm-level wages as dependent variables, this challenge can be overcome by using rich employer-employee data of the type exploited in a limited set of recent contributions primarily focused on advanced economies (Becker, Ekholm, & Muendler, 2013; Hummels, Jørgensen, Munch, & Xiang, 2014). Unfortunately, such data are currently not available in the case of Viet Nam. A set of robustness checks (Table A D.12, Table A D.13, Table A D.14 and Table A D.15) show that the main findings remain similar when controlling for capital per worker or the firm-level female employment share (the only gender-related variable included in the dataset).

¹⁷ Without details on workers' skill levels and experience, it is impossible to explore such composition effects based on the firm-level dataset used for this analysis.

¹⁸ As the services import intensity variables as well as several controls are measured at the sectoral level, one might wonder whether a high correlation between the sector-level import intensity variable and other sector-level variables

Table 3. Firm-level results: Average wage

	Services firms		Manufacturing firms	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	0.376*** (0.127)	0.216* (0.113)	-0.446 (0.581)	0.456 (0.791)
Lagged sector-level net exports of goods			-0.015* (0.009)	0.007 (0.016)
N	682 277	682 277	154 000	154 000
R-squared	0.235		0.325	
Number of firms	175 262	175 262	36 728	36 728
Kleibergen-Paap F		964.4		68.53

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of average wage per employee. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls

In terms of variation across firm size categories, the positive effect on average wages is most pronounced in the case of medium-sized firms and smallest for micro firms (Figure 4). While this pattern cannot be explored in more depth without information on employees' education and age,¹⁹ one possible explanation could be smaller firms' difficulties in reaping the benefits from trade integration (Harvie, Narjoko, & Oum, 2017). If micro firms lack the capacities required to successfully use foreign services inputs, this could translate into a smaller positive effect of sector-level services imports on average wages. For manufacturing firms the regression do not provide evidence of an effect of services imports on average wages (columns 3 and 4, Table 3).

Regarding the findings for manufacturing firms, the absence of a clear positive link between employment as well as average wages with sector-level services import intensity may seem surprising. It contrasts with conceptual (Nordås, 2011) and empirical (Lopez Gonzalez, 2016) contributions, which highlight the beneficial effects of foreign services on manufacturing activities in emerging economies. Three potential reasons can explain this finding: First, the relevant mechanisms might occur over a longer period of time. Second, issues related to data quality might limit our ability to detect a statistically significant relationship between sectoral services import intensity and firm-level employment and wages.²⁰ Third, it might be the case that only a narrow subset of the manufacturing firms in the sample display a significant response to changes in sector-level services import intensity.

might affect the results. In a robustness check (see Table A D.4 and Table A D.5) all sector-level controls were omitted from the regressions. The results remain similar. In addition, correlation tables for all sector-level variables shows that pairwise correlations are relatively low (Table A D.6 and Table A D.7). In addition, one might wonder whether controlling for a sector's propensity to source foreign services inputs would change the findings. Drawing on the OECD TiVa database, a variable capturing the sector-specific foreign share of total services intermediate consumption was calculated. Controlling for this variable (lagged by one period to align with the key variable of interest) does not alter the results (Table A D.8 and Table A D.9).

¹⁹ More specifically, without data including information on individual employees' characteristics one cannot observe the firm-level employment share of a specific category of workers (e.g. in terms of age or education) remains similar or changes in response to changes in services import intensity. Similarly, one cannot examine differences across firm size categories regarding employees' characteristics, e.g. in order to explore whether a lower share of high-skilled workers in micro firms might partly explain this pattern.

²⁰ For example, the relatively large number of missing values for the wage variable constitutes a limitation of this dataset.

Figure 4. Average wages of services firms, services imports and firm size

Note: The y-axis shows the predicted % change in the firm-level average wage associated with a 10 percentage point increase in sector-level services imports relative to domestic output

In a set of additional regressions, we exclude observations with extreme values regarding average revenue per employee.²¹ This step decreases the standard errors in the IV estimation, but the coefficient of the services import intensity variable is not statistically significant. In a final step, we only include firms based in the two main economic hubs, Hanoi and Ho Chi Minh City (HCMC). Having restricted the sample in such a way, we now find a positive association between sector-level import intensity and firm-level employment (not statistically significant) as well as firm-level average wages (strongly significant). We therefore find strong support for a positive effect of sector-level services imports on firm-level average wages in the two main cities. This is a picture that was not observed for the main sample (IV estimates not statistically significant for both dependent variables, see Tables 2 and 3).

While one cannot rule out more accurate data collection in the largest cities as an explanation, the difference compared to the main sample might be due to the greater outward orientation of firms based in the largest cities: It seems likely that this smaller sample includes a higher share of firms actively engaging in services trade.²² In addition, it appears plausible to assume that manufacturing firms in Hanoi and HCMC have easier access to the local subsidiaries of foreign providers of services inputs. This finding might therefore also point to synergies between different modes of services trade.

²¹ In this brief robustness check, we remain agnostic about the reasons why observations at the extreme ends of the distribution of that variable might display a different response to sector-level services imports than the main part of the distribution. If one assumes that extreme values of this variable occur in cases where revenue and/or employment are reported inaccurately, the exclusion of these observations might reduce the noise in the data. Yet, in the absence of measurement error, firms with extremely low or extremely high labour productivity might still be less likely to respond to services imports. For example, this could be the case if firms with very low values of revenue per worker are actually in a “dormant” state or firms with very high levels of revenue per worker have less “novelty” to discover in foreign services inputs.

²² Put differently, this result is simultaneously likely to reflect differences across firms regarding the capability of using foreign inputs. Firms based in the two main agglomerations are likely to have superior access to skills, more experience in dealing with foreign partners and better knowledge of relevant trade-related technology than firms located in other parts of Viet Nam.

4.2. Worker-level analysis

As discussed earlier, if the services import activity in Viet Nam consists mainly of sourcing certain domestically scarce services inputs, businesses are able to overcome production bottlenecks. In that case, services imports will generate productivity gains, which, in turn, leads to higher compensation to workers (given increased firm profits) and increased labour demand.

In the worker-level analysis below, hourly wages found in the Vietnamese LFS are linked to occupation-specific exposure to services import intensity, in order to assess their potential relationship. Like in the firm-level analysis, the potential joint determination of wages and services import intensity poses a problem for any causal interpretation. However, instead of using an instrumental variable as above, this part of the analysis tries to control for all relevant wage-setting factors in order to identify the unique contribution of services import exposure.

Drawing on information on the distribution of workers employed in a given occupation across sectors in 2011, sector-level services-import intensity is disaggregated by occupation. As described in Annex C, weights reflecting a sector's share of the total employment in a given occupation are used to calculate a measure that captures the services import exposure for each individual occupation (Ebenstein, Harrison, McMillan, & Phillips, 2014). This approach, however, disregards any dynamics associated with changes in the occupational composition of sector-level employment over time. Furthermore, a bias is introduced if occupational shares in 2011 are correlated with variables which are unaccounted for, which would then be correlated with the error term. The worker-level specification uses a rich set of control variables and fixed effects to address this concern.

The main specification is a wage equation on the individual-level, with clustered standard errors on the occupation level. The main variable of interest in the model is occupational trade exposure and its relationship with wages. The model draws on human capital theory (Card, 1999; Becker S. G., 1962; Mincer, 1974) and recent work on returns to education and skill in Viet Nam (Doan, Le, & Quang Tran, 2018; Demombynes & Testaverde, 2018) regarding the selection of controls for the individual wage-setting variables, such as educational level, with the highest being a university degree, tenure, including a non-linear term (quadratic), being a female worker, their age and type of labour contract applied (permanent, short-term or no contract).²³

The wage equation is further extended by variables that control for underlying differences between provinces, occupations, sectors, and yearly economy-wide shocks. In order to identify the particular effect of occupational services imports exposure, overall variation in total imports of final goods is accounted for in the empirical model. The specification also includes an interaction term between services import exposure and type of business. The underlying assumption is that the effect of services import exposure is different between foreign and domestic businesses. It should be noted that all import variables are lagged by one year to allow for sufficient wage adjustment in response to import exposure. Response lags may also alleviate some endogeneity concerns, such as simultaneity and reverse causation. Finally, hourly wages are in Vietnamese dong and log-transformed, as is standard.

A first overview of Table 4 shows that exposure to imports of final consumption goods affects wages negatively across all specifications, but the estimated magnitude is close to zero (-0.00184% decrease for 1% increase in total import exposure in the specification that includes all occupations). The high significance level indicates a, more or less, precisely estimated zero effect. The control variables are of the expected sign. Female workers receive in general 10% lower wages, although the difference is smaller

²³ If a worker is employed without any formal contract, that worker is considered to be employed informally. A little over 30% of all workers belong to the informal sector according to this definition. However, only a little over 10% also declare wages in the survey. Thus, it is not possible to conduct any comprehensive analysis on the informal sector apart from the formal sector. Given selection on observable wages, Table A E.1 and Table A E.2 present additional specifications where the informal sector is separated out from the formal sector.

in high-skilled occupations. Tenure (linear effect) seems to raise wages by 6.6% per year worked. Married workers have on average 4.9% higher wages than non-married workers.

The interaction term and the related variables are more difficult to interpret. Therefore, Figure 5 provides a graphical illustration of the interaction effects found in column 1, Table 4. Specifically, the marginal effect on the logarithm of hourly wages is predicted at different levels of services import exposure. The predicted effects of services import exposure on hourly wages differ between foreign and domestic firms depending on the level of services import exposure. Yet, the association between occupational services import exposure and wages is statistically significant in the case of workers of foreign-owned firms only. The effect (slope) is, however, constant since the model is log-linear. Note also that, in the presence of the interaction term, the effect of the main lagged services import exposure only pertains to workers in domestic businesses.

A closer look further shows that, when there is no occupational services import exposure, the wages

Figure 5. Predictive margins by business type

All occupations

Note: Predictions do not extend beyond real data values for services import exposure;

Source: Predicted marginal effects calculated from column 1 in Table 4.

received by workers in foreign businesses are approximately 3.2% higher than the wages of workers in domestic businesses. Conversely, state employees do not seem to receive higher wages than workers in private domestic businesses (see rows B1 and B2, column 1, in Table 4). Second, as services import exposure increases, wages for domestic workers in foreign firms increase (row A2, column 1, in Table 4), whereas the association is not statistically significant for workers in domestic firms (state and private). To obtain the overall effect on a specific group, one has to consider the main effect of the services import exposure variable as well as the corresponding interaction effect. For example, for a one percent increase in services imports exposure, hourly wages will increase by 0.7% for Vietnamese workers in foreign businesses (considering the specification including all occupations).²⁴

²⁴ To arrive at this effect, one has to consider both the coefficient (-0.432) of services import exposure (not interacted, shown in column 1 of Table 4) and the coefficient (1.081) of the interaction of services import exposure with the dummy equalling one if a worker is employed by a foreign firm (see row A.2, column 1 of the same table). The effect can therefore be calculated as $\exp((-0.432 + 1.081) * 0.01)$.

Table 4. Worker-level results: Wages and occupational trade exposure, 2011–2016

Dependent variable: Logarithm of hourly wages

Dependent variable: Logarithm of hourly wages	(1)	(2)	(3)	(4)
	All occupations	Elementary occupations	Medium-skilled occupations	High-skilled occupations
Lagged occupational services import exposure	-0.432 (0.401)	-0.818 (1.182)	-0.171 (0.587)	0.0246 (0.382)
Lagged occupational import exposure (final consumption goods)	-0.00184*** (0.000562)	-0.00153** (0.000712)	-0.00137 (0.000904)	-0.00195** (0.000806)
Woman	-0.108*** (0.00719)	-0.132*** (0.0196)	-0.107*** (0.00978)	-0.0641*** (0.00621)
Tenure (years)	0.0637*** (0.00514)	0.0625*** (0.00748)	0.0732*** (0.00808)	0.0915*** (0.00687)
Tenure squared (years)	0.000479 (0.000790)	-0.00544*** (0.00103)	-0.00127 (0.000939)	0.00305*** (0.000851)
Married	0.0474*** (0.00333)	0.0323*** (0.00485)	0.0463*** (0.00430)	0.0449*** (0.00645)
Comparison group: Domestic private businesses				
A1. Lagged occupational services import exposure (state)	-0.234 (0.256)	-0.745* (0.426)	-0.0150 (0.273)	-0.598** (0.241)
A2. Lagged occupational services import exposure (foreign)	1.081*** (0.201)	-0.991*** (0.353)	0.559** (0.244)	0.595 (0.370)
B1. State-owned business	-0.000820 (0.0182)	0.0756*** (0.0216)	-0.00505 (0.0217)	0.00463 (0.0229)
B2. Foreign-owned business	0.0318*** (0.00929)	0.0854*** (0.0152)	0.0211** (0.00976)	0.154*** (0.0344)
Constant	2.610*** (0.0436)	2.605*** (0.0766)	2.519*** (0.0494)	2.510*** (0.0990)
Adj. R-Square	0.50	0.28	0.40	0.45
N	550436	104135	268101	178163
<i>Additional controls</i>				
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Education (5 levels)	Yes	Yes	Yes	Yes
Labour contract (5 types)	Yes	Yes	Yes	Yes
Age groups (3 levels)	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1.

Source: Viet Nam Labour Force Survey 2011–2016.

Additionally, the model was estimated separately for low-skill (elementary), medium-skill and high-skill occupations. When workers are not exposed to services imports, the wages of low-skilled workers in foreign businesses are 8.9% higher than the wages of low-skilled workers in domestic businesses (column 2, row B.2). The joint consideration of the coefficient of services import exposure and the coefficient of the interaction term (row A.2) shows that the link between services import exposure and wages displays heterogeneity across workers (of foreign firms) characterised by different skill levels. For a one percent increase in services imports exposure, wages for low-skilled workers in foreign businesses are associated with a 1.8% decrease in wages. Conversely, for medium-skilled workers in foreign-owned firms a one percent increase in services import exposure is associated with an increase of wages by 0.4%. For higher skilled workers of foreign-owned firms, the results indicate an increase of wages by 0.6%. However, this relationship is not statistically significant.

5. Conclusions

Developing countries' share of total services trade has increased from 28% in 2005 to 34% in 2017 (Roy, 2019). Their growing involvement in services trade contrasts sharply with the scarcity of research into the employment effects associated with this trade. While a growing number of studies investigate the labour market effects of services imports of advanced economies, little is known about the employment implications of the growing services imports of emerging economies. This paper sets out to address this gap by exploring the case of Viet Nam.

The results of the analyses at the level of firms and workers reveal a nuanced picture. Sector-level services import intensity positively affects firm-level average wages in Viet Nam's formal services sector. The findings also show a small negative effect of sector-level services import intensity on firm-level employment in services firms.

Regarding manufacturing firms, the association between sector-level services import intensity and firm-level average wages is not statistically significant over the total sample of firms located in all parts of Viet Nam. Yet, a positive significant effect of sector-level services import intensity on firm-level average wages is observed when the sample is restricted to manufacturing firms located in Hanoi or Ho Chi Minh City. However, there is no conclusive evidence regarding the association between sector-level services import intensity and employment in formal manufacturing firms.

Additionally, the worker-level analysis, which includes the informal sector, identifies a positive effect of occupation-level exposure to services imports on Vietnamese workers in foreign-owned businesses in all sectors.

These findings resonate with arguments that imports of foreign services may enable firms in emerging economies to overcome bottlenecks. Steps towards greater openness to services trade can contribute to developing countries' efforts to create new growth opportunities. Recent reforms implemented by the Vietnamese government, including a further liberalization of the retail sector, can be considered as an important part of the mix of policies that are needed as Viet Nam enters the next phase of development and seeks to move up the quality ladder within GVCs.

The findings of this paper also shed light on several dimensions of heterogeneity. The positive effect on firm-level wages per worker identified in the analysis is most pronounced in the case of medium-sized firms, whereas it is smaller for micro enterprises and small firms. This finding is in line with calls for the use of a carefully balanced mix of policies to create an enabling environment for SMEs (OECD/ERIA, 2018; López González & Sorescu, 2019).

As larger firms are able to exploit scale economies in complying with regulatory requirements, reductions of the fixed costs associated with crossing the border, e.g. through the streamlining of customs procedures, are particularly beneficial for SMEs. Similarly, efforts to facilitate SMEs' indirect participation in trade and to address information asymmetries as well as training programmes to promote SMEs' use of digital technologies can help to level the playing field between small and large firms. In addition, steps towards greater regulatory harmonisation within ASEAN could ease constraints on SMEs' trade participation (López González, Munro, Gourdon, Mazzini, & Andrenelli, 2019). Trade facilitation measures can enable Vietnamese SMEs to exploit untapped potential by making better use of foreign services.

In addition, the results of the econometric analysis at the worker-level suggests that higher skilled workers might be more likely to benefit from services imports. While Viet Nam has made considerable progress in terms of access to education and quality of education in recent years (Phan & Coxhead, 2015), there are many remaining challenges. The know-how and applied skills covered in technical and vocational education and training (TVET) appear particularly important to SMEs' capacity to benefit from services imports and opportunities to interact with MNEs. While Viet Nam's TVET-related legislation increasingly attributes importance to the involvement of employers, in practice TVET institutions remain poorly connected to employers (OECD, 2017).²⁵

The findings of this study provide support for an approach that combines an emphasis on lowering firms' costs of sourcing foreign services inputs with efforts to support SMEs' participation in trade and improve workers' skills. However, many questions remain open and this exploratory contribution is not without limitations. More detailed data, such as matched employer-employee data, and additional controls, e.g. regarding firms' use of different assets, would allow for a more comprehensive analysis. In addition, this study uses a specific sector-level measure of services import intensity. While more fine-grained data on services trade are currently not available for Viet Nam, valuable nuances could be uncovered by studies using firm-level trade data in a similar context. More research into the link between services trade and employment dynamics in emerging economies is needed to improve the design of policies.

²⁵ Apart from pilot models inspired by Korea's and Germany's approach, TVET in Viet Nam does typically not involve on-the-job training (EPF, 2017). In addition, confusion has been caused by the simultaneous involvement of multiple national and subnational authorities in TVET policies in Viet Nam (ILO, 2016).

References

- Amendolagine, V., Presbitero, A., Rabello, R., Sanfilippo, M., & Seric, A. (2017). FDI, Global Value Chains, and Local Sourcing in Developing Countries. *IMF Working Paper, WP/17/284*.
- Amiti, M., & Wei, S.-J. (2009). Service Offshoring and Productivity: Evidence from the US. *World Economy*, 32(2), 203-220. doi:10.1111/j.1467-9701.2008.01149.x
- Andrenelli, A., Cadestin, C., De Backer, K., Miroudot, S., Rigo, D., & Ye, M. (2018). Multinational production and trade in services. In *OECD Trade Policy Papers*. OECD Publishing, Paris. doi:https://dx.doi.org/10.1787/16ec6b55-en
- Athukorala, P.-c., & Tien, T. (2012). Foreign direct investment in industrial transition: the experience of Vietnam. *Journal of the Asia Pacific Economy*, 17(3), 446-463. doi:10.1080/13547860.2012.694699
- Atkin, D., Faber, B., & Gonzalez-Navarro, M. (2018). Retail Globalization and Household Welfare: Evidence from Mexico. *Journal of Political Economy*, 126(1), 1-73. doi:10.1086/695476
- Baccini, L., Impullitti, G., & Malesky, E. (2019). Globalization and state capitalism: Assessing Vietnam's accession to the WTO. *Journal of International Economics*, 119, 75-92. doi:10.1016/j.jinteco.2019.02.004
- Baumgarten, D., Geishecker, I., & Görg, H. (2013). Offshoring, tasks, and the skill-wage pattern. *European Economic Review*, 61, 132-152. doi:10.1016/j.euroecorev.2013.03.007
- Becker, S. G. (1962). Investment in Human Capital: A Theoretical Analysis. *Journal of Political Economy*, 70(5), 9-49.
- Becker, S., Ekholm, K., & Muendler, M.-A. (2013). Offshoring and the onshore composition of tasks and skills. *Journal of International Economics*, 90(1), 91-106. doi:10.1016/j.jinteco.2012.10.005
- Beerepoot, N., & Hendriks, M. (2013). Employability of offshore service sector workers in the Philippines: opportunities for upward labour mobility or dead-end jobs? *Work, Employment and Society*, 27(5), 823-841. doi:10.1177/0950017012469065
- Benjamin, D., & Brandt, L. (2004). Agriculture and Income Distribution in Rural Viet Nam under Economic Reforms: A Tale of Two Regions. En N. A. P. Glewwe (Ed.), *Economic Growth, Poverty, and Household Welfare in Viet Nam*. World Bank.
- Card, D. (1999). The Causal Effect of Education on Earnings. En O. Ashenfelter, & D. Card (Edits.), *Handbook of Labor Economics*. Amsterdam: North-Holland.
- Chamarbagwala, R. (2006). Economic Liberalization and Wage Inequality in India. *World Development*, 34(12), 1997-2015. doi:10.1016/j.worlddev.2006.02.010
- Coxhead, I., & Phan, D. (2013). Princelings and Paupers? State Employment and the Distribution of Human Capital Investments Among Households in Viet Nam. *Asian Development Review*, 30(2), 26-48. doi:10.1162/adev_a_00014
- Crinò, R. (2010). Service Offshoring and White-Collar Employment. *The Review of Economic Studies*, 77(2), 595-632. doi:10.1111/j.1467-937x.2009.00586.x
- Criscuolo, C., & Garicano, L. (2010). Offshoring and Wage Inequality: Using Occupational Licensing as a Shifter of Offshoring Costs. *American Economic Review*, 100(2), 439-443. doi:10.1257/aer.100.2.439
- Dauth, W., Findeisen, S., & Suedekum, J. (2014). The Rise of the East and the Far East: German Labor Markets and Trade Integration. *Journal of the European Economic Association*, 12(6), 1643-1675. doi:10.1111/jeea.12092

- Demombynes, G., & Testaverde, M. (2018). *Employment Structure and Returns to Skill—Estimates Using the Labor Force Survey*. World Bank.
- Doan, T., Le, Q., & Quang Tran, T. (2018). Lost in Transition? Declining Returns to Education in Vietnam. *The European Journal of Development Research*, 30(2), 195–216.
- Ebenstein, A., Harrison, A., McMillan, M., & Phillips, S. (2014). Estimating the Impact of Trade and Offshoring on American Workers using the Current Population Surveys. *Review of Economics and Statistics*, 96(4), 581–595. doi:10.1162/rest_a_00400
- Eichengreen, B., & Poonam, G. (2013). Exports of services: Indian experience in perspective. *Indian Growth and Development Review*, 6(1), 35–60.
- EPF. (2017). *The Role of the Private Sector in Vocational and Educational Training*. doi:https://www.bibb.de/dokumente/pdf/epf_the_role_of_the_private_sector_in_vet_official.pdf
- Eppinger, P. (2019). Service offshoring and firm employment. *Journal of International Economics*, 117, 209–228. doi:10.1016/j.jinteco.2019.01.007
- ESCAP. (2018). *Asia-Pacific Trade and Investment Report 2018. Recent Trends and Developments*.
- Feenstra, R., & Hanson, G. (1999). The Impact of Outsourcing and High-Technology Capital on Wages: Estimates For the United States, 1979–1990. *The Quarterly Journal of Economics*, 114(3), 907–940. doi:10.1162/003355399556179
- Fforde, A., & de Vylder, S. (1996). *From Plan to Market*. Routledge. doi:10.4324/9780429039966
- Finger, J., & Kreinin, M. (1979). A Measure of 'Export Similarity' and Its Possible Uses. *The Economic Journal*, 89(356), 905. doi:10.2307/2231506
- Glewwe, P. (2004). An Overview of economic growth and household welfare in Vietnam in the 1990s. En P. A. Glewwe (Ed.), *Economic Growth, Poverty, and Household Welfare in Vietnam*. World Bank.
- Grenet, J. (2013). Is Extending Compulsory Schooling Alone Enough to Raise Earnings? Evidence from French and British Compulsory Schooling Laws*. *The Scandinavian Journal of Economics*, 115(1), 176–210. doi:10.1111/j.1467-9442.2012.01739.x
- Harvie, C., Narjoko, D., & Oum, S. (2017). *Economic Integration in East Asia: Production networks and small and medium enterprises*. Routledge.
- Hummels, D., Jørgensen, R., Munch, J., & Xiang, C. (2014). The Wage Effects of Offshoring: Evidence from Danish Matched Worker-Firm Data. *American Economic Review*, 104(6), 1597–1629. doi:10.1257/aer.104.6.1597
- Hummels, D., Munch, J., & Xiang, C. (2018). Offshoring and Labor Markets. *Journal of Economic Literature*, 56(3), 981–1028. doi:10.1257/jel.20161150
- ILO. (2016). *Compilation of assessment studies on technical vocational education and training (TVET). Lao People's Democratic Republic, Mongolia, the Philippines, Thailand and Viet Nam*. .
- Kleibert, J. M. (2015). *Expanding Global Production Networks: The emergence, evolution and the developmental impact of the offshore service sector in the Philippines*.
- Kozel, V. J. (2014). *Well begun but not yet done : progress and emerging challenges for poverty reduction in Vietnam* (Vol. 1). (V. J. Kozel, Ed.) Washington, DC: World Bank Group.
- Lassmann, A. (2020). Services trade and labour market outcomes. In *OECD Trade Policy Papers*. OECD Publishing, Paris. doi:https://dx.doi.org/10.1787/1079852d-en
- Liu, R., & Trefler, D. (2019). A sorted tale of globalization: White collar jobs and the rise of service offshoring. *Journal of International Economics*, 118, 105–122. doi:10.1016/j.jinteco.2018.11.004
- Lopez Gonzalez, J. (2016). Using Foreign Factors to Enhance Domestic Export Performance: A Focus on Southeast Asia. In *OECD Trade Policy Papers* (Vol. 2016). OECD Publishing, Paris. doi:https://dx.doi.org/10.1787/5jlpq82v1jxw-en
- López González, J. (2017). Mapping the participation of ASEAN small- and medium- sized enterprises in

- global value chains. In *OECD Trade Policy Papers*. OECD Publishing, Paris.
doi:<https://dx.doi.org/10.1787/2dc1751e-en>
- López González, J., & Sorescu, S. (2019). Helping SMEs internationalise through trade facilitation. *OECD Trade Policy Papers*(TAD/TC/WP(2018)24/FINAL).
- López González, J., Munro, L., Gourdon, J., Mazzini, E., & Andrenelli, A. (2019). Participation and benefits of SMEs in GVCs in Southeast Asia . In *OECD Trade Policy Papers*. OECD Publishing, Paris. doi:<https://dx.doi.org/10.1787/3f5f2618-en>
- Magli, M. (2019). *The effects of services offshoring at home: An aggregate and distributional analysis across sectors and local labour markets*.
- Malesky, E., & London, J. (2014). The Political Economy of Development in China and Vietnam. *Annual Review of Political Science*, 17(1), 395-419. doi:10.1146/annurev-polisci-041811-150032
- Markusen, J., Rutherford, T., & Tarr, D. (2005). Trade and direct investment in producer services and the domestic market for expertise. *Canadian Journal of Economics*, 38(3), 758-777.
doi:10.1111/j.0008-4085.2005.00301.x
- McCaig, B. (2011). Exporting out of poverty: Provincial poverty in Vietnam and U.S. market access. *Journal of International Economics*, 85(1), 102-113. doi:10.1016/j.jinteco.2011.05.007
- McCaig, B., & Pavcnik, N. (2017). Moving out of agriculture: Structural change in Viet Nam. En M. S. McMillan, D. Rodrik, & C. and Sepúlveda (Eds.), *Structural change, fundamentals, and growth: A framework and case studies*. Washington, D.C.: International Food Policy Research Institute .
- McCaig, B., & Pavcnik, N. (2018). Export Markets and Labor Allocation in a Low-Income Country. *American Economic Review*, 108(7), 1899-1941. doi:10.1257/aer.20141096
- Miguel, E., & Roland, G. (2011). The long-run impact of bombing Vietnam. *Journal of Development Economics*, 96(1), 1-15. doi:10.1016/j.jdeveco.2010.07.004
- Mincer, J. (1974). *Schooling, Experience, and Earnings*. New York: NBER Press.
- Miroudot, S., & Cadestin, C. (2017). Services In Global Value Chains: From Inputs to Value-Creating Activities. In *OECD Trade Policy Papers*. OECD Publishing, Paris.
doi:<https://dx.doi.org/10.1787/465f0d8b-en>
- Nayyar, G. (2011). The quality of employment in India's services sector: exploring the heterogeneity. *Applied Economics*, 44(36), 4701-4719. doi:10.1080/00036846.2011.589816
- Nordås, H. (2010). Trade in goods and services: Two sides of the same coin? *Economic Modelling*, 27(2), 496-506. doi:10.1016/j.econmod.2009.11.002
- Nordås, H. (2011). Opening the Markets for Business Services: Industrial Perspective for Developing Countries. *Journal of Economic Integration*, 26(2), 306-328.
- OECD. (2017). Economic Outlook for Southeast Asia, China and India 2017: Addressing Energy Challenges. doi:<https://dx.doi.org/10.1787/saeo-2017-en>
- OECD. (2019). Enterprises by business size. doi:<https://dx.doi.org/10.1787/31d5eeaf-en>
- OECD/ERIA. (2018). SME Policy Index: ASEAN 2018: Boosting Competitiveness and Inclusive Growth. In *SME Policy Index*. OECD Publishing, Paris/Economic Research Institute for ASEAN and East Asia, Jakarta. doi:<https://dx.doi.org/10.1787/9789264305328-en>
- OECD/The World Bank. (2014). Science, Technology and Innovation in Viet Nam. In *OECD Reviews of Innovation Policy*. OECD Publishing, Paris. doi:<https://dx.doi.org/10.1787/9789264213500-en>
- Phan, D., & Coxhead, I. (2015). Education in Southeast Asia: investments, achievements, and returns. . En I. Coxhead (Ed.), *Routledge Handbook of Southeast Asian Economics*. Oxon, UK and New York: Routledge Taylor and Francis Group.
- Roberts, M., & Tybout, J. (1991). Size rationalization and trade exposure in developing countries. En R. Baldwin (Ed.), *Empirical Studies of Commercial Policy*. Chicago Press.

- Roy, M. (2019). Elevating Services: Services Trade Policy, WTO Commitments, and their Role in Economic Development and Trade Integration. *G-24 Working Paper*. doi:10.2139/ssrn.3358775
- UNCTAD. (2018). *World Investment Report 2018 - Investment and New Industrial Policies*.
- Utar, H., & Ruiz, L. (2013). International competition and industrial evolution: Evidence from the impact of Chinese competition on Mexican maquiladoras. *Journal of Development Economics*, 105, 267-287. doi:10.1016/j.jdeveco.2013.08.004
- World Bank. (2016). *Vietnam 2035: Toward Prosperity, Creativity, Equity, and Democracy*. The World Bank. doi:10.1596/978-1-4648-0824-1
- World Bank. (2018). *Taking Stock. An Update on Vietnam's Recent Economic Developments - Special focus: Facilitating Trade by Streamlining and Improving the Transparency of Non-Tariff Measures*.

Annex A. Supplementary descriptive statistics

Table A A.1 provides descriptive statistics for the variables included in the firm-level analysis presented in Section 1. Each row displays the mean, minimum, maximum, standard deviation and median for the variable shown in the first column. The table provides these descriptive statistics separately for the set of observations used in the regressions focused on services firms (i.e. the regressions shown in columns 1 and 2 of Table 2 and columns 1 and 2 of Table 3) and for the observations used in the regressions focused on manufacturing firms (i.e. the regressions shown in columns 3 and 4 of Table 2 and columns 3 and 4 of Table 3).

These statistics show, for example, that the highest observed sector-level services import intensity is 0.166 for the sample of services firms. This means that in the corresponding sector, the weighted sum of Viet Nam's total annual imports of financial and insurance services, transport and travel services, as well as telecommunications and IT services, corresponds to roughly 17% of the domestic output of that sector in the corresponding year. For the sample of manufacturing firms, the maximum amounts to only 0.068.

The control for sector-level net exports of goods is only entered in regressions focused on manufacturing firms. The average of this variable is negative, reflecting the fact that Viet Nam has a negative trade balance in many manufacturing sectors. The mean value of -0.114 indicates that – among the manufacturing sectors included in this analysis – on average a negative trade balance corresponding to 11.4% of the corresponding sector's output was observed.

The instrumental variable (listed as the third variable) for sector-level services import intensity displays larger absolute values than the endogenous services import intensity variable. This is due to the fact that it is not normalised by sectoral output, since normalising the instrumental variable by Vietnamese sectoral output would undermine the identification strategy (Annex B). The same applies to the instrumental variable for net goods exports. Both instrumental variables (calculated as explain in Annex B) are expressed in millions of US Dollars.

The variables referring to firms' employment, average wage and revenue are entered in the regressions after logarithmic transformation. The median of the logarithm of employment is 1.8 for services firms, and 2.7 for manufacturing firms.

The variables highlighted with an asterisk (*) are binary variables. For example, the mean values of the dummy "Age >9 years" indicates that 11.3% of the services firms are older than nine years, for manufacturing firms that percentage amounts to 8.3. Similarly, the mean value of the dummy variable "Large firm" indicates that 27.4% of the manufacturing firms are large (i.e. have more than 249 employees), but only 1.1% of the services firms are in that size category.

Entered in the regressions as a sector-level control, the Herfindahl index of revenue concentration is based on information on the revenue of all firms in the dataset that are assigned to the same sector. The average of that variable is relatively low (indicating a low level of concentration) for the sample of services firms as well as for the manufacturing sample. State-owned enterprises account, on average, for 16.6% of total sector-level revenue in the services sample and nearly 18% for the manufacturing sample. The mean of the control variable for the revenue share of foreign-owned enterprises shows that they account, on average, for 9.7% of the sector-level revenue in the services sample and for 15.7% in the manufacturing sample.

Table A A.1. Descriptive statistics: Variables included in firm-level analysis

Variable	Regressions on services firms					Regressions on manufacturing firms				
	Mean	Minimum	Maximum	Standard deviation	Median	Mean	Minimum	Maximum	Standard deviation	Median
Sector-level services import intensity	0.0616	0	0.166	0.0419	0.0704	0.023	0.004	0.068	0.019	0.017
IV for sector-level services import intensity	179 932	0	292 482	99 505	229 630	32594.8	12874.84	55709.88	8817.696	30989.87
Sector-level net exports of goods [^]						-0.114	-2.599	0.748	0.535	-0.0264
IV for sector-level net exports of goods [^]						5381.81	-58385.14	31508.83	18131.4	-24.63
log employment	1.994	0	10.84	1.147	1.792	3.009	0	11.353	1.6	2.708
log wage per worker	3.403	0.0198	12.49	0.694	3.45	3.145	0.00245	12.49	0.818	3.237
log revenue	7.532	0.693	18.86	2.393	7.744	7.291	0.693	20.28	2.517	7.494
Age 4-9 years*	0.368	0	1	0.482	0	0.273	0	1	0.445	0
Age > 9 years*	0.113	0	1	0.317	0	0.0832	0	1	0.276	0
SOE*	0.00762	0	1	0.0869	0	0.012	0	1	0.109	0
FDI*	0.0128	0	1	0.112	0	0.0285	0	1	0.166	0
Trader*	0.0132	0	1	0.114	0	0.0223	0	1	0.148	0
Micro firm*	0.653	0	1	0.476	1	0.446	0	1	0.497	0
Small firm*	0.28	0	1	0.449	0	0.22	0	1	0.414	0
Medium-sized firm*	0.0554	0	1	0.229	0	0.0599	0	1	0.237	0
Large firm*	0.011	0	1	0.104	0	0.274	0	1	0.446	0
Herfindahl index revenue	0.00543	0.00063	0.997	0.0153	0.00216	0.00811	0.00063	0.997	0.024	0.0027
Sector-level SOE revenue share (%)	16.59	0	88.2	9.149	17.55	17.97	0	99.2	12.67	16.42
Sector-level FDI revenue share (%)	9.71	0	51.78	8.2	6.445	15.65	0	99.05	16.73	6.477

Note: [^] indicates that the corresponding variables were only included in regressions relying on the sample of manufacturing firms.

Table A A.2. Major occupations by skill

ISCO–08

Occupations (major headings)	Percentage	Skill level
Managers	1.33	High skill
Professionals	7.60	High skill
Technicians and associate professionals	4.10	High skill
Clerical support workers	2.05	Medium skill
Service and sales workers	17	Medium skill
Skilled agricultural, forestry and fish	11.76	Medium skill
Craft and related trades workers	14.56	Medium skill
Plant and machine operators, and assemblers	9.73	Medium skill
Elementary occupations	32.14	Low skill
Total	100	

Note: Weighted averages.

Source: Vietnamese Labour Force Survey.

Figure A A.1. Employment shares by business type, 2000–2016

Figure A A.2. Employment share by sector and business type

Annex B. Methodology: Firm-level analysis

The empirical findings presented in this paper are based on regressions estimated at two different levels of granularity. First, firm-level employment and average wages are linked to services imports. Second, the association between the wage of individuals and the occupation-specific exposure to services imports is examined in the worker-level analysis (described in Annex C).

The firm-level analysis focuses on the relationship between firm-level labour outcomes and the services import intensity of the sector in which the firm operates. This link is examined separately for services firms and manufacturing firms.

The regressions are based on variations of the following main specification:

$$Y_{i,s,t} = \alpha_0 + \beta_1 BWSERV_{s,t-1} + \beta_2 X_{i,s,t-1} + \beta_3 Z_{s,t-1} + \delta_i + \delta_t + \varepsilon_{i,s,t} \quad (1)$$

Where the dependent variable is either the logarithm of total employment or the logarithm of average wage per employee of firm i operating in sector s in year t .

$BWSERV$ is a measure of the exposure of sector s in year t to foreign services imports in services sectors j providing inputs to sectors s . It is calculated using the formula below:

$$BWSERV_{s,t} = \frac{1}{Domestic_output_{s,t}} \times \sum_{j \neq s} Import_{j,t} \times backw_link_{s,j,t_0} \quad (2)$$

$BWSERV_{s,t}$ is therefore the sum of all services imports in all services sectors j (with $j \neq s$), weighted by sector j 's share of the total inputs consumed by sector s in the base year t_0 (2005) and normalised by the total domestic output of sector s .²⁶ The calculation of the backward linkage weights, $backw_link_{s,j,t_0}$, relies on the OECD input-output table for Viet Nam for the year 2005. This data source provides information on the total value of intermediate inputs that each sector s sources. The input-output table simultaneously shows the value of intermediates that each sector s sources from all other sectors j . For a given sector s (e.g. manufacture of metals) and an input providing sector j (e.g. financial and insurance activities), this input-output table hence allows us to calculate $backw_link_{s,j,t_0}$ by dividing the value of inputs sector s sources from sector j by the total intermediate consumption of sector s .

This measure captures the imports of services that are likely to be – based on the input-output linkages between sectors – used by the firm in its production process. An increase in the value of $BWSERV_{s,t}$ hence indicates growth – relative to the total output of sector s – of Viet Nam's imports of those services that can be used as intermediate inputs by sector s . To avoid any confusion with import competition in the case of firms operating in services sectors, this measure does not take into account imports of services in the sector in which the firm operates.

X represents a vector of lagged firm-level controls. As mentioned in Section 1, it includes the logarithm of total revenue, dummies for foreign ownership and state ownership, dummies for age categories as well as a dummy equalling one if a firm is an exporter or importer. To take into account unobservables correlated with firm size, such as access to credit, we also control for size dummies.²⁷

²⁶ This measure of the exposure to foreign services imports follows the general logic of the goods offshoring measure used by (Feenstra & Hanson, 1999) that was applied to services offshoring by (Amiti & Wei, 2009). The normalization by domestic production is inspired by (Roberts & Tybout, 1991).

²⁷ A large body of literature discusses the relevance of firm ownership in the Vietnamese context with respect to access to factors of production and firms' responses to trade shocks (Baccini, Impullitti, & Malesky, 2019; Coxhead & Phan,

Z is a set of lagged sector-level controls encompassing state-owned enterprises' share of total revenue, foreign firms' share of total revenue as well as the Herfindahl-Hirschman index of revenue concentration as a proxy for sector-level competition (Roberts & Tybout, 1991). All specifications include firm and year-fixed effects to control for unobservable characteristics of firms, such as managerial ability, and economy-wide shocks affecting all firms in a given year. Standard errors are clustered at province-by-sector level.²⁸

While equation (1) corresponds to the regressions estimated for the set of firms operating in services sectors, an additional control was included in regressions based on observations of firms operating in manufacturing industries. In light of the importance of exports of manufactures to Viet Nam's recent economic development (Athukorala & Tien, 2012; López González, Mapping the participation of ASEAN small- and medium- sized enterprises in global value chains, 2017), all regressions based on manufacturing firms also control for the net exports (exports minus imports) of the manufacturing sector in which the firm operates, normalised by total domestic output of the same manufacturing industry.

It is important to note that trade flows are not allocated randomly, i.e. unobserved shocks could simultaneously affect services import intensity – as well as net manufacturing exports – and firm-level employment outcomes. Notwithstanding the inclusion of firm and year fixed effects and a large set of control variables, one cannot rule out that part of the sector-level variation in the two trade variables is influenced by Vietnamese firms' behaviour or by third variables that affect both trade and firm-level outcomes in Viet Nam.

An instrumental variable (IV) strategy inspired by the shift-share approach (Utar & Ruiz, 2013; Dauth, Findeisen, & Suedekum, 2014), is adopted in order to address this concern. To instrument for the endogenous variable of interest, *BWSERV*, the IV is calculated as follows:

$$IV_BWSERV_{s,t-1} = \sum_{j \neq s} (ExportsWLD_{j,t-1} - ImportsVNM_{j,t-1}) \times backw_link_{s,j,t_0} \quad (3)$$

ExportsWLD refers to the all exports of services in sector *j* from all countries other than Viet Nam, whereas *ImportsVNM* represents the imports of Viet Nam in sector *j* from the rest of the world. In line with the world-supply instrument used by Hummels et al. (2014), this approach uses the rest of the world's exports to destinations other than Viet Nam to predict Viet Nam's imports of services in a given sector *j*. Apart from the measure of backward linkage intensity (derived from the Viet Nam-specific input-output table for 2005), the instrument does not incorporate information from Viet Nam. Designed to capture world-wide shifts in the export supply of specific services that might be driven by reduced trade costs, for example, this IV is expected to predict changes in Vietnamese imports of services without being correlated with unobserved supply and demand shocks within Viet Nam.²⁹

Since similar endogeneity concerns also afflict the second trade variable (net manufacturing exports), an additional IV is calculated following the same general logic. Yet, the net export patterns of the rest of the world are a poor predictor of Viet Nam's net exports, i.e. an instrumental strategy using information from the rest of the world would fail to meet the relevance criterion. The Finger-Kreinin-Index (Finger & Kreinin, 1979) was therefore calculated for both exports and imports to identify countries displaying high levels of

2013). Note that ownership is not time-invariant in all cases (i.e. these controls can be entered in a regression with firm fixed effects), as some state-owned enterprises were privatised and former joint ventures became fully foreign-owned enterprises. Following (Utar & Ruiz, 2013), three age dummies are computed: less than four years, 4-9 years, more than 9 years. The size dummies correspond to the main categories employed by the OECD (OECD, 2019): micro (less than 10 employees), small (10 to 49 employees), medium (50 to 249), and large (more than 249).

²⁸ Note that clustering at the sector level is not possible due to an insufficient number of sectors. For the relevance of the province-level to industrial development and economic policies in the case of Viet Nam, see for example (McCaig B. , 2011) and (Malesky & London, 2014).

²⁹ The correlation between the IV and the endogenous variable (*BWSERV*) is 0.76.

similarity with Viet Nam in terms of the distribution of exports and imports. The IV strategy uses the total net exports of the ten countries with the highest level of similarity with Viet Nam according to the Finger-Kreinin-Index to predict Viet Nam's net exports.³⁰ Like the IV for services imports, the IV for net manufacturing exports is not normalised by domestic production. The correlation between the IV and the endogenous variable (BWSERV) is 0.76, whereas the correlation between this IV and the endogenous net manufacturing exports variable is 0.67 (Figure A B.1).

Figure A B.1. Correlation between endogenous trade variables and instrumental variables

³⁰ This group includes Tunisia, Indonesia, Syria, Moldova, Slovenia, Denmark, Morocco, Guatemala, Turkey, and Dominican Republic.

Annex C. Methodology: Worker-level analysis

Drawing on the measure of sector-level services import intensity (*BWSERV*) described in Annex B, occupation-specific measures of services import exposure are calculated in the worker-level analysis as follows. First, information (from the Vietnamese labour force survey 2011) on the distribution of workers employed in a given occupation k across sectors s is used to compute weights ($a_{ks(2011)}$):

$$a_{ks(2011)} = \frac{L_{ks(2011)}}{L_k(2011)}$$

In other words, the number of workers in each occupation k , in sector s , is divided by the total number of workers in occupation k across all sectors. The weight, $a_{ks(2011)}$, is used to compute two measures of occupational trade exposure, R_{kst} (*exposure to services import intensity*) and, as a control variable, H_{kst} (*exposure to imports of final goods*):

$$R_{kst} = \sum_{s=1}^S a_{ks(2011)} \times BWSERV_{s,t}.$$

$$H_{kst} = \sum_{s=1}^S a_{ks(2011)} \times Fin_good_{s,t}.$$

Where $BWSERV_{s,t}$ is a measure of the sector-level services import intensity (calculated as explained in Annex B) regarding sector s at time t . Conversely, $Fin_good_{s,t}$ refers to total Vietnamese imports of final consumption goods in sector s at time t .

Following Ebenstein, Harrison, McMillan, & Phillips (2014), the trade exposure measures enter into the specification with a one year lag to allow for sufficient time of potential wage adjustments to take place. The main specification is a wage equation on the individual-level, but with clustered standard errors on the occupation level.

$$W_{ikst} = \alpha + \beta_0 H_{kst-1} + \beta_1 R_{kst-1} + \beta_2 Z_k + \beta_3 I_s + \beta_3 X_{it} + \varepsilon_{ikst}$$

The remainder consists of various control variables on the macro and micro level. Time-invariant characteristics of occupations and sectors are controlled for in Z_k and I_s , respectively. Furthermore, individual year dummies are included to control for common shocks to the whole economy and individual province dummies to control for regional differences. Worker heterogeneity that affects wage setting is captured in a set of explanatory variables, X_{it} , such as education, tenure (linear and quadratic), age, ethnicity (kinh), marital status, gender, whether their firm is foreign owned, and type of labour contract.

A problem with analysing trade effects on wages is that underlying productivity differences may determine both trade and wage levels simultaneously (Hummels, Jørgensen, Munch, & Xiang, 2014). This makes it difficult to disentangle the trade effect from other productivity-improving factors. While the above firm-level analysis circumvents endogeneity issues using an IV approach, the worker-level analysis is instead estimated in a standard linear regression. Although causality cannot be guaranteed in such a framework, it is possible to plausibly identify the import effect by controlling for a very large selection of observable and non-observable variables.

Moreover, the occupation-level approach described in this section disregards any dynamics caused by changes in the occupational composition of sector-level employment over time. In addition, a bias is introduced if occupational shares in 2011 are correlated with variables which are unaccounted for, which would then be correlated with the error term. The worker-level specification uses a rich set of control variables and fixed effects to address this concern.

Annex D. Supplementary results: Firm-level analysis

Table A D.1. Firm-level wage per employee, services imports and firm ownership

	Services firms	Manufacturing firms
	(1)	(2)
Lagged sector-level services import intensity	0.379*** (0.127)	-0.523 (0.633)
Lagged sector-level net exports of goods		-0.015* (0.009)
(Interaction) services imports × FDI	-0.419 (0.495)	0.792 (1.082)
(Interaction) services imports × SOE	0.091 (0.339)	0.868 (0.972)
Lagged revenue	0.014*** (0.003)	0.017*** (0.002)
Age 4-9 years	-0.008*** (0.003)	0.004 (0.005)
Age > 9 years	0.012* (0.007)	0.002 (0.008)
SOE	-0.010 (0.029)	-0.026 (0.035)
FDI	0.451*** (0.075)	0.043 (0.056)
Trader	0.076*** (0.024)	0.071*** (0.010)
Small firm	0.029*** (0.004)	0.031*** (0.007)
Medium-sized firm	0.050*** (0.013)	0.094*** (0.011)
Large firm	0.094*** (0.020)	0.146*** (0.015)
Lagged SOE sales share	-0.004*** (0.001)	0.000 (0.001)
Lagged MNE sales share	-0.002*** (0.000)	0.000 (0.000)
Lagged Herfindahl index revenue	0.504** (0.196)	-0.117 (0.101)
N	682 277	154 000
R-squared	0.235	0.325
Number of firms	175 262	36 728

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS regressions. Dependent variable: logarithm of wage per employee. All regressions include firm fixed effects and year fixed effects.

Source: Viet Nam Enterprise Survey 2004-2016.

Table A D.2. Firm-level employment, services imports and firm size

	Services firms only							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	IV	IV	IV	IV
Lagged sector-level services import intensity	-0.381***	-0.391***	-0.414***	-0.415***	-0.339**	-0.339*	-0.390**	-0.383**
	(0.118)	(0.109)	(0.113)	(0.119)	(0.157)	(0.173)	(0.172)	(0.177)
(Interaction) services imports × micro	-0.044				-0.056			
	(0.069)				(0.111)			
(Interaction) services imports × small		-0.044				-0.113		
		(0.068)				(0.130)		
(Interaction) services imports × medium			0.321***				0.458***	
			(0.089)				(0.156)	
(Interaction) services imports × large				0.048				0.104
				(0.063)				(0.069)
Lagged revenue	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***	0.066***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age 4-9 years	0.010**	0.010**	0.010**	0.010**	0.010**	0.010**	0.010**	0.010**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Age > 9 years	0.009*	0.010**	0.010**	0.009*	0.009	0.010**	0.010**	0.007
	(0.005)	(0.004)	(0.004)	(0.005)	(0.006)	(0.004)	(0.004)	(0.005)
SOE	0.161***	0.161***	0.160***	0.161***	0.161***	0.161***	0.160***	0.162***
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
FDI	0.248***	0.248***	0.247***	0.249***	0.248***	0.249***	0.247***	0.249***
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.033)	(0.034)
Trader	0.132***	0.132***	0.132***	0.132***	0.132***	0.132***	0.132***	0.132***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Small firm	0.231***	0.231***	0.231***	0.231***	0.231***	0.232***	0.231***	0.231***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)
Medium-sized firm	0.636***	0.636***	0.634***	0.636***	0.636***	0.637***	0.633***	0.637***
	(0.021)	(0.021)	(0.020)	(0.021)	(0.020)	(0.021)	(0.020)	(0.021)
Large firm	0.934***	0.934***	0.934***	0.934***	0.934***	0.935***	0.934***	0.934***
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)
Lagged SOE sales share	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lagged MNE sales share	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Lagged Herfindahl index revenue	0.039	0.040	0.042	0.038	0.035	0.036	0.040	0.031
	(0.108)	(0.109)	(0.109)	(0.108)	(0.118)	(0.120)	(0.120)	(0.117)
N	1,652,077	1,652,077	1,652,077	1,652,077	1,652,077	1,652,077	1,652,077	1,652,077
R-squared	0.091	0.091	0.091	0.091				
Number of firms	351,922	351,922	351,922	351,922	351,922	351,922	351,922	351,922
Kleibergen-Paap F					508.7	502.8	503.3	517.2

Note: *** p<0.01, ** p<0.05, * p<0.1. Dependent variable: logarithm of employment. All regressions include firm fixed effects and year fixed effects.

Table A D.3. Firm-level average wage, services imports and firm size

	Services firms only							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	IV	IV	IV	IV
Lagged sector-level services import intensity	0.517*** (0.141)	0.328** (0.128)	0.350*** (0.129)	0.357*** (0.124)	0.350*** (0.116)	0.168 (0.115)	0.188* (0.114)	0.200* (0.112)
(Interaction) services imports × micro	-0.268*** (0.054)				-0.254*** (0.049)			
(Interaction) services imports × small		0.166*** (0.030)				0.161*** (0.028)		
(Interaction) services imports × medium			0.542*** (0.093)				0.597*** (0.096)	
(Interaction) services imports × large				0.143** (0.068)				0.135** (0.060)
Lagged revenue	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.003)	0.014*** (0.003)	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.003)	0.014*** (0.003)
Age 4-9 years	-0.011*** (0.003)	-0.008*** (0.003)	-0.008*** (0.003)	-0.009*** (0.003)	-0.011*** (0.003)	-0.008*** (0.003)	-0.008*** (0.003)	-0.009*** (0.003)
Age > 9 years	0.002 (0.006)	0.013* (0.007)	0.012* (0.007)	0.005 (0.006)	0.002 (0.006)	0.013* (0.007)	0.012* (0.007)	0.006 (0.006)
SOE	-0.003 (0.022)	-0.005 (0.022)	-0.004 (0.022)	-0.004 (0.022)	-0.003 (0.022)	-0.005 (0.022)	-0.004 (0.022)	-0.004 (0.022)
FDI	0.415*** (0.050)	0.410*** (0.050)	0.410*** (0.049)	0.413*** (0.051)	0.415*** (0.050)	0.410*** (0.050)	0.410*** (0.049)	0.414*** (0.051)
Trader	0.074*** (0.024)	0.076*** (0.024)	0.074*** (0.024)	0.075*** (0.024)	0.074*** (0.024)	0.076*** (0.024)	0.074*** (0.024)	0.076*** (0.024)
Small firm	0.030*** (0.005)	0.030*** (0.005)	0.029*** (0.004)	0.030*** (0.005)	0.030*** (0.004)	0.029*** (0.004)	0.029*** (0.004)	0.029*** (0.004)
Medium-sized firm	0.050*** (0.013)	0.050*** (0.013)	0.047*** (0.013)	0.050*** (0.013)	0.049*** (0.013)	0.049*** (0.013)	0.045*** (0.013)	0.049*** (0.013)
Large firm	0.094*** (0.020)	0.095*** (0.020)	0.093*** (0.020)	0.094*** (0.020)	0.093*** (0.020)	0.094*** (0.020)	0.092*** (0.020)	0.092*** (0.020)
Lagged SOE sales share	-0.003*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
Lagged MNE sales share	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Lagged Herfindahl index revenue	0.481** (0.193)	0.508*** (0.195)	0.510*** (0.196)	0.490** (0.194)	0.488** (0.192)	0.515*** (0.194)	0.517*** (0.195)	0.497** (0.193)
N	682,277	682,277	682,277	682,277	682,277	682,277	682,277	682,277
R-squared	0.235	0.235	0.235	0.235				
Number of firms	175,262	175,262	175,262	175,262	175,262	175,262	175,262	175,262
Kleibergen-Paap F					471.4	479.0	483.0	498.6

Table A D.4. Firm-level employment, excluding sector-level controls

	Services firms		Manufacturing firms	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	-0.265**	-0.378**	1.189**	-0.838
	(0.114)	(0.183)	(0.520)	(1.325)
Lagged sector-level net exports of goods			0.002	0.025
			(0.009)	(0.025)
N	1 652 077	1 652 077	327 494	327 494
R-squared	0.091		0.133	
Number of firms	351 922	351 922	65 507	65 507
Kleibergen-Paap F		433.8		133.9
Sector-level controls included	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1. Dependent variable: logarithm of employment. All regressions include firm-level controls as well as firm fixed effects and year fixed effects.

Table A D.5. Firm-level average wage, excluding sector-level controls

	Services firms		Manufacturing firms	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	0.358***	0.310***	-0.614	0.231
	(0.099)	(0.089)	(0.510)	(0.706)
Lagged sector-level net exports of goods			-0.015*	0.006
			(0.009)	(0.017)
N	682 277	682 277	154 000	154 000
R-squared	0.234		0.325	
Number of firms	175 262	175 262	36 728	36 728
Kleibergen-Paap F		306.7		69.01
Sector-level controls included	No	No	No	No

Note: *** p<0.01, ** p<0.05, * p<0.1. Dependent variable: logarithm of wage per employee. All regressions include firm-level controls as well as firm fixed effects and year fixed effects.

Table A D.6. Pairwise correlations of sector-level variables, services

	Sector-level services import intensity	SOE sales share	FDI sales share	HH index sales concentration
Sector-level services import intensity	1			
SOE sales share	-0.1358	1		
FDI sales share	0.2101	-0.3048	1	
HH index sales concentration	0.0609	0.3796	0.1745	1

Table A D.7. Pairwise correlations of sector-level variables, manufacturing

	Sector-level services import intensity	Net exports goods	SOE sales share	FDI Sales share	HH index sales concentration
Sector-level services import intensity	1				
Net exports goods	-0.2864	1			
SOE sales share	0.3887	-0.2406	1		
FDI sales share	-0.5176	0.1079	-0.4734	1	
HH index sales concentration	0.037	-0.0731	0.1169	0.2944	1

Table A D.8. Firm-level employment, controlling for foreign share of services sourcing

	Services firms		Manufacturing firms	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	-0.433*** (0.112)	-0.345** (0.163)	1.623*** (0.550)	-0.111 (1.433)
Lagged sector-level net exports of goods			0.003 (0.010)	0.041* (0.024)
Lagged foreign share of services sourcing	-0.081 (0.052)	-0.072 (0.053)	0.057 (0.051)	0.050 (0.075)
N	1,652,033	1,652,033	327,494	327,494
R-squared	0.091		0.133	
Number of firms	351,913	351,913	65,507	65,507
Kleibergen-Paap F		1820		313.9

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of employment. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls.

Table A D.9. Firm-level average wage, controlling for foreign share of services sourcing

	Services firms		Manufacturing firms	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	0.324** (0.140)	0.220** (0.106)	-0.455 (0.670)	0.568 (0.876)
Lagged sector-level net exports of goods			-0.015 (0.010)	0.010 (0.018)
Lagged foreign share of services sourcing	-0.163 (0.201)	-0.171 (0.196)	-0.005 (0.111)	0.092 (0.116)
N	682,238	682,238	154,000	154,000
R-squared	0.235		0.325	
Number of firms	175,248	175,248	36,728	36,728
Kleibergen-Paap F		1470		64.91

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of wage per employee. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls.

Table A D.10. Firm-level employment, restricted sample of manufacturing firms

	All provinces		Hanoi and HCMC only	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	1.500***	-0.029	0.370	1.734
	(0.560)	(1.360)	(0.839)	(1.734)
Lagged sector-level net exports of goods	0.003	0.041*	-0.008	-0.003
	(0.010)	(0.022)	(0.014)	(0.018)
N	322,673	322,673	129,815	129,81
R-squared	0.139		0.141	
Number of firms	64,204	64,204	28,791	28,79
Kleibergen-Paap F		235.8		95.9

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of employment employee. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls. All regressions exclude observations in the bottom and top percentile of the distribution in terms revenue per worker.

Table A D.11. Firm-level average wage, restricted sample of manufacturing firms

	All provinces		Hanoi and HCMC only	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	-0.435	0.485	0.873	2.852***
	(0.581)	(0.793)	(0.612)	(1.081)
Lagged sector-level net exports of goods	-0.016*	0.006	0.004	0.048*
	(0.009)	(0.016)	(0.010)	(0.027)
N	153,102	153,102	55,615	55,61
R-squared	0.326		0.375	
Number of firms	36,541	36,541	14,355	14,35
Kleibergen-Paap F		68.76		23.1

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of wage per employee. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls. All regressions exclude observations in the bottom and top percentile of the distribution in terms revenue per worker.

Table A D.12. Firm-level employment, additional controls: Services firms

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	-0.391***	-0.360**	-0.381***	-0.320*
	(0.110)	(0.172)	(0.112)	(0.168)
Lagged female firm-level employment share	0.000	0.000		
	(0.000)	(0.000)		
Lagged logarithm of capital per worker			-0.014***	-0.014***
			(0.002)	(0.002)
N	1 641 419	1 641 419	1 645 368	1 645 368
R-squared	0.093		0.094	
Number of firms	348 508	348 508	349 111	349 111
Kleibergen-Paap F		987.1	.	1014

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of employment. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls.

Table A D.13. Firm-level employment, additional controls: Manufacturing firms

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	1.547*** (0.555)	-0.071 (1.381)	1.442*** (0.535)	-0.028 (1.381)
Lagged sector-level net exports of goods	0.002 (0.010)	0.039* (0.022)	-0.000 (0.010)	0.039* (0.022)
Lagged female firm-level employment share	0.000 (0.000)	0.000 (0.000)		
Lagged logarithm of capital per worker			-0.037*** (0.003)	-0.037*** (0.003)
N	325 341	325 341	326 011	326 011
R-squared	0.135		0.137	
Number of firms	64 744	64 744	64 846	64 846
Kleibergen-Paap F		231.4		232.7

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of employment. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls.

Table A D.14. Firm-level average-wage, additional controls: Services firms

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	0.375*** (0.125)	0.214* (0.112)	0.391*** (0.126)	0.233** (0.110)
Lagged female firm-level employment share	0.000 (0.000)	0.000 (0.000)		
Lagged logarithm of capital per worker			-0.019*** (0.006)	-0.018*** (0.006)
N	682 277	682 277	682 005	682 005
R-squared	0.235		0.236	
Number of firms	175 262	175 262	175 213	175 213
Kleibergen-Paap F		965.2	.	964.8

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of wage per employee. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls.

Table A D.15. Firm-level average-wage, additional controls: Manufacturing firms

	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Lagged sector-level services import intensity	-0.444 (0.580)	0.479 (0.792)	-0.443 (0.565)	0.468 (0.792)
Lagged sector-level net exports of goods	-0.015* (0.009)	0.008 (0.016)	-0.015* (0.009)	0.007 (0.016)
Lagged female firm-level employment share	-0.000* (0.000)	-0.000* (0.000)		
Lagged logarithm of capital per worker			-0.026*** (0.003)	-0.026*** (0.003)
N	154,000	154,000	153,972	153,972
R-squared	0.325	0.325	0.326	0.326
Number of firms	36,728	36,728	36,724	36,724
Kleibergen-Paap F		68.40		68.50

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered at the sector-by-province level. Dependent variable: logarithm of wage per employee. All regressions include firm fixed effects, year fixed effects, firm controls and sector controls.

Annex E. Supplementary results: Worker-level analysis

Table A E.1. Worker-level results: Wages and occupational trade exposure, 2011–2016, formal employment

Dependent variable: Logarithm of hourly wages

	(1)	(2)	(3)	(4)
	All occupations	Elementary occupations	Medium-skilled occupations	High-skilled occupations
Lagged occupational services import exposure	-8.218 (5.829)	-5.244 (4.509)	-10.48 (7.294)	-0.443 (2.309)
Lagged occupational import exposure (final consumption goods)	0.0209*** (0.00472)	0.0282*** (0.00695)	0.0194*** (0.00610)	0.00111 (0.00233)
Woman	-0.156*** (0.0135)	-0.157*** (0.0156)	-0.161*** (0.0211)	-0.0611*** (0.00612)
Tenure (years)	-0.135*** (0.0347)	-0.249*** (0.0855)	-0.221*** (0.0322)	0.127*** (0.00985)
Tenure squared (years)	0.0269*** (0.00384)	0.0377*** (0.0105)	0.0393*** (0.00453)	0.000652 (0.000917)
Partner	-0.00201 (0.00764)	-0.0153 (0.00910)	-0.0322*** (0.00899)	0.0330*** (0.00660)
Comparison group: Domestic private businesses				
A1. Lagged services import share (state)	3.133*** (1.165)	0.355 (1.897)	2.683** (1.071)	1.082* (0.556)
A2. Lagged services import share (foreign)	3.229*** (0.672)	1.093 (1.747)	3.063*** (0.809)	1.721** (0.685)
	0	0	0	0
B1. State-owned business	0.0595 (0.0718)	0.373** (0.145)	0.110* (0.0588)	-0.00162 (0.0407)
B2. Foreign-owned business	0.0941*** (0.0275)	0.167* (0.0914)	0.0948*** (0.0243)	0.157*** (0.0540)
Constant	0.648 (0.474)	-2.742*** (1.001)	1.259*** (0.436)	1.771*** (0.198)
Adj. R-Square	0.67	0.68	0.66	0.41
N	1154211	275591	585085	293509

Note: *** p<0.01, ** p<0.05, * p<0.1.

Source: Viet Nam Labour Force Survey 2011–2016.

Table A E.2. Worker-level results: Wages and occupational trade exposure, 2011–2016, informal employment

Dependent variable: Logarithm of hourly wages

	(1)	(2)	(3)	(4)
	All occupations	Elementary occupations	Medium-skilled occupations	High-skilled occupations
Lagged occupational services import exposure	-0.585 (0.481)	-1.311 (0.985)	-0.482 (0.552)	-0.816 (1.786)
Lagged occupational import exposure (final consumption goods)	-0.00116* (0.000674)	-0.00125* (0.000616)	0.000669 (0.000755)	0.00721* (0.00373)
Woman	-0.157*** (0.0137)	-0.141*** (0.0257)	-0.172*** (0.0129)	-0.0583** (0.0280)
Tenure (years)	0.0819*** (0.00818)	0.0708*** (0.00863)	0.0905*** (0.00952)	0.112*** (0.0300)
Tenure squared (years)	-0.00624*** (0.00103)	-0.00717*** (0.00114)	-0.00576*** (0.000953)	-0.00456 (0.00447)
Partner	0.0476*** (0.00664)	0.0319*** (0.00548)	0.0584*** (0.0112)	0.0418 (0.0253)
Comparison group: Domestic private businesses				
A1. Lagged services import share (state)	-1.893*** (0.525)	-1.441** (0.674)	-1.090* (0.606)	0.775 (1.620)
A2. Lagged services import share (foreign)	-0.0163 (0.636)	-1.335 (1.265)	0.0346 (0.946)	-0.200 (1.127)
B1. State-owned business	0.0487 (0.0383)	0.112*** (0.0400)	-0.0425 (0.0391)	-0.238* (0.139)
B2. Foreign-owned business	0.107*** (0.0297)	0.161*** (0.0512)	0.0937*** (0.0299)	0.152 (0.134)
Constant	2.358*** (0.0480)	2.386*** (0.0823)	2.308*** (0.0312)	2.512*** (0.239)
Adj. R-Square	0.35	0.25	0.38	0.48
N	209519	85873	119605	3913

Note: *** p<0.01, ** p<0.05, * p<0.1.

Source: Viet Nam Labour Force Survey 2011–2016.