



Research article

Foreign direct investment and employments in Asia Pacific nations: The moderating role of labor quality

Hoang Tien Nguyen^a, Ai Ngoc Nhan Le^a, Hoi Vu Le^b, Khoa Dang Duong^{c,*}^a Faculty of Finance and Banking, Van Lang University, Ho Chi Minh City, Viet Nam^b Accounting Department, State Bank of Vietnam, Phan Thiet City, Binh Thuan Province, Viet Nam^c Faculty of Finance and Banking, Ton Duc Thang University, Ho Chi Minh City, Viet Nam

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ABSTRACT

This study analyzes the impact of Foreign Direct Investment and labor quality on employment in 29 Asia-Pacific nations from 1990 to 2020. We employ the Dynamic System Generalized Method of Moments to estimate the results. This study finds that a ten percent increase in Foreign Direct Investment creates an additional 0.890 % in employment, and a percent increase in labor quality increases employment by 0.0021 %. Our study also figures a moderating role of labor quality and FDI on employment in Asia Pacific countries. Our findings are robust before and after the recent financial crisis and alternative regression method. Finally, the findings are robust even if we employ an alternative estimation method. Our results are consistent with the Traditional FDI, the Neo-classical, and Resource-Based View theories. Our research generates practical policy implications to develop employment sustainably in Asia-Pacific nations.

1. Introduction

Developing employment sustainably is a global concern because of the following reasons. Developing economies play a crucial role in the overall global economic landscape. Sustainable employment in these regions contributes to increased consumer spending, demand for goods and services, and economic growth. A vibrant and stable economy in developing countries can have positive spill-over effects on global trade, investment, and financial markets. Moreover, sustainable employment practices attract foreign direct investment (FDI), which is crucial for economic development. A stable employment environment enhances the attractiveness of developing economies as investment destinations, leading to positive economic outcomes on a global scale. Addressing these issues requires collaborative efforts and a commitment to inclusive and sustainable development practices on a global scale. Finally, developing economies often undergo rapid industrialization and urbanization, which can lead to increased resource consumption and environmental degradation. Promoting sustainable employment involves adopting eco-friendly practices and incorporating environmental considerations into development strategies. This is crucial for achieving global sustainability goals and mitigating the impact of human activities on the environment.

This study focuses on the Asia-Pacific region for several reasons. First, the Asia-Pacific region holds considerable importance on a global scale, accounting for approximately 34 % of global GDP in 2020. It encompasses some of the largest and fastest-growing

* Corresponding author. Faculty of Finance and Banking, Ton Duc Thang University, No. 19 Nguyen Huu Tho Street, Tan Phong Ward, District 7, Ho Chi Minh City, Viet Nam.

E-mail addresses: hoang.nguyentien@vlu.edu.vn (H.T. Nguyen), ai.lnn@vlu.edu.vn (A.N.N. Le), hoi.levu@sbv.gov.vn (H.V. Le), duongdangkhoa@tdtu.edu.vn (K.D. Duong).

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economies, including China, India, and Southeast Asia. China, for instance, recorded a GDP of around \$16.64 trillion in 2020, making it the region's largest economy and a substantial contributor to global GDP. Second, according to the United Nations Conference on Trade and Development (UNCTAD), the Asia-Pacific region has become a significant recipient of foreign direct investment (FDI) in recent years. The region has accounted for nearly 40 % of global FDI inflows. This statistic highlights the region's attractiveness to foreign investors and its significant role in attracting international capital. Third, the Asia-Pacific region has significantly developed a skilled labor force. Many countries in the region have invested heavily in education and vocational training, increasing the number of skilled workers. Besides, the recent COVID-19 pandemic can lead to job losses and increased unemployment rates due to social lockdowns and business disruptions. Many countries in the Asia Pacific region are highly dependent on exports and FDI capital, making them vulnerable to economic downturns in their trading partners. Finally, Asia Pacific nations face demographic challenges, including an aging population, declining birth rates, and a shrinking workforce. Reducing unemployment can help address these challenges by increasing the size of the labor force and ensuring that the population is engaged in productive activities.

Our study significantly extends the growing literature on sustainable development goals in the following ways. First, we chose to employ the dynamic system Generalized Method of Moments (GMM) in line with the studies conducted by Duong et al. [1], Le et al. [2], and Xu et al. [3]. This decision was based on several advantages of GMM compared to other estimation techniques. GMM is generally considered more efficient than Ordinary Least Squares (OLS) and Fixed Effects Models (FEM). By utilizing all available moment conditions, GMM helps to reduce bias in parameter estimation. Moreover, GMM is more likely to yield consistent estimates than OLS and FEM when the number of instruments is proportional to the sample size. Additionally, GMM offers greater flexibility in model estimation than OLS and FEM, as it can accommodate various specifications, including models with autocorrelation and heteroscedasticity.

Second, prior studies report that FDI positively impacts local employment [4]. Becker [5], Rozen-Bakher [6], and Somani [7] found that a higher education environment almost doubles the probability of paid employment. However, only a few studies examine the impact of FDI and labor quality on employment. As a result, this study closes the literature gap by examining the moderating role of labor quality on the relationship between FDI and Employment.

Third, following Rong et al. [4], we estimate the impact of FDI on Employment with labor quality instead of market flexibility because education is a significant factor in employment opportunities [7]. Fourth, while Rong et al. [4] study in China, our study uses a database of Asia Pacific to investigate the impact of FDI when the market is still in the development stage. We will have a more holistic view instead of just one country. Finally, our study performs the robustness test to check whether the primary findings are robust before and after the financial crisis and uses an alternative regression method.

This study generates the following striking results. First, our study suggests that FDI positively affects employment during labor quality and vice versa. These results are consistent with Rong et al. [4], Hou et al. [8], and Nguyen et al. [9], supporting the traditional FDI theory and the neo-classical theory. In addition, our findings indicate a moderating role of labor quality in the relationship between FDI and employment. Finally, the robustness tests indicate that the moderating role remains robust after the 2008 financial crisis and the alternative regression method.

The remainder of the research is described below. Section 2 is a theoretical background; Section 3 is about data and methodology; Section 4 provides results. Section 5 is the discussion, and Section 6 is the conclusion.

2. Literature review

2.1. Background theories

Neo-classical theory shows that FDI is believed to bring significant benefits to host economies for the following reasons. Firstly, foreign firms often possess advanced technologies, research and development capabilities, and technical expertise [9]. When establishing operations in host countries, they can transfer these technologies and knowledge to domestic firms, improving their productivity, efficiency, and competitiveness. Thus, attracting FDI projects increases employment opportunities for the workforce in the host countries. In addition, foreign firms often introduce modern management practices, organizational structures, and operational processes. By adopting these practices, domestic firms can improve their management efficiency, enhance product quality, and streamline operations. The increasing productivity, higher wages, and better working conditions ultimately encourage an expansion in employment.

In contrast to the neo-classical theory, the dependency theory argues that FDI can perpetuate economic exploitation and reinforce dependence on foreign entities [9]. It suggests that multinational corporations (MNCs) often extract profits from host countries without adequately reinvesting in the local economy. Thus, they narrowly focus on job creation and dependence on foreign capital and technologies. Besides, the dependency theory posits that FDI can contribute to widening income inequalities within the host country. MNCs may offer low-skilled and low-wage employment opportunities while retaining high-skilled and high-paying jobs in their home countries. This trend leads to a polarization of the labor market and a concentration of wealth and power within foreign firms, further exacerbating income disparities.

The human capital theory suggests that a well-educated and skilled workforce is essential for economic development [6]. Countries prioritizing investments in education and training have higher productivity, innovation, and competitiveness levels. This, in turn, can attract new businesses and investment, leading to job creation and economic growth. Moreover, societies can create new job opportunities by investing in human capital development. Individuals acquire the necessary skills and qualifications and become more employable in various industries and sectors. Therefore, higher labor quality can lead to increased labor force participation and reduced unemployment rates.

Additionally, the Resource-Based View (RBV) theory posits that each economic entity (be it a firm or a nation) possesses unique characteristics and competitive advantages [10]. Leveraging internal strengths (including labor force, machinery, and equipment) enhances operational efficiency and competitive advantage. Nowadays, this perspective is further extended by developing new potential capabilities through learning, acquiring, and accumulating skills to create competitive advantage, with the labor force being one of such resources [11]. Therefore, according to the Resource-Based View, enhancing the capabilities of the labor force is crucial for increasing efficiency and competitiveness [12].

2.2. The nexus between FDI and employment

Prior studies report the mixed relationship between FDI and employment. Rong et al. [4] and Lee et al. [13] found that FDI inflows positively create employment. Rong et al. [4] explained that FDI could directly increase employment creation and facilitate the transfer and re-employment of domestic labor across regions or industries. FDI inflows can directly contribute to job creation in the host country. When foreign companies invest in the local economy, they establish new operations, such as factories, offices, or service centers. These investments require a workforce, leading to the creation of direct employment opportunities. Foreign companies hire local workers to staff their operations, increasing job prospects for the domestic labor force. Furthermore, FDI can facilitate domestic labor's transfer and re-employment across regions or industries. When foreign companies invest in a specific sector, they bring in new technologies, management practices, and market knowledge. This infusion of expertise can lead to the upgrading of local industries and the development of new sectors. As a result, there may be a demand for skilled workers in these emerging areas. Besides, Lee et al. [13] found that FDI can play a role in facilitating communication and collaboration among diverse ethnic groups, which, in turn, can contribute to increased employment opportunities. When foreign companies invest in a host country, they often bring diverse teams and expertise from different cultural backgrounds. This multicultural environment can promote understanding, tolerance, and collaboration among employees from various ethnic groups. FDI can catalyze intercultural communication and cooperation, fostering a more inclusive and harmonious work environment. The results of Rong et al. [4] and Lee et al. [13] are consistent with the neo-classical theory.

Conversely, Sokhanvar and Jenkins [14] found that FDI inflows negatively impact economic growth due to investment inefficiency, resulting in a low real economic rate of return on assets. When the government guarantees a high financial return to foreign investors, but the actual economic recovery is low, these investments can hinder economic growth. This is because the financial return provided to foreign investors ends up being an economic cost that outweighs the economic benefits generated by the investment.

Jude and Silaghi [15] found that FDI can affect employment negatively and positively. Foreign affiliates, often equipped with advanced technologies and efficient production methods, may introduce capital-intensive technologies and labor-saving techniques in the host country. Besides, foreign affiliates' adoption of capital-intensive technologies and labor-saving practices may give them competitive advantages against domestic firms. Domestic firms may reduce their labor to compete with foreign affiliates in terms of efficiency and cost-effectiveness. However, FDI can positively affect employment when domestic firms closely linked to foreign affiliates through supply chains or subcontracting arrangements may experience technology transfer, skill enhancement, or increased business opportunities, leading to job creation.

Based on the results of Rong et al. [4], Lee et al. [13], and neo-classical theory, we propose the following hypothesis.

H1. FDI positively impacts employment in the Asia Pacific nations.

2.3. The nexus between labor quality and employment

According to the classical economic theory, human capital is limited in the long term, and the long-run aggregate supply is fixed and constant. However, the human capital theory states that human capital can change and improve; therefore, investing in education and training skills will improve labor productivity and increase new jobs [5,6]. They found that a well-educated and skilled workforce tends to be more productive. Employees with higher levels of education and specialized skills can perform tasks more efficiently and effectively. This increased productivity can lead to higher demand for labor and, consequently, more excellent employment opportunities. Besides, as technologies evolve, the need for specific skills also changes. A well-educated and adaptable workforce is likelier to keep pace with technological advancements and readily acquire new skills to meet evolving market demands. This flexibility and ability to adapt to changing labor market requirements improve employment prospects. The results of Becker [5] and Rozen-Bakher [6] are consistent with the human capital theory.

However, the traditional FDI theory states that the motivation of firms to expand production overseas comprises a labor force with low cost and high market demand. Hou et al. [8] state that labor quality is closely related to labor cost (or the wage of labor), and a higher labor quality indicates a higher labor cost. When the labor wage is relatively low, labor quality attracts more employment because it attracts more MNCs to invest in their country. Neo-classical theory suggests that MNCs choose to locate where their profits are maximized [8,16]. However, if the labor wage exceeds the marginal point, it will reduce employment. Hou et al. [8] also stated that, in the 1990s, China attracted more FDI from MNCs and increased employment because of a large labor force with low labor costs. However, in the 2000s, China's labor costs increased. Therefore, MNCs transfer their production lines to lower-cost countries such as Asian and Latin American developing countries. Therefore, one of the reasons MNCs invest in a country is the trade-off between labor quality and labor cost.

Based on the analysis above and the traditional FDI theory, we propose the following hypothesis.

H2. Labor quality has a negative impact on employment in the Asia Pacific nations

2.4. The moderating role of labor quality on the relationship between FDI and employment

FDI can play a constructive role in promoting employment, benefiting both high-skilled and low-skilled labor. However, the effect is often more significant for high-skilled labor [4]. Firstly, FDI can significantly positively impact employment for high-skilled workers. When foreign companies invest in a host country, they often bring advanced technologies, managerial expertise, and specialized knowledge. This creates a demand for high-skilled workers with the necessary qualifications and expertise to work with these technologies and contribute to the operations of foreign firms. Secondly, FDI can also create employment opportunities for low-skilled workers because they are operating in labor-intensive sectors in the Asia Pacific region. While the demand for low-skilled labor may not be as high as that for high-skilled labor, FDI can still contribute to job creation and provide opportunities for individuals with lower levels of education and skills. The above arguments are consistent with the neo-classical theory.

Zhuang et al. [17] and Sharma and Cardenas [18] argue that the labor force attracts FDI based on its competencies and skills. The RBV theory suggests that foreign investors are more likely to invest in countries that offer a workforce with the necessary skills and competencies to support their operations effectively. This could include technical expertise, specialized knowledge, language proficiency, managerial capabilities, and other relevant skills. Focusing on developing a skilled labor force can enhance the opportunities for attracting FDI. Therefore, RBV theory implies that emerging nations can position themselves as favorable investment destinations, tap into the potential benefits of foreign investments, create jobs, and develop local economies. The results of Zhuang et al. [17] and Sharma and Cardenas [18] are consistent with the neo-classical theory.

Conversely, Nguyen et al. [9] found that expanding import and export trade can lead to an increase in unskilled labor and a decrease in skilled labor. Following the classical theory and the traditional FDI theory, foreign firms may seek countries with lower labor costs to maximize cost efficiencies in their production processes [8]. Thus, they prefer hiring unskilled labor at lower wages than skilled labor. The availability of a cheap labor force in less developed countries can be attractive for foreign firms as it can help reduce production costs and increase competitiveness in international markets. Besides, the increase in import and export trade, driven by the demand for goods and services, may not necessarily lead to a proportional increase in skilled labor demand. Foreign firms often prioritize cost-saving measures, which may lower the need for skilled labor or substitute skilled workers with automation or technology. This can lead to decreased professional employment or slower growth than unskilled labor. This result is consistent with the dependency theory.

Based on the analysis of the results of previous studies, we propose the following hypothesis.

H3. Labor Quality moderates the relationship between FDI and employment in the Asia Pacific nations.

3. Data and methodology

3.1. Data source

We collect data for 29 Asia-Pacific countries from the World Bank, the International Labor Organization, and the International Monetary Fund from 1990 through 2020. We examine the sample data from 1990 to 2020 because the sampling period is long enough to include recent economic crises, such as the Asian economic crisis in 1997 and the subprime financial crisis in 2008. We follow Duong et al. [19] to winsorize our sample at the 5 % and 95 % levels to overcome the outlier issues. The final sample data is an unbalanced panel with 796 annual observations from 29 Asia-Pacific countries from 1990 to 2020.

Our study uses several proxies, such as Foreign Direct Investment (FDI), labor quality (LQ), Inflation (INF), Gross Capital Formation (GCF), GDP, Trade Openness (TRADE), and Government Spending (GOV). It is clearly described in [Appendix A](#).

3.2. Measurement employment

In line with previous studies [4,6], we employ the employment ratio to measure employment variable. The employment is calculated as follows:

$$\text{Employ}_{i,t} = \frac{\text{Employment}_{i,t}}{\text{Population}_{i,t}}$$

Where i , t refers to country i at time t . The value of Employ ranges from 0 to 100 %, indicating low and high employment in a country.

3.3. Measurement FDI

We follow Rizvi and Nishat [20] to measure FDI as the percentage of FDI inflow on GDP. The equation to define FDI is as follows:

$$\text{FDI}_{i,t} = \frac{\text{FDI inflow}_{i,t}}{\text{GDP}_{i,t}}$$

Where i , t refers to country i at time t . The value of FDI ranges from 0 to 100 %, which indicates low and high FDI inflow in a country.

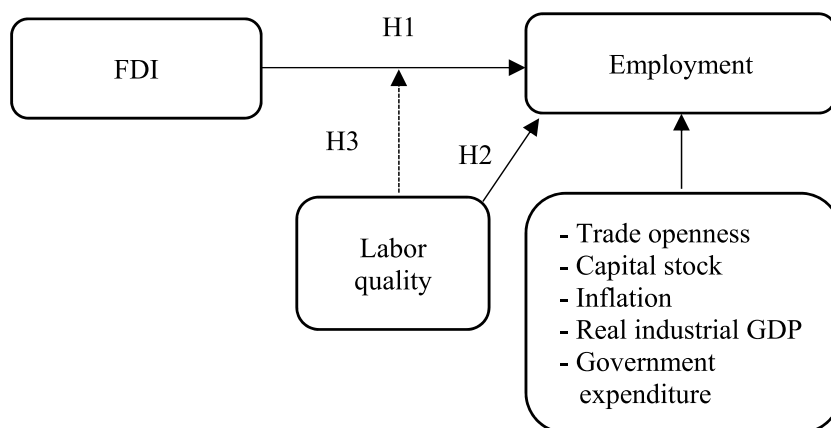


Fig. 1. Theoretical model.

3.4. Measurement labor quality

There are many ways to measure labor quality in academics. Some studies use the employment ratio with intermediate education to measure labor quality [8,17] or tertiary school enrolment [6]. This study uses the labor productivity from the International Labour Organization to measure labor quality. Labor productivity represents the total output produced per labor. This index provides general information about the efficiency and quality of human capital and the increased productivity that can lead to a higher demand for labor [6]. Prior studies employing employment with intermediate and tertiary school enrollment are from the 2000s, and they have more missing values than the labor productivity index from the International Labour Organization. Moreover, they are sometimes unavailable in some countries. Therefore, we use labor productivity data from the International Labour Organization to measure labor quality. Moreover, to scale the value of labor quality, we take the natural logarithm of the labor productivity variable.

3.5. Empirical models construction

Following prior empirical research by Rong et al. [4], we developed models (1), (2), and (3) to assess the moderating role of labor quality. Assume the interaction coefficient between FDI and labor quality ($FDI \cdot LQ$) is substantial. In such a situation, the RBV and neo-classical theories conjecture that labor quality acts as a moderating variable between FDI and employment. The fundamental independent variables, such as FDI, labor quality, and employment, are decentralized. On the other hand, some control variables are included in the model to investigate impacts on employment, such as:

Trade openness: The positive impact of trade openness on trade flows for the economy is well acknowledged [21]. Several empirical studies have argued that trade liberalization would create jobs [22]. However, others have shown that trade liberalization increases unemployment [23].

Government expenditure: Government expenditure is one of the government's intervention strategies to offset the failed market and ensure continued economic growth [24]. Economic growth includes national income, poverty reduction, and unemployment as new jobs are created or promoted. Atems [25] argues that efficient government spending periods can positively affect employment. On the contrary, Connolly and Li [26] have found that specific government spending can negatively and indirectly affect the employment rate beyond a certain point. Government spending can affect the employment rate depending on the time and type of expenditure. Karras [27] found adverse employment effects of government spending shocks in certain other nations. Karras [27] investigates the impact of government spending on employment and productivity. Suppose government spending does not affect the employment rate. In that case, no data can be cited or quoted in the data range, so it is safe to assume that the percentage is small and can be skipped.

Capital stock: Capital stock is a stock that provides services. This stock has its law of motion, with additions and deductions. On the one hand, capital formation is a clear-cut concept that is well-known and easily identifiable as a gross investment. Findings conclude that most BRI countries are developing. It is essential to attract foreign direct investments and increase the gross capital formation in the countries to bring economic growth and stability. It will boost the countries' economic activities, increasing employment opportunities, development, and change [28]. Despite facing stagnant economic growth and unemployment, Taraki and Arslan [29] emphasize that gross capital formation can create job opportunities, improving human capital and production. The study revealed that gross capital formation positively influences unemployment and economic growth. Thus, gross capital formation catalyzes employment and economic development [30].

Inflation: According to Friedman [31], inflation is a steady increase in the overall price level. Most previous research has negatively impacted the relationship between inflation and employment. Škare and Caporale [32]Škare and Caporale (2014) state that inflation positively impacts employment and productivity growth in the short term but negatively impacts the long-term periods. It supports the theory that inflation has a short-term positive impact on careers (Phillips curve). In the short term, increasing labor productivity positively affects production growth. In addition, they found a long-term negative relationship between inflation and employment. As

Table 1
Summary statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max	Median
Employment	1020	62.487	9.949	39.200	85.370	60.915
FDI	1127	3.453	4.779	-37.173	43.912	2.098
LQ	1020	9.271	1.304	5.975	11.740	9.029
GCF	968	25.802	8.063	5.253	69.510	24.554
GDP	1044	27.158	11.816	4.541	74.113	27.125
INF	1149	15.056	192.458	-22.091	6261.240	3.937
Trade	1059	85.654	62.014	0.167	437.327	70.652
GOV	937	16.967	14.791	3.460	147.733	14.022

Note: This table highlights the summary statistics of key variables. The sample includes annual observations from 29 Asia-Pacific nations from 1990 through 2020. All variable definitions are reported in [Appendix A](#). Source: World Bank, IFM, International Labor Organization, and author's calculations

inflation uncertainty increases, foreign firms become more risk-averse.

GDP: Anyanwu [33] reports that real GDP has a positive effect, showing that real GDP growth has led to higher jobs. However, the employment problem of companies is based on something other than GDP but due to autonomous activities. In recent years, autonomy has become more evident in employment growth. Employment is still growing despite low or moderate GDP growth. It has drastically changed the decoupling of GDP and career [34]. Besides, in some countries, the labor market is mature, and many foreign companies seek qualified workers, increasing demand for recruitment. If the labor force increases, the need for workers will be replenished. As a result, employment growth is most affected by the available labor force.

We construct equation (1) and equation (2) to test hypotheses 1 and 2 to determine the impact of FDI and labor quality on employment. In addition, it is important to employ equation (3) to test hypothesis 3 further. [Fig. 1](#) highlights the theoretical model of our study.

$$\text{Employment}_{it} = \alpha_0 + \theta_0 \text{Employ}_{i(t-1)} + \rho_0 \text{FDI}_{it} + \beta_0 C_{it} + \mu_i + \gamma_t + \varepsilon_{it} \tag{1}$$

$$\text{Employment}_{it} = \alpha_1 + \theta_1 \text{Employ}_{i(t-1)} + \rho_1 \text{FDI}_{it} + \delta_1 \text{LQ}_{it} + \beta_1 C_{it} + \mu_i + \gamma_t + \varepsilon_{it} \tag{2}$$

$$\text{Employment}_{it} = \alpha_2 + \theta_2 \text{Employ}_{i(t-1)} + \rho_2 \text{FDI}_{it} + \delta_2 \text{LQ}_{it} + \varphi_{it} \text{FDI} \bullet \text{LQ}_{it} + \beta_2 C_{it} + \mu_i + \gamma_t + \varepsilon_{it} \tag{3}$$

Where *i*, *t* denote country *i* at time *t*. In the (1)–(3) equation, employment is the proportion of a country's employed population. FDI is the ratio of net FDI inflows to GDP, and *C_{it}* indicates a set of control variables. These mainly include trade openness (TRADE), Inflation (INF), Government expenditure (GOV), GDP, and capital stock (GCF). All variables are defined in [Appendix A.appsec1](#)

3.6. Estimation methods

Our study utilizes panel data, which is widely used in social and economic research, including observations of subjects at different time points [35]. The paper applies the estimation method of Pooled Ordinary Least Square (OLS), Fixed Effects Model (FEM), and Random Effects Model (REM). The OLS stacks the data and does not discriminate for specific countries in the data, while FEM and REM discriminate for each country. However, the difference between FEM and REM regression is that handling the model's error has unobservable factors that differ between the objects but do not change over time. The FEM removes these factors, while the REM method does otherwise [35]. Therefore, the Hausman test was employed to test whether FEM or REM is suitable for each model, while Breusch-Pagan, and some tests were used to choose OLS, FEM, or REM [19]. However, the Pool OLS method often has heteroskedasticity, auto-correlation, and endogeneity problems. In addition, Duong et al. [36] suggest that FEM and REM carry inefficiency terms and heterogeneity, drastically affecting outcomes. Therefore, this study will implement the System Generalized moment method (Sys-GMM) to overcome the endogeneity issue [37] because it is more efficient than Dif-GMM [38]. Moreover, this study chose the two-step estimator because it is more efficient than the single-step estimator [[19,38,39]].

4. Empirical results

4.1. Descriptive statistics

[Table 1](#) shows the descriptive statistics of the study. The employment is around 62.487 with a standard deviation of 9.949. Foreign direct investment ranges from -37.173 to 43.912, with a mean of 3.453 and a standard deviation of about 4.779. This value of FDI is consistent with Rong et al. [4]. Labor quality varies from 5.975 to 11.740, with an average value of 9.271. The table also shows descriptive statistics for other variables such as inflation, trade openness, government expenditures, GDP, and capital stock.

4.2. Pearson correlation matrix

[Table 2](#) presents the research data sample by the correlation matrix. The data shows that the correlation coefficient between TRADE and FDI is around 0.556. However, all correlation coefficients are acceptable with no perfect relationships. So, multicollinearity is not a

Table 2

Table 2 reports the Pearson correlation coefficients of all variables. The sample includes annual observations from 29 Asia-Pacific nations from 1990 through 2020. All variable definitions are reported in Appendix A.

	FDI	LP	GCF	Industry	INF	Trade	CTCP
FDI	1						
LQ	0.092*** (0.004)	1					
GCF	0.155*** (<0.001)	0.011 (0.740)	1				
GDP	-0.001 (0.965)	0.204*** (<0.001)	0.192*** (<0.001)	1			
INF	-0.032 (0.285)	-0.057* (0.071)	-0.034 (0.289)	0.067*** (0.032)	1		
Trade	0.556*** (<0.001)	0.161*** (<0.001)	0.091*** (0.005)	0.032 (0.313)	-0.032 (0.300)	1	
GOV	-0.034 (0.308)	0.071** (0.038)	0.077** (0.018)	-0.289*** (<0.001)	-0.026 (0.426)	0.107*** (0.001)	1

Notes: The symbols ***, **, * represent the statistical significance at 1 %, 5 %, and 10 %, respectively. P-values are in parentheses. Source: World Bank, IFM, International Labor Organization, and author’s calculations.

Table 3

This table reports the estimation results from REM methods. The sample includes 796 annual observations from 29 Asia-Pacific nations from 1990 through 2020. All variable definitions are reported in Appendix A.

Independent variables	Dependent variable: Employment	
	Model 1	Model 2
Employment _{t-1}	0.938*** (<0.001)	0.933*** (<0.001)
FDI	0.034*** (<0.001)	0.036*** (<0.001)
LQ		-0.486*** (<0.001)
GCF	-0.001 (0.868)	0.003 (0.588)
GDP	-0.007 (0.522)	-0.008 (0.453)
INF	0.000 (0.365)	-0.001 (0.182)
Trade	0.003 (0.154)	0.004** (0.031)
GOV	-0.029*** (0.002)	-0.028*** (0.002)
Constant	4.127*** (<0.001)	8.776*** (<0.001)
N	806	806
Prob > F	<0.001	<0.001
Prob(Hausman)	0.001	<0.001
Prob(Modified Wald)	<0.001	<0.001
Prob(Wooldridge)	<0.001	<0.001

Notes: The symbols ***, **, and * denote the significant level at 1 %, 5 %, and 10 %, respectively. P-values are in parentheses. Source: World Bank, IFM, International Labor Organization, and author’s calculations.

Table 4

This table shows the endogeneity test using the Durbin-Wu-Hausman test.

The residual of independent variables	Statistical significance
Employment _{t-1}	0.000***
FDI	0.549
LQ	0.000***
GCF	0.703
GDP	0.686
INF	0.738
Trade	0.017***
GOV	0.014***

Notes: The symbols ***, **, and * denote the significant level at 1 %, 5 %, and 10 %, respectively. Source: World Bank, IFM, International Labor Organization, and author’s calculations.

significant problem in our study [36].

4.3. Impact of FDI and labor quality on employment

Table 3 reports the regression results of equations (1) and (2). We adopt the Fixed Effects Model (FEM) after using the Hausman test since FEM fits all selection techniques’ requirements. However, the Wald and Wooldridge tests also show that the model has heteroskedasticity and autocorrelation. On the other hand, we also follow Duong et al. [36] in employing the Durbin-Wu-Hausman test for the endogeneity concern. As shown in Table 4, the coefficients of lagged employment, LQ, Trade, and GOV are statistically significant. Therefore, the endogeneity problem exists in this model [40]. Thus, we employ the system GMM to estimate the results to overcome endogenous issues.

Table 5

This table reports the estimations from GMM. The sample includes 796 annual observations from 29 Asia-Pacific nations from 1990 through 2020. All variable definitions are reported in [Appendix A](#).

Independent variables	Dependent variable: Employment		
	Model 1	Model 2	Model 3
Employment _{t-1}	0.973*** (<0.001)	0.888*** (<0.001)	0.980*** (<0.001)
FDI	0.043*** (<0.001)	0.089*** (0.001)	0.171*** (0.006)
LQ		-0.210** (0.026)	0.074 (0.289)
FDI*LQ			-0.013** (0.043)
GCF	-0.011** (0.044)	-0.007 (0.394)	-0.007 (0.113)
GDP	0.001 (0.697)	0.006 (0.291)	0.003 (0.214)
INF	-0.002*** (<0.001)	-0.002*** (<0.001)	-0.001 (0.302)
Trade	0.000 (0.318)	-0.001 (0.424)	0.000 (0.710)
GOV	-0.003 (0.477)	-0.007 (0.215)	-0.004 (0.394)
Constant	1.798 (0.107)	8.922*** (0.003)	0.528 (0.722)
N	796	796	796
Number of instrument	120	120	233
Prob(Hansen test)	0.990	0.990	0.990
Prob(AR2 test)	0.109	0.147	0.103

Notes: The symbols ***, **, and * denote significant levels of 1 %, 5 %, and 10 %, respectively. *P*-values are in parentheses.

Source: World Bank, IFM, International Labor Organization, and author's calculations.

Table 5 shows the result from GMM estimations for equations from (1) to (3). **Table 5** reports that the *P*-value of the Hansen test and AR(2) test are higher than 10 %. Therefore, the instrumental variables are appropriate for these models.

5. Discussion

Table 5 highlights exciting results related to the impacts of FDI on Employment in Asia-Pacific countries for equations from (1) to (3) based on the theoretical model in [Fig. 1](#). We figure out the significant positive effect of FDI on employment in all models. As given in models 1, 2, and 3, the coefficients of FDI are 0.043, 0.089, and 0.171, respectively, explaining approximately 0.430 %, 0.890 %, and 1.710 % of employment increase in those countries with a ten percent increase in FDI. Our findings are consistent with [Rong et al. \[4\]](#), [Lee et al. \[13\]](#), and the neo-classical theory. When foreign companies invest in the host country, they establish new operations such as factories, offices, or service centers. These investments require a workforce, leading to the direct creation of employment opportunities. Foreign companies often hire local workers to fill these positions, increasing job prospects for the domestic labor force. Overall, our result supports hypothesis 1.

Table 5 reports a negative relationship between labor quality and employment in Asia Pacific nations. As given in model 2, a one percentage increase in labor quality generates a deduction of 0.0021 % employment. Our findings support the view that foreign firms are attracted by countries with relatively cheap labor costs, implying lower labor quality to reduce costs and ensure operations [\[4\]](#) and consistent with the view of [Hou et al. \[8\]](#) that supports the traditional FDI theory and reports MNCs to invest in countries to have large labor force with low labor cost to maximize its profit. On the other hand, our findings do not support [\[5,6\]](#) and the human capital theory. Overall, our finding supports hypothesis 2.

Furthermore, **Table 5** also reports that the interaction between labor quality and FDI negatively affects employment, implying that labor quality moderates the relationship between FDI and employment. As given in model 3, the interaction term of LQ on the relationship between FDI and Employment is statistically significant and supports hypothesis 3. The partial effect of FDI on Employment under the interaction of LQ is:

$$\frac{\Delta \text{EMPLOYMENT}}{\Delta \text{FDI}} = 0.171 - 0.013 * \text{LQ}$$

The coefficient of LQ*FDI is lower than zero, indicating that the interaction term of FDI and LQ will decrease the positive effect of FDI on employment. Specifically, when other factors are constant, LQ is at average value, and the impact of FDI on Employment is "0.171-0.013*9.271 = 0.050". This result shows that labor quality in Asia Pacific nations, which affects the relationship between FDI and employment, will decrease the positive effect of FDI on employment. This result shows that foreign firms are attracted by countries with relatively cheap labor costs, implying lower labor quality to reduce costs and ensure operations, especially after the crisis [\[4\]](#). Our results are consistent with those of [Hou et al. \[8\]](#) and [Nguyen et al. \[9\]](#). They found that MNCs find the appropriate competencies and skills of the labor force to maximize their profit. Countries that can offer a workforce with the requisite skills and competencies are more likely to attract foreign investors and increase employment. These skills encompass technical expertise, specialized knowledge, language proficiency, managerial capabilities, and other relevant proficiencies. By prioritizing the development of a requisite skills force in line with the needs of foreign investors, emerging nations can enhance their prospects of attracting FDI. Consequently, they position themselves as favorable investment destinations, capable of leveraging the potential benefits that foreign investment brings, such as job creation and economic growth [\[8\]](#). Overall, our finding supports hypothesis 3.

Table 6

This table represents the robustness of the GMM regression results investigating the determinants of employment before and after the financial crisis of 2008. All variable definitions are reported in [Appendix A](#).

Independent variables	Dependent variable: Employment					
	Before Crisis			After Crisis		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Employment _{t-1}	0.956*** (<0.001)	0.879*** (<0.001)	0.941*** (<0.001)	0.985*** (<0.001)	0.995*** (<0.001)	0.986*** (<0.001)
FDI	0.046*** (<0.001)	0.137*** (<0.001)	0.341*** (0.002)	0.033*** (<0.001)	0.036*** (<0.001)	0.162*** (<0.001)
LQ		-0.261** (0.028)	-0.048 (0.554)		0.070 (0.212)	0.145*** (0.006)
FDI*LQ			-0.028*** (0.007)			-0.014*** (<0.001)
GCF	-0.009 (0.150)	-0.003 (0.691)	-0.013** (0.017)	-0.007 (0.191)	0.001 (0.813)	0.002 (0.476)
GDP	0.002 (0.311)	0.005 (0.197)	-0.002 (0.736)	0.008 (0.132)	0.005** (0.029)	0.004* (0.076)
INF	-0.003*** (<0.001)	-0.002*** (<0.001)	-0.003*** (<0.001)	0.049*** (<0.001)	0.031*** (<0.001)	0.041*** (<0.001)
Trade	0.000 (0.675)	-0.004*** (<0.001)	0.000 (0.853)	0.000 (0.775)	0.000 (0.763)	0.001 (0.237)
GOV	-0.006 (0.518)	-0.011 (0.350)	-0.016 (0.114)	-0.002 (0.567)	-0.002 (0.373)	-0.003 (0.169)
Constant	2.841** (0.012)	9.913*** (0.006)	4.564*** (0.001)	0.484 (0.674)	-0.900 (0.500)	-1.122 (0.364)
N	434	434	434	362	362	362
Number of instrument	68	69	129	59	113	113
Prob(Hansen test)	0.990	0.990	0.990	0.997	0.990	0.990
Prob(AR2 test)	0.410	0.673	0.460	0.945	0.808	0.926

Notes: The symbols ***, **, and * denote significant levels of 1 %, 5 %, and 10 %, respectively. *P*-values are in parentheses.

Source: World Bank, IFM, International Labor Organization, and author's calculations.

5.1. Robustness test

5.1.1. Alternative sample before and after the financial crisis

Rozen-Bakher [6] argues that the labor market was affected by an economic crisis. The impact on the employment rate in Asia varied depending on the country. However, in general, many countries in the region experienced rising unemployment rates following the crisis. In countries heavily reliant on exports, such as Japan and South Korea, the decline in global demand resulting from the financial crisis led to decreased production and increased unemployment. For example, South Korea's unemployment rate rose from 3.2 % in 2007 to 3.8 % in 2008 and 3.9 % in 2009. In Japan, the unemployment rate rose from 3.8 % in 2007 to 5.1 % in 2009. However, in other countries such as China and India, which had relatively insulated financial systems, the impact of the crisis on the unemployment rate was less severe. In China, the unemployment rate remained relatively stable at around 4 % in the years following the crisis. In India, the unemployment rate continued to decline despite the crisis. Therefore, it is worth testing whether our primary findings are robust before and after the recent financial crisis.

Table 6 reports the robustness test of GMM regression before and after the financial crisis. In this table, only labor quality has a mixed effect on employment before and after the financial crisis. Table 6 indicates that higher labor quality led to lower employment rates before the financial crisis. Before a financial crisis, businesses may become cautious about making long-term investments and commitments, including hiring highly skilled workers. Economic uncertainty can lead companies to adopt a wait-and-see approach, delaying expansion plans and workforce investments. This hesitation can result in a slowdown in hiring, even if a pool of skilled labor is available. However, Table 6 reports that higher labor quality empowers the employment rate after the financial crisis. Skilled workers are more productive and efficient, contributing to increased output and economic productivity. In the aftermath of a financial crisis, businesses may prioritize efficiency and cost-effectiveness to recover, leading them to hire skilled workers who can help optimize operations. As productivity rises, companies may expand their production and services, creating more employment opportunities. These findings after the financial crisis are consistent with Zhuang et al. [17] and Sharma and Cardenas [18]. Our main results are robust before and after the recent financial crisis.

5.1.2. Robustness test by employing Two-Stage Least Squares method

To overcome the endogeneity concern, many studies use other regression methods. In this section, we employ the Two-Stage Least Squares method (2SLS) to check for robustness further. This method comprises two stages. In the first stage, instrument variables are used to estimate the endogenous variables. In this stage, the Anderson LM test is used to test the satisfaction of instrument variables for relevance conditions. The null hypothesis of this test indicates that the equation is underidentified. The rejection of the null indicates that the equation is identified and instrument variables satisfy the relevant condition. It is helpful for stage 2, estimated by the OLS method [40,41]. In addition, we also test for endogeneity, and the rejection of the null hypothesis indicates the model has an endogeneity problem [42]. Table 7 reports that the main findings are robust, even if we employ an alternative estimation method.

Table 7

This table represents the robustness of the 2SLS regression results investigating the determinants of employment. The data sample consists of annual observations from 29 Asia-Pacific nations from 1990 through 2020. All variable definitions are reported in [Appendix A](#).

Independent variables	Dependent variable: Employment		
	Model 1	Model 2	Model 3
Employment _{t-1}	0.996*** (<0.001)	0.974*** (<0.001)	0.981*** (<0.001)
FDI	0.050** (0.018)	0.044*** (<0.001)	0.870** (0.019)
LQ		−0.414** (0.040)	0.370** (0.010)
LQ*FDI			−0.088** (0.024)
GCF	−0.013* (0.057)	−0.010 (0.121)	0.0001 (0.971)
GDP	0.007 (0.158)	0.011* (0.093)	−0.007 (0.115)
INF	−0.002** (0.035)	−0.003*** (0.009)	0.000 (0.857)
Trade	−0.002 (0.332)	0.001 (0.562)	0.004* (0.068)
GOV	0.032** (0.042)	0.005 (0.441)	−0.014* (0.005)
Constant	−0.107 (0.785)	5.134** (0.023)	−2.402** (0.034)
Prob (Anderson LM test)	<0.000	0.001	0.003
Prob (Endogeneity test)	0.029	0.006	0.001

Notes: Notes: The symbols ***, **, and * denote significant levels of 1 %, 5 %, and 10 %, respectively. *P*-values are in parentheses.

Source: World Bank, IFM, and author's calculations.

6. Conclusion

This paper examines the impact of FDI on employment with labor quality in 29 countries of the Asia-Pacific and municipalities over the period 1990–2020. We employ the GMM estimations to overcome the endogeneity issue. Our findings show that FDI positively impacts employment during labor quality and vice versa. Moreover, the findings show that the moderating role of labor quality does not support FDI to create new employment in Asia Pacific nations. We also check the robustness of our findings by using an alternative regression method and separate sample data before and after the financial crisis. Our results are consistent with Rong et al. [4], Hou et al. [8], and Nguyen et al. [9], the traditional FDI theory, and support the view that countries with relatively cheap labor costs attract foreign firms.

Our study contributes to the following policy implications for increasing employment in the Asia Pacific region. This study shows the positive role of FDI on employment; thus, policymakers can encourage collaboration and knowledge transfer between foreign and domestic firms. This recommendation can be made through partnerships, joint ventures, or technology-sharing initiatives. By fostering cooperation, local firms can benefit from the expertise, technology, and management practices brought in by foreign firms, leading to increased employment opportunities.

In addition, this study shows that the moderating role of labor quality does not support FDI in creating new employment in Asia Pacific nations. Hence, policymakers should focus on contributing the appropriate education and skills to ensure that the labor force possesses the necessary competencies and capabilities foreign investors demand. Moreover, governments may offer initiatives to support continuous learning and upskilling, ensuring workers can adapt to evolving technologies and industry demands. This suggestion can be achieved through subsidies for vocational training, apprenticeship programs, or tax incentives for businesses investing in employee education.

Finally, policymakers should focus on developing robust labor market institutions that efficiently match skills and job opportunities. This recommendation includes establishing effective job placement services, labor market information systems, and public-private partnerships to bridge the gap between labor supply and demand.

Our study has the following limitations. First, the results of this study apply only within the scope of this study of 29 countries in the Asia-Pacific region. Second, the research results are consistent with prior studies. Moreover, we have yet to analyze how labor quality moderates the relationship between FDI inflows and employment in different sectors. Therefore, future studies may use different regression methods or extend the data sample to explore this topic in various industries and regions.

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Ethic statement

This study does not involve animals or humans.

Data availability statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

CRedit authorship contribution statement

Hoang Tien Nguyen: Writing – original draft, Project administration, Funding acquisition. **Ai Ngoc Nhan Le:** Software, Methodology, Formal analysis, Data curation. **Hoi Vu Le:** Software, Methodology, Data curation, Validation, Visualization. **Khoa Dang Duong:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Conceptualization, Formal analysis.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Variables definition

Variable	Notation	Variable Description	Citations
Dependent Variable			
Employment	EMPLOYMENT	The employment calculates the employment to population ratio, the proportion of a country's employed population.	Rong et al. [4]
Independent Variable			
Foreign Direct Investment	FDI	Net FDI inflows (% of GDP).	Rizvi and Nishat [20]
Labor quality	LQ	Labor productivity is collected from the International Labour Organization. We take the natural logarithm of labor productivity.	
Inflation	INF	As measured by the annual growth rate of the GDP implicit deflator, The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.	Kok and Ersoy [43]
Capital stock	GCF	Gross capital formation	Wang et al. [30], Zaman et al. [28]
Real GDP	GDP	is calculated as the nominal industrial GDP divided by its deflator	Hua [44]
Trade Openness	TRADE	The ratio of total imports and exports to GDP by country.	Rong et al. [4]
Government expenditure	GOV	The proportion of government spending to regional GDP calculates it.	Rong et al. [4]

(Source: World Bank, IFM, International Labor Organization)

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