



Effect of foreign direct investment on wage inequalities between skilled and unskilled workers in Vietnam

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ABSTRACT

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Foreign direct investment (FDI) can bring many benefits to the host country's economy, but not all citizens in that country benefit equally. This study aimed to analyze the impact of FDI on wage inequality between skilled and unskilled workers in Vietnam. The study used an econometric model, applying systematic generalized method of moments (GMM) estimation to panel data from 63 Vietnamese provinces in the period from 2010 to 2018 to analyze the impact of FDI on wage inequality. The empirical results from the econometric models using systematic GMM showed that FDI tends to increase wage inequality in localities. The results of this study suggest that to ensure sustainable development, policies to attract and use FDI need to be linked with social security policies and efforts to reduce wage inequality. Based on the research results, the study proposes some policy implications to minimize the negative impact of FDI on wage inequality in Vietnam.

Contribution/Originality: This study is the first to study the effect of foreign direct investment on wage inequality between skilled and unskilled workers in Vietnam using an econometric model and applying systematic generalized method of moments (GMM).

1. INTRODUCTION

In the last 20 years, the issues of foreign direct investment (FDI) and social justice have been connected in more and more studies, indicating that while FDI can bring many benefits to a host country's economy, not all citizens in that country will benefit equally. The relationship between an increase in FDI inflows and wage inequality has become an interesting topic for researchers and policymakers and has inspired theoretical and empirical research. Various theories have been developed to explain this disparity (Aghion & Howitt, 1998; Feenstra & Hanson, 1997; Figini & Görg, 1999; Gatsi & Appiah, 2020; Markusen & Venables, 1999; Taylor & Driffield, 2005; Te Velde & Morrissey, 2004). Other research has created an initial scientific basis for the implementation of experimental studies in countries and regions around the world. However, the inconsistency of the conclusions of these theoretical studies leads to an urgent need to carry out empirical studies to allow more precise conclusions to be drawn.

Meanwhile, empirical studies have also provided mixed conclusions about the relationship between FDI and wage inequality. The prior literature can be divided into three groups of empirical studies on this relationship; some concluded that FDI reduces wage inequality in host countries (Bhandari, 2007; Jensen & Rosas, 2007; Mugeni, 2015),

others that FDI deepens wage inequality (Choi, 2006; Gopinath & Chen, 2003; Jaumotte, Lall, & Papageorgiou, 2013; Reuveny & Li, 2003; Suyunov, 2022; Te Velde & Morrissey, 2004), and a third group reported a nonlinear effect of FDI on wage inequality (Aghion & Howitt, 1998; Figini & Görg, 1999; Taylor & Driffield, 2005).

Nevertheless, there is evidence that in both developed and developing countries, FDI leads to an increase in wage inequality between skilled and unskilled workers (Johansson & Liu, 2020; Taylor & Driffield, 2005; Te Velde & Morrissey, 2004). In general, studies on this topic have been very limited and have not come to a unified conclusion. In particular, no research has been conducted on the relationship between FDI and wage inequality between skilled and unskilled workers in the context of Vietnam.

Therefore, the current study analyzed the impact of FDI on wage inequality between skilled and unskilled workers in Vietnam. The author used an econometric model applying systematic generalized method of moments (GMM) estimation (Arellano & Bover, 1995) to panel data from 63 provinces in Vietnam in the period from 2010 to 2018 to analyze the impact of FDI on wage inequality.

2. THEORETICAL BACKGROUND AND LITERATURE REVIEW

Research on the impact of FDI inflows on income or wage inequality has attracted the attention of researchers around the world. However, previous studies have not reached a unified conclusion on the impact of FDI inflows on wage inequality. The prior theoretical and empirical research can be divided into 3 groups according to their conclusions regarding the relationship between FDI and wage inequality; their results are outlined below.

2.1. FDI has a Nonlinear Effect on Wage Inequality

Theoretically, the endogenous growth model of Aghion and Howitt (1998) suggests that technological change creates income disparities between unskilled and skilled workers. Based on the economic model, the authors pointed out that when multinational companies bring new technology to a host country, the country goes through two stages. In the first stage, there is an increase in demand for skilled workers in the host country, which leads to an increase in wage inequality during this period. Next, when the company has completed the transition to the new technology paradigm and the supply of necessary skills has improved, wage inequality will decrease. In addition, previously low-skilled workers will have trained themselves to become skilled, joining the middle-income class and thus reducing pre-existing wage inequalities. In short, the endogenous growth model of Aghion and Howitt (1998) hypothesizes a nonlinear relationship between FDI and wage inequality. Moreover, using the general purpose technology (GPT) model, the research of Aghion and Howitt (1998) also confirmed the nonlinear effect of FDI on wage inequality.

Later empirical studies by Figini and Görg (1999) and Figini and Görg (2011) also found a nonlinear relationship between FDI and wage inequality. Figini and Görg (1999) found an inverted U-shaped relationship in the Irish context. Meanwhile, their 2011 study investigated more than 100 developed and developing countries in the period 1980-2002 and also found a nonlinear effect of FDI on wage inequality in developing countries. Specifically, having studied the effect of FDI on wage inequality in OECD (Organisation for Economic Co-operation and Development) countries and non-OECD developing countries separately, the study found a clear difference between the two country groups. For the group of non-OECD developing countries, the study showed a nonlinear impact of FDI on wage inequality in an inverted U-shape. Specifically, FDI inflows initially increased wage inequality, but when FDI inflows increased further, wage inequality reduced in these countries. However, no evidence of this effect was found in developed countries.

2.2. FDI Increases Wage Inequality

The negative effect of FDI on wage inequality is theoretically explained in the model of Feenstra and Hanson (1996), who researched countries in the global North and South. This theory assumes that the countries in the North are developed countries with abundant skilled labor, and the countries in the South are less developed countries,

where the labor force consists mainly of unskilled workers. Given this context, enterprises in Northern countries will hire businesses in Southern countries where unskilled workers are concentrated to produce intermediate inputs. The availability and cheapness of labor in the Southern countries attract FDI from Northern countries where labor is seen as scarce and expensive. However, when production jobs are transferred to Southern countries, they may be regarded as skilled activities there, but in Northern countries, they are considered simple activities. This implies that some activities may be considered low-skilled in one country but high-skilled in other countries. As such, this type of FDI can increase the demand for and wages of skilled workers both in developed and less developed countries.

Some empirical studies, such as [Aitken, Harrison, and Lipsey \(1996\)](#), [Gopinath and Chen \(2003\)](#), [Lipsey and Sjöholm \(2004\)](#), [McLaren \(2000\)](#), [Taylor and Driffield \(2005\)](#), and [Te Velde \(2003\)](#), have provided support for the hypothesis derived from the North-South model, in which FDI has a negative impact on wage inequality by increasing the demand for and wages of skilled workers in the host countries. These studies have shown that FDI flows into host countries are largely through the activities of multinational enterprises (MNEs). MNEs often have a higher demand for skilled workers than domestic firms, leading to disparities in wages for these enterprises' workers ([Taylor & Driffield, 2005](#)). This causes the income gap between high-skilled and low-skilled workers to widen.

In addition, FDI enterprises create disparities in the qualifications and skills of labor groups through their training activities. As skills training activities for workers become more frequent in FDI enterprises, the qualifications of workers in this enterprise sector increase. This increases the gap in labor qualifications between enterprise types. The difference in qualifications again widens the income gap between workers in FDI enterprises and workers in other enterprises.

Furthermore, [Te Velde \(2003\)](#) pointed out the difference in status between high-skilled and low-skilled workers. This status gives highly qualified workers the ability to negotiate salaries with enterprises and receive higher salary offers. In addition, FDI enterprises tend to choose areas of operation that employ skilled workers to carry out investment activities ([Feenstra & Hanson, 1997](#)). Thus, the relative position of the group of highly skilled workers improve, resulting in an increase in income inequality for different skill groups.

In 2003, [Te Velde's](#) study in the Latin American context examined the degree to which FDI influenced the wage distribution of skilled and unskilled workers. The results suggested that FDI may have increased wage inequality in Bolivia and Chile. Similarly, [Gopinath and Chen \(2003\)](#) used a sample of 11 developing countries to show that FDI inflows widen the wage gap between skilled and unskilled workers.

[Johansson and Liu \(2020\)](#) studied the impact of FDI on wage inequality in China and found a link between FDI and the need to employ highly skilled workers. This study found evidence that wage inequality was higher in cities that attracted more FDI. In addition, the study showed through firm-level analysis that FDI not only increases the relative demand for skilled labor but also creates a strong wage disparity effect. In particular, FDI enterprises all pay higher average salaries and high salaries for skilled positions within the enterprise. Finally, FDI produces a positive wage spillover effect on both skilled and unskilled workers in state-owned enterprises and collectives, but the magnitude of the spillover effect is much higher for skilled labor.

2.3. FDI Reduces Wage Inequality

[Heckscher and Ohlin \(1991\)](#) developed a theory of natural resources for international trade, in which FDI tends to reduce wage inequality in developing countries. Their principle is stated that some countries have the advantage of produce and export goods which are highly available and cheap in production. In contrast, they will import goods which are scarce and expensive in production. The results of that process will increase the demand and price for cheap and high available products. Regarding the theory, income difference will be widened in developed countries while closer in developing countries. That is also the cause to reduce wage inequality, demand for skilled labor and increase demand for capital in developing countries.

Subsequent empirical studies have demonstrated that FDI reduces wage inequality in the host country. Jensen and Rosas (2007) showed that FDI in Mexico in the period from 1990 to 2000 helped reduce wage inequality at the state level. Also, Bhandari (2007) showed that FDI in the United States had a beneficial distributive effect, but with significant regional and time variability. A similar conclusion was reached by Chintrakarn, Herzer, and Nunnenkamp (2012), who found that FDI in the United States reduced wage inequality, although the effect was heterogeneous across states.

Research by Mugeni (2015), using a panel dataset of 153 developed and developing countries during the period from 1995 to 2010, showed that inward FDI along with a degree of democracy reduced wage inequality. In addition, the results were consistent with the assumption that FDI inflows reduce wage inequality in countries with a higher degree of democracy.

In Vietnam, few studies have been conducted on the impact of FDI on wage inequality; most researchers have focused on the relationship between FDI and income inequality or the gap between rich and poor. Ho, Bui, Nguyen, Dao, and Nguyen (2020) analyzed the effect of FDI on the average wage difference between workers in the FDI sector and domestic enterprises in Vietnam. The empirical estimation results from the estimation models showed that these relationships were non-linear. The downtrend in the wage differential variable was temporarily replaced by an increase, before experiencing a renewed downward trend in the long run.

In general, although many studies have been conducted on the effects of FDI on wage inequality across many countries and in single countries, the conclusions have been inconsistent as FDI affects regions and territories according to different mechanisms and characteristics. The difference in research results is caused by differences in the capital absorption capacity and development strategy of each country receiving foreign investment. It can also be affected by the choice of proxies for wage inequality, the estimation model, the dependent variables, the control variables included in the model, and the different estimation techniques. Therefore, the relationship between FDI and wage inequality cannot be generalized across all countries/regions, and a separate study is needed on this relationship in the context of Vietnam.

3. RESEARCH METHOD

3.1. Research Model

According to the theory of Te Velde (2003), FDI can affect the supply and demand of skills, leading to an increase in the wages of skilled and/or unskilled labor, thus having a positive or negative impact on wage inequality. Based on Te Velde's (2003) theoretical model of skills supply and demand, as well as the empirical research of Taylor and Driffield (2005), the author estimates the impact of FDI on wage inequality in Vietnam using the following empirical model:

$$WI_{it} = \beta_0 + \beta_1.FDI_{i,t} + \beta_j.X_{i,t} + \mu_i + \varepsilon_{it} \quad (1)$$

Equation 1 presents the effect of some variables on wage inequality, in which μ_i is a fixed effect that does not change over time, representing the specificity of each locality, and ε_{it} is an unobserved random component.

The variable representing wage inequality is WI, which is calculated as the average salary of skilled workers compared with the average salary of unskilled workers in province i and year t . According to Te Velde (2003) and Taylor and Driffield (2005), the variable WI can be calculated using the following formula:

$$WI = \frac{\text{Average salary of skilled workers}}{\text{Average salary of unskilled workers}}$$

Based on the definition provided by the General Statistics Office, in this study, the author defined skilled workers as those who have been trained at a school or a professional or technical training institution under the national education system for 3 months or more, graduated, and been granted a degree/certificate certifying that they have achieved a certain professional or technical level from elementary school up to university and postgraduate level.

Unskilled workers are those who do not have a professional or technical qualification and have not been granted a diploma/certificate of having attained a certain professional or technical level.

The variable FDI is the ratio of realized FDI to current GDP in province i and year t and represents the effect of FDI in province i and year t . Finally, X is the set of other explanatory variables. In accordance with the theory of skills supply and demand, five basic control variables are included in the equation: trade openness, level of economic development, human capital, skills scarcity, and labor training costs for businesses.

Feenstra and Hanson (1997) and Blonigen and Slaughter (2001) showed that economic openness can affect wage inequality. For developing countries, it is expected that less skilled labor will be used more than skilled labor in machining and outsourcing activities through international trade, leading to an increase in wage inequality. In this study, the variable Trade is the percentage of total trade (both imports and exports) to the GDP of province i in year t , reflecting the trade openness from a macro perspective (% of total exports + imports/GDP).

The studies of Te Velde (2003) and Taylor and Driffield (2005) used the criterion of GDP per capita to represent the level of economic development. This variable is the most commonly used proxy for economic development and growth. According to Joo, Shawl, and Makina (2022), economic growth leads to an increase in a country's wage inequality if the economic development leads to an increase in the demand for skills. On the other hand, economic growth can lead to a reduction in wage inequality if policies are employed to increase the supply of skills or establish an imperfect wage competition mechanism (policies to protect regulations, minimum wage regulations, effective wage models, etc.). The variable PGDP (Potential Gross Domestic Product) is the GDP per capita of the province i in year t at fixed 2010 prices (unit million Vietnam Dong (VND)/person).

The human capital (HC) variable in this model represents the proportion of trained labor force in province i in year t . This variable represents the supply side of skilled labor. Supply and demand for skills contribute to wage inequality. Therefore, when the supply of skilled labor increases, the gap between the wages of skilled and unskilled workers will decrease, and wage inequality will be reduced. However, high-quality localities will often attract FDI enterprises using new technologies and need to recruit skilled workers. This can increase the demand for skilled labor in those localities and increase wage inequality. Thus, human capital is expected to have a mixed effect on wage inequality.

Skills scarcity, represented as the RS variable, also impacts wage inequality. Te Velde and Morrissey (2004) used the unemployment rate of skilled workers compared with the unemployment rate of unskilled workers to represent skills scarcity. The lower the ratio, the less scarce skills become, which can push up the wages of skilled workers and lead to an increase in wage inequality.

This study adds the variable Cost of training labor for enterprises to the model. Based on Te Velde's (2003) model of relative supply and demand of skilled workers, it is conceivable that training policies in enterprises affect wage inequality because the target of such training programs can be either unskilled or skilled workers. If enterprises only provide additional training for skilled workers, wage inequality will increase. The variable labor training costs for enterprises, symbol TC, is calculated as a percentage of total business expenses for labor training in enterprises in province i and year t .

This study used provincial data from 63 provinces of Vietnam between 2010 and 2018 from the following sources: the General Statistics Office, Labor and Employment Survey, General Department of Customs, and Provincial Competitive Index (PCI) dataset.

3.2. Dealing with Endogenous Problems

Some technical defects that traditional models such as ordinary least squares (OLS), random effects model (REM), and fixed effects model (FEM) cannot solve include endogeneity of the variables in the model. The study data had a relatively short time period ($T = 8$ time periods) and a large number of observation groups ($N = 63$ provinces/cities) because the study assessed the impact of FDI on wage inequality using data from 63 provinces/cities over the period

2010–2018. For this reason, the FDI variable could be endogenous. First, FDI tends to flow to provinces with a high level of economic development. Second, some macroeconomic policies can affect economic growth and attract FDI inflows across all provinces simultaneously. Third, the FDI variable could be correlated with the uncontrolled factors in the regression model. Many unobserved macro factors, including time-invariant, time-variant, and province-specific factors, can affect the economic growth and income distribution of a province and are also related to FDI inflows into the provinces. Since economic growth and level of development affect wage inequality, the FDI variables can therefore be endogenous. Endogeneity issues may skew the estimated impact of FDI on wage inequality. Therefore, the study used generalized method of moments (GMM) estimation to handle this potential endogeneity problem.

4. EXPERIMENTAL RESULTS

Table 1 presents the estimated effects of FDI on wage inequality using the systematic GMM method.

Table 1. Estimation results of the impact of FDI on wage inequality.

Variable name	System GMM
	WI
FDI	0.005* (0.003)
lnPGDP	-0.444*** (0.156)
HC	-0.023*** (0.008)
RS	-1.362*** (0.480)
TC	0.147*** (0.044)
TRADE	-0.0002 (0.000)
Constant	1.779*** (0.541)
AR (1) test	0.001
AR (2) test	0.224
Sargan test	0.000
Hansen test	0.123
Number of observations	567
ID number	63
Number of instrument variables	37

Note: 1) * and *** show that the estimated coefficients are statistically significant at the 10% and 1% level, respectively.
 2) The value in brackets (...) is the corrected standard deviation heteroskedasticity.
 FDI: foreign direct investment; lnPGDP: GDP per capita; HC human capital; RS: skills scarcity; TC: training costs; TRADE: trade openness

First, the results of testing the impact of FDI on wage inequality when using the systematic GMM method show that the variable FDI has a positive sign and is statistically significant, which shows that FDI increases the wage disparity between skilled and unskilled workers, contributing to the exacerbation of wage inequality in Vietnam. This result is consistent with the theoretical model. This does not imply that FDI is good or bad for growth and poverty reduction in Vietnam, but it does imply that most of the benefits derived from FDI are in favor of skilled workers. This result is similar to the case of Thailand, described by [Te Velde and Morrissey \(2004\)](#), and Latin American countries ([Te Velde, 2003](#)).

Second, the lnPGDP variable is significant and has a positive effect on reducing wage inequality. Thus, economic growth contributes to reducing wage inequality in Vietnam. This implies that Vietnam's economic development helps to reduce the wage gap between skilled and unskilled workers.

Third, the HC variable has a positive effect on reducing wage inequality. This implies that when the proportion of trained workers increases, increasing the supply of skills, the wage gap between skilled and unskilled workers decreases. This result is in agreement with the theoretical analysis.

Fourth, the SC (skills scarcity) variable, calculated as the unemployment rate of skilled workers compared with the unemployment rate of unskilled workers, is significant at 1% and has a negative coefficient. Thus, when the unemployment rate of skilled workers increases compared to the unemployment rate of unskilled workers, it means that the shortage of skills has decreased, leading to a decrease in the wage growth of skilled workers compared to less skilled workers. In this case, wage inequality will diminish.

Finally, the TC (training costs) variable is significant at the 1% level and has a positive impact on wage inequality. This result means that the higher the training costs for enterprises, the greater the wage inequality. This may imply that firms devote more training costs to skilled workers than unskilled workers. [Batra and Tan \(1997\)](#) showed that training has a positive effect on productivity growth, but the effect only occurs in skilled workers, while it is insignificant for unskilled workers. In general, skilled workers are often better learners because of their higher receptivity, and they are therefore more likely to benefit from training. It may be for this reason that the cost of training workers in Vietnamese enterprises benefits skilled workers more than unskilled ones. The impact of the trade openness variable has not been confirmed in this model.

5. CONCLUSION

The main results of the econometric model applying the GMM system were as follows. First, the study showed that FDI increases wage inequality in the provinces of Vietnam. This may stem from the fact that FDI enterprises often have higher requirements for their workers' skills and discipline. Second, economic growth in Vietnam has led to a reduction in the wage gap between skilled and unskilled workers as workers benefit from economic development. Third, localities with high human capital, a well-developed education system, and a higher proportion of skilled workers will have reduced wage inequality. Fourth, when the unemployment rate of skilled workers increases compared to the unemployment rate of unskilled workers, representing a decrease in skills shortage, wage inequality will diminish. Fifth, the higher the training costs of enterprises, the more wage inequality increases, which implies that enterprises currently spend more on training skilled workers than unskilled workers.

Based on the above research results, some policy implications can be suggested to reduce the negative impact of FDI on wage inequality in Vietnam. Combining FDI with improving the quality of human resources will contribute to reducing wage inequality in Vietnam. As analyzed from a theoretical perspective, the investment of FDI enterprises is often capital-intensive and requires higher skills than local enterprises, requiring more skilled workers than the average level of labor in the host country. As a result, FDI growth leads to an increased demand for skilled labor. This impact can only be mitigated when the local education system provides more skilled and suitable workers to FDI enterprises, who can demand higher salaries when recruited. However, the starting point of the qualifications and skills of Vietnamese workers is very low, and, according to the assessment of FDI enterprises in recent years, there have not been many significant improvements. For this reason, it is important to work to develop the labor market and build a qualified workforce to reduce the negative impact of FDI on wage inequality.

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