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Bahaaeddin Alareeni
Allam Hamdan *Editors*

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The Impact of Minimum Wage on Economic Growth: Empirical Analysis on Developed and Developing Countries

Nurza Mohamed Yusoff, Nurnaddia Nordin, and Nurhaiza Nordin

Abstract The minimum wage is a contentious and divisive subject, with numerous viewpoints and studies. Therefore, the global economic crisis that lasted from 2018 to 2019 had a significantly different impact on economic growth in developed and developing countries. The main objective of this paper is to examine the impact of minimum wage implementation on economic growth in developed and developing countries during the recession period. This paper used a method where its data was retrieved from the World Development Indicators (WDI) database as main sources from 2015 to 2019. 20 countries from developed and developing countries were selected with a similar frequency of minimum wage determination which is monthly rate. The results shows that, there are different impact of minimum wage on economic growth in developed and developing countries, where the implementation of the minimum wage has a direct and long term impact on the developed countries, as it has a positive impact on the economic growth. Based on this empirical data, it appears that not all economic conditions during a recession, such as growth, employment and unemployment, would improve as an implementation of minimum wage, due to uncertain effects.

Keywords Minimum wages · Developed countries · Developing countries

1 Introduction

Economic growth and minimum wages are among the most important issues in the field of economics. In the past decades, economics research on the minimum wage Neumark and Wascher (2008) conclude for the least-skilled workers and increases

N. M. Yusoff (✉) · N. Nordin · N. Nordin
Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan, Kelantan, Malaysia
e-mail: nurza.a18e025f@siswa.umk.edu.my

N. Nordin
e-mail: naddia.n@umk.edu.my

N. Nordin
e-mail: haiza@umk.edu.my

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in the minimum wage will reduce job opportunities. However, this minimum wage policy tools is still debatable among the scholars regarding the effectiveness of minimum wage. As demonstrated by Stigler (1946) and Abd Karim et al. (2016) minimum wage concluded that if miscalculate the minimum wage and it pegged above the market wage, it will reduce employment, increase an unemployment rate, cause to increase in price level that increase inflation rate, reduced profit for firms, will affected workers in uncovered sector that will paid at lowest wage rate, and cause the loss efficiency.

The topic of minimum wage is frequently discussed, reviewed and debated on the economic impact to the labor market, particularly on the topic of labor and unemployment in industries (Brown 1999; Card, 1991; Katz and Krueger 1992; Meer and West 2013; Schmitt 2013). Recent research has shown that unemployment rates are growing as a result of the introduction of minimum wage between sectors (Neumark 2014; Neumark and Wascher 2000). Since this policy has been introduced in more than 150 countries, the question "Is the minimum wage successful in achieving its goals of increasing workers' lives, reducing poverty, reducing organizational disparity, increasing productivity and motivating companies to become more competitive (Schulten 2010; Abdo Alaghbari et al. 2021; Hasan Al-Naser 2019; Ali et al. 2018)" It remains a major problem for researchers and policy-makers since its implementation.

Despite studies, discussions, and numerous debates about minimum wages, empirical studies on the impact of minimum wages remain scarce, particularly studies focusing on the impact of minimum wages on developed and developing countries. These findings and assumptions necessitate further research into the effectiveness and impact of implementing a minimum wage in developed and developing countries.

This paper is divided into four parts. Section 2 provides a review of the related literature, with a focus on the impact of the minimum wage on economic growth. Section 3 describes the research methodology as well as the data sources used in this study. Section 4 presents the estimation results, and Sect. 5 concludes by discussing the study's results implications.

2 Literature Review

A global recession is a prolonged period of economic downturn throughout the world. The world's most economically vulnerable developed countries have had a particularly difficult time recently. The effects of the 2008 financial crisis are still being felt in Greece. Falling oil prices have hit Russia and Venezuela particularly hard. Among the most significant social consequences of the crisis have been increased unemployment, income loss, and increased vulnerability. The impact of the minimum wage on the economy is only marginal. In the real world, it has increased by almost 2% annually since 2011 without causing inflation or unemployment.

However most of the young, unskilled workers were affected by the implementation (Wellington 1991), the explanation was that the productivity of this type of

worker was poor. To ensure that the requirements of the company are met, the training of workers must be enforced; at the same time, however, companies were unable to provide training because of a financial crisis redirected to the minimum wage workers (Acemoglu and Pischke 1999; Hashimoto 1982). Employers have begun decreasing young and unskilled workers to deal with the problem (Neumark 2014). According to Mao (2012), the introduction of Minimum Wage among young workers has led to a slight negative job. A based analysis by Schmitt (2013) from countries in Canada, the United States and Europe found that more than 85% had a negative impact on the employment of mostly unskilled employees.

On the other hand, the United States practices the variation of the minimum wage at the state level; while the United Kingdom applies only one minimum wage enacted in 1999, it found zero effect on employment. A research performed by Card and Krueger (1993) explicitly on employment effects based on the increase in minimum wage between two states showed a negative impact on employment. It is clear that the minimum wage in Canada, the USA, Europe and Asia has been well studied, especially on the effect on employment.

Research about minimum wage more focus in developed countries compare to developing countries. The main reason is, some of the economic sectors in developing countries are not obligated to follows the minimum wage regulation. Recently, the study on minimum wage among economists is emergent to present new empirical evidence. In developing countries, a large proportion of workers is outside the umbrella of minimum wage legislation, Lemos (2009). Thus, it becomes interesting research to explore the results.

Del Carpio et al. (2014) choose Thailand in their study and found that the minimum wage decreases the probability that older employees and women will be working, but in a limited amount. A minimum wage is the lowest hourly, regular or monthly remuneration that employers in different industries can legally pay to some employees. However, Del Carpio et al. (2014) found that less research on the effect of minimum wage on future employment in South East Asia in particular in Malaysia.

The result of a study in Vietnam shows an adverse impact of minimum wage on employment, wages and welfare (Del Caprio et al. 2013). The study finds that minimum wage rises reduce the total number of wage workers especially in the domestic firms and increase self-employment. The number of wage workers declines because many workers with informal contracts lose their jobs. The profile of workers who earn below the minimum wages find that they tend to be young, relatively uneducated and of ethnic minorities.

Past study had shown a strength and weakness of the empirical work used in order to examine minimum wage especially in developing countries due to the robust findings. Thus, further research on the estimation of minimum wage on developing countries should conducted.

3 Methodology

In order to analyses the impact of minimum wage on economic growth in developed and developing countries, ordinary least square (OLS) analysis were employed. This econometrics methods use to identify the relationship between economic growth and minimum wage. This method employed in this study because the techniques is the simplest in terms of estimation procedure. The growth model adopts from the framework introduced by Mankiw et. al (1992). Equation (1) provides the basic econometric model, which states that GDP is a function of minimum wage and other explanatory variables. The model can be express as follows:

$$GDP_{it} = \alpha + \beta_1 MW_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (1)$$

where GDP is a growth rate, MW is a minimum wage, X is an explanatory variables. In order to estimate Eq. (1) the first step is examining the stationary test of the variables. Second step is using OLS approach to estimate the growth model and finally in order to determine the accurate estimation of OLS model, the diagnostic checking were employed.

The data set consist of selected developed and developing countries based on the availability of data set. Annual data on GDP growth rate, employment, unemployment and labour force participation rate. Data are collected from World Development Indicators. Minimum wage is constructed based on the converting value of minimum wage to monthly estimates because different country has a different benchmark of the minimum wage (i.e.: United States and United Kingdom set in hours, Mexico and Myanmar is set per day's work, Malaysia, and Indonesia set at monthly rate).

4 Results and Discussion

The results on the examining the impact of minimum wage on economic growth are present in this section. The empirical analysis is based on 20 selected developed and developing countries over the 2015–2019 periods. Tables 1 2, 3, 4, 5, 6, 7 and 8 present the estimation results on the developed countries.

4.1 Empirical Analysis on Developed Countries

The summary of statistics present in Table 1 and Table 2 show the correlation analysis, respectively. For the descriptive, the first estimation variable of economic growth shows the mean value is 2.7189. Romania has recorded the maximum growth rate with 7.3194. Meanwhile, the mean value for second variable, employment is 3.9879 with a standard deviation of 0.0112. The highest value for employment rate is

Table 1 The descriptive statistics of developed countries

Variable	Mean	Standard deviation	Minimum	Maximum
GROWTH	2.7189	0.1857	0.5554	7.3194
EMP	3.9879	0.0112	3.8907	4.1284
UNM	1.8567	0.0681	1.1442	3.0937
LFPR	4.2845	0.0078	4.1826	4.3937
MW	7.2072	0.0504	6.3787	7.7186

Notes: GROWTH = output growth per capita, EMP = employment rate, UNM = unemployment rate; LFPR = labour force participation rate and MW = minimum wage; all the values are in the logarithm form

Table 2 Correlation matrix

	GROWTH	EMP	UNM	LFPR	MW
GROWTH	1				
EMP	−0.0682	1			
UNM	−0.3994	−0.0062	1		
LFPR	−0.0980	−0.7276	0.5682	1	
MW	0.17335	−0.5997	−0.2348	0.2587	1

Notes: GROWTH = output growth per capita, EMP = employment rate, UNM = unemployment rate; LFPR = labour force participation rate and MW = minimum wage; all the values are in the logarithm form

Netherlands with 4.1284 and the minimum value is 3.8907 for Spain. The mean of unemployment is 1.8567 with a standard deviation of 0.0681, and it ranges from 1.1442 (Germany) to 3.0937 (Spain). For the labour force participation rate, the mean is 4.2845. The highest value is 4.3937 (Netherlands) and the lowest is 4.1826 (Romania). In the case of minimum wage, the mean and standard deviation are 7.2072 and 0.0504, respectively. It ranges from 6.3787 (Portugal) to 7.7186 (Poland).

The estimation of correlation analysis are reported in Table 2 for all variables used in this analysis. From the estimation, variables that indicate negative correlations with GDP growth are employment, unemployment and labour force participation rate. The other interest variable minimum wage indicate positive correlations with output growth.

The next step of estimation is using simple linear model as shown in Eq. (1). The estimation results show in Table 3. The results indicates in developed countries that there is direct impact of employment on growth rate and this result is consistent with Khan (2020), Kapsos (2005), Basnett and Sen (2013), with 0.1709 significant at 10 percent significant level, which this results indicate that employment contributing 17.09 percent to the output growth. The estimated coefficient on unemployment rate also indicates significant and has a direct impact on economic growth. According to Soylu et al. (2018) unemployment is positively affected by economic growth and

study by Zagler (2003) stated that in long run there is positive relationship between these variable.

Another key variable in our model is minimum wage which is found has a direct effect with the value is positive and significant at the 10 percent level. This indicates that an increase in minimum wage rate it will promote output growth in developed countries and this is consistent with the findings in Sunarsih et al. (2019) where they stated that in Indonesia minimum wage has significant impact on economic growth.

The estimated coefficient on labor force participation rate indicates a negative and significant relationship with economic growth in developed countries. This result is inconsistent with the past studies, and only in line with Clark et al. (1999).

Table 4 report the result the linear interaction model with the estimation of interaction term between MW x EMP. The interaction term were employed to examine does minimum wage play a moderating role on employment on economic growth in developed countries. The result show that the coefficient on MW x EMP is highly

Table 3 Results of linear estimation model for developed countries

	Coefficient	s.e	t-stat
EMP	0.1709*	0.103132	1.657786
UNM	0.1399*	0.0953	1.469032
LFPR	−0.2151***	0.07456	−2.88494
MW	0.0005*	0.000509	1.148623
Constant	7.2495*	4.139992	1.751108
Multiple R^2	0.4762		
Number of observation	250		

Notes: GROWTH = output growth per capita, EMP = employment rate, UNM = unemployment rate; LFPR = labour force participation rate and MW = minimum wage; all the values are in the logarithm form

Table 4 Results of linear interaction model in developed countries

	Coefficient	s.e	t-stat
EMP	−0.846612***	21.9687	−3.85372
UNM	−0.26794***	0.266844	−1.00411
LFPR	−0.649016	1.639276	−3.95916
MW	−0.483074***	12.28866	−3.93105
$MWXEMP$	0.120744***	3.075945	3.925427
Constant	7.8715***	90.89065	4.047408
Multipe R^2	0.5998		
Number of observation	250		

Notes: GROWTH = output growth per capita, EMP = employment rate, UNM = unemployment rate; LFPR = labour force participation rate, MW = minimum wage

significance at 1 percent significant level. This is strongly provide a justification that, in developed countries minimum wage able to moderate the impact of employment on economic growth.

Thus, in developed countries, minimum wage indicates a positive and significant impact on economic growth and able to moderate the impact of employment on economic growth.

4.2 Empirical Analysis on Developing Countries

The next step of analysis is to examine the impact of minimum wage on economic growth in developing countries. Table 5, 6 and 7 shows the estimation analysis. Table 5 shows the descriptive analysis. The mean value for output growth is 4.7201 with a maximum growth rate was recorded for Tajikistan (7.6174). The mean of employment rate is 3.9860, where the highest was recorded for by Peru. The mean of unemployment is 1.856 and it ranges from 1.0986 (Turkey) to 2.9428 (Armenia). The mean value of labour force participation rate is 4.1538 with the highest value is 4.3949 (Peru). Lastly the interest variable of this study, minimum wage with the mean (8.3403) and it ranges from 5.5214 (Tajikistan) to 12.6415 (Costa Rica).

Estimation results for correlation shows that only minimum wage show a positive relationship with economic growth, and the other three variables indicate negative relationship on economic growth in developing countries. This estimation results is similar with the findings for developed countries in Table 6.

In order to indicate the effect of minimum wage on economic growth, the linear estimation analysis were conducted. As shown in Table 7, the coefficient of minimum wage shows negative with a weak significant level. Thus, in developing countries minimum wage indicates negative impact on economic growth, where if firms and employers force to follow the minimum wage regulation, they will reduce the number of employment which reduce the country national income that directly will reduce the economic growth. This situation is different in the developed countries, as firms

Table 5 Results of descriptive statistics for developing countries

Variable	Mean	Standard deviation	Minimum	Maximum
GROWTH	4.7201	0.2733	0.2	7.6174
EMP	3.9860	0.0296	3.6119	4.3241
UNM	1.8560	0.0779	1.0986	2.9428
LFPR	4.1538	0.0285	3.7249	4.3949
MW	8.3403	0.3153	5.5214	12.6415

Notes: GROWTH = output growth per capita, EMP = employment rate, UNM = unemployment rate; LFPR = labour force participation rate and MW = minimum wage; all the values are in the logarithm form

Table 6 Results of correlation matrix for developing countries

	GROWTH	EMP	UNM	LFPR	MW
GROWTH	1				
EMP	−0.09805	1			
UNM	−0.0682	−0.7276	1		
LFPR	−0.39948	0.568294	−0.00626	1	
MW	0.23714	0.235383	−0.57796	−0.25317	1

Notes: GROWTH = output growth per capita, EMP = employment rate, UNM = unemployment rate; LFPR = labour force participation rate and MW = minimum wage; all the values are in the logarithm form

Table 7 Results of linear estimation model for developing countries

	Coefficient	s.e	t-stat
EMP	0.0712*	0.039612	1.797414
UNM	0.039172	0.064596	0.606416
LFPR	−0.12647***	0.034074	−3.71173
MW	−4.8E-06*	2.88E-06	−1.66407
Constant	8.9139***	1.632645	5.459824
Multiple R^2	0.5686		
Number of observation	250		

Notes: GROWTH = output growth per capita, EMP = employment rate, UNM = unemployment rate; LFPR = labour force participation rate and MW = minimum wage; all the values are in the logarithm form

Table 8 Results of linear interaction model in developing countries

	Coefficient	s.e	t-stat
EMP	0.1211*	6.995703	1.731818
UNM	0.0789	0.644231	0.122528
LFPR	–0.0781***	1.911761	−4.08765
MW	0.0438	3.464796	1.264813
$EMPxMW$	−0.11412	0.870945	−1.31034
Constant	−9.9522	25.48108	−0.39057
Multipe R^2	0.5800		
Number of observation			

Notes: GROWTH = output growth per capita, EMP = employment rate, UNM = unemployment rate; LFPR = labour force participation rate and MW = minimum wage; all the values are in the logarithm form

in developed countries is already well establish and they able to strictly follow the minimum wage regulation.

Table 8 shows the estimation result of the interaction estimation analysis. In this model, an interaction term MW x EMP is added to examine the role of minimum wage through employment effect on economic growth in developing countries. Based on the estimation results, the coefficient value of interaction term between on MW x EMP indicate insignificance. Thus, we can conclude that, the role minimum wage in moderate the impact of employment on growth in developing countries should be denied.

5 Conclusion

The main result is derived from regression analysis on 20 selected developed and developing countries over the 2015–2019 periods. The results have a different impact on economic growth in developed and developing countries, and the implementation of the minimum wage has a long-term impact on the country's economy, as it has a positive impact on the economic growth in developed countries. However results shows that, in developing countries there is negative impact on economic growth and consistence with previous studies on developing countries found that instituting a minimum wage had either a negative or positive effect on economic growth. However, based on previous research, empirical evidence suggests that not all economic factors, such as growth, poverty, unemployment, and productivity, will benefit from the implementation of the minimum wage, because there are ambiguous effects of the implication of minimum wage stated by the past literatures.

As a result, additional research using a different methodology is required to explain the ambiguous effects. The limitations of this study are that it only examines four economic factors. Perhaps more economic factors can be considered in future reviews or studies.

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