How Does Minimum Wage Policy Impact Unemployment in Malaysia?

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Abstract

The Minimum Wage Order has been implemented in Malaysia since 2012 with the aim of improving living standards and reducing poverty. However, the impact of the implementation of the minimum wage on unemployment remains unclear and raises concerns that higher labour costs have the potential to reduce hiring and subsequently increase unemployment rates. Therefore, this study intends to re-examine the extent to which the implementation of the minimum wage has affected the unemployment rate in line with the increasingly technology-driven Malaysian labour market, utilising data from 2013 to 2023. Using a quantile regression analysis, the results of this study show that there is a consistent positive relationship between the minimum wage and unemployment, starting from the 10th quantile up to the 50th quantile of unemployment distributions. The unemployment rate increased from 11.7% at the 10th quantile to 13.7% at the 50th quantile. However, at higher quantiles, starting from the 75th to the 90th quantile, our results indicate a negative and statistically insignificant relationship between the minimum wage and the unemployment rate. Our results suggest that the Malaysian labour market is efficient in addressing the mismatch between job requirements and workers' skills during the minimum wage implementation period. As a result, wage increases did not lead to a significant increase in unemployment, suggesting that the Malaysian labour market can accommodate higher wages through productivity gains or cost management strategies. Based on our findings, we suggest future policymakers implement balanced wage policies while simultaneously promoting skills training initiatives and educational reforms to reduce unemployment risks and address educational mismatches for vulnerable workers.

Keywords:
Minimum Wage, Unemployment, Quantile Regression, Labour Market, Skills Mismatch

INTRODUCTION

The purpose of minimum wage policy implementation is to ensure that all workers receive a basic level of income that allows them to meet their essential needs while reducing poverty and inequality within the workforce, particularly among low-skilled workers. However, the global implementation of minimum wages has raised debate regarding its impact on labour markets due to various challenges associated with its enforcement. Several concerns include disparities in the cost of living across different regions, administrative capacity to ensure compliance, and the potential burden of increased operating costs on employers, which may have broader economic implications (Belman & Wolfson, 2014). In developed countries such as the United States, New Zealand, Canada, and the United Kingdom, minimum wage policies have largely achieved their intended objectives of protecting workers from exploitation and improving their living standards (Sikora, 2021). The positive outcomes

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observed in these countries, including improved living conditions for low-wage workers and improved access to basic necessities, have influenced Malaysia's decision to implement a similar policy framework.

In Malaysia, the Minimum Wage Order was officially introduced in 2012. The main aim is to address the issue of low wages and ensure more equitable income, especially among low- and middle-income workers. Although this policy has improved workers' welfare, Malaysia still faces challenges such as rising youth unemployment, skills mismatch, and unstable wage growth (Razak et al., 2020; Mohamad & Yunus, 2024). Additionally, the influx of foreign workers and increasing automation in key industries, particularly in manufacturing and services, further complicate employment trends. Previous studies have shown that firms often respond to rising labour costs by adjusting employee benefits and restructuring their workforces, which raises concerns about potential job losses due to businesses raising wages to comply with the law (Sinnapen, 2019; Kim & Lim, 2018; Ismail & Yuliyusman, 2014; Ali, 2020). These concerns are exacerbated when firms adjust their labour composition according to skill levels and technological proficiency, which may reduce the demand for low- and medium-skilled workers (Yunus & Zouya, 2024; Mohamad & Yunus, 2024).

Several studies have shown that the small and medium-sized enterprise (SME) sector is most affected because its smaller profit margins make it difficult to adjust to rising labour costs (Arrowsmith et al., 2003; Avram et al., 2019; Razak et al., 2020; Dung, 2017). However, the relationship between the minimum wage and unemployment remains a subject of debate, as most studies on the minimum wage often focus on its impact on productivity, inflation, and poverty, and there is still a gap in research focusing on the direct relationship between the minimum wage and its impact on labour market demand (Bisht & Pattanaik, 2021; Yunus et al., 2015; Belman & Wolfson, 2014).

In order to address this gap, this study aims to re-examine the impact of minimum wages on unemployment in Malaysia, as it is crucial due to several pressing issues in the current labour market, such as high youth unemployment, skills mismatch, stagnant wage growth, and the rising cost of living. This study becomes even more important given the Malaysian government's recent decision to increase the minimum wage from RM1,500 to RM1,700 per month, effective on 1st February 2025. The findings from our study on the minimum wage and its impact on unemployment also offer valuable insights into the field of business education. The results of this study have the potential to help educational institutions and businesses adapt to the changing labour market by better serving students and meeting labour market demands. This proactive approach can lead to more effective academic programme offerings while strengthening collaborative relationships between the education and industry sectors.

The literature also reveals that measuring the impact of the minimum wage is challenging due to data quality issues and limited resources. Poor data quality, such as outdated or incomplete information, can lead to inaccurate results (Ali et al., 2022; Daniels, 2022; Zammari & Ayob, 2023). In addition, most previous studies have relied on Ordinary Least Squares (OLS) as the main analytical method. Although OLS is widely used, it may not fully address the complexities of the impact of the minimum wage, such as differences in the impact across industries, regions, or skill levels of workers. Without better data and more advanced methods, research findings may be biased or fail to capture the true impact of minimum wage policies (Wye & Bahri, 2021).

As a solution to this problem, this study will employ quantile regression that is able to capture the relationship between minimum wage and unemployment, starting from the lowest to the highest level in the unemployment distribution in Malaysia. Quantile regression is an

effective approach to identify the impact of minimum wage implementation on unemployment because it allows for deeper analysis along the data distribution. By doing so, the findings from this study are able to provide a clearer picture of how minimum wage policies affect various segments of the labour market. Targeted policies and programmes can be implemented periodically based on the results at each quantile, especially for workers most exposed to the risk of unemployment. To the best of our knowledge, existing studies using quantile regression mostly focused on developed countries and give little attention to developing countries, including Malaysia (Nielsen & Rosholm, 2010; Abdeljawad et al., 2014; Yunus & Zouya, 2024).

We also contribute to existing research on the determinants of unemployment by including several macroeconomic variables that are rarely estimated together with minimum wages, such as foreign exchange rates, foreign direct investment (FDI), and job vacancies in an unemployment model covering the period 2013-2023. This approach distinguishes our study from previous research, as the impact of these macroeconomic variables on unemployment rates in dynamic labour markets remains uncertain and requires further investigation. Our analysis is particularly relevant in the context of the digital economy and automation, where employment structures are undergoing rapid transformation (Abdeljawad et al., 2014; Dube & Freeman, 2024; Wye & Bahri, 2021; Wang & Gunderson, 2018). Although previous studies have examined the relationship between minimum wages and unemployment in specific sectors, there is a lack of research exploring this relationship at the macroeconomic level (Kim & Lim, 2018; Ismail & Yuliyusman, 2014; Ali, 2020; Islam et al., 2017).

LITERATURE REVIEW

In the context of studying the relationship between minimum wage and unemployment, economic theory provides various perspectives. Classical economic theory suggests that an increase in the minimum wage increases labour costs, potentially leading to a reduction in the demand for labour. According to this theory, employers faced with higher wage bills may reduce their workforce, which in turn increases unemployment, especially among low-skilled or less productive workers. This theory assumes that the labour market is competitive, in which wage levels are determined by the dynamics of supply and demand. Meanwhile, Keynesian theory also offers insights into the relationship between minimum wages and unemployment, suggesting that higher wages can increase aggregate demand by increasing the purchasing power of workers, thereby stimulating economic growth and job creation (Keynes, 1936). Keynesian theory states that during economic downturns, a higher minimum wage can increase consumption and offset the negative employment effects typically associated with increased labour costs.

On the other hand, in a monopsony labour market-where a single or limited number of employers have significant control over wage setting-the introduction or increase of the minimum wage may not necessarily lead to higher unemployment. In such a market, employers tend to set wages below the equilibrium rate in order to maximise their profit margins. As Card and Krueger (1995) point out, a modest increase in the minimum wage could correct this imbalance, leading to increased employment and improved worker welfare without significant job losses.

However, there are several empirical studies that support and also contradict the theory used to explain the relationship between minimum wage and unemployment due to the differences in the focus of the studies in terms of economic context, sector composition, and labour market structure. For example, Majchrowska and Ziolkowski's (2012) study on the

effects of minimum wage increases in Poland revealed that significant increases in the minimum wage had a negative impact on employment status between 1999 and 2012. Higher minimum wages pushed workers towards the informal sector and reduced their participation in the formal labour market (Siregar, 2020). As a result, many workers chose to leave the labour market altogether. However, studies by Card and Krueger (2016), and Katz and Krueger (1992) showed that minimum wage increases do not necessarily reduce the number of jobs.

In Malaysia, the literature clearly shows that there is still limited empirical research examining the implementation of the minimum wage and its impact on labour demand and job composition in the period 2014–2020. For example, Ismail and Yuliyusman (2014), and Kim and Lim (2018) found that the implementation of the minimum wage increases the income of low-skilled workers but also causes higher unemployment among less productive workers due to increased labour costs. Their study showed that small firms often face challenges in retaining workers due to higher operating costs. Their findings are also consistent with a study by Sinnapen (2019), which also shows that increasing labour costs force firms to adjust their operations, including changes in working hours, employee benefits, and local hiring practices.

Meanwhile, Ali (2020), who studied the impact of minimum wage rates on the number of job offers in Malaysia, showed no significant change in the number of job offers between 2012 and 2017. The author concluded that a higher minimum wage will encourage workers to enter the labour market and employers do not incur significant production costs when workers remain in jobs, which reduces the need for frequent turnover. The findings of this study also show that increasing the minimum wage encourages workers to be more productive and committed to improving their work performance, which is also supported by other studies such as Akerlof and Yellen (1990), and Ghani (2020). On the other hand, Islam et al. (2017) found that the minimum wage rate and unemployment rate are negatively related, meaning that an increase in the minimum wage policy reduces national unemployment and increases labour force participation. However, the relationship between these two variables is still weak and requires further quantitative research in order to measure the extent to which the implementation of the minimum wage causes a fall or increase in the unemployment rate. Their findings also show that after the introduction of the minimum wage policy, workers choose full-time jobs over part-time work.

We now turn to other macroeconomic variables influencing unemployment rates. Empirical studies indicate that there is still a lack of research on the extent to which FDI affects unemployment, although unemployment is associated with FDI through job creation and leads to a reduction in unemployment, especially in the manufacturing and service sectors. Jude and Silaghi (2016) found that FDI reduces unemployment in developing countries by generating new jobs. However, Feenstra and Hanson (1997) suggested that FDI in high-tech sectors can temporarily increase unemployment by replacing low-skilled workers with advanced technology. Although FDI facilitates technology transfer and skill development, the effect depends on the adaptability of the workforce (Apostolov, 2016). In Malaysia, Athukorala and Wagle (2011) found that FDI reduces unemployment in the manufacturing sector but poses challenges for high-tech sectors that require specialised skills. In conclusion, FDI tends to have a positive impact on unemployment, depending on the investment sector and the capabilities of the local workforce.

Research on the role of job vacancies in influencing unemployment is still limited. Existing studies often focus on labour market mismatch, where there is an imbalance between the skills needed by employers and those possessed by the workforce in the era of artificial intelligence (Yunus, 2018; Yunus & Zouya, 2024; Zouya & Yunus, 2024). Meanwhile, Layard et al. (2005) found that job vacancies significantly affect unemployment through skill mismatch

and slow job-filling rates. They emphasised that high job vacancies alongside high unemployment rates reflect a mismatch between workers' skills and industry needs. Moreover, Blanchard and Summers (1986) and Pissarides (2000) showed that prolonged unemployment leads to a decline in workers' skills, making them less suitable for available job opportunities. Similarly, Davis, Faberman, and Haltiwanger (2013) found that slow job-filling rates, particularly in high-skilled sectors, contribute to higher unemployment levels.

In terms of methodology, the literature shows that quantile regression has been increasingly employed to analyse the relationship between economic factors such as education, unemployment, and economic growth. This approach provides a more detailed and comprehensive understanding than traditional average-based methods. For example, Martins and Pereira (2004) examined the effects of education on unemployment duration across different schooling periods and found that education reduces unemployment duration more significantly for individuals with longer schooling, highlighting the benefits for those better positioned in the labour market. Similarly, Koenker and Hallock (2001) presented a basic analysis of quantile regression in labour economics, demonstrating its application in studying wage and unemployment distributions. Their study shows that quantile regression can reveal variations in unemployment that average methods overlook, allowing for a deeper understanding of how labour market policies affect different groups.

In another study, Gregory and Nason (2001) employed quantile regression to investigate how macroeconomic shocks affect unemployment across various quantiles, revealing that the effects are not uniform and that different groups in the labour market are affected differently by economic shocks. Wadud (2009) explored the relationship between unemployment and economic growth in Australia, showing that the effects of structural fragmentation vary depending on labour market conditions. Similarly, Clements and Sensier (2003) examined regional unemployment in the UK, revealing asymmetric unemployment rate forecasts and highlighting that certain regions are more sensitive to economic changes. Both studies highlight the value of advanced statistical approaches in capturing the effects of heterogeneity across different labour market conditions and regional disparities, as well as addressing the complexity of unemployment forecasting.

Until recently, only a few studies have specifically used quantile regression to analyse the effects of minimum wages on unemployment. A notable study by Nielsen and Rosholm (2010) used quantile regression to investigate the effects of minimum wage increases on youth employment in Denmark. Their study found that the negative employment effects were more pronounced at the lower end of the wage distribution, meaning that low-skilled workers and young workers were more likely to lose their jobs when the minimum wage increased. These results are in line with the findings of Dube et al. (2024), who used the same method to examine the regional effects of minimum wage policies on employment. They showed that the effects of minimum wage increases on employment were more pronounced in economically disadvantaged areas and for workers at the bottom of the wage distribution. Their study highlights the importance of considering different labour market segments when assessing the effects of minimum wage policies.

In addition to these findings, Wang and Gunderson (2018) extended the analysis by exploring how the impact of the minimum wage varies across different levels of unemployment using quantile regression. Their study found that the impact of minimum wage increases on unemployment was non-uniform, with a more pronounced effect for low-skilled workers and during economic downturns. This study suggests that quantile regression is particularly useful for understanding the heterogeneous effects of economic policies, as it provides a more detailed view than traditional methods that focus on average effects. Similarly, Islam et al. (2017), who

also used quantile regression to examine the effects of economic policies, including the impact of the minimum wage on unemployment rates in developing countries, found that although minimum wage increases did not significantly affect overall employment, the effects varied depending on the economic context and skill level of workers. These studies suggest that quantile regression is an effective method for capturing the effects of various minimum wage policies on unemployment across different wage levels and economic conditions.

In conclusion, using quantile regression estimation will allow researchers to provide more detailed policy recommendations by capturing the effects of various economic variables, especially minimum wage policies, on different segments of the workforce. By examining the effects across multiple quantiles, this study offers valuable insights into the diverse nature of unemployment, highlighting how economic policies can affect different regions, wage levels, and skill groups. This approach demonstrates the effectiveness of quantile regression in addressing labour market complexity and formulating more precise and impactful policy interventions.

METHODOLOGY

Data Source

This study used secondary data obtained from the open-source websites of the Department of Statistics Malaysia and Bank Negara Malaysia. The data covers the first, second, third, and fourth quarters from 2013 to 2023, totalling 44 samples. The dependent variable in this study is the unemployment rate, while the independent variables include the minimum wage (MIN_WAGE), exchange rate (EXC), foreign direct investment (FDI), the number of job vacancies, and real GDP (GDP).

In this study, the unemployment rate is calculated based on the Department of Statistics Malaysia (DOSM) definition, which refers to the percentage of the labour force (working-age population aged 15-64 years) who are unemployed. For the minimum wage, there are five different data points: RM 850 (average combined minimum wage for Peninsular Malaysia, Sabah, and Sarawak) from 2013 to 2015; RM 960 from 2016 to 2018; RM 1,100 in 2019; RM 1,200 for 2020 and 2021; and RM 1,500 for 2022 and 2023 (DOSM, 2023).

On the other hand, foreign exchange rate data represents the value of the Malaysian Ringgit (RM) per unit of the United States Dollar (USD). FDI data refers to the net amount of investment from countries across Latin America, North America, Southeast Asia, East Asia, Europe, Oceania, and other regions. The job vacancy data reflects the total number of job vacancies, not categorised by sector or industry. Lastly, real GDP is used to measure the total value of goods and services produced by the economy, adjusted for price changes over time (Pascual, 2022). This adjustment allows real GDP to better reflect the economy's ability to meet the needs and desires of the people and serves as an appropriate indicator of economic well-being.

Empirical Model

Quantile regression is well suited to analyse the differences in the impact of the minimum wage on unemployment in Malaysia from 2013 to 2023. Unlike standard linear regression, which estimates the average effect, quantile regression captures how changes in the minimum wage affect different levels of unemployment across the distribution. This method is useful because the relationship between the minimum wage and unemployment may vary depending on the

level of unemployment considered. For example, regions or sectors with high unemployment may respond differently to minimum wage policies than those with low unemployment rates. Quantile regression allows for a more detailed examination of these differences, providing insights that average estimates cannot capture (Koenker & Hallock, 2001; Clemens & Strain, 2018).

To analyse the extent to which the minimum wage can affect the unemployment rate in Malaysia, this study incorporates key macroeconomic variables that are still underestimated in estimating the unemployment model in Malaysia, namely GDP, job vacancy rate, FDI, and foreign exchange rate. The quantile regression developed in this study allows for the measurement of the extent to which the macroeconomic variables used in this study interact with changes in the minimum wage at different points in the unemployment distribution. Given the complexity of the Malaysian labour market and the impact of varying economic conditions, quantile regression offers a more comprehensive analysis than OLS (Wye & Bahri, 2021; Wang & Gunderson, 2018). Although previous studies have examined the effects of the minimum wage on employment, there are few studies that focus on unemployment using quantile regression in the Malaysian context, making this approach innovative and valuable for policymakers seeking targeted interventions.

Model Estimation

Quantile regression was estimated at five different quantiles: the 10th, 25th, 50th (median), 75th, and 90th percentiles of the unemployment distribution. Through quantile regression, the effect of minimum wages could be differentiated within a particular conditional quantile. From Equation (6), this study follows the fundamental model by Koenker and Bassett (1978) and Abdeljawad et al. (2014) to estimate the unemployment rate model using a quantile regression estimator as follows:

$$UNEMP_{it} = MIN\_WAGE'_{it}B_{\theta} + \mu_{\theta i} \; ; \; Quant_{\theta}\,(UNEMP_t/MW_{it}) = R'_{it}B_{\theta} \quad (1)$$

Where: $UNEMP$ is unemployment rate. MIN_WAGE' represents minimum wages and other determinants influencing unemployment, namely GDP, FDI, foreign exchange rates, and job vacancy rates during the period of 2013-2023. B_{θ} is the slope coefficient quantifying the level of minimum wages on unemployment at quantile θ. $Quant_{\theta}\,(UNEMP_{it}/MIN\_WAGE_i)$ is the conditional quantile of unemployment. μ is the error term.

The quantile regression estimator involves the minimisation of the sample size, 1/n, and also minimises the weighted absolute values of the residuals using all the available data (Buchinsky, 1998), as presented in Equation (8), with the θth quantile regression solving $0 < \theta < 1$:

$$Min\frac{1}{n}(\left|UNEMP_{it} - MIN\_WAGE'_{it}B\right| + \sum_{i,t:UNEMP<MIN\_WAGE'B}(1-\theta)\left|UNEMP_{Pit} - MIN\_WAGE'_{it}B\right|) \quad (2)$$

Where: $UNEMP \geq MIN\_WAGE'B$ and $UNEMP < MIN\_WAGE'$ are indicator functions which describe the positive and negative values of residuals contingent on the value of θ. As one quantile continues to increase from 0 to 1, one can detect the entire conditional distribution of unemployment, which is conditional on the regressors of minimum wages. Instead of squaring all errors, this method gives a weight of θ to positive and (1-θ) to negative residuals.

RESULTS AND DISCUSSION

Pearson Correlation Analysis

The Pearson correlation analysis in Table 4.1 provides important insights into the relationships between the unemployment rate and several macroeconomic variables, including minimum wage, GDP, FDI, exchange rate, and job vacancies in Malaysia. The results indicate a strong positive correlation between the unemployment rate and the minimum wage (0.661), indicating that higher minimum wages are associated with higher unemployment. This could be explained by the fact that employers may be reluctant to hire workers at higher wage costs, potentially leading to fewer job opportunities, particularly in low-skill sectors. Similarly, the moderate positive correlation between unemployment and GDP (0.566) points to the possibility that economic growth, while generally associated with higher employment, may also lead to structural shifts in the labour market, causing some workers to be displaced from certain sectors. On the other hand, the negative correlation between unemployment and FDI (-0.309) indicates that increased foreign investment is likely to reduce unemployment, as FDI tends to create new job opportunities by establishing new businesses or expanding existing ones.

The foreign exchange rate also plays a role in influencing unemployment, with a moderate positive correlation (0.502) between the exchange rate and the unemployment rate. A depreciating currency, for example, can raise the costs of imports, potentially leading to reduced employment in import-dependent sectors. The strong negative correlation between job vacancies and unemployment (-0.632) further supports the idea that higher job vacancies correlate with lower unemployment, as more job openings provide greater employment opportunities, which should help reduce the unemployment rate. This relationship suggests that an increase in the number of available jobs can alleviate the pressure on the labour market and contribute to reducing unemployment. Additionally, the correlation between minimum wage and the number of job vacancies (-0.682) is notably negative, implying that higher minimum wages may discourage job creation. Employers may respond to higher wage floors by reducing the number of jobs available or turning to automation, which can lead to fewer vacancies. Conversely, the positive correlation between GDP and minimum wage (0.649) suggests that as the economy grows, there tends to be upward pressure on wage levels, likely due to higher productivity and inflationary forces.

Table 4.1: Pearson correlation analysis

Variables	UNEMP	MIN_WAGE	GDP	FDI	EXR	JOB
UNEMP	1					
MIN_WAGE	0.661	1				
GDP	0.566	0.649	1			
FDI	-0.309	0.545	0.643	1		
EXR	0.502	0.642	0.658	0.432	1	
JON	-0.632	-0.682	0.285	0.366	-0.447	1

Similarly, the positive correlation between FDI and minimum wage (0.545) indicates that foreign investments may push for higher wages, likely in sectors that benefit from technological advancements or global market competition. Importantly, although some correlation between independent variables, such as between GDP and MIN_WAGE and between EXR and real GDP, show moderate correlations, the correlation values do not exceed the threshold of 0.8, indicating that multicollinearity is not a significant concern in this analysis. This step confirms that multicollinearity will not bias the parameter estimates and thus supports continuing with the quantile regression analysis (Jim, 2017).

Quantile Regression Analysis

The results of the quantile regression estimation on the extent to which minimum wage, real GDP, the number of job vacancies, FDI, and foreign exchange rates influence Malaysia's unemployment rate across different quantile levels of the unemployment distribution for the period 2013–2023 are presented in Table 4.2. The results in Table 4.2 reveal that the minimum wage exhibits a consistent positive relationship with unemployment from the lower quantile up to the median quantile of the unemployment distribution—specifically, at the 10th (0.117**), 25th (0.121***), and 50th (0.139**) quantiles. These findings suggest that increases in the minimum wage contribute to an 18.8% rise in the unemployment rate in Malaysia between the 10th and 50th quantiles. This positive relationship can be explained by several factors. The results align with classical economic theory, which posits that higher labour costs may reduce the demand for workers, particularly in lower-skilled or labour-intensive sectors. When minimum wages increase, employers may respond by downsizing their workforce in an effort to maintain profitability (Neumark & Wascher, 2008). This effect is typically more pronounced at the lower end of the unemployment distribution, where workers tend to have fewer skills or less experience. This is particularly relevant to Malaysia's labour market, where a significant portion of the workforce is concentrated in low-wage sectors (Yunus, 2023; Yunus et al., 2015).

Furthermore, increases in the minimum wage can lead to job displacement, as firms may opt to automate tasks or hire more skilled workers who can justify the higher wage. Consequently, low-skilled workers—who are the most vulnerable to such changes—may experience job losses, thereby exacerbating unemployment at the lower quantiles (Lemos, 2009). In Malaysia’s context, this effect is further amplified by the dominance of small and medium-sized enterprises (SMEs), which constitute the backbone of the economy. These firms often face challenges in absorbing rising labour costs and may be compelled to reduce their workforce (Ismail & Yuliyusman, 2014).

Table 4.2: The quantile regression results on the unemployment rate, 2013-2023

Variables	10th quantile	25th quantile	50th quantile (Median)	75th quantile	90th quantile
MIN_WAGE	0.117**(0.120)	0.121***(0.231)	0.139**(0.241)	-0.226(0.223)	-0.232(0.031)
GDP	-0.436*(0.214)	-0.414**(0.227)	-0.222**(0.219)	0.419*(0.212)	-0.391**(0.221)
FDI	-0.138*(0.160)	0.230*(0.110)	-0.242**(0.113)	-0.222(0.183)	-0.314(0.149)
EXR	0. 016**(0.131)	0.151**(0.041)	0.119*(0.101)	-0.213*(0.110)	-0.240**(0.104)
JOB	-0.321 (0.012)	-0.314(0.024)	-0.262*(0.011)	-0.242*(0.005)	-0.256*(0.010)
Constant	15.27**(0.161)	15.52**(0.152)	15.23*(0.173)	16.17*(0.178)	16.52**(0.094)
Observations	44	44	44	44	44
Pseudo R^2	0.712	0.618	0.724	0.718	0.726

Notes: The dependent variable for the quantile regression is unemployment rate. Entries in parentheses are robust standard errors, and all variables are transformed into natural logarithms. *** p<0.01, ** p<0.05, * p<0.1.

Our study also suggests that the absorptive capacity of Malaysia's labour market-the ability to integrate and retain employees despite wage increases-appears to be limited, particularly among lower-income groups. Many workers in these quantiles lack the necessary skills or training to adapt to market demands, making them more susceptible to unemployment when wage policies shift (Juhdi et al., 2008; Mohamad & Yunus, 2024). This situation emphasises a structural challenge in Malaysia's labour market, where educational mismatches and skill shortages impede the effective implementation of minimum wage policies. These combined factors help explain the observed increase in unemployment following minimum wage increases and highlight the need for comprehensive policies that balance wage growth with measures to support worker skill development and SME resilience.

It is interesting to note that, at the 75th to 90th quantiles, our estimation results demonstrate a negative but statistically insignificant association between minimum wages and the unemployment rate in Malaysia during the period from 2013 to 2023. Several plausible reasons can be attributed to our results based on the labour market situation in Malaysia during the period under investigation. We suggest that at higher quantiles, the unemployment distribution typically represents regions or sectors that are more adaptable and resilient to minimum wage adjustments. Employers in these sectors, such as advanced manufacturing and service industries, may possess better absorptive capacity and productivity levels, allowing them to absorb wage increases without significantly reducing employment levels. Additionally, at higher quantiles, Malaysia's labour market appears more efficient, with fewer instances of structural unemployment or mismatches between job requirements and worker skills. Consequently, wage increments do not lead to a significant rise in unemployment, suggesting that the market can accommodate higher wages through improved productivity or cost management strategies.

Regarding the negative association observed at the higher quantiles, the findings of this study indicate that these quantiles may be characterised by a more skilled or specialised workforce; hence, employers may prefer to retain employees despite wage increases to avoid productivity losses associated with high turnover or skill shortages. This aligns with the notion that the adverse employment effects of minimum wages are more significant for low-skilled workers, while employment among higher-skilled workers remains relatively stable. This outcome is consistent with the findings of Neumark and Wascher (2008), who reported that increases in minimum wages tend to negatively affect employment for low-skilled workers, particularly in developing countries with businesses operating on tight profit margins.

Next, we examine the effects of the macroeconomic variables, which were estimated together with the minimum wage variables in the unemployment model. The impact of GDP exhibits a significant negative relationship with unemployment at the 10th (-0.436*), 25th (-0.414**), and median (-0.222**) quantiles, indicating that economic growth helps reduce unemployment at these levels. This result supports Okun's Law, which posits that higher GDP growth typically leads to lower unemployment. The results also show that economic expansion creates more job opportunities, particularly in sectors like manufacturing and services, which benefit from increased production and demand. However, at the 75th quantile, the effect of GDP shows a positive relationship (0.419*), suggesting that during periods of higher unemployment, economic growth alone may not effectively reduce unemployment due to structural issues such as skill mismatches or inefficiencies in the labour market. These results are supported by Juhdi et al. (2010) and Yunus (2023), who highlighted that Malaysian graduates often lack industry-specific skills required by advanced manufacturing and foreign firms, limiting the effectiveness of GDP growth in lowering unemployment.

As for FDI, its impact on unemployment is mixed. At the 10th quantile, FDI negatively affects unemployment (-0.138*), implying that FDI creates job opportunities when unemployment is relatively low. This result is consistent with Lipsey and Sjöholm (2004), who found that FDI can enhance employment through technology transfer and increased demand for local suppliers. However, at the 25th quantile, FDI shows a positive relationship (0.230*), suggesting that foreign investments might initially favour capital-intensive industries that do not generate immediate employment gains. The mixed impact may also be due to the absorptive capacity of the local workforce, as highlighted in Yunus (2023) and Sandrasegaran and Rambeli (2024), in which the lack of industry-specific skills among Malaysian workers, particularly at higher education levels, limits their ability to benefit from FDI-driven employment opportunities.

Regarding the effect of foreign exchange rates on unemployment, the quantile analysis shows a significant relationship across all quantiles. Foreign exchange rates affected the unemployment rate in Malaysia during the period 2013–2023, mainly through export and import channels. The findings of this study suggest that the depreciation of the ringgit, especially after the fall in global oil prices in 2014, may have increased the competitiveness of Malaysia's exports, while also raising the cost of importing raw materials, which puts pressure on certain production sectors. Although export sectors such as electronics and palm oil showed an increase in demand, other sectors that rely on imported inputs experienced a reduction in employment, leading to unemployment. Additionally, high exchange rate volatility affected foreign investor confidence and subsequently impacted FDI and job creation. Therefore, changes in the exchange rate indirectly influence unemployment through their relationship with trade, production costs, and investment (Shaari et al., 2013).

The number of job vacancies consistently shows a statistically significant and negative relationship with unemployment across all quantiles, with coefficients ranging from -0.321 to -0.242. This indicates that an increase in job openings reduces unemployment, reinforcing the importance of labour market demand in addressing unemployment levels. This finding aligns with Blanchard and Diamond (1989), who identified a strong inverse relationship between job vacancies and unemployment, implying that improving job creation mechanisms and labour market efficiency is essential for reducing unemployment rates.

CONCLUSION

The purpose of this study is to examine how the implementation of the minimum wage affects Malaysia's unemployment rate from 2013 to 2023. This study is linked to the Sustainable Development Goals (SDGs), which aim to reduce poverty in achieving equitable growth. This study also lends support to the MADANI framework, which focuses on building a fair, sustainable, and balanced economy in Malaysia. Therefore, by using quantile regression analysis, this study not only looks at the impact of the minimum wage but also examines how other factors such as real GDP, job vacancies, FDI, and exchange rates affect the unemployment rate. Understanding these factors is crucial so that Malaysia can implement policies that support fair and equitable growth in the labour market.

The main results indicate that the implementation of minimum wages is associated with an increase in the unemployment rate of 18.8% between the 10th quantile and the 50th quantile during the period of investigation, highlighting potential challenges related to higher labour costs for businesses. Based on the results, which indicate a persistently positive significant relationship between the minimum wage and unemployment from the lower quantiles to the median quantile, this study suggests that minimum wage increases may exacerbate unemployment among low-skilled workers or in less resilient economic sectors, as predicted by classical economic theory.

In order to mitigate these adverse effects, we suggest that policymakers consider implementing wage subsidies or targeted training programmes to support low-skilled workers' transition to higher-productivity jobs. Therefore, greater investment in education and skills development programmes tailored to industry demand should be expanded. These policies can reduce structural unemployment and improve the employability of workers in affected regions or sectors. Meanwhile, the insignificant results observed between minimum wages and unemployment rates at both higher quantiles imply that the Malaysian labour market may appear more resilient to wage adjustments. Hence, we propose that policymakers leverage this adaptability by encouraging the growth of high-productivity industries and fostering

innovation. Policymakers can achieve this by providing incentives for technology adoption, investing in research and development, and upgrading industry competencies. By tailoring wage policies to industries with stronger absorptive capacity, such as advanced manufacturing and service sectors, the risk of adverse employment effects can be minimised.

Our findings also highlight the importance of adopting a distinctive approach to minimum wage policy based on region or sector. This approach could help balance the needs of diverse labour market segments to ensure that wage increments do not disproportionately impact vulnerable workers or regions. By aligning minimum wage adjustments with local economic conditions and labour market efficiencies, Malaysia could foster a more inclusive and sustainable labour market while maintaining its competitiveness in the global economy. Besides, the Malaysian government should aim policies to promote people's happiness by considering relevant and significant macroeconomic determinants of happiness (Subramaniam & Abdul Jalil, 2025). This is hoped to encourage more youths to participate in the government and non government program, and link training to job and labour market opportunities (Owenvbiugie & Egbri, 2020).

Like most studies, our research faces certain limitations that provide scope for future researchers to examine this issue in greater depth. Our study relies exclusively on secondary data from 2013 to 2023, which may not fully capture the impact of recent policy changes or economic shocks, such as the long-term impact of the COVID-19 pandemic. Hence, future research can incorporate more recent and comprehensive data and investigate the post-pandemic recovery period, including examining the impact of the minimum wage by economic sector to provide a broader understanding regarding the impact of the minimum wage on the unemployment rate in Malaysia. More in-depth research is needed to understand how the minimum wage affects worker employability and helps reduce imbalances in the labour market, including in the formal and informal sectors.

We also suggest that future studies examine the impact of the minimum wage by demographic group (e.g., gender, age, skills, and education levels) using survey data, which may further reveal the extent to which minimum wage implementation has varying impacts. From these findings, more tailored education and training policies can be implemented according to demographic profiles to reduce unemployment. Finally, qualitative research methods such as interviews with policymakers and industry experts could be conducted in future studies, which have the potential to provide valuable context to support quantitative findings and offer more effective policy recommendations.

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