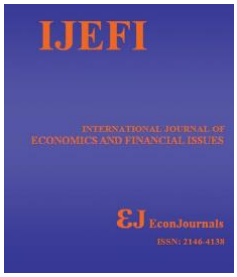

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Graduate Unemployment Hinders Economic Growth in Indonesia: Does Government Spending on Education Matters?

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ABSTRACT

This paper attempts to examine the impact of graduate unemployment on economic growth in Indonesia. Time series data has been included from year 1990 to 2022 and consists of two stages of data analysis. The first stage analysis to identify long-run cointegration between graduate unemployment (GUEM), government spending in education (GEDU), inflation (INF) and foreign direct investment (FDI) towards economic growth by applying the Autoregressive Distributed Lag (ARDL) approach as an estimation method. Second stage analysis determines strength of the relationship by using standard asymptotic Chi-square in Wald test. The findings found that GUEM, GEDU and INF own a significant long run cointegration towards economic growth in Indonesia. This outcome suggests the GUEM lower economic growth due to existence of large mismatch between demand skills by employer and graduate supply by Higher Education which reduce productivity of the whole economy. Meanwhile government spending on education should focus on providing a better infrastructure in higher education to produce quality graduate that matches job requirement in labor market. Overall, the outcomes of this study provide benefits for policymakers to align job demand and production of marketable university graduates from higher education hence boost the economic growth in future.

Keywords: Economic Growth, Graduate Unemployment, Education, Government Spending, Labor Market
JEL Classifications: J64, H52, I25, O40

1. INTRODUCTION

Indonesia owns largest economy in Southeast Asia experienced a remarkable economic transformation over the past few decades. It explains transition process from a primarily agricultural-based economy to one that is more diversified, with a growing services sector and a strong manufacturing base. Economic progression in Indonesia was majorly contributed by informal labor sector. However, the prime issue of high unemployment rate in Indonesia become critical when it has average around 4.4% from 2010 to 2020 gaining concern since it has double-bottom consequences for both individuals and the economy as a whole (Abdurachman et al., 2021). The Indonesian economy suffers in multiple ways due to unemployment and decrease consumption and tax revenues to heightened government expenditures and social instability.

Unemployment is a persistent problem in Indonesia, with a significant proportion of the workforce which include graduates struggling to find gainful employment (Sugianto and Permadhy, 2020). According to Abdurachman et al. (2021), graduate employment poses quality of human development, as represented by the education and skill levels of the workforce, which drive as a key factor in economic growth. However, the Indonesian domestic labor market is dominated by workers with low levels of productivity and skills, which has implications for the country's economic development. The participation of graduates in the labor force for large and medium-sized

industrial sectors in Indonesia is relatively low, with only a 0.61% increase from 2008 to 2018, indicating a mismatch between the skills of graduates and the demands of the labor market (Abdurachman et al., 2021).

Graduate unemployment significantly affects economic growth when knowledge and skills supply by higher education which necessitate by employer is mismatch. Higher number of graduate unemployment can lead to decreased productivity and economic stagnation. This condition has been experienced by Nigeria where unemployment rate rose from 25.6% in 2003 to 40.3% in 2009 due to inadequate skills among graduates (Akinyemi et al., 2012). This mismatch hampers the economy's ability to innovate and adapt as graduates are not equipped for modern job demands (Bassey and Atan, 2012). Besides, unemployment among graduates will reduce productivity through portion of the labor force is not being utilized, leading to an output gap in the economy. This gap implies that Indonesia is not reaching its full potential in terms of production and economic growth.

Additionally, Oktafiani and Setiawan (2017) suggest graduate employment that equip with skills and knowledge become potential taxpayer to the country hence they represent competent labour force that contribute majorly to country's Gross Domestic Product (GDP). However, if the rate of graduate unemployment consistently high it will reduce tax collection by the government and spending to the public. Also, rising unemployment leads to increased government expenditure on unemployment benefits. This financial burden can divert resources away from productive investments and public services, further hindering economic growth. The cost of supporting unemployed individuals can strain public finances, limiting the government's ability to stimulate the economy (Haryanto, 2016).

In addition to this, government spending on education in Indonesia has been a priority for the nation. According to the passage of Law No. 20/2003 on the National Education System, which mandated 20% of the national and local budgets to be allocated to education. This includes spending on various sectors within education, such as early childhood, primary, secondary, and higher education, as well as technical and vocational training (Abdurachman et al., 2021). In 2023, the Indonesian government allocated USD 42 billion for education, which is in line with the 20% threshold of the national budget. This effort has made Indonesia one of the countries in the world with a legal commitment to allocate such a high percentage of its budget toward education. Despite these efforts, ensuring that high spending results in high quality education remains inconclusive.

Study by Ali et al. (2020), even though there is a tendency to open more vocational educational institutions to increase the number of graduates ready for work, however, the opening of these schools is not accompanied by adequate infrastructure, competent teachers, industry partnerships, or sound financial management. As a result, it back to square when there is a mismatch between the supply of educated graduates and the available job opportunities, leading to high rates of educated unemployment.

Generally, the impact of unemployment to economic growth had become a continuous phenomenon that trapped in most countries. Previous literature had revealed unemployment hamper economic growth results from lower productivity, consumption, tax revenue and rising cost for social assistance. However, evidence to support more specifically on the impact of graduate unemployment and government spending in education on economic growth is scarce. If the implications of this situation have been overlooked, Indonesia is predicted to experience a shortage of educated and skilled workers while owning an excessive number of unskilled labor by 2030 (Report Indonesia) (Ollivaud, 2021). This condition implies the quality of human capital is still low, which give a direct impact on economic growth in Indonesia. Therefore, this study proposes to examine the existence of long-run cointegration between graduate unemployment and government spending in education towards economic growth in Indonesia as the first objective. Next, to identify one-to-one relationship between graduate unemployment and government spending in education towards economic growth in Indonesia as the second objective.

The construction of this paper follows by section two which prevail the discussion of the previous findings in literature review. Next in section three reveal on data collection and research methodology employ in this study. In section four is discussion on the results and analysis. Section five deliver conclusions and recommendations of the study.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Unemployment in Indonesia is a major challenge that whole country is currently grappling with. Years of inefficient labour utilisation, high cost on unemployment benefits and deflationary pressure have significantly disrupt the nation's economic growth.

2.1. Theoretical Framework

There are two proposed theory that act as fundamentals to support in this study. Firstly, Classical Theory of Unemployment rooted in classical economic thought, which emphasizes the role of free markets and minimal government intervention. According to this theory, unemployment arises primarily due to rigidities in the labor market, particularly when wages are kept artificially high, preventing the market from reaching equilibrium. Classical economists argue that unemployment is caused by wages being too high above the market-clearing level. Besides, this theory discuss unemployment is considered voluntary hence workers choose not to accept jobs at the lower market wage. Workers are seen as unwilling to work for lower wages, leading to a situation where jobs are available, but people are not willing to accept them at the offered wage rates.

Second, Keynesian Theory of Unemployment which pioneer by John Maynard Keynes (1930) have innovate thinking in several areas of macroeconomics including unemployment, inflation and money supply. Keynesian unemployment, also known as demand-deficient unemployment, occurs when there is insufficient aggregate demand in the economy. Keynes explained that when the demand for goods and services declines, less production is

required. As a result, wages do not adjust to the equilibrium level, leading to widespread unemployment.

2.2. Unemployment Disrupts Economic Output in Indonesia

In Indonesia, the relationship between unemployment and economic growth has been given particular attention on ways in which unemployment constrains economic development, productivity, and human capital. Many studies on the impact of unemployment on economic growth in Indonesia are grounded in Okun's Law, which posits a rise in unemployment typically results in a decrease in economic output due to labor, the critical inputs in production is underutilised. In Indonesia, empirical research has confirmed this inverse relationship, although the strength of this relationship has varied over time due to structural changes in the economy.

Wibisono and Tirtosuharto (2013) validate the existence of Okun's Law in Indonesia and found the coefficient linking unemployment and Gross Domestic Product (GDP) growth is relatively lower than in advanced economies, which may be due to the large informal sector that can absorb displaced workers. They infer persistent rise in unemployment hampers long-term economic growth by reducing productive capacity and weakening consumer demand.

In addition, unemployment leads to lower household incomes which in turn diminishes consumption, a major component of GDP. According to study by Aswicahyono and Hill (2015), Indonesia's consumption-driven growth model relies heavily on the purchasing power of its working population. High unemployment rates reduce disposable income and consumption levels, which disrupt whole economic activity.

Rise in unemployment increases the fiscal burden on the government, as it may need to spend more on social safety nets and unemployment benefits in which divert resources from productive public investments. Haryanto (2016) emphasized that increased government spending on welfare programs, while the participants include unemployed, it can lead to budget deficits if not properly managed. These deficits can then constrain economic growth by reducing public investment in infrastructure and other high potential sectors.

Moreover, the linkage among unemployment, poverty, and inequality is significant in the context of Indonesia's economic growth. Unemployment exacerbates poverty and income inequality, which in turn stifles economic development. Suryahadi et al. (2012) conclude regions with higher unemployment rates tend to experience higher poverty levels and more severe inequality, as unemployment disproportionately affects low-income and unskilled workers. This dynamic creates a vicious cycle, where rising poverty reduces access to education and skills development, further contributing to unemployment and limiting the potential for inclusive growth.

2.3. Impact of Graduate Unemployment on Economic Growth in Indonesia

Graduate unemployment is a growing concern in Indonesia, especially as the country continues to expand its higher education system and produce more university graduates. While education is generally seen as a key driver of economic growth, the rise in unemployment among university graduates indicates types of degrees and skills being offered often do not align with the needs of the labor market. In a study by Dhanani et al. (2009) revealed Indonesian universities have historically focused on academic, rather than vocational and training, which has led to an oversupply of graduates in certain fields while industries such as manufacturing, engineering, and information technology struggle to find qualified workers.

This is consistent with Elaine et al., (2024) which found high levels of graduate unemployment due to job skills mismatch negatively affect economic growth. This condition elevated unemployment rates hinder economic growth in Indonesia. This results in a bottleneck, where fresh graduates struggle to enter the job market, thereby prolonging periods of unemployment and underemployment. They also mention Indonesia's private sector often seeks employees with practical, job-specific skills rather than purely academic qualifications.

Additionally, human capital often regarded as a key factor for driving economic growth, refers to the skills, knowledge, and abilities that individuals accumulate through education and training. However, when graduates failed to find employment that matches their qualifications, their potential contribution to economic growth is significantly diminished. (Technical Report, 2020). Study by Ardi et al., (2025) highlight that graduate unemployment in Indonesia represents a significant underutilisation of human capital when many young graduates are found unable to fit their educational achievements into meaningful employment.

This mismatch between education and employment not only leads to personal economic costs for graduates but also represents a broader macroeconomic inefficiency. Instead of contributing to higher productivity and innovation, unemployed graduates experience skill depreciation over time, which reduces their future employability and productivity. According to Pratama and Purniyati (2020), if a significant portion of the educated workforce remains unemployed, the economy misses out on potential growth that could have been generated by this highly educated labor force.

In contrast, some argue that a higher number of graduates can stimulate economic growth by enhancing overall productivity, provided that educational institutions adapt to market demands (Hermannsson et al., 2014). This condition implies job demand in labour market match with skills and competency equipped among graduates. Therefore, based on the discussion in the literature, the first hypothesis developed in this study is:

H_1: Graduate unemployment gives significant impact on economic growth in Indonesia

2.4. Impact of Government Spending in Education on Economic Growth in Indonesia

Education is often viewed as a means of enhancing human capital (Karaçor et al., 2017), it also provides indirect economic benefits. People with formal qualifications can generate economic

returns. Research from Chang and Shi (2016) that studies across over 30 provinces and autonomous regions in China have highlighted strategies to optimize human capital for achieving high economic growth. However, challenges remain in human capital development. In Korea, despite the crucial role human capital plays in driving economic growth, the increasing number of elderly workers and female labourers has spurred the need for policy improvements (Han and Lee, 2020). Burgess (2016) emphasises that both human capital as an educational outcome and the unique policy contexts of individual countries should be considered.

Educational institutions have been strategically designed to produce high-quality outcomes. Between 1973 and 1978, Indonesia expanded its educational system by emphasizing elementary schools to improve basic literacy. Meanwhile, higher education has also been reshaped to meet development objectives. Postiglione and Wright (2017) postulates families often view higher education as essential for securing better employment opportunities In East and Southeast Asian countries. Universities, in particular are seen as key players in the knowledge economy, providing the skilled human capital needed for national development (Zaika and Gridin, 2020). Education also serves to reduce social inequalities. In Pakistan, for instance, increased investment in higher education has helped reduce income inequality (Dotti, 2019).

The role of government funding in higher education has long been a subject of intense debate. While the expansion of higher education has led to a larger pool of graduates, there is a growing concern in regards with complex relationship between government funding for higher education and the development of competent graduates. Byrne (2022) propose one key factor that has received less attention is the role of government funding for higher education. Government spending to provide better infrastructure in higher education institutions is crucial for delivering quality education and producing competent graduates. Insufficient infrastructure can negatively impact both teaching and learning experiences, leading to graduates who may not meet industry standards. Babatunde (2018) found that in Nigeria government spending on education poses long-term relationship and has direct effects on economic growth. It promotes good learning environment as quality of physical learning spaces, such as classrooms and laboratories, significantly influences educational outcomes. Addressing infrastructure efficiency is essential for enhancing the quality of higher education and ensuring that graduates are well-prepared to meet the demands of the modern workforce.

In contrast, Finland's educational system is regarded as one of the most successful in fostering an education-based economy (Schatz, 2015). This has led to increased focus on education, as a reciprocal relationship between education and the economy has been established. Educational models can drive economic benefits, while an economy that prioritises innovative education plays a critical role in shaping the future. Despite the positive effects of education spending on economic growth, there is a pressing need to improve public spending management systems to ensure sustained development. This is consistent with study from Frank (2017) where they found education expenditure positively affects economic growth in non-oil countries but has a negative impact in developing countries and a non-significant effect in OECD countries, depending on institutional quality. According to Trabelsi (2018), they found public education spending positively impacts economic growth only when governance is above a certain threshold otherwise, it would produce a negative effect. Besides, Suwandaru et al. (2021) suggest public expenditure on education in Indonesia shows a long-term positive relationship with economic growth, but an insignificant and negative relationship in the short term. From the discussion above, second hypothesis developed in this study is:

H_2: Government spending in education have a significant impact on economic growth in Indonesia

3. DATA AND RESEARCH METHODOLOGY

3.1. Data Collection

Data selection in this study comprises of yearly time series spanning 33 years, from 1990 to 2022. Economic growth, measured by real Gross Domestic Product (GDP) per capita, serves as the dependent variable while independent variables involve graduate unemployment (GUEM), government spending on education (GEDU), inflation (INF), and foreign direct investment (FDI). Table 1 depicts the details of independent and dependent variables in this study:

All data has been gathered from World Development Indicator, World Bank web-based database. The present study proposes GDP as dependent variable as a function of set explanatory variables which include GUEM, GEDU, INF and FDI in model estimation.

3.2. First Stage – Autoregressive Distributed Lag (ARDL) Cointegration Approach

This study undertakes Autoregressive Distributed Lag (ARDL) cointegration approach to examine the cointegration relationship between economic growth, graduate unemployment, government spending in education and other control variables in the first stage of analysis. Pesaran et al. (1999) introduced the ARDL cointegration approach that later continued by Pesaran et al. (2001). The ARDL analysis is a recent cointegration method named after the Johansen Juselius (Johansen and Juselius, 2009) and Engle

Table 1: Description on dependent and independent variables

Variable	Description
Dependent Variable	
Gross Domestic Product (GDP)	Real Gross Domestic Product per capita
Independent Variable	
Graduate Unemployment (GUEM)	Unemployment among High Education
Government Spending in Education (GEDU)	Government expenditure on education (% of government expenditure)
Inflation (INF)	Percentage change in the general level prices of goods and services
Foreign Direct Investment (FDI)	Measure as a net outflow or inflow as percentage of GDP

All sources from World Development Indicator (WDI), World Bank database (www.data.worldbank.org)

Granger (Engle and Granger, 1987) cointegration approaches. The ARDL cointegration involve of two steps analysis: (1) ARDL bounds test; and (2) ARDL level relation. The main advantage of the ARDL cointegration approach is that it allows a mix order of integration and is not restricted to the same order of integration between the variables. This condition is appropriate particularly for those variables that own fractional order of integration (Pesaran et al., 1999). Besides, the ARDL method able to detect long-run relationship for two or more variables in a small sample size as compared to the Engle and Granger (1987) and Johansen and Juselius (2009) approaches. Other than that, Pesaran et al. (1999) indicate the ARDL cointegration delivers super-consistent long-run coefficients estimators.

Majority of the studies have proven the existence of cointegration between variables by employing ARDL cointegration as the preferred research method. Prior estimation, it is important to validate the stationarity and to ensure order of integration for all variables are not more than I(2). There is a large debate among the researchers who claim that ARDL cointegration is not required for preliminary testing of stationarity to identify the variables' integration order. However, based on Alimi and Ofonyelu (2013) this preliminary check is important for modelling under the ARDL model since it ensures none of the variables are integrated in the order I(2). Ouattara (2004) explains any variable with integrated order of I(2), the computed F-statistics are invalid since the critical values for the bounds test as proposed by Pesaran et al. (2001) covers the variables ranging from I(0) or I(1). Therefore, preliminary unit root tests before employing the ARDL approach are needed to confirm none of the variables were integrated with the order of I(2) or more.

The next step is to proceed with ARDL bounds test as suggested by Pesaran et al. (2001) which to examine the existence of a long-run cointegration between economic growth and set of explanatory variables. Depicted below is the ARDL (p, q) model used to examine the long-term relationship between the variables:

$$\Delta i_t = c\beta_1 i_{t-1} + \beta_2 X_{t-1} + \sum_{j=1}^{p-1} \phi \Delta i_{t-1} + \sum_{i=1}^{q-1} \psi \Delta X_t + \varepsilon_t \quad (1)$$

Where, Δ presents the first difference operator, it = explanatory variables ($GUEM_t$, $GEDU_t$, INF_t, FDI_t); x_t = economic growth (GDP_t) and ε_t represents white noise error term. In addition, p and q are the autoregressive lag orders of the dependent and independent variables, respectively. The long-run cointegration in equation (1) can be estimated through F-statistics and ordinary least squares. A Schwarz Bayesian Criterion (SBC) has been chosen for the selection of optimal lag length. Following Pesaran et al., (2001), the critical values of this test are valid for the variables stationary at I(0) and I(1). Moreover, critical value comprises of two sets which are lower and upper bounds. An alternative hypothesis is supported when the calculated F-statistics fall above the upper bound, which indicate the existence of a long-run cointegration between the variables. Otherwise, if the calculated F-statistic falls below the lower bound, the null hypothesis is supported, which indicates no long-run cointegration between variables. Additionally, if the calculated F-statistics fall between these bounds then the result is inconclusive.

Furthermore, El-Seoud (2014) proposed to identify a the significant long-run cointegration relationship between the variables is applicable in the next step of analysis which is ARDL level relations. For this purpose, to identify a significant long-run cointegrations between economic growth and set of explanatory variables when estimation model presence with negative and significance lagged in Error Correction Model (ECM_{t-1}). They suggest a significant and negative value of ECM_{t-1} reveals the existence of significant long-term cointegration which infers the variations in economic growth is explained by the graduate's unemployment and government spending in education. The coefficient on ECM_{t-1} also implies the speed between economic growth and the explanatory variables will attain their equilibrium in the long run.

3.3. Second Stage – The One-to-one Relationship on Economic Growth

In the first stage of analysis, a significant long-run cointegration between economic growth and graduate unemployment has been recognised. Meanwhile in the second stage of analysis the one-to-one relationship implies the strength of relationship between variables. Practically, at this stage analysis we able to identify two types of relationship, namely weak and strong relationship. The estimation is measured from the value of β given in equation (1). Anari and Kolari (2016) also suggested to spot a one-to-one relationship between economic growth and the explanatory variables; the restriction β = 1 must be imposed in the cointegration model. This hypothesis can be examined by applying standard asymptotic Chi-square in Wald tests and β = 1 denotes a strong relationship between the variables.

4. RESULTS AND DISCUSSIONS

4.1. Stationarity Test – Phillips-Perron and Augmented Dickey-Fuller Unit Root Tests

Before conducting the ARDL bounds test, it is essential to determine the order of integration for both dependent and independent variables. For this purpose, the study utilises the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) unit root tests to assess the integration order of the variables (Dickey and Fuller, 1979; Phillips and Perron, 1988). The ADF test is appropriate when the error term considered as a white noise. The model is specified as below:

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=1}^{p} a_i \Delta Y_{t-i} + \varepsilon_t \quad (2)$$

In the meantime, the PP test is represented by the equation shown below:

$$Y_t = a_0 + a_1 Y_{t-1} + \varepsilon_t \quad (3)$$

Table 2 exhibits the outcome of unit root tests under Augmented Dickey Fuller and Phillips-Perron tests.

As describe in Table 1, none of the variables are stationary beyond the first order of integration at I(1) which permit the estimation to

continue with the ARDL bounds test. It is important to confirm the stationarity of each variable hence to ensure that none of them are integrated of order I(2), as this will produce invalid results (Alimi and Ofonyelu, 2013).

4.2. Cointegration between Economic Growth and Graduate Unemployment - ARDL Bound Test

After clarifying the stationarity status of all the variables, next is to proceed identification of cointegration relationship between economic growth and graduate unemployment which also includes several control variables by employing the ARDL bounds test (Pesaran et al. 2001). Below describes the general model to explain the relationship:

$$\Delta GDP_t = c + \beta_1 GDP_{t-1} + \beta_{21} GUEM_{tt-1} + \beta_2 GEDU_{t-1}$$
$$+\beta_2 INF_{t-1} + \beta_2 FDI_{t-1} + \sum \alpha_{1i} \Delta GDP_{t-i} + \sum \alpha_{2i} \Delta GUEM_{t-i}$$
$$+\sum \alpha_{3i} \Delta GEDU_{t-i} + \sum \alpha_{4i} \Delta INF_{t-i} + \sum \alpha_{5i} \Delta FDI_{t-i} + \varepsilon_t$$

According to critical value tabulated in Table 3, F-statistics for all dependent and independent variables in Table 4 under the estimation of ARDL bounds test have fall above the upper bound at 1%, 5% and 10% significant level. Graduate Unemployment (GUEM) present the computed F-statistics more than the upper bound critical value at 5%. Besides, Government Spending in Education (GEDU) shows computed F-statistics above the upper bound critical value at 1%. Likewise, the Inflation (INF) and Foreign Direct Investment (FDI) display the computed F-statistic exceed the upper bound critical value at 10% and 5% accordingly.

Table 2: Augmented Dickey-Fuller and Phillip-Perron unit root test results

Unit root test	ADF		Phillip-Perron	
	Level			
	Intercept	Intercept and trend	Intercept	Intercept and trend
GDP	−1.5744 (5)**	−1.8922 (5)**	−1.2390*	−1.2217*
GUEM	−1.4689 (5) ***	−1.6639 (5) ***	−1.9276***	−1.9081**
GEDU	−2.9974 (5)	−2.7899 (5)	−2.8211	−2.8766
INF	−2.0147 (5)	−2.1789 (5)	−3.4213	−3.9221
FDI	−2.3442 (5)	−2.5233 (5)	−2.8266	−2.8120
First Different				
GDP	−4.2311 (5)***	−4.6819 (5)***	−4.2289***	−4.8138***
GUEM	−4.8834 (5) ***	−4.1138 (5)***	−4.7762***	−4.9877***
GEDU	−7.5543 (5) ***	−7.5871 (5)***	−7.8243***	−7.9651***
INF	−7.9264 (5) ***	−7.7884 (5) ***	−7.9012***	−7.9532***
FDI	−6.3261 (5) ***	−6.4457 (5)***	−6.1102***	−6.1212***

*, **, ***Denotes 10%, 5% and 1% significance levels respectively

Table 3: Critical values for ARDL bounds test

Critical value	Lower bound	Upper bound
1% significant level	6.84	7.84
5% significant level	4.90	5.73
10% significance level	4.04	4.78
Null Hypothesis: No Cointegration		

The Critical Value Developed by Pesaran et al. (2001) Under Case III: Unrestricted Intercepts; No Trends

Therefore, the results generated from ARDL bound test infers GUEM and other control variables which include GEDU, INF and FDI are found to cointegrate with economic growth in Indonesia. After confirming existence of cointegration under the ARDL bounds test, next is to undertake the ARDL level relation test to validate whether the cointegration relationship is significant in the long run by estimating the Error Correction Model (ECM).

4.3. Long-run Cointegration between Economic Growth and Graduate Unemployment - ARDL Level Relation

Following Pesaran et al. (2001), he suggested the present of cointegration in the ARDL bounds test does not form a perfect cointegration between the variables. He recommends a negative and significant value of error correction terms (ECM_{t-1}) specify the cointegration is significant and stable in the long run. The value of ECM_{t-1} also gauges the speed at which the short-run deviations in explanatory variables and economic growth converge to its long-run equilibrium.

Table 4 elaborates the finding on the ECM_{t-1} and the coefficient for all variables involved in the model. The value of ECM_{t-1} from Table 4 reveals that except for FDI, all the explanatory variables appear to have a significant long-run coefficient towards economic growth. The estimated coefficient of ECM_{t-1} is -0.050 suggests that any short-run deviations between explanatory variables and economic growth, will take almost 1.7 years to convergence into long-run equilibrium and it is corrected for about 60% in the next year. This finding is consistent with the study by Schubert and Turnovsky (2017) that examines the speed at which economic growth and unemployment rates converge to their long-run equilibrium. They demonstrate structural attributes directly enhancing productivity significantly affect the long-run growth rate, while having negligible impacts on the long-run unemployment rate.

Firstly, the findings on graduate unemployment (GUEM) appears to own a negative and significant relationship with the economic growth (GDP). This situation explains in the long run, as graduate unemployment increase it will progressively slower the economic growth. High unemployment among graduates constantly occurs when there is a skills mismatch between demanded job in labour market and skills supply from higher education institutions. The study from Daud et al. (2024) reveal in Indonesia, only 53% of university graduates being offers jobs placement that match with their field of study, highlighting the disconnection between education and employment needs. Moreover, majority of companies nowadays impose high qualification requirements that

Table 4: Estimated results for the existence of long run cointegration relationship

Variable	ARDL bounds test		ARDL level relation	
	F-statistic	SBC (p, q)	ECM_{t-1}	Coefficient
GDP	4.815*	(8,6)	−0.050	0.088**
GUEM	6.012**	(8,8)		−0.664 ***
GEDU	7.928***	(8, 4)		0.121**
INF	4.946*	(8,4)		−0.076**
FDI	6.284**	(8,2)		−0.268

*, **, ***Denotes 10%, 5% and 1% significance levels respectively

exceed the competencies of fresh graduates, that will result in a spiking in unemployment rates (Daud et al. 2024). This condition definitely provides negative effect to economic growth when rise in unemployment will decline the productivity and output resulted from underutilise the labor force. In addition to this, graduates are among the potential taxpayers to the government. A higher number of graduate is not employed, the revenue from government's income tax will drops, thus limit its ability to finance essential services, public infrastructure, and other development programs.

Secondly, Table 4 presents that government spending in education (GEDU) poses a positive and significant relationship with economic growth (GDP). This relationship elaborates the more government spending in education will result to enhance the economic growth. Spending on education in Indonesia has been an important area of focus when the government allocate 20% of the National Budget to education making it one of the largest components in the budget. Alarge portion of the education budget is allocated to basic education, which includes primary and secondary schooling. Investment in higher education, including universities and vocational training still at lower level hence higher education experience difficulties to build a more skilled workforce (Azzahra et al., 2024). Therefore, this finding implies government spending in education promotes economic growth through improve access to education in primary and secondary school but not focusing at tertiary level education. Since largest component in Indonesian labor market comprise of informal employment that do not require higher education background, this situation indicate informal sector of employment among the factor that triggered economic growth.

Thirdly, Table 4 displays inflation (INF) presents a negative and significant relationship with economic growth (GDP). This condition describes in the long run, as inflation increase it will hamper the economic growth. A period of high inflation rate explains a situation when rising price of goods and services hence reduces the purchasing power among consumers. As prices rise, households have less disposable income to spend which can lead to a reduction in overall consumption thus hinders economic growth (Juhro et al., 2021). Other that that, higher inflation diminishes economic growth resulted from reduce in consumer purchasing power which create uncertainty that hinders investment.

Lastly, foreign direct investment (FDI) appears not significant to support long run cointegration to explain variation in economic growth (GDP). The results suggest economic growth are not fully adjusted by the number of investment foreign company.

4.4. One-to-one Relationship between Economic Growth and Graduate Unemployment

The findings from ARDL bounds test and level relations confirm the long-run cointegration between GUEM, GEDU and INF towards GDP. The study next continues to estimate one-to-one changes between the GUEM, GEDU and INF with GDP in its strictest form. For this purpose, the null hypothesis of H_0: $\beta = 1$ was examined to determine the strong form of relationship. According to Table 5, the P-value for GUEM, GEDU and INF are significant at 1% which means the strong form relationship with economic growth is rejected. This implies the alternative hypothesis is supported which indicate the GUEM, GEDU and INF own a weak form of relationship with economic growth. This situation elaborates that the GUEM, GEDU and INF correlate to influence economic growth hence the effect is minimal. This finding is consistent with Juhro et al. (2021) since they found a weak correlation to affect economic growth in Pakistan. They suggest the weak relationship among interest rate and inflation has provide a minimum impact on the economic growth.

Table 5: The coefficient towards economic growth

Variable	Chi-square
GUEM	14721.3 (0.000)
GEDU	14457.1 (0.000)
INF	13723.5 (0.000)

P-value in the parentheses (…) shows the probability of Chi-square

4.5. Diagnostic Tests

To validate the estimation models are dynamically stable and no present of serial correlation problem, all model regressions had undergone the diagnostic test, namely Cumulative Sum Recursive Residuals (CUSUM) and Lagrange Multiplier (LM) tests. The LM test estimates no serial correlation problem exists since the $P > 0.05$ and CUSUM tests indicate the stability within the bounds and significant at the 5% level. Therefore, the results suggest all models in ARDL cointegration are dynamically stable hence the findings are valid.

5. CONCLUSIONS AND RECOMMENDATIONS

The aim of this research is to determine the significant impact of graduate unemployment on economic growth in Indonesia. To accomplish the proposed objectives in the study, the ARDL cointegration proposed by Pesaran et al. (2001) has been employed in the first stage of analysis. The findings discover the significant long-run cointegration among graduate unemployment, government spending on education and inflations towards the economic growth in Indonesia.

In conclusion the findings suggest there is a large gap between number of graduates and the job demand which appear as a key factor to slower economy growth in Indonesia. Graduates often possess qualifications that do not align with job market demands which lead to higher rate of graduate unemployment. Nowadays many employers impose stringent qualification requirements that exceed the competencies of recent graduates. The consistent higher rate of unemployment among graduates disrupts economic growth through lower tax collection. This condition also increased government expenses on unemployment benefits when the expenditure may divert resources away from productive investments and public services, further hindering economic growth. Meanwhile, government spending in education is found to enhance economic growth in Indonesia. Informal sector employment owns a largest composition in labour market in Indonesia therefore, government spending in education is found to boost economic growth through the improvement in first tier level of education where less priority given to promote quality of education in tertiary education level. The output of government

spending in education is not significantly from the skills and knowledge among graduate from higher education. To produce employable graduate, the government should invest in providing good infrastructure to promotes better teaching and learning environment in higher education. Furthermore, government spending in higher education should be improvise in term of curriculum development and quality education to produce well-prepared graduates to meet the demands of the recent workforce.

Moreover, the results suggest period of high inflation rate will raise the overall price hence the households have less disposable income to spend which eventually hinders the economic growth. In the second stage of analysis, the study found that graduate unemployment, government spending in education and inflation owns a weak relationship in adjusting the variation in economic growth in Indonesia.

Future researcher should resume the current research by further investigate the relationship between curriculum development and number of graduate employment as well as to affect the economic growth. Since this study solely focus on the impact of graduate unemployment to economic growth, future study should emphasis more on the impact of quality educations to generate a skills graduate and how they able to fulfil the demand in job market thus to improve economic growth. Second, since this study employs a time-series methodology, future study should propose panel data regression which to include more data observation. This will produce a robust result and we can compare the situation with other countries for a long period.

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