Do Household Consumption and Literacy Rate Impact the Fluctuation of the Unemployment in Indonesia?

Muhammad Ismail Sunni[1*], M. Indre Wanof[2], Angga Kusuma Wijaya[3]

Email : [1*]muhammad.sunni@uiii.ac.id, [2]wanofmindre8@gmail.com, [3]angga.sijaya.10@gmail.com

[1]Universitas Islam Internasional Indonesia, Indonesia; [2]Moscow State University of Technology STANKIN, Russia; [3]Australian National University, Australia
* *Corresponding Author*

Abstract
This paper aims to investigate the linkage and explore what has determined the unemployment rate in Indonesia from 2000 to 2021 which include literacy rate, school enrolment, labour force participation and household and non-profit institutions serving households (NPISHs) as the main explanatory variables. To control factors of unemployment and avoid spurious or misleading results, other than FDI, we include other macroeconomics variables such inflation, trade and interest rate. This study deploys timeseries regression and Ordinary Least Square (OLS) as the regression technique to estimate the coefficients of the linear function that best fits the data. To assess the model's assumptions and diagnose any potential issues that may affect the model's reliability and validity, the author applied heteroscedasticity, normality, multicollinearity, and autocorrelation test. All data are attained from World Development Index (WDI). Overall, HNC is the only determinant significantly increase level of Indonesia unemployment. While the increase of FDI may exacerbate Indonesia's unemployment rate, LFP plays significant role in reducing the unemployment rate in Indonesia. The contribution of this paper lies in providing a nuanced understanding of the specific determinants of unemployment, with a particular emphasis on the significant impact of NPISHs. Based on the findings, policymakers should think about making investments in NPISHs to spur growth in the economy while generating job opportunities.

Introduction

Unemployment is not just a problem of joblessness, but it also leads to a range of social and economic challenges, including poverty, social exclusion, and inequality. Understanding the causes and consequences of unemployment requires an in-depth study of various factors, including education, labor force participation, technological advances, economic policies, and global economic conditions. Vancea & Utzet (2017) emphasize that this research helps individuals and society to better understand labor market dynamics. Additionally, making wise career decisions and developing appropriate skills also has a positive impact on the labor market (Dencker et al., 2021). Research on unemployment can provide policymakers with evidence-based solutions to reduce unemployment rates and improve economic outcomes.

Poverty is a global phenomenon that arises not only from a lack of resources but also from limited access to resources, information, opportunities, empowerment and mobility (Az Zakiyyah, 2023),. Conducting research on unemployment in Indonesia is of paramount importance, as it represents a pivotal concern with profound ramifications on the nation's economic and societal advancement. Notably, Indonesia boasts the world's fourth-largest population, magnifying the urgency of this matter (Van Empel et al., 2020), with a substantial influx of youth joining the workforce annually. However, the country's high unemployment rate has hindered its economic growth and resulted in social challenges, including poverty and inequality (Asrol & Ahmad, 2018; Erlando et al., 2020; Idrus & Rosida, 2020). Understanding the causes and consequences of unemployment in Indonesia requires a comprehensive analysis of various factors, including education, training, labor force participation, government policies, and global economic conditions. The following is graph that depicts the unemployment rate in Indonesia in one decade.
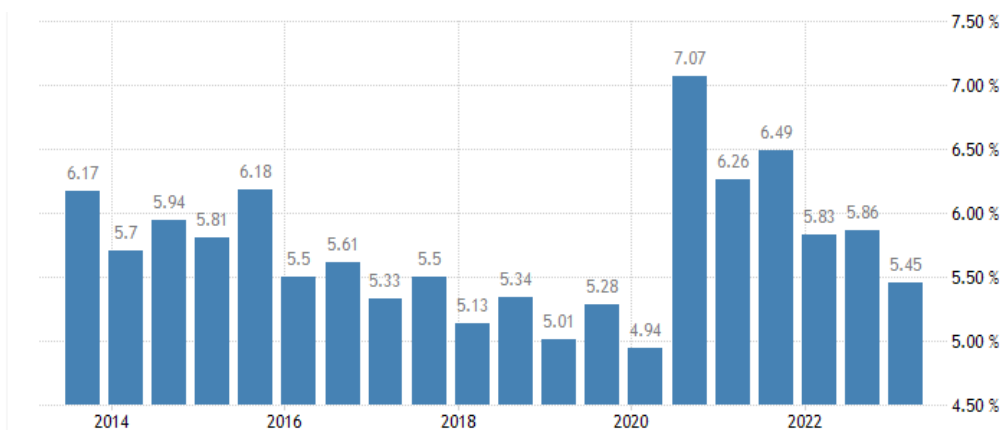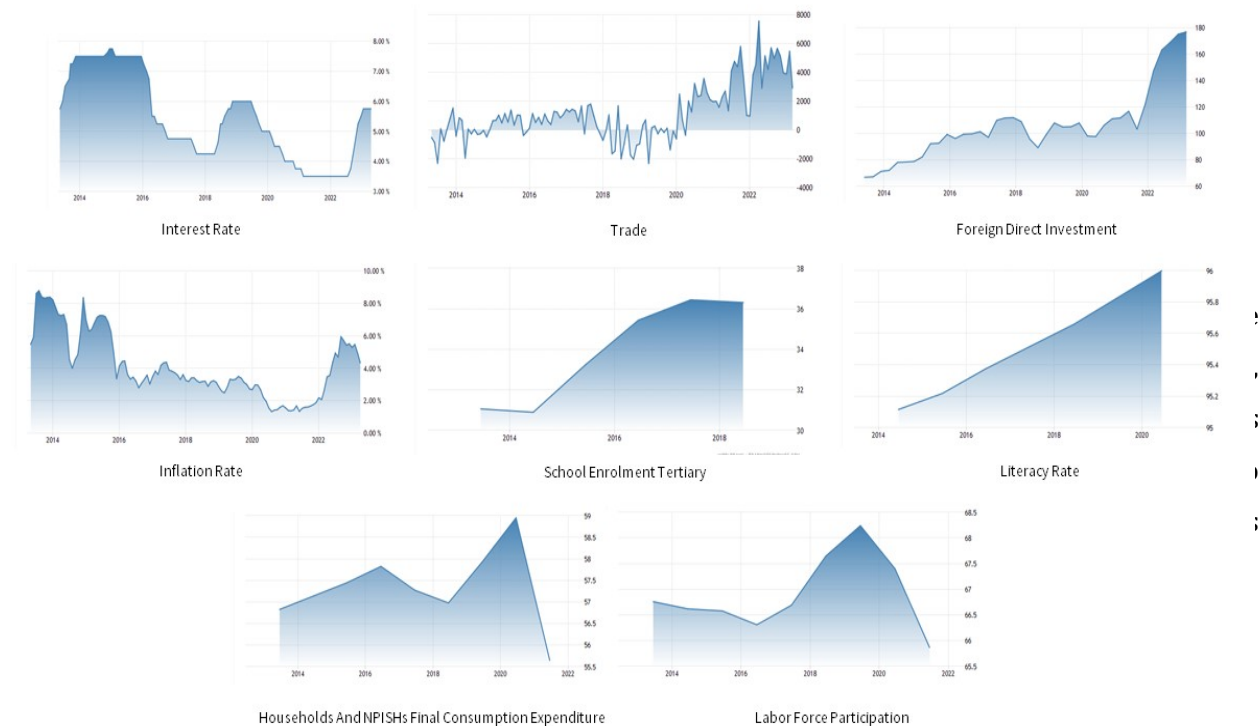

Source: Tradingeconomics | Worldata (2023)
Fig 1. Decade of Unemployment level in Indonesia

As of the first quarter of 2023, as shown in Figure 1, the unemployment rate in Indonesia experienced a decline to 5.45%. In the third quarter of 2022, the unemployment rate was 5.86%, indicating an improvement from the same quarter in the previous year. In 2021, the unemployment rate was 4.41%, slightly higher than that of 2020.

The decline in Indonesia's unemployment rate in 2023 can be attributed, in part, to the relaxation of COVID-19 restrictions. During this period, the count of individuals without employment decreased significantly by 4.88 million, amounting to 7.99 million individuals. Concurrently, the ranks of the employed swelled by 2.23 percent, reaching 138.63 million, with notable increases observed in sectors such as food, accommodation, beverages, and other related services. Furthermore, the labor force participation rate demonstrated a slight uptick, advancing to 69.30 percent from its previous figure of 69.06 percent over the preceding year. However, other factors such as Indonesia's large population, which creates a new labor force every year, and the projected positive economic growth in 2023 of 4.9 - 5.2%.

Source: Tradingeconomics | Worldata (2023)
Figure 2. All Exogenous Variables in Indonesia in a decade

Figure 2 shows Indonesia's fluctuations seen from several factors that have the potential to influence the rise and fall of decline in Indonesia. Overall, household consumption and NPISH as well as labor force participation have decreased, while other determining factors, unlike school participation rates at the tertiary level which have not changed compared to previous years, have actually increased. Higher school participation rates at the tertiary level can result in a workforce that is more skilled and better equipped to access employment opportunities. In addition, enrolment levels in secondary and higher education institutions also play an important role in driving economic growth both on an individual and regional scale. Likewise, higher literacy levels can also result in a more skilled workforce. However, none of these factors is a direct solution to reducing poverty levels.

Based on a brief but critical evaluation of the background of unemployment occurring in Indonesia today, the author believes that, although Indonesia can reduce the unemployment rate, it cannot be denied that the findings of this research still have practical implications for policy makers, researchers and beneficiaries in Indonesia by reducing unemployment. This research can enrich existing knowledge by examining the basics of unemployment in Indonesia through careful analysis that includes various variables including literacy levels, labour force participation, households and non-profit institutions that serve households, foreign investment, interest rates, trade and high school enrolment, using time series regression methodology. Therefore, this research seeks to provide novelty to the unemployment literature in Indonesia by including households and non-profit institutions that serve households (NPISH) as determinants of unemployment. Food security is one of the main concerns in the world to tackling global hunger Yuniarti & Purwaningsih (2017). Thus, this research is different from previous research. The contribution of this study emphasizes the importance of monitoring economic variables such as inflation rates, trade dynamics, and interest rates, because these factors can indirectly impact unemployment.

Literature Review

School Enrolment Tertiary on Unemployment

Maneejuk & Yamaka (2021) reveals that fluctuations in the unemployment rates among highly educated professionals can exert both favorable and adverse effects on economic growth, necessitating the implementation of prudent policies to mitigate any detrimental repercussions. Furthermore, the rates of enrollment in secondary and tertiary education institutions can play a pivotal role in driving economic growth within the ASEAN-5 nations, both at the individual and regional scales. However, Salmi (2017) suggests that higher SET rates may also lead to job shortages

and increased competition in certain sectors, which could result in higher unemployment rates. Additionally, there is evidence to suggest individuals with advanced educational achievements exhibit superior health conditions and longer lifespans relative to those with lower educational attainments. This underscores the paramount importance of tertiary education in shaping critical health indicators such as infant mortality, life expectancy, child vaccination rates, and educational enrollment figures. Furthermore, it is imperative for an economy to contemplate potential years of life lost, often referred to as premature mortality, as a metric of health quality, which, in turn, indirectly influences the fluctuations in unemployment rates.

Labor Force Participation on Unemployment

Coibion et al., (2020) & Feng et al., (2017) exposed that an upsurge in labor force participation (LFP) can result in a reduction in the unemployment rate, primarily attributable to the expansion of the employed population. Nevertheless, the impact of LFP on unemployment rates can also be complex, as it can lead to a temporary increase in unemployment rates as more individuals enter the labor market and actively seek employment (Gallant et al., 2020 & Yip, 2018). Additionally, LFP rates can be influenced by factors such as gender, age, education, and economic policies.

Literacy Rate on Unemployment

Higher literacy rates are associated with a more skilled workforce, which is likely to have better access to employment opportunities (Mitch, 2018). A study by Karakurum - Ozdemir et al., (2019) has shown that financial literacy scores are lower among women, younger adults, and individuals who lack proficiency in the official language of their country of residence. This might be one of root causes of the increasing joblessness, while financial literacy increases with education on the developed countries, highlighting that it is not solely the duration of education that counts, but also the quality thereof. However, Schinckus et al., (2018) argue that literacy rates alone are not enough to reduce unemployment rates. According to Dwyer (2022), the policy aims to create jobs and encourage necessary economic growth.

Household and non-profit institutions serving households on Unemployment

The Household and Non-profit Institutions Serving Households (HNC) sector plays a vital role in creating employment opportunities and reducing unemployment rates, particularly for women and low-skilled workers (Kwaku Amoah, 2018). The HNC sector encompasses activities related to the production and consumption of goods and services within households, such as unpaid work, volunteer activities, and personal care services. A study by Martin et al., (2020) shown that an

increase in the HNC sector's size leads to a reduction in unemployment rates, as it creates job opportunities that are accessible to those with limited education or experience. However, the HNC sector is also vulnerable to economic downturns, which can result in a reduction in employment opportunities, especially in times of crisis (Gopinath, 2020). Thus, policies aimed at supporting and promoting the HNC sector may be effective in reducing unemployment rates, particularly for marginalized groups.

Inflation on Unemployment

While there have been no studies directly examining the relationship of the two, reveals that to simultaneously sustain low inflation and unemployment rates, these ideal circumstances can exclusively be attained through the implementation of an interest-free monetary policy (IFMP) (Selim & Hassan, 2019). It's no surprise that countries with a historical commitment to IFMP, such as Japan, Switzerland, Sweden, the Netherlands, and Denmark, have effectively managed to control both inflation and unemployment rates when compared to their English-speaking counterparts.

Singh (2018) examines the correlation between unemployment and inflation and reveals a negative association between these two factors. Elevated inflation rates trigger a decline in consumer expenditure, subsequently diminishing the demand for products and services. This, in turn, leads to job cuts and a subsequent surge in unemployment rates. Furthermore, inflation leads to wage stagnation, making it difficult for employers to hire new workers, resulting in higher unemployment rates (Furth, 2017). The studies suggest that policymakers should adopt measures that aim to maintain a stable inflation rate to ensure low unemployment rates.

Interest Rate on Unemployment

Blanchard (2019) exposes that higher interest rates can lead to decreased consumer and business spending, resulting in job losses and increased unemployment rates. Conversely, lower interest rates can stimulate economic growth, leading to job creation and a decrease in unemployment rates (Susilawati et al., 2020). Feng et al., (2017) have found that monetary policy, encompassing alterations in interest rates, possesses the capacity to influence the labor market and impact unemployment rates. For example, a study of the US economy found that the monetary policy implemented by the Federal Reserve exerted a substantial influence on unemployment rates, as reduced interest rates corresponded to decreased unemployment rates. However, other studies have found mixed results on the impact of interest rates on unemployment, highlighting the complexity of the relationship between monetary policy and the labor market.

Trade on Unemployment

Some researchers argue that increased trade can lead to job losses in certain industries, due to increased competition from foreign producers, resulting in higher unemployment rates (Feenstra et al., 2019 & Pavcnik, 2017). However, Dauth et al., (2017) & Khanh Nguyen et al., (2019) suggest that heightened trade activities can result in the generation of fresh employment opportunities within export-centric sectors and a surge in the demand for domestically manufactured products and services. This, in turn, can contribute to a reduction in unemployment rates. The influence of trade on unemployment levels may exhibit variances contingent upon the particular sector and the skill prerequisites associated with the roles within it.

Foreign Direct Investment on Unemployment

While Grahovac & Softić, (2017) & Johnny et al., (2018) argue that Foreign Direct Investment (FDI) has the potential to stimulate job creation and mitigate unemployment rates. While Aykut et al., (2017) and Dechezleprêtre & Sato, (2017) others suggest that it may result in job losses due to increased competition with domestic firms. Empirical evidence on the impact of FDI on unemployment is mixed and context-dependent. For instance, studies suggest that FDI has a positive impact on employment in developing countries (Saini & Singhania, 2018). While in developed countries, FDI tends to have a more ambiguous effect on employment (Alfaro & Chauvin, 2020). The literature also highlights the importance of the host country's policies and institutions in determining the impact of FDI on unemployment.

Method

Data Description

This study deploys timeseries regression as the econometric model since the data, which are taken in annual form from two decades after 2000 until 2021, are observed to explore the relationships between the dependent variable and one or more independent variables, while also accounting for the temporal dependence of the data. Table 1 displays the descriptive statistic and since it was shock-resistant, converting all variables to logarithmic form to standardize the data distribution was not imposing. While Table 2 provides information comprehensively but concise on all variables used. All data are attained from World Development Index (WDI).

Table 1. Descriptive statistic

	UEP	LTR	LFP	HNC	FDI	INT	TRA	SET
Mean	5.539	92.895	66.477	60.058	1.318	5.078	50.419	70.441
Median	5.380	92.897	66.580	58.316	1.812	6.061	49.110	72.136
Maximum	8.060	96.999	68.240	68.138	2.916	12.322	71.436	80.555
Minimum	3.590	86.384	64.210	55.423	-2.757	-3.852	32.975	55.043
Standard Dev.	1.475	3.070	0.983	4.036	1.447	4.329	10.535	7.076

Table 2. Summary of variables

Variable	Description	Units	Definition
UEP	Unemployment	% of total labor force (national estimate)	The labor force's proportion that is unemployed, indicating individuals without work who are actively seeking employment.
LTR	Literacy Rate	adult total (% of people ages 15 and above)	The percentage of individuals aged 15 and older who possess the ability to both read and comprehend a brief, straightforward statement concerning their daily life.
LFP	Labor Force Participation	% of total population ages 15+ (national estimate)	The percentage of individuals aged 15 and above who are actively engaged in economic activities.
HNC	Household and non-profit institutions serving households	% of GDP	The total economic worth of all commodities and services, encompassing long-lasting goods.
FDI	Foreign Direct Investment	% of GDP	Net inflows of investments made to attain a substantial managerial stake (equal to or exceeding 10 percent of voting shares) in an enterprise functioning in a foreign economy, distinct from that of the investor.
INT	Interest Rate	%	The real lending interest rate, which accounts for inflation and is determined by the GDP deflator.
TRA	Trade	% of GDP	The total value of both exports and imports of goods and services.
SET	School Enrolment Tertiary	% gross	The gross enrolment ratio represents the proportion of individuals enrolled in a particular level of education, irrespective of their age, in relation to the population within the specified age group designated for that level of education. For tertiary education, including advanced research programs, the usual prerequisite for admission is the successful completion of secondary education.

Source: WDI-World development indicators World Bank (2023)

Model Specification

We use ordinary least squares (OLS) as a regression technique to explore the relationship between the dependent variable and one or more independent variables and also take into account the temporal dependence of the data. Equation (1), (2), (3) and (4) are the models used in this study, with the basic model in model without equipping it with any control variables unlike the model in equation (4). Meanwhile, the difference of model in equation (2) and model in equation (3) are that the latter does not employ *SET* as the main variable, while removing *INT* and *TRA* as the control variable.

$$UEP = \alpha + \beta_1 SET + \beta_2 LTR + \beta_3 LFP + \beta_4 HNC + \varepsilon \tag{1}$$

Model (1) aims to explain the relationship between unemployment (*UEP*) and its potential determinants, namely tertiary school enrolment (*SET*), literacy rate (*LTR*), labor force participation (*LFP*), and household and non-profit institutions serving households (*HNC*). The model assumes that these variables have a linear relationship with unemployment, as represented by their respective coefficients ($\beta_1, \beta_2, \beta_3$, and β_4). The error term (ε) represents the unobserved factors that influence unemployment, but are not accounted for in the model. By estimating the coefficients of the model, we can determine the strength and direction of the relationship between each independent variable and unemployment, and assess their statistical significance in explaining variations in unemployment.

$$UEP = \alpha + \beta_1 SET + \beta_2 LTR + \beta_3 LFP + \beta_4 HNC + \beta_5 INF + \beta_6 INT + \varepsilon \tag{2}$$

We put inflation and interest rate as control variable for model (2) since they are macroeconomic factors that can significantly affect unemployment. Inflation refers to the general increase in the price level of goods and services in an economy. High inflation rates can lead to reduced economic growth, increased uncertainty, and a decrease in the purchasing power of consumers, which can result in a decrease in demand for goods and services, leading to increased unemployment. Interest rates, on the other hand, refer to the cost of borrowing money. High-interest rates can lead to decreased investment and decreased demand for goods and services, leading to increased unemployment. Therefore, including inflation and interest rates in the model can provide a more comprehensive understanding of the factors that contribute to unemployment.

$$UEP = \alpha + \beta_1 LTR + \beta_2 LFP + \beta_3 HNC + \beta_4 INF + \beta_4 FDI + \varepsilon \qquad (3)$$

In model (3), we do not include SET which is one of the main variables and also *TRA* and *INT* as the control variable. This is due to the fact that other models which is model four have already accounted for the impact of *SET* and *TRA* on unemployment. Instead, *INF* and *FDI* are put together since they both have a significant impact on the economy and hence unemployment. Inflation affects the purchasing power of consumers, leading to lower demand for goods and services and resulting in decreased production and ultimately lower employment levels. On the other hand, *FDI* can lead to job creation and contribute to economic growth, which could lead to a reduction in unemployment rates.

$$UEP = \alpha + \beta_1 SET + \beta_2 LTR + \beta_3 LFP + \beta_4 HNC + \beta_5 INF + \beta_6 INT + \beta_7 TRA + \beta_8 FDI + \varepsilon \qquad (4)$$

The decision to include all variables regardless of their status as main or control variables goes with the aim of the research study. This model four is designed to examine the effects of all variables, including both the main variables and the control variables, on unemployment. Additionally, we argue that all variables could potentially have an impact on unemployment and thus should be included in the model to provide a comprehensive analysis of the factors that affect unemployment. We want to evaluate to what extent unemployment would rise when all control variables are taken into account as this is important to know the extent of each exogenous variable to bring significance to every policy-making related to *UEP* later on. To assess the model's assumptions and diagnose any potential issues that may affect the model's reliability and validity, the author applied heteroscedasticity, normality, multicollinearity, and autocorrelation tests.

Result and Discussion

With regard to the heteroscedasticity test, it appears that the null hypothesis of homoscedasticity cannot be rejected at conventional levels of significance. This is indicated by the relatively high p-values (0.9370) associated with the F-statistic and the chi-square test (0.9065), which suggest that there is insufficient evidence to conclude that the variance of the errors is not constant across the range of observations. Therefore, the data is likely homoscedastic, and assumptions of OLS regression are not violated.

Table 3. Estimation results from Ordinary Least Square (OLS) regression

Variable	Model 1	Model 2	Model 3	Model 4
School Enrolment Tertiary (SET)	-0.085 (0.532)	0.046 (0.724)		-0.094 (0.651)
Literacy Rate (LTR)	-0.021 (0.941)	-0.088 (0.704)	-0.039 (0.705)	-0.073 (0.749)
(LFP)	-0.615 (0.008)*	-0.331 (0.096)*	-0.199 (0.263)	-0.207 (0.300)
Household and non-profit institutions serving households (HNC)	0.083 (0.289)	-0.331 (0.006)***	0.230 (0.000)***	0.224 (0.011)**
Inflation (INF)		0.050 (0.795)	0.131 (0.001)	0.021 (0.919)
Interest Rate (INT)		-0.096 (0.601)		-0.131 (0.541)
Trade (TRA)				-0.044 (0.463)
Foreign Direct Investment (FDI)			0.286 (0.059)**	0.337 (0.084)*
R-squared	0.769	0.87	0.89	0.90

* p-value < 0.1; **p-value < 0.05; *** p-value < 0.01.

The Jarque-Bera test is a test for the normality of the residuals in a regression model. The test statistic is a combination of the sample skewness and kurtosis. In this case, the Jarque-Bera test statistic is 2.055051 and the associated p-value is 0.357891. The p-value of 0.357891 indicates that Insufficient evidence exists to warrant rejecting the null hypothesis that the residuals conform to a normal distribution. Consequently, it is probable that the residuals within the regression model exhibit normal distribution characteristics, a crucial assumption in ordinary least squares (OLS) regression.

The Breusch-Godfrey LM Test for Serial Correlation is employed to examine whether autocorrelation exists within the residuals of a regression model. In this case, the test produced an F-statistic of 0.889183 and a p-value of 0.4330, suggests that there is no indication of autocorrelation within the residuals. The Obs*R-squared value of 2.479602 and its associated p-value of 0.2894 further support this conclusion. Therefore, we can assume that the residuals are independent of each other and the OLS model is valid for making prediction.

The test for multicollinearity employs the Variance Inflation Factor (VIF) to assess the existence of multicollinearity among the independent variables. Multicollinearity arises when there is a strong correlation between two or more independent variables, making it difficult for the model to differentiate between their individual effects on the dependent variable. In the result, all the VIF values are below the threshold of 10, indicating that there is no serious multicollinearity problem

among the independent variables in the model. However, there is a moderately high VIF value for LTR at 7.015134, which suggests that there may be some correlation between these variable and other independent variables in the model. Overall, the result indicates that multicollinearity is not a major issue in this model.

Thus, after applying goodness-of-fit tests, the regression models, with probability value more than α, have met the assumptions of homoscedasticity, normality of residuals, absence of multicollinearity, and no autocorrelation. Hence, the model can be deemed appropriate for making inferences and predictions.

Model one, as portrayed in Table 1, is the initial model with no control variables at all, resulting in that only *LFP* is significant variable that strongly influence to the decrease of unemployment in Indonesia. the variables *LFP* and *HNC* are statistically significant in explaining changes in unemployment, with a negative and positive impact, respectively. On the other hand, *SET*, *LTR*, and the constant term are not statistically significant in the model. The R-squared of 0.769 indicates that the model explains around 77% of the variation in unemployment. The Durbin-Watson statistic of 0.857 indicates that there might be autocorrelation in the residuals which then should be investigated further.

Labor force participation and household institutions serving households are likely to have a significant impact on unemployment because they directly affect the number of people who are actively seeking work and the availability of jobs. This is in line with the findings of Coibion et al., (2020) & Feng et al., (2017). Higher labor force participation rates mean that more people are looking for work, as what Gallant et al., (2020) & Yip (2018) found, which may lead to lower unemployment rates if there are enough job opportunities available. Household institutions, such as non-profit organizations, may also play a role in job creation and training programs, which can help reduce unemployment.

On the other hand, the lack of significant impact from school enrollment tertiary and literacy rates may be due to a number of factors. For instance, it is possible that even with high levels of education, job opportunities are limited or not aligned with the skills and knowledge of the workforce. Additionally, in some cases, people may choose to pursue higher education or literacy skills for personal growth rather than for the purpose of finding employment (Karakurum-Ozdemir et al., 2019). Therefore, while education and literacy are important, they may not be the most significant factors in reducing unemployment rates.

Model two puts all predictor variables in use including *INF* and *INT* as the control variables, but not *TRA* and *FDI*. It reveals that *LFP* and *HNC* are the only determinants impacting the unemployment in the long term. This model suggests that household and non-profit institutions serving households have a significant impact on reducing unemployment. This finding could be explained by the fact that such institutions provide services and resources that support households, such as food assistance, childcare, and job training programs. By providing these resources, households may be better equipped to find and maintain employment, ultimately reducing unemployment rates (Martin et al., 2020).

Additionally, the model shows that labor force participation and literacy rate do not have a statistically significant effect on unemployment. However, it is important to note that literacy rates and education, in general, are crucial for a country's long-term economic growth and development. Even if these variables do not have a significant effect on unemployment in the short term, they are still essential for building a skilled workforce and increasing productivity in the long term.

The model also shows that foreign direct investment and interest rates do not have a significant effect on unemployment. However, foreign direct investment can bring new job opportunities and economic growth to a country (Grahovac & Softić, 2017 and Johnny et al., 2018). While interest rates can impact borrowing and spending, both of which can have an effect on employment levels (Feng et al., 2017).

Comparatively in model three, *HNC* persistently has an impact on the response variable, along with *FDI* where *SET*, *TRA* and *INT* are excluded in the model. The variables *LTR*, *LFP*, and *FDI* do not have a significant effect on the unemployment rate (*UEP*). This suggests that changes in labor market policies or foreign investment may not have an immediate impact on reducing unemployment. On the other hand, the variables *HNC* and *INF* are statistically significant predictors of *UEP*. This implies that higher levels of human capital and inflation may have a positive or negative impact on the unemployment rate, respectively. A higher human capital level may lead to better employment opportunities and a lower unemployment rate, while inflation, as elaborated by Singh (2018) may lead to increased unemployment due to its negative effect on the overall economy.

Both variables are also influencing the unemployment level in Indonesia in model four where all variables are estimated at once. The R-squared value of this model is quite high at 0.901592, which indicates that the independent variables included in the model can explain approximately 90% of the variability in the unemployment rate. Looking at the coefficients of the independent variables, we can see that the variables *HNC* (higher education), *INF* (inflation), and *INT* (interest rate) have statistically

significant coefficients at the 5% level. This means that changes in these variables have a significant impact on the unemployment rate. Specifically, the coefficient for *HNC* is positive, indicating that higher levels of education are associated with higher levels of unemployment. This could be because those with higher education may be more selective in their job search, or they may be overqualified for available jobs (Maneejuk & Yamaka, 2021).

The coefficients for *INF* and *INT* are both negative, indicating that increases in inflation and interest rates are associated with decreases in the unemployment rate. This could be because higher inflation and interest rates can result in reduced consumer spending, subsequently decreasing the demand for goods and services, ultimately leading to a decline in labor demand (Ben Romdhane et al., 2023). The coefficients for the other variables, *LTR, LFP, FDI, TRA,* and *SET*, do not appear to be statistically significant at the 5% level. However, it is important to consider societal factors that may impact these variables and, in turn, impact the unemployment rate. For example, the variable *FDI* (foreign direct investment) may be important for job creation in certain industries and regions, while *TRA* (trade) may impact job opportunities in certain sectors (Stepanok, 2023).

Overall, from all models, HNC is the only determinant positively and significantly influence the endogenous variable in model two and three but negatively in model one. While FDI is a positive influencing determinant in model two and three, LFP plays significant role in reducing the unemployment rate in Indonesia based on model one. Based on the findings from the model analysis, a number of policy recommendations can be considered to reduce the unemployment rate in Indonesia. In general, several policy suggestions include (1) policies that support strengthening households and non-profit institutions that serve households can be improved; (2) investments in household training and education, as well as increasing the role of non-profit institutions, can help reduce unemployment rates; (3) encouraging labor force participation through training and skills development programs can be an effective measure to reduce unemployment rates, especially according to the findings in model one; and (4) economic policies that focus on managing economic variables such as inflation, trade, and interest rates can help create a stable economic environment.

Conclusion

This research discusses the interrelationships and explores what determines the unemployment rate in Indonesia from 2000 to 2021 with the inclusion of households and non-profit institutions that serve households as determinants of unemployment. This is a new addition to the literature on unemployment in Indonesia. One of the weaknesses of this research is its exclusive focus

on researching the relationship between selected variables and the unemployment rate in Indonesia, and ignoring other potential factors such as political instability or changes in government policy that could influence unemployment. Future research efforts could refine this analysis by incorporating current data and exploring the impact of other important factors such as technological progress and political instability. A more comprehensive understanding can be obtained by integrating regional or sectoral analysis to reveal the main causes of unemployment in Indonesia. The contribution to policy makers is to provide a strong argument for considering investment in this sector as a way to stimulate economic growth and create jobs. Furthermore, the contribution of this study emphasizes the importance of monitoring economic variables such as inflation rates, trade dynamics, and interest rates, because these factors can indirectly impact unemployment. Policymakers must remain vigilant and implement policies to ensure the long-term sustainability of these variables. The importance of careful monitoring and rapid response from policymakers can help optimize economic stability, reduce unemployment levels, and create conditions that support long-term growth. This research methodology and approach can be a blueprint for future research on unemployment rates in Indonesia and similar developing countries.

References

Alfaro, L., & Chauvin, J. (2020). Foreign direct investment, finance, and economic development. *Encyclopedia of International Economics and Global Trade*, *1*, 231–258. http://dx.doi.org/10.1142/9789811200595_0011

Asrol, A., & Ahmad, H. (2018). Analysis of factors that affect poverty in Indonesia. *Revista Espacios*, *39*(45).

Aykut, D., Sanghi, A., & Kosmidou, G. (2017). What to do when foreign direct investment is not direct or foreign: FDI round tripping. *World Bank Policy Research Working Paper*, *8046*. http://dx.doi.org/10.1596/1813-9450-8046

Az Zakiyyah, N.A. (2023). Infrastructure and Poverty: State Budget Effect Analysis with Panel Model. *Journal of Asset Management and Public Economics 2*(2), 82-94. https://doi.org/10.12928/jampe.v2i2.7943

Bank, W. (2022). *World Development Indicators*. World Development Indicators.

Stepanok, I. (2023). FDI and unemployment, a growth perspective. *Review of International Economics*, *31*(2), 761–783. https://doi.org/10.1111/roie.12643

Blanchard, O. (2019). Public debt and low interest rates. *American Economic Review*, *109*(4), 1197–1229. http://dx.doi.org/10.1257/aer.109.4.1197

Coibion, O., Gorodnichenko, Y., & Weber, M. (2020). *Labor markets during the COVID-19 crisis: A preliminary view*. National Bureau of economic research. http://dx.doi.org/10.3386/w27017

Dauth, W., Findeisen, S., & Suedekum, J. (2017). Trade and manufacturing jobs in Germany. *American Economic Review*, *107*(5), 337–342. http://dx.doi.org/10.1257/aer.p20171025

Dechezleprêtre, A., & Sato, M. (2017). The impacts of environmental regulations on competitiveness. *Review of Environmental Economics and Policy*. http://dx.doi.org/10.1093/reep/rex013

Dencker, J. C., Bacq, S., Gruber, M., & Haas, M. (2021). Reconceptualizing necessity entrepreneurship: A contextualized framework of entrepreneurial processes under the condition of basic needs. *Academy of Management Review*, *46*(1), 60–79. http://dx.doi.org/10.5465/amr.2017.0471

Dwyer, L. (2022). Tourism economics and policy. In *Encyclopedia of Tourism Management and Marketing* (pp. 421–424). Edward Elgar Publishing. http://dx.doi.org/10.4337/9781800377486.tourism.economics

Erlando, A., Riyanto, F. D., & Masakazu, S. (2020). Financial inclusion, economic growth, and poverty alleviation: evidence from eastern Indonesia. *Heliyon*, *6*(10), e05235. http://dx.doi.org/10.1016/j.heliyon.2020.e05235

Feenstra, R. C., Ma, H., & Xu, Y. (2019). US exports and employment. *Journal of International Economics*, *120*, 46–58. http://dx.doi.org/10.1016/j.jinteco.2019.05.002

Feng, S., Hu, Y., & Moffitt, R. (2017). Long run trends in unemployment and labor force participation in urban China. *Journal of Comparative Economics*, *45*(2), 304–324. http://dx.doi.org/10.1016/j.jce.2017.02.004

Furth, S. (2017). Measuring inflation accurately. *Backgrounder*, *3213*.

Gallant, J., Kroft, K., Lange, F., & Notowidigdo, M. J. (2020). *Temporary unemployment and labor market dynamics during the COVID-19 recession*. National Bureau of Economic Research. http://dx.doi.org/10.3386/w27924

Gopinath, G. (2020). The great lockdown: Worst economic downturn since the great depression. *IMF Blog*, *14*, 2020.

Grahovac, D., & Softić, S. (2017). Impact of the FDI on Unemployment rate in countries of West Balkan. *Review of Innovation and Competitiveness: A Journal of Economic and Social Research*, *3*(2), 65–82. http://dx.doi.org/10.32728/ric.2017.32/4

Idrus, S., & Rosida, L. (2020). Poverty In Indonesia: Critical Review. *Archives of Business Review*, *8*(6). http://dx.doi.org/10.14738/abr.86.8326

Johnny, N., Timipere, E. T., Krokeme, O., & Markjackson, D. (2018). Impact of foreign direct investment on unemployment rate in Nigeria (1980-2015). *International Journal of Academic Research in Business and Social Sciences*, *8*(3), 57–69. http://dx.doi.org/10.6007/ijarbss/v8-i3/3905

Karakurum-Ozdemir, K., Kokkizil, M., & Uysal, G. (2019). Financial literacy in developing countries. *Social Indicators Research*, *143*, 325–353. http://dx.doi.org/10.1007/s11205-018-1952-x

Khanh Nguyen, H. T., Nang Thu, T. T., Lebailly, P., & Azadi, H. (2019). Economic challenges of the export-oriented aquaculture sector in Vietnam. *Journal of Applied Aquaculture*, *31*(4), 367–383. http://dx.doi.org/10.1080/10454438.2019.1576568

Kwaku Amoah, S. (2018). The Role of Small and Medium Enterprises (SMEs) to Employment in Ghana. *International Journal of Business and Economics Research*, *7*(5), 151. https://doi.org/10.11648/j.ijber.20180705.14

Ma, J., Hou, Y., Yang, W., & Tian, Y. (2020). A time-based pricing game in a competitive vehicle market regarding the intervention of carbon emission reduction. *Energy Policy*, *142*(September 2019), 111440. https://doi.org/10.1016/j.enpol.2020.111440

Maneejuk, P., & Yamaka, W. (2021). The impact of higher education on economic growth in asean-5 countries. *Sustainability (Switzerland)*, *13*(2), 1–28. https://doi.org/10.3390/su13020520

Martin, A., Markhvida, M., Hallegatte, S., & Walsh, B. (2020). Socio-economic impacts of COVID-19 on household consumption and poverty. *Economics of Disasters and Climate Change*, *4*(3), 453–479. http://dx.doi.org/10.1007/s41885-020-00070-3

Mitch, D. (2018). The role of education and skill in the British industrial revolution. In *The British Industrial Revolution*, 241–279. Routledge. http://dx.doi.org/10.4324/9780429494567-5

Pavcnik, N. (2017). *The impact of trade on inequality in developing countries*. National Bureau of Economic Research.

Saini, N., & Singhania, M. (2018). Determinants of FDI in developed and developing countries: A quantitative analysis using GMM. *Journal of Economic Studies*. http://dx.doi.org/10.1108/jes-07-2016-0138

Salmi, J. (2017). *The tertiary education imperative: Knowledge, skills and values for development.* Springer.

Schinckus, L., Dangoisse, F., Van den Broucke, S., & Mikolajczak, M. (2018). When knowing is not enough: Emotional distress and depression reduce the positive effects of health literacy on diabetes self-management. *Patient Education and Counseling*, *101*(2), 324–330. http://dx.doi.org/10.1016/j.pec.2017.08.006

Selim, M., & Hassan, M. K. (2019). Interest-free monetary policy and its impact on inflation and unemployment rates. *ISRA International Journal of Islamic Finance*, *11*(1), 46–61. http://dx.doi.org/10.1108/ijif-06-2018-0065

Singh, R. (2018). Impact of GDP and inflation on unemployment rate:" A study of Indian Economy in 2011–2018". *International Journal of Management, IT and Engineering*, *8*(3), 329–340.

Stepanok, I. (2023). FDI and unemployment, a growth perspective. *Review of International Economics*, *31*(2), 761–783. https://doi.org/10.1111/roie.12643

Susilawati, S., Falefi, R., & Purwoko, A. (2020). Impact of COVID-19's Pandemic on the Economy of Indonesia. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, *3*(2), 1147–1156. http://dx.doi.org/10.33258/birci.v3i2.954

van Empel, G., Mulyanto, J., & Wiratama, B. S. (2020). Undertesting of COVID-19 in Indonesia: what has gone wrong? *Journal of Global Health*, *10*(2). http://dx.doi.org/10.7189/jogh.10.020306

Vancea, M., & Utzet, M. (2017). How unemployment and precarious employment affect the health of young people: A scoping study on social determinants. *Scandinavian Journal of Public Health*, *45*(1), 73–84. http://dx.doi.org/10.1177/1403494816679555

Yip, C. M. (2018). On the labor market consequences of environmental taxes. *Journal of Environmental Economics and Management*, *89*, 136–152. http://dx.doi.org/10.1016/j.jeem.2018.03.004

Yuniarti, D., & Purwaningsih, Y. (2017). Household Food Security and Vulnerability: the Sustainable Livelihood Framework. *JEJAK: Jurnal Ekonomi dan Kebijakan, 10*(2), 223-241. doi:https://doi.org/10.15294/jejak.v10i2.11290