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# Relative costs and FDI: Why did Vietnam forge so far ahead?

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A R T I C L E I N F O

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A B S T R A C T

Foreign direct investment (FDI) into Southeast Asia has grown at impressive rates in recent years, with Vietnam exhibiting the fastest growth rate in the region. There are a growing number of studies that have explained FDI inflows into Vietnam both at the macro and the provincial levels. This study builds on this line of research by investigating the role of relative wages and relative productivity of Vietnam vis à vis other countries in the region, which hold similar locational advantages like Vietnam. The underlying premise is that a multinational corporation (MNC) has a choice between investing in two similar countries and chooses one country (Vietnam) rather than the other based on relative costs and benefits. Using a panel dataset spanning from 2000 to 2015, the study finds that during the recent years of transition, high level of FDI inflows into Vietnam could be explained mainly by the relatively skilled workforce, combined with low wages as compared to her neighboring countries in the region.



## 1. Introduction

Vietnam's adoption of an open-door policy through its *Doi Moi* reform in 1986 ended the country's economic and political isolation as well as its dependence on the former Soviet Union. One of the pillars of *Doi Moi* has been the active pursuit of an export-oriented development strategy, fueled mainly by an influx of foreign direct investment (FDI). The reform has progressively liberalized foreign capital constraints, beginning with the 1987 Law of Foreign Investment and culminating with the country's accession into the World Trade Organization (WTO) in 2007 (Tran and Dinh, 2014). In fact, accession into the WTO is estimated to have increased annual FDI into Vietnam from the Organisation for Economic Co-operation and Development (OECD) by as much as 70% (Hoang, 2013). Overall, the reform has been very successful, shifting Vietnam's productive capacity from low productivity agriculture to labor-intensive manufacturing (Tran and Dinh, 2014).

What is unique and most impressive about Vietnam is that, in a short period of time, it has enjoyed the fastest rate of per annum growth of net inflows of FDI, as a percentage of GDP, in East Asia over the period 1980–2013, as shown in Fig. 1. Thanks to that impressive growth, Vietnam became one of the largest recipients of FDI in Asia (Nguyen et al., 2017a). Since the Law on Foreign Investment was promulgated in 1987, FDI has played a crucial role in boosting Vietnam's economic growth. FDI has mobilized capital for development and promoted economic development. FDI has also been a great source of direct promotion of the creation of several industrial sectors with a high demand for technology and added-value products: these sectors include machinery manufacturing, energy, computers, and telephones. Furthermore, FDI has facilitated the transfer of technology, generated jobs for the local people, and accelerated the country's global integration. FDI has also significantly

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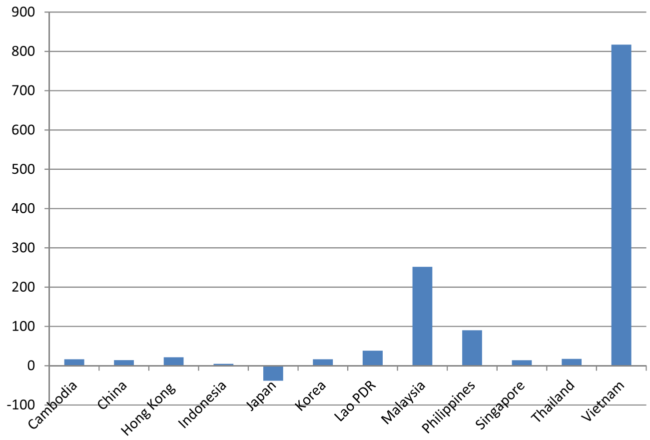


**Fig. 1.** Cumulative growth of FDI inflows (% of GDP) in East Asia, 1980–2013.
*Source:* World Bank, World Development Indicators (WDI), 2015.

contributed to the country's export and import activities over the past years. Based on the latest statistics provided by the General Statistics Office of Vietnam, FDI accounts for 65%–67% of national export turnover. The FDI sector has ensured the supply of foreign exchange as well as the national balance of payments.

It is, thus, not surprising that understanding the key drivers of FDI into Vietnam is important from the public policy point of view and has attracted significant interest from the academic community. Most studies to date have tended to employ aggregate-level data to either estimate gravity models (Hoang, 2013) or examine the role of free-trade agreements (Büthe and Helen, 2008; Nguyen and Jonathan, 2002). A handful of studies, however, have attempted to understand the key drivers of FDI into Vietnam by using disaggregated data. For example, using a survey of 22 firms, Mirza and Axele (2004) argued that Vietnam attracts FDI because it has political stability, friendly government policies, a large local market, and qualified workers. Similarly, Pham (2002), Meyer and Nguyen (2005), and Nguyen and Nguyen (2007) utilized provincial-level data to demonstrate that market size, the wage rate, labor productivity, and education, as well as tax incentives and other supportive government policies, explain why certain provinces in Vietnam attract more FDI than do others.

Building upon previous studies that utilize disaggregated data, this paper contributes to the literature by explicitly addressing the relative cost of funds faced by multinational corporations (MNCs). In essence, we argue that an MNC has a choice between investing in several similar countries and makes its decision to choose one over the others on the basis of relative costs and benefits. According to a 2014 report by the US Department of State, Vietnam's labor force is large (over 53.6 million people), literate (94% literacy rate), inexpensive, and young (nearly 66% of the population is under 40). The labor pool is expected to increase by 1.5% annually through 2015. Vietnam is, thus, an ideal case study to test this hypothesis, because it is in the center of a region characterized by high growth in FDI, while exhibiting the highest growth rate in FDI in the region in recent years. To test our hypothesis, we employ recent disaggregated industry-level data, covering 2000–2015.

The remainder of the paper is structured as follows. Section 2 reviews the related literature on the subject matter. Section 3 presents the model and the data. Section 4 discusses the empirical strategy. Section 5 reports and explains the results obtained and discusses their policy implications. Section 6 concludes.

## 2. Literature review

Lucas (1990) raised the question of why capital does not flow from rich to poor countries. Based on the law of diminishing returns, the marginal product of capital is high in poor and labor-abundant countries, whereas it is low in rich and capital-abundant countries. A standard constant-returns-to-scale production function implies that, when the wage (per efficiency unit of labor) is higher in a rich country, the return to capital in the rich country should be lower compared to that in a poor country. As a result, capital is expected to flow from rich to poor countries.

However, this is not clearly observed in practice. Even though barriers to international capital mobility are generally reduced, the wage gap is still in force. Following Lucas (1990), several studies attempted to examine and explain the lack of capital flows from rich to poor countries: the "Lucas paradox" (for instance, Tornell and Velasco, 1992; Calvo et al., 1996; Schularick, 2006; Alfaro et al., 2008; Azémar and Desbordes, 2013; Göktan, 2015). In particular, Alfaro et al. (2008) showed the critical role of foreign investment as an important channel through which institutions affect long-run development.

This study focuses on FDI as a crucial channel of international capital flows, which are likely to be closely related to cross-country labor wages and productivity differences. Based on the comparative advantage framework of the Heckshers–Ohlin model, location patterns are pre-determined by endowments of raw materials and labor, relative prices, and transport costs (Benacek et al., 2000). This implies that costs in the host country relative to those elsewhere could be a major determinant in the home country's location decision. This is particularly relevant for firms that seek to produce labor-intensive products either for export or to compete with imports (Davaakhuu et al., 2014). Besides wage costs, labor productivity is also a critical factor, since this determines the actual cost of producing one unit of output (Benacek et al., 2000). Bellak et al. (2008) showed that the choice of an FDI location in central and eastern European countries is driven by two factors: total labor costs and labor productivity.

In this study, we develop a model that takes into account these two critical labor factors that might affect the flow of FDI to developing countries, using Vietnam as a case study. In the panel model setting, we consider 25 major FDI investors in Vietnam and several alternative host countries to Vietnam (including ASEAN countries, China, and India).

Specifically, this study considers two research questions:

- Do (and to what extent) unit labor costs (proxied by labor wage) in Vietnam relative to the FDI home country and other potential alternative host countries affect FDI inflows to Vietnam?
- Does (and to what extent) labor productivity in Vietnam relative to the FDI home country and other potential alternative host countries affect FDI inflows to Vietnam?

### *2.1. Labor productivity and FDI*

In theory, a rise in labor productivity, ceteris paribus, implies an improvement in the marginal profitability of a new investment. However, it might push up the demand for inputs (such as land and labor) and, hence, input costs (such as either rental or wages). Consequently, the total profitability can be adversely affected, since this rise in input costs will not only increase the variable costs (and, hence, mitigate the initial rise in the marginal productivity) but also the one-off bill associated with the setup costs of the new investment. As such, an improvement in labor productivity could raise the marginal productivity but lower the total profitability of new investments at the same time (Razin et al., 2008). Hence, higher labor productivity might imply both favorable and unfavorable impacts on the inflows of FDI to the host country.

Razin et al. (2008) brought evidence from India that this country has seen a wave of FDI inflows since 2000 in the computer software industry. As a result, local wages of engineers in some areas, such as Bangalore, have been raised to near US levels (Leahy, 2007). According to Waters (2007), this has forced some Silicon Valley start-ups to close Indian engineering centers and move the jobs back to California to reduce costs. Havrylchyk and Poncet (2007) studied the determinants of FDI in China and found that increased productivity of labor fosters the country's FDI. Elkomy et al. (2016) explained that a skilled labor force attracts FDI inflows by relatively technology-intensive foreign firms in high-growth sectors owing to its absorptive capacity as well as it being the mechanism through which technology can be assimilated and transferred to domestic firms.

Aziz and Mishra (2016) showed that quality of labor plays a key role in attracting FDI inflows to Arab economies. Similarly, Salike (2016) examined regional distribution of FDI in China and found quality of labor to be a significant factor. Wach and Wojciechowski (2016) studied the determinants of inward FDI into Visegrad countries and confirmed the crucial impact of labor productivity of the host country (pull factor) and the taxation in the home country (push factor). Dutta et al. (2017) investigated a panel of 107 countries and showed that human capital plays a significant role in attracting FDI to host countries. On the other hand, in his study of 80 countries across Asia, Africa and South America, Omanwa (2013) identified openness and size of market as the major variables influencing FDI, while identifying quality of labor, political stability, inflation, infrastructure, and corruption as statistically insignificant factors.

### *2.2. Labor wage and FDI*

Whether labor costs influence the decision to invest in the developing economies is an important issue that has been extensively studied in literature. According to Noorbakhsh et al. (2001), the cost of labor in many developing countries could be a critical factor for FDI investors who seek efficiency particularly in labor-intensive sectors. This is because, for any given level of productivity, labor in developing countries costs less than that in developed countries. Most empirical evidence seems to suggest that labor wage cost is a significant determinant of FDI inflows to transition and developing economies (see, for example, Konings and Janssens, 1996; Lankes and Venables, 1997; Na and Lightfoot, 2006; Hsiao and Hsiao, 2006; Bellak et al., 2008; Wahid et al., 2009; Bilgili et al., 2012; Chan et al., 2014).

Konings and Janssens (1996) showed that labor costs are a relatively critical determinant in the location decision in Hungary, although they are less important than achieving a market share. Lankes and Venables (1997) demonstrated that, for export-oriented firms, production costs and cheap skilled labor play more important roles, as would be intuitively expected. By estimating the effects of the determinants of FDI in 29 Chinese regions from 1985 to 1995, Cheng and Kwan (2000) found that a large regional market, good infrastructure, and preferential policy have a positive effect on FDI, whereas wage costs have a negative effect. Na and Lightfoot (2006) studied the determinants of FDI by regions in China and found that high labor costs discouraged FDI inflows. Similarly, Hsiao and Hsiao (2006) also revealed that FDI into China has been positively affected by market size and real wage differential. It is evident from the result that the investors from the United States and Japan were influenced by market size, while, for those from Hong Kong, Taiwan, and Korea, wage differential was the most significant factor in deciding on investment in China.

Bellak et al. (2008) examined the determinants of FDI across selected central and eastern European countries, focusing on labor costs. Their study utilized a panel dataset comprising bilateral net-FDI flows between seven home and eight host countries for 1995–2003. Their results revealed that higher unit labor costs and higher total labor costs affect FDI unfavorably, whereas higher labor productivity has a favorable impact on FDI. Chan et al. (2014) proposed that, while lower wages was a key determinant in attracting FDI to China in the early years, productivity would be the driving force of FDI inflows to the country. Parashar (2015) found that lower wage rates play a great part in attracting FDI in the case of China, while, in the case of India, policy reforms play a crucial role in attracting FDI.

On the other hand, empirical results from several studies are not, in general, unequivocal (for instance, Altzinger, 1999; Zhao and Zhu, 2000; Capello et al., 2011; Mahalakshmi et al., 2015; Turnbull et al., 2016). More specifically, Altzinger (1999) found that, for Austrian investors, with the exception of the engineering sector, low wage costs are a significant factor but are less important than is market potential. In addition, to investors in finance and insurance, labor costs are of particularly low importance. As such, it might be concluded that the importance of labor costs seems to depend on the sector of the foreign investment in the host country. Furthermore, according to Branstetter and Feenstra (2002), multinational firms in China tend to pay a wage premium to their workers to hire quality labor. Hence, a higher wage may reflect better labor quality. Indeed, Zhao and Zhu (2000) found a positive significant relationship between labor wage and FDI. On the contrary, Capello et al. (2011) found that labor costs are non-significant in explaining FDI location in European countries. Also, Mahalakshmi et al. (2015) showed that average real wages are not the key factors influencing FDI inflows to India. Similarly, Turnbull et al. (2016) studied Australia's manufacturing sector and found no empirical evidence to suggest that inward FDI to the sector is directly impacted by either domestic manufacturing productivity or the wage rate.

## 3. Model and data

In this section, to set the stage for the empirical analysis, we construct a simple, industry-level model where FDI from country *j* into Vietnam's industry *i* depends on relative wages and productivity in the industry *i* between Vietnam and country *j* and between Vietnam and a group of FDI competing countries *z*. The dependent variable is the implemented FDI inflows to Vietnam at the industry level.

The first independent variable in our model is the relative wage of Vietnam to either home or alternative host countries. A higher relative wage means that Vietnamese workers become more expensive relative to workers in either the home or the alternative host countries. The second dependent variable is the relative labor productivity. A higher labor productivity (i.e., Vietnamese workers become more productive) is expected to increase marginal profitability of the investment. While, theoretically, there could be high correlation between labor wage and labor productivity, the use of ratios (to obtain relative wages and productivity), as in this study, is expected to significantly reduce this potential problem of multicollinearity, as will be shown later in the Variance Inflation Factor (VIF) test.

The specification of the model does not consider two potentially important structure variables: tariffs and tax rates. There are two reasons for not including those variables in this study. First, the tax haven hypothesis for FDI determination is generally tested with cross-country data (Xing, 2006). This study, however, uses cross-industry data of Vietnam only. It is, therefore, impossible to calculate the industry tariffs and tax rates that are representative for groups of countries because these countries are involved in several different trade agreements. Second, the "jumping over the tariff wall" hypothesis is only relevant to domestic market-oriented FDI. However, most FDI in Vietnam is export-oriented, thanks to the country's numerous incentives promoting export-oriented investments. As such, tariffs should not be relevant here.[1]

In its general form, the baseline model is as follows:

$$FDI_{i,t} = f\left(W_{h,i,t}, W_{a,i,t}, X_{h,i,t}, X_{a,i,t}\right) \tag{1}$$

where

$FDI_{i,t}$ is the FDI inflows from a group of Vietnam's major FDI home countries to Vietnam's industry $i$ at time $t$;

$W_{h,i,t} = \frac{w_{i,vn,t}}{w_{i,j,t}}$ is the relative wage ratio of Vietnam to the average of the group of Vietnam's major FDI home countries for industry $i$ at time $t$;

$X_{h,i,t} = \frac{x_{i,vn,t}}{x_{i,j,t}}$ is the relative productivity ratio of Vietnam to the average of the group of Vietnam's major FDI home countries for industry $i$ at time $t$;

$W_{a,i,t} = \frac{w_{i,vn,t}}{w_{i,z,t}}$ is the relative wage ratio of Vietnam to the average of the group of alternative FDI host countries to Vietnam for industry $i$ at time $t$;

and $X_{a,i,t} = \frac{x_{i,vn,t}}{x_{i,z,t}}$ is the relative productivity ratio of Vietnam to the average of the group of alternative FDI host countries to Vietnam for industry $i$ at time $t$.

In this study, the baseline model is assumed to take the following specific regression form:

$$\log\left(FDI_{i,t}\right) = \alpha_{it} + \beta_{1i}\frac{w_{i,vn,t}}{w_{i,j,t}} + \beta_{2i}\frac{w_{i,vn,t}}{w_{i,z,t}} + \beta_{3i}\frac{x_{i,vn,t}}{x_{i,j,t}} + \beta_{4i}\frac{x_{i,vn,t}}{x_{i,z,t}} + u_{it} \tag{2}$$

[1] The authors acknowledge the omission of several potential control variables (e.g., market size, trade costs, industry specific costs, relative factor endowments) in the model due to the lack of data at industry level for Vietnam—this is a typical issue when doing research on developing countries. While we wish to include as many control variables as possible in our regressions to achieve more robust results, available data are so limited that the cost of in terms of reduced sample size is too great.

**Table 1**
List of countries in the study sample.
*Source:* Authors' selection.

| No | List of alternative host countries to Vietnam (ASEAN plus China and India) |
|---|---|
| 1 | China |
| 2 | India |
| 3 | Indonesia |
| 4 | Malaysia |
| 5 | Philippines |
| 6 | Singapore |
| 7 | Thailand |
| **No** | **List of FDI home countries to Vietnam** |
| 1 | Australia |
| 2 | Belgium |
| 3 | Canada |
| 4 | China |
| 5 | Denmark |
| 6 | France |
| 7 | Germany |
| 8 | India |
| 9 | Indonesia |
| 10 | Italy |
| 11 | Japan |
| 12 | Malaysia |
| 13 | Netherlands |
| 14 | New Zealand |
| 15 | Philippines |
| 16 | Poland |
| 17 | Republic of Korea |
| 18 | Russian Federation |
| 19 | Singapore |
| 20 | Switzerland |
| 21 | Thailand |
| 22 | United Kingdom |
| 23 | United States of America |

where $i = 1, 2, 3 \ldots N$ for each industry in the panel, $t = 1, 2, 3 \ldots T$ refers to the time period, $j =$ the group of FDI investors in Vietnam, $z =$ the group of alternative FDI destinations to Vietnam, $w =$ wage level, $x =$ labor productivity and $u =$ a classical random error. The signs of $\beta_1, \beta_2, \beta_3,$ and $\beta_4$ are the main interest of this study in light of the mixed and inconclusive effect of these factors on the FDI inflow found in the literature.

This treatment of variables is subject to data constraints. In particular, we could not obtain the FDI data specifically from the investing country $j$ to industry $i$ in Vietnam at time $t$ since those data are not available. On the other hand, we could only attain the amount of implemented FDI capital for industry $i$ of Vietnam at time $t$.

Apart from Vietnam, the list of countries included in the study sample is summarized in Table 1. In the case of Vietnam, the country's major FDI investors are also its major trading partners. Meanwhile, all the alternative FDI destination countries to Vietnam are in the Asian region and are mostly member countries of the Association of Southeast Asian Nations (ASEAN), except for China and India. The list of industries is presented in Table 2. Due to the data availability, this study only focuses on the manufacturing sectors of Vietnam, and, hence, primary and services sectors are excluded.

The data for FDI is the amount of implemented FDI taken from the General Statistics Office of Vietnam (in thousand US$). Following the standard practice in econometric analysis, this variable is converted into a natural logarithm to stabilize data variability.

The data for the control variables (relative wage and relative productivity) refer to the manufacturing data of 23 industries, and the inputs are industry-level data for all the countries included in the study sample. The industry-level data on wages and salaries of employees (in US$), number of employees, and value added are taken from United Nations (UN) data. Subject to data availability, the period of investigation in this study spans 2000–2015. The descriptive statistics of the variables and the correlation matrix are summarized in Tables 3 and 4, respectively.

Note that wages per worker are calculated as the wages and salaries of employees divided by the number of employees. We instrument the productivity by the value added/labor ratio, because this enables us to stick with the labor story.

## 4. Empirical methodology

This study employs panel estimation even though it would be possible to use a cross-country regression. This is because panel data methodology saves many degrees of freedom. This is a crucial advantage, as, in this case, several explanatory variables are used but we could only attain a constrained dataset.

**Table 2**
List of industries.
*Source:* Authors' selection subject to data availability.

| No | Sector |
|---|---|
| 1 | Food and beverages |
| 2 | Tobacco products |
| 3 | Textiles |
| 4 | Wearing apparel, fur |
| 5 | Leather, leather products and footwear |
| 6 | Wood products (excluding furniture) |
| 7 | Paper and paper products |
| 8 | Printing and publishing |
| 9 | Coke, refined petroleum products, nuclear fuel |
| 10 | Chemicals and chemical products |
| 11 | Rubber and plastic products |
| 12 | Non-metallic mineral products |
| 13 | Basic metals |
| 14 | Fabricated metal products |
| 15 | Machinery and equipment (not elsewhere classified) |
| 16 | Office, accounting, and computing machinery |
| 17 | Electrical machinery and apparatus |
| 18 | Radio, television, and communication equipment |
| 19 | Medical, precision and optical instruments |
| 20 | Motor vehicles, trailers, semi-trailers |
| 21 | Other transport equipment |
| 22 | Furniture, manufacturing (not elsewhere classified) |
| 23 | Recycling |

**Table 3**
Descriptive statistics.
*Source:* Authors' calculation.

| | FDI | $W_h$ | $W_a$ | $X_h$ | $X_a$ |
|---|---|---|---|---|---|
| Mean | 1,864,513 | 0.127 | 0.383 | 0.105 | 0.317 |
| Median | 969,825.2 | 0.080 | 0.215 | 0.074 | 0.252 |
| Maximum | 11,160,845 | 1.639 | 6.082 | 0.911 | 2.069 |
| Minimum | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Standard deviation | 2 072 382 | 0.192 | 0.659 | 0.112 | 0.299 |
| Skewness | 1.302 | 4.422 | 5.231 | 3.134 | 3.127 |
| Kurtosis | 4.325 | 26.569 | 35.252 | 16.808 | 14.873 |
| Jarque–Bera | 128.121 | 9505.478 | 17 245.15 | 3449.080 | 2701.375 |
| Probability | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sum | 6.71E+08 | 45.736 | 137.968 | 37.798 | 114.016 |
| Sum Sq. Dev. | 1.54E+15 | 13.255 | 155.993 | 4.493 | 32.189 |
| Observations | 360 | 360 | 360 | 360 | 360 |

Note: FDI is in raw data, in thousand US$.

**Table 4**
Correlation matrix.
*Source:* Authors' calculation.

| Correlation probability | FDI | $W_h$ | $W_a$ | $X_h$ | $X_a$ |
|---|---|---|---|---|---|
| FDI | 1.00<br>– | | | | |
| $W_h$ | −0.13<br>(0.01) | 1.00<br>– | | | |
| $W_a$ | −0.07<br>(0.02) | 0.87<br>(0.00) | 1.00<br>– | | |
| $X_h$ | 0.16<br>(0.00) | 0.21<br>(0.00) | −0.10<br>(0.06) | 1.00<br>– | |
| $X_a$ | 0.18<br>(0.01) | 0.20<br>(0.00) | 0.08<br>(0.12) | 0.48<br>(0.00) | 1.00<br>– |

Note: *p*-values are in parentheses.

The study first examines the stationarity of the data. Traditional unit root methods, such as Augmented Dickey–Fuller test, Phillips–Perron, Kwiatkowski–Phillips– Schmidt–Shin and Ng–Perron tests suffer from low test power due to insufficient data. Levin et al. (2002) found that the panel approach can significantly improve the power of tests with increased sample size and time period.

This study follows the procedures of Maddala and Wu (1999), who proposed a more straightforward, nonparametric unit root test using the Fisher-type statistics. Maddala and Wu (1999) have shown that Fisher-type statistics (Fisher–PP) are superior to both the Levin–Lin–Chu (LLC) test of Levin et al. (2002) and the Im–Pesaran–Shin test of Im et al. (2003). Specifically, the Fisher test is non-parametric. As such, $p$-values are always obtainable, whatever test statistic is used for testing for a unit root for each sample. In addition, the Fisher test can be used with any unit root test. Further, the Fisher test does not require a balanced panel. It can be conducted on unbalanced panels, which is the case for this study. Moreover, there is no restriction of the sample sizes for different samples. They can vary according to data availability.

This study employs the inverse normal $Z$ statistic, as recommended by Choi (2001), since this statistic offers the best trade-off between size and power. Under the null hypothesis, all panels contain a unit root. Under the alternative, at least one panel is stationary. This is applied for a finite number of panels, as in this study.

In cross-sectional analysis, the error variance is likely to vary across the groups impacting the consistency of the estimators. Using the generalized least squares method (GLS) in the estimation could solve this issue. However, other sources of variance variability might still exist; these are represented by the correlation of the squared residuals with the regressors in each group. There are two sources of within-group heteroscedasticity, which could be given either by differences in the unconditional variance of the residual terms or by differences in the variance of the residual terms conditioned on the regressors. A more efficient estimator that uses the generalized method of moments (GMM) can control for both heteroskedasticity sources.

Using a restrictive matrix that assumes no conditional heteroskedasticity, GLS is equivalent to GMM. Thus, it could be inferred that the superiority of GMM (which uses a non-restrictive matrix) on GLS (which uses a restrictive matrix) in the case of heteroscedasticity depends on the presence of regressors.

Considering the general linear model:

$$Y_{it} = \alpha + X_{it}'\beta + \delta_i + \gamma_t + \varepsilon_{it} \tag{3}$$

where $i \in \{1, 2, \ldots, N\}$, $t \in \{1, 2, \ldots, T\}$, $Y$ is a dependent variable, $\alpha$ is a constant, $X$ is a vector of explanatory variables, $\beta$ represents a vector of coefficients to be estimated, $\delta_i$ and $\gamma_t$ are the fixed and random effects, respectively, and $\varepsilon_{it}$ represents the classical residual terms.

The GMM estimator is computed based on the following equation:

$$g(\beta) = \sum_{i=1}^{N} g_i(\beta) = \sum_{i=1}^{N} Z_i'\varepsilon_i(\beta) \tag{4}$$

and solves the following minimization problem in terms of $\beta$:

$$S(\beta) = \left(\sum_{i=1}^{N} Z_i'\varepsilon_i(\beta)\right)' W \left(\sum_{i=1}^{N} Z_i'\varepsilon_i(\beta)\right) = g(\beta)'Wg(\beta). \tag{5}$$

There are two common transformations for dynamic panel data, namely, difference GMM, developed by Holtz-Eakin et al. (1988) and Arellano and Bond (1991), and system GMM, developed by Arellano and Bover (1995), Blundell and Bond (1998), and Bond et al. (2001). However, a differenced GMM estimator is poorly behaved when the time series are persistent and the number of time series observations is small. On the other hand, the desirable properties of system GMM estimators remain asymptotic for large $N$. This gives rise to an important reason for choosing the system GMM method as the main method in this study, as $T$ $(= 16)$ in this case is smaller than $N$ $(= 23)$.

Furthermore, system GMM is more robust to missing data. The system GMM estimation method corrects for omitted variable bias by eliminating fixed effects through first differencing and corrects for endogeneity bias by using lagged endogenous regressors as effective instruments (Kimura et al., 2012).[2] By exploiting more moment conditions, the system GMM estimator is also more efficient than is the first-differenced GMM estimator, which uses only a subset (Cheng and Kwan, 2000). As De Vita (2014) notes, system GMM not only accounts for the underlying data dynamics but also corrects for serial correlation, measurement error, and potential endogeneity attributable to crucial unobservables and measurement error. System GMM is naturally well-suited to dealing with potential endogeneity issues for explanatory variables (Blundell and Bond, 1998).

This study first conducted three diagnostic tests on three different assumptions about the error process, including: (i) contemporaneous correlation; (ii) serial correlation; and (iii) heteroscedasticity. These three tests are, respectively, Breusch and Pagan's (1980) Lagrange Multiplier (LM) test, Wooldridge's (2002) test, and the modified Wald test, as proposed by Greene (2008). The null hypotheses of Breusch and Pagan's (1980) LM test and Wooldridge's (2002) test are that there is no contemporaneous correlation and there is no serial correlation, respectively. Meanwhile, the null hypothesis of the modified Wald test, as proposed by Greene (2008), is that there is homoscedasticity.

[2] In the difference equations, predetermined and endogenous variables are instrumented with suitable lags of their own levels. On the other hand, the levels' equations are instrumented with the lags of their first differences. The predetermined variables are correlated with past errors, and the endogenous variables are correlated with past and present errors (see Blundell and Bond, 1998).

**Table 5**
Diagnostics tests.

| Test name | Error process | Test statistic | Critical value |
|---|---|---|---|
| Modified wald | Heteroscedasticity | $\chi^2$ | 360 000*** |
| Breusch–Pagan LM test | Contemporaneous correlation | $\chi^2$ | 332.237*** |
| Wooldridge test | Serial correlation | F | 4.215*** |

Notes: Modified Wald statistic for group-wise heteroscedasticity in fixed effect model. $H_0$: No heteroscedasticity. Breusch–Pagan LM Test. $H_0$: Homoscedasticity. Wooldridge test for autocorrelation in panel data. $H_0$: No first-order autocorrelation.

**Table 6**
Panel unit root test results.

| With intercept | Fisher-type tests (Phillips–Perron) | |
|---|---|---|
| | Inverse normal $Z$ statistic (Choi, 2001) | |
| Variables | Level | 1st difference |
| lnFDI | 2.571 | −11.652*** |
| $W_d$ | −1.312* | −11.367*** |
| $W_a$ | −1.268* | −11.528*** |
| $P_d$ | 0.126 | −8.241*** |
| $P_a$ | −0.769 | −4.920*** |

Notes: ***, **, and * indicate rejection of the null hypothesis at the 1%, 5%, and 10% significance levels, respectively. Using LLC (2002) removing cross-sectional averages from the data to help control for cross-sectional correlation.

**Table 7**
Variance Inflation Factor (VIF) (test for multicollinearity).

| Variable | VIF | 1/VIF |
|---|---|---|
| $\Delta W_h$ | 3.68 | 0.31 |
| $\Delta W_a$ | 3.34 | 0.23 |
| $\Delta X_h$ | 4.87 | 0.52 |
| $\Delta X_a$ | 2.98 | 0.24 |
| Mean VIF | 3.72 | |

Table 5 reports the test results of these three assumptions, which confirm the existence of contemporaneous correlation and heteroscedasticity at the 1% level of significance. The null hypothesis of no first-order autocorrelation is also rejected at the 1% significance level. These results justify the choice of system GMM as the main method in this study. Moreover, we also estimate the main model using pooled ordinary least squares (OLS), the fixed effect (FE) and random effect (RE) techniques but only for a robustness check, because, in the case of our study, system GMM outperforms pooled OLS, FE, and RE estimation methods.

## 5. Results and discussions

The results of conducting the Fisher-type panel unit root test are reported in Table 6. The unit root statistics reported are for the variables in level and in first difference. The finding is that, for the variables in level, there is insufficient evidence to accept the null hypothesis of a unit root at the 1% and 5% levels of significance. Meanwhile, in first difference, there is insufficient evidence to reject the null hypothesis of a unit root at the 1% level of significance. These conclusions apply to all variables under study. Thus, we may conclude that all the variables are $I(1)$.

To determine the multicollinearity problem in the dataset, this study employs the variance inflation factor (VIF) test in the proposed model to identify potential multicollinearity (Alin, 2010). VIF is an effective approach for multicollinearity assessment since it overcomes the lacunas of the above-mentioned methods. In addition, VIF calculations are straightforward and comprehensive; the higher the value of VIF, the higher the collinearity between the related variables.

Results reported in Table 7 seem to suggest that there is no serious multicollinearity in this dataset. As explained earlier, while the absolute wage level and labor productivity are expected to be strongly and positively correlated, the use of relative wage and related productivity in the estimating model has largely removed this potential problem.

To reduce the severity of the bias that arises when some regressors may be endogenous, the model is estimated by using system GMM. The results of system GMM are reported in Table 8.[3] Our system GMM seems to yield appropriate

[3] We have run many regressions using System GMM with different sets of instruments. This is necessary, since the optimal set of instruments is difficult to determine, and too many instruments may hamper the regression results and the Hansen test. The results were stable in terms of coefficients that proved to vary very marginally, and the signs remained almost always the same. We never observed one coefficient to be significantly positive under one specification and significantly negative under another. Mostly, only the significances changed.

**Table 8**
GMM estimation results.

| | $\Delta$ lnFDI |
|---|---|
| $\Delta$ lnFDI(−1) | −3.78*** |
| | (−4.82) |
| $\Delta W_h$ | 12.56 |
| | (0.98) |
| $\Delta X_h$ | 14.31 |
| | (0.67) |
| $\Delta W_a$ | −10.68*** |
| | (−3.83) |
| $\Delta X_a$ | 12.62*** |
| | (3.63) |
| CONST | 3.25 |
| | (0.62) |
| Estimation diagnostics | |
| Number of observations | 330 |
| Number of instruments | 118 |
| *F*-test | 38.59*** |
| Arellano–Bond AR(1) | −1.79 |
| [*p*-value] | [0.093] |
| Arellano–Bond AR(2) | −1.23 |
| [*p*-value] | [0.131] |
| Sargan test | 28.356 |
| [*p*-value] | [0.683] |
| Hansen test | 9.193 |
| [*p*-value] | [0.190] |
| Difference-in-Hansen tests of exogeneity [*p*-value] | [0.194] |

Note: *t* statistics in parentheses. *p*-values are in brackets. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively. The Difference-in-Hansen test of exogeneity is under the null that instruments used for the equations in levels are exogenous.

estimation results, since the coefficient of the lagged dependent variable is significant at the 99% confidence level. Several diagnostics testing results are also reported. Specifically, the null hypothesis of first-order autocorrelation in residuals is rejected in Arellano–Bond AR(1) for our model. Arellano–Bond AR(2), with the null hypothesis of no second-order autocorrelation, is not rejected. These results are important for the consistency of the GMM estimator. The Sargan–Hansen test for overidentification with the null hypothesis of exogenous instruments was not rejected. The rule of thumb implying that instruments should not exceed the number of groups is not violated. Therefore, our model is unlikely to suffer from overidentification according to both the Sargan and the Hansen statistics. Our system GMM estimates also satisfy the difference-in-Hansen's tests for instrument validity, which examines the exogeneity of the instrument subsets with the null hypothesis that the subsets of instruments are exogenous. An *F*-test indicates the joint significance of explanatory variables.

The results of estimated coefficients reported in Table 8 show that a rise in the wage of Vietnam relative to those of the alternative host countries negatively impacts the FDI inflows to Vietnam. Meanwhile, an improvement in the labor productivity of Vietnam to its neighboring countries in the region seems to attract greater FDI inflows to the country. Furthermore, the fact that the coefficients of $W_a$ and $X_a$ are both significant indicates the absence of multicollinearity in the panel. These findings are consistent with a prior belief that labor costs should be important determinants of direct investment flows. Specifically, a rise in the host country wage or a fall in the alternative host countries' wage discourages FDI unless a strong capital–labor substitution effect occurs. Productivity effects are the opposite (Cushman, 1987).

This result is consistent with that obtained by Holland and Pain (1998), who examined a panel of investment in eight transition economies and also found that a rise in wages in one country relative to those of the other panel members will adversely affect investment, unless offset by a corresponding rise in relative productivity per head. Our finding is also consistent with that of Nguyen and Nguyen (2007) that the key country-specific advantages that have enabled Vietnam to attract FDI include the country's relatively high level of education and quality of labor.

We could not find significant coefficient estimates for the wage and productivity ratios of Vietnam relative to the average of the group of Vietnam's major FDI investing countries. The results suggest that FDI investors to Vietnam appear to be driven by the expected long-run cost differentials between the host and alternative host countries, rather than those between the host and the investing countries.[4]

Thus, we may deduce that, for the case of Vietnam, since the country possesses a huge pool of cheap labor with improved productivity as compared to the neighboring countries, it has attracted large inflows of FDI, especially from export-oriented

[4] To validate our results, we run sensitivity analyses by excluding $\Delta W_h$ and $\Delta X_h$ variables one by one at a time to receive a more parsimonious estimation. The regression outputs displayed in Table A1 in Appendix reveal that this leaves our main findings untouched: coefficients of $\Delta X_h$ and $\Delta W_h$ in both cases are still not significant. The basic results do not change in both cases.

multinational firms, to produce simple exported goods. This is in line with Xuan and Xing (2008), who found that the abundant cheap labor, along with other factors, including political stability, rich natural resources, and an improved legal environment, has made Vietnam a popular destination for FDI inflows from various countries. Although the Vietnamese economy has been growing rapidly during the past two decades, the real wages of both laborers in general and unskilled laborers in particular have not increased much due to continuous rural-to-urban migration within the country.

Vietnam's abundance of cheap labor has played an important role in attracting foreign firms looking to set up overseas' manufacturing operations in the country. Nevertheless, while Vietnam boasts its advantage in cheap labor, the risk for an economy depending on cheap labor is high. In the long-term, this low-cost strategy could hamper Vietnam's economy and the quality of the labor force. If the country only focuses on maintaining cheap labor and manual labor, this might eventually lead to a low-quality labor force that lacks the qualities of innovation and creativity. With such characteristics, Vietnam might no longer be an attractive destination for FDI projects that either have high levels of technology or are large-scale. Furthermore, despite the continuing global slowdown, Vietnam has recently experienced high wage growth, both as a result of a large concentration of labor-intensive FDI in some areas and as an inevitable response to the high inflation rate. If wages begin to increase rapidly, Vietnam may not have enough lead time to improve labor productivity. Under wage pressure, the only way for Vietnam to remain competitive for FDI investors is to improve labor productivity to outpace the wage growth. Malaysia and China have stopped inviting labor-intensive FDI projects and turned to more 'high-tech' investors (Ohno, 2009).

There is still room for improvement to the existing training and education systems, together with the restrictive labor policies. According to a recent report by Di Gropello (2011), over the last decade, while access to higher education has been growing fast in Vietnam, many challenges remain for tertiary education institutions to improve skill delivery. In 2014, the Institute of Labor Science and Social Affairs and the Manpower Group in Vietnam conducted a survey for 100 FDI businesses in six provinces and cities, focusing on three sectors—consumer products, electronics, and automobile assembly. The survey revealed the limitations of Vietnamese workers in terms of soft skills, including teamwork, communications skills, and adaptability to new circumstances. A worrying trend was also pointed out, which highlighted the fact that some FDI businesses attract workers from their rivals, instead of training their workers.

Vietnam needs investment in human development to maintain its comparative advantage of being a country with cheap but skilled labor and, thus, sustain the continued inflows of FDI. According to Becker (2008), human capital consists of the intangible set of skills and knowledge that a worker possesses, including those that are innate and those that are acquired through schooling, non-schooling investments, pre-labor market influences, and labor market experience. Investments in education and training help to improve these intangible skills and, in turn, increase a worker's productivity (Nguyen, 2014). Prompt efforts to provide technical training for laborers, particularly in areas related to potential industries for FDI, should, therefore, be consistent with the FDI promotion policy itself. Furthermore, investment in human capital would enable people to take advantage of market opportunities—particularly for those people who are usually excluded. Examples include providing electricity, irrigation, education, and health services to mountainous highland areas (Overseas Development Institute, 2011).

Furthermore, according to Nguyen et al. (2017b), during 2007–2015, the gap between minimum wage growth and labor productivity growth in Vietnam expanded not only rapidly but also faster than the case in other countries in the region, such as China, Indonesia, and Thailand. The ratio of the minimum wage against labor productivity experienced a significant increase, particularly from 25% in 2007 to 50% in 2015. Furthermore, during 2004–2015 period, average wage growth in Vietnam (5.8%) also outpaced labor productivity growth, which was 4.4% (Nguyen et al., 2017b). If the misalignment between labor productivity growth and both minimum wage growth and average wage growth continues, the health and competitiveness of the economy would be disrupted seriously, in many respects. This implies several recommendations for Vietnam's minimum wage scheme, as follows: (1) minimum wage adjustments should be in line with labor productivity growth; (2) minimum wages are currently measured on a monthly basis but should be an hourly minimum wage; and (3) the minimum wage should be adjusted under a rule-based approach and, therefore, more transparently and predictably (Nguyen et al., 2017b).

For robustness checks, we estimated the same model as in Table 8, but using pooled OLS, FE, and RE models, and reported the results in Table 9. The $F$-test (Wald $\chi^2$ in RE regression) is significant for all regressions, meaning that explanatory variables are jointly significant. Furthermore, measures of goodness of fit in these two estimation models are relatively good. $R^2$ for the FE and RE models is 60% and 66%, respectively. Overall, as compared to the GMM estimation results, the results of FE and RE estimations differ mainly in significance. As such, we may conclude that the empirical findings of this study are robust.[5]

[5] Two tests were carried out to decide the appropriateness of these three models (pooled OLS, FE, and RE) for estimating the baseline model's specification. Specifically, the Breusch–Pagan LM test was applied to decide whether pooled OLS or FE is more appropriate. The null hypothesis is that the variance across entities is zero. The test was statistically significant, showing that there is a statistical difference across units (i.e., a panel effect) and, thus, RE results are more efficient. As a second step, the Hausman Specification test was used to compare between the RE model and the FE model. The significance of the chi-square value favors the FE model over the RE model. For further robustness checks, we also run the two alternative models, as in Table A1, using OLS, FE, and RE. The results, as reported in Table A2 in Appendix, are, again, qualitatively the same as those we obtained from the GMM.

**Table 9**
Robustness checks: Pooled OLS, FE, and RE estimation results.

| | $\Delta$ lnFDI | | |
|---|---|---|---|
| | Pooled OLS | FE | RE |
| $\Delta$ lnFDI(−1) | −2.13** | −3.91*** | −2.72** |
| | (−2.02) | (−4.50) | (−2.18) |
| $\Delta W_h$ | 7.05* | 5.63 | 6.03 |
| | (1.95) | (1.03) | (1.27) |
| $\Delta X_h$ | 4.41 | 5.90 | 6.12 |
| | (1.16) | (1.37) | (1.41) |
| $\Delta W_a$ | −8.35** | −11.41*** | −10.12** |
| | (2.02) | (−3.32) | (−2.19) |
| $\Delta X_a$ | 12.31** | 11.05*** | 10.01*** |
| | (2.87) | (6.35) | (5.58) |
| CONST | 1.12*** | 0.41** | 0.71*** |
| | (2.61) | (2.16) | (3.23) |
| Estimation diagnostics | | | |
| Number of observations | 330 | 330 | 330 |
| $F$-test | 56.12*** | 78.34*** | |
| Wald $\chi^2$ | | | 86.12*** |
| Hausman $\chi^2$ | | 27.87*** | |
| Breusch– Pagan LM $\chi^2$ | | | 291.12*** |
| $R^2$ | 0.43 | 0.60 | 0.66 |

Notes: $t$ statistics in parentheses. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

## 6. Conclusion

Recent years have witnessed unusually large amounts of FDI inflows to Vietnam, a fast-growing transition economy in the world. Studying determinants of Vietnam's FDI inflows would be both interesting for FDI theorists and important for policymakers of Vietnam in particular and other transition economies in general. However, little empirical work has been conducted on this subject matter, mainly due to the lack of a required comprehensive dataset, which is a norm for studying developing economies.

The present study focuses on the labor story of FDI determinants for the case of Vietnam. Specifically, it examines the extent to which unit labor costs (proxied by labor wage) and labor productivity relative to the FDI home country and relative to other potential alternative host countries affect FDI inflows to Vietnam. The econometric analysis applies panel methodology to a dataset spanning 2000–2010.

This study finds that, during recent years of transition, high levels of FDI flow into Vietnam could be explained mainly in terms of the country's comparative labor advantage. More specifically, Vietnam's success in attracting FDI appears to be due mainly to the country's relatively skilled workforce, combined with low wages as compared to the neighboring countries in the region. This may also, in part, be due to the fact that, despite relatively higher qualifications, productivity in some neighboring countries of Vietnam tends to be lower than expected. The results also reveal that FDI investors in Vietnam appear to be driven by the expected long-run cost differentials between the host and alternative host countries, rather than by those between the host and the home countries.

The findings of this study imply the need for Vietnam to invest further in human capital development to sustain its comparative advantage of an inexpensive and qualified labor force in attracting FDI inflows. Although the low-cost labor strategy might help in the short run, focusing on cheap labor might eventually result in a low-quality workforce, which would deter FDI inflows to the country. As such, Vietnam should improve its training and education programs, particularly in areas related to potential industries for FDI, to either maintain or attract even higher amounts of FDI in the long run. In addition, minimum wage adjustments should be in line with labor productivity growth to promote the accumulation of human capital and motivation among investors, and, hence, sustain the competitiveness of the economy.

## Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.eap.2018.02.004.

## References

Alfaro, L., Kalemli-Ozcan, S., Volosovych, V., 2008. Why doesn't capital flow from rich to poor countries? An empirical investigation. Rev. Econ. Stat. 90 (2), 347–368.
Alin, A., 2010. Multicollinearity. Wiley Interdiscip. Rev.: Comput. Statist. 2 (3), 370–374.
Altzinger, W., 1999. Austria's foreign direct investment in Central and Eastern Europe: Supply based or market driven. In: 47th International Atlantic Economic Conference, Vienna.

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev. Econom. Stud. 58 (2), 277–297.

Arellano, M., Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. J. Econometrics 68 (1), 29–51.

Azémar, C., Desbordes, R., 2013. Has the Lucas Paradox been fully explained? Econom. Lett. 121 (2), 183–187.

Aziz, O.G., Mishra, A.V., 2016. Determinants of FDI inflows to Arab economies. J. Int. Trade Econ. Dev. 25 (3), 325–356.

Becker, G.S., 2008. Human Capital. Retrieved on 1st September, 2015. Available at: http://www.econlib.org/library/EncHumanCapital.html.

Bellak, C., Leibrecht, M., Riedl, A., 2008. Labour costs and FDI flows into Central and Eastern European countries: A survey of the literature and empirical evidence. Struct. Change Econ. Dyn. 19 (1), 17–37.

Benacek, V., Miroslaw, G., Dawn, H., Magdolna, S., 2000. The determinants and impact of foreign direct investment in Central and Eastern Europe: A comparison of survey and econometric evidence. Transnatl. Corp. J. United Nat. 9 (3), 163–212.

Bilgili, F., Sevil, N., Tülüce, H., Doğan, İ, 2012. The determinants of FDI in Turkey: A Markov regime-switching approach. Econ. Modell. 29 (4), 1161–1169.

Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. J. Econometrics 87 (1), 115–143.

Bond, S., Hoeffler, A., Temple, J., 2001. GMM Estimation of Empirical Growth Models.

Branstetter, L.G., Feenstra, R.C., 2002. Trade and foreign direct investment in China: A political economy approach. J. Int. Econ. 58 (2), 335–358.

Breusch, T., Pagan, A., 1980. The Lagrange multiplier test and its application to model specification in econometrics. Rev. Econom. Stud. 47 (1), 237–254.

Büthe, T., Helen, V.M., 2008. The politics of foreign direct investment into developing countries: Increasing FDI through international trade agreements? Amer. J. Polit. Sci. 52 (4), 741–762.

Calvo, G.A., Leiderman, L., Reinhart, C.M., 1996. Inflows of capital to developing countries in the 1990s. J. Econ. Perspect. 10 (2), 123–139.

Capello, R., Fratesi, U., Resmini, L., 2011. Globalization and Regional Growth in Europe: Past Trends and Future Scenarios. Springer, Heidelberg.

Chan, M.L., Hou, K., Li, X., Mountain, D.C., 2014. Foreign direct investment and its determinants: A regional panel causality analysis. Quart. Rev. Econ. Finance 54 (4), 579–589.

Cheng, L.K., Kwan, Y.K., 2000. What are the determinants of the location of foreign direct investment? The Chinese experience. J. Int. Econ. 51 (2), 379–400.

Choi, I., 2001. Unit root tests for panel data. J. Int. Money Finance 20 (2), 249–272.

Cushman, D., 1987. The effects of real wage and labor productivity on foreign direct investment. South. Econ. J. 54 (1), 174–185.

Davaakhuu, O., Sharma, K., Bandara, Y.M., 2014. Export performance during economic transition in Mongolia. Econ. Anal. Policy 44 (4), 442–450.

De Vita, G., 2014. The long-run impact of exchange rate regimes on international tourism flows. Tourism Manag. 45 (December), 226–233.

Di Gropello, E., 2011. Putting Higher Education to Work: Skills and Research for Growth in East Asia. The World Bank, Washington DC.

Dutta, N., Kar, S., Saha, S., 2017. Human capital and FDI: How does corruption affect the relationship? Econ. Anal. Policy 56, 126–134.

Elkomy, S., Ingham, H., Read, R., 2016. Economic and political determinants of the effects of FDI on growth in transition and developing countries. Thunderbird Int. Bus. Rev. 58 (4), 347–362.

Göktan, M.G., 2015. On the explanation of the Lucas Paradox. Econom. Lett. 137 (C), 109–113.

Greene, W.H., 2008. Econometric Analysis, sixth ed.. Prentice Hall, Upper Saddle River, NJ.

Havrylchyk, O., Poncet, S., 2007. Foreign direct investment in China: Reward or remedy? World Econ. 30 (11), 1662–1681.

Hoang, C.C., 2013. The impact of the World Trade Organization (WTO) regime on foreign direct investment (FDI) flows to Vietnam: A gravity model approach. J. Mod. Account. Audit. 9 (7), 961–987.

Holland, D., Pain, N., 1998. The determinants and impact of foreign direct investment in the transition economies: A panel data analysis. In: Edwards, V. (Ed.), Convergence Or Divergence: Aspirations and Reality in Central and Eastern Europe and Russia, Proceedings 4th Annual Conference, Centre for Research Into East European Business. University of Buckingham.

Holtz-Eakin, D., Newey, W., Rosen, H.S., 1988. Estimating vector autoregressions with panel data. Econometrica 56, 1371–1395.

Hsiao, F.S.T., Hsiao, M.C.W., 2006. FDI, exports, and growth in East and Southeast Asia - Evidence from time-series and panel data causality analyses. In: International Conference on Korea and the World Economy V. Korea University, Seoul, 7–8 July.

Im, K.S., Pesaran, M.H., Shin, Y., 2003. Testing for unit roots in heterogeneous panels. J. Econometrics 115 (1), 53–74.

Kimura, H., Mori, Y., Sawada, Y., 2012. Aid proliferation and economic growth: A cross-country analysis. World Dev. 40 (1), 1–10.

Konings, J., Janssens, S., 1996. How do western companies respond to the opening of Central and East European countries? Survey evidence from a small open economy, Working Paper No. 60, Leuven: Leuven Institute for Central and East European Studies.

Lankes, H.P., Venables, A.J., 1997. Foreign direct investment in Eastern Europe and the former Soviet Union: results from a survey of investors. In: Zecchini, S. (Ed.), Lessons from the Economic Transition: Central and Eastern Europe in the 1990s. Kluwer Academic Publishers, Dordrecht.

Leahy, J., 2007. India rejects Valley view on reverse-outsourcing. Financ. Times, 1 July.

Levin, A., Lin, C.-F., Chu, J.C-S., 2002. Unit root tests in panel data: Asymptotic and finite-sample properties. J. Econometrics 108, 1–24.

Lucas, R.E., 1990. Why doesn't capital flow from rich to poor countries? Amer. Econ. Rev. 80 (2), 92–96.

Maddala, G.S., Wu, S., 1999. A comparative study of unit root tests with panel data and a new simple test. Oxford Bull. Econ. Stat. 61 (S1), 631–652.

Mahalakshmi, S., Thiyagarajan, S., Naresh, G., 2015. Determinants of foreign direct investment inflows into india. J. Int. Econ. 6 (1), 24–43.

Meyer, K., Nguyen, H.V., 2005. Foreign investment strategies and sub-national institutions in emerging markets: Evidence from Vietnam. J. Manage. Stud. 42 (1), 63–93.

Mirza, H., Axele, G., 2004. Regional integration and benefits from foreign direct investment in ASEAN countries: The case of Vietnam. Asian Dev. Econ. Rev. 21 (1), 66–98.

Na, L., Lightfoot, W.S., 2006. Determinants of foreign direct investment at the regional level in China. J. Technol. Manag. China 1 (3), 262–278.

Nguyen, D.T., 2014. An analysis of labour market returns to education in Vietnam: Evidence from the National Labour Force Survey 2012. Turin School of Development Working Paper No. 3, Turin: International Training Centre of the ILO.

Nguyen, N.B., Jonathan, H., 2002. Trade liberalisation and foreign direct investment in Vietnam. ASEAN Econ. Bull. 19 (3), 302–318.

Nguyen, N.A., Nguyen, T., 2007. Foreign direct investment in Vietnam: An overview and analysis the determinants of spatial distribution across provinces. MPRA Paper 1921, Munich Personal Repec Archive.

Nguyen, D.T.H., Sun, S., Anwar, S., 2017a. A long-run and short-run analysis of the macroeconomic interrelationships in Vietnam. Econ. Anal. Policy 54, 15–25.

Nguyen, D.T., Yamauchi, F., Nguyen, T.D., Eiichi, M., Pham, T.T.T., Nguyen, T.T., 2017b. Labor Productivity and Wage Growth in Vietnam. Vietnam Institute for Economic and Policy Research (VEPR) and Japan International Cooperation Agency (JICA)'s Workshop on 13th September, 2017. Retrieved on 15th September, 2017. Available http://vepr.org.vn/upload/533/fck/files/1_%20Full%20ENG_20170912_0615pm.pdf.

Noorbakhsh, F., Paloni, A., Youssef, A., 2001. Human capital and FDI inflows to developing countries: New empirical evidence. World Dev. 29 (9), 1593–1610.

Ohno, K., 2009. Avoiding the middle-income trap: Renovating industrial policy formulation in Vietnam. ASEAN Econ. Bull. 26 (1), 25–43.

Omanwa, S.M., 2013. Determinants of FDI in Kenya: An empirical study. Vilakshan: XIMB J. Manag. 10 (1), 47–66.

Overseas Development Institute 2011. Viet Nam's Progress on Economic Growth and Poverty Reduction: Impressive Improvements. Retrieved on 1st September, 2015. Available at: http://www.developmentprogress.org/sites/default/files/viet_nam_report_-_master_0.pdf.

Parashar, S., 2015. Factors affecting FDI inflow in China and India. University of Alberta Research Experience, China Institute's Working Paper. Retrieved on 1st September, 2017. Available at: https://cloudfront.ualberta.ca/-/media/china/media-gallery/research/research-papers/fdichinaandindiasumitparashar201507.pdf.
Pham, H.M., 2002. Regional economic development and foreign direct investment flows in Vietnam, 1988-98. J. Asia Pacific Econ. 7 (2), 182–202.
Razin, A., Efraim, S., Tong, H., 2008. Bilateral FDI flows: Threshold barriers and productivity shocks. CESifo Econ. Stud. 54 (3), 451–470.
Salike, N., 2016. Role of human capital on regional distribution of FDI in China: New evidences. China Econ. Rev. 37, 66–84.
Schularick, M., 2006. A tale of two 'globalizations': capital flows from rich to poor in two eras of global finance. Int. J. Financ. Econ. 11 (4), 339–354.
Tornell, A., Velasco, A., 1992. The tragedy of the commons and economic growth: why does capital flow from poor to rich countries? J. Polit. Econ. 100 (6), 1208–1231.
Tran, T.A.D., Dinh, T.T.B., 2014. FDI and growth in Vietnam: A critical survey. J. Econ. Dev. 15 (3), 91–116.
Turnbull, C., Sun, S., Anwar, S., 2016. Trade liberalisation, inward FDI and productivity within Australia's manufacturing sector. Econ. Anal. Policy 50, 41–51.
US Department of State 2014. 2014 Investment Climate Statement. Retrieved on 1st September 2015. Available at: www.state.gov/documents/organization/229305.pdf.
Wach, K., Wojciechowski, L., 2016. Determinants of inward FDI into Visegrad countries: empirical evidence based on panel data for the years 2000-2012. Econ. Bus. Rev. 2 (1), 34–52.
Wahid, A.N.M., Sawkut, R., Seetanah, B., 2009. Determinants of foreign direct investments: Lessons from the African economies. J. Appl. Bus. Econ. 9 (1), 70–81.
Waters, R., 2007. Bangalore wages spur reverse offshoring. Financ. Times, July 1.
Wooldridge, J.M., 2002. Econometric Analysis of Cross Section and Panel Data. MIT Press, Cambridge, MA.
Xing, Y., 2006. Why is China so attractive for FDI? The role of exchange rates. China Econ. Rev. 17, 198–209.
Xuan, N.T., Xing, Y., 2008. Foreign direct investment and exports: The experiences of Vietnam. Econ. Transit. 16 (2), 183–197.
Zhao, H., Zhu, G., 2000. Location factors and country-of-origin differences: An empirical analysis of FDI in China. Multinatl. Bus. Rev. 8 (Spring), 60–73.