PANEL AND SPATIAL PANEL MODEL OF UNEMPLOYMENT RATE FOR SELECTED ASIAN COUNTRIES

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PANEL AND SPATIAL PANEL MODEL OF UNEMPLOYMENT RATE FOR SELECTED ASIAN COUNTRIES

by

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TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

LIST OF ABBREVIATIONS

UR	Unemployment Rate
ILO	International Labour Organization
SARS	Severe Acute Respiratory Syndromes
USD	United States Dollar
GDP	Gross Domestic Product
AI	Artificial Intelligence
ESCAP	Economic and Social Commission for Asia and the Pacific
ADB	Asia Development Bank
UNDP	United Nations Development Programme
GINI	Gender Inequality National Index
UNESCO	United Nations Educational, Scientific and Cultural Organization
MIER	Malaysia Institute of Economic Research
EFI	Economic Freedom Index
LSDV	Least Square Dummies Variables
POLS	Pooled Ordinary Least Squares
OLS	Ordinary Least Squares
FEM	Fixed Effect Model
REM	Random Effect Model
GMM	Generalized Method of Moment
Diff-GMM	Difference of Generalized Method of Moment
STATA	Statistics and Data
GeoDa	Geographic Data Analysis
IEF	Index of Economic Freedom

OECD	Organisation for Economic Co-operation and Development
WGI	Worldwide Governance Indicators
SA	South Asia
WDI	World Development Indicators Governance Indicators
LAC	Latin America and the Caribbean
EA	East Asia
MENA	Middle East and North Africa
FDSD	Foundation for Democracy and Sustainable Development
FDI	Foreign Direct Investment
ICT	Information and Communications Technology
HDI	Human Development Index
HD	Human Development
HDR	Human Development Report
UNDP	United Nations Development Program
SGMM	System Generalized Method of Moments
CIPS	Cross-sectionally augmented Im-Pesaran-Shin (CIPS)
CADF	Cross-section Augmented Dickey-Fuler
GNS	General Nesting Spatial
LR	Likelihood Ration
LM	Langrage Multiplier
ML	Maximum Likelihood
US	United State
SLX	Spatial Panel Models
SDEM	Spatial Durbin Error Model
SECM	Spatial Error Correction Model

SDM	Spatial Durbin Models
GLS	Generalized Least Squares
LSDV FEM	Least Squares Dummy Variables Fixed Effect Model
SEM	Spatial Error Model
SAC	Spatial Autoregressive Combined Model
MLE	Maximum Likelihood Estimation
IV	Instrumental Variables
FGLS	Feasible Generalized Least Square
SAR	Spatial Auto Regressive
SLX	Spatial Lag of X Model
SARAR	Spatial autoregressive model with *spatial* autoregressive disturbances
SLM	Standard Linear Regression Model
SAC	Spatial Autocorrelation Model
GNS	General Nesting Spatial Models
SWM	Spatial Weight Matrix
IDW	Inverse Distance Weighting
QML	Quasi Maximal Likelihood
MCMC	Bayesian Markov Chain Monte Carlo
AIC	Akaike Information Criterion
BIC	Bayesian Information Criterion
SYS-GMM	System Generalized Moment Method
AB-Test	Arellano and Bond Test
HH	High-High Unemployment Rate Neighbours
LL	Low-Low Unemployment Rate Neighbours
LH	Low-High Unemployment Rate Neighbours

HL	High-Low Unemployment Rate Neighbours
LSDV	Least Square Dummy Variables
EFI	Economic Freedom Index
SSA	Sub-Saharan African
GSM	Global System for Mobile communication
EFI	Economic Freedom Index
PSDC	Penang Skill Development Centre
GRS	Graduate Reskilling Scheme
PSMB	Pembangunan Sumber Manusia Berhad
NGO	Non-government Organizations
LSS	Labour and Social Security
WAP	Work Appreciation Program
SPES	Program for the Employment of Students
TULAY	Tulong Alalay sa Taong May Kapansanan
LBAT	Labour-Based Appropriate Technologies
INDISCO	Indigenous and Tribal Peoples' Self-Dependence through Cooperatives and Other Self-Help Organization
SIYB	Start and Improve Your Business
JSBC	Japan Small Business Corporation
SNA	System of National Accounts
OGQ	Overall Governance Quality
OEF	Overall Economic Freedom
MBL	Mobile Subscription
FER	Fertility rate
POG	Population Growth

INF	Inflation rate
EDU	Education index
INC	Income index
MUR	Male Unemployment rate
FUR	Female Unemployment rate
LLmax	Maximum log-likelihood

LIST OF SYMBOLS

V_i	covariance matric
$\overline{X}$	mean
θ	theta, vector of fixed by unknown parameters
s^2	Variance
s	Standard deviation
$\hat{\beta}_{GLS}$	Generalized Least Square
β_{ols}	slope estimator of slope estimator
H_0	Null hypothesis
H_1	Alternative hypothesis
χ^2	Chi-Square distribution
u_i	countries different
Y_{it-1}	lagged response variable
v_{it}	well-behaved problems
λ_t	year different
a	scalar, constant term parameter
D	dummy variable
I	Moran's I test
K	dimension of β
S_0	Standard factor
W	Spatial mean matrix
μ	fixed spatial effects

W_{ij}	Spatial weight matrices
N	total number of countries
RRSS	restricted residual sum square
Ω	covariance matrix of the errors
T	total number of years
URSS	unrestricted residual sum square
Wa	Wald Statistics
Ws	weighting matrix
X_{it}	independent variables
Y_{it}	dependent variables
ε	error term
WY	endogenous interactions between dependent variables
WX	exogenous interactions between independent variables
Wu	interactions between disturbance terms of specified units
ρ	spatial autoregressive coefficient,
λ	spatial autocorrelation coefficient,

PANEL DAN MODEL PANEL RERUANG BAGI KADAR PENGANGGURAN UNTUK NEGARA ASIA TERPILIH

ABSTRAK

Kadar pengangguran sentiasa menjadi perhatian dalam konteks ekonomi global. Objektif utama penyelidikan ini adalah untuk mengkaji hubungan antara indeks kebebasan ekonomi (EFI), indeks kualiti pentadbiran, dan petunjuk ekonomi terhadap kadar pengangguran bagi beberapa negara Asia yang dipilih. Oleh itu, penyelidikan ini menerangkan dan menggunakan model data panel statik, data panel dinamik, dan data panel reruang untuk menganalisis kadar pengangguran di negara-negara Asia yang dipilih. Model Kuasa Dua Terkecil Tergembeleng (POLS), Model Kesan Tetap (FEM) dan Model Kesan Rawak (REM) telah digunakan dalam kajian ini untuk menentukan hubungan antara indeks kebebasan ekonomi dan indeks kualiti pentadbiran terhadap kadar pengangguran dari perspektif perbezaan jantina. Model Kesan Tetap (FEM) dengan sistem panel yang kukuh dan berkelompok adalah model yang paling sesuai untuk kadar pengangguran secara keseluruhan, lelaki dan wanita, yang dapat mengatasi masalah heteroskedastisiti dan isu korelasi bersiri. Beberapa indeks kebebasan ekonomi dan kualiti tadbir urus didapati signifikan dalam kajian ini. Seterusnya, kebergantungan reruang adalah satu keadaan yang mana hasil dalam sesuatu negara bergantung kepada hasil atau faktor lain dari negara lain. Semua keputusan ujian menunjukkan bahawa FEM SDM untuk kedua-dua kesan (masa dan individu) bagi kadar pengangguran keseluruhan, lelaki dan wanita adalah model yang paling sesuai. Faktor-faktor utama yang secara signifikan mempengaruhi corak kadar pengangguran keseluruhan dan lelaki dalam model negara-negara terpilih di Asia, adalah Integriti Kerajaan, Beban

Cukai, Kebebasan Monetari, Stabiliti Politik Tanpa Keganasan, dan Kualiti Peraturan. Manakala untuk kadar pengangguran wanita, Integriti Kerajaan, Beban Cukai, Kebebasan Monetari, Stabiliti Politik Tanpa Keganasan, dan Kualiti Peraturan adalah pembolehubah penerangan yang signifikan untuk antara negara.Dua jenis kaedah Momen Umum (GMM) dimasukkan, yang dikenali sebagai Perbezaan GMM (Diff-GMM) dan Sistem GMM (SYS-GMM). Keputusan analisis panel dinamik menunjukkan bahawa GMM t-2 adalah model yang paling sesuai untuk kadar pengangguran keseluruhan, kadar pengangguran lelaki dan kadar pengangguran wanita. Beberapa pembolehubah, seperti langganan telefon bimbit, Indeks Pembangunan Manusia (HDI), Pelaburan Langsung Asing (FDI), dan GDP didapati signifikan dalam mempengaruhi kadar pengangguran keseluruhan, lelaki dan wanita. Keputusan panel dan panel reruang ini sangat bernilai terutamanya untuk pembuat dasar negara-negara Asia dalam memahami trend, corak dan kesan kebebasan ekonomi, kualiti tadbir urus dan penunjuk sosioekonomi terhadap kadar pengangguran mereka.

PANEL AND SPATIAL PANEL MODEL OF UNEMPLOYMENT RATE FOR SELECTED ASIAN COUNTRIES

ABSTRACT

The unemployment rate has always been a concern in the global economic context. The main objective of this research is to examine the relationship between the Economic Freedom Index (EFI), index of Governance quality, and economic indicators on the unemployment rate for selected Asian countries. Therefore, this study explains and employs static panel data models, dynamic panel data models, and spatial panel data models to analyse the unemployment rate in the selected Asian countries. The Fixed Effects Model (FEM) with robust panel and clustering is found to be the most suitable model for overall unemployment rate, male and female, which can address heteroskedasticity and serial correlation issues. Several of the economic freedom and governance quality indices were found to be significant in this study. Furthermore, spatial dependence is a condition where the outcome in one country depends on the outcome or other factors of another country. All test results indicate that the FEM SDM for both effects (time and individual) for overall unemployment rate, male, and female is the most suitable model. The key factors that significantly affect the pattern of total and male unemployment rate of selected Asian countries' models, including Government Integrity, Tax Burden, Monetary Freedom, Political Stability No Violence, and Regulatory Quality. While for the female unemployment rate, Government Integrity, Tax Burden, Monetary Freedom, Political Stability No Violence, and Regulatory Quality are the significant explanatory variables for inter-countries. Two types of Generalized Method of Moments (GMM) methods are incorporated, known as

Difference GMM (Diff-GMM) and System GMM (SYS-GMM). The results of dynamic panel analysis show that GMM t-2 is the most suitable model for total unemployment rate, male unemployment rate, and female unemployment rate. Several variables, such as mobile phone subscriptions, the Human Development Index (HDI), Foreign Direct Investment (FDI), and GDP, were found to be significant in influencing overall, male and female unemployment rate. The results of panel and spatial panel analysis are invaluable for policymakers in Asian countries to understand trends, patterns, and effects of economic freedom, administrative quality, and socioeconomic indicators on their unemployment rates.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter begins with discussions on the background of the study. The problem statements, research questions, objectives of study, scope of study and significant of the study are also given in this chapter. The structure of the research is presented at the end of this chapter.

1.2 An Overview on Economy of Asia and Labour Market

Unemployment rate (UR) plays an important role in analysing and investigating the macroeconomic and the microeconomic success of economic stabilization of a country. Unemployment rate is one of the important key indicators concerned by labour market in all countries in the world.

In year 1997, the economic crisis occurred in South-East and East Asian countries. During the same period, there are several countries which faced faster-growing economies. South Korea, Thailand, and Indonesia were the most affected countries by the Asia economic crisis. Malaysia, Laos, Hong Kong were also affected by the slump. China, Japan, Singapore, Taiwan, Brunei and Vietnam were less affected by the economic crisis. Overall, all countries suffered from a loss of demand and confidence throughout the region.

World downturn refer to the period of economic decline characterized by reduced economic activity, decreased consumer spending, falling production levels, rising and unemployment rate (Reinhart & Rogoff, 2009). Next, the world downturn which began in year 2007, leading to increase number of unemployment. The International Labour Organization (ILO) approximated that nearly 212 million individuals within the global workforce were without employment. This statistic reveals a noteworthy escalation of 16% in the unemployment rate between the years 2007 and 2009 (Aaronson, 2010). Before the financial and economic crisis in 2008, unemployment rates were noticeable in all countries' economies during the years 2006 and 2007.

Furthermore, the public health crisis has significantly exacerbated the adverse effects on the economies of Asian countries, leading to a notable surge in the unemployment rate. The outbreaks of Severe Acute Respiratory Syndromes (SARS), Virus Subtypes H7N9, and Covid-19 significantly affected the labour market in Asian countries and globally. During the SARS outbreak in 2003, various sectors such as retail, tourism, transportation, and business experienced significant downturns, leading to layoffs and reduced hiring. Similarly, the H7N9 virus outbreak in 2013 resulted in substantial losses in China's poultry industry, potentially leading to job losses in that sector. The Covid-19 pandemic in 2019 further exacerbated the situation, causing widespread disruptions in economic activities, leading to layoffs, furloughs, and reduced work hours across multiple industries globally. Overall, these outbreaks had a notable impact on the labour market, contributing to increased unemployment rates and economic instability. The outbreak resulted in economic losses ranging from USD 12.3 to 28.4 billion, contributing to an estimated 0.5% reduction in GDP for Southeast Asia and a 1% decline for China (Qiu et al., 2018). While, the H7N9 virus subtypes

led to losses exceeding 40 billion Renminbi (RMB) within China's poultry industry. Nonetheless, in comparison to SARS, the virus demonstrated a lesser severity and had a relatively minor impact on the global community.

China, situated in East Asia and boasting the world's largest population of any country, encountered a significant event in the form of the Chinese Stock Market Crash in the year 2015. The stock market crash give a huge impact not only on the nation and global economy, but also in the social aspect. There was millions of middle-class Chinese people lose their savings. This crisis also caused politically instability for China's rulers. However, the Chinese Stock Market Crash 2015 not only affecting the China but also gave the negative impact for the third world countries. Any deceleration in the country's GDP growth translates to a reduction in new job opportunities, decreased wages, and a rise in youth unemployment (Bendini, 2015).

Political instability and low governance quality will also lead to higher unemployment rate. Between the years 2011 and September 2015, it is estimated that over 25,000 foreign fighters travel to Iraq and the Syrian Arab Republic to participate in the civil war (El-Said & Barrett, 2017). By December 2011, Syria witnessed a rise in its unemployment rate to 14.90%, marking an increase from the previously recorded figure of 8.60% in December 2010. The issues that such as economic crisis, social problems, political issues, diseases and specific viruses spread had an adverse impact on labour markets in the affected countries, especially in affecting the trend of unemployment rate.

Unemployment rate is one of the important indicators in Asian Labour Market. All Asian countries' governments at the individual and joints level are seeking

solutions to improve the productivity of their manufacturing, agriculture and services sectors to ensure the labour market of Asian countries have the higher value-added based. This study will concern the unemployment rate issues across the Asian countries and highlights the determinants are affecting the labour market. Before year 1997, in prior to the economic crisis, all countries enjoyed low unemployment rate except for Philippines. Table 1.1 shows the Unemployment rates for selected Asian countries in the period year 1990 to 2001.

Table 1.1: The Unemployment Rate, Year 1995 and 2001

Countries	1995	1996	1997	1998	1999	2000	2001
Indonesia	7.2	4.9	4.7	5.5	6.4	6.1	8.1
Malaysia	3.1	2.5	2.4	3.2	3.4	3.1	3.6
Philippines	8.4	7.4	7.9	9.6	9.4	10.1	9.8
Republic of Korea	2.0	2.0	2.6	6.8	6.3	4.1	3.7
Thailand *	1.1	1.1	0.9	3.4	3.0	2.4	2.6

Source: Asian Development Bank, Key Indicators of Developing Asian and Pacific Countries 2002 (ADB, 2002).

* The World Bank has estimated that the unemployment rate world be much higher if transient workers with occasional jobs were treated as unemployed (Economist Intelligence Unit 1999).

As depicted in Table 1.1, Thailand exhibited an unemployment rate of 1.1% in the year 1995. However, by the year 1998, this rate surged to 3.4%, representing a remarkable increase of over 200%. This escalation in unemployment was accompanied by the loss of approximately 0.8 million jobs, precipitated by the economic crisis. Republic of Korea faced similar situation with Thailand. In the year 1995, the unemployment rate was 2.0%, but it rose to 6.8% in the year 1998 where around 1 million population were under unemployed. The unemployment rate remain higher than prior to the economic crisis, although some countries witnessed a reduction in unemployment rate.

Figure 1.1 shows the unemployment rate slightly decreased in 8 of 14 economies with recent year 2017 estimates. The unemployment rate decreased in countries: Hong Kong (China), Japan, New Zealand, Taiwan (China), Indonesia, Philippines, Vietnam and Malaysia.

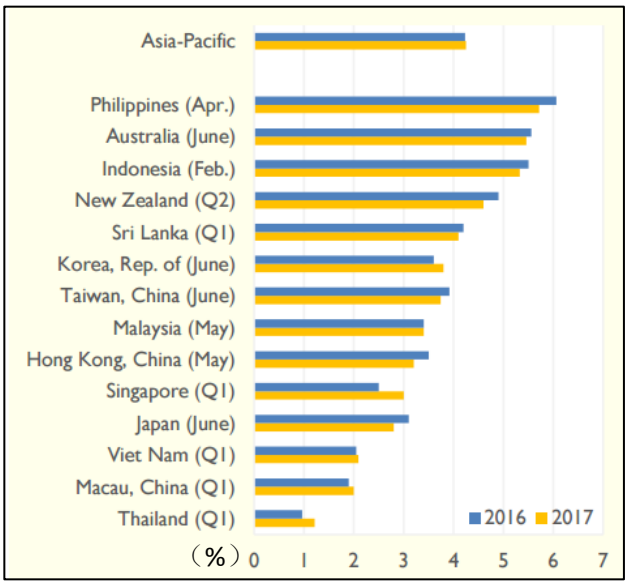

Figure 1.1: The Unemployment rate, Year 2016 and 2017

Source: ILO estimates based on labour force survey data from national statistical offices; ILO: Trends Econometric Models, Apr. 2017 (forthcoming).

Japan's unemployment rate currently stands at a near-historical low of 2.8%, a trend attributed to the robust domestic demand. Conversely, the unemployment rate rose in four countries: Singapore, Republic of Korea, Thailand and Macau (China). Singapore witnessed the most significant increase of 0.5 percentage points in its unemployment rate, with the majority of job reductions occurring within the services sector. The impact of the financial crisis, outbreak of epidemic and pandemic issues and political issues on the labour market need urgent concerns and attentions. To comprehend the trajectory and patterns of unemployment rates in Asian countries, along with their strategies to address unemployment challenges, we formulated an explanatory framework to guide our analysis.

1.2.1 Asian countries Background and Profile

The diversity of Asian countries is notable, encompassing a range of sizes and complexities, as highlighted by Imran et al. in 2015. Geographically, Asia claims the distinction of being the largest and most populous continent on Earth, predominantly situated within the Eastern and Northern hemispheres. Encompassing a vast expanse, Asia spans 44,579,000 square kilometres, accounting for approximately 30% of Earth's total land area and 8.7% of its overall surface. Asia is subdivided into five regions as shown in Table 1.2.

Figure 1.2 Asian countries

Table 1.2: Subdivided into five regions of Asia

Regions	Countries
Central Asia	Taijkistan, Uzbekistan, Kazakhstan, Thurkmenistan, Kyrgyzstan
East Asia	China, Mongolia, North Korea, South Korea, Japan, Hong Kong, Taiwan, Macau
South Asia	Sri Lanka, Bangladesh, India, Afghansistan, Pakistan, Bhutan, Nepal, Maldives
Southeast Asia	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor Lester, Vietnam, Chistmas Island, Cocos Islands
Western Asia	Georgia, Armenia, Azerbaijan, Turkey, Cyprus, Syria, Lebanon, Israel, Palestine, Jordan, Iraq, Iran, Kuwait, Bahrain, Qatar, Saudi Arabia

Asia is comprised of 50 countries. Asia's population is expected to be 4,434,846,235 in 2016. Asia's borders include the two most populous countries, China and India. China is currently the most populated country, with an estimated population of 1.3 billion in 2016. It has 31.69% of Asia's overall population and more than 18% of the world's population. With an estimated population of 1.2858 billion, India is not far behind, accounting for 29.36% of the continent's population and 17.5% of the world's population. India's population is expected to overtake China's by 2022, when both countries would have a population of around 1.45 billion people.

The Maldives, with a population of 345,000 people, is Asia's least populous country. Maldives is also one of the world's smallest countries, with an area of only 298 square kilometers (115 square miles), 99% of which is water. This little country is the 12th most densely inhabited country on the planet, with a population density of 1,065 people per square kilometer (2,758/square mile). Following the Maldives comes Brunei, the 50th least populous country in Asia, with a population of 421,000 in 2016. Brunei is located in Southeast Asia and is separated into two halves. It is bounded by Sarawak, Malaysia. It is the only sovereign state entirely on the island of Borneo, and it is one of the richest countries in the world thanks to its natural gas and petroleum deposits, with a public debt that is less than 3% of GDP.

There are some countries such as Laos, Vietnam and Cambodia having major progress in productivity and growth of their manufacturing industries from an agricultural-based industry to the transition from Industry 2.0 to Industry 4.0 (Rubaneswaran, 2017). In order to transform form Industry 2.0 to Industry 4.0, the revolution in manufacturing process with reducing the costs, expanding the market

which involve small group of human operations and replaced by the robotics or high technology machines such as Artificial Intelligence (AI) tools are needed. Therefore, a systematic solution or method needs to transform the structure of the country's economy to attain the high-income-country status.

Structural transformation has been fast in the region, with employment moving from agriculture mainly into services and only to some extent into industry. With regard to the sector distribution of employment, Asia and the Pacific has experienced a remarkable shift away from employment in agriculture over the past decades. Between year 2000 and 2017, the share of persons working in agriculture had decreased by 58, 36 and 28 percentage in Eastern Asia, South-Eastern Asia and the Pacific, and Southern Asia, respectively. Most of the loss in agriculture work was taken up by the increase in employment in the services sector, where 740 million jobs were gained since year 2000. In South-Eastern Asia and the Pacific and in Southern Asia, industrial employment also increased, causing an overall gain of 108 million jobs in the whole region, most of which were in the construction sector (Regional Economic and Social Analysis Unit, 2018).

1.2.2 Demographic of Labour Force

This section discussed about the labour force according to the Gini Coefficient, average years of schooling over time by education level and illiterate adult population by gender for selected Asian countries.

(A) Gini Coefficient of Selected Asian Countries

This section discussed about the labour force of Asian countries according to the Gini coefficients.

Table 1.3: The Gini coefficient of Selected Asian Countries

Country	1990-1994	2010-2014
Azerbaijan	0.37	0.19
Bangladesh	0.275	0.32
Cambodia	0.38	0.32
China	0.325	0.42
India	0.31	0.35
Indonesia	0.29	0.37
Kazakhstan	0.33	0.27
Lao PDR	0.34	0.38
Malaysia	0.47	0.45
Pakistan	0.33	0.30
Philippines	0.43	0.43
Sri Lanka	0.32	0.39
Thailand	0.455	0.38
Vietnam	0.36	0.40

Source: United Nations, Economic and Social Commission for Asia and the Pacific (ESCAP), Asian Development Bank (ADB), United Nations Development Programme (UNDP) (2019).
Available at http://data.unescap. org/escap_stat (accessed on 17 June 2019)
Note: The Gini coefficient of each country was calculated as the simple average of the available Gini coefficients within each five-year period (1990-1994 and 2010-2014)

Gini coefficient or Gini index is a statistical measurement which is developed by Italian statistician Corrado Gini in year 1912. The used of the Gini coefficient is commonly as a gauge of economic inequality, income distribution measurement or wealth distribution among a population.

Table 1.3 shows the Gini coefficient of selected Asian Countries between year 1990-1994 and year 2010-2014. China shows the highest increase in Gini coefficient between year 1990-1994 and year 2010-2014 with value 0.095. While Azerbaijan shows the highest decrease in Gini coefficient between years 1990-1994 and 2010-2014 which decreased of 0.18. Besides, the Philippines shows a constant for Gini coefficient between years 1990-1994 and year 2010-2014.

(B) Average Years of Schooling Over Time By Education Level

Education plays an important role in labour market and economic development (Tan *et al.*, 2006). The education level is categorized into primary, secondary and tertiary.

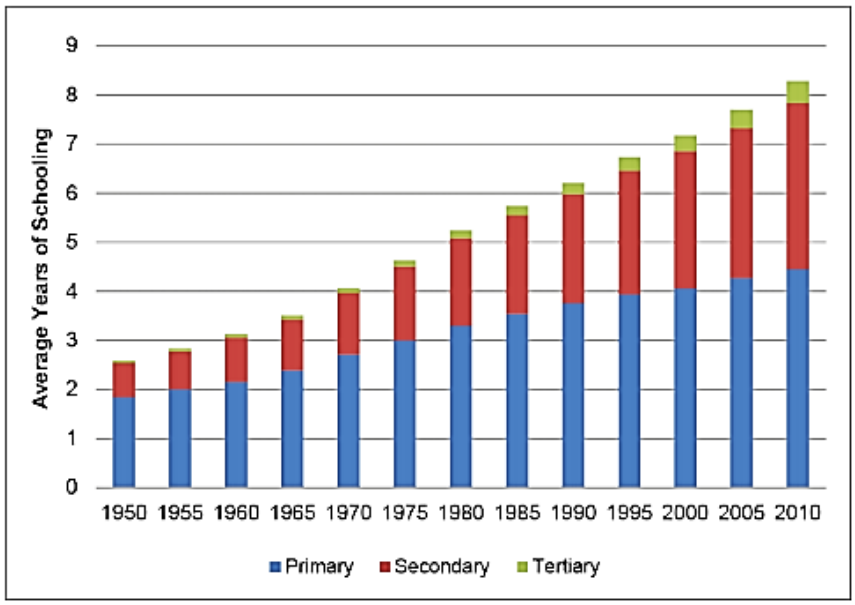

Figure 1.3: Average Years of Schooling Over Time
Years 1950 to 2010 by Education Level in Asian countries

Figure 1.3 shows the average years of schooling over time by education level. The figure indicate a steady growth in average years of schooling over time for all three levels of education in Asian countries over year 1950 until year 2010. This new data set includes 31 Asian and Pacific (hereafter Asian) countries (Park, 2017). The primary, secondary and tertiary education levels also shows an upward trend from year 1950 to year 2010. This represents that education has become an important element to the economic growth for a country. Furthermore, the awareness of the important of education has also increased.

(C) Illiterate Adult Population by Gender by Selected Asian Countries

Illiterate adult population plays an important role in labour market and economic growth. Definition of illiterate adult population as stated by United Nations Educational, Scientific and Cultural Organization (UNESCO) is the number of persons aged 15 years and over who both cannot read and write with understanding a short simple statement in their daily life.

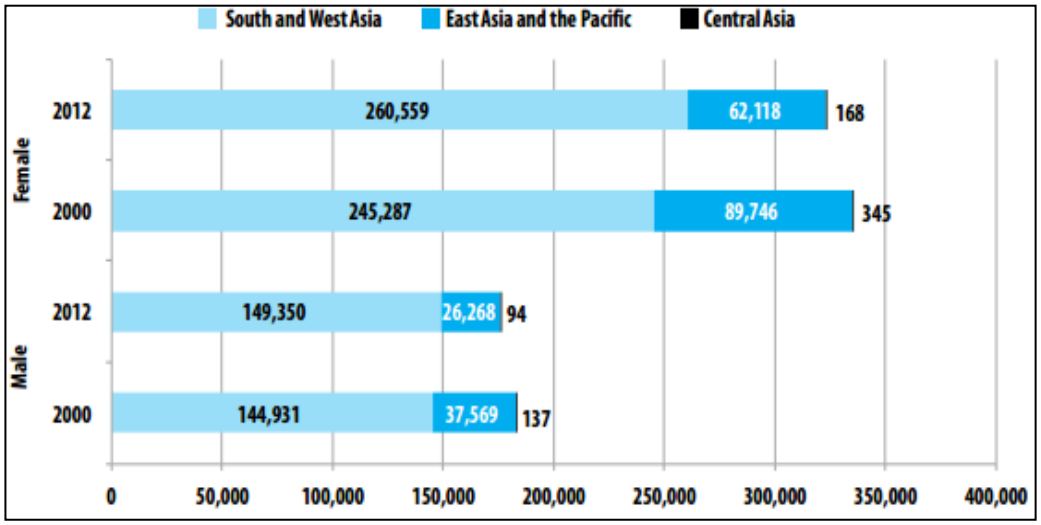

Figure 1.4: Number of illiterate for Male and Female in Year 2000 and 2012 (in thousands)

Source: UNESCO Institute for Statistics Data Centre

Figure 1.5 shows that the illiterate adult population of South and West Asia, East 18Asia and the Pacific and the Central Asia according to gender. South and West Asia shows that the illiterate female adult population has increases from 245,287,000 in year 2000 to 260,599,000 in year 2012. While the East Asia and the Pacific regions shows that the illiterate female adult population has decreases from 89,746,000 in year 2000 to 62,118,000 in year 2012. Lastly, the illiterate female adult population for Central Asia shows a decrease from 345,000 in year 2000 to 168,000 in year 2012.

Furthermore, for illiterate male adult population for South and West Asia shows that the illiterate male adult population has increases from 144, 931,000 in year 2000 to 149,350,000 in year 2012. While the East Asia and the Pacific regions shows that the illiterate male adult population has decreases from 37,569,000 in year 2000 to 26,268,000 in year 2012. Lastly, the illiterate male adult population for Central Asia shows a decrease from 137,000 in year 2000 to 94,000 in year 2012. In general, the illiterate of male adult population is lower than the illiterate of female population in all the three regions of Asian countries.

1.3 Background of Study

Asian countries have undergone a remarkable economic transformation and structural change from the independence, moving from a low-income and agriculture-based to middle-income, manufacturing and service-based urban economy. All west countries and few Asian countries such as China, Japan, Korea, India and other else wish to have economic growth, great development and low level of unemployment.

Unemployment rate plays an important role in labour market of Asian countries. It is consider as one of the relevant measures of labour market to determine the good and composition of the workforce as well as analysing and investigating the current labour force. It can also be used to monitor and project the future labour force. The variety profile of the labour force that can be generated is very helpful for understanding the labour market behaviour of different categories in the population, for example by gender, strata or country.

Economic freedoms, governance quality, education level, gender, fertility rate, inflation rate, gross domestic production (GDP) and other else held to be the key of

determinants of unemployment rate of Asian countries. To lower unemployment rates in Asian countries, efforts are being made to improve global environments in both public and private sectors. These efforts aim to promote gender equality, enhance youth employability, and decrease overall unemployment rates. At the level of the labour market, the main challenge is to increase the female employability and youth employability.

In late of the year 2008, the global financial crisis causes the rise in unemployment in many countries. Official unemployment rates have been rising across developing Asia. Figure 1.5 shows the unemployment rates are higher in Southern Asia and Eastern Asia, however in Eastern Asia, the rate projected slightly increase in year 2020.

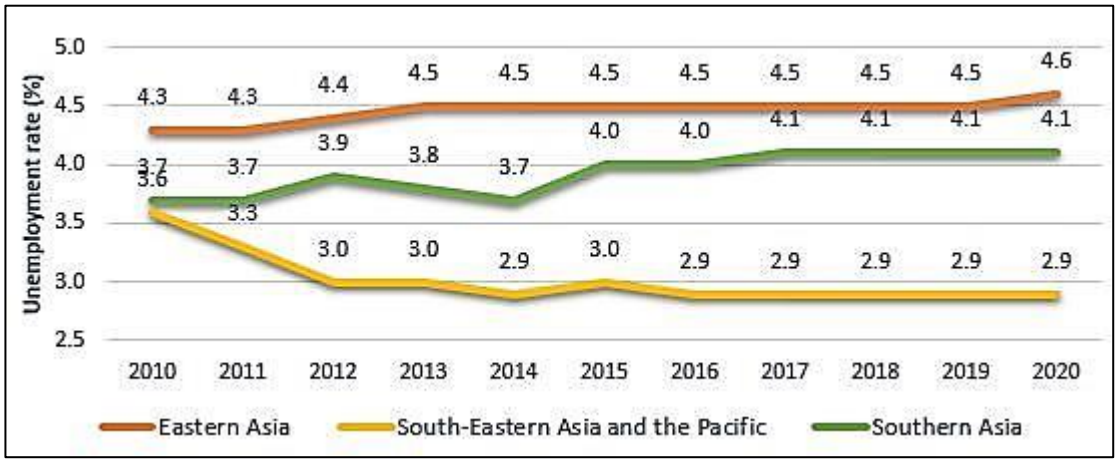

Figure 1.5: Unemployment rate of Asia in year 2010 – 2020
Sources:*International Labour Organization*

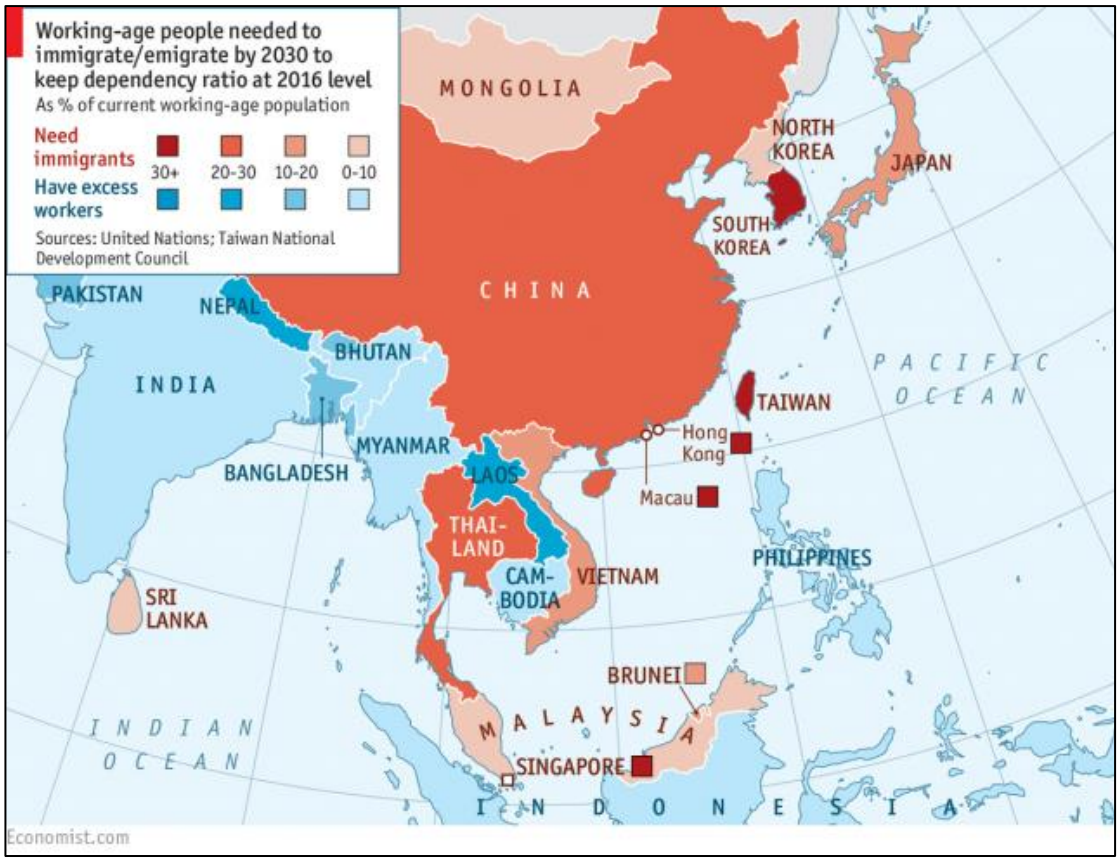

Figure1.6: The required number of working-age individuals to immigrate or emigrate by 2030 in order to maintain the dependency ratio at the same level as it was in 2016 (as a percentage of the current working-age population).
Sources: *United Nations: Taiwan National Development Council*

Figure 1.6 shows the working age between 14 – 64 years old people who needed to immigrate or emigrate by 2030 to keep dependency ratio at 2016 level. Map above shows that the Nepal, Pakistan, Philippines, Cambodia, Bangladesh, Myanmar, Bhutan, Indonesia, India and Laos have excess workers. Moreover, China, Thailand, Vietnam, Macau, Hong Kong, Taiwan, Brunei, Singapore, Sri Lanka, Mongolia, North Korea, South Korea and Japan need immigrants of labour force.

To understand the unemployment rate patterns, this study set out to examine the unemployment rates in selected Asian countries. This is done not only from an economic perspective, but also from a socio-cultural one, such as the GDP, governance

index, economic freedoms and important factors as an explanatory variables in this study.

1.4 Problem Statement

In recent years, labour force employment becomes a debated issue of public and privates sectors due to the development of the economic sector in each country. It is important to determine the determinant variables of labour force that affect the unemployment rate for a country.

Beforehand, since this study will focus on unemployment rate in selected Asian countries, it is also important to know and understand the patterns and changes of unemployment rate in those selected Asia countries. For instance, Matuzeviciute et al. (2017); Ozcelebi & Ozkan, (2017); Bayrak & Tatli, (2018); Doğan & Erdoğan, (2016); Bein & Ciftcioglu, (2017); Soylu et al., (2018); Mucuk & Demirsel, (2013) and etc. studied different factors or determinants of labour force that affecting the unemployment rate for Asian countries. Societies in Asia have experienced dramatic and rapid changes in their economic, social and political spheres in the past few decades. Given the wide diversity, it is understandable that the manifestation, extent and impact of these changes vary from country to country (Bendini, 2015).

This study casts new light on an essence problem in statistical and econometric research related to the geographical for unemployment rate for Asian countries and regional development policy evaluation. This study will discuss some recent statistical and econometric issues about unemployment rate of Asian countries.

Unemployment is one of the major issues in all countries over the world. It is considered as one of the most important and serious problems most countries suffer, where it results in negative impacts on the national economy (El-agrody et al., 2010). In previous studies, it had been shown that unemployment rate of a country has been influenced by many factors or determinant variables, such as the education level, economic freedom, governance quality, Gross Domestic Product (GDP), inflation rate, income and salary, life expectancy rate and other else. Economic growth, unemployment and inflation are among the most difficult and politically sensitive economic issues that policymakers face, especially in developed and developing countries (Mohamed Fargani, 2014).

The International Labour Organization (ILO) estimates that nearly 75 million young people are unemployed in the world today. This number has increased by more than 4 million since the financial crisis of year 2008-2009, and the outlook for the medium term is worsening. The global youth unemployment rate is 12.7% in year 2012, and the ILO projects that it is likely to rise to 12.9% by year 2017 (Manpowergroup, 2012). Unemployment is a major contributor to widespread poverty and income inequality. Therefore, it is of utmost importance to understand the relationship between unemployment and economic growth to ensure sound policies that will boost economic growth (Sibusiso, 2018). In year 2018, International Labour Organization stated that one hundred and seventy-two million people globally or 5% of the reported workforce of the world was without any job.

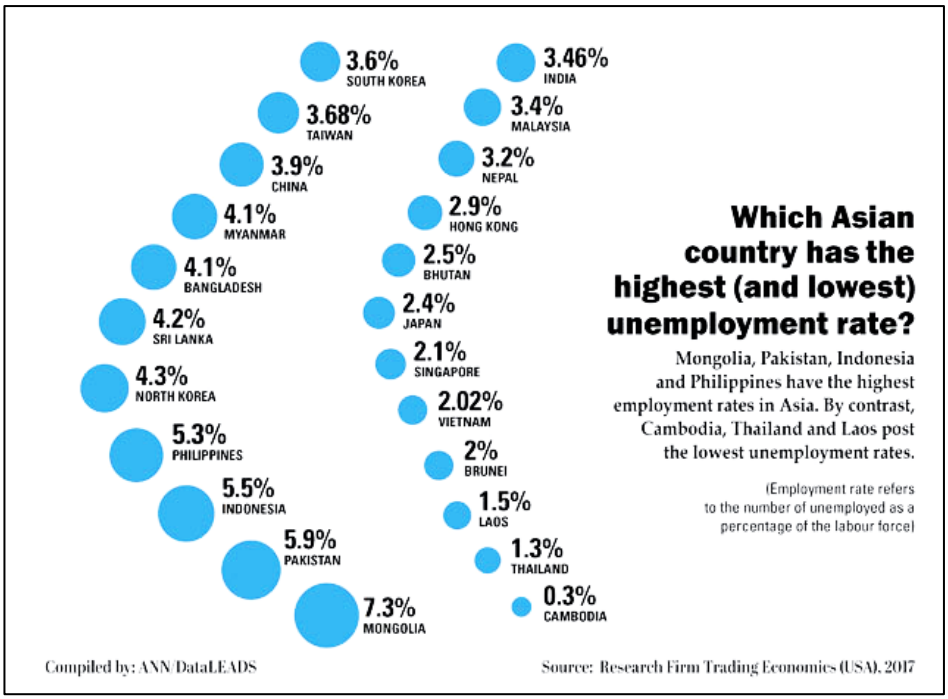

Figure1.7: Highest and Lowest Unemployment rate in Asian countries year 2017

Figure 1.7 shows the highest and lowest unemployment rate in Asian countries for the year 2017. Mongolia, Pakistan, Indonesia and Philippines have the highest employment rate in Asia. By contrast, Cambodia, Thailand and Laos have the lowest unemployment rates.

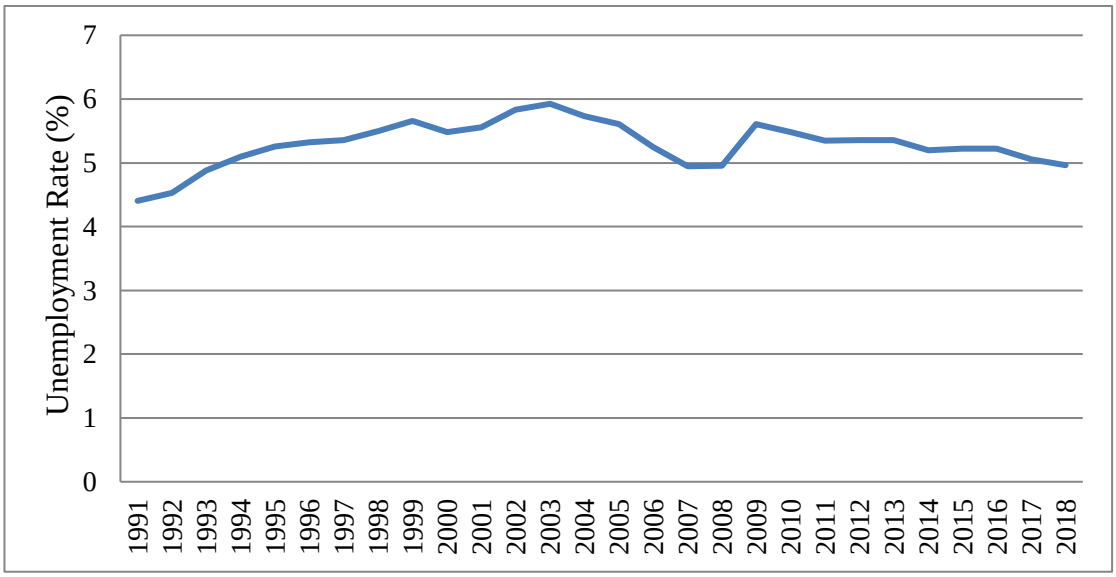

Figure1.8: World Unemployment rate from year 1991 – 2018

Figure1.8 shows the world unemployment rate form year 1991 to year 2018. Overall, the world unemployment rate is changing across the time and shows the upward trend from year 1991 to 1999. It also shows the decreasing point at the year 2003, 2005 and 2013. From year 2009 the unemployment rate shows a downward trend till 2018. Generally, the world unemployment rate is higher than 4%.

The percentage of the labour force that is between the ages of 15 and 24 but is not employed but is looking for work is known as youth unemployment. The global youth unemployment rate increases from a pre-crisis rate of 11.7% in year 2007 to 13.1% in year 2009, reaching to a historic peak of 13.2% in 2013, and remained constant at 13.1% in 2016. It is approximately 3 times the unemployment rate of adults, and more than two times the overall unemployment rate (Dian & Mohd, 2017).

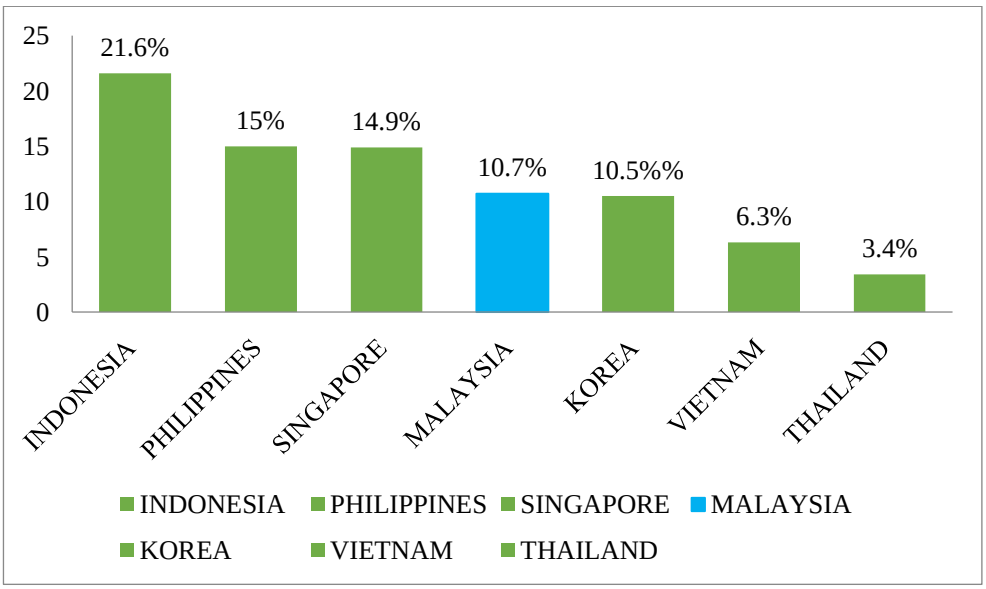

Figure 1.9: Youth Unemployment across the Region in 2015

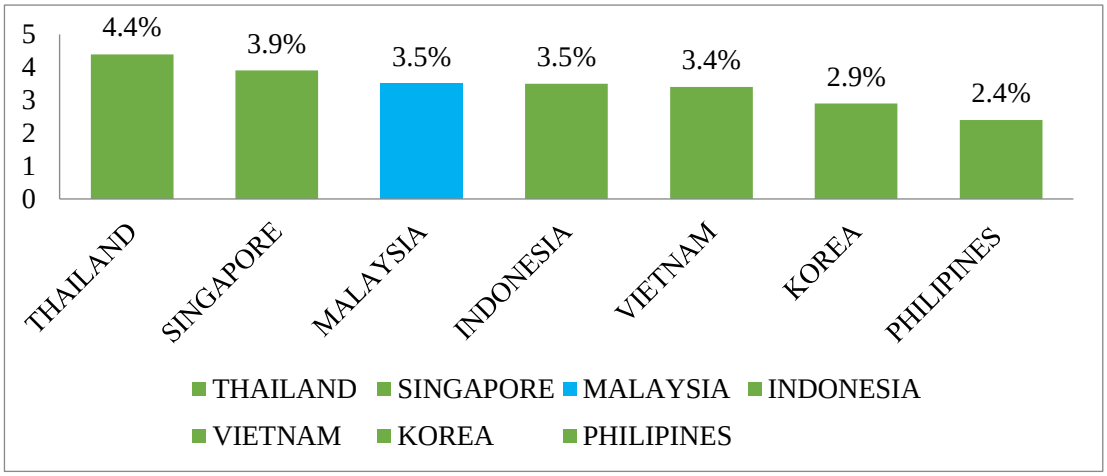

Figure 1.10: Ratio of Youth Unemployment to National Unemployment in 2015

Unemployment is one of the serious issues in Malaysia which affected by major factors such as population growth, GDP and inflation. Malaysia Institute of Economic Research (MIER) stated that economic growth of Malaysia was slower and could not support labour market of Malaysia (Toh, 2017). Based on the Figure 1.9, the youth unemployment rate of Malaysia was estimated to have reach 10.7% in year 2015. While the national unemployment rate in year 2015 is 3.5%. Based on the Figure 1.10, it shows the ratio of youth unemployment to national unemployment in year 2015, was more than three times higher than the national unemployment rate. Malaysia is among the regional economies with an incidence of youth unemployment in the double-digits, despite a low overall unemployment rate (Dian & Mohd, 2017).

Unemployment is an important indicator of labour market. Unemployment will be devastating when there is no social safety net. Failure to get or secure a work, especially among vulnerable groups – youth, older applicants, the disabled, and women will leads to a host of other problems, for example social exclusion and poverty. Motivating from previous studies on unemployment rate, by taking all the factors discussed into account, this study is significant as it provides an overview of the

underlying pattern and change of unemployment rate in Asian countries. This study can provide an insight on how the unemployment rate of labour market in Asian countries may evolve in the future.

1.5 Research Questions

There are some research questions to be addressed:

i. How the economic freedom index (EFI) and governance quality influence the overall, male and female unemployment rate of Asian countries?
ii. Does the data for selected Asian countries exhibit spatial autocorrelation or not?
iii. How does the spatial interaction influence on unemployment rate of selected Asian countries according the gender difference?
iv. Which economic indicators, overall economic freedom index (EFI) and overall governance quality influence the unemployment rate of Asian countries?

1.6 Objectives of the Study

In this section shows the general objective and specific objective for this study.

1.6.1 General Objective

To study the relationship of economic freedom index (EFI), governance quality and economic indicators toward the unemployment rate for Asian countries.

1.6.2 Specific Objectives

The research objectives:

i. To identify the relationship between the economic freedom index (EFI) and governance quality towards the overall unemployment rate for Asian countries and according to their gender.

ii. To examine the spatial autocorrelation for overall unemployment rate of selected Asian countries and according to their gender. If the spatial autocorrelation is present, the study will need to formulate more complicated model.

iii. To determine the spatial pattern of overall unemployment rate and according to their gender from one location to other. In addition, to find the interdependence that it can originate from direct effects and indirect effects stemming from unobserved heterogeneity.

iv. To determine the relationship between overall economic freedom index (EFI), overall governance quality index and economic indicators toward the unemployment rate for selected Asian countries.

1.7 Scope of Study

This study investigate and analyse several aspects of unemployment rate of labour market performance for selected Asian countries. Each of these aspects represent different feature of the labour market for each Asian countries which together aims to provide a comprehensive understanding on how the unemployment rate affect the countries.

Panel analysis methods and Spatial Panel analysis methods are employed in this research. The first objective is about the static panel analysis of unemployment rate according to gender perspective for selected Asian countries' labour markets. This section utilize the static panel analysis such as Pooled OLS Model (POLS), Fixed Effect Model (FEM) and Random Effect Model (REM). Next, this topic is extend to second objective, which is spatial autocorrelation and spatial panel deeply understand

the spatial pattern of the unemployment rate among the Asian countries, such as the spatial dependency, spatial panel model and spatial spillovers (direct – indirect effect).

The third objective will apply the Least Square Dummy Variable (LSDV) which allows the heterogeneity among the countries or time period (years) effect by allowing to have their own different intercept value. The difference intercept value between the countries or period (years) may be due to some special issues in the countries, such as political stability, governance quality, economic crisis and other else.

The fourth objective are about the dynamic panel analysis of unemployment rate according selected Asian countries. This section will use the dynamic panel analysis such as models: Difference and System Generalized Method of Moments (due to andogeneity issues present in the research problem) to describe the relationship between the unemployment rate with economic indicator, overall score of Economic Freedom and overall governance quality.

Nowadays, panel analysis and spatial panel analysis of unemployment rate of Asian countries has received more attention in terms of statistics research published in peer reviewed journal. It hoped that the particular topics chosen will show the importance of a ‘Panel and Spatial Panel Analysis Method’ view of labour market.

1.8 Significance of Study

The results of the research will provide valuable insights for policy makers, employers and market participants to identify the relationship of socioeconomic indicators, governance quality and economic freedoms index toward unemployment rate in improving workforce policies and combating the issues of labour market. It is important for policymaker to design the policies, projects and programmes, particularly those aims at promoting the gender equality in employment in all regions, measuring the intervention impact of unemployment rate and other interest.

This study intends to investigate the relationship between the determinants variables of economic freedom index (EFI), governance quality and socioeconomic indicators with the unemployment rate of Asian countries. There are several studies done regarding the socioeconomic indicators and economic freedoms toward the unemployment rate in different countries. Therefore, as this study focus on data obtained in selected Asian countries, the findings in this study might be different as compare with the previous studies of other researchers due to the different dependent variables and independent variables used. Studies on unemployment rate in Asian countries that were carried mainly focus on identifying the relationship of the independent and dependent variables of interest, for examples the fertilization rate, growth domestic product (GDP), inflation, salary, living strata, inflation rate and other else on unemployment rate of Asian countries.

In order to close the gap between the econometric and statistical fields, this study included some determinants based on certain previous researches due to the

availability of the data sets. For a better understanding of how the social indicators, governance quality and economic freedoms affect the unemployment rate of Asian countries, the gross domestic product (GDP), inflation and economic freedom index, governance quality index and other else are included in this study. Our contribution in this study is able to provide knowledge and allow more people to understand the pattern and trend of unemployment rate in Asian countries and the factors affecting the unemployment rate in Asian countries. This would allow the policy maker to implement better policies to reduce the issues and problems in labour market such as high unemployment rate, gender inequality, youth unemployment rate and other else. Furthermore, policy maker can improve the facilities and do interventions to overcome these issues.

From the economic point of view, the relationship between unemployment rate and determinant variables of labour market, economic freedom and governance quality are important in the manner that they can affect the economic performance of Asian countries. The results of this study can be used as a guidance to policy maker especially the government and private sectors to planning the Asian Plan, and formulating the labour policy accordingly to achieve Industry 4.0 and the era of Artificial Intelligent (AI). This study would give confirmation about the labour market and may help the government or the private sectors to monitor the progress towards attainment of gender equality, the living strata, and education in employment goals. It is hope that policy makers can implement policies that will utilize all labour force in Asian countries with a most productive ways that can enhance the economic growth of this region.