MINIMUM WAGE POLICY EFFECTS ON ECONOMIC GROWTH

By

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ABSTRACT

The purpose of this study is to examine the relationship between minimum wage policy and economic growth for the period 2000 – 2005. To achieve the objective, we estimate a growth model by employing the panel ordinary least square (OLS) and panel estimated generalized least square (EGLS) method. A sample consists of 61 countries with and without minimum wage and 33 were used in this study. For the minimum wage measure, we used minimum wage dummy, excess wage and minimum wage ratio to GDP as separate variables. We also include additional variables namely initial GDP, population growth, investment, trade openness, government expenditure and gross enrolment ratio. The results of the study show that, first, countries with minimum wage policy have higher economic growth. Second, the level of minimum wage does not affect economic growth for the countries that have the minimum wage policy. Based on the findings, countries should implement minimum wage policy since it would increase income for the worker and at the same time have positive effect on economic growth. The results also support the minimum wage policy that will be implemented in Malaysia.

ABSTRAK

Tujuan utama penyelidikan ini adalah untuk mengkaji hubungan di antara polisi upah minimum dan pertumbuhan ekonomi bagi tempoh 2000 – 2005. Untuk mencapai objektif ini, kami menganggarkan model pertumbuhan dengan menggunakan kaedah panel kuasa dua terkecil biasa (OLS) dan panel kuasa dua terkecil umum (EGLS). Sampel yang digunakan di dalam penyelidikan ini terdiri daripada 61 buah negara yang mempunyai dan tidak mempunyai upah minimum dan 31 buah negara yang mempunyai upah minimum. Untuk mengukur upah minimum, kami menggunakan dumi atas patung upah minimum, upah lebihan dan nisbah upah minimum kepada KDNK sebagai pembolehubah yang berlainan. Kami juga menggunakan pembolehubah bebas tambahan iaitu KDNK asal, pertumbuhan populasi, pelaburan, keterbukaan perdagangan, perbelanjaan kerajaan dan kadar *enrolment* kasar. Keputusan kajian menunjukkan bahawa pertama, negara yang mempunyai polisi upah minimum mempunyai kadar pertumbuhan ekonomi yang lebih tinggi. Kedua, tahap upah minimum tidak mempengaruhi pertumbuhan ekonomi bagi negara yang mempunyai upah minimum. Berdasarkan kepada penemuan ini, negara seharusnya melaksanakan polisi upah minimum disebabkan polisi ini boleh meningkatkan pendapatan pekerja dan pada masa yang sama memberi kesan yang positif terhadap pertumbuhan ekonomi. Hasil kajian juga menyokong pelaksanaan polisi upah minimum di Malaysia.

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LIST OF ABBREVIATIONS

BLUE	Best Linear Unbiased Estimation
CPS	Current Population Survey
COTU	Central Organization of Trade Unions
EGLS	Estimated Generalized Least Square
ENROL	Gross Enrolment Ratio
EW	Excess Wage
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GOVEXP	Government Expenditure
GR	Growth Rate
GSP	Gross State Product
ILO	International Labor Organization
INIGDP	Initial GDP
INV	Investment
MEF	Malaysia Employees Federation
MW	Minimum Wage
MWD	Minimum Wage Dummy
MWRATIO	Minimum Wage Ratio
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Square
POPG	Population Growth
OPEN	Trade Openness
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

INTRODUCTION

1.1 Introduction

'Why, when the economist gives advice to his society, is he so often coolly ignored? He never ceases to preach free trade…and protectionism is growing in the United States. He deplores the perverse effects of minimum wage laws, and the legal minimum is regularly raised each 3 or 5 years.' – George Stigler, cited in Rustici (1985).

According to international standards, the minimum wage is the lowest monetary value which may be paid to workers in a region and a point of time, either through existing acts or through collective bargaining. In some countries the minimum wage is determined by law, while in others it is determined through dialogue or negotiation, or through collective agreements between workers and employers. The minimum wage has the purpose of safeguarding the income and living conditions of workers who are considered to be the most vulnerable in the labor market.

The minimum wage has long been a controversial issue since its passage in the Fair Labor Standard Act of 1938. Most of the economists argue that the minimum wage may price out low-skilled workers, discriminate against minorities, and cause unemployment to rise. However, its supporters typically argue that it actually can reduce poverty and increase the income of the lowest-paid workers.

Despite of all the debate that going on over the minimum wage policy, it is actually an attractive tool that politicians and governments can use to show their support for reducing poverty and income inequality. This method is simple, and visible, and it also does not require significant direct government expenditure in the immediate term. Besides that, politicians also can use this legislation to win the support of specific interest groups.

The knowledge of the effects of minimum wage in aggregate models has been firstly exposed by Stigler (1946). The basic model of the minimum wage effects on employment and unemployment focuses on a single competitive labor market with homogeneous workers, and it also predicts that minimum wage causes both employment and output reductions. However, in dynamic contexts, the impact of the minimum wage policy on employment, economic growth and welfare is controversial. In particular, it has been shown that under certain conditions, if the minimum wage generates some positive externalities it can be growth improving. The literature about the methodologies, issues and debates over the minimum wage policy are well-documented in Neumark and Wascher (2008).

Although there are ample of theoretical and empirical studies on the determinants of growth, only a few studies have related the effects of this labor market regulation on economic performance. Very little knowledge that we can find about its general impacts on productivity and economic growth, and which channels that influences these measures.

Therefore, this study will analyze and summarize the effect of the minimum wage policy on a country's economic growth. By using this study, we can also predict and analyze whether the minimum wage legislation that had been proposed in Malaysia will have any effect on the growth of Malaysian economy. This is a very pertinent issue in the case of Malaysia as any policy that could erode its economic growth would be detrimental to its quest of becoming a high income economy.

1.1.1 Overview of the Minimum Wage

The idea for the administered wages is ancient. Wage payments to laborers were conventional long before the industrial revolution. But the idea of administered wages as a legal means to improve the lot of the urban working paper has its origins in nineteenth-century reform movements, especially in the United Kingdom. According to Webb and Webb ([1897] 1920), minimum wage were an important item on the Fabian socialist agenda to 'democratize' unregulated industries and improve the working conditions. Besides that, the minimum wage were also connected to the mid-Victorian-era trade union movements. The first laws setting wage floors, as against a fixed wage, have their origin in Australasia.

The first independent legal agencies designed specifically for setting minimum wages were established by the 1896 Factory and Shops Act, which was enacted by the state of Victoria. At the heart of economists' interest in the minimum wage they predict that an increase in the minimum wage will destroy jobs. Without minimum wage, wages and

employment are determined by the intersection of the supply and demand curves. If the minimum wage been introduced, it will force the employers to move up the demand curve, which will reduce the employment and increase the unemployment. The basic argument is compelling as it is based on pure rational thinking that when a product becomes more expensive demand for it will fall.

However, the view that a higher minimum wage will reduces employment was not always so strongly held by economists. Some economists in the labor economics in the twentieth century which they called revisionists believed that minimum wage could increase employment in some instances, and reduce it in others. They believed that some noneconomic factors such as ability to pay and fairness will influence the wage setting and employment. For example, if the wages is higher, it could reduce the worker turnover and therefore, can improve the productivity. It can also motivates some firms to adopt better managements practices, which then will lead to gains in output and employment.

In general, the revisionists expected a modest increase in the minimum wage will lead to little effect on employment. In the last two decades of the past century the shift from neoclassical theory to more modern means of evaluating minimum wage impact on employment began. This shift makes more accurate data became available through increasing use of statistics and computer technology which facilitated the empirical research. This is proven true when 27% of the articles published in economics journals in 1960 contained empirical data and it increase to around 44% in 1992. The most widely

research used as a principle in minimum wage industry is the study of the fast food industry that conducted by two economists, Alan B. Krueger and David Card in 1994 that compare the minimum wage increase and employment in New Jersey, Pennsylvania, Texas and California.

1.1.2 Recent Trends of Minimum Wage

The International Labour Organization (ILO) defines minimum wage as a wage which provides a floor to the wage structure in order to protect workers at the bottom of the wage distribution. Minimum wage are applied in more than 90% of ILO member States and it is nearly a universal policy instrument. However, the rate and frequency and the level at the minimum wage are set are different between the countries. The ILO has not defined a specific rate that countries should follow. However, they recommended that the minimum wage should be set at a "decent" level.

In Convention 131 from 1970 the ILO writes : "The elements to be taken into consideration in determining the level of minimum wage shall, so far as possible and appropriate in relation to national practice and conditions, include (a) the needs of workers and their families, taking into account the general level of wages in the country, the cost of living, social security benefits, and the relative living standards of other social groups; (b) economic factors, including the requirements of economic development, levels of productivity and the desirability of attaining and maintaining a high level of employment." The amount of the minimum wage to average wage is set in practice at

around 40% in many countries. (ILO 2009:10). However, in the end the minimum wages to the general wage level involves value judgement which must be politically decided upon in each country.

Based on Table 1.1, we can see that real growth in minimum wages is increasing for developed and developing countries from year 2000-2007. When we compare the minimum wages with average wages, we find that the minimum wages globally have increased slightly from 37% in 2000-02 to 39% in 2004-07. This increasing factor is mainly because of the upward trend in developing countries. However, when we compared it with GDP per capita, minimum wage have declined globally from 68% to 60%. This mainly reflects the strong growth in average labor productivity in developing countries, which did not fully translate into corresponding increases in minimum wage at the lower end of the labor market.

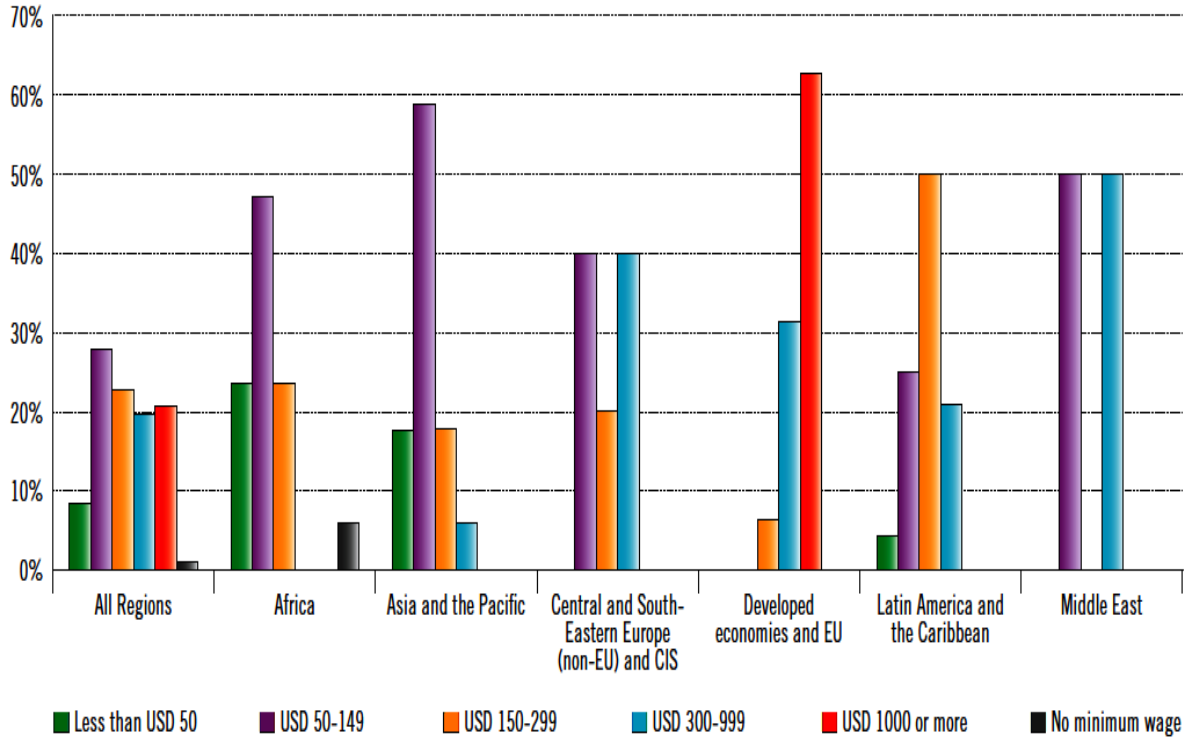
Table 1.1 : Trends in Minimum Wage

	Real growth in minimum wages (%)	Minimum wages/ average wages (%)		Minimum wages/ GDP per capita (%)	
	2001-07	2000-02	2004-07	2000-02	2000-07
Developed countries	+ 3.8	39	39	38	37
Developing countries	+ 6.5	36	40	76	68
Total	+ 5.7	37	39	68	60

Source : ILO Wage Database

By looking at Figure 1.1, we can see that 8% of the reviewed countries have a minimum wage lower than USD 50 and 21% of it have a minimum wage that exceed USD 1,000, mostly in industrialized countries. The highest minimum wage rates can be found in the developed economies and EU countries, which we can see that 63% of the reviewed countries exceed a monthly minimum wage of USD 1,000. In Latin American and Carribean countries, majority of the countries provide minimum wage rate between USD 150 and 300 which is 50%. Only Haiti has set a minimum wage below USD 50 in these regions.

In Africa and Asia and the Pacific, majority of the countries set their minimum wage at between USD 50 and 150. (47% and 59%, respectively). In Africa, 24% of reviewed countries provide minimum wage rates below USD 50, while in Asia and Pacific its only 18% of countries. Republic of Korea is the only country that exceeding the minimum wage rate at USD 300 in these regions.

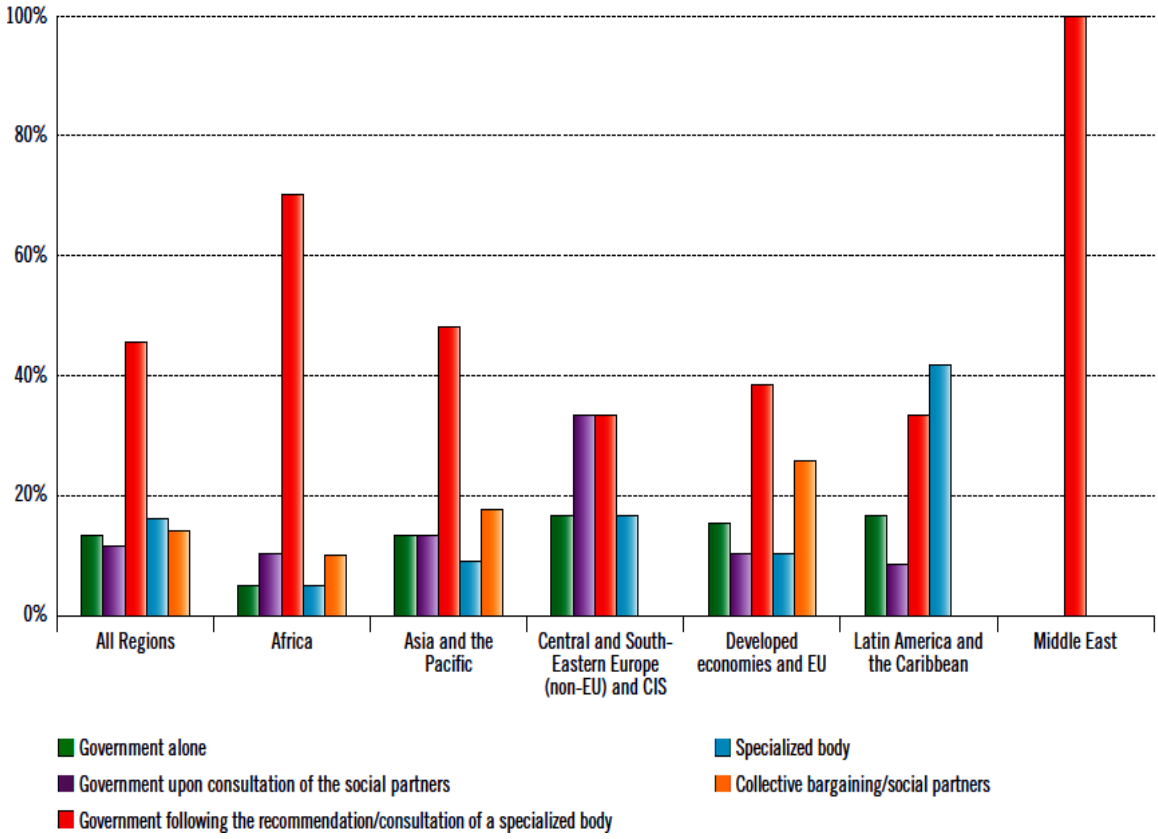


Source : ILO Wage Database

Figure 1.1 : Monthly Minimum Wage by Region (USD), 31 December 2008 (97 countries)

There are different minimum wage-fixing mechanisms that had been used in all countries that have minimum wage policy. In Figure 1.2, we can see that there are five types of mechanisms that had been used in 105 selected countries that have minimum wage policy. Most of the analyzed countries used the mechanisms which government followed the recommendation of a specialized body (45 %) to set the minimum wages policy. Only 13% of the countries does the government set the minimum wage alone, without any further consultation.

In African countries that been reviewed, 70% of the minimum wage setting is been dominated by the government that followed the recommendation of a specialized body. Majority of the analyzed countries in Asia and the Pacific also use the same method to sets their minimum wage in their countries. (48%). Same goes to the developed countries and EU countries that been analyzed, the government often sets the minimum wage following the recommendation of a specialized body (39%). Only countries in Latin America and the Carribean that used directly specialized body to set the minimum wage policy (42%). Another 33% of the countries set the minimum wage policy that followed the recommendation of a specialized body.



Source : ILO Wage Database

Figure 1.2 : Minimum Wage-fixing Mechanisms by Region, 2009 (105 countries)

1.2 Problem Statement

For many years the economists has largely debated and argued about the effect of minimum wage policy. Most of the studies discussion on the effect of minimum wage policy traditionally focused on two themes, output and employment. Although the minimum wage is broadly discussed, there are only a few empirical studies that analyzed the relationship between minimum wage and economic growth.

Economic growth is the most important factor that determined the success of nations. It is a tool that measures the performance of an economy. Economic growth is a result of greater quantity and better quality of human, capital resources, natural, and technological resources that promote productivity. It should be the main objective in government policy for every developed or developing country. Smith (1776) stated that not only capital accumulation but also technological progress and institutional and social factors play a crucial role in the economic development process of a country. There are many investigations and discussions that concentrate on the potential of minimum wage negative effects on employment, overall earnings of workers, as well as its effectiveness in reducing income inequality and poverty.

Even though there are plenty of theoretical and empirical literature on determinants of growth, only few studies that related to the effects of this market labor regulation on economic performance. Among the studies are from Cahuc and Michel (1996), Ravn and Sorensen (1999), Irmen and Wigger (2006), Askenazy (2003), Fanti and Gori (2010) and

Cukierman and et al. (2001). Furthermore, there are lack of studies that analyzed whether the level of minimum wage have effects on economic growth. Hence, this study contributes to the literature on minimum wage by examining not only whether minimum wage have positive or negative effect on economic growth, but also analyzed whether the level of minimum wage rate affect economic growth.

By exploring the minimum wage effect on economic growth, the government can better understand the circumstances and can react properly to find a solution that can make the economy become more competitive and highly income. By using this study, we can also predict and analyze whether the minimum wage legislation that had been proposed in Malaysia will have any effect on the growth of the Malaysian economy.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study is to analyze the effects of minimum wage on economic growth.

1.3.2 Specific Objectives

The specific objectives of this study are

i. To determine whether countries with minimum wage policy have significantly different economic growth compare to countries without minimum wage policy.

ii. To determine whether the level of minimum wage rates affect economic growth.

1.4 Significance of the Study

This study will help policy makers to forecast the effect of minimum wage on a countries economic growth. By using the results from this study, policy makers in Malaysia can analyze and determined whether the minimum wage will have negative effect on the growth of the Malaysian economy. It is important because minimum wage legislation has not yet been implemented in Malaysia. Therefore by using this information as a guide, the government can ensure that the minimum wage policy in Malaysia will bring positive benefit to all in order for this country to become a high income country.

1.5 Structures of the Study

This study consists of five chapters. The first chapter introduces a general understanding of the study, which includes the problem statement, the objectives of the study and the significance of the study. Chapter two reviews the related previous work that had been done on the effect of minimum wage. Chapter three presents the theoretical framework, the empirical model to be estimated and sample description employed in this study. Chapter four presents and discusses the empirical results and interpretation of the study. Finally, chapter five summarizes the findings of the study and provide some recommendations for future works.

CHAPTER TWO

LITERATURE REVIEWS

2.1 Introduction

Chapter two reviews related literatures on the theoretical and empirical studies on minimum wage policy and economic growth. Section 2.2 reviews the theoretical models while Section 2.3 reviews the empirical framework. Section 2.4 is the conclusion of this chapter.

2.2 Theoretical Review

An important and largely debated argument in the economic literatures concerns the effect of minimum wage. Most of the economists have traditionally agreed that an increase in minimum wage will have an adverse effect on employment especially among young and unskilled workers. They believed that the markets are characterized by the competitive model that predicts that an increase in the wage floor should always reduce employment. However several studies have challenged this model, finding that minimum wage increase does not seem to lower the employment among teens and retail workers. Some studies have found the expected negative impact on employment, yet others have found no impact or, in occasional cases, a positive effect of minimum wage on jobs.

There are some theoretical economic models that explain the linkage between minimum wage and employment. The most basic model of minimum wage effects on employment and unemployment is the supply-demand model which focuses on a single competitive labor market. In this model, the labour force is homogeneous. The demand labour of the firm is a decreasing function of the real wages.

In Figure 2.1, if the minimum wage level is set above the equilibrium level, which is W_c , it would lead to a drop in the demand for labour. This will make the workers whose productivity is below the minimum wage will not be demanded in the labour market. The negative effects of minimum wage on employment result from the combination of two elements which is Substitution Effect and Scale Effect.

In Substitution Effect, if the minimum wage is set higher than the equilibrium, the firms could decide to use more capital than labour or they could substitute skilled-labour for unskilled-labour. In Scale Effect, when the minimum wage is increase, the sales will fall due to increases of the cost. This will lead to reduction in the use of capital and labour factors, which include the low-skilled labour.

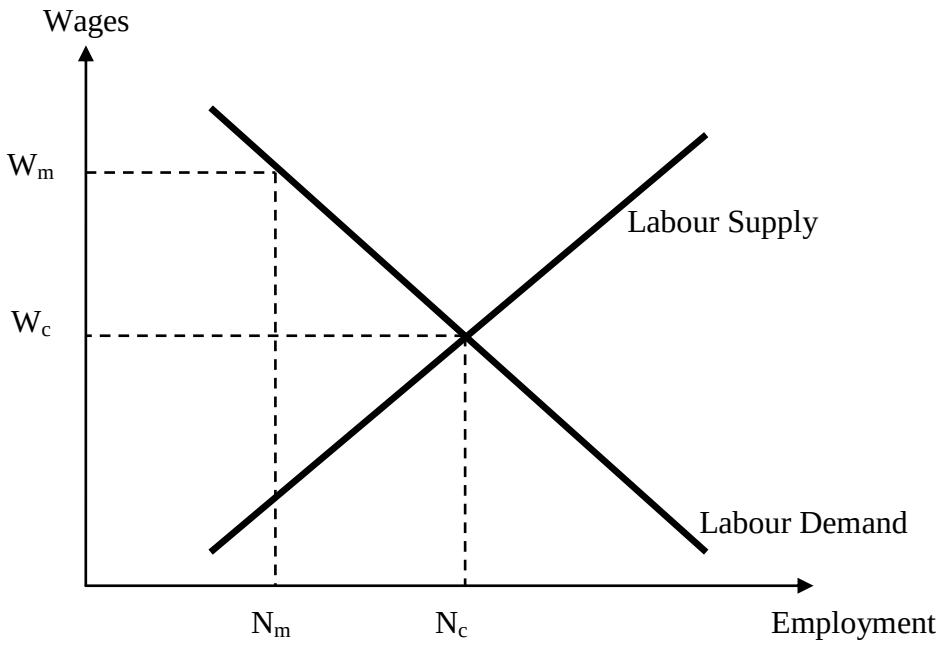


Figure 2.1 : The Competitive Labour Market

W_m : minimum wage

W_c : equilibrium wage

N_m : demand for labour if minimum wage is set above the equilibrium wage

N_c : demand for labour at the equilibrium wage

Another theoretical model that connects minimum wage and employment is the two-sector model which is formalized by Welch (1974). He considers an economy with two sectors and the concept can be explained in the Figure 2.1. If the minimum wage, $W_{m,}$ is higher than the equilibrium wage, $W_{c,}$ it would lead to the workers displaced to the uncovered sector. Traditionally in economic theory, the wages in that sector will fall and the employment will increase. However, Welch said that those who displaced from the covered sector do not automatically become employed in the uncovered sector. Some of

the workers including the ones that been working in the uncovered sector, would quit the job because the wages offered by the employer in that sector are lower than their reservation wage. Therefore, the overall effect of minimum wage on employment will depends on the elasticity of labour supply and the reservation wage of those who do not obtain a job in the covered sector, as well as the other factors such as the size of the covered sector and the elasticity of labour demand.

Besides that, the efficiency wage theory also tells us the linkage between minimum wage and employment. This theory suggests that higher real wages can result in higher labour productivity through various mechanisms. If the wage is set above the average, it would increase the workers incentives to work, and this would lead to better economic performance. This theory also suggests that if any wages regulation is absence, and if unemployment is high and supply of labour is abundant, wages can fall drastically, and this will lead to poverty among workers. Both labour productivity and the firms' profits also will drop if the real wage decline.

2.3 Empirical Evidences

2.3.1 Minimum Wage and Growth

Although there are many studies on minimum wage and employment, only a few of it that analyze and summarize the effect of minimum wage policy on economic performance. Among the studies are from Cahuc and Michel (1996) that studied how the minimum wage for unskilled labour affects economic growth and welfare. They assumed

that when minimum wage is introduced in the market, the demand for skilled labour will raise and this will make the unskilled labour to improve their level of skills in order to avoid unemployment. Therefore this positive external effect on human capital accumulation may promote growth and welfare.

Studies from Ravn and Sorenson (1999) also assumed that minimum wage can promote growth. In the model, the growth occurs through skill formation, and those skills are generated through schooling before entering the labour market and training on the job. The final effects are ambiguous because while a minimum wage discourages training, it also encourages schooling.

Another important contribution that analyzed the effects of minimum wage on growth in an open economy model is Askenazy (2003). Based on the empirical study on 11 OECD countries, the minimum wage causes a shift of efforts from production to the research and development sector, which speed up the long run growth in proportional to exports. As a result, it may stimulate the growth through this channel. Fanti and Gori (2010) also analyzed the minimum wage effect on economic growth. By using a simple double Cobb-Douglas overlapping generations growth model, the studies shown that a regulated-wage economy with unemployment may grow more rapidly than the *laissez-faire*, and a growth maximizing minimum wage exists in the case of both skilled and unskilled labour. They also found that minimum wages can be welfare-improving despite the unemployment occurrence.

Cukierman et al. (2001) also investigates the relationship between minimum wage and growth. They estimated growth regressions using panel data estimation technique based on World Bank dataset. The result shows that they find a nonlinear relationship between minimum wage and growth. At a low minimum wage, an increase in the minimum wage will stimulates economic growth. However, at higher minimum wage they find no effect on economic growth.

Irmen and Wigger (2006) considered a two-country endogenous growth model with capital mobility that emphasizes a link between wages, savings and growth. They shown that economic growth can be stimulate depending on the elasticity of substitution between capital and efficient labour, the output elasticity of efficient labour and the differences between the propensity to save in both the foreign and domestic countries. And the result implies that with Cobb-Douglas production function and uniform propensity to save, minimum wage would be harmful to the global economic growth.

Mo (2011) also analyzed the effects of minimum wage legislation on economic performance. In this study, he used a novel method to estimate the magnitude and transmission channels by which minimum wage legislation affect productivity and economic growth. The results show that countries with minimum wage legislation have a growth rate about 20% to 30% lower than the sample mean. Therefore the results suggest that the longer the minimum wage legislation have been in place, the more destructive they are to an economy.

Studies by Drabicki and Takayama (1982) also investigates the long-run growth impacts of minimum wage regulation that been enforced nationally. Using the familiar aggregate growth model, the studies show that if the minimum wage legislation is effective, it will always lower the rate of the economic growth. And it will cause the economy to decline if the minimum wage floor is sufficiently high. Another studies by Todorovic and Ma (2008) found out that minimum wage regulation had a differential effect on different countries and regions. They conclude that minimum wage regulation will have a greater impact on the economy of developing countries than it will on the economy of developed countries.

2.3.2 Minimum Wage and Employment

The empirical literature on the effects of minimum wage on employment is voluminous. Minimum wages have often been a major cause of unemployment. It will create unemployment and thus reduce GDP and welfare. This will give negative impact on economic growth. Some of the studies found out that minimum wage will reduce employment especially on teenagers. Neumark and Wascher (2007, 2008) summarized and published fifty-three studies since 1990 that examined the minimum wage effects in the US. Most of these panel studies found statistically significant, negative employment effects for teens, with elasticity that range from -0.1 to -0.3.

Neumark and Wascher also used pooled national time-series cross-section Current Population Survey (CPS) data on individuals in their studies in 2007. They found negative employment elasticity of -0.136 among the teens, which is significant at the

10% level. Brown et al. (1982) also studies about teenage employment and they estimated that a 10% increase in the minimum wage rate will reduces the teenage employment by between 1% and 3%.

Williams (1993) examined the effects of federal minimum wage changes on teenage employment by using 1977-1989 state-year panel data. He included regional dummies that interacted with his minimum wage variable and found negative, region-varying effects of minimum wage. He estimated using his real minimum wage specification and found that a 10% increase in the minimum wage led to a 3.6%-6.8% decrease in teen employment. Zavodny (2000) also analyzed the effects of minimum wage on teenage employment and hours of work using similar method like Williams (1993) where she estimated the specifications with relative and real effective minimum wage. By using both state and year fixed effects for her 1979-1993 state and individual level data, she found that minimum wage had a small negative effect on teen employment but it has no effect on hours of work.

Couch and Wittenburg (2001) also analyze the effect of minimum wage on both employment and total hours worked by teenager by following the model that been used by Burkhauser et al. (2000). They used monthly data from January 1979 to December 1992 and the result shows that the employers respond to the minimum wage increase by reducing both teen employment and average hours of those teenagers who remain employed. Thompson (2009) examined both countries and states to determine whether

federal minimum wage changes will affect teen employment or not. By using quarterly data for 1996-2000, he divided the countries into two categories which are high and low impact and estimate using difference-in-differences method. In his state level analysis, he found no effects on the minimum wage, but in his county level analysis, he found that teen employment decrease 2.6%-3.7% for all size countries and 3.8%-5.7% decrease for small countries in response to a 10% increase in the federal minimum wage.

Sabia (2009) used monthly CPS data to find out whether a negative relationship between minimum wage and teen employment could be found even if year effects were included. And the result shows that a negative relationship still remained regardless of whether year effects were included. She found that a 10% increase in the minimum wage lead to 2%-3% decrease in employment and 4%-5% decrease in hours. Others studies including Vandenbrink (1987), Ragan (1977) and Welch (1974, 1978) also agreed that minimum wage give negative impact to teenage employment.

International studies of the minimum wage such as research by Forrest (1982) for Canada, Corbo (1981) for Chile and Rosa (1981) for France also agreed that the minimum wage has reduced employment in foreign countries. Forrest estimates that since 1950s the teenage unemployment in Canada has increased by 40% due to higher minimum wage. Corbo found that the minimum wage had cause substantial job losses in Chile. While Rosa showed that the minimum wage reduces employment of youth in France, especially males. Bazen and Skourias (1997) studied about the effects of 1981-

1984 minimum wage increase on youth employment (for 15-24 years old) in France. They collect sample from 32 sectors and calculate the ratio of youth employment to total employment in each sector and the proportion of workers in the sector whose wage was below the level of the minimum wage that was set in June 1981. By using difference-in-differences approach, they found out that the share of the youth employment fell even though the overall employment is growing in the sector which the minimum wage is increase. The estimation of the sample is statistically significant and negative for the first-difference estimates (for October 1980 to October 1981 and March 1981 to March 1982) and it become larger when a longer difference is used in the estimation.

Empirical evidence in Canada also produced similar negative estimation. Mercier's (1987) done a survey on Quebec and Canada for the 1966-1981 period and found that a 10% increase in the minimum wage had caused a reduction in the employment, which is 1% for teenagers and less than 0.05% for young adults aged 20-24. So does the study by Swindisky (1980) that used sample data from 1956 to 1975 and found that a 10% increase in the minimum wage will increase the unemployment rate for males aged 15-19 by 0.5 %, and also females in the same age increase drastically to 6.8%.

Study by Van (1993) examined the link between minimum wage and youth employment in Netherlands. He studied both macro and micro analysis of the employment effects of minimum wage. In the micro analysis, the result shows that a 10% increase in minimum

wage would lead to a decline of total employment estimated at 5.9% in 1984 and 5.1% in 1987 for males. For females the total decline are 5.4% in 1984 and 5.9% in 1987.

In Portugal, Ribeiro (1993) carried out an empirical study to determine the employment effects of minimum wage. To estimate the minimum wage effect, Ribeiro selected six groups of workers : male teenagers aged 15-19, female teenagers aged 15-19, young male aged 20-24, young female aged 20-24, adult men aged 25-64, and adult females aged 25-64. The result shows that the impact is higher on women employment than men's and higher on youth employment compare to adults. He concluded that a 10% increase in minimum wage would lead to a decline in youth employment between 1% - 2%, except for young women aged 20-24.

Besides that, in a study carried out by Koutsogeorgopoulou (1994) in Greece in 1994, he found out that a 10% increase in the minimum wage will reduces the employment by about 0.6% for low estimation to 1% for high estimation. For developing countries like Kenya, there are also studies that been carried out regarding the impact of minimum wage on employment even though it is limited. For example, Vandemoortele and Ngola (1982) carried out a study for the Central Organization of Trade Unions (COTU) in May 1982 that focuses on both the public and private sectors. And they found out that the effect on the employment is different depending on the sector concerned. In the private sector, the minimum wage had a negative effect on the employment. It can be seen in the employment from 1972 to 1978 in this sector that hardly increase by 1% per annum and

they also concluded that the employment would have risen by 3.3% a year if the minimum wage did not change. However, in the public sector, they estimate that the increase in minimum wage had no significant impact on total employment.

Minimum wage also reduces employment in low-wage industries, such as retailing. Douty (1960) studies the effects of the $1.00 minimum wage in the United States. The minimum wage has been increased from 75 cents to $1.00. And he found out that although it did lead to an increase in workers payment, but the industry long-term employment losses increases from 3.2% to 15%. Cotterman (1981) studies the effects of minimum wage on the industrial distribution of teenage employment. The result indicates that minimum wage have altered the distribution of the teenage employment. For low wage industries such as retailing, teenagers are most likely will not be employed, but the demands for them are increased in high wage industries, such as manufacturing.

Fleisher (1981) studies the minimum wage regulation in retail trade. He found out that the implementation of the minimum wage in retail trade had lowered employment in that industry by as much as 500,000 and the effect are mostly on teenagers. Peterson (1981) also studies the effects of minimum wage on industry. In this study, he calculates the impact of the minimum wage on different type on industries. The results of the study suggests that the low-wage industries such as retailing is primarily been impacted by the negative employment effects. So does the study by Zucker (1973) that uses quarterly time-series data to analyze the impact of minimum wage in seven low-wages, nondurable

goods manufacturing industries during the period 1947-1966. The empirical results are similar with the theoretical expectation that increases in the minimum wage lead to reductions in employment.

Besides that, Boschen and Grossmans (1981) also investigate the impact of minimum wage changes on employment in eight low-wage manufacturing industries based on annual data during the period 1948-1979. The effect is found to be negative in six of the eight industries and the coefficient is statistically significant in half of these studies. They conclude that a 10% increase in the minimum wage would reduce employment by just less that 1%.

Minimum wage laws also had come under significant criticism with Stigler (1946) explaining its negative impact on low wage workers. His argument continues to explain the potential negative consequences of the wage floor on employment. Stigler concludes that a minimum wage will tend to increase unemployment and reduce family income. Even though the minimum wage increase will help the low-skilled workers to receive higher labour earnings, the other households will fall into poverty because some of the previously employed workers will lose their jobs or their work hours will significantly cut. Furthermore, Stigler also argues that the minimum wage will reduce output and hurts the poor generally. Not only it affects poor people, minimum wage also negatively affects the small businesses which also been mentioned by Kaun (1965).

There are also a few studies that found no or positive effect on employment. Based on the Keynesian approach, it gives a clear explanation as to why minimum wage increases do not lead to higher unemployment on a macroeconomic level. When the minimum wage is increase, it will change the structure of the wages and also the structure of the prices of the affected industries. The new structure of prices will change the structure of demand, as well as the technology and the structure of production.

However, it is extremely difficult to predict empirically on how the employment is affected. There is also a valid argument that higher minimum wages will lead to a positive employment effect. A household which will receive the minimum wages tend to have a higher propensity to consume, this will make the level of consumption to increase which then will have a positive impact on aggregate demand, output and employment.

Card and Krueger (1995) from USA also proved that it was quite wrong to believe that the only possibility was that minimum wage would reduce employment. Instead it could actually increase employment in some circumstances. Their main findings are all outlined in a series of academic papers of *The New Economics of The Minimum Wage* in 1995. In their first studies they compared employment in fast food restaurants in Pennsylvania and New Jersey. There was no increase of minimum wage in Pennsylvania but in New Jersey the minimum wage increase was implemented so that it will be higher than the minimum wage in Pennsylvania. As a result the employment in New Jersey restaurants is increased but in Pennsylvania restaurants the employment decreased.

Besides that, Card and Krueger also applied the same technique to analyze the minimum wage increase in the US that happen in 1990 and 1991 and they get very similar findings. The result indicated that no evidence was found in order to show that the minimum wage will significantly lowered the teenage employment rates in more highly affected states. A more recent study by Dube et al. (2007) also supports Card and Krueger analysis. They compare the restaurants in San Francisco and the adjacent East Bay before and after the implementation of the minimum wage in San Francisco in 2004. After implementation the minimum wage raised from $6.75 to $8.50. Based on the results they did not obtain any significant effects of the minimum wage increase on employment or hours.

2.3.3 Minimum Wage and Other Effects

In addition of the effect on employment, there are also empirical studies that relate minimum wages to poverty and wage distribution but there are relatively scarce. Studies from Saget (2001) by using data from cross section of countries found out that the relationship between the level of poverty and the level of the minimum wage is negative and significant. Another similar analysis conducted by Neumark et al. (2004) find that reduced work hours and employment may actually increase the poverty rates.

There are also several studies that analyzed minimum wage effect on poverty in developing countries. For example, Morely (1995) use data from Latin America countries and finds that minimum wage increase will decrease the poverty level. So does the study by Lustig and McLeod (1996) that used data from Latin America and Asian countries and

found out that higher minimum wages will lower the levels of poverty in both regions. Neumark and Wascher (2002) use a matched sample of individuals in the CPS data in United States to examine the minimum wage effect and they find that the minimum wage in the state-level increase the probability of non poor families entering the poverty due to decreased employment and hours worked. They also find little evidence that show minimum wage increases will reduce poverty.

The minimum wage also has causes employers to cut back on training and fringe benefits. Hashimoto (1982) examined the minimum wage effects on training on the job. The results from the analysis indicated that minimum wage indeed will reduce the training because some of the workers will lose the job opportunities, therefore they will be no longer need that training. And the other reason is that the employers will no longer be able to afford to give such training because of the higher cost from the minimum wage. Studies by Leighton and Mincer (1981) using empirical analysis also found that minimum wage will tend to discourage the job training.

McKenzie (1980) argues that if the minimum wage increase it will lead to a reduction in non-money wages such as fringe benefits. This happen because the employers will lower the benefits in order to respond to the higher minimum wage. On the other studies, Wessels (1980) investigates the effect of minimum wage on fringe benefits and working condition. The results show that an increase in the minimum wage will reduce the fringe benefits and working conditions also will decline.

By looking at the research that had been done before, we can summarized it as follows. First, the overwhelming majority of studies find only small negative employment effects of a minimum wage. A small number of studies find no effect on employment. And only few studies that find small positive wage effects. These variety of results is been obtained maybe because the timing of studies is different. A recent study of economists opinions found that between half and three quarters did not support the minimum wage, and felt it could cause reduced employment (Whaples, 2006). And little studies find that minimum wage can promote growth. What is clear is that the minimum wage is relatively high cost mechanism for ensuring low wage workers are better off.

2.4 Conclusion

This chapter reviews the theories and empirical evidences regarding of the determinants of economic growth based on the past studies.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Chapter three describes the methodology used to achieve the objectives of the study. Section 3.2 presents the theoretical framework while Section 3.3 provides the empirical model that includes the explanation of dependant and independent variables and the model specification. Section 3.4 describes the model specification and Section 3.5 describes the sample description. Section 3.6 explains the methods description and finally conclusion of this chapter is in Section 3.7.

3.2 Theoretical Framework

To investigate the growth mechanism, we follow the framework develop by Mo (2000, 2001) that had been applied or modified in various investigation with remarkable robustness. The input-output relationship is characterized by a general production function,

(1) $Y = Tf(K, L)$

Where Y is the total output labor, T is a total productivity index, and K and L are the capital stock and labour, respectively. Total differentiation of Y gives,

(2) $dY = fdT + T(f_k dK + f_L dL)$

By dividing (2) with Y, we will get a decomposition that similar to Solow (1957) :

(3) $$\frac{dY}{Y} = \frac{dT}{T} + Tf_K \frac{dK}{Y} + \frac{f_L L}{f} \frac{dL}{L}$$

Equation (3) states the growth component which is related to the growth of capital and growth of labour endowments. However, according to Schumpeter (1912), there is another growth determinant, the development component, which is related to the total growth rate of productivity. The components can be expressed as equation:

(4) $$GR = F[\gamma, IY, dLL]$$

where *GR* and γ are the growth rates of real GDP and total factor productivity, *IY* is the investment output ratio, and *dLL* is the growth rate of labor. In this equation, $F\gamma$ equals to 1, F_{IY} is the marginal product of capital, and F_{dLL} is the elasticity of output to labor.

According to Levine and Renelt (1992), there are four variables that are robust in determining growth. The variables are the share of investment in GDP, the rate of population growth, the initial level of real GDP per capita, and a proxy for human capital. Investment and population growth belong to the growth component while initial real GDP and human capital belong to the development component. Based on the findings in the growth literature before, the rate of productivity growth is determined by :

(5) $$\gamma = \gamma (MW, HUM, y_0)$$

where *MW* is the minimum wage variables, HUM is human capital and y_0 is the initial GDP per capita; $\gamma_{MW}, \gamma_{y0} < 0$, and $\gamma_{HUM} > 0$.

Based on Schumpeter (1912, 1939) studies, he suggests that private investment is positively related to the growth rate of total factor productivity. That is, $IY = IY(\gamma)$, with $IY(\gamma) > 0$. If we substitute equation (5) into (4), we will get :

(6) $$GR = F [\gamma(MW, HUM, y_0), IY(\gamma), dLL]$$

Based on the equation, we can estimate the total effect of MW on the growth rate as follow :

(7) $$GR = F [MW, HUM, y_0, IY, dLL]$$

where;

GR is growth rates of real GDP
MW is minimum wage variables
HUM is human capital
y_0 is initial GDP per capita
IY is investment output ratio
dLL is growth rate of labor

3.3 Empirical Model

This study attempts to look at the linkage between the minimum wage policy and economic growth determinants for the period between years 2000 to 2005. In this study, GDP growth is used as a measure of the economic growth. GDP growth is the annual percentage growth rate of GDP. Initial GDP is data for GDP in current US dollars (2000

as the base year). Investment is the value of investment in each country. Trade openness is the ratio of exports plus imports to GDP. Meanwhile the growth rate of labour is proxied by the growth rate of the population as it is always been used in other studies because the quality of the data on population is usually better. Government expenditure is the ratio of government expenditures to GDP. For human capital we use gross enrolment ratio which is the ratio of total enrolment for primary and secondary education. Minimum wage is measured as real hourly rate.

As a measure of the minimum wage we include the minimum wage dummy, excess wage and minimum wage ratio to GDP as separate variables. We enter these three variables separately because of theoretically possible differential effects between the variables. We also include additional variables to control for various macro factors. We include trade openness and government expenditure into the equations. The theoretical models that include all respective variables are shown in Figure 3.1, Figure 3.2 and Figure 3.3.

3.3.1 The Dependant Variable

The dependant variable in this study is growth rate and it is defined as the annual percentage growth rate of GDP. To achieve the objectives, we estimates three models. Model 1 determines whether countries with minimum wage policy has significantly different economic growth rate than countries without minimum wage policy. Hence, the sample also includes countries that have no minimum wage policy. In Model 1, we use dummy for minimum wage.

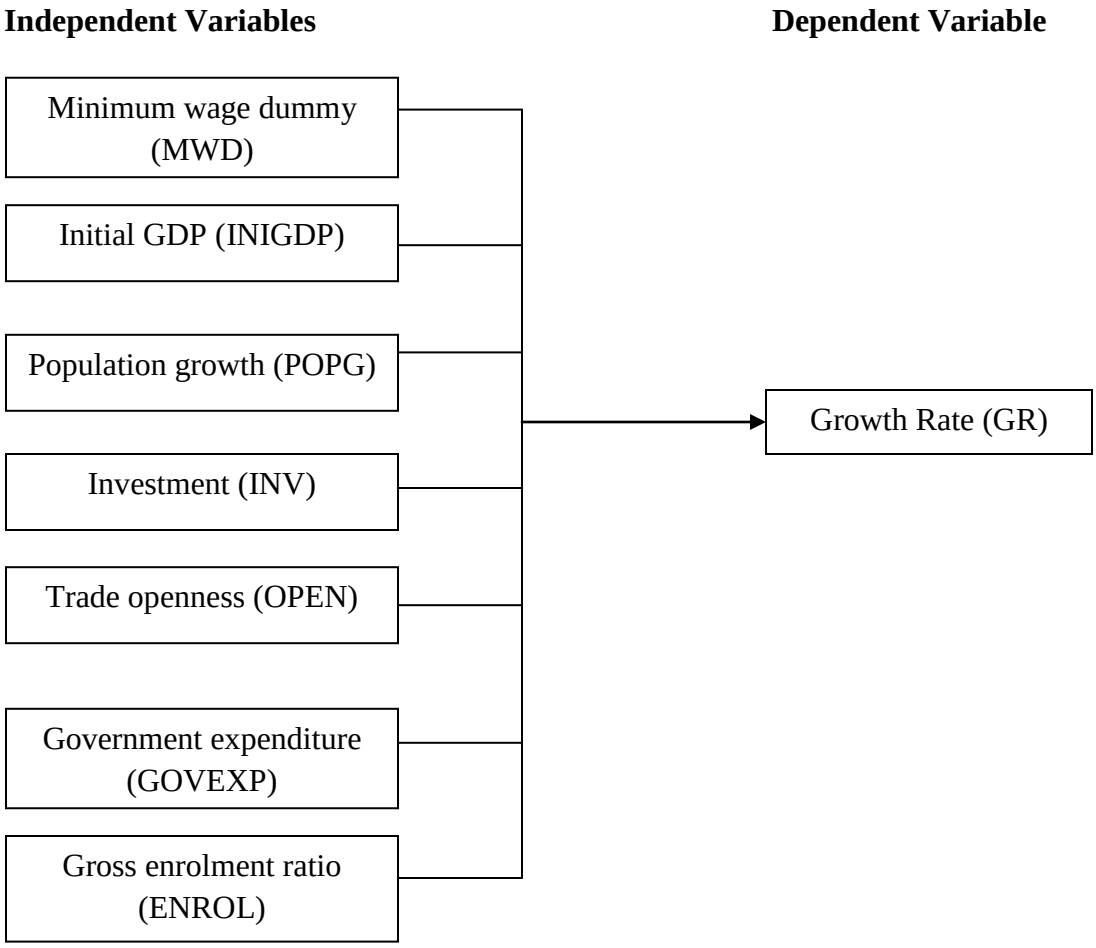


Figure 3.1 : *Empirical Framework (Model 1)*

For Model 2 and Model 3, the purpose of these model are to determine whether the minimum wage level affect economic growth or not. The sample consists of only countries that have minimum wage policy. The difference between Model 2 and Model 3 is only in the measurement of minimum wage. In Model 2, we use excess wage (ie. the difference between minimum wage and average wage) as a measurement of minimum wage. On the other hand, in Model 3, we use the ratio of minimum wage to average wage.

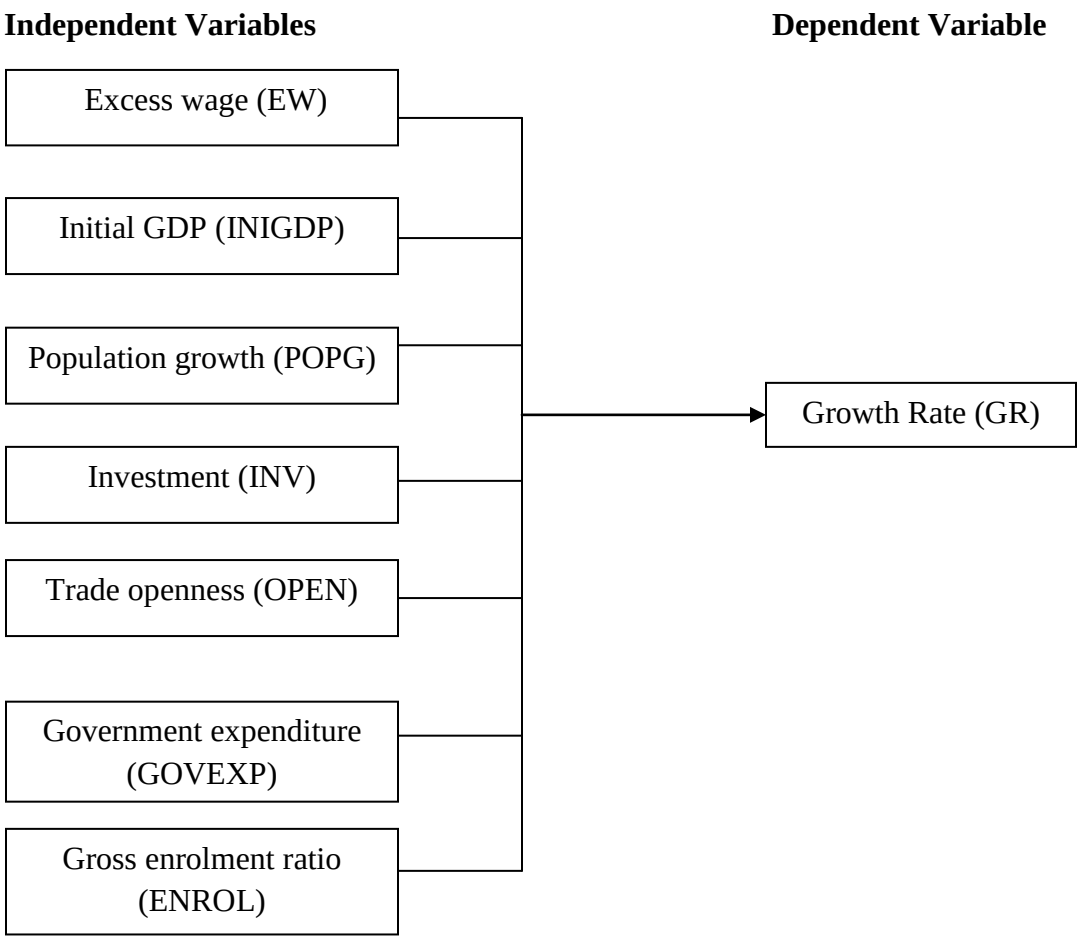


Figure 3.2 : *Empirical Framework (Model 2)*

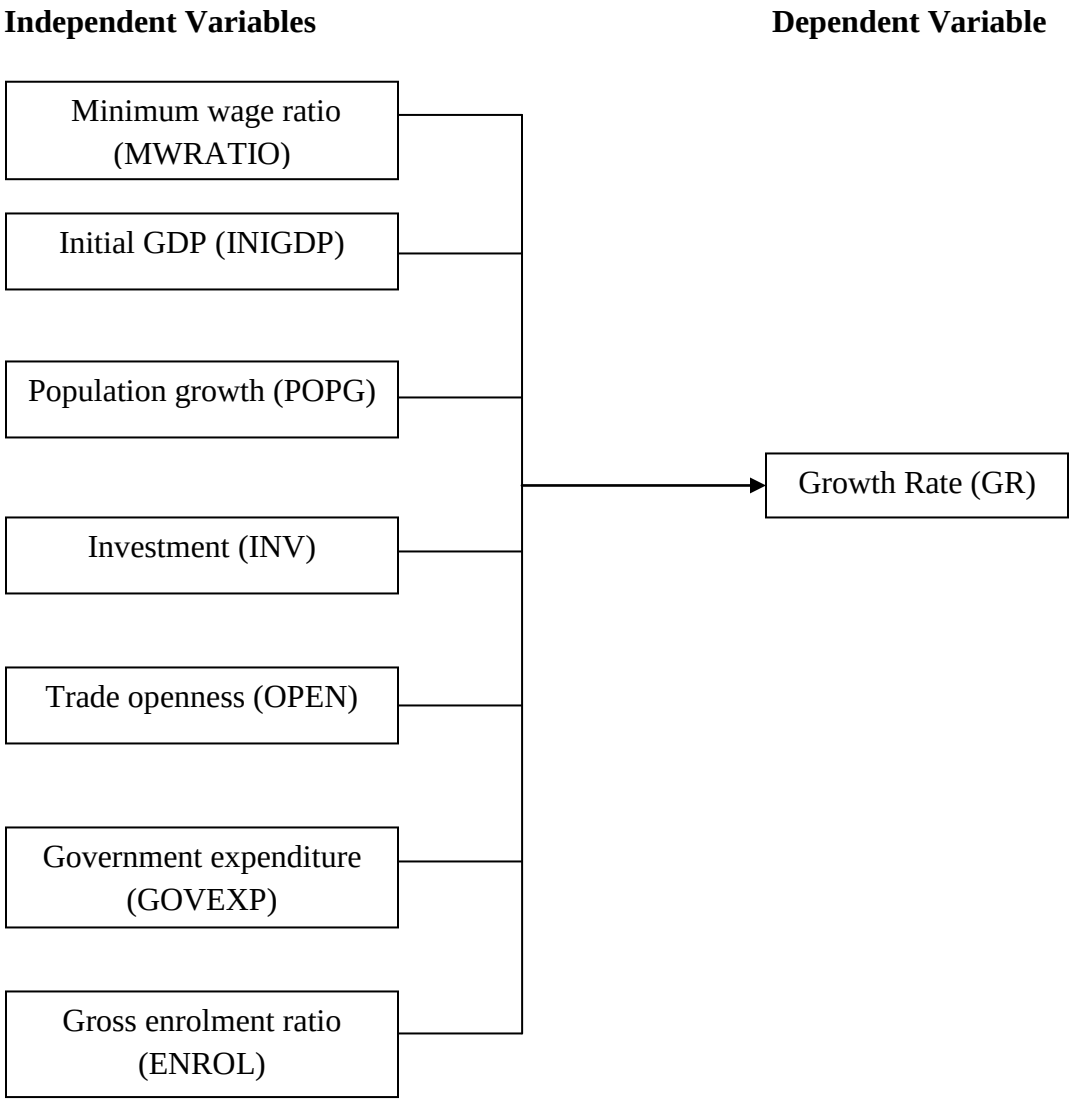


Figure 3.3 : *Empirical Framework (Model 3)*

3.3.2 The Independent Variable

- **Minimum wage dummy (MWD)**

The proxy of minimum wage dummy is used to measure the effect of minimum wage policy on economic growth. The dummy variable is interpreted as 1 for countries with minimum wage and 0 for otherwise. We include this variable to

investigate how the countries with minimum wage perform in comparison with other countries without the minimum wage. The relationship between the variables can be either positive or negative. If minimum wage is implemented, workers will become more productive because they are paid more. Therefore the productivity and economic growth will also increase. However, setting the minimum wage also will create rigidities and reducing the efficiency. It will also harm the interests of low productivity workers. The legislation places barriers to such workers in entering the labor market, makes it impossible for them to raise their productivity. Besides that, recent findings also suggest that minimum wage may make people increasingly reluctant to work and encourage them to rely on government protection and welfare.

- **Excess wage (EW)**

Excess wage is used to measure the effect of the countries with minimum wage policy on economic growth. The variable is obtained by subtracting the average wage with the minimum wage. The relationship between these two variables that include only the countries with the minimum wage policy can either be positive or negative. The impact of the excess wage plays an important role in employment creation. Higher excess wage generates a substitution between formal and informal workers. However, the impact depends on the composition of the latter. A higher share of informal employment in total employment reduces the impact of the excess wage on employment, thus suggesting that the impact of the excess wage on the informal employment could be less negative or even positive.

- **Minimum Wage Ratio (MWRATIO)**

The ratio of minimum wage to average wage is used to measure the effect of the countries with minimum wage policy on economic growth. The relationship between these two variables that include only the countries with the minimum wage policy can either be positive or negative. If the level of the minimum wage is higher, public spending power will also increase. This will increase the economic growth. However, if the minimum wage is not increase, it will not give impact to the economic growth.

- **Initial GDP (INIGDP)**

INIGDP represents initial GDP which is measured using current US dollars. Initial GDP data use 2000 as a base year and it is one of the important variables to determine economic growth. The Neoclassical model predicts a negative coefficient between initial GDP and economic growth. Therefore, we also expect to get a negative relationship for this variable.

- **Population growth (POPG)**

POPG represents the population growth and it is measured in annual percentage. We expect that this variable will have negative relationship with the growth rate. In a neoclassical model, if the population grows, investment will have to be increase to provide capital for new workers rather than to raise capital per worker.

Therefore, a higher rate of population growth will give a negative effect on the steady-state level of output per effective worker.

- **Investment (INV)**

INV represents the investment that been measured in percentage of GDP. The standard neoclassical explanation is that increased investment raises the steady-state level of output per effective worker and therefore raises the growth rate for a given starting value of GDP. The studies of Edwards (1992), Onafowora and Owoye (1998), Harrison and Hanson (1999), and Greenaway et al. (2002) also showed that investment is positively correlated with growth. Based on the assumption we expect to find a positive coefficient on this variable.

- **Trade openness (OPEN)**

OPEN represents the trade openness. Index of trade openness is calculated as sum of exports and imports divided by the value of GDP and the value is in current U.S. dollars. Most of the studies provide support that openness effects growth positively. Romer (1993), Grossman and Helpman (1991) and Barro and Sala-i-Martin (1995) among others, argue that countries that are more open have a greater ability to increase their countries growth. Therefore, in this study we also expected that the relationship between trade openness and economic growth are positive.

- **Government expenditure (GOVEXP)**

Government expenditure is measured as a percentage of GDP. Government expenditure is also a component of the GDP. Government expenditure has traditionally been a component of fiscal policy which is an instrument of the State to influence the economic growth. Several studies like Gandhi (1971), Gupta (1967), and Dritsakis and Adamopoulos (2004) recognized a positive correlation between government expenditure and economic growth. However, if the government expenditure results in a crowding out effect, then the impact on economic growth will be negative.

- **Gross enrolment ratio (ENROL)**

ENROL represents gross enrolment ratio in primary and secondary education. There are several proxies that been used to measure human capital, such as school enrolment, government expenditure on education, literacy rate, and life expectancy rate. However, in this study, school enrolment is been employed as most of the studies like Barro and Sala-i-Martin (2004) that used this proxy into their analysis and they predict that education should enhance growth. Therefore the expected relationship should be positive for this variable.

Table 3.1 shows the summary of the effects of the variables used in this study on output. This expected effect is based on the studies that had been done before. It had been mentioned in each of the variables on the previous page.

Table 3.1 Expected Effect of Variables

Variables	Expected Effect
MWD	+/-
INIGDP	-
POPG	-
INV	+
OPEN	+
GOVEXP	+/-
ENROL	+
EW	+/-
MWRATIO	+/-

3.4 Model Specification

An econometric analysis based on the theoretical model is used to look at the relationship between the minimum wage and the economic growth indicator. The equations for this study are stated as below :

Equation 1

$$GR = \alpha + \beta_1 MWD(dummy) + \beta_2 INIGDP + \beta_3 POPG + \beta_4 INV + \beta_5 OPEN + \beta_6 GOVEXP + \beta_7 ENROL + \varepsilon i$$

Equation 2

$$GR = \alpha + \beta_1 EW + \beta_2 INIGDP + \beta_3 POPG + \beta_4 INV + \beta_5 OPEN + \beta_6 GOVEXP + \beta_7 ENROL + \varepsilon i$$

Equation 3

$$GR = \alpha + \beta_1 MWRATIO + \beta_2 INIGDP + \beta_3 POPG + \beta_4 INV + \beta_5 OPEN + \beta_6 GOVEXP + \beta_7 ENROL + \varepsilon i$$

where :

GR : annual percentage growth rates of real GDP.

MWD : minimum wage dummy variable set equal to 1 for countries with minimum wage and 0 for otherwise.

INIGDP : initial GDP in current U.S. dollars (2000 as base year).

POPG : annual population growth rate.

INV : investment as a percentage of GDP.

OPEN : trade openness as a share of GDP is the sum of exports and imports divided by the value of GDP, all in current U.S. dollars.

GOVEXP : total government expenditure as a percentage of GDP.

ENROL : gross enrolment ratio for primary and secondary education.

EW : excess wage is the difference in minimum and average wage.

MWRATIO : minimum wage ratio is ratio for minimum and average wage.

3.5 Sample Description

We estimate panel regression models based on panel data variables to explain the effect of minimum wage variables on economic growth. The panel data consists of observations on the same cross sectional countries over the periods 2000 to 2005 based on the availability of data. After the countries with missing values of outputs and/or inputs were dropped, the final sample consists of 61 countries for countries with and without minimum wage and 33 countries with minimum and excess wage.

Data for Growth Rate, Population, Trade Openness and Government Expenditure are obtained from the World Bank while data for minimum and average wages were obtained from the ILO minimum wage database. Investment data is collected from Economy Watch and data for school enrolment rate is obtained from United Nations Educational, Scientific and Cultural Organization (UNESCO). For minimum wage ratio, we calculated it by dividing the minimum wage with the average data. And for excess wage we obtained the data by subtracting the average wage with the minimum wage. For initial GDP the data is calculated based on the GDP of the first year of the study period and we take year 2000 as a base year.

3.6 Method of Analysis

In this study, we used two methods of estimation which is panel Ordinary Least Square (OLS) and panel Estimated Generalized Least Squares (EGLS) with cross-section weights. In the first estimation, we regress the dependent variable which is GR with minimum wage variables only using panel OLS estimation method. The purpose for this regression is to see whether a simple regression are able to capture the effect of minimum wage on GDP growth before other independent variables are added into the equation. In the second estimation, we estimate the model by employing panel EGLS with cross-sectional weights method. We used this method because we assume there is a presence of cross-sectional heteroscedasticity. We cannot use the usual OLS estimation because with the presence of heteroscedasticity, whatever conclusions or results that we make may be very misleading. By applying the panel EGLS method, it will satisfy the standard least-

square assumptions and it will produce estimators that are best linear unbiased estimation (BLUE).

3.7 Conclusion

This chapter presents the data, the theoretical framework and the methods in analyzing the relationship between the minimum wage and the economic growth. The time frame of this study is from 2000 to 2005 covering 366 observations for Equation 1 and 198 observations for Equation 2 and Equation 3.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The aim of this chapter is to provide evidences for the factors that influence the determinants of economic growth. The descriptive analysis is illustrated in Section 4.2 while Section 4.3 provides the correlation coefficients. Section 4.4 discuss the normality test and Section 4.5 discusses the regression analysis. Section 4.6 is the conclusion of this chapter.

4.2 Descriptive Statistics

Descriptive statistics provide simple summaries about the sample characteristic. Table 4.1 and Table 4.2 will show the specific descriptive statistics for the variables. It consists of mean, median, standard deviation, minimum and maximum value for all the variables used in this study for the period 2000 - 2005.

As shown in Table 4.1, the highest mean of the independent variables are minimum wage (MW) and POPG which is 49253.78 and 1.185. The highest value for the standard deviation is MW with 166406 and the lowest value is POPG with 1.308. The highest minimum value is ENROL with 20.77 while the highest value for maximum is MW with

1225920. We can see that most of the value is positive except for the minimum value of GR and POPG which show a negative value.

Table 4.1 Summary of Descriptive Statistics

Variable	Minimum	Maximum	Mean	Standard Deviation
GR	-10.894	26.400	4.414	3.523
MW	0.000	1225920	49253.78	166406
INIGDP	7.5E+08	4.7E+12	2.6E+11	6.8E+11
POPG	-1.500	10.660	1.185	1.308
INV	9.450	192.120	50.966	37.008
OPEN	16.080	173.120	47.731	32.475
GOVEXP	11.310	115.810	67.002	32.330
ENROL	20.770	135.220	90.236	20.057

Notes :
1. The statistics are based on the panel data set in the period 2000-2005.
2. The above descriptive statistics is based on 366 observations.

In Table 4.2, we include EW and MWRATIO as the independent variables. The highest and lowest mean value for independent variables is EW and POPG. For standard deviation, EW is the highest value with 94263.50 and POPG is the lowest value with 0.845. The minimum value for EW is 99.00 and the maximum value is 559634. For MWRATIO, the minimum value is 1.27 and the maximum value is 1565.82. All the value in the table is positive except for the minimum value of GR and POPG with value of -10.89 and -1.50.

Table 4.2. Summary of Descriptive Statistics II

Variable	Minimum	Maximum	Mean	Standard Deviation
GR	-10.890	18.290	3.825	3.378
EW	99.000	559634.0	43885.16	94263.50
MWRATIO	1.270	1565.820	47.360	239.672
INIGDP	1.4E+09	4.7E+12	3.3E+11	8.4E+11
POPG	-1.500	3.010	0.635	0.845
INV	10.780	34.390	23.090	4.318
OPEN	17.440	173.120	72.059	36.142
GOVEXP	11.310	53.390	35.468	9.612
ENROL	44.020	135.220	97.980	13.237

Notes :
1. The statistics are based on the panel data set in the period 2000-2005.
2. The above descriptive statistics is based on 198 observations.

4.3 Correlation Coefficient

This section discuss the correlation coefficients between the variables. Table 4.3 shows the correlation coefficient between the variables that used MWD as one of the independent variables. Table 4.4 shows the correlation coefficient between the variables that used EW and Table 4.5 shows the correlation coefficient between the variables that used the MWRATIO.

Correlation coefficient measures the strength and the direction of a linear relationship between two variables. If the correlation value is positive, it indicates that when one variable increase, the other variable will also increase. Negative correlation indicates that when one variable is increase, the other variable will decrease. If the value of the

correlation is 0, there is no correlation between the two variables. If the value is 1, it will be a perfect correlation.

In Table 4.3 that used MWD as one of the independent variables, MWD is positively correlated with GOVEXP with a value of 0.0116. All the other variables are negatively correlated with minimum wage. The correlation between INV and GOVEXP are the highest positive correlation (0.5746). The highest negative correlation is between OPEN and GOVEXP which is -0.3974.

In the case where the minimum wage variable used in the dummy variable, the dependent variable, the GDP growth rate is positively correlated with MWD, POPG, INV and OPEN. On the other hand, it is negatively correlated with INIGDP, GOVEXP and ENROL.

Table 4.3 Correlation Coefficients in the Case Where Minimum Wage is the Dummy Variable.

Variable	GR	MWD	INIGDP	POPG	INV	OPEN	GOVEXP	ENROL
GR	1.0000							
MWD	0.0314	1.0000						
INIGDP	-0.2207	-0.1333	1.0000					
POPG	0.0711	-0.2052	-0.1732	1.0000				
INV	0.0748	-0.1045	-0.1946	-0.0168	1.0000			
OPEN	0.1298	-0.0989	-0.0688	-0.2527	-0.2826	1.0000		
GOVEXP	-0.1931	0.0116	0.1485	-0.2137	0.5746	-0.3974	1.0000	
ENROL	-0.1794	-0.1180	0.2254	-0.4721	0.0560	0.2346	0.4027	1.0000

Notes :
1. The statistics are based on the panel data set in the period 2000-2005.
2. The above descriptive statistics is based on 366 observations.

Table 4.4 shows the results where the minimum wage used is the excess of minimum wage over average wage. The dependent variable GR is positively correlated with EW, INV and OPEN. And for EW it is positively correlated with INIGDP, POPG and INV. The highest positive correlation is between GR and INV which is 0.46. The highest negative correlation is between POPG and GOVEXP with a value of -0.45.

Table 4.4 Correlation Coefficients in the Case Where Minimum Wage is the Excess of Minimum Wage over Average Wage.

Variable	GR	EW	INIGDP	POPG	INV	OPEN	GOVEXP	ENROL
GR	1.0000							
EW	0.1101	1.0000						
INIGDP	-0.1789	0.2423	1.0000					
POPG	-0.1791	0.2268	-0.0616	1.0000				
INV	0.4595	0.0707	-0.0821	-0.1659	1.0000			
OPEN	0.2295	-0.1309	-0.3535	-0.3296	0.2954	1.0000		
GOVEXP	-0.0815	-0.2197	0.1117	-0.4491	0.0445	0.3860	1.0000	
ENROL	-0.1480	-0.3700	0.1723	-0.2863	-0.1177	0.0674	0.4442	1.0000

Notes :
1. The statistics are based on the panel data set in the period 2000-2005.
2. The above descriptive statistics is based on 198 observations.

Table 4.5 shows the results where the minimum wage variable used is ratio of minimum wage to average wage. The MWRATIO is correlated positively with POPG with a value of 0.24. The other variables are negatively correlated with MWRATIO. The dependent variable, GR is positively correlated only with INV with value of 0.46 and OPEN with value of 0.23. The highest positive correlation is between GR and INV and the highest negative correlation is between POPG and GOVEXP.

Table 4.5 Correlation Coefficients in the Case Where Minimum Wage is the Ratio of Minimum Wage to Average Wage.

Variable	GR	MWRATIO	INIGDP	POPG	INV	OPEN	GOVEXP	ENROL
GR	1.0000							
MWRATIO	-0.0302	1.0000						
INIGDP	-0.1791	-0.0491	1.0000					
POPG	-0.1791	0.2359	-0.0616	1.0000				
INV	0.4595	-0.0179	-0.0821	-0.1659	1.0000			
OPEN	0.2295	-0.1212	-0.3535	-0.3296	0.2954	1.0000		
GOVEXP	-0.0815	-0.0778	0.1117	-0.4491	0.0445	0.3860	1.0000	
ENROL	-0.1480	-0.1352	0.1723	-0.2863	-0.1177	0.0674	0.4442	1.0000

Notes :
1. The statistics are based on the panel data set in the period 2000-2005.
2. The above descriptive statistics is based on 198 observations.

4.4 Econometric Estimation Results Analysis

4.4.1 Results Using Simple Regression

In this estimation, we regress the GDP growth rate with the minimum wage variables only. To estimate the model, we use the panel OLS estimation in each regression. In Table 4.6, we regress the growth rate with the minimum wage dummy variable.

Table 4.6 Panel OLS Regression Results for GDP Growth Rate and Minimum Wage Dummy

Independent Variables	Coefficient	Standard Error	P-Value
MWD	-0.024	0.392	0.952
C	4.230	0.488	0.000*
Number of Observation	366		
R-squared	0.000007		
Adjusted R-squared	-0.003		
Prob (F-statistic)	0.961		
Durbin-Watson stat	1.172		

* significant at 0.05 levels

The result shows that the coefficient of MWD is negative but not significant. Therefore we can say that MWD has no effect on GR.

In Table 4.7, we regress the growth rate which is the dependent variable with excess wage which is the independent variable.

Table 4.7 Panel OLS Regression Results for GDP Growth Rate and Excess Wage.

Independent Variables	Coefficient	Standard Error	P-Value
EW	4.08E-06	5.19E-07	0.000*
C	3.625	0.169	0.000*
Number of Observation	198		
R-squared	0.141		
Adjusted R-squared	0.137		
Prob (F-statistic)	0.000		
Durbin-Watson stat	1.417		

* significant at 0.05 levels

The EW variable coefficient is positive and significant with p-value at 5%. Therefore we can say that EW has effect on GR.

In Table 4.8, we regress the GR which is the dependent variable with MWRATIO.

Table 4.8 Panel OLS Regression Results for GDP Growth Rate and Minimum Wage Ratio.

Independent Variables	Coefficient	Standard Error	P-Value
MWRATIO	2.56E-05	0.003	0.992
C	3.798	0.152	0.000*
Number of Observation	198		
R-squared	0.000		
Adjusted R-squared	-0.005		
Prob (F-statistic)	8.44E-05		
Durbin-Watson stat	1.297		

* significant at 0.05 levels

The result shows that the MWRATIO coefficient is positive but not significant. Therefore we can say that MWRATIO has no effect on GR.

4.4.2 Regression Results with the Inclusion of Other Independent Variables

After we estimate the model using simple regression, we then estimate the model by including other explanatory variables into the equation. As mentioned earlier, this study employs Panel EGLS with cross-sectional weights method to estimate the coefficients of the variables. For Equation 1, the independent variables that were included in the regression are minimum wage dummy, initial GDP,

population growth, investment, trade openness, government expenditure and enrolment.

Table 4.9 presents the estimation results of the Equation 1 model in which GR is a dependent variable. The MWD variable is included as the independent variable to determine its affect on economic growth. The coefficient of MWD is positive and significant at one % level. The result indicate that countries that have minimum wages have higher economic growth. Raising the minimum wage might have an efficiency wage effect because workers are more productive when they are paid more. And because of the reduced turnover, unit labour costs do not necessary have to rise when the minimum wage goes up. Therefore, when the minimum wage is implemented across all firms, the average wage increase, discouraged workers return to the labour force, productivity soars and economic growth will increase.

The coefficient of INIGDP is negative and significant at five % level. The result is consistent with the prediction that countries with lower initial GDP have higher economic growth. In this study, POPG is used as a proxy of labour. Based on the estimation results given, POPG gives a positive significant impact on economic growth. The proxy for human capital is primary and secondary school enrolment. The impact of ENROL on economic growth is negative but it significant.

If we look back at the concepts, adult literacy rates indicates the result of a country's efforts to provide basic education for its citizens. Mankiw et al. (1992) stated that : "particularly for the developing countries, investment in human capital also becomes more quantitatively important when a more open trading environment and a better public infrastructure are in place". However, Temple (1998) also does not found human capital coefficient to be significant.

The coefficient of INV is positive and statistically significant at the five % confidence level. Similarly, the coefficient for OPEN is also positively and significant at the five % level. Therefore we can say that INV and OPEN has positive effect on economic growth.

Table 4.9
Panel EGLS Estimation Results for Equation 1
Dependent Variable : GR

Independent Variables	Coefficient	Standard Error	P-Value
MWD	0.658	0.240	0.006*
INIGDP	-4.4E-13	1.5E-13	0.003*
POPG	0.216	0.098	0.028*
INV	0.018	0.005	0.000*
OPEN	0.013	0.003	0.000*
GOVEXP	-0.014	0.003	0.000*
ENROL	-0.014	0.009	0.085**
C	4.299	1.084	0.000*

Number of Observation	366
R-squared	0.238
Adjusted R-squared	0.223
Prob (F-statistic)	0.000
Durbin-Watson stat	1.255

*, **, significant at 0.05 and 0.10 levels, respectively

In Equation 2, we want to determine that for countries that have minimum wage policy, whether the size of the minimum wage has effect on economic growth. Hence, instead of MWD, we used EW (i.e how large is the excess of minimum wage over average wage) as one of the independent variable.

Table 4.10 present the results of estimation of Equation 2. In this model, the sample consists of countries that had implemented minimum wage policy only. A total data of 33 countries is collected which consists of 198 observation. For the minimum wage variable we use the EW which we get by subtracting the minimum wage with average wage. The empirical results show that the impact of EW on GR is positive but not statistically significant. It means that EW did not have impact on economic growth. Studies by Klein (2012) shows that EW led to a negative impact on overall and formal employment. The analysis shows that higher excess wage generates a substitution between formal and informal employment. Therefore the effect will not lead to economic growth.

For INIGDP we can see that the result is same with the one in Equation 1 where the coefficient of INIGDP is negative and significant. Both coefficient of POPG and GOVEXP are negative and statistically significant at five % level. It means that both of these variables give negative impact to economic growth. If POPG and GOVEXP increase by one %, GR will decrease by 1.01% and 0.06% respectively. The negative coefficients of POPG imply that population growth can reduce the capital per worker and as the result it will bring negative effect to productivity and economic growth (Solow, 1956). Government expenditure is a significant element of the economy's aggregate demand. Government spending is also an important instrument of fiscal policy to influence the economy. The results support the finding by Devarajan et al. (1996) that found the relationship

between the capital component of public expenditure and per capita real GDP growth for 43 countries over the period 1970-1990 to be negative and significant.

For INV, the result is consistent with the prediction of the study where the coefficient of INV is positive and significant at five % level with the coefficient of 0.26. Romer (1996) stated that in the neoclassical growth model for a closed economy, the saving rate is exogenous and equal to the ratio of investment to output. Therefore, a higher investment raises the steady-state level of output per effective worker and thereby raises the growth rate for a given starting value of GDP. Besides that, there are also some empirical studies of cross-country growth that reported an important positive role for the investment ratio, for example DeLong and Summers (1991) and Mankiw, Romer, and Weil (1992).

The impact of ENROL on economic growth is negative and statistically significant. The result is not same as we predicted but as we had explained earlier, the result can be varies based on the proxy that we used for the human capital variable.

Table 4.10
Panel EGLS Estimation Results for Equation 2
Dependent Variable : GR

Independent Variables	Coefficient	Standard Error	P-Value
EW	1.2E-06	1.2E-06	0.315
INIGDP	-6.6E-13	1.2E-13	0.000*
POPG	-1.008	0.099	0.000*
INV	0.265	0.016	0.000*
OPEN	-0.0003	0.003	0.922
GOVEXP	-0.063	0.009	0.000*
ENROL	-0.019	0.010	0.052*
C	2.679	1.310	0.042*
Number of Observation	198		
R-squared	0.544		
Adjusted R-squared	0.527		
Prob (F-statistic)	32.359		
Durbin-Watson stat	1.379		

*, **, significant at 0.05 and 0.10 levels, respectively

For Equation 3, we included MWRATIO, INIGDP, POPG, INV, OPEN, GOVEXP and ENROL as an independent variables into the regression.

Table 4.11 presents the results of estimating Equation 3 regression model. In this equation, the sample is for the countries that only have minimum wage policy. The sample is similar to Equation 2 where 198 observations have been used from 33 countries. For the minimum wage variable we use the MWRATIO which is the ratio of minimum and average wage. Based on the empirical results, the coefficient of MWRATIO is positive but not statistically significant. The results indicate that the level of minimum wage has no effect on economic growth.

The impact of INIGDP on GR is similar to Equation 1 and Equation 2 where the coefficient is negative and statistically significant at five % level. The coefficient of POPG, GOVEXP and ENROL is also similar to the result in Equation 2 where all the coefficient are negative and significantly significant at five %. From this result, we can conclude that the effect of these three variables on economic growth is still the same even though we used different minimum wage measures.

The regression result for INV on economic growth is also consistent with previous equation and same as we predicted earlier. We can interpret it as if INV increase by one %, GR also will increase by 0.26%. Investment is an important determinant for economic growth. Jorgenson (2004) found that *"investment in tangible assets is the most important source of economic growth in the G7 nations. The contribution of capital input exceeds that of productivity for all countries for all periods."* For the openness variable we also found that the

coefficient to be similar with the equation before. The negative coefficient is not consistent with the prediction however, it is not statistically significant.

Table 4.11
Panel EGLS Estimation Results for Equation 3
Dependent Variable : GR

Independent Variables	**Coefficient**	**Standard Error**	**P-Value**
MWRATIO	0.001	0.003	0.660
INIGDP	-6.1E-13	9.2E-14	0.000*
POPG	-1.005	0.092	0.000*
INV	0.259	0.018	0.000*
OPEN	-0.0002	0.003	0.941
GOVEXP	-0.068	0.009	0.000*
ENROL	-0.020	0.009	0.029*
C	3.113	1.051	0.003*
Number of Observation	198		
R-squared	0.576		
Adjusted R-squared	0.560		
Prob (F-statistic)	0.000		
Durbin-Watson stat	1.443		

* significant at 0.05 levels

4.5 Conclusion

This chapter provides empirical results on descriptive statistics, correlation coefficients and regression analysis. The regression analysis has been done by using the panel OLS and panel EGLS methods. It is classified into two types of testing, which are the regression analysis using simple regression and the regression analysis with the inclusion of other independent variable. For simple regression, EW has effect on economic growth while MWD and MWRATIO have no effect on economic growth. For the regression with other independent variables, the results show that MWD has effect on economic growth while EW and MWRATIO have no effect on economic growth.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter concludes this study by summarizing the findings and the implications based on the objectives and limitations of the study. The paper ends with several recommendations for future studies.

5.2 Summary of Results

This study is designed to determine the minimum wage policy effects on economic growth and it is done through testing of several empirical models. A total of 61 countries are used in the sample of equation that includes minimum wage dummy and 33 countries for the equation that includes excess wage and minimum wage ratio as a minimum wage variable. The period of this study is from 2000 to 2005.

The estimation consists of three equations. In each of the equation we changed the measure of the minimum wage variable. For the first equation, we used the MWD as the independent variable. The other variables that included were INIGDP, POPG, POPG, INV, OPEN, GOVEXP and ENROL. In this equation we used dummy for the minimum wage variable which is interpreted as 1 for countries with minimum wage and 0 for countries without minimum wage. The sample includes all countries with and without minimum wage policy.

For the second equation, we replace the minimum wage variable with EW. Other independent variables are still the same. In this sample, we used data for the countries that had only implemented the minimum wage policy. The same applies to the third equation where we only change the minimum wage variable to MWRATIO. After deciding all the variables we first run the regression of economic growth on the minimum wage variables only without other independent variables. And for the second regression analysis, we included the minimum wage variables along with the other independent variables.

The finding reveals different results for the policy. The MWD coefficient is positive and significant in the estimation of the Equation 1 model. The results indicate that countries with minimum wage policy have higher economic growth. In the second equation, wage variable which is the EW, the result show that in the first regression between the minimum wage variable and the GR, the coefficient is positive and significant at five %. However, in the second regression which used the EW on the independent variable, the coefficient is still positive but not significant. From this result we can conclude that the EW will not influence economic growth for the countries that implements the minimum wage policy.

In the third equation which included the MWRATIO as the independent variable, the regression analysis shows a positive but not significant result. Based on the results we can say that the level of minimum wage does not affect economic growth for the countries that have the minimum wage policy. The coefficients of INIGDP has a negative

sign and significant for all the three equations. This result implies that the INIGDP will affect the economic growth negatively. The variable for GOVEXP also shows a negative and significant result. This means that the GOVEXP will negatively affected the economic growth. Besides that, ENROL also shows a negative and significant result in all three equations. But for INV it will affect the growth rate positively as the regression shows positive and significant result on all three equations.

5.3 Recommendations

In this paper, we only study about the minimum wage effect on the economic growth. The present paper can be extended in several directions. For example, we can study the effect of minimum wage policy on poverty reduction. In addition, more variables can be added into the equations so that the results can become better and more convincing.

5.4 Conclusions

Based on the findings, countries should implement minimum wage policy since it would increase income for the worker and at the same time have positive effect on economic growth. The results also support the minimum wage policy that will be implemented in Malaysia. However, the government should be careful in the case of the level of minimum wage rates since the results show there is no effect on economic growth.

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APPENDICES

Table A1 : Data Sources

Variables Involved	Original Source
Growth rates of real GDP	World Bank
GDP per capita	World Bank
Population growth rate	World Bank
Investment in percentage of GDP	Economy Watch
Trade openness as a share of GDP	World Bank
Total government expenditure as a percentage of GDP	World Bank
Gross enrolment ratio for primary and secondary education	UNESCO
Excess wage (minimum and average wage)	International Labor Organization

Table A2 : List of the Countries With Minimum Wage Policy and Without Minimum Wage Policy.

Countries With Minimum Wage Policy			
Argentina	Australia	Azerbaijan	Belarus
Belgium	Benin	Botswana	Brazil
Burkina Faso	Cambodia	Costa Rica	Czech Republic
El Salvador	Estonia	Ethiopia	France
Ghana	Greece	Hungary	Indonesia
Iran	Ireland	Jamaica	Japan
Kyrgyzstan	Latvia	Lesotho	Lithuania
Luxembourg	Malta	Mauritius	Mexico
Morocco	Netherlands	New Zealand	Niger
Nigeria	Paraguay	Peru	Poland
Portugal	Romania	Senegal	Slovakia
Slovenia	Spain	Syria	Tanzania
Uganda	Ukraine	United Kingdom	Uruguay
Venezuela	Vietnam		
Countries Without Minimum Wage Policy			
Bahrain	Germany	Iceland	India
Italy	Malaysia	United Arab Emirates	