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Impacts of Foreign Direct Investment Inflows on Employment in Vietnam

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Abstract: *This paper assesses the impacts of foreign direct investment (FDI) on the demand for aggregate employment and skilled labour in Vietnam during the period from 2011-15. Thanks to deeper integration into the global economy, Vietnam has attracted a large amount of FDI which is a crucial driver for economic development. Employing panel data of all 63 Vietnamese provinces in the 2011-15 period and the fixed effects technique with robust standard errors, we show the adverse effects of FDI on demand for both aggregate employment and skilled labour in Vietnam. Interestingly, the absolute magnitude of the effect on employment of skilled labour is considerably larger than that of aggregate employment. In addition, the effects are positive in both the services and industry sectors, though in terms of magnitude, the effects in the latter are significantly lower than those in the former. The effects are negative in the agriculture sector. Rises in import-export scale increase the negative effects of FDI on demand for skilled labour.*

Keywords: foreign direct investment; mergers and acquisitions; employment; skilled labour; dependency theory; Vietnam
JEL Classification: F21; C23; P33

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1. Introduction

The impacts of foreign direct investment (FDI) on host economies, particularly issues related to employment in developing countries, have been major concerns for development economists. Theoretical and empirical studies show that the employment effects of FDI inflows can be positive for one country but negative for others, depending on the characteristics of these inflows and host economies (e.g. Baldwin, 1995; UNCTAD[1], 1994).

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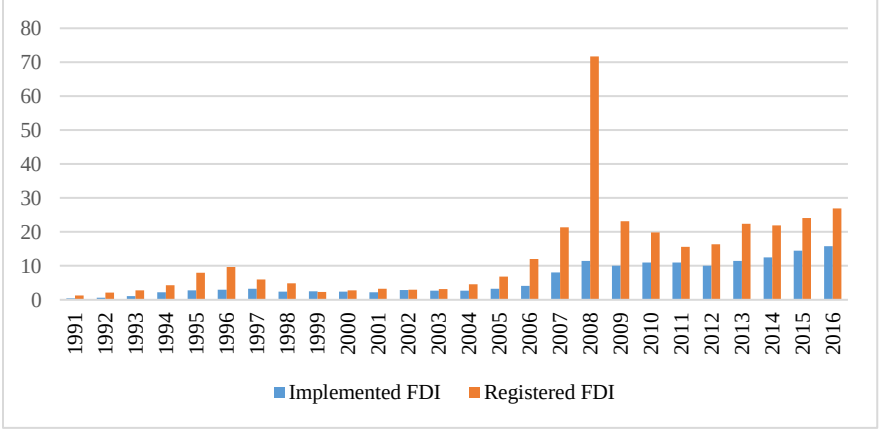
Since introducing *Doi moi (Renovation)* in 1986 with market-oriented reforms, Vietnam has attracted a large amount of FDI as a crucial driver of economic development. After steady growth in the period from 1991-2006, FDI inflows began to increase considerably in 2007 with total implemented FDI capital of over 8 billion USD (Figure 1). The inflows witnessed a peak of up to 11,500 billion USD in 2008, nearly fivefold that for the year 2000. However, this is the period when the Vietnamese economy saw unsustainable policies for attracting FDI. The amount of registered FDI capital was markedly greater than the implemented FDI. In 2008, the ratio of implemented FDI to registered FDI was only 16%. The average implemented FDI capital in the 2006-10 period increased by 2.2 times while the average registered FDI capital increased by 6.1 times in comparison with the 2001-05 period. Vietnamese FDI attraction policies have changed significantly, which require foreign firms to demonstrate stronger commitments on their capital disbursement. The implemented-registered FDI ratio in the 2011-16 period was around 60%. In addition, implemented FDI capital increased to 15.8 billion USD in 2016.

Fulfilling the government's expectation, foreign firms have helped Vietnam significantly improve economic growth and productivity through their own technology and productivity spillovers (e.g. Anwar & Nguyen, 2010; Le & Pomfret, 2011; Nguyen, 2008a; Nguyen, Vu, Tran, & Nguyen, 2006; Ni & Kato, 2017).

Figure 1: Implemented and registered FDI in Vietnam, 1991-2016 (Billion USD)



Note: Preliminary data for 2016
Source: GSO's statistical data

However, along with the success of FDI attraction, several studies show the shortcomings of attracting Vietnamese FDI, including limited linkages

and increasing competition between domestic and foreign firms (e.g. Giroud, 2007; Le & Pomfret, 2011; Nguyen, 2008b). These are associated with the adverse employment effects of FDI inflows in host countries (UNCTAD, 1994). As a result, Jenkins (2006) shows the negative impacts in Vietnam during the 1995-99 period.

This paper makes two main contributions to the current literature. First, in addition to assessing impacts of FDI inflows on employment in Vietnam, we account for the impacts of the former on skilled labour. Second, we extend previous analysis of examining both direct and indirect impacts of FDI inflows on employment via mergers and acquisitions (M&As) and interactions between foreign and local firms.

To do so, we first review the impacts of FDI on employment, especially in developing countries. After that, we investigate several aspects of FDI inflows related to the employment impacts in Vietnam and establish empirical models to assess these impacts on both employment and skilled labour during the 2011-15 period. The findings are elaborated and discussed in the last section.

2. Literature Review

In this section, we use the theoretical framework of UNCTAD (1994) to investigate the impacts of FDI inflows on employment. Next, we review studies of empirical evidence on the impacts in different countries, focusing on developing countries. As far as we know, apart from the research paper of Jenkins (2006), there has not been any academic papers analysing this issue in Vietnam.

2.1 Theories on the Impacts of FDI on Employment

FDI has both positive and negative, direct and indirect effects on employment in host countries. Examples of the types of impacts are described in Table 1. From theoretical perspectives, our paper focuses on the impacts of FDI on employment in terms of the quantity and quality of employment.

In terms of quantity, UNCTAD (1994) provides specific theoretical evidence on the effects of FDI. Directly, the way FDI firms invest in host countries, such as greenfield investments or M&As, is a crucial factor affecting the labour market in the short-term. While building new plants and factories increases the demand for workers, M&As may cause the quantity of employment to remain unchanged since it is only a change in firms' ownership. Firms after M&As can even restructure and rationalise their operation, resulting in employment demand and staff reduction.

Table 1: Impacts of FDI on employment

	Direct		Indirect	
	Positive	**Negative**	**Positive**	**Negative**
Quantity	Adds to net capital and creates jobs in expanding industries	Acquisitions may result in rationalisation and job losses	Creates jobs through forward and backward linkages and multiplier effects in local economy	Reliance on imports or displacement of existing firms results in job loss
Quality	Pays higher wages and has higher productivity	Introduces practices in e.g. hiring and promotion that are considered undesirable	Spillover of "best practice" work organisation to domestic firms	Erodes wage levels as domestic firms try to compete
Location	Adds new and perhaps better jobs in areas with high unemployment	Crowds already congested urban areas and worsens Regional imbalances	Encourages migration of supplier firms to areas with available labour supply	Displaces local producers, adding to regional unemployment, if foreign affiliates substitute for local production or rely on imports

Source: UNCTAD (1994, Table IV.1)

In addition, the impacts of FDI on the number of employees depend on other factors. For instance, if FDI takes the form of new investments in labour-intensive industries, the effects on job creation are markedly large. As a result, FDI in labour-intensive industries has a greater impact on employment than capital-intensive or technology-intensive ones.

Indirectly, the employment effects depend on whether foreign firms' products are substitutes for domestic production. Competition from FDI firms can cause many local producers to shrink production, leading to more job losses.

Linkages between foreign and local firms need to be considered. Accordingly, local firms can become suppliers of foreign firms' input materials or take advantage of foreign firms' output. The strong linkages provide favourable conditions for local firms to expand their production and deeply engage in supply chains, which increases labour demand. However, if levels of the linkages are low, foreign firms are too dependent on imported materials or exports, leading to minimal changes in domestic firms' demand for labour.

The employment effects of FDI can change over time (UNCTAD, 1994). The decline in employment may come at an early stage of new investments as domestic firms adjust to compete with foreign firms. However, in the long

run, competition helps stimulate domestic firms to improve their technologies and produce new goods, leading to higher demand for labour.

In terms of quality, UNCTAD (1994, Table IV.1) shows different effects of FDI inflows on the quality of employment. FDI firms can directly improve their productivity and generate technology spillovers to local firms through backward and downward linkages. In contrast, foreign firms may apply insufficient management principles, which make their workers have less motivation to improve skills. In addition, reduction in wages due to fierce competition between domestic and foreign firms can discourage workers to enhance their skills.

Sornarajah (2010) summarises two theories on the effects in developing countries. On the one hand, the neo-classical theory holds that FDI is largely beneficial to host economies. Foreign firms, in addition to easing the shortage of domestic capital, improve the quality of employment or productivity by introducing new technologies and modern management. On the other hand, the dependency theory contradicts the neo-classical theory, in a sense that foreign affiliates in developing countries aim to benefit their headquarters. FDI firms focus on taking advantages of cheap labour forces rather than training skills for their employees in host countries. Therefore, developing countries should adopt appropriate policies to reconcile these two theories thereby maximising the positive aspects of FDI.

Baldwin (1995) points out that with different types of effects, it is impossible to have a solid conclusion on the net employment effect of FDI. The net effect depends on many factors of FDI inflows and host economies (UNCTAD, 1994).

2.2 Empirical Findings on Impacts of FDI on Employment

Empirical studies have provided various findings of the employment impacts of FDI. On the one hand, the positive impacts are found in many developing countries. Several studies show export-oriented FDI inflows have positive effects on employment in selected developing countries (e.g. Fu & Balasubramanyam, 2005; Massoud, 2008; Waldkirch, Nunnenkamp, & Bremont, 2009). This is because exports are complementary to ones produced by local firms. FDI firms' export in Egypt creates little competition with the domestic firms and directly increase demand for labour (Massoud, 2008). In China, FDI inflows help the Chinese manufacturing industry access the global market and boost domestic employment (Fu & Balasubramanyam, 2005). In addition, through spillover effects, FDI firms indirectly increase Chinese private firms' labour demand (Karlsson, Lundin, Sjöholm, & He, 2009).

On the other hand, FDI inflows may cause either decreases or no changes in labour demand in developing countries. Moubarak & Keorite (2016) point

out in the short-term, Chinese FDI inflows into Thailand reduced industrial employment due to increases in demand for foreign employees and decreases in demand for unskilled local labour. Meanwhile, in Malaysia, there are no long-term interactions between FDI and employment (Pinn et al., 2011). Rizvi & Nishat (2009) also confirm this phenomenon in Pakistan, India and China when employing macro-level data.

The effects vary with different economic characteristics in FDI-invested sectors, economic crisis, and labour markets. By sector, studies on FDI and employment in selected African and Caribbean countries demonstrate the positive effects with magnitudes varying in different sectors (e.g. Abor & Harvey, 2008; Craigwell; 2006; Massoud, 2008).

In addition, economic shocks can change the positive effects. Sass, Gál, & Juhász (2018) show a positive employment impact of FDI inflows in business and services sectors in the Visegrad countries, but the impact decreased or disappeared in the 2008-09 economic crisis.

The effects can be different between skilled and unskilled employment. In the United Kingdom (UK), the effects on demand for unskilled labour are negative, but these are positive for skilled labour (Bailey & Driffield, 2007). With a Brexit case, the UK faces creation of highly skilled jobs when FDI inflows decrease (Bailey, Driffield, & Kispeter, 2019).

In Vietnam, apart from the research paper of Jenkins (2006), which shows the negative employment impacts of FDI in the 1995-99 period, other studies on the effects of FDI inflows on the Vietnamese economy show little in-depth analysis of the employment impacts. According to Jenkins (2006), although FDI firms expanded to labour-intensive industries during the 1995-99 period, the direct impacts when they create jobs were limited due to their high productivity, and minimal value-added. While the direct employment effects of FDI were low, the indirect effects were negative due to limited connections between foreign and domestic firms and a more competitive business environment that foreign firms generated. Foreign firms mainly imported raw materials for production and displaced their domestic competitors, creating overwhelming effects.

Other studies show limited linkages of FDI inflows with domestic firms (Giroud, 2007; Le & Pomfret, 2011) and their impacts on increasing competition in the Vietnamese economy (Nguyen, 2008b). Connections between FDI and domestic firms depend on FDI-intensity in Vietnamese provinces. In highly FDI-intensive provinces, FDI firms support domestic firms. However, in provinces with less FDI-intensity, FDI firms tend to crowd out domestic firms (Taguchi, 2019).

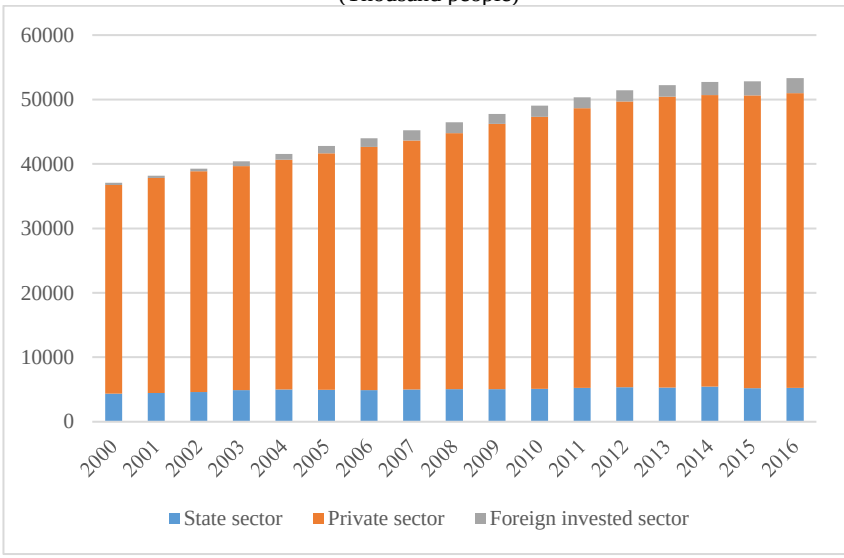
In the next section, we investigate selected factors affecting direct and indirect employment impacts of FDI inflows in Vietnam during the 2011-15 period.

3. An Illustration of Vietnamese FDI Inflows and Employment

3.1 Direct Effects: Employment of FDI and M&As

During the period from 2011-15, total FDI inflows in Vietnam accounted for more than 20% of total social investment, and their value-added constituted up to 20% of Gross Domestic Product (GDP) at current prices.[2] FDI has become an important driver for Vietnamese economic growth. However, foreign firms only employ 3-4% of total Vietnamese labour force in the same period (Figure 2).

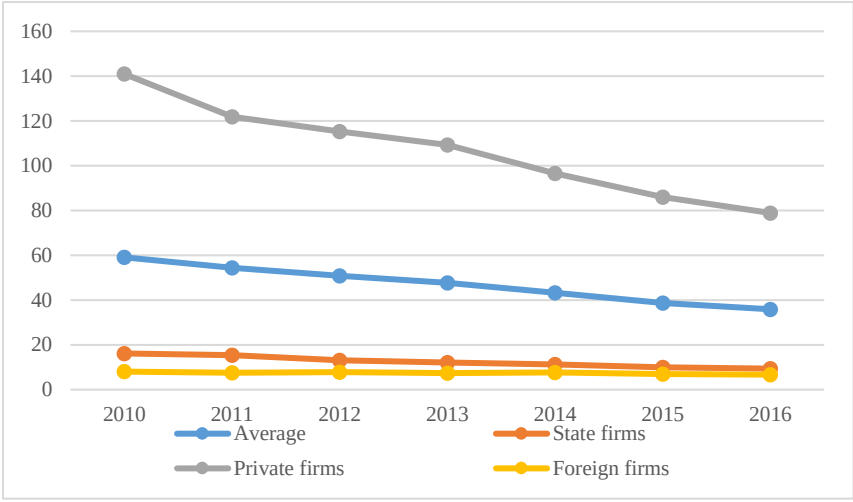
Figure 2: Contribution of foreign firms to employment in Vietnam, 2000-16 (Thousand people)



Note: Preliminary data for 2016
Source: GSO's statistical data

Figure 3 shows the labour-to-capital ratio in Vietnam by type of ownership to measure the direct employment effects of FDI in the 2010-16 period. For all types, the ratios gradually decreased, which means firms increased their capital intensity. The ratio for foreign firms was only about seven workers per one billion VND, nearly equal to one-tenth of that for local private firms. Foreign firms' demand for labour is considerably low. Therefore, the direct employment effect of FDI is expected to be highly limited.

Figure 3: The number of employees per one billion VND by type of ownership in Vietnam, 2010-16 (Employees per one billion VND)



Note: Preliminary data for 2016
Source: Authors' calculation from GSO's statistical data

If the ownership of one domestic private firm is transferred to foreign investors through M&As, as calculated in Figure 3, on average, 9/10 of the workforce will be cut off. That process with a state-owned firm exerts a lower negative impact (Figure 3). It should be noted that the value of net cross-border M&A deals in Vietnam during the period from 2011-15 was positive and of moderate size in comparison with greenfield investments in South East Asia (Table 2). The value of M&A deals tends to increase in Vietnam in the coming years due to equitisation (privatisation) of state-owned firms (Nguyen, 2017).

Table 2: Accumulated values of Net Cross-border M&As and Greenfield Investments in South East Asia, 2011-15 (Billion USD)

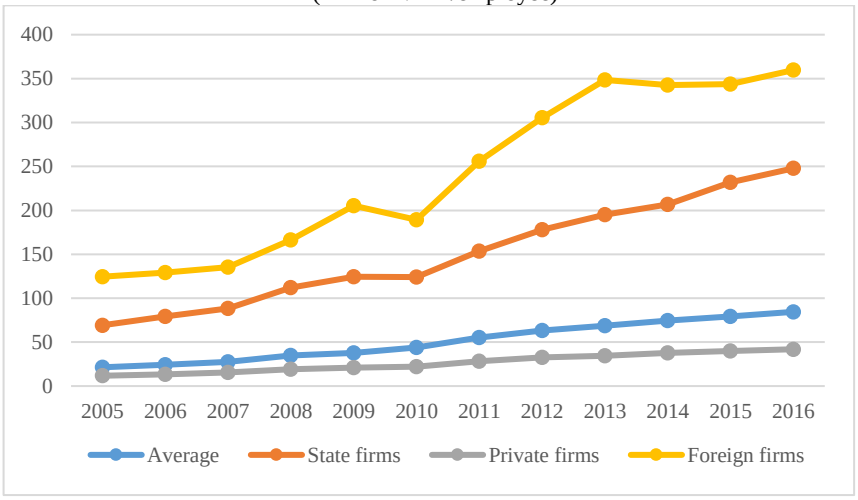
No.	Region/country	Net M&As	Greenfield Investments	Ratio
1	Brunei	-0.1	6.4	-1.1%
2	Laos	0.0	8.9	0.4%
3	Myanmar	0.6	35.9	1.6%
4	Thailand	0.5	33.7	1.6%
5	Cambodia	0.4	14.9	3.0%
6	Vietnam	4.8	82.0	5.8%
7	Malaysia	5.2	67.5	7.7%
8	Indonesia	13.3	116.7	11.4%
9	Philippines	5.3	33.0	16.1%
10	Singapore	21.2	57.7	36.8%
South-East Asia		51.3	457.8	11.2%

Notes: Values of net cross-border M&As: (sales of local firms to foreign firms) – (divestments: sales of foreign firms to local firms); Greenfield Investments: Values of announced greenfield investments.
Source: World Investment Report Series: Annex Tables, retrieved from UNCTAD's website: http://unctad.org/en/Pages/DIAE/World%20Investment%20Report/Annex-Tables.aspx

3.2 Indirect Effects: Linkages Between Foreign and Domestic Firms

We use statistical descriptions to investigate connections between foreign and domestic firms through two aspects: (i) backward and forward linkages and (ii) horizontal linkages. These linkages strongly associate with the employment effects of FDI.

Figure 4: Value added per employee by type of ownership in Vietnam, 2005-16 (Million VND/employee)



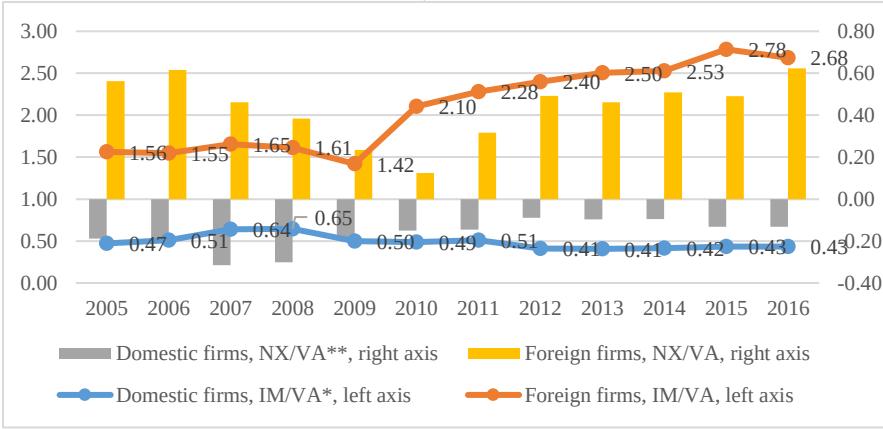
Note: Preliminary data for 2016
Source: Authors' calculation from GSO's Statistical Data

First, we measure value-added per employee at current prices to show differences in labour productivity by type of ownership (Figure 4). During the 2011-15 period, the indexes of foreign firms were almost nine and 1.5 times as large as those of domestic private and state-owned firms, respectively. Considerable differences in labour productivity can hinder local firms from connecting with foreign firms in supply chains. Foreign firms require rigorous technical standards, high management qualifications for their partners which domestic firms cannot meet. This circumstance leads foreign firms to become dependent upon imports and exports to compete

with local firms instead of connecting with them in producing goods and services.

In order to assess the linkages of these two types of firms, we calculate the ratio of imported materials' value (IM) to the value-added (VA), IM/VA (Figure 5). This ratio indirectly reflects the firms' dependence on imports.[4] During the period from 2005-09, in order to create a unit of value-added, foreign firms used over 1.4 value units of imported inputs. The number sharply rose in the 2009-16 period, reaching a peak of 2.78 in 2015. Foreign firms show their dependence on imported materials in comparison with domestic firms since the figure for domestic firms was lower than 0.66 in the 2005-16 period.

Figure 5: Imports and net exports-imports ratio to value added by type of ownership in Vietnam, 2005-*16*



Note: * IM/VA: imports/value added; ** NX/VA: (exports-imports)/value added. We use USD/VND average exchange rates from World Development Indicators to calculate the ratios, see detailed data on USD/VND exchange rates in World Bank's website: https://data.worldbank.org/products/wdi. Preliminary data for 2016

Source: Authors' calculation from GSO's Statistical Data and World Development Indicators

For the forward linkages, we calculate the firms' distribution of value-added by type of ownership through the ratio of net export-import (NX) to value-added (NX/VA) (Figure 5). This index is based on the expenditure approach to calculating GDP: Y = C + I + G + NX, where NX is the value-added distributed abroad; C, I, G are the value-added domestically distributed, including final consumption, investment expenditure and government spending, respectively. The value-added from local firms is largely distributed domestically. To domestically distribute one unit of value-added, local firms imported about 0.1 value unit from abroad, which is reflected by the domestic firms' trade deficit in the period from 2005-16.

Meanwhile, the value-added from foreign firms tends to be distributed abroad through exports. With one unit of value-added generated from foreign firms, more than 0.4 unit was distributed abroad in the 2011-15 period. Increases in the NX/VA index imply decreases in forward linkages of foreign firms with local firms, reducing the indirectly positive employment effects. If the value-added of net export-import is used for domestic consumption or investment, more jobs can be created in domestic firms.

This leads to a hypothesis that non-tradeable sectors in Vietnam see more significant spillover effects of FDI on employment. If FDI inflows into non-tradeable sectors such as services, FDI firms are forced to connect with local firms through forward linkages and create more jobs in local firms.

Table 3: HHI50 Index in Vietnamese Agriculture, 2015

Subsector	**HHI50 with all firms**	**HHI50 without foreign firms**
Cultivation and Animal Production	467.6	597.8
Forestry	922.7	965.8
Fishing	354.6	400.6

Note: $HHI50 = \sum_{i=1}^{50} (\text{market share of firm } i)^2$, where market share is a firm's revenue share, and HHI50 includes the top 50 firms. The larger HHI50 is, the less competitive the subsector is.
Source: Authors' calculation from VEC 2015

For horizontal linkages, we focus on analysing competitive environments with the appearance of foreign firms. Le & Pomfret (2011) and Jenkins (2006) show evidence of rising competition, exerting negative effects of FDI on technology transfers and employment in Vietnam. In addition, export-oriented FDI firms bring negative impacts on backward linkages because a competitive effect is larger than the demand effect (Nguyen-Huu & Nguyen-Khac, 2017).

We provide an example of this situation in the Vietnamese agriculture sector. Table 2 illustrates our calculation of the HHI50 index for three sub-sectors of Vietnamese agriculture with and without foreign firms in 2015. We assume that without participation of foreign firms, the market shares of domestic firms remain unchanged. The results show that if there had been no foreign firms in agricultural sub-sectors, competitive levels would have decreased. HHI50 indexes without participation of foreign firms would have been larger than HHI50 with all firms. Along with rises in the number of firms, FDI inflows into Vietnam increase the competition, at least in the agriculture sector, causing the indirect negative employment effects.

Analysing Vietnamese FDI inflows, we predict the negative impacts of FDI on employment in Vietnam in terms of both aggregate employment and the number of skilled labour. We give two other hypotheses on the impacts in different sectors with the scale of export-import activities:

Hypothesis 1 (H1): FDI inflows have negative impacts on the demand for aggregate employment and skilled labour.

Hypothesis 2 (*H2)*: Positive impacts of FDI inflows in services are larger than those in other sectors such as industry and agriculture in terms of both aggregate employment and the number of skilled labour.

Hypothesis 3 (*H3):* Increases in the value of export-import reduce positive employment impacts of FDI in terms of both aggregate employment and the number of skilled labour.

4. Research Method

4.1 Model

We employ panel data of all 63 Vietnamese provinces during the 2011-15 period with the scale of foreign firms in three sectors: agriculture, industry and services to examine the impacts of FDI on employment. Our models are largely based on the model of Craigwell (2006) on the determinants of labour demand. Approaching from an aggregate employment function, Craigwell (2006) examines the impacts of technology development and FDI inflows on aggregate employment. In our paper, we focus on the impacts of FDI on the demand for aggregate employment as well as skilled labour in different sectors with import-export scale. Therefore, we make two modifications from the model of Craigwell (2006) to establish our model specifications. First, we consider other determinants of labour demand and employ a modified vector of control variables. Second, we expand our baseline model to test the employment effects of FDI by sector and scale of import-export. Our baseline model specification is as Equation (1):

$$ln(em_{ijt}) = \alpha_1 + \alpha_2 ln(F_{ijt}) + \gamma X_{ijt} + \delta_j + \omega_t + u_{ijt} \quad (1)$$

where:

+ i, j, t are indexes by sector, province, and year, respectively. Three sectors are agriculture, industry and services.
+ em_{ijt} includes two variables representing aggregate employment emp_{ijt} and the number of skilled employees $skill_{ijt}$. The concept of "skilled employee" refers to workers who hold college or higher qualifications.
+ X_{ijt} is a control variable vector, including determinants of labour demand in sector i province j at year t.
+ δ_j, ω_t correspond to unobserved effects by province j, year t;

+ F_{ijt} is a main independent variable of the model, reflecting the total scale of FDI firms in sector *i* province *j* year *t*;

It should be noted that several studies add lagged-term FDI variables in their models to examine the dynamic effects of FDI (e.g. Bailey & Driffield, 2007; Craigwell, 2006; Fu & Balasubramanyam, 2005). However, due to short time dimension of our panel data (5-year dimension: 2011-15), we investigate static impacts of FDI on employment in the short-term (one year) without lagged-term variables in our models.

To calculate the scale of FDI firms (F_{ijt}) in each Vietnamese province, we use Vietnam Enterprise Census (VEC), annually carried out by General Statistics Office of Vietnam (GSO) in which all registered firms are surveyed. It is important to determine an "FDI" firm of which foreign investors take "control or a significant degree of influence on the management" (IMF[3], 2009, paragraph 6.8). VEC does not clearly distinguish domestic and foreign-owned firms and records three main types of firms that can be considered as FDI firms, including:

(1) Firms with 100% foreign capital;
(2) State firms with foreign partners;
(3) Private firms with foreign partners.

In VEC, types (2) and (3) are not recorded in detail about the proportion of foreign capital or the right to control firms. Therefore, we cannot use the classification of IMF (2009) to determine FDI firms in Vietnam. In three types of firms above, only type (1) is owned by foreign investors. Thus, we calculate two measures reflecting the scale of FDI firms:

- The average asset of all foreign-invested firms (fdi_{ijt}), including types (1), (2), and (3) in sector *i* province *j* of year *t*;
- The average asset of all firms with 100% foreign capital ($fdip_{ijt}$), type (1).

We use four control variables in which are hypothesised to have impacts on labour demand and commonly used in quantitative models (e.g. Bailey & Driffield 2007; Craigwell, 2006; Fu & Balasubramanyam 2005; Massoud 2008; Vacaflores 2011):

- w_{ijt}: monthly wage, measured by the average wage of employees in sector *i*, province *j* year *t*;
- xm_{ijt}: scale of import and export, measured by the total import and export value of sector *i*, province *j*, year *t*;

- $asset_{ijt}$: scale of domestic firms, measured by the average asset of all domestic firms in sector *i*, province *j*, year *t*; and
- rev_{jt}: provincial economic performance, measured by total net revenue of all firms in province *j* year *t*.

Differences in the characteristics of each sector cause uneven impacts of FDI on employment in these sectors. We continue to provide a model for analysing the impacts in three sectors to test hypothesis *H2*. From the baseline model (Equation 1), we add two dummies: *AG* =1 if sector *i* is agriculture (the others: *AG* = 0); and *IN* = 1 if sector *i* is industry (the others: *IN*= 0) and multiply them with $ln(F_{ijt})$:

$$ln(em_{ijt}) = \alpha_1 + \alpha_2 ln(F_{ijt}) + \beta_1 AG*ln(F_{ijt}) + \beta_2 IN*ln(F_{ijt}) + \gamma X_{ijt} + \delta_j + \omega_t + u_{ijt} \quad (2)$$

Thus, a coefficient α_2 in Equation (2) reflects the employment effects of FDI in services. The coefficients β_1 and β_2 respectively show relative differences of the employment effects in the agriculture and industry sectors in comparison with the services sector.

For testing hypothesis *H3*, we add interaction of $ln(xm_{ijt})$ and $ln(F_{ijt})$ into the baseline model:

$$Ln(em_{ijt}) = \alpha_1 + \alpha_2 ln(F_{ijt}) + \beta_3 ln(xm_{ijt})*ln(F_{ijt}) + \gamma X_{ijt} + \delta_j + \omega_t + u_{ijt} \quad (3)$$

Similar to the Equation (2), in the Equation (3), a coefficient β_3 reflects changes in the employment effects when one sector increases the total value of imports and exports.

4.2 Data

The data are extracted from two Vietnamese annual surveys, VEC and Labour Force Survey (LFS). LFS is a sampled survey of GSO to capture information on citizens' employment status. Data on fdi_{ijt}, $fdip_{ijt}$, xm_{ijt}, $asset_{ijt}$, and rev_{jt} are extracted from VEC while data on emp_{ijt}, $skill_{ijt}$ and w_{ijt} are calculated from LFS. Three sectors are divided based on Vietnam Standard Industrial Classification 2007 (VSIC 2007) (see details in Appendix 1).

After filtering and calculating variables, we remove abnormal observations such as emp_{ijt} equal to zero.[5] The number of remaining observations is 943. Table 4 illustrates a statistic description of input data. On average, employment of skilled labour accounted for about one-tenth of

total employment. In addition, in terms of average asset, firms with 100% foreign capital (*fdip*) accounted for a considerably large proportion, about 77%, of total foreign-invested firms (*fdi*). It should be noted that in some observations, the values of *fdi* and *fdip* are zero. These observations are ignored in the empirical models because we take the logarithm of variables for testing elasticity of variables. A correlation matrix of the logarithm of variables is shown in Table 5.

Table 4: Statistic description of input data

	No. of Obs.	Mean	S.D.	Min	Max	Unit
Emp	943	258.0	350.6	0.04	3,072.1	Thousand people
skill	943	25.8	75.0	0.03	839.2	Thousand people
W	943	2.8	2.4	0.003	20.0	Mil.VND
Fdip	943	12.8	57.6	0	666.0	Tri. VND
Fdi	943	16.6	74.3	0	836.0	Tri. VND
Xm	943	462.0	2,600.0	0	30,400.0	Mil. USD
Rev	943	193.0	501.0	3.6	3,440.0	Tri. VND
asset	943	67.6	373.0	0.005	5,360.0	Tri. VND

Source: Authors' calculation

Table 5: Correlation matrix

	Ln (emp)	*Ln (w)*	*Ln (fdi)*	*Ln (fdip)*	*Ln (xm)*	*Ln (rev)*	*Ln (asset)*
Ln(emp)	1	-	-	-	-	-	-
Ln(w)	-0.498	1	-	-	-	-	-
Ln(fdi)	0.1867	0.2915	1	-	-	-	-
Ln(fdip)	0.1805	0.2738	0.9484	1	-	-	-
Ln(xm)	0.2047	-0.0935	0.4617	0.434	1	-	-
Ln(rev)	0.3511	0.1486	0.5534	0.5399	0.3015	1	-
Ln(asset)	0.5364	0.168	0.5752	0.5389	0.3704	0.6761	1

Source: Authors' calculation

4.3 Analytical Method

We consider three techniques: pooled ordinary least squares (POLS), random effects (RE), and fixed effects (FE) for our model estimation. First, we employ POLS to regress *ln(emp)* on *ln(fdip)* and control variables with STATA 13.0. Wooldridge (2002) argues that unobserved heterogeneity in provinces (δ_j) and years (ω_t) should not correlate with independent variables in the model when we employ POLS. To test this hypothesis, we apply a test constructed by Breusch & Pagan (1980). The results show that the null hypothesis is rejected at the 1% significance level, which means unobserved heterogeneity factors are correlated with independent variables. We must employ RE and FE techniques. Our selection between the FE or RE estimators is based on the Hausman's (1978) test for model specification. The null hypothesis is that there are no systematic differences between

coefficients in the RE and FE methods. If the null hypothesis is rejected, FE method should be applied for our estimation. The test results show that the null hypothesis is rejected at the 1% significance level.

Since the FE technique can be inefficient in panel data with heteroskedasticity, Greene's (2000) modified Wald is estimated to examine for groupwise heteroskedasticity. The result shows that the null hypothesis of no groupwise heteroscedasticity is rejected, so we use White's (1980) heteroskedasticity-robust standard errors with the FE technique to estimate our model (see Appendix 2 for results of these tests).

We take similar steps for technique selection in other models and the selected estimators in all models are the FE technique with robust standard errors.

5. Results

5.1 Employment Effects of FDI in Vietnam

In the baseline model, we regress employment on FDI variables and control variables. Four regressions examine different combinations of two measures of employment: aggregate employment and the number of skilled workers, and two alternative FDI variables, *fdi* and *fdip*.

Estimation results from the baseline model in columns (i) and (ii) of Table 6 show that the impacts of foreign firms on aggregate employment are negative and statistically significant at the 10% level. If the average asset of firms with 100% foreign capital (*fdip*) increases by 1%, employment decreases by 0.0511 percentage point. The employment effect of the average asset of foreign-invested firms (*fdi*) is slightly lower, with a coefficient of -0.0502.

For the number of skilled labour, magnitudes of the negative impacts are larger than those for aggregate employment. If *fdip* increases by 1%, the number of skilled labour decreases by 0.0663 percentage point with a significance level of 10%. The effect is larger for *fdi*, with a coefficient of -0.0686, statistically significant at the 10% level.

Our results are similar to the findings of Jenkins (2006) during the period from 1995-99 in Vietnam. However, we confirm the negative impacts of FDI not only on aggregate employment but also on the number of skilled labour. With analysis in Section 3, we show that the negative employment effects of FDI inflows, which come from increases in competition and a process of replacing domestic firms through M&As, outweighed minimally positive impacts coming from FDI's creation of new jobs and links between FDI and domestic firms.

Table 6: Impacts of FDI on employment in Vietnam

	Ln(emp)		***Ln(skill)***	
	(i)	**(ii)**	**(iii)**	**(iv)**
Ln(fdi)	-0.0502*	-	-0.0686*	-
	(0.0282)		(0.0387)	
Ln(fdip)	-	-0.0511*	-	-0.0663*
		(0.0281)		(0.0368)
Ln(w)	-1.238***	-1.274***	0.236**	0.225**
	(0.0881)	(0.0896)	(0.107)	(0.109)
Ln(xm)	-0.0235	-0.0182	-0.0362	-0.0327
	(0.0169)	(0.0175)	(0.0241)	(0.0249)
Ln(rev)	-0.285**	-0.263**	-0.172	-0.131
	(0.116)	(0.119)	(0.167)	(0.178)
Ln(asset)	0.824***	0.819***	0.928***	0.915***
	(0.0586)	(0.0605)	(0.0622)	(0.0605)
Constant	13.26***	13.13***	-3.368	-3.924
	(2.266)	(2.287)	(3.341)	(3.542)
Province FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of Obs.	609	593	609	593
R-squared	0.712	0.718	0.395	0.396

Note: Robust standard errors are in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: Authors' calculation

5.2 Employment Effects by Sector

Table 7 presents the results of the estimating Equation (2), comparing the effects in three sectors: agriculture (dummy *AG*), industry (dummy *IN*), and services on aggregate employment, *emp,* in columns (v) and (vi), and the number of skilled labour, *skill,* in columns (vii) and (viii).

The results from columns (v) and (vii) show that at the significance levels of 10% and 5%, *fdip* has positive impacts on the demand for both aggregate and skilled employment in the services sector. With a 1% increase in *fdip* in the services sector, *emp* increases by 0.0473 percentage points. The positive impact on *skill* is markedly larger, with a magnitude of about 0.0768 percentage point.

However, the positive employment effects diminish as FDI inflows shift from services to industry and agriculture. The coefficients of interaction between FDI variables and agriculture and industry dummies in four columns of Table 7 are negative and statistically significant at the 1% level.

Taking *fdip* as a measure for the scale of foreign firms, the magnitudes of the positive employment effects in the industry and agriculture sectors are 0.0436 and 0.146 lower than in services, respectively. Similarly, magnitudes of the positive effects on *skill* in services are 0.0641 and 0.203 larger than in industry and agriculture sectors, respectively. For point estimates, a 1% increase in *fdip* in the industry sector can exert a slight increase in *emp* (0.0473 - 0.0436 = 0.0037 percentage point) and *skill* (0.0768 - 0.0641 = 0.0127 percentage points). However, foreign firms have negative effects on

emp and *skill* in the agriculture sector. A 1% increase in *fdip* in this sector decreases aggregate employment by nearly 0.099 (0.0473 - 0.146) percentage point and the number of skilled labour by 0.126 (0.0768 - 0.203) percentage point.

Table 7: Impacts of FDI on employment in Vietnam by sector

	Ln(emp)		***Ln(skill)***	
	(v)	**(vi)**	**(vii)**	**(viii)**
Ln(fdi)	0.0349	-	0.0610*	-
	(0.0241)		(0.0355)	
Ln(fdi)*IN	-0.0421***	-	-0.0639***	-
	(0.00757)		(0.0115)	
Ln(fdi)*AG	-0.149***	-	-0.204***	-
	(0.0186)		(0.0197)	
Ln(fdip)	-	0.0473*	-	0.0768**
		(0.0251)		(0.0339)
Ln(fdip)*IN	-	-0.0436***	-	-0.0641***
		(0.00761)		(0.0115)
Ln(fdip)*AG	-	-0.146***	-	-0.203***
		(0.0191)		(0.0205)
Ln(w)	-1.151***	-1.186***	0.369***	0.355***
	(0.0931)	(0.0952)	(0.109)	(0.113)
Ln (xm)	-0.0244	-0.0210	-0.0311	-0.0329
	(0.0166)	(0.0170)	(0.0198)	(0.0199)
Ln(rev)	-0.0970	-0.125	0.0810	0.0541
	(0.119)	(0.132)	(0.154)	(0.171)
Ln(asset)	0.308***	0.318***	0.206**	0.212**
	(0.0893)	(0.0953)	(0.0896)	(0.0949)
Constant	17.18***	17.61***	1.975	2.342
	(2.017)	(2.226)	(2.879)	(3.213)
Province FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of Obs.	609	593	609	593
R-squared	0.766	0.767	0.506	0.500

Note: Robust standard errors are in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: Authors' calculation

For *fdi*, a coefficient of *ln(fdi)* to *ln(emp)* is positive but not statistically significant. However, it is significant to confirm that *fdi* in the industry and agriculture sectors exerts lower positive impacts on *emp*, and *skill* than in the services sector.

The results show that the negative effects of FDI on employment in the agriculture sector are significantly larger than the positive effects that foreign firms could bring from new investments or spillover effects. Agriculture is a traditional sector in Vietnam; therefore, investment of foreign firms in this sector can increase competition (Table 3). Meanwhile, in the industry and services sectors, the positive effects outweigh the adverse effects which come from rising competition or M&As. FDI inflows into two sectors can

open new business activities, which create more jobs for the economy. Besides, the results imply that non-tradeable sectors in Vietnam see larger spillover effects of FDI on employment as FDI inflows into these sectors such as services are forced to link with local firms.

5.3 Employment Effects by Export-Import Scale

The Equation (3) is estimated for testing hypothesis *H3* with the results presented in Table 8. We examine the correlation between the scale of import-export in one sector and the employment effects of FDI. Therefore, the coefficients of interactions of *ln(fdi), ln(fdip)* and *ln(xm)* are considered in terms of statistical significance.

We do not conclude that increases in imports and exports exert negative impacts of FDI on aggregate employment (columns (ix) and (x)). However, expanding exports and imports in one Vietnamese sector reduces positive effects of FDI on the employment of skilled labour. Coefficients of interactions of *ln(fdi), ln(fdip)* and *ln(xm)* in columns (xi) and (xii) are negative and statistically significant at the 10% level.

Table 8: Impacts of FDI on employment in Vietnam with import-export

	Ln(emp)		***Ln(skill)***	
	(ix)	**(x)**	**(xi)**	**(xii)**
Ln(fdi)	-0.0925	-	0.0593	-
	(0.0651)		(0.0888)	
Ln(fdip)	-	-0.109*	-	0.0724
		(0.0646)		(0.0863)
Ln(fdip)*ln(xm)	-	0.00374	-	-0.00905*
		(0.00336)		(0.00481)
Ln(fdi)*ln(xm)	0.00288	-	-0.00870*	-
	(0.00342)		(0.00489)	
Ln(w)	-1.239***	-1.275***	0.240**	0.229**
	(0.0882)	(0.0896)	(0.105)	(0.107)
Ln (xm)	-0.0628	-0.0675	0.0829	0.0864
	(0.0477)	(0.0451)	(0.0700)	(0.0673)
Ln(rev)	-0.293**	-0.277**	-0.149	-0.0974
	(0.114)	(0.115)	(0.163)	(0.178)
Ln(asset)	0.821***	0.816***	0.938***	0.923***
	(0.0581)	(0.0595)	(0.0610)	(0.0604)
Constant	14.03***	14.18***	-5.702	-6.474*
	(2.462)	(2.422)	(3.522)	(3.798)
Province FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of Obs.	609	593	609	593
R-squared	0.712	0.719	0.400	0.402

Note: Robust standard errors are in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: Authors' calculation

Increasing imports and exports may derive from weak linkages between domestic and foreign firms and reduce the positive spillover effects. The correlation is not confirmed in the effects of FDI on aggregate employment, but there is empirical evidence to show that in demand for skilled labour. Export-oriented FDI firms in Vietnam mainly take advantage of cheap labour and unskilled labour recruitment while they can hire foreigners for highly technical tasks. These increase demand for unskilled labour and decrease demand for skilled labour.

6. Discussion and Conclusion

This paper aims at assessing the impacts of FDI on the demand for aggregate employment and employment of skilled labour in Vietnam during the 2011-15 period. FDI has accounted for more than 20% of total social investment of Vietnamese economy and become crucial resources for Vietnamese productivity enhancement and economic growth. However, there are major concerns on the employment effects of FDI inflows.

To thoroughly investigate the effects in Vietnam, we employ the FE technique with robust standard errors and the panel data on activities of foreign firms in three sectors: agriculture, industry and services of all 63 provinces from 2011 to 2015. We investigate the employment effects in terms of aggregate employment and the number of skilled labour, then examine how the effects change in different sectors and levels of import-export scale.

Our findings show that the effects of FDI inflows on aggregate employment and skilled labour in Vietnam are significantly negative. In terms of direct job creation effect, the labour force in foreign firms accounted for under 5% of total employment in Vietnam during the period from 2011-15. In addition, the net cross-border M&As to greenfield investments ratio was positive and moderate, which implies that foreign investors might buy Vietnamese firms and cut a large proportion of their personnel. Increasing competition also forces domestic firms to lay off workers. Another reason is limited linkages between domestic and foreign firms which produce minimal spillover effects.

In terms of magnitude, the effects on the number of skilled labour are markedly more substantial than those of aggregate employment. To some extent, the negative effects on demand for skilled labour support the dependency theory on FDI in which foreign investors take advantages of unskilled labour in developing countries to expand their production. Meanwhile, skilled jobs in foreign firms could be occupied by foreigners. Besides, domestic firms prioritise recruiting less-skilled workers with lower wages paid to improve their competitiveness, which has negative impacts on demand for skilled labour.

By sector, point estimates from our models indicate that agriculture sees the negative effects in terms of both aggregate employment and the number of skilled labour. On the other hand, the effects are positive in both the services and industry sectors, though, in terms of magnitude, the effects in the latter are significantly lower than those in the former. Industry and services sectors have not yet been being flourished in Vietnam, and FDI firms in these sectors are bringing investments in new business areas with their products different from local firms' ones. In addition, the services sector is largely comprised of non-tradeable sub-sectors which force foreign firms to link with domestic firms.

Furthermore, the negative impacts on the number of skilled labour increase when one sector expands its import-export value. However, there is no empirical evidence to confirm this interaction for aggregate employment. Expansion in import and export trade may result in increases in unskilled labour and decreases in skilled labour with similar amounts, which further demonstrates foreign firms' nature of taking advantage of cheap labour to export goods.

Increasing levels of competition and limited linkages between foreign and domestic firms in Vietnam hinder not only positive employment effects but also technology transfer (Le & Pomfret, 2011). Therefore, besides making efforts to attract FDI inflows, the Vietnamese government should consider improving domestic firms' performance and facilitate their linkages with foreign firms. In addition, Vietnam should provide more incentives for FDI firms to invest in new business areas in industry and services sectors to increase positive employment impacts of FDI. Attracting FDI inflows into non-tradeable sectors, from which foreign firms would be forced to link with local firms when providing products or services, could be an effective strategy.

Decreasing demand for employment adversely affects social securities and sustainable development in developing countries. More importantly, it may deter the government from improving good governance practices. Research elsewhere indicates that increases in the Vietnamese labour force, of which employed workers are the main portion, help enhance the Vietnamese government's transparency (Nguyen, Nguyen, & Nguyen, 2017).

In conclusion, we call for a more critical view on the impacts of FDI on the Vietnamese economy. Strategic policies on attracting FDI inflows should help Vietnam increase demand for aggregate employment and improve quality of human resources.

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Notes

1. UNCTAD stands for United Nations Conference on Trade and Development

2. Figures are collected from GSO's Statistical Data on June 10, 2018. Details on data, see GSO's website: https://www.gso.gov.vn/Default_en.aspx?tabid=766

3. IMF stands for International Monetary Fund

4. Jenkins (2006) calculates an import dependence ratio in a firm by a proportion:
$$\frac{\text{Value of imported inputs}}{\text{Total value of input materials}} = \left(\frac{\text{Value of imported inputs}}{\text{Value added}}\right)x\left(\frac{\text{Value added}}{\text{Total value of input materials}}\right)$$
. The first factor of multiplication on the right side is our calculation. If the value-added/total of input materials is fixed, our ratio represents firms' import dependence.

5. Because LFS is a sampled survey, emp_{ijt} is weighted aggregate employment in sector *i* province *j* of year *t*; therefore, the value of emp_{ijt} in several observations can be zero.

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Appendices

Appendix 1. Sector classification through VSIC

Code	Area	Sector
A	Agriculture, Forestry and Fishing	Agriculture
B	Mining and Quarrying	Industry
C	Manufacturing	
D	Electricity, Gas, Steam and Air Conditioning Supply	
E	Water Supply; Sewerage, Waste Management and Remediation Activities	
F	Construction	Services
G	Wholesale and Retail Trade; Repair of Motor Vehicles And Motorcycles	
H	Transportation and Storage	
I	Accommodation and Food Service Activities	
J	Information and Communication	
K	Financial, Banking and Insurance Activities	
L	Real Estate Activities	
M	Professional, Scientific and Technical Activities	
N	Administrative and Support Service Activities	
O	Communist Party, Socio-Political Organisations Activities; Public Administration and Defence; Compulsory Social Security	
P	Education	
Q	Human Health and Social Work Activities	
R	Arts, Entertainment and Recreation	
S	Other Service Activities	
T	Activities of Households as Employers; Undifferentiated Goods- And Services-Producing Activities Of Households For Own Use	
U	Activities of Extraterritorial Organisations and Bodies	

Source: VSIC 2007

Appendix 2. Tests for choosing the technique applied in our model

Tests	Regression *emp* by *fdip* and control variables
Breusch and Pagan Test	chibar2(01) = 39.22***
Hausman Test	$\chi^2(9) = 46.61$***
Modified Wald Test	$\chi^2(62) = 42991.98$***

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Authors' calculation