THE IMPACT OF INTERNATIONAL TRADE FACTORS ON WAGE DIFFERENTIAL IN ASIA COUNTRIES: NEW PANEL DATA EVIDENCE

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research report is ____13890____.

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FDI	Foreign Direct Investment
TO	Trade Openness
PGR	Population Gender Ratio (female to male)
EDU	Educational Level
UEMP	Unemployment Rate
INF	Inflation Rate
GDP	Gross Domestic Product
REM	Random Effect Model
FEM	Fixed Effect Model
BP-LM	Breusch and Pagan Lagrangian Multiplier Test
OLS	Ordinary Least Square
POLS	Pooled Ordinary Least Square
WTO	World Trade Organization
OECD	Organisation for Economic Co-operation and Development
BLUE	Best Linear Unbiased Estimator
ILO	International Labour Organization
WAGE	Wage Rate
VIF	Variance Inflation Factor

PREFACE

This research study was inspired by the the Impact of international trade factors on wage differential in Asia countries as Asia is one of the huge emerging economies in the world. This topic was chosen as Malaysia is one of the countries under Asia. Besides, Asia's international trade are influencing other countries and this topic, Asia's countries wage towards international trade factors and role of population gender ratio in labor (female to male) is rarely discussed in Malaysia on undergraduate papers.

In this study, I am going to discuss the international trade factors and the role of population gender ratio on Asia's countries wage differential. The determinants of wage are selected based on the theory and current economic situation of the Asia countries. This paper aimed to examine the impact of international trade factors and the interaction role of gender gap on wage differential in Asia countries as it will provide information to Asia countries on factors that will help them increase the Asia's countries wage rate and also narrow the wage differential of Asia countries.

I loved implementing and completing this entire study project since I can obtain new information and experience during the entire process. I assumed that this research paper would allow us to apply what I had learnt in the course.

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ABSTRACT

International trade is vital to the global economy, contributing to global prosperity and job growth. By driving the growth of the global economy, it provides employment opportunities for people in different industries in various countries. In this study, data from 30 Asian countries from 2015 to 2020 will be used to explore how International Trade affects Wage Differential. Therefore, in order to continue to promote wage equality, it is urgent to clarify the mechanism by which International Trade affects the Wage Differential. This study will look at Trade Openness, Population Gender Ratio (female to male), and Foreign Direct Investment (FDI) three aspects of in-depth analysis of International Trade impact on the Wage Differential of the internal mechanism. The contribution and positive and negative impacts caused by the level, thus providing support for how International Trade can better promote wage equality.

Chapter 1: Research Overview

1.0 Introduction

This chapter provided an overview of the study. The background of the study is being discuss in Section 1.1. Section 1.2 including the problem statement of the study, it will discuss about the problem that has found within this topic. Section 1.3 will be the research questions as well as Section 1.4 will be the research objectives. Section 1.5 will be stated out the significance of the overall study.

1.1 Background

International trade, the purchase and sale of goods and services between countries, also plays an indispensable role in promoting global economic growth and creating jobs. International trade is expected to improve the overall economic level of a country by expanding markets, increasing production, and increasing employment. By joining the World Trade Organization, countries can gain access to International Trade for their own countries, and through International Trade, their own goods and services can grow (Srdelic & Davila-Fernandez, 2024). According to the data provided by WTO, the total value of global trade in 2022 has reached 24.9 million dollars (WTO, 2022). It can be imagined that the scale of International Trade plays a very important role in the world and reflects the extensive economic exchanges between countries.

The wage is the monetary compensation provided by a boss to an employee for contributing labour force to the operation of the boss's business. At present, wage plays a role of moving through the whole economy, a social system and reflecting the dynamic changes and complex relationships, rather than just the compensation

provided by the boss to the employees for their hard work. At the same time, wage can also play a guiding role in the influence of occupation choice on the plasticity of labour market and so on. Some enterprises in order to attract talents into their own companies and raise wages, which will make certain industries or fields of talent shortage. Some companies are lowering wages for various reasons, such as financial problems, which can lead to labour shortages and the loss of talent from the industry. In the global trade system, the expansion of global trade and the deepening of international industrial division of labour directly affect the wage level of countries and regions.

Companies now split their activities globally, from product design and component manufacture to assembly and marketing, resulting in worldwide production chains. Asia's countries actively participate in the international trade, producing a production network made up of numerous countries and regions, with each link accountable for unique production and processing connections. This involvement allows Asian nations to focus on their own industrial advantages and enhance production efficiency, hence influencing wages in many industries. The WTO has reported that as of 2020, the trade-based participation rate was 44.4%, while the production-based rate was 12.1% (WTO, 2021). In the meantime, the domestic skill wage has a significant influence since the country can get foreign intermediaries by engaging in the international trade, altering the relative demand for local capabilities (Timmer et al., 2014).

Among them, population gender ratio in labor (female to male) also drives the operation to affect the wage level. This is because some countries may have a competitive advantage in a certain stage of the production process because they have a relatively large female labour force, thus affecting cooperation in international trade. According to Saure & Zoabi (2014), as countries with abundant capital tend to focus on female-intensive sectors, the prices of commodities

produced by female-intensive sectors continue to rise, while economies with abundant capital see the opportunity to focus more on this sector. Saure & Zoabi (2014) points out the implications of this phenomenon, including that women's wages will rise, but men's wages will rise proportionally, so the wage differential between the two genders will remain the same.

On the other side, trade openness may successfully advance international trade. Open trade policies sometimes involve actions like cutting tariffs or strengthening free trade agreements, which assist to reduce trade barriers between nations and allow products and services to flow more freely throughout the world. The trade openness strategy also has a significant impact on the country's wage levels. For example, trade openness frequently results in increased access to foreign markets for a country's export-oriented businesses. As a result, increasing the volume of production in connected industries offers additional job possibilities, raising the industry's wage. WTO has reported that the total merchandise that the world had exported and imported in year 2021 has reached 22.3 million dollar and 22.6 million dollar (WTO, 2021). According to Yahmed (2020), the research results show that import competition reduces rent and thus reduces the wage differential between the gender. Cheong & Jung (2020) showed that trade openness increases the wage of unskilled workers, while the wage of skilled workers decreasen that trade openness affects all kinds of wage levels like gender and skill level, even educational level.

Meanwhile, Foreign Direct Investment (FDI) refers to a country or enterprise investing capital into an entity in another country to gain control or influence over the entity in that country to gain long-term economic benefits. Foreign Direct Investment (FDI) promotes the formation of international trade, and international trade is an important means to support the operation of this supply chain. Therefore, the relationship between Foreign Direct Investment (FDI) and International Trade

is complementary. With the inflow of Foreign Direct Investment (FDI) from foreign countries, it also has an impact on the wages of local workers. The recognized level of education and technical proficiency required for Foreign Direct Investment (FDI) to enter the country is not the same, which may cause wage differential widen and talent shortage. According to Wang et al. (2021), research shows that Foreign Direct Investment (FDI) has an impact on the wage differential between urban and rural areas, especially the Foreign Direct Investment (FDI) in the primary industry has a negative spillover effect on the wage differential. Therefore, there are certain differences in the impact of different types of Foreign Direct Investment (FDI) on the wage differential.

1.2 Problem Statement

First and foremost, when refer to the articles written by predecessors, found that the research results of some articles are positive relationship, while some are negative relationship. Taking the independent variable (FDI) as an example, there are two relationship after reviewing both literature, one will be positive relationship between foreign direct investment and the wage Feng and Wen (2023) , and another one will be a negative relationship between foreign direct investment and the wage (Nguyen, 2019). Hence, a different article with different relationship shows a contradict result.

Furthermore, in many Asia countries, the increase of foreign direct investment is a good thing, but if the inflow of foreign direct investment rises steadily, but the wage fluctuates constantly, it will become a problem for a country. As like FDI in Singapore has increased significantly from 2015 to 2019, but the wage rate has declined during these five years. According to World Bank (2023), the FDI inflow in Singapore increased from $69.7billion in 2015 to $105.2billion in 2019. Although the rise of FDI is good for Singapore, the wage rate has also dropped from

50% in 2015 to 46% in 2019. The rise of FDI and the decline of wage rate will lead to decline in consumption level. If wages for employees in Singapore do not rise in parallel with FDI, they could lower their purchasing power or consumption level, which might have an impact on overall economic development because consumption is one of Singapore's primary drivers. Other countries like Bahrain, Cambodia, and Vietnam also facing the same problem.

Moreover, trade openness has always been the main driving force to promote the economic development of Asian countries. However, if the trade openness rise, the wage rate drop, which will become a problem. Although the rise of trade openness is good for workers themselves, but it is unpractical in these circumstances. Because under normal situation in the Stolper-Samuelson Theorem, usually an increase of trade openness may result to a increase of wage rate at the same time. This situation may raise questions or require further research to understand the reasons for its occurrence. Some Asia countries like the Kazakhstan’s trade openness is gradually increasing from 2015 to 2020, but the wage rate is decreasing during this period. According to Accounting to World Bank (2023), the trade openness of Kazakhstan increased from 53% in 2015 to 57% in 2020, but the wage rate decreased from 43% in 2015 to 40% in 2020. Not only Kazakhstan, the Iran and Azerbaijan also facing the same problem. This circumstance will negatively impact Kazakhstan's economic growth. The drop in the wage rate could decrease consumption, reducing overall growth in the economy, because consumption is one of the economy's primary driving forces. There are a evidence proof that the GDP has significantly decreased from 2015 to 2020 due to this problem. The GDP of Kazakhstan decrease from $10510 to $9121 during this 6 years period because of the problem of trade openness increased and wage rate decreased.

Besides, the changes of population gender ratio in labor (female to male) will affect the labor market situation and economic activity level of an Asia countires or a region in the country, so it is very important. However, if a country's population

gender ratio gradually approaches equality, the country's wage rate continues to decline, which will become a problem. The population gender ratio in labor (female to male) of For Turkiye increased from 2015 to 2020, because the educational level of the country also increased at the same time. However, the wage rate has been declining continuously during these six years. According to the world bank (2023), the population gender ratio in labor (female to male) of Turkiye increased from 43% in 2015 to 47% in 2020, because the educational level also increased from 95% to 118% at the same time, but the wage rate decreased from 37% in 2015 to 34% in 2020. This may cause the gender wage differential to widen, which is because under the same education level and work participation rate, women's wage level is not as fast as that of men, or women are treated unfairly in the workplace.

1.3 Research Questions

1.3.1 General Question

What is the effect of impact of international trade factors and the interaction role of gender gap on wage differential in Asia countries?

1.3.2 Specific Question

1. What is the impact of trade openness on wage differential in Asia countries?
2. What is the impact of population gender ratio on wage differential in Asia countries?

3. What is the impact of foreign direct investment on wage differential in Asia countries?

1.4 Research Objectives

1.4.1 General Objective

To examine the impact of international trade factors and the interaction role of gender gap on wage differential in Asia countries.

1.4.2 Specific Objectives

1. To examine the impact of trade openness on wage differential in Asia countries.
2. To examine the impact of population gender ratio on wage differential in Asia countries.
3. To examine the impact of foreign direct investment on wage differential in Asia countries.

1.5 Hypothesis of The Study

Hypotheses 1：

H_0: There is no relationship between Wage and Trade Openness

H_1: There is a relationship between Wage and Trade Openness

Hypotheses 2：

H_0: There is no relationship between Wage and Population Gender Ratio

H_1: There is a relationship between Wage and Population Gender Ratio

Hypotheses 3：

H_0: There is no relationship between Wage and Foreign Direct Investment

H_1: There is a relationship between Wage and Foreign Direct Investment

1.6 Significance of Study

The study will focus on Asia countries, and the literature on Asia countries will be increased. The results of this study could guideline to governments and international organizations such as the World Trade Organization (WTO) on how to adjust international trade policies to promote a more equitable distribution of wages. This can also contribute to the development of more targeted and equitable policies, thereby enhancing socio-economic justice.

Furthermore, the findings can also serve as a reference for policy makers in Asia to improve accuracy while narrowing the wage differential and creating a more equal wage distribution in future policy formulation. First, the research findings can assist the government better understand the impact of internal and external economic factors on wage levels, allowing it to develop more focused and effective policy initiatives. Policymakers may better align nations' economic policies to promote more equitable and sustainable growth by conducting in-depth analyses of the link between factors such as trade openness, foreign direct investment, and labor gender disparity on wages.

Moreover, the study's findings can also be useful in guiding the countries' regulation and management of the national economy. Understanding the impact of

domestic and external economic factors on wage levels enables the government to better formulate and adjust macroeconomic policies, ensuring stable economic

growth, protecting workers' legitimate rights and interests, and promoting societal harmony and stability.

1.7 Chapter Layout

This study is included 5 chapters: Chapter 1: Research Overview, Chapter 2: Literature Review, Chapter: 3 Methodology, Chapter 4: Data Analysis, and Chapter 5: Discussion and Conclusions.

Chapter 1: Research Review

In this chapter, we provide a brief introduction and research background on international trade factors, as well as the effect of population gender ratios (female to male). In addition, the issue description, research objectives, research questions, and study hypotheses are identified. Furthermore, the importance of the study will be emphasised in this chapter.

Chapter 2: Literature Review

In this chapter, we will look at and summarise related journal articles that are relevant to our research subject. Following the summary, we will present key theoretical frameworks and models in order to create our conceptual framework for testing the study's hypotheses.

Chapter 3: Methodology

In this chapter, we will explain how we do research. This includes data gathering techniques, methods for processing data results, and how to assess and measure the

obtained data. This chapter focuses on the data gathering and result running procedure.

Chapter 4: Data Analysis

In this chapter, we will compile the obtained data and examine the results. We will present and evaluate the results in detail.

Chapter 5: Discussion and Conclusions

In this last chapter, we will explore and summarise the study subject. In addition, we will address the implications, limitations, and recommendations for the topic study.

1.8 Conclusion

To summarize, the background of the study regarding the current situation of international trade as well as the issue of trade openness, population gender ratio, and foreign direct investment (FDI) are being discussed. The problem statement, research question, research objectives, and significance of study are also being discussed. The relevant research that has been done by the previous researchers will also be discussed in the next Chapter.

Chapter 2.0 Literature Review

2.0 Introduction

After reviewing many literatures, it was found that different researchers can study the same or different research results on the same topic, and these research results include positive and negative effects. Section 2.1 briefly explains the dependent variables used in this study and the relationship between dependent variables and international trade. Meanwhile, Section 2.1.1 to Section 2.1.4 explains the independent variables and control variables used in this study. Other researchers' literature on the correlation between international trade and wage differential is cited and the results are illustrated. Section 2.2 explains the theoretical framework referenced in this study. Section 2.3 presents the conceptual framework for this study. Section 2.4 illustrates the literature gap for this study. The hypotheses of such a study are stated in Section 2.5. Lastly, the knowledge learned in the literature review of Section 2 is summarized in Section 2.6.

2.1 Review of the Literature

2.1.1 Wage

How international commerce impacts wages has long been a heated subject in the study of international economics. The influence of international commerce on wage differenrial is merely one part of economic globalization's impact on wage distribution, which is far more complex. In recent years, international trade and wage differentials have received a lot of attention since many nations' wage differentials are progressively expanding, and all countries' trade openness is increasing significantly.

Some researchers have also made some comment on the country's wage differential. The wages level has a direct impact on trade unions' wage-oriented behaviour (Lee & Lee, 2016). If wages grow, trade unions may have greater motivation to push for higher wages, making the international trade factors such as FDI more appealing to businesses looking to save costs. On a contrary, according to the justification by Barua & Pant (2014), they noted that wages changes are determined by the balance between labour demand and supply. At the same time, in the Stolper-Samuelson theory, international trade factors will lead to a reduction in the real wage gap between nations. This is because trade raises real wages in surplus labour nations while lowering real wages in surplus capital countries, resulting in a shift of production components.

2.1.2 Foreign Direct Investment (FDI)

Feng and Wen (2023) produced a study report on the impact of foreign direct investment on employee wages in Chinese firms, using labour heterogeneity as the theoretical idea. This study's research sample included of listed companies in Shanghai and Shenzhen from 2013 to 2020. At the same time, the data for this investigation was gathered from the CSMAR database. The findings reveal that foreign direct investment raises the number of patents and total factor productivity, indicating that technical advancement has been effectively supported, and hence increases the percentage of employees' wage. Generally speaking, the results of this study show that the increase of foreign direct investment will lead to the increase of employees' wage, which is a positive relationship.

Furthermore, a study done by Noria (2015) for the degree of trade openness and the relative role of foreign direct investment in explaining the wage difference between industries in Mexico, employing the two-stage estimating approach. The research sample for this study was the prospective working class of Mexicans aged 15 to 65

between 1994 and 2004. At the same time, data for this study were acquired from INEGI's national urban employment survey. The findings indicate a positive and statistically significant nonlinear link between FDI and inter-industry wage differential. In general, the findings of this study suggest that, in the context of foreign direct investment liberalisation, firms may pay higher wages in order to recruit or hire more competent individuals, hence increasing wage level; there will be a positive association between foreign direct investment and wages.

Moreover, Ibarra-Olivo and Rodríguez-Pose (2022) conducted an analysis on the overall impact of foreign direct investment on average wages, the wage differential between skilled and unskilled labourers, and inter-industry heterogeneity, using Selection on Observables and Difference-in-Difference Estimation Methods as the research method. This study employed research samples of technical and unskilled workers from different industries and within industries in Mexico in 1998, 2003, and 2008. At the same time, the data for this study were acquired from the National Statistics Institute of Mexico's (INEGI) economic and population censuses. The findings indicate that foreign direct investment is often associated with higher average skill wages, whether in manufacturing or service industries. Overall, the findings of this survey reveal that all Mexican businesses believe that a good connection with foreign direct investment will raise the wages of workers in industry.

Besides, a study produced by Laffineur and Gazaniol (2019) for a study report on the influence of foreign direct investment on domestic wages in France, using Abowd et al. (1999)'s AKM framework as the theoretical idea. The research sample for this study is the matching information between the panel data set of French enterprises and the characteristics of their employees from 2002 to 2007. At the

same time, data for this study were gathered from an employee-level database, a LIFI data set, customs data, and EAE. The findings indicate that outbound foreign direct investment decreases wages for those whose jobs are simpler to outsource. In sum, the findings of this study demonstrate that more foreign direct investment leads to lower wages for workers, indicating a negative link.

On the contrary, this study quantifies the impact of Foreign Direct Investment (FDI) on the wage paid to employees by domestic companies in the wholesale and retail industries in Vietnam (Nguyen, 2019). Data of the wholesale and retail industry in Vietnam between 2009 and 2013 were used as research materials. The findings suggest that an increase in the number of foreign enterprises will result in a fall in wages paid by domestic companies. At the same time, the data indicate that private enterprises and enterprises engaged in low-wage industries are affected by wage declines. Nguyen also stated that the country's cheap labour costs may be exploited to attract foreign direct investment.

Besides, a study report utilised by Perić (2019) for a multiple linear regression model to study how foreign direct investment affects average earnings and employment in Serbia. This study used data from the National Bank of Serbia and the Statistical Office of Serbia from 2005 to 2017 as research data. The research findings demonstrate that the model developed to assess the impact of foreign direct investment on wages shows that foreign direct investment inflows hardly enhance wages and are statistically irrelevant and meaningless. Thus, increasing the inflow of foreign direct investment by one unit will neither result in a higher wage level for workers, nor will increasing the inflow of foreign direct investment result in an increase in working wages. In conclusion, there is no substantial association between wages and foreign direct investment.

2.1.3 Trade Openness

A paper studies done by Cheong & Jung (2020) that whether trade openness affects the wage differential among the same workers in South Korea. They used survey data from South Korea between year 2000 to 2015. Moreover, they believe that Stolper-Samuelson theorem can explain how Trade Openness affects the wage differential of different educational level, gender or technical level, but it does not explain wage differentials within the same group of workers. Cheong and Jung adopted the difference-in-difference (DID) specification and got the result. The results show that since South Korea signed free trade agreements with more advanced countries, the wage of skilled workers has increased, but the wage of unskilled workers has decreased, which is consistent with Stolper-Samuelson's theory. But when it comes to workers in the same group of workers but employed by different companies, trade openness raises the wage for workers in small businesses, while large firms do not benefit.

Furthermore, Jamielaa and Kawabata (2018) produced a study report on the influence of trade openness on Indonesia's wage differential, using Quantile Regression Analysis with an expanded citizen model. This study uses household survey data from Indonesia from 2008 to 2014 as research data. The findings indicate that trade liberalisation can help narrow the wage differential, particularly at the low wage level. This demonstrates that trade liberalisation will raise wages in Indonesia, particularly among low-paid workers, hence reducing the country's wage differential.

In Addition, a research thesis that conducted by W. Zhang et al. (2024) on how urban openness leads to wage premiums and wage distribution in the context of trade liberalisation and new urbanisation, using quantitative regression analysis

with an extended citizen model as the model for this research. This study makes use of micro data from the China family wage project as well as matching data from 144 cities. The findings indicate that trade liberalisation has a large beneficial influence on urban inhabitants' wage wage, particularly in the early years after China joined the WTO. Furthermore, trade liberalisation has significantly improved wages for low- and middle-income groups while having a smaller influence on high-income groups. This tendency helps to close the wage differential between various groups since trade liberalisation causes low- and middle-income groups' wages to rise quicker, lowering the wage differential between them and high-income groups.

Moreover, Milner et al. (2018) conducted a study report on the link between trade liberalisation and inter-industry wage differential following China's accession into the WTO, using the two-stage estimate technique and the Heckscher-Ohlin (H-O) model as the research model. This study uses data from China's China General Social Survey (CGSS) and the World Input-Output Database (WIOD) as research data. The findings suggest that opening up trade and capital has a favourable effect on the wage differential. This demonstrates that trade liberalisation will enhance wages in certain industries in China while having no effect on wages in others, hence widening the wage differential.

Also, Murakami (2021) conducted a study report on the continuing decrease of the wage differential between skilled and unskilled workers in Chile induced by the proliferation of regional trade agreements, using the particular factors model and heterogeneous firm trade models as the models for this research. This study referenced research data from Chile's Socio-Economic Characterization Survey (CASEN) in 2000, 2003, 2009, and 2009. The findings suggest that lowering effective tariffs on final goods raises the industry's wage level, implying that

productivity gains from liberalisation contribute to wage rises. It demonstrates that trade openness has a favourable influence on wages, reducing the wage differential.

On the other hand, Brussevich (2018) conducted a research report on the influence of trade liberalisation and dynamic labour adjustment on wage and benefit outcomes in the United States, with the dynamic model of sectoral choice serving as the study model. The March current population survey (CPS) in the United States and the ONET were utilised as research data in this study. The findings reveal that when male workers encounter open trade competition, they incur greater costs when migrating to other industries, resulting in wage and benefit losses, but when female workers face the same switching shock, the switching costs are lower. This will expand the wage differential between the two sides.

At the same time, Borrs and Kanauth (2021) completed a research report on a sample of German workers to analyse whether low-wage competition with China and Eastern Europe will affect the wage structure of the German manufacturing industry, using the AKM framework developed by Abowd et al. (1999) as the main model of this study. This study used 50% administrative data samples of all full-time working males in Germany from 1985 to 2015 for research purposes. According to the research findings, while market access and rising competitiveness in the East have had a significant impact on widen differential in terms of workers' wages, one of the study's Panel C results also shows that trade growth in Germany's East has had no significant impact on enterprise specific wages. That is, the shift in trade openness has no significant impact on labors' wages. If the research findings are factored into the variables of this study, a rise in one unit of trade openness will not result in greater wage for workers, nor will an increase in the sum of exports and imports result in an increase in working earnings. In conclusion, there is no substantial association between waggons and trade openness.

2.1.4 Population Gender Ratio

First and foremost, Ahmed and McGILLIVRAY (2015) conducted a research study on the changing gender wage gap in Bangladesh, using Abowd et al.'s (1999) framework as the theoretical idea. This study employs labour force surveys from 1999, 2005, and 2009 as research samples, which span the whole country of Bangladesh, including urban and rural. At the same time, data for this study were gathered from the Bangladesh Bureau of Statistics. The results demonstrate that the gender wage gap in Bangladesh has reduced, indicating that more female labour is permitted in the labour market, and female workers' wages have grown, resulting in a reduction in the wage difference between men and women. Overall, the two findings of this study indicate that there is a positive association between population gender ratio and wage.

Hansen et al. (2022) produced a study report on the gender wage gap among Myanmar's urban workers, using the Oaxaca-Blind decomposition technique devised by Blinder (1973) and Oaxaca (1973) as the theoretical idea. The research samples for this study came from two surveys conducted in Myanmar in 2017. At the same time, both surveys use a stratified, two-stage regional sample design with seven states, seven regions, and the central administrative region (Naypyidaw) as strata. The findings demonstrate that, despite having a greater degree of education, female paid workers' average wages are 29% lower than men's. This demonstrates that, despite receiving more education, women continue to experience unfair wage treatment, resulting in lower wages for women in the labour market and a wider wage differential between men and women.

Kunze (2017) produced a study report on the gender wage gap in developing nations, using the Oaxaca-Blinder decomposition as the research model. This study relies on raw data from industrialised nations from 1970 to 2015 to investigate the gender

wage gap and employment rate. The findings reveal that, while women's human capital investment tends to be commensurate with men's, the gender wage gap remains significant. This demonstrates that, while women and men invest consistently in education and skill development, i.e., women are actively acquiring education and professional skills, their wages remain lower than those of men, implying that there is a significant gender wage gap between men and women.

Siddiquee and Hossain (2018) produced a study report on the gender wage gap among urban workers in Bangladesh, using Mincerian ols regression and Blinder-Oaxaca decomposition as models. This study relies on research data from the Bangladesh Labour Force Survey report, which was performed in 2010 and administered by the Bangladesh Bureau of Statistics. The data suggest that female labors' wages are lower than those of male employees, with a wage disparity of around 21.2%. This demonstrates that, while women and men invest similarly in all elements, women's wages are still lower than men's, implying that there remains a significant gender gap between the two.

Nagayoshi (2024) completed a study paper on how Japan's restricted immigration policy affects the gender wage gap. This study used data from Japan's fundamental survey on wage structure in 2020 as research data. The findings indicate that there is no significant association between women and wages in terms of immigration visas for those aged 34 and younger. At the same time, the study found insufficient data to conclude that there is a significant statistical relationship between immigrant age and the gender wage gap. If the results of this study are included into the variable of this study, that is, every rise of one unit of population gender ratio for labour in women will not result in greater wage for workers, nor will an increase in population gender ratio result in an increase in working earnings. In conclusion, there is no substantial association between wage and population gender ratio.

2.1.5 Educational Level

Wongmonta (2023) conducted a study report on the possible influence of vocational education on the life-cycle wage differential between Thai vocational and ordinary graduates, with the Inverse-Probability-Weighted Adjustment (IPWRA) technique serving as the research model. This study used secondary school, diploma, and degree data from Thailand's National Labour Force Survey (LFS) from 2018 to 2020 for research purposes. The findings indicate that workers with vocational education earn more than those with general education, but there is no significant difference when compared to graduates of scientific and engineering institutions with the same educational years. Finally, workers with diplomas and degrees are more likely to forgo secondary school, implying that the more the education, the higher the average wage, which is a positive association.

On the contrary, according to Donovan and Bradley's (2018) Real Wage Trends study paper. This study used CRS Estimates Using Current Population Survey Outgoing Rotation Group from the National Bureau of Economic Research in the United States from 1979 to 2017 for research data. The findings demonstrate that the reduction in the median wage of workers with a specific university degree is less than that of workers with high school or less education, although there is also a negative tendency in this study. The statistics suggest that college-educated workers' wages fell from $21.92 in 1979 to $19.93 in 2000 and $19.23 in 2017. In conclusion, for college students, while the wage of workers with higher education is greater than that of workers with middle school education, it is on a declining trend, which means that the average wage of workers with higher education will fall, resulting in a negative association.

Bol and Heisig (2021) produced a research report on explaining wage variations by area of study among higher education gradations, using the Oaxaca-Blinder decomposition technique as the main model. This study used data from 17,590 graduates from 29 countries from 2011 to 2012 and 2014 to 2015 from the International Adult Assessment Programme (PIAAC) for research. According to the research findings, graduates from the Engineering, Manufacturing and Construction, Health and Welfare, Social Science, Business, and Law sectors did not find a significant association between years of schooling and wages. Education level changes in engineering, manufacturing and construction, health and welfare, and social science, business and law do not significantly impact graduation wage. If the results of this study are included into the variable of this study, that is, every rise of one unit of educational level will not result in greater wage for workers, nor will an increase in educational level result in an increase in working earnings. In conclusion, there is no substantial association between wage and education level.

2.1.6 Gross Domestic Product

Goschin (2014) conducted a research report on explaining wage determinants in Romania from a geographical viewpoint, using a Simple Pooledols (Orderly Lest Squares) regression model. From 1995 to 2010, this study cited 41 counties in Romania, including Bucharest, and supplied 672 observation data for research purposes. The findings reveal that the rise of GDP per capita has a long-term impact on wage determination in Romania. That is, workers in places with greater GDP per capita will earn higher wages, or when GDP per capita rises in a certain area, so will the earnings of workers in that area. Finally, there is a positive and strong link between wages and GDP per capita.

Aslam et al. (2022) conducted a research report on the influence of trade liberalisation on the formal and informal wage differential, and the model utilised in this study was the wage premium method (WPM), Oaxaca-Blind decomposition, restricted least squares, and weighted least squares (WLS) regression models. This study used data from Pakistan's micro-manufacturing industry from 1990 to 2005 as research data. The findings indicate that Pakistan's GDP per capita growth is negatively correlated with manufacturing wages. That is, workers in places with greater GDP per capita will have lower wage, or as long as Pakistan's GDP per capita manufacturing industry rises, the wages of workers in this area will decline as well. In conclusion, this is a negative and significant relationship between wage and GDP per capital.

Gong et al. (2022) completed a research report using data from manufacturing enterprises in 35 major cities in China to investigate whether the expansion of the real estate industry leads to an increase in manufacturing wages, using the Eastern Lesser Square specification as the model. This study used research data from the annual survey of industrial enterprises (ASIE), the China Real Estate Statistics Yearbook, and the research centre for rural economy (rcre), all of which include the variable GDP per capita in city characteristics. The findings indicate that rise in GDP per capita has no meaningful association with manufacturing wages in China. That is, a rise of one unit of GDP per capita for workers in the manufacturing industry will not result in better wage, nor will an increase in GDP per capita result in an increase in the wages of workers in the manufacturing industry. In conclusion, there is no substantial association between wage and GDP per capita.

2.1.7 Inflation Rate

Jordà and Nechio (2023) produced a study report on the follow-up reaction of inflation following the Covid-19 epidemic and its impact on wages, using a unique dynamic difference-in-difference technique based on local forecasts as the model. This study used data from Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, and Sweden, as well as real household gross disposable wage per capita data from the United Kingdom and the United States, from the OECD's Household Dashboard: Cross-Country Comparisons. The findings reveal that the impact of inflation expectations on American wage level has increased since the pandemic, demonstrating the significance of inflation expectations in wage inflation. The authors argue that, particularly in the presence of strong inflation expectations, the impact of inflation on wages may grow.

Pérez (2020) produced a research report on the influence of Colombia's minimum wage on formal wages, informal wages, and employment, using Unconditional Quantitative Regressions with a differences-in-differences design as the study methodology. The research data for this study came from a quarterly cross-sectional survey conducted by Colombia's National Household Survey (ENH) between 1996 and 2000. The findings indicate a positive association between the change in the minimum wage and inflation. In conclusion, rising inflation will result in higher wages since businesses and employers often adjust wage to offset the impact of rising prices on employees' purchasing power.

Donayre and Panovska (2018), on the other hand, conducted a study report on how the link between wage growth and unemployment in the United States fluctuates during the business cycle, using the Phillips curve (WPC) as a model. This study

used American monthly data from the Federal Reserve Economic Data (FRED) website from 1965 to 2015 as research data. The findings indicate that there is a negative relationship between inflation and wage growth, particularly during the economic slump. In conclusion, during a recession or depression, the inflation rate often decreases, causing wage level to fall, while the wage differential on the opposite side expands.

Bilkova (2020) produced a comparative research report on wage levels in OECD nations, using regression and correlation analysis, Cluster Analysis, and Time Series Analysis serving as the primary models for this study. This analysis incorporates data from OECD member nations from 2000 to 2007 on average wages and other independent variables such as inflation rates, as well as research data from the official OECD website. According to the research findings, only three independent variables, employment rate, per capita GDP, and labour productivity, have a statistically meaningful and beneficial influence on the average wage. This means that there is no substantial association between the inflation rate and wage rate in OCED member nations. If the findings of this study are included into the variables of this study, it follows that every 1 unit rise in the inflation rate will not result in better wage for workers, or that an increase in the inflation rate will not result in an increase in the wages of working people. In conclusion, there is no substantial association between wage and inflation rate.

2.1.8 Unemployment Rate

Pinheiro and Visscher (2015) produced a study report on the link between unemployment risk and wage differential, employing the equilibrium model as the theoretical framework. According to the study findings, solving the labour market equilibrium demonstrates that, at the risk tail of the enterprise-level unemployment

risk distribution, wages for all companies rise as job security improves. In other words, when the unemployment rate falls, earnings decrease in tandem, stabilising the unemployment rate, indicating a positive link.

On the contrary, Blien (2023) conducted a study report on the total wage effect of unemployment over a very long observation period, using the wage-setting curve, aggregate wage equality, and wage curve as the model. This study used full-time employment connection information in Western Germany on June 30th as research data from 1982 to 2010. The findings suggest that the unemployment rate has a considerable influence on national wages. Although the wage setting environment in Germany is rather rigid, an increase in the unemployment rate would nonetheless have a negative influence on overall earnings. Finally, the author proposes that Germany should take national-level actions to address unemployment.

Also, Faryna et al. (2022) produced a study report on the link between labour market circumstances and wage trends, using the Phillips curve (WPC) as their model. This study used information on employment location, description, wage, and job kind from OLX.ua, one of Ukraine's largest online advertising platforms in 2019, as research data. The findings reveal that the evidence for the Phillips curve is very poor at the national level, but when alternative forms of heterogeneity are included, such as departmental or occupational heterogeneity, the Phillips curve becomes more clear. Finally, the wage curve demonstrates that the wage level is inversely

associated with the unemployment rate, implying that as the unemployment rate grows, the wage falls.

Stirati and Meloni (2021) conducted a study report on the link between unemployment and wage distribution changes in the economies of eight developed nations, with a long-term technique and two alternative metrics of poor labour

markets serving as the primary model. This study used data from eight nations, namely Canada, France, Germany, Italy, Japan, Spain, Sweden, the United Kingdom, and the United States, from 1960 to 2017 to explore the unemployment rate and wage. According to the research findings, Canada and Sweden failed to discover a meaningful association between unemployment rates and earnings. That is, the change in the unemployment rate has no significant impact on wages in Canada and Sweden. If the findings of this study are included into the variables of this study, that is, every 1 unit rise in the employment rate will not result in better earnings for workers, nor will an increase in the employment rate result in an increase in the wages of working workers. In conclusion, there is no substantial association between wage and employment rates.

2.2 Theoretical Framework

2.2.1 Stolper-Samuelson Theorem

Stolper-Samuelson Theorem is created by Stolper and Samuelson (1941), they explained that this theory is an important theorem in international trade theory, and described how the benefits of different production factors are affected when two countries trade, taking into account the two factors of labor and capital. At the same time, this theorem has points out that if a country trades with other countries, it will lead to changes in the relative prices of production factors, thus affecting the income of production factors. Not only that, Gonzaga et al. (2006) has also defined the concept of Stolper-Samuelson Theorem as the wage changes have a direct impact on the price change decomposition process since wage is the price of labour, a production factor. This directly proves that work on trade and the skill premium has been most focused on the supply side.

According to Stolper-Samuelson theorem, when one country conducts international trade with another country, the income of the labor forces of the two countries may be affected. At the same time, it can also be explained that if a country is an exporter of labor-intensive products and an importer of capital-intensive products, the country's labor income may decline, which may lead to the decline of wage. Thus, Stolper-Samuelson theorem emphasizes the influence of international trade on labor income. Because this study focuses on the influence of international trade factors on wage differences, it is closely related to Stolper-Samuelson theorem. Through this theoretical framework, we can better explore how international trade affects the income of different labor forces based on this theorem in the process of research, so as to better explain the purpose and motivation of this research. On the other hand, this theorem can also help this study to define a more clear link of the international trade factors variables.

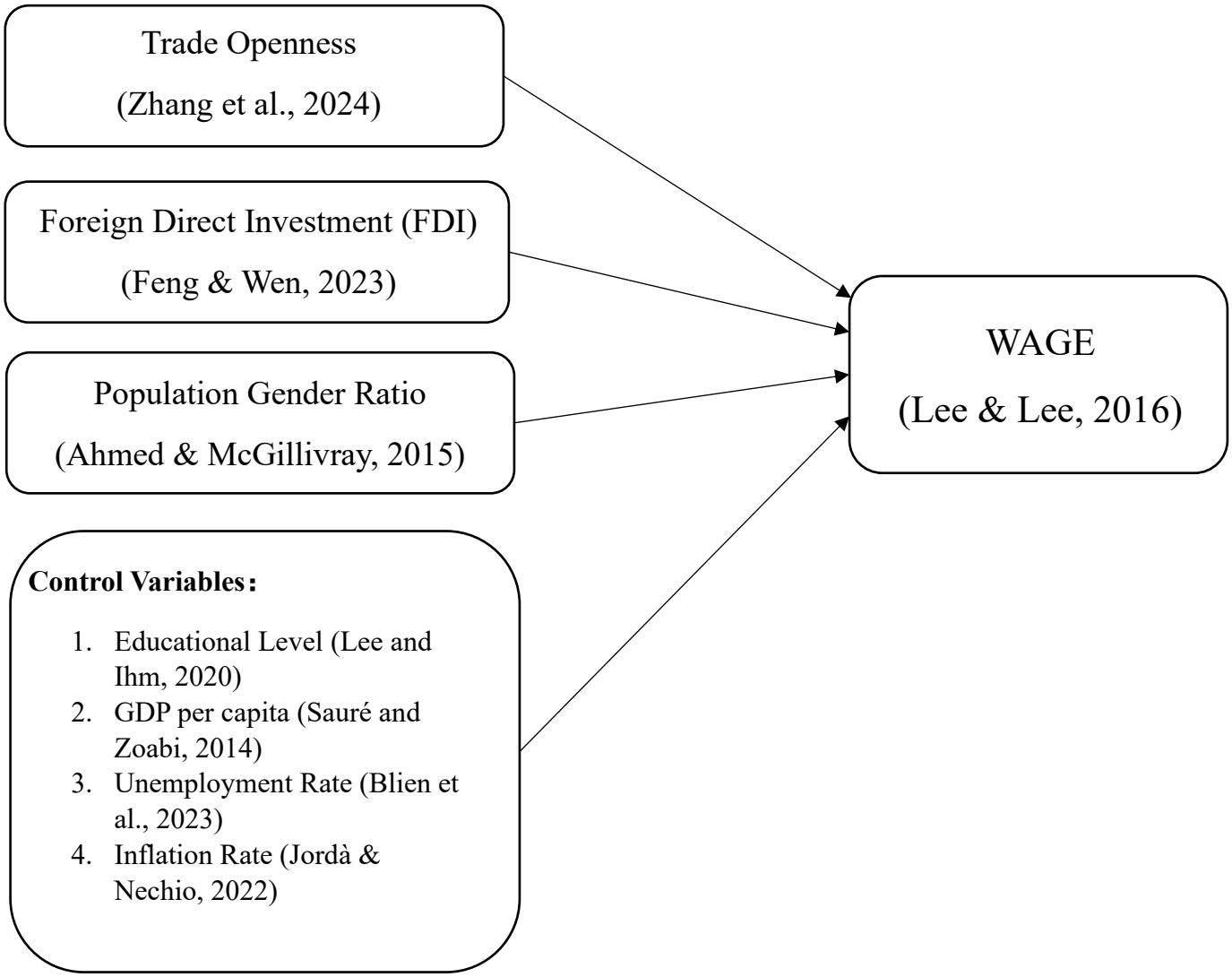
2.2.2 Oaxaca–Blinder decomposition

Oaxaca-Blinder decomposition is a statistical approach for analysing differences between groups. It is commonly used to explain the wage differential. Juan Blinder (1973) and Ronaldo Oaxaca (1973) to explain the gender wage gap. This model mentions that since 1970s, the observed gender wage gap has narrowed, women's labor force participation rate has increased, and women's education level has steadily improved, even surpassing that of men in some countries. However, despite extensive progress in gender equality in wage, the trends observed in different countries and different periods are quite different. The technique divides the discrepancy into two parts: explicable and inexplicable. The disparity between groups is explainable due to the effect of distinct traits. The unexplained discrepancy is driven by additional factors that the model does not account for. At the same time, Hansen et al. (2022) explained that this Oaxaca-Blinder decomposition is the most commonly used method to analyze the wage difference between individual groups such as male and female workers.

Stolper-Samuelson theorem emphasizes the influence of different gender labor on their own income. Because this study pays attention to the influence of international trade factors on wage difference, and objective includes the study of the relationship between population gender ratio in labor (female to male) and wage, which is closely related to Stolper-Samuelson theorem. Through this theoretical framework, based on this theorem, we can better explore how the role of population gender ratio affects the income of different labor forces, so as to better explain the purpose and problems of this study.

2.3 Conceptual Framework

Figure 2.1: The Conceptual Framework



2.4 Literature Gap

After reviewing the various studies that have been written, independent variable (Foreign Direct Investment (FDI), Population Gender Ratio, And Trade Openness) and the relationship between dependent variable (Wage) and each other's influencing factors. However, researchers that examine about international trade and wage rarely use data from at least 30 countries across Asia. In addition to that, only a few of researchers looked at Foreign Direct Investment (FDI), Population Gender Ratio, And Trade Openness as an independent variable to measure whether it affects the wage differential.

Also, the up-to-date data has been used in this study and these data are collected from the official platform such as World Bank and International Labor Organization. In the sector of economics, data timeliness is critical to the quality and dependability of study findings. The new statistics are expected to reflect current economic and social developments, allowing us to better understand the implications of trade openness, foreign direct investment, and population gender ratios on wages. Also, the changes, trends, or results that may emerge from current data, as well as ways to gain a better understanding of the link between those independent variables.

Not only that, but this study will also have the use of panel data. Panel Data Regression allows for a more thorough analysis of the link between international commerce and wage differentials. So, using the information from panel data, it can gain a clearer understanding of how trade policy implementation influences wage differentials. It also allows policy makers in Asia to tailor their policies to their countries. Therefore, the issue of wage differentials can be improved through effective regulation and policy practice.

2.6 Conclusion

In short, this chapter reviewed the literature that explained the relationship between the international trade and wage differential including the independent variables and control variables. Each study uses different verification methods to explore the impact of international trade on wage differential. Studies have shown that international trade increases the wage differential, causing social concern. Therefore, more research is necessary to explore the relationship between these variables, so that policymakers can make more inform and accurate decisions.

Chapter 3.0 Methodology

3.0 Introduction

Methodology is a system or approach used to solve a research topic. As a result, this chapter will describe the steps of the approach utilised, which is based on indicators and data sources, to assess the influence of trade openness, foreign direct investment, and population gender ratio (Independent Variables) on wage differentials in Asia countries. Furthermore, it offers a description of data collection methods, methodologies, and appropriate econometric modelling that will be utilised to analyse the study objectives.

3.1 Research Design

The aim of this study is to test the role of wage in the relationship between international trade. Below are the listed dependent variable, and independent variables.

Table 3.1 Observed Variables

Abbreviation	**Variable**	**Unit**
Dependent Variables:		
Wage	Wage	Labor income share as a percent of GDP (%) - Annual
Independent Variables:		
TO	Trade Openness	Trade (% of GDP)
lnFDI	Foreign Direct Investment	Foreign direct investment, net inflows (BoP Current US$)
PGR	Population Gender Ratio	Ratio of female to male labor force participation rate (%) (modeled ILO estimate)
Control Variables:		
EDU	Educational Level	Tertiary School Enrollment (%)
lnGDP	Gross Domestic Product per capita	GDP per capita (Current US$)
UEMP	Unemployment Rate	Unemployment, total (% of total labor force) (modeled ILO estimate)
INF	Inflation Rate	Inflation, consumer prices (annual %)

Variable Specification:

Wage (WAGE)

Wage is the dependent variable of this study which represents the wage differential of Asia countries with the year period of 2015-2020 and measured in percent of Gross Domestic Product (GDP).

Trade Openness (TO)

Trade Openness represents the sum of the total amount of export and total amount of import for good and services in percentage of Gross Domestic Product (GDP). This justifies Asia's and other host nations' economics and trade linkages, which may be viewed as a critical component influencing wage-related obstacles.

Foreign Direct Investment (lnFDI)

Foreign Direct Investment describe the Net investment inflows to obtain a long-term managerial stake in a firm operating in a different economy than the investor's.

Population Gender Ratio (PGR)

The Population Gender Ratio represents the labour force participation rate is the proportion of the population aged 15 and older that are economically engaged. The ratio of female to male labour force participation rate is obtained by dividing the female participation rate by the male participation rate and multiplying by 100.

Educational Level (EDU)

Educational Level is a control variable in this study which describe the gross enrolment ratio for the tertiary education in percentage (%). Tertiary education,

whether leading to an advanced research certification or not, often needs satisfactory completion of secondary education as a minimum entry requirement.

Gross Domestic Product per capita (lnGDP)

GDP per capita is calculated by dividing gross domestic product by the population at the middle of the year. GDP is the total of the gross value created by all resident producers in the nation's economy, plus any goods and services taxes, minus any non-product subsidies. It is estimated without accounting for depreciation of manufactured assets or depletion as well as deterioration of resources of nature. Data is presented in current US dollars.

Unemployment Rate (UEMP)

Unemployment is defined as the fraction of the labour force that doesn't have a job but is actively seeking for one. In these indicators, the data is going to be tallied as a proportion of the total labor force based on ILO estimations.

Inflation Rate (INF)

Inflation, determined by the Consumer Price Index (CPI), is the yearly percentage rise in the cost of a certain goods and services for the average consumer, whether can be fixed or fluctuate at regular intervals in every year.

3.2 Data Collection Method

The data for this research study were gathered from the World Bank Database and the International Labour Organisation (ILO). This research project will gather data using a panel approach, with an observation period ranging from 2015 to 2020. The arguments for using the World Bank and the ILO to acquire data sets are that these platforms give reliable and full data that we can quickly get while also saving money and time throughout the process of secondary data collection.

The researcher gathered data from these platforms on independent variables that may influence the wage differential between Asian nations, such as population gender ratio, foreign direct investment (FDI), trade openness, and educational level. These studies employ secondary data and are collected on an annual basis for each nation in Asia, which includes 30 countries. Our data collection is an unbalanced panel, thus we will utilise a special way to fix this unbalanced panel problem. The rationale for not including all of Asia's participating nations is because the data for the 18 remaining countries was incomplete due to a large number of missing data points. As a result, including these 18 nations will lead to erroneous results in our research study. To summarise, these countries that take into consideration are given below:

Table 3.2 Observed countries:

1. Armenia	16. Kyrgyzstan
2. Azerbaijan	17. Korea, Republic of
3. Bahrain	18. Malaysia
4. Bangladesh	19. Mongolia
5. Bhutan	20. Nepal
6. Brunei Darussalam	21. Oman
7. Cambodia	22. Pakistan
8. Cyprus	23. Philippines
9. Georgia	24. Qatar
10. India	25. Singapore
11. Indonesia	26. Sri Lanka
12. Iran, Islamic Republic of	27. Thailand
13. Israel	28. Türkiye
14. Japan	29. Uzbekistan
15. Kazakhstan	30. Viet Nam

3.3 Data Analysis

3.3.1 Static Panel

3.3.1.1 Pooled Ordinary Least Squares (POLS)

POLS can be described as pooling data to estimate an OLS regression. The formula for the equation takes the following form:

$$Y_{it} = \beta_0 + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \beta_4 X4_{it} + \beta_5 X5_{it} + \beta_6 X6_{it} + \beta_7 X7_{it} + \mu_{it} \quad (1)$$

POLS describes the parameter of independent variables (Xs) as seen in the equation above. In our study, the dependent variable (Y) evaluated is wage in Asian countries, and the independent factors (X) used to test the link include population gender ratio (X1), trade openness (2), foreign direct investment (X3), educational level (X4), GDP (X5), unemployment (X6), inflation (X7). The symbol β_0 represents the constant, whereas μ_{it} represents the equation's error. The symbol was defined as the panel data that we used to conduct this research. Ordinary Least Squares produces efficient and consistent parameter estimation under the assumption of homogeneity and the absence of individual effects. Furthermore, POLS takes into account the Best Linear Unbiased Estimator (BLUE), which excludes all feasible linear unbiased estimators.

Hence, the integrated equation is going to be formed as follows:

$$WAGE_{it} = \beta_0 + \beta_1 PGR_{it} + \beta_2 TO_{it} + \beta_3 FDI_{it} + \beta_4 EDU_{it} + \beta_5 lnGDP_{it} + \beta_6 UEMP_{it} + \beta_7 INF_{it} + \mu_{it}$$

(2)

3.3.1.2 Fixed Effect Model (FEM)

The second estimating approach is used when individual particular effects are time invariant due to a person-specific intercept. In other words, it is concerned with distinctive characteristics of each country. As a result, each nation has a unique intercept, whereas slope coefficients remain consistent across countries. The advantage of using this model is that it produces consistent estimates regardless of whether there is a link between the explanatory variable and the unit-specific impact.

The estimated models are stated as:

$$Y_{it} = \beta_0 + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \beta_4 X4_{it} + \beta_5 X5_{it} + \beta_6 X6_{it} + \beta_7 X7_{it} + \alpha_i + \mu_{it} \quad (3)$$

With a prediction of within-transform:

$$(Y_{it} - \bar{Y}_i) = \beta(X_{it} - \bar{X}_i) + \varepsilon_{it} \quad (4)$$

$$Where\ \bar{Y}_{it} = \frac{1}{T}\sum t\, Y_{it}\ and\ \bar{X}_{it} == \frac{1}{T}\sum t\ X_{it}\ , and\ \varepsilon_{it} = (\varepsilon_{it} - \bar{\varepsilon}_i)$$

The dependent variable is Y_{it}, and the independent variables are X_{it}, where *i* is the entity and *t* are an annual time series. Then, α_i (i = 1.... n) indicates the unidentified intercept for each entity, which is heterogeneity under a given influence. The coefficient of the equation shall be denoted by β_s.

Thus, the integral form of the equation may be stated as follows:

$$WAGE_{it} = \beta_0 + \beta_1 PGR_{it} + \beta_2 TO_{it} + \beta_3 lnFDI_{it} + \beta_4 EDU_{it} + \beta_5 lnGDP_{it} + \beta_6 UEMP_{it} + \beta_7 INF_{it} + \alpha_i + \mu_{it} \quad (5)$$

3.3.1.3 Random Effect Model (REM)

Random Effect Model (REM) is also known as the error component model. Furthermore, one method to avoid the difficulties that overwhelm in both time and cross-section is the random effect model. REM handles the intercept term, where β_0 is a random variable that may be represented as:

$$Y_{it} = \beta_{0it} + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \beta_4 X4_{it} + \beta_5 X5_{it} + \beta_6 X6_{it} + \beta_7 X7_{it} + \varepsilon_{it} + \mu_{it} \quad (6)$$

The error term W_{it} consists of two elements: the cross-section error component, ε_i, and the combination of cross-section and time series error components, μ_{it} .The Error Correlation Model (ECM)'s assumptions are as follows:

$$\varepsilon_i \sim N(0, \sigma^2)$$

$$\mu_{it} \sim N(0, \sigma^2)$$

$$E(\varepsilon_i \, \mu_{it}) = 0 \; E(\varepsilon_i \, \varepsilon_j) = 0 \; (i \neq j)$$

$$E(\mu_{it} \; \mu_{is}) = E(\mu_{it} \; \mu_{it}) = E(\mu_{it} \; \mu_{js}) = 0 \; (i \neq j; t \neq s)$$

Both error components followed the conventional linear regression model (CLRM) assumptions, which state that errors have a zero mean and constant variance. Time-series and cross-sectional units are uncorrelated with one another, as are the individual error components. This model has the advantage of producing efficient results while being consistent in the absence of correlation between the explanatory variable and the unit-effect. This model can also integrate time-invariant variables.

Therefore, the equation will be rewritten as follows:

$$WAGE_{it} = \beta_0 + \beta_1 PGR_{it} + \beta_2 TO_{it} + \beta_3 FDI_{it} + \beta_4 EDU_{it} + \beta_5 lnGDP_{it} + \beta_6 UEMP_{it} + \beta_7 INF_{it} + \varepsilon_{it} + \mu_{it} \quad (7)$$

3.3.2 The Selection of Panel Data Models

To choose the most suitable model between POLS, FEM, and REM, the Breusch and Pagan Lagrangian Multiplier Test (BP-LM) and the Hausman Test for REM are going to be performed.

3.3.2.1 Breusch and Pegan Lagrangian Multiplier (BP-LM) Test for REM

Breusch and Pagan Lagrangian Multiplier Test (BP-LM) will be used to determine the best module among POLS and REM. Trevor Breusch and Pagan created this test in 1979. H_0 will be rejected if the p-value is below than the 1%, 5%, or 10% level of significance (α). As a result, the REM model outperforms the POLS. The hypothesis is given as follows:

H_0: Poolability Test
H_1: Non-Poolability Test

3.3.2.2 Hausman Test

The Hausman Test is used to find the most appropriate model between FEM and REM by comparing the random effect and fixed effect estimators. Jerry Hausman devised this exam in 1978 and dubbed it the Hausman exam. When FEM outperforms H_0, it will be dismissed. The ε_{it} in the sample will be conditional owing to statistical judgements about the cases. The hypothesis is given as follows:

H_0: REM is more preferred
H_1: FEM is more preferred

3.3.3 Diagnostic Test

3.3.3.1 Heteroscedasticity

The heteroscedasticity test will determine if the error term has constant variance. Test the null hypothesis that $V(\varepsilon_j) = \sigma^2$ for all j, indicating that the error term has constant variance. On the other hand, the alternative hypothesis shows that the error term's variance is not constant. The modified Wald test technique is utilised in this report, and H_0 is rejected when the P-value is less than the level of significance (α). The hypothesis is stated as follows:

H_0: Heteroscedasticity does not exist
H_1: Heteroscedasticity exist

3.3.3.2 Autocorrelation

Another name for autocorrelation is serial correlation. It describes the relationship between the proximity of variables and observations over different time periods. Autocorrelation is calculated using the mean and variance functions. Autocorrelation is a common problem in time series data, where the error components are significantly correlated if the function's covariance is greater than zero.

H_0: The residuals have no autocorrelation
H_1: The residuals have autocorrelation

3.3.3.3 Multicollinearity

STATA uses the Variance inflation factor (vif) to detect multicollinearity. If the mean vif is more than 10, there is a concern with multicollinearity. If vif is < 10, it indicates no multicollinearity, which aligns with the benefit of utilising panel data

- reduced collinearity. If multicollinearity occurs, it can be reduced by dropping the highest vif variable. Nevertheless, the theory will give guidance on which variables should be kept or dropped from the estimation.

3.4 Panel-corrected Static Panel

PCSE is frequently using as the examination of time series and cross-sectional data, and it can estimate correct standard errors (Reed & Webb, 2010). Parameters are first estimated using OLS before switching to PCSE; nevertheless, if residual difficulties in OLS such as heteroscedasticity and serial correlation exist, PCSE will take over to generate an estimate that is more correct. The standard error estimation derived by PCSE addresses the residual issue; thus, by employing PCSE, the previously encountered and discovered residual problem is overcome. The formula depicted below is the PCSE equation, which was specifically developed for panel data.

The panel-correct standard error can be used to calculate the square roots of the matrix's diagonal elements.

$$cov(b) = (X'X)^{-1}(X'(\phi \otimes I_T)X)\ (X'X)^{-1} \quad (8)$$

Where,

ϕ = N x N matrix along to the $(i,j)^{th}$ component determined through:

$$\frac{\left(\sum_{t}^{T} = 1\ \hat{e}_{i,t}\hat{e}_{j,t}\right)}{T} \tag{9}$$

3.5 Model Specification

$$WAGE_{it} = \beta_0 + \beta_1 PGR_{it} + \beta_2 TO_{it} + \beta_3 lnFDI_{it} + \beta_4 EDU_{it} + \beta_5 lnGDP_{it} + \beta_6 UEMP_{it} + \beta_7 INF_{it} + \alpha_i + \mu_{it}$$

Where,

WAGE = Wage Differential

PGR = Population Gender Ratio (Female to Male)

TO = Trade Openness

lnFDI = Foreign Direct Investment

EDU = Educational Level

lnGDP = Gross Domestic Product

UEMP = Unemployment Rate

INF = Inflation Rate

WAGE = Labor income share as a percent of GDP (%) - Annual

PGR = Ratio of female to male labor force participation rate (%) (modeled ILO estimate)

TO = Trade (% of GDP)

lnFDI = Foreign direct investment, net inflows [current US$]

EDU = Tertiary School Enrollment (%)

lnGDP = GDP per capita (current US$)

UEMP = Unemployment, total (% of total labor force) (modeled ILO estimate)

INF = Inflation, consumer price (annual %)

μ = Error

t = Time period

α = unidentified intercept

3.6 Conclusion

In this chapter, we laid out the research methodologies that would be used in this study. Our data is a panel dataset gathered on an annual basis from 2015 to 2020. Furthermore, this chapter provided an explanation for each model that would be used in this study. The results and findings will be detailed in the next chapter.

Chapter 4: Data Analysis

4.0 Introduction

In this chapter, the study will show out the model that have discussed in the previous chapter by conducting a step-by-step regression analysis to test out research objectives. Also, this analysis will use the static panel as the basis for the regression analysis progress.

Table 4.1: Correlation matrix

	WAGE	PGR	LNFDI	TO	EDU	LNGDP	UEMP	INF
WAGE	1.0000							
PGR	0.1722	1.0000						
LNFDI	0.4046	0.0445	1.0000					
TO	-0.1496	0.4025	0.1753	1.0000				
EDU	0.1703	0.1807	0.3950	0.3240	1.0000			
LNGDP	-0.0183	1.3021	0.3322	0.4040	0.5886	1.0000		
UEMP	0.1590	-0.1143	-0.1756	-0.1441	0.2875	-0.1701	1.0000	
INF	-0.1751	-0.4141	-0.0966	-0.0091	-0.0091	-0.3828	0.3005	1.0000

Source: Developed via STATA for research purpose

4.1 Results of Descriptive Analysis

Table 4.2: Summarize Statistic

Variables	Observations	Mean	Std. Dev	Min	Max
WAGE	180	44.5527	7.9072	25.743	61.228
PGR	180	65.1128	19.1231	20.3967	92.1974
lnFDI	167	21.7901	1.9745	14.7899	25.3800
TO	178	88.4521	57.3616	24.7016	332.7738
EDU	171	45.0234	25.9866	8.2705	118.8837
lnGDP	180	8.8024	1.2298	6.7802	11.1122
UEMP	180	5.4199	3.8281	0.1000	16.6000
INF	180	3.9273	5.2042	-2.5403	39.9074

Source: Developed via STATA for research purpose

Based on the results provided in the table above, the population gender ratio of all Asian nations has an average of 65.1128, with a minimum of 20.3967 and a maximum of 92.1974. Aside from that, trade openness in Asian nations has the highest mean value of 88.4521 with a minimum of 24.7016 and a maximum of 332.7738. Furthermore, the average foreign direct investment inflow of Asian nations is 21.7901, with a minimum of 14.7899 and a high of 25.3800. Furthermore, the average school enrolment of tertiary education of Asian nations is 45.02% of GDP, with a minimum of 8.2705 and a high of 118.8837.

4.2 Static Panel (POLS, FEM, REM)

4.2.1 Result of Estimated Model

The data is analysed using three alternative estimating approaches. Pooled Ordinary Least Squares (POLS), Fixed Effect Models (FEM), Random Effect Models (REM), and Panel Corrected Standard Error (PCSE) are used in this study to examine and explain the influence of independent factors on dependent variables such as Asia countries' wages. Breusch and Pagan's Lagrange Multiplier test and the Hausman test are utilised to determine which model is most suited for this research. The results of the Breusch and Pagan Lagrange Multiplier test and the Hausman test in Section 4.3 indicate that the FEM model is preferred.

Based on the FEM results, only TO is significant with the right sign, whereas all other factors are not significant. As a result, the findings show that Asia is a trade-opened country. The FEM posits that λ_i are picked separately via a certain probability distribution. Several economic concepts are fundamentally stagnant Law (2018). Hence, a static panel should be considered. Also, the Stolper-Samuelson Theorem will be used as a theory in this data analysis.

The results of the Breusch and Pagan Lagrange Multiplier test and the Hausman test in Section 4.3 suggest that Fixed Effect Models (FEM) are preferred. The results show that the **PGR** is a statically significant result with a positive sign; with 1% increase in population gender ratio, on typical, has a positive relationship impact on increasing WAGE by 9.92% with statically significance at the level of 0.05, holding the other variables unchanged. This result is consistent with the existing literature, that is, countries with more female labor participation in the labor market will increase their wage rate (Ahmed & McGILLIVRAY, 2015). Hence, the result

that there is a statistically significant link between increases in female labour force participation compared to male labour force involvement and increases in median wages in the study population.

Furthermore, the statically significant result with a negative sign of **TO** shows that the wage of Asia countries will decrease, or the wage differential will become larger when the trade openness increase. With 1% increase in trade openness (TO), on average has negative relationship effect of decreasing the WAGE by 4.49% with statically significance at the level of 0.1, holding constant with other variables. When workers face the competition of open trade, the cost when they switch to other industries is higher, which leads to the loss of their wages and benefits, while when other workers face the same switching shock, the switching cost is lower Brussevich (2018). Wage of workers with higher costs who switch to other industries will be lower than that of workers with lower costs. This will lead to the widening of the wage differential between the two sides.

In addition, the **LNFDI** is statically significant result with a positive sign with 1% increase in foreign direct investment (LNFDI), on average has positive relationship effect of increasing the WAGE by 2.1119 units with statically significance at the level of 0.01, holding constant with other variables. This positive relationship has brought more employment opportunities, technology transfer and economic growth because of FDI, thus improving the supply and demand of the labor market, and further promoting the growth of the wage level. This result is consistent with the

existing literature, that is, countries with more foreign direct investment inflow will increase their wage rate (Feng & Wen, 2023; Noria, 2015; Olivo & Post, 2022; Laffineur & Gazaniol, 2019).

Besides, the **INF** is statically significant result with a negative sign with 1% increase in inflation rate (INF), on average has negative relationship effect of decreasing the WAGE by 0.4309 units with statically significance at the level of 0.10, holding constant with other variables. According to Donayre & Panovska (2018), countries with high inflation rate in consumer prices are more likely to decrease the wage rate on those particular countries as the inflation rate is the major determinant of wage rate. This shows that the rate of inflation may have an influence on wages, but not a significant one.

Moreover, through the finding, we found that EDU, LNGDP and UEMP are all insignificant. Therefore, wages are not sensitive to the educational level, gross domestic product, and unemployment rate of the Asia countries.

Table 4.3 The Result of Estimated Model

Estimated Model				
Variables	(1) POLS	(2) REM	(3) FEM	Panel Corrected
PGR	0.0992***	0.0638	-0.0176	0.0992**
	(0.0300)	(0.0575)	(0.1089)	(0.0455)
LNFDI	2.1119***	0.2164	0.1726	2.1119***
	(0.3040)	(0.2164)	(0.2272)	(0.6081)
TO	-0.0449***	-0.0304**	-0.0446**	-0.0449*
	(0.0105)	(0.0155)	(0.0206)	(0.0250)
EDU	0.0363	0.0541*	0.0284	0.0363
	(0.0302)	(0.0304)	(0.0368)	(0.0899)
LNGDP	-1.7990***	-1.4912	-2.2889	-1.7990
	(0.6162)	0.9361	(1.5855)	(1.3191)

UEMP	0.4804***	-0.0384	-0.1629	0.4804
	(0.1583)	(0.1470)	(0.1709)	(0.3184)
INF	-0.4309***	-0.0668	-0.0817	-0.4309**
	(0.1122)	(0.0488)	(0.0562)	(0.1908)
Constant	9.6302	48.0483***	66.2657***	9.6302
	(8.5519)	(8.8937)	(14.0766)	(15.6856)
Observations	157	157	157	157
Number of group	-	30	30	30
R-squared	0.4098	0.2028	0.0244	0.4098
Breusch-Pagan LM test	224.34 (0.0000)***		-	-
Hausman test	-	15.58 (0.0293)**		-
Heteroskedasticity (x^2 - stat)	-	-	5558.92 (0.0000)***	
Serial Correlation (F-stat)	-	-	22.336 (0.0001)***	-

Source: Developed via STATA for research purpose

Note: The result is generated from Panel Corrected Standard Error (PCSE)

* p<0.01, ** p<0.05, * p<0.1

LNFDI = foreign direct investment

PGR = population gender ratio (female to male)

TO = trade openness

EDU = educational level

LNGDP = GDP

UEMP = unemployment rate

INF = inflation rate

4.3 The selection of Panel Data Models

The Breusch and Pagan Lagrange Multiplier (BP-LM) Test for Random Effect and the Hausman Test are used to choose the best regression model between Pooled Ordinary Least Squares (POLS), Fixed Effect Model (FEM), and Random Effect Model (REM).

4.3.1 Breusch and Pagan Lagrange Multiplier (BP-LM) for Random Effect

The Breusch and Pagan Lagrange Multiplier (BP-LM) test is used to find the best model among Pooled Ordinary Least Squares (POLS) and Random Effect Model (REM). The outcomes are presented in Table 4.4

Table 4.4: The estimated results of BP-LM test

	Estimated Model	
	Var	sd = sqrt (Var)
WAGE	61.9530	7.8710
e	2.5678	1.6024
U	44.1364	6.6435
Var (u) = 0		
	chibar2 (01) = 224.34	
	Prob > chibar2 = 0.0000	

Source: Developed via STATA for research purpose

Based on Table 4.4, the estimated model result reveals that the p-value of the chibar-square is 0.0000, implying that the H_0 is rejected. The p-value is less than the significance level of 0.01. As a result, the REM model outperforms the POLS.

4.3.2 Hausman Test

The Hausman test is used to determine the preferred model between the Fixed Effect Model (FEM) and the Random Effect Model (REM), and the findings are displayed at Table 4.5.

Table 4.5: Result of Hausman Test

Estimated Model	
chi2 (7)	= 15.58
Prob > chi2	0.0293

Source: Developed via STATA for research purpose

Based on Table 4.5, in the estimated model, the p-value of the chi-square is 0.0293. This has led to the conclusion that H_0 should not be rejected, as the probability value of 0.0293 above the significance level of 0.05. As a result, the FEM model is recommended.

In summary, the findings of the Breusch-Pagan LM test and the Hausman test show that the FEM model is chosen in the estimated model. Therefore, FEM model in estimated model will be used to find the diagnostic problem.

4.4 Diagnostic Tests

4.4.1 Autocorrelation

Table 4.6: Result of Autocorrelation

Wooldridge test for autocorrelation in panel data
Estimated Model for FEM
F (1, 26) = 22.336
Prob > F = 0.0001

Source: Developed via STATA for research purpose

Table 4.6 presents the results of the Wooldridge test on a random effect regression model to evaluate if the variables in the panel data are autocorrelation. Based on the results of the estimated model FEM, the p-value of the F-statistic equals 0.0001, indicating that the Ho is rejected. The value of the probability is lower than the significance threshold of 0.01. As a result, it was determined that the residuals were autocorrelated.

4.4.2 Heteroskedasticity

Table 4.7: The Results of Heteroskedasticity

Modified Wald Test for groupwise heteroskedasticity in fixed effect regression model (FEM)
H0: sigma(i)^2 = sigma^2 for all i
chi2 (30) = 5558.92 Prob>chi2 = 0.0000

Source: Developed via STATA for research purpose

Table 4.7 explains how to use the Modified Wald test on a fixed effect regression model to determine if the error components have constant variance. According to the findings, the p-value of the chi-square is 0.0000. The outcome shows that the hypothesis is rejected since the probability value is less than the significance threshold of 0.01. Therefore, there is heteroscedasticity in the estimated model.

4.4.3 Multicollinearity

Table 4.8: Results of Variance Inflation Factor Test

Estimated Model (FEM)		
Variable	VIF	1/VIF
PGR	1.37	0.7293
LNFDI	1.34	0.7450
TO	1.40	0.7166
EDU	2.55	0.3928

LNGDP	2.25	0.4447
UEMP	1.54	0.6478
INF	1.50	0.6659
MEAN VIF	1.71	

Source: Developed via STATA for research purpose

Table 4.9 presents the results of the variance inflation factor (VIF) test. According to the data, the estimated model (FEM) with a mean VIF is 1.18, which is less than the value 5. As such, the findings revealed that there is no difficulty with multicollinearity. As a consequence, the findings revealed that there is no difficulty with multicollinearity.

4.5 Conclusion

The purpose of this research is to study the factor of international trade which are foreign direct investment, population gender ratio, trade openness, gross domestic product per capita, unemployment rate, inflation rate, educational level that affect wages on Asia countries. The Fixed Effect Model (FEM) is chosen due to the significant value on Hausman Test. We had found positive relationship on population gender ratio and foreign direct investment, whereas the trade openness, and inflation rate has a negative impact on Asia countries' wage rate. Besides, the educational level, gross domestic product per capita, and unemployment rate were not significant.

Chapter 5.0: Conclusion

5.0 Introduction

This chapter will analyse and examine the preceding chapter's findings more deeply detail, as well as outline the implications of the research. Furthermore, the limitations of this study were discussed, and recommendations were made to researchers to help them do additional research on this issue. Finally, the conclusion will be discussed at the end of this study. Finally, when the study comes to a close, the conclusion will be discussed.

5.1 Summary and Discussion on Major Findings

Based on the Fixed Effect Model (FEM) result, only the trade openness (TO) has significant and negative relationship with wage rate (WAGE), while the foreign direct investment (lnFDI), and population gender ratio (PGR), inflation rate (INF), educational level (EDU), gross domestic product (lnGDP) and unemployment rate (UEMP) don't have a significant relationship with wage rate (WAGE).

So, for the diagnostic tests, the Heteroskedasticity Modified Wald test revealed that there is a heteroskedasticity in residuals. The residuals have a serial correlation based on the result of Wooldridge Test for autocorrelation, Furthermore, the residuals also don't have multicollinearity issues based on the Multicollinearity Test are lesser than 5.

To solve the standard error problem, based on the Panel-corrected Standard Error (PCSE) result, the trade openness (TO), and inflation rate (INF) has significant and negative relationship with wage rate (WAGE), whereas the foreign direct investment (lnFDI), and population gender ratio (PGR) has significant and positive

relationship with wage rate (WAGE). Besides, Educational Level (EDU), Gross Domestic Product (lnGDP) and unemployment rate (UEMP) don't have a significant relationship with wage rate (WAGE).

Based on the research results, it shows that the foreign direct investment inflow had performed a positive and significant toward Asia countries' wage rate. The result is consistent with (Noria, 2015; Olivo & Post, 2022; Laffineur & Gazaniol, 2019). which found positive result shows that Asia countries' wage is increased by the foreign direct investment inflow of foreign countries and Feng & Wen (2023) which found that FDI have a significant impact on the wage of Asia countries. Therefore, foreign countries that inflow the foreign direct investment is able to increase Asia countries' motivation to increase the domestic wage level. Moreover, another variable tested in this research, trade openness is negatively associated with Asia countries' wage rate. The result is consistent with Brussevich (2018) which conclude that trade openness is the main consideration of the government and companies to make decision on the wage rate for their labor, while the trade openness will enhance competition between domestic and international companies. As a result, domestic companies will cut expenses, including wages, in order to preserve their worldwide competitiveness. Hence, a higher trade openness will intend to reduce the Asia countries' wage rate.

Furthermore, the population gender ratio (female to male) of Asia counties is positively associated with Asia countries' wage rate. The result is consistent with the findings of (Ahmed & McGILLIVRAY, 2015) which found that the increases of population gender ratio of female labor of Asia countires shows statistically significant effect on probability Asia countries' wage rate. Therefore, if the participation rate of female labor keep increasing, Asia countries will make the domestic government association more involved in the task of women's education and training, so as to improve their education and skills. Best, pray that female workers with education level will be more competitive than male workers, so they will get higher wages. Lastly, the inflation rate Inflation refers to the rate at which

prices rise over time (Oner, 2019). The result showed positively associated with Asia countries' wage rate which consistent with the finding of Donayre & Panovska (2018) where they had concluded that there is a negative correlation between inflation and wage growth, especially during the economic depression. Thus, Asia countries with high inflation rate will lead to a decrease of purchasing power parity, and this circulations will make the wage growth of Asia countires relatively low.

5.2 Implication of Study

5.2.1 Managerial Implications

The government can take measures to optimize the trade policy to maximize the economic growth potential of trade, while ensuring that wages are not excessively affected. This policy will enable Asian governments to achieve a win-win situation in economy. For instance, the government can sign Free Trade Agreement (FTA) with many countries, which can not only promote trade opnness, but also reduce the risk of dependence on some countries. In this way, it can bring a lot of investment and trade to Asian countries and create a lot of employment opportunities. In this way, increasing the supply in the labor market can not only reduce the unemployment rate, but also raise the wage level. In addition, trade openness can improve efficiency, lower the cost of production, this will lead to more competitiveness for the enterprises and this circumstances will make the firm more ability to wage higher wages to attract or re Main the employee with high education and technical level. At the same time, Asian governments not only promoted the economic growth of their own countries, but also guaranteed the wage level of workers, killing two birds with one stone.

Furthermore, promoting gender equality in employment opportunities is a major issue that Asian countries must measure now. After all, many Asian countries are still facing gender inequality, such as Iran. Thus, the local government and businesses can build a policy, and training for Asia countries to promote equal job opportunities and wages. For example, Asian governments can issue a gender equality policy. Such a policy can help male and female workers of different sexes in Asian countries enjoy equal and fair rights and interests in employment and reproduction. In this way, employers can treat employees of different sexes more fairly in the process of hiring people to work, such as during interviews. Best, some companies can also hold some training, such as gender equality training. This type of training can help employees understand more clearly the consequences of gender inequality for themselves and the country. For female employees, more training can be set up to improve their educational and technical level, so as to help them raise their own wages, thus narrowing the wage differential with male employees.

Moreover, for Asian countries, if we don't strengthen supervision, some enterprises will exploit the welfare and wage of workers, which is what no one wants to see. Therefore, strengthen supervision is very important for Asian countries, which can solve the problem of labor exploitation or unfair wages caused by foreign direct investment and trade activities. For instance, domestic government for Asia countries can strengthen the supervision of the inflow of foreign direct investment, such as setting up some regulatory agencies. In this way, we can better supervise and review any latest inflow of foreign investment by checking the living conditions and wage of workers in the factory. This will not only ensure that local workers are treated fairly in all kinds of benefits, but also ensure that the foreign investment complies with the labor laws of this Asian country.

5.3 Limitation

First and foremost, some countries' data might have a blank for one or two particular years, So the data might integrity to this study. This is due to the reasons that some of the Asia countries do not disclose their data to World Bank or other databases for particular year. This situation may make it more difficult to effectively compare and contrast trends or patterns. Due to some Asian countries don't disclose all relevant data publicly at all, this study only covers 30 Asian countries, but does not include 18 other countries. This is one of the limitations of study, which will make it impossible for this study to understand the specific situation of Asia in depth and comprehensively. This is because other 18 countries may have different situations from these 30 Asian countries in terms of economic urgency. Moreover, because this study only covers 30 Asian countries, there are still many continents and countries in the world worth discussing, so there are limitations of regional differences. It does not include countries such as Europe, so it may not be possible to fully understand the differences in other parts of the world.

5.4 Recommendation for Future Study

Thus, because the data in some years of this study is not complete enough, future researchers can find some alternative data sources as an alternative solution. The researchers in future study can supplement the integrity of the study data by looking for more databases, such as the database applying to enter the country, to collect unpublished data, so as to provide a more accurate result for this future study in the future. At the same time, the future researchers should carefully consider the source of this data, such as reliability. Furthermore, the future researchers can include the remaining 18 countries when studying Asian countries. This will make the data more complete, and secondly, it may also make the research results different. With the passage of time, some Asian countries that have not reported their data may

make their data more transparent and open, and even upload them to the World Bank database, so that the researchers who conduct future study can improve the quality of their own study data. Not only that, the future researchers can also expand the scope to include other continents and countries in future research, such as developed and developing countries. In this way, the future researchers can have a more comprehensive understanding of the characteristics of the labor market in various countries and industries around the world, and the newly added data can also make the research results more diversified.

5.5 Conclusion

To sum up, this research is carried out to identify the factors that affect wage rate in the perspective of Asia countries. China foreign direct investment (FDI), population gender ratio (female to male), trade openness, and inflation rate are the main factors affecting the Asia countries' wage rate. The research findings are consistent with the assumptions and hypothesis made in the earlier chapter as foreign direct investment, population gender ratio of Asia countries have positive relationship whereas Asia countries' trade openness and inflation rate has negative relationship to Asia counties wage rate.

The Asia countries' policy makers are encouraged to Optimise trade policy to maximise the economic development potential of trade while making sure wages are not too impacted. Besides, Asia countries' policy makers are encouraged to promote gender equality in work possibilities by developing a policy and providing training to Asian countries to encourage equal job opportunities and wage levels. Also, the policy makers in Asia countries should also strengthen monitoring to prevent some firms from exploiting workers' welfare and wages.

Last but not least, there is a limitation in this study which some countries' data might have a blank for one or two particular years that might not provide an accurate results and consist only 30 countries out of 48 countries in Asia countries due to the 18 countries' data were highly unbalanced and have mass missing data as well as there are still many continents and countries in the world worth discussing instead of the 30 Asia countries such as developed and developing countries or Europe. Hence, recommendation is given as an advice to further improvement for the future study.

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Appendices

Appendix 1.1: Correlation Matrix

(obs=157)

	WAGE	PGR	lnFDI	TO	EDU	lnGDP	UEMP	INF
WAGE	1.0000							
PGR	0.1722	1.0000						
lnFDI	0.4046	0.0445	1.0000					
TO	-0.1496	0.4025	0.1753	1.0000				
EDU	0.1703	0.1807	0.3950	0.3240	1.0000			
lnGDP	-0.0183	0.3021	0.3322	0.4040	0.5886	1.0000		
UEMP	0.1590	-0.1143	-0.1756	-0.1441	0.2875	-0.1701	1.0000	
INF	-0.1751	-0.4141	-0.0966	-0.2993	-0.0091	-0.3828	0.3005	1.0000

Appendix 1.2: Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
WAGE	overall	44.55271	7.907236	25.743	61.228	N =	180
	between		7.872819	28.27117	59.876	n =	30
	within		1.50812	39.05271	48.86371	T =	6
PGR	overall	65.11277	19.12307	20.39668	92.1974	N =	180

```
         between |             19.3419   23.11785   91.84758 |      n =       30
         within  |             1.425721   61.77643   71.36785 |      T =        6
                 |                                           |
lnFDI    overall |  21.79009   1.974441   14.78986   25.38001 |      N =      167
         between |             1.988712   15.78541    25.1345 |      n =       30
         within  |              .570385   19.32617   23.31761 | T-bar = 5.56667
                 |                                           |
TO       overall |  88.45211   57.36159   24.70158   332.7738 |      N =      178
         between |             57.41864   26.68495     321.46 |      n =       30
         within  |             7.215048   65.42932   108.7553 |      T = 5.93333
                 |                                           |
EDU      overall |   45.0234   25.98658   8.270536   118.8837 |      N =      171
         between |             26.10992   9.126032   110.1943 |      n =       30
         within  |              3.95047   27.46241   60.29894 | T-bar =      5.7
                 |                                           |
lnGDP    overall |  8.802382   1.229757   6.780178   11.11222 |      N =      180
         between |             1.242476   6.945283   11.02144 |      n =       30
         within  |             .1080661   8.378016   9.118411 |      T =        6
                 |                                           |
UEMP     overall |  5.419944   3.828093         .1       16.6 |      N =      180
         between |             3.778489       .135   13.83667 |      n =       30
         within  |             .8809711   2.134944   10.01494 |      T =        6
                 |                                           |
INF      overall |    3.9273   5.204241  -2.540315   39.90735 |      N =      180
         between |             4.384292  -.3244931   19.38177 |      n =       30
         within  |             2.898108  -8.209047   24.45287 |      T =        6
```

Appendix 1.3: Pooled Ordinary Least Squares (POLS)

```
      Source |       SS           df       MS      Number of obs   =       157
-------------+----------------------------------   F(7, 149)       =     14.78
```

```
       Model |  3960.75732         7  565.822475   Prob > F        =    0.0000
    Residual |  5703.91076       149  38.2812803   R-squared       =    0.4098
-------------+------------------------------   Adj R-squared   =    0.3821
       Total |  9664.66809       156  61.9530006   Root MSE        =    6.1872

------------------------------------------------------------------------------
        WAGE |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         PGR |   .0991582   .0299737     3.31   0.001     .0399297    .1583866
       lnFDI |   2.111864    .304043     6.95   0.000     1.511071    2.712657
          TO |  -.0448613   .0104595    -4.29   0.000    -.0655294   -.0241931
         EDU |   .0362697   .0301514     1.20   0.231    -.0233099    .0958492
       lnGDP |  -1.799004   .6162292    -2.92   0.004    -3.016681   -.5813274
        UEMP |   .4804336   .1583321     3.03   0.003     .1675672    .7932999
         INF |   -.430884    .112154    -3.84   0.000    -.6525017   -.2092662
       _cons |   9.630242   8.551906     1.13   0.262    -7.268436    26.52892
------------------------------------------------------------------------------
```

Appendix 1.4: Fixed Effect Model (FEM)

```
Fixed-effects (within) regression               Number of obs      =       157
Group variable: Code                            Number of groups   =        30

R-sq:                                           Obs per group:
     within  = 0.0711                                         min =         2
     between = 0.0281                                         avg =       5.2
     overall = 0.0244                                         max =         6

                                                F(7,120)           =      1.31
corr(u_i, Xb)  = -0.3239                        Prob > F           =    0.2505
```

WAGE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
PGR	-.0175586	.1089426	-0.16	0.872	-.2332574	.1981403
lnFDI	.1725588	.2271888	0.76	0.449	-.2772592	.6223768
TO	-.0446088	.0205783	-2.17	0.032	-.0853525	-.0038651
EDU	.0283771	.0367597	0.77	0.442	-.0444045	.1011587
lnGDP	-2.288854	1.585544	-1.44	0.151	-5.42812	.8504123
UEMP	-.1629022	.1708548	-0.95	0.342	-.5011829	.1753785
INF	-.0816783	.0561552	-1.45	0.148	-.1928616	.0295051
_cons	66.2657	14.07664	4.71	0.000	38.39494	94.13646

sigma_u	8.1354396	
sigma_e	1.6024449	
rho	.96265149	(fraction of variance due to u_i)

F test that all u_i=0: F(29, 120) = 72.46 Prob > F = 0.0000

Appendix 1.5: Random Effect Model (REM)

Random-effects GLS regression Number of obs = 157

Group variable: Code Number of groups = 30

R-sq: Obs per group:

within = 0.0508 min = 2

between = 0.2126 avg = 5.2

overall = 0.2028 max = 6

Wald chi2(7) = 13.18

corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0677

WAGE	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
PGR	.0638459	.057448	1.11	0.266	-.0487502	.1764419
lnFDI	.310393	.2164181	1.43	0.152	-.1137787	.7345648
TO	-.0361136	.0155192	-2.33	0.020	-.0665307	-.0056965
EDU	.0540601	.0303723	1.78	0.075	-.0054686	.1135888
lnGDP	-1.491193	.936114	-1.59	0.111	-3.325943	.3435569
UEMP	-.0383859	.1470203	-0.26	0.794	-.3265403	.2497685
INF	-.0668489	.0488345	-1.37	0.171	-.1625628	.028865
_cons	48.04829	8.893701	5.40	0.000	30.61695	65.47962
sigma_u	6.6435229					
sigma_e	1.6024449					
rho	.94501933	(fraction of variance due to u_i)				

Appendix 1.6: Breusch and Pagan Lagrangian Multiplier Test for Random Effects

```
Breusch and Pagan Lagrangian multiplier test for random effects

        WAGE[Code,t] = Xb + u[Code] + e[Code,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                    WAGE |      61.953       7.871023
                       e |     2.56783       1.602445
                       u |     44.1364       6.643523

        Test:   Var(u) = 0
```

```
                        chibar2(01) =   224.34
                      Prob > chibar2 =   0.0000
```

Appendix 1.7: Hausman Test

```
                ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |     fixed          .          Difference          S.E.
-------------+------------------------------------------------------------------
         PGR |   -.0175586     .0638459       -.0814044        .0925647
       lnFDI |    .1725588      .310393       -.1378342        .0691226
          TO |   -.0446088    -.0361136       -.0084953        .0135138
         EDU |    .0283771     .0540601        -.025683        .0207073
       lnGDP |   -2.288854    -1.491193       -.7976611        1.279703
        UEMP |   -.1629022    -.0383859       -.1245163        .0870426
         INF |   -.0816783    -.0668489       -.0148294        .0277235
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       15.58
                Prob>chi2 =      0.0293
                (V_b-V_B is not positive definite)
```

Appendix 1.8: Cluster Code for POLS

```
Linear regression                               Number of obs     =        157
                                                F(7, 29)          =       6.25
                                                Prob > F          =     0.0002
```

```
                                                R-squared         =     0.4098
                                                Root MSE          =     6.1872

                                    (Std. Err. adjusted for 30 clusters in Code)
------------------------------------------------------------------------------
             |               Robust
        WAGE |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         PGR |   .0991582   .0454538     2.18   0.037     .0061947    .1921216
       lnFDI |   2.111864   .6080609     3.47   0.002     .8682394    3.355488
          TO |  -.0448613   .0249517    -1.80   0.083    -.0958933    .0061708
         EDU |   .0362697    .089933     0.40   0.690    -.1476639    .2202033
       lnGDP |  -1.799004   1.319143    -1.36   0.183    -4.496954    .8989453
        UEMP |   .4804336   .3183563     1.51   0.142    -.1706782    1.131545
         INF |   -.430884   .1908312    -2.26   0.032    -.8211775   -.0405904
       _cons |   9.630242   15.68555     0.61   0.544    -22.45031    41.71079
------------------------------------------------------------------------------
```

Appendix 1.9: Autocorrelation Test

```
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,      26) =     22.336
           Prob > F =      0.0001
```

Appendix 1.10 Heteroskedasticity Test

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i
```

```
chi2 (30)  =    5558.92

Prob>chi2 =      0.0000
```

Appendix 1.11: Variance Inflation Factor

Variable	VIF	1/VIF
EDU	2.55	0.392826
lnGDP	2.25	0.444744
UEMP	1.54	0.647772
INF	1.50	0.665926
TO	1.40	0.716647
PGR	1.37	0.729307
lnFDI	1.34	0.745014
Mean VIF	1.71	