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Comparative Analysis of Unemployment Trends and Demographic Disparities in Malaysia and Its Neighboring Countries

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ABSTRACT

This study conducts a comparative analysis of unemployment trends and demographic disparities in Malaysia and its neighbouring countries, focusing on age, gender, and education level. Using data from the International Labour Organization (ILO), the research explores the relationships between these demographic factors and unemployment rates. Statistical tests, including Spearman's Rank Correlation, Kruskal-Wallis H Test, and Mann-Whitney U Test, were employed to identify patterns and significant differences between each variable. The results indicate that younger individuals and those with intermediate education face higher unemployment rates, while older individuals and those with less formal education experience lower unemployment. Gender disparities were observed, with males exhibiting slightly higher unemployment rates. Cross-country comparisons revealed Malaysia's unemployment rates as moderate and stable, while Indonesia and the Philippines faced higher rates. Thailand, Brunei, and Singapore consistently recorded low unemployment levels. These findings emphasize the need for targeted, region-specific policies to address unemployment challenges effectively.

1. Introduction

Global unemployment is on the rise, with an estimated two million additional people projected to join the job market in the coming year, compounding existing challenges [1]. Disparities between higher-income and lower-income countries remain significant, with unemployment and job gap rates disproportionately higher in less affluent nations [1]. Inflation has further eroded real disposable income, diminishing living standards and weakening consumer demand, thereby hindering economic recovery [1]. Despite some progress, the number of workers living in extreme poverty increased by about a million in 2023 which underlining persistent vulnerabilities. Stagnant productivity growth, widespread informal employment was accounts for 58% of the global workforce and uneven post-pandemic recovery continue to present obstacles [1]. Residual health

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issues, such as long COVID, and reduced work hours have impacted productivity, while youth unemployment and persistent gender gaps in employment are particularly pronounced in developing and emerging economies. These global trends emphasize the urgent need for comprehensive policies to address unemployment, inequality, and workforce vulnerabilities [1].

The unemployment rate is one of the most recognized labor market indicators and is widely cited in the media as a measure of labor supply underutilization. It reflects an economy's inability to provide jobs for individuals who are actively seeking work but remain unemployed, even when they are available for employment [2]. Unemployment trends significantly impact a country's social and economic well-being [3-6]. A high unemployment rate can have adverse effects on the social, political, and economic stability of a country, including an increase in poverty, income inequality, and even social unrest [5,7].

In Malaysia and its neighboring countries (Indonesia, Thailand, Brunei, the Philippines, and Singapore), unemployment and demographic disparities pose significant challenges to regional economic development and social stability [5]. Unequal distribution of job opportunities and demographic characteristics, both within and between these countries, exacerbates these issues. Interrelated factors, including globalization, labor migration, education gaps, workplace inequality, and youth and long-term unemployment, further intensify the problem [8].

Firstly, globalization has heightened competition, leading to job outsourcing in the manufacturing and service sectors. While some regions benefit from increased employment, others grapple with job scarcity, brain drain, and the exploitation of migrant workers [9]. These dynamics amplify social and economic disparities, fueling dissatisfaction and inequality across the region [8].

A mismatch between available jobs and the skillsets of job seekers remains a critical issue. Educational unemployment is a situation where individuals possessing a certain level of education and qualifications are unable to secure suitable employment opportunities corresponding to their skill set [10,11]. This phenomenon is often attributed to a mismatch between the skills acquired through education and the demands of the labor market. Many individuals, particularly in rural and underprivileged areas, lack access to affordable, high-quality education and vocational training. This skills gap leaves workers unable to secure sustainable employment while employers struggle to fill critical roles, impeding economic growth and innovation [8,12].

Besides, discrimination based on gender, race, age, and other factors persists in labor markets. Marginalized groups often face barriers to employment despite being qualified, perpetuating unemployment and underemployment. These inequities not only deny opportunities to individuals but also prevent economies from leveraging their full talent potential [8]. In addition, youth and long-term unemployment are significant concerns, as affected individuals often lack experience, relevant skills, and professional networks. These challenges are exacerbated by sluggish economic growth and limited job opportunities, leading to cycles of poverty and social instability [8].

The combined effects of unemployment and demographic disparities threaten both short-term recovery and long-term growth in the region [13,14]. High unemployment undermines economic stability, reduces consumer spending, and increases reliance on social welfare systems. It also fuels social unrest, crime, and mental health challenges, particularly among vulnerable groups. Addressing these issues is essential to achieving equitable economic growth, reducing inequalities, and promoting sustainable development across the region [8]. The unemployment rates of Malaysia and other countries are shown in Figure 1.

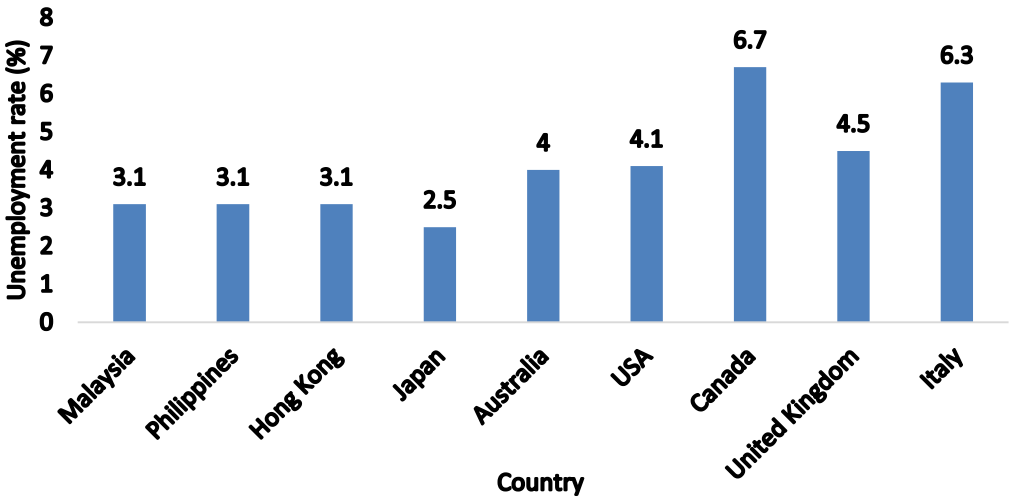

Fig. 1. The unemployment rate of Malaysia and other countries [15]

In Malaysia, the labor market has shown resilience, with steady improvements in 2024 driven by strong domestic economic momentum. According to the Department of Statistics Malaysia (DOSM), Malaysia's unemployment rate in December 2024 hit the lowest rate since 116 months at 3.1 per cent (May 2015: 3.1%), with 544.3 thousand unemployed. UOB Global Economics and Market Research also confirmed that Malaysia has achieved full employment, which is likely to continue throughout the year [16]. Figure 2 shows the unemployment rates and their changes in Malaysia from 2000 to 2024.

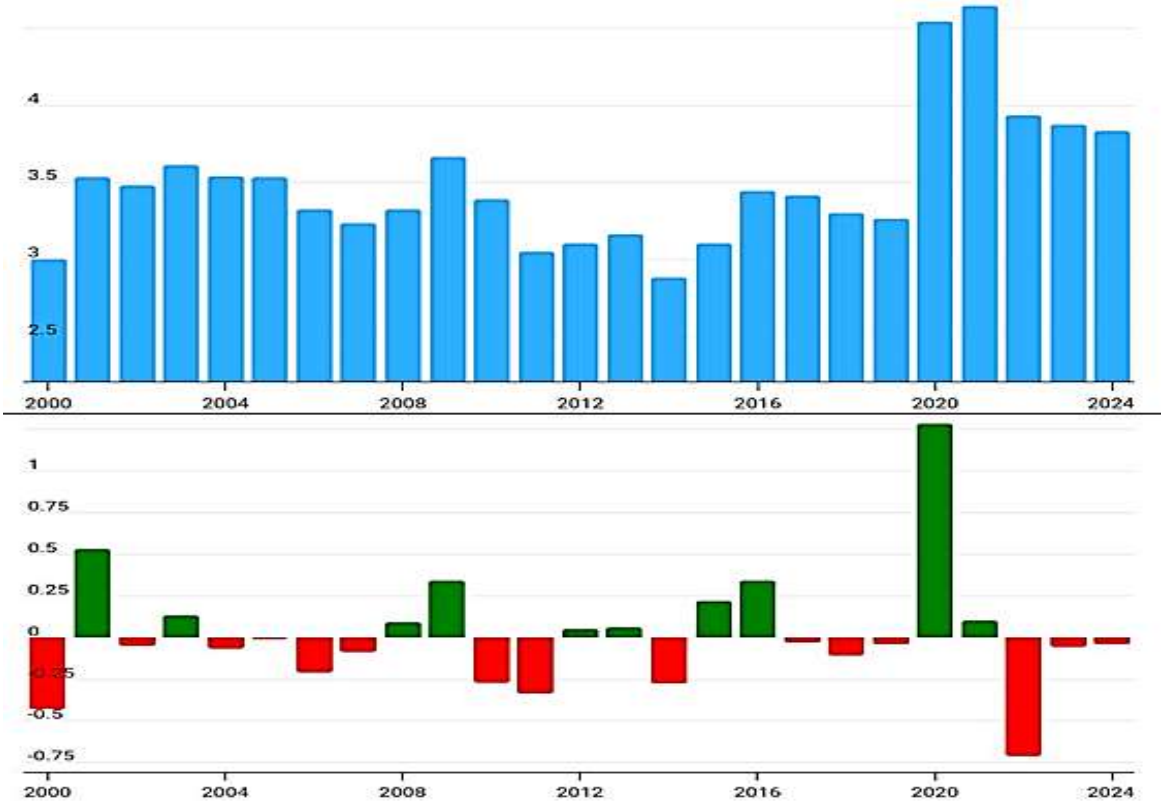

Fig. 2. The unemployment rate and annual change of unemployment rate in Malaysia from 2000 to 2024 [17]

Low unemployment is a vital indicator of economic health, reflecting stability and growth that inspires confidence among businesses, investors, and consumers. This stability creates a positive cycle: businesses are encouraged to expand, innovate, and invest, while consumers with secure incomes drive demand for goods and services, collectively supporting sustainable growth. In Malaysia, low unemployment has been a cornerstone of the nation's remarkable economic transformation since gaining independence in 1957. Transitioning from an agriculture-based economy to one driven by manufacturing and services, Malaysia has capitalized on its economic stability to attract both domestic and foreign investment. This shift not only generated diverse job opportunities but also fostered a skilled workforce through strategic investments in human capital and labor-intensive growth policies [18].

The benefits of low unemployment extend beyond economic growth. It reduces poverty, as evidenced by Malaysia's significant decline in extreme poverty to less than 1% of the population [9]. Stable employment enhances individual well-being and societal cohesion by enabling people to support their families and contribute to their communities. Furthermore, it boosts consumer confidence, increases disposable income, and reduces dependency on social welfare systems, allowing governments to allocate resources toward other developmental priorities.

In essence, low unemployment is both a driver and a result of economic resilience, ensuring that nations like Malaysia continue advancing toward sustained prosperity and equitable growth [9]. It underscores the importance of strategic governance, workforce development, and adaptive economic policies in creating a thriving labor market that fosters long-term stability and expansion.

This study aims to compare unemployment trends and demographic differences between Malaysia and its neighboring countries. By employing statistical methods, it seeks to uncover patterns, trends, and relationships among these variables, offering insights into regional dynamics. Although current literature emphasizes the importance of unemployment and demographic changes in social and economic development, research gaps persist in understanding these factors across neighboring countries. This study endeavors to bridge these gaps by examining similarities, differences, and potential explanations for observed variations, contributing to cross-national comparative analysis. Additionally, this article explores key demographic factors such as age, gender, and education level. These elements provide a foundation for understanding the complex connections between demographic changes and unemployment trends, as well as their implications for regional cooperation and stability.

This paper is structured as follows. The methodology is described in Section 2 consists of data collection and methods used. Results and discussion are contained in Section 3 followed by conclusions in Section 4.

2. Methodology

This study employs a quantitative research design. Quantitative research is characterized by a systematic, planned, and structured approach from the beginning of the study to its design and execution. It involves the use of numerical data to collect, analyze, and interpret information. The results are typically presented using visual aids such as charts, tables, graphs, or other graphical representations to enhance clarity and understanding, especially during the conclusion phase of the research.

This study utilizes two types of tests: the normality test and hypothesis testing. The normality test is conducted in the early stages to determine the appropriate method of analysis. If the data are normally distributed, parametric statistical methods are used (such as t-test, analysis of variance (ANOVA), Pearson correlation); if the data are not normally distributed,

non-parametric methods are applied instead (such as the Mann-Whitney test, Kruskal-Wallis test, Spearman correlation).

2.1 Data Collection

This study involves secondary data from the International Labour Organization (ILO). The data includes annual statistics on unemployment rates and demographic disparities across Malaysia and its neighboring countries. The variables in the comparative analysis of unemployment trends and demographic disparities across neighboring countries involve several types of data and measurement scales. The variables include unemployment rate, sex, age, and educational attainment.

Firstly, unemployment rates are measured on a ratio scale, categories include total unemployment rate, gender-specific unemployment rate, age-specific unemployment rate, and education-specific unemployment rate. Next, gender is measured on a nominal scale with categories of Total, Male and Female. Age is measured on an ordinal scale with categories typically divided into age groups such as 15-24, 25-54, 55-64 and 65+ which follow the aggregate band. Lastly, educational attainment is measured on an ordinal scale with categories of Total, Less than basic, Basic, Intermediate, Advanced and Level not stated which follow the aggregate band [19].

2.2 Descriptive Statistics

Descriptive statistics were used to summarize and describe the basic features of the unemployment data, including mean, median, standard deviation, and range. Graphical representation of data also involves bar charts, histograms or box plots which can further aid in visualizing and interpreting the information [20]. This will provide an overview of the unemployment rates across different demographic groups and countries.

2.3 Normality Test

To evaluate whether the data followed a normal distribution, the Shapiro-Wilk Test and the Kolmogorov-Smirnov Test were used. The Shapiro-Wilk Test is used to compare the data points in a sample to the expected values of a normal distribution. It is considered highly reliable, especially for smaller sample sizes of less than 50 [21]. Otherwise, Kolmogorov-Smirnov Test compares the overall distribution of the sample data to a normal distribution by analyzing their cumulative values. It is particularly sensitive to differences in the tails of the distribution [21]. Both tests determine whether the data follows a normal distribution:

Null Hypothesis (H_0): The data follows a normal distribution.
Alternative Hypothesis (H_I): The data does not follow a normal distribution.

If the p-value is greater than the significance level, it suggests the data is likely normal, and the null hypothesis is not rejected. Otherwise, the data is not normal, and the null hypothesis is rejected.

2.4 Spearman Rank Correlation

Spearman rank correlation was used to examine the relationship between age, education levels, and unemployment rates. This method measures the strength and direction of the relationship between two variables without assuming a specific type of relationship. Instead of using raw data, the test ranks the data points and compares these ranks. The Spearman correlation coefficient, which ranges from -1 to +1, indicates the strength of the relationship: +1 represents a perfect positive relationship, -1 indicates a perfect negative relationship, and 0 means no relationship. In this study, Spearman's Rank Correlation helped determine whether age and education level were related to unemployment rates, with a p-value less than 0.05 indicating that the relationship is statistically significant [22].

2.5 Kruskall-Wallis H Test

The Kruskal-Wallis H Test was used to compare unemployment rates across different groups, such as individuals with different levels of education. This test is used when the data does not meet the normality assumptions required for other tests. It works by ranking all the values in the data and comparing the ranks between the groups. In this analysis, the null hypothesis (H_0) assumes that the population medians of all the groups are the same, meaning there is no significant difference between the groups' medians. The alternative hypothesis (H_I) suggests that at least one group's median is different. The goal is to test these hypotheses to see if there are significant differences in the medians. If the p-value is less than 0.05, it means there are significant differences in unemployment rates between at least one group and the others [23].

2.6 Mann-Whitney U Test

The Mann-Whitney U Test was used to compare the unemployment rates between two independent groups, such as people with a high school diploma and those with a bachelor's degree. This test is the non-parametric equivalent of the t-test for comparing two groups and examines whether the distributions of the two groups are different by comparing their ranks. The p-value indicates if this difference is statistically significant, with a p-value less than 0.05 suggesting a significant difference between the two groups [24]. In this study, the Mann-Whitney U Test was applied to compare the median unemployment rates between groups with different educational backgrounds or other categories. This test helped determine if there were significant differences in unemployment rates between these groups.

2.7 Statistical Tool

IBM SPSS Statistics is powerful and easy-to-use software for analyzing data. It helps manage large datasets and perform various statistical tests, such as calculating averages, identifying trends, and test outcomes. The software is widely used because it simplifies complex analyses and provides reliable results. In this study, SPSS was used to organize the data, perform statistical tests, and draw accurate conclusions to support the research findings [25].

3. Results and Discussion

3.1 Normality Test

Figure 3 shows the result of the normality test for unemployment within Malaysia. The results of the Kolmogorov-Smirnov and Shapiro-Wilk tests indicate that the unemployment data do not follow a normal distribution. The Kolmogorov-Smirnov test yields a statistic of 0.19 with a p-value of less than 0.001, and the Shapiro-Wilk test shows a statistic of 0.823 with a p-value also less than 0.001. Since both p-values are below the 0.05 threshold, the null hypothesis of normality is rejected.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
UNEMPLOYMENT	.190	209	<.001	.823	209	<.001

a. Lilliefors Significance Correction

Fig. 3. Normality test of unemployment within Malaysia

The histogram shown in Figure 4 depicts a positively skewed distribution, with most unemployment values clustered between 0 and 25, followed by a rapid decline as the values increase. This pattern indicates that unemployment is primarily concentrated at lower levels in this dataset.

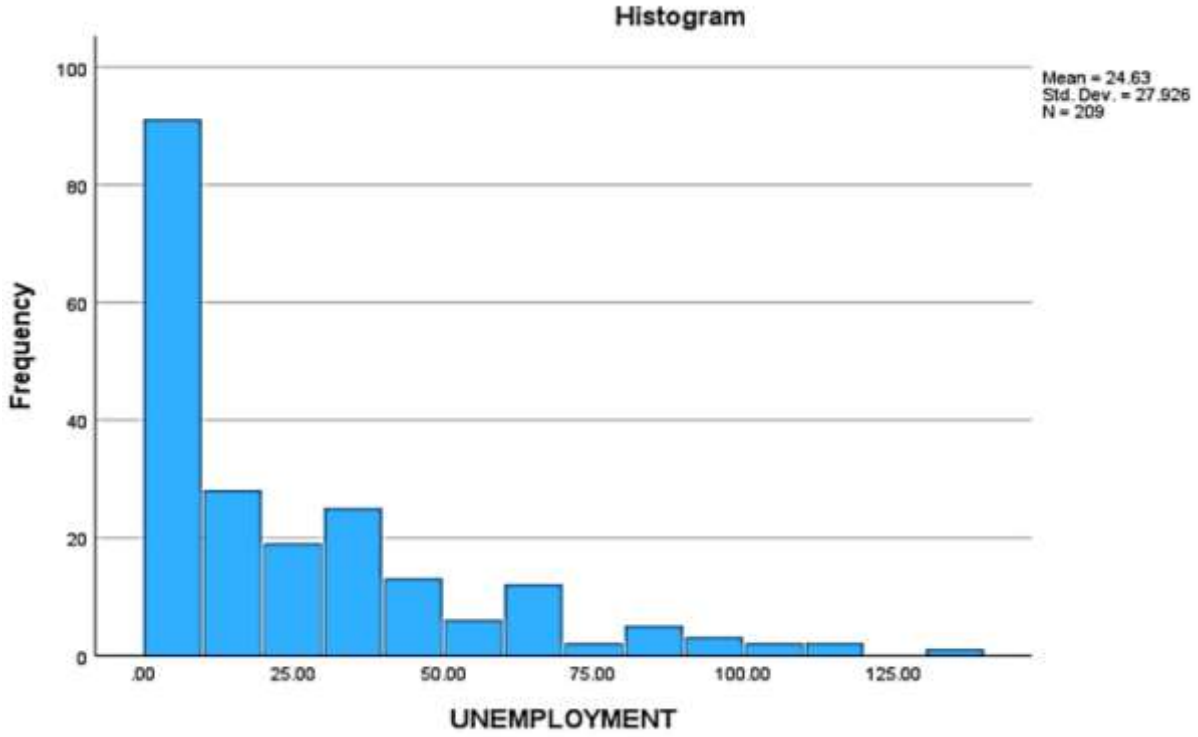

Fig. 4. Histogram of unemployment within Malaysia

Figure 5 illustrates the results of the normality test for unemployment across Malaysia and its neighboring countries. In Figure 5, the Kolmogorov-Smirnov test produces a statistic of 0.304 with a p-value of less than 0.001, while the Shapiro-Wilk test shows a statistic of 0.720 with a p-value also below 0.001. The null hypothesis of normality is rejected, confirming that the data is not normally

distributed. The histogram in Figure 6 further supports this conclusion, showing a positively skewed distribution with most values concentrated around 0 and a sharp decline as the values increase. This indicates that unemployment values are heavily concentrated at lower levels. In both cases, the statistical tests and visualizations consistently show that the unemployment data is not normally distributed. Since the results show that the unemployment data sets are not normally distributed, the analysis proceeds with the nonparametric tests.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
unemployment	.304	138	<.001	.720	138	<.001

a. Lilliefors Significance Correction

Fig.5. Normality test of unemployment across Malaysia and its neighbouring countries

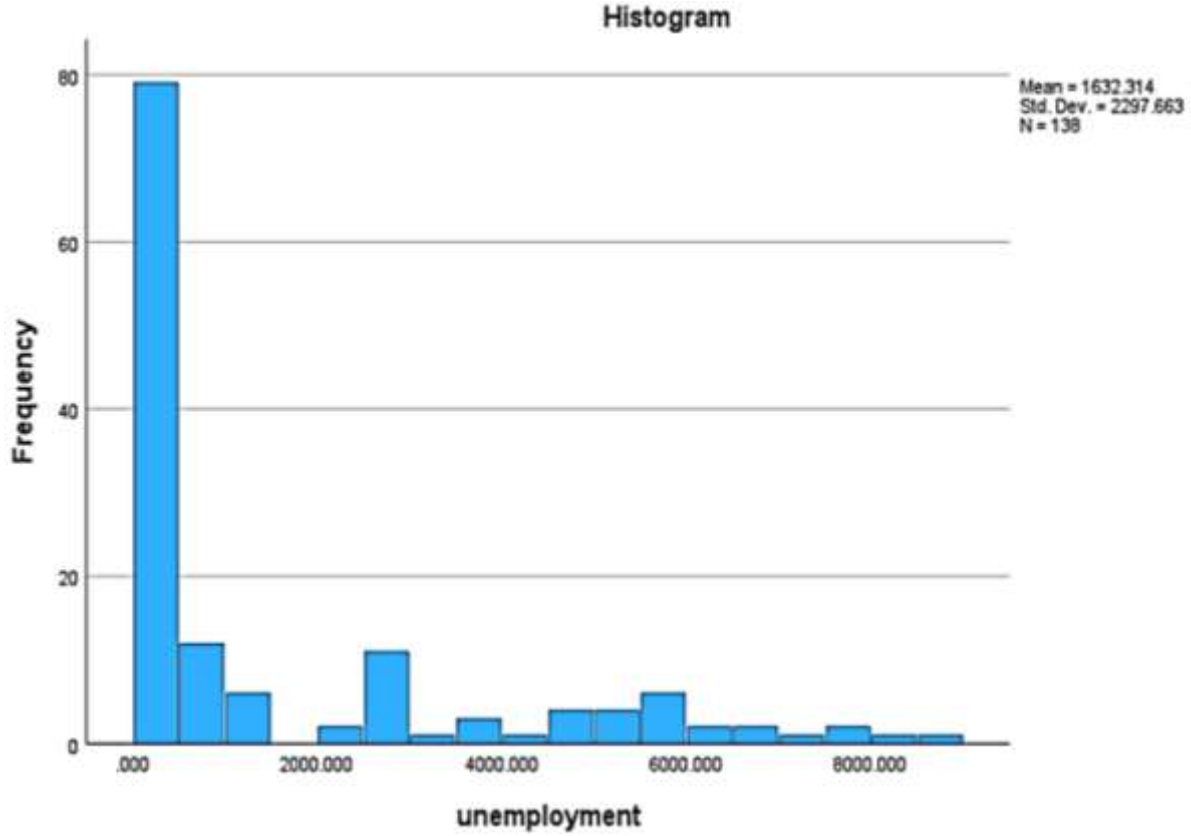

Fig. 6. Histogram of unemployment across Malaysia and its neighboring countries

3.2 Spearman's Rank Correlation

The results of the Spearman correlation are revealed in Figure 7. The relationship between unemployment and age shows a moderate negative correlation with a value of -0.534 and a significance value of $p < 0.001$. This indicates that as age increases, unemployment tends to decrease. The statistically significant relationship suggests that younger individuals are more likely to experience unemployment, possibly due to factors like limited work experience or difficulties in entering the job market.

Nonparametric Correlations

Correlations

			AGE	EDUCATION	SEX	UNEMPLOYMENT
Spearman's rho	AGE	Correlation Coefficient	--			
		Sig. (2-tailed)	.			
		N	209			
	EDUCATION	Correlation Coefficient	-.029	--		
		Sig. (2-tailed)	.678	.		
		N	209	209		
	SEX	Correlation Coefficient	-.064	-.038	--	
		Sig. (2-tailed)	.359	.586	.	
		N	209	209	209	
	UNEMPLOYMENT	Correlation Coefficient	-.534**	.447**	-.145*	--
		Sig. (2-tailed)	<.001	<.001	.036	.
		N	209	209	209	209

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Fig. 7. Correlation test of unemployment with age, education and sex in Malaysia

The relationship between unemployment and education reveals a moderate positive correlation, with a correlation coefficient of 0.447 and a significance value of $p<0.001$. This indicates that individuals with higher education levels tend to have higher unemployment rates. While this finding may seem counterintuitive, it could reflect issues such as job-market mismatches, over qualification, or regional economic conditions where highly educated individuals struggle to find suitable employment opportunities.

The relationship between unemployment and sex shows a weak negative correlation, with a correlation coefficient of -0.145 and a significance value of $p = 0.036$. Although statistically significant, the correlation is relatively small, indicating only a slight difference in unemployment rates between genders. This suggests that one gender may experience marginally lower unemployment rates than the other, but the effect is minimal. These findings highlight distinct relationships between unemployment and each variable, offering valuable insights for understanding unemployment patterns and guiding targeted interventions.

3.3 Kruskal-Wallis H Test and Mann-Whitney U Test

Figure 8 shows the analysis examined whether there is a significant difference in unemployment levels between males and females using the Mann-Whitney U Test and the Kruskal-Wallis Test. The Mann-Whitney U Test, which compares two independent groups, assessed whether unemployment is distributed differently between sexes. This is equivalent to the Kruskal-Wallis test. Since the p-value of 0.036 is below the significance level of 0.05, the null hypothesis, which assumes no difference in unemployment distribution between males and females, was rejected. This result indicates a significant difference in unemployment levels between the two groups.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of UNEMPLOYMENT is the same across categories of SEX.	Independent-Samples Mann-Whitney U Test	.036	Reject the null hypothesis.
2	The distribution of UNEMPLOYMENT is the same across categories of SEX.	Independent-Samples Kruskal-Wallis Test	.036	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

Independent-Samples Mann-Whitney U Test

UNEMPLOYMENT across SEX

Independent-Samples Mann-Whitney U Test Summary

Total N	209
Mann-Whitney U	4534.000
Wilcoxon W	9584.000
Test Statistic	4534.000
Standard Error	436.724
Standardized Test Statistic	-2.097
Asymptotic Sig.(2-sided test)	.036

Independent-Samples Kruskal-Wallis Test

UNEMPLOYMENT across SEX

Independent-Samples Kruskal-Wallis Test Summary

Total N	209
Test Statistic	4.399[a,b]
Degree Of Freedom	1
Asymptotic Sig.(2-sided test)	.036

a. The test statistic is adjusted for ties.

b. Multiple comparisons are not performed because there are less than three test fields.

Fig. 8. Test results for sex

A box plot in Figure 9 further illustrated these differences, showing that females have a lower median unemployment rate compared to males. The results from both tests consistently show that unemployment levels are not equally distributed between males and females. Males tend to experience higher unemployment rates with more variability, and this difference is statistically significant.

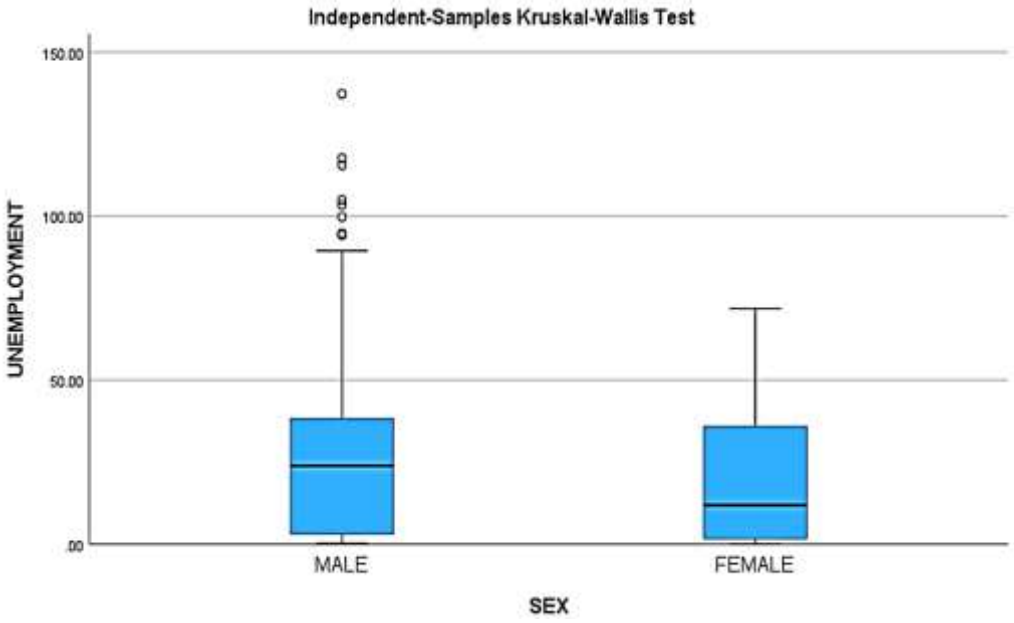

Fig. 9. Boxplot of unemployment by sex

According to the study by Lee [26], males often experience higher unemployment rates than females due to several interconnected factors. Men are predominantly employed in industries such as construction, manufacturing, and mining, which are more susceptible to economic fluctuations

and job losses during downturns. Additionally, mismatches between education or skills and job market demands further hinder male employment, particularly in sectors favoring technical or interpersonal skills often associated with female workers. Cultural norms also play a role, as traditional gender roles discourage men from pursuing opportunities in expanding fields like healthcare and education. While policies promoting female workforce participation are essential for gender equity, they may inadvertently impact male employment prospects. Furthermore, health challenges, including higher rates of mental health issues and substance abuse among men, also contribute to their limited labor force participation. These findings highlight the need for targeted policies addressing skills training, sectoral diversification, cultural norms, and health support systems to mitigate gender disparities in unemployment [26].

The results of the Kruskal-Wallis test for education levels shown in Figure 10 indicate a statistically significant difference in unemployment across various education categories. The null hypothesis, which assumes that unemployment levels are the same across all education categories, was rejected as the test statistic was 57.691, with 3 degrees of freedom, and a p-value of less than 0.001. This low p-value confirms that unemployment levels vary significantly based on education level.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[b,c]	Decision
1	The distribution of UNEMPLOYMENT is the same across categories of EDUCATION.	Independent-Samples Mann-Whitney U Test	.[a]	Unable to compute.
2	The distribution of UNEMPLOYMENT is the same across categories of EDUCATION.	Independent-Samples Kruskal-Wallis Test	<.001	Reject the null hypothesis.

a. The group field does not have exactly two values.

b. The significance level is .050.

c. Asymptotic significance is displayed.

UNEMPLOYMENT across EDUCATION

Independent-Samples Kruskal-Wallis Test Summary

Total N	209
Test Statistic	57.691[a]
Degree Of Freedom	3
Asymptotic Sig.(2-sided test)	<.001

a. The test statistic is adjusted for ties.

Fig. 10. Test results for education

In Figure 11, pairwise comparisons provided further insights into these differences. Individuals with less than basic education consistently had lower unemployment rates compared to those with basic, advanced, or intermediate education levels. A significant difference was observed between individuals with less than basic education and those with basic, advanced, or intermediate education. Similarly, those with basic education had significantly lower unemployment compared to individuals with intermediate education. However, no significant difference was found between unemployment rates for individuals with advanced education and those with intermediate education.

Pairwise Comparisons of EDUCATION

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
LESS THAN BASIC-BASIC	-48.364	11.697	-4.135	<.001	.000
LESS THAN BASIC-ADVANCED	-67.530	12.040	-5.609	<.001	.000
LESS THAN BASIC-INTERMEDIATE	-85.230	11.804	-7.221	<.001	.000
BASIC-ADVANCED	-19.166	11.880	-1.613	.107	.640
BASIC-INTERMEDIATE	-36.866	11.640	-3.167	.002	.009
ADVANCED-INTERMEDIATE	17.699	11.985	1.477	.140	.838

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

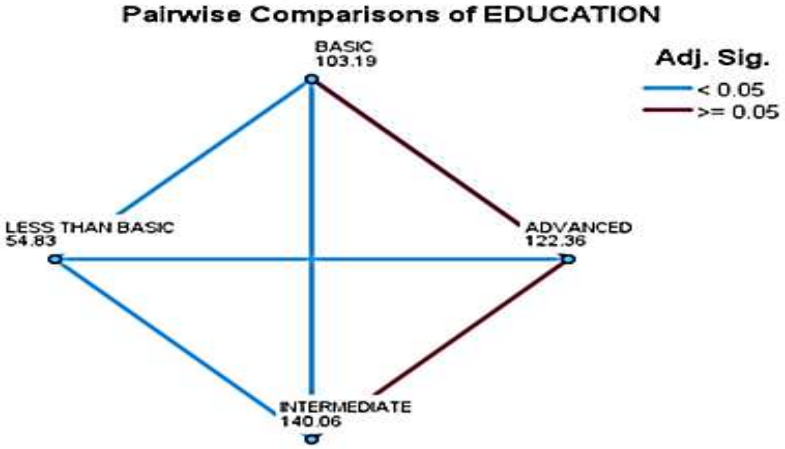

Fig. 11. Pairwise comparison of unemployment with education

In Figure 12, the patterns observed reveal that individuals with less than a basic education tend to have the lowest unemployment rates, while those with intermediate education experience the highest unemployment. This may reflect the types of jobs available to individuals with less education or the industries they participate in, which may be less competitive or require fewer qualifications. In contrast, higher unemployment among those with intermediate education may be due to mismatches between their qualifications and job market demands.

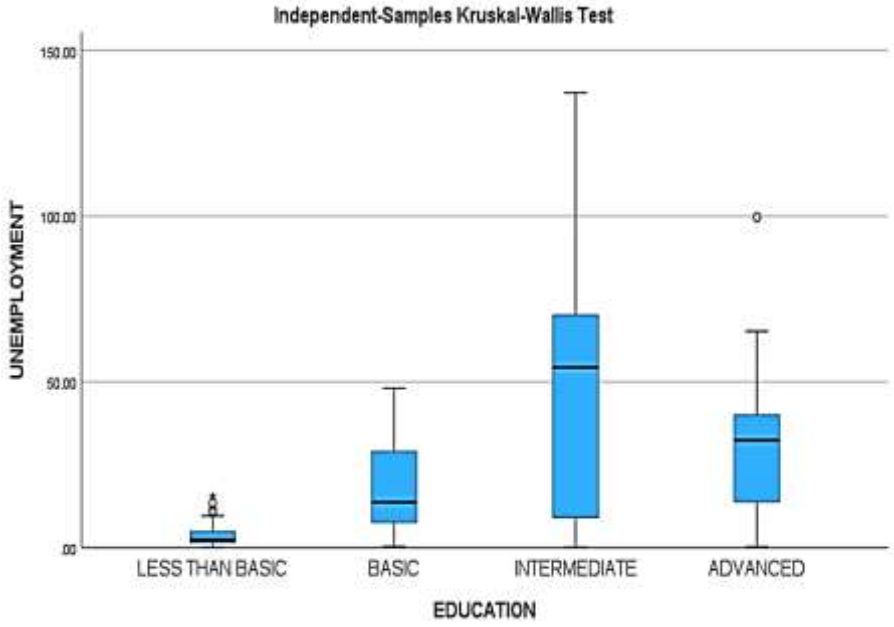

Fig. 12. Boxplot of unemployment with education

The World Bank highlights that the unemployment rate for individuals with intermediate education levels often surpasses that of those with higher education across various countries [27]. Similarly, data from IndexMundi reveals that in Malaysia, unemployment among individuals with intermediate education has fluctuated over the years but remains consistently higher compared to other education levels [28].

The relationship between education level and unemployment rates is influenced by several interconnected factors, particularly for individuals with intermediate education who often face higher unemployment rates. A significant issue is skill mismatch, where their qualifications may not align with job market demands, leaving them overqualified for low-skilled roles yet under qualified for specialized positions. Additionally, economic structures in many regions prioritize highly skilled professionals or low-skilled labor, marginalizing those with intermediate qualifications. Oversaturation in the labor market further exacerbates this challenge, increasing competition for limited roles. A lack of practical experience among individuals with intermediate education also makes them less attractive to employers seeking hands-on expertise. Broader economic conditions, such as recessions or sluggish growth, disproportionately impact this group, making them more susceptible to job losses. These complexities are discussed further by Salim and Abdullah [29], who explore the intricate relationship between education and unemployment.

The result of the Kruskal-Wallis test for age groups shown in Figure 13 indicates a statistically significant difference in unemployment across various age categories. The null hypothesis, which assumes that unemployment levels are the same across all age groups, was rejected as the test statistic was 95.000, with a p-value of less than 0.001. This low p-value confirms that unemployment levels vary significantly based on age.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[b,c]	Decision
1	The distribution of UNEMPLOYMENT is the same across categories of AGE.	Independent-Samples Mann-Whitney U Test	.[a]	Unable to compute.
2	The distribution of UNEMPLOYMENT is the same across categories of AGE.	Independent-Samples Kruskal-Wallis Test	<.001	Reject the null hypothesis.

a. The group field does not have exactly two values.

b. The significance level is .050.

c. Asymptotic significance is displayed.

Independent-Samples Kruskal-Wallis Test

UNEMPLOYMENT across AGE

Independent-Samples Kruskal-Wallis Test Summary

Total N	209
Test Statistic	95.600[a]
Degree Of Freedom	3
Asymptotic Sig.(2-sided test)	<.001

a. The test statistic is adjusted for ties.

Fig. 13. Test results for age

Pairwise comparisons in Figure 14 provide further insights into these differences. No significant difference was observed between the 15-24 and 25-54 age groups or between the 15-24 and 65+ groups. However, significant differences were found between the 15-24 and 55-64 groups, with

lower unemployment in the 55-64 group. Similarly, the 25-54 groups had significantly lower unemployment rates compared to the 65+ group. The 55-64 groups consistently showed the lowest unemployment rates, with significant differences compared to both the 15-24 and 65+ groups. The 65+ group exhibited the highest unemployment rates.

Pairwise Comparisons of AGE

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
55-64-25-54	83.297	10.524	7.915	<.001	.000
55-64-15-24	92.477	10.524	8.788	<.001	.000
55-64-65+	-124.818	31.213	-3.999	<.001	.000
25-54-15-24	9.181	10.079	.911	.362	1.000
25-54-65+	-41.521	31.065	-1.337	.181	1.000
15-24-65+	-32.340	31.065	-1.041	.298	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .050.
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

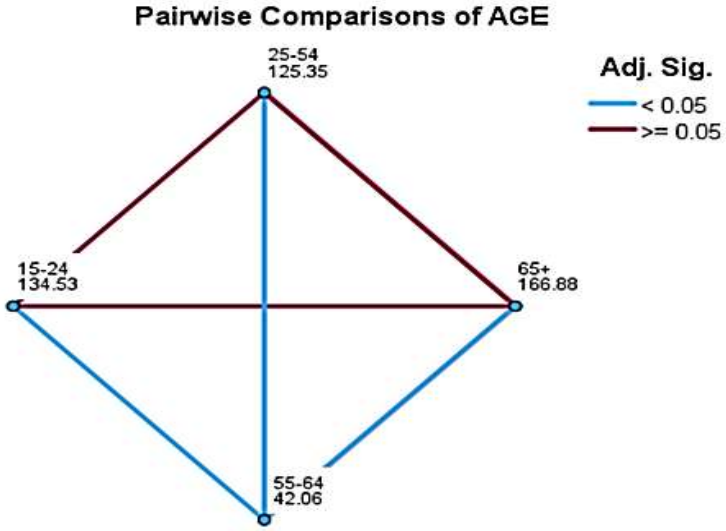

Fig. 14. Pairwise comparison for age

In Figure 15, the patterns observed reveal that individuals in the 55-64 age group tend to have the lowest unemployment levels, likely due to their higher likelihood of holding stable jobs or being closer to retirement. Conversely, the 65+ age group experiences the highest unemployment rates, possibly due to reduced employment opportunities or workforce participation challenges at this age. The 15-24 groups also shows a broad range of unemployment rates, reflecting the challenges young individuals face in entering the job market. According to the OpenDOSM, the unemployment rate for older age groups, including those aged 65 and above, is tracked and reported in their labor force statistics [30]. These findings emphasize the importance of tailoring unemployment policies to address the unique needs of different age groups, particularly for younger and older populations.

Older individuals often face unique challenges contributing to higher unemployment rates. Age discrimination in the workplace can make it difficult for them to find or retain employment, as employers may perceive them as less productive or adaptable than younger workers [31]. Retirement policies and social security benefits can further incentivize older individuals to exit the workforce, even if they are still capable of working [31]. Additionally, health issues that become more common with age may limit their ability to perform certain jobs or work consistently [32].

These combined factors underscore the complex challenges older individuals face in maintaining employment.

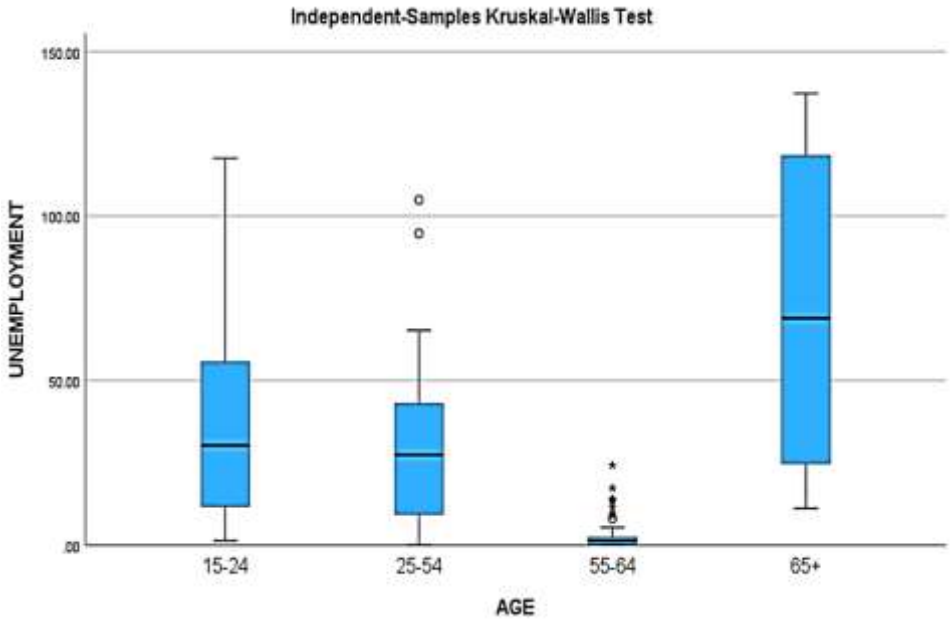

Fig. 15. Boxplot of unemployment with age

3.4 Comparison Analysis

The result of the Kruskal-Wallis test shown in Figure 16 was conducted to examine whether the distribution of unemployment significantly differs across six countries. The results reveal a test statistic of 124.697 with 5 degrees of freedom and an asymptotic significance value (p-value) of less than 0.001, indicating that there are statistically significant differences in unemployment distributions among the countries analyzed.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of unemployment is the same across categories of country.	Independent-Samples Kruskal-Wallis Test	<.001	Reject the null hypothesis.

a. The significance level is .050.
b. Asymptotic significance is displayed.

Independent-Samples Kruskal-Wallis Test

unemployment across country

Independent-Samples Kruskal-Wallis Test Summary

Total N	138
Test Statistic	124.697[a]
Degree Of Freedom	5
Asymptotic Sig.(2-sided test)	<.001

a. The test statistic is adjusted for ties.

Fig. 16. Test result for unemployment across countries

Pairwise comparisons in Figure 17 offer deeper insights into unemployment differences across countries. No significant difference was observed between Brunei Darussalam and Singapore, or between Thailand and Malaysia. However, significant differences were found between Brunei Darussalam and Thailand, Malaysia, Philippines, and Indonesia, with Brunei generally exhibiting lower unemployment rates. Similarly, Singapore showed significantly higher unemployment compared to Malaysia, Philippines, and Indonesia. Indonesia consistently displayed the highest unemployment rates, with significant differences compared to Brunei, Singapore, Thailand, and Malaysia. In contrast, Brunei and Malaysia showed some of the lowest unemployment rates, significantly differing from countries like Indonesia and the Philippines. The pairwise comparisons highlight that unemployment rates vary greatly between specific countries, with some sharing similar patterns while others differ substantially.

Pairwise Comparisons of country

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Brunei Darussalam - Singapore	-19.000	11.790	-1.612	.107	1.000
Brunei Darussalam - Thailand	-50.565	11.790	-4.289	<.001	.000
Brunei Darussalam - Malaysia	-55.522	11.790	-4.709	<.001	.000
Brunei Darussalam - Philippines	-88.391	11.790	-7.497	<.001	.000
Brunei Darussalam - Indonesia	-111.696	11.790	-9.474	<.001	.000
Singapore - Thailand	-31.565	11.790	-2.677	.007	.111
Singapore - Malaysia	36.522	11.790	3.098	.002	.029
Singapore - Philippines	69.391	11.790	5.886	<.001	.000
Singapore - Indonesia	92.696	11.790	7.862	<.001	.000
Thailand - Malaysia	4.957	11.790	.420	.674	1.000
Thailand - Philippines	37.826	11.790	3.208	.001	.020
Thailand - Indonesia	61.130	11.790	5.185	<.001	.000
Malaysia - Philippines	-32.870	11.790	-2.788	.005	.080
Malaysia - Indonesia	56.174	11.790	4.765	<.001	.000
Philippines - Indonesia	23.304	11.790	1.977	.048	.721

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

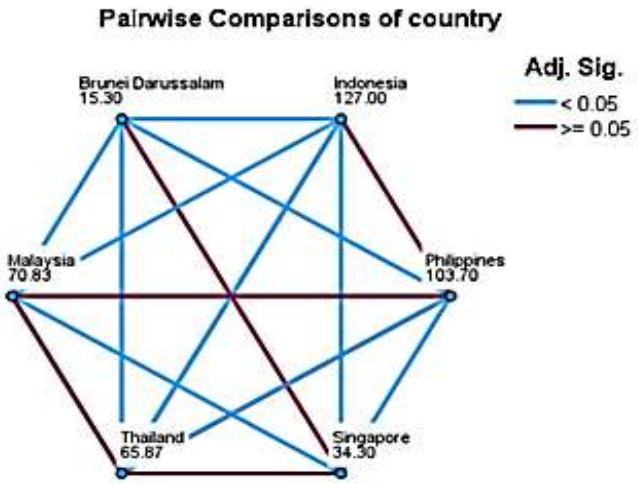

Fig. 17. Pairwise comparison for unemployment across countries

The graphs in Figures 18 and 19 compare unemployment trends across Malaysia and its neighbouring countries which are Indonesia, Thailand, Brunei Darussalam, the Philippines, and Singapore spanning the period from 2000 to 2022. The analysis reveals distinct patterns and significant differences in unemployment levels across these nations.

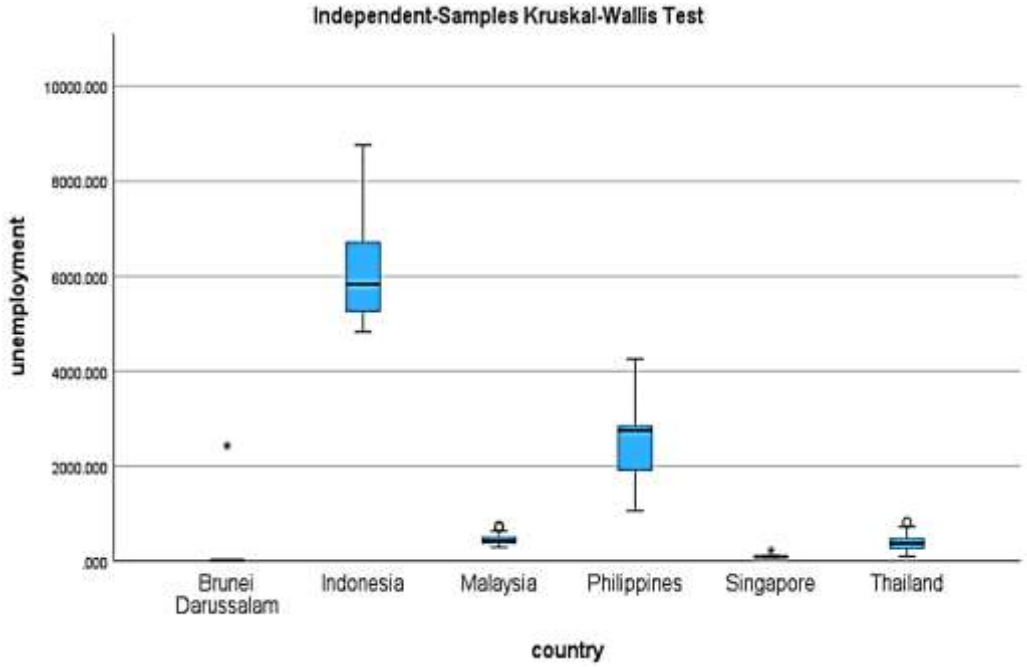

Fig. 18. Box plot for unemployment across countries

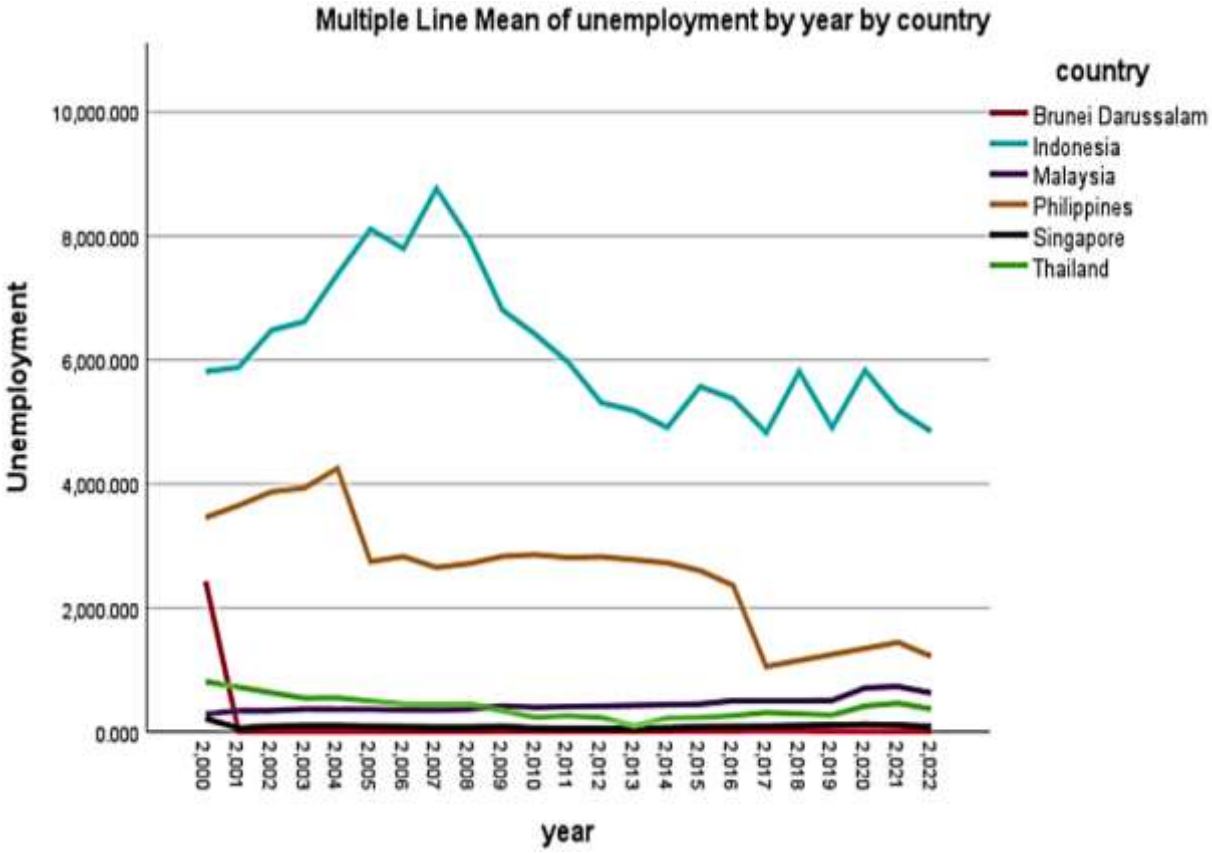

Fig. 19. Unemployment across Malaysia and its neighbouring countries

Indonesia experienced the highest unemployment levels throughout the observed period. Unemployment peaked around 2007, reaching approximately 9,000 individuals, but it showed a steady decline in subsequent years. By 2022, while unemployment in Indonesia had significantly reduced, it remained higher than in other countries. The boxplot for Indonesia displays a broad interquartile range (IQR) and several outliers, reflecting substantial variability in unemployment levels and localized or sector-specific spikes.

Philippines consistently reported the second-highest unemployment levels. Between 2000 and 2015, unemployment fluctuated without a clear trend, but from 2016 onward, it began to decline noticeably, stabilizing at a lower level by 2022. The wider IQR observed for the Philippines suggests significant regional or economic disparities within the country, contributing to its variability in unemployment levels.

Malaysia demonstrated moderate unemployment levels compared to Indonesia and the Philippines. Its trend remained relatively stable over the 22-year period, with minor fluctuations and a slight decline in recent years, indicating steady labor market conditions. The boxplot for Malaysia shows a narrow IQR with a few outliers, underscoring generally stable unemployment levels with occasional exceptions.

Thailand consistently reported among the lowest unemployment levels in the region. From 2000 to 2022, its unemployment rate steadily declined, showing minimal variations. This reflects strong labor market performance and stability. Similarly, the boxplot indicates low unemployment levels with limited variability and very few outliers. Brunei Darussalam maintained consistently low unemployment rates throughout the period. Its unemployment trend remained flat, with minimal changes, indicating a stable economic and labor market environment. Brunei's boxplot corroborates this, showing very low and consistent unemployment levels without significant variability.

Singapore also reported very low unemployment levels throughout the observed period. The trend in Singapore was stable, with no significant fluctuations, reflecting a well-functioning and resilient labor market. Like Brunei, Singapore's boxplot highlights minimal variability in unemployment levels.

In conclusion, the unemployment trends highlight significant differences between countries. Indonesia and Philippines faced the greatest challenges, particularly in the early 2000s, but both showed signs of improvement over time. Malaysia maintained moderate and stable unemployment levels, higher than those in Thailand, Brunei, and Singapore, which consistently recorded the lowest unemployment rates. These three countries exhibit strong, stable labor market conditions, as indicated by their minimal variability in unemployment levels. The presence of outliers in countries like Indonesia underscores the influence of localized or sector-specific factors on unemployment.

4. Conclusions

This study analyzed unemployment trends and demographic differences in Malaysia and its neighbouring countries, focusing on how factors such as age, gender, and education influence unemployment rates. Using data from the International Labour Organization (ILO), the research highlighted significant differences in unemployment patterns both within Malaysia and across the region.

The results showed that younger individuals and those with intermediate education levels face higher unemployment rates, while older individuals and those with less formal education tend to experience lower unemployment. Gender disparities were also evident, with males generally facing higher unemployment rates than females. Comparing countries, Malaysia's unemployment rates

were moderate and stable, while Indonesia and the Philippines struggled with higher rates. On the other hand, Brunei, Singapore, and Thailand consistently recorded low unemployment levels, indicating strong labor market stability.

The unemployment rates in Indonesia, the Philippines, Singapore, Thailand, and Brunei show notable patterns when analyzed by age, gender, and education level. In Indonesia, unemployment varies significantly by age, with younger individuals facing higher rates. For instance, in 2023, the unemployment rate for ages 15–19 was 25.77%, compared to just 1.28% for those aged 60 and above [33]. Females generally have higher unemployment rates than males, and individuals with lower education levels are more likely to be unemployed [33]. Similarly, in the Philippines, younger age groups, particularly those aged 15–24, experience higher unemployment rates. Females also face higher unemployment than males, and unemployment decreases with higher education levels [34].

In Singapore, unemployment rates are higher among younger and older age groups, while females experience slightly higher rates than males [35]. As with Indonesia and the Philippines, individuals with higher education levels tend to have lower unemployment rates. In Thailand, although unemployment is generally low across all age groups, younger individuals have slightly higher rates. Females face marginally higher unemployment than males, and higher education levels are associated with lower unemployment rates [36]. Lastly, in Brunei, younger individuals face higher unemployment rates, females are more likely to be unemployed than males, and those with lower education levels experience higher unemployment [37].

This study has made valuable contributions but also has several limitations. It relied exclusively on secondary data, which may not fully capture the complexity of unemployment or account for informal employment and unrecorded labor activities. Additionally, the study did not thoroughly examine the effects of government policies, cultural influences, or major economic disruptions, such as the COVID-19 pandemic, which can significantly impact labor market conditions.

In conclusion, the findings of this study highlight the need for targeted policies to address unemployment issues affecting specific demographic groups. For example, initiatives aimed at creating job opportunities for youth or increasing support in the workforce are essential. Collaboration among neighbouring countries can further help tackle common challenges and encourage inclusive economic growth. These actions will contribute to a fairer and more sustainable labor market across the region.

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