

Investigating the Role of Foreign Direct Investment on Youth Unemployment Rate in Indonesia

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ABSTRACT

Youth unemployment is a contemporary socioeconomic problem in many countries. Although it is a negative phenomenon, this number can be translated into different perspectives as it offers plenty of available job force not only in terms of age and easily adaptable workers but also opportunities for low-wage workers. Unfortunately, despite having a high Foreign Direct Investment (FDI) and economic growth rate, Indonesia still suffers from the youth unemployment problem. The research observed a relationship between youth unemployment and FDI in the case of Indonesia from 1991 until 2019. Because of a different situation faced by female and male workers, the research also extended the impact of FDI into gender-specific effects. Data were from World Development Indicator (WDI) in 1991-2019. The short- and long-run situations were analyzed using the Auto-Regressive-Distribution-Lag (ARDL) technique. Based on the findings, it is found that in the short run, FDI can increase youth unemployment in Indonesia. This situation can be due to the reallocation industry, which requires workers' adjustment. However, in the long run, FDI significantly reduces youth unemployment. Therefore, it concludes that FDI in Indonesia can provide employment opportunities for young people. Next, FDI is found to have a negative and significant effect on female youth unemployment. Meanwhile, there is no significant effect found in male youth unemployment.

Keywords: Foreign Direct Investment (FDI), youth unemployment, Indonesia

INTRODUCTION

Youth unemployment is a significant issue in developing countries. Many young people struggle to find a job. In the past two years, there has been a decline in labor market engagement among young people. This condition is partly due to young people's concern about pursuing higher education. From the global youth trend data in 2019, 429 million youth were employed. However, 509 million were not employed, but in education, and 267 million were not in Employment, Education, or Training (NEET) (International Labour Organization, 2020). The significant numbers of young people in NEET reflect a relatively high portion of young people around the world who are currently not contributing to either national development or self-development. Young people are more vulnerable than adults (Michael & Geetha, 2020). Globally, the ratio of young-to-adults to

be unemployed is 3:1. Meanwhile, in the Asia Pacific, the ratio is higher, reaching 6,2:1 (International Labour Organization, 2020).

As a part of Asia Pacific, Indonesia has a full two-thirds of the population of 15-64-year-old people (productive age). This number shows demographic dividends that can be invested in the country's future. On the other hand, it is a challenge to make this investment successful. Currently, it shows that Indonesia has the second-highest rank in the youth unemployment rate in the region (UNICEF, 2020). Moreover, although the current generation of young people in Indonesia has a better education than before, they still face numerous constraints in obtaining decent work (OECD, 2019).

Moreover, the condition is getting worse because, in a few years, the employee's skills will be obsolete, and new graduates will fill the market. Hence, this unemployment problem has become a big

issue. In the spirit of finding solutions for this issue, the International Labour Organization (ILO) has organized some global and regional forums to discuss the youth unemployment crisis, and governments from many countries have participated in providing some policy recommendations for reducing youth unemployment.

One distinctive way for governments to deal with the youth unemployment issue is by stimulating effective demand from young people. In addition, stimulating aggregate demand through promoting private sector growth and increasing investment and further infrastructure development will energize the economic growth of the country, which in turn will provide a good environment for new job creation (Sitompul & Simangunsong, 2019; Yeboah et al., 2022).

One of the significant factors in energizing economic growth is through promoting Foreign Direct Investment (FDI). This investment is vital as it can be used to supplement domestic savings, be a source to enhance the production capacity, and increase employment (Alkofahi, 2020; Khan et al., 2022). The attractiveness of FDI inflows is supported by crucial reasons, such as up-to-date information, skills and training, and technological development (Saleem et al., 2020). The effect of FDI is huge as it can be obtained through direct channels, such as the availability of jobs, tax income, and capital accumulation, and indirect channels through the endogenous growth model. The direct and indirect channels of FDI can lead to different arguments on the effect of employment. FDI directly creates jobs from the direct channels when the investments are channeled into labor-intensive industries. Furthermore, new technology transfer from FDI may create new demand in the domestic market. It has been identified that the technology spillover effect from FDI is an essential channel through which domestic firms benefit from FDI inflows (Ahmed & Kialashaki, 2021).

FDI may also generate job creation through cooperation and collaboration with local firms, such as creating product input. As time goes by, the knowledge from foreign firms spreads into the domestic market and promotes the entry of domestic firms (Kim, 2019). Based on the research by Mazhar and Wei (2020), international competition from FDI can facilitate the formation of an entrepreneurial class and domestic entry in the country. Entrepreneurial knowledge through education can also increase the intentions of young people to become entrepreneurs (Buana et al., 2017). Finally, new knowledge and technology may provide additional opportunities for youth as they are more adaptable to digital skills. Openness to the global market may bring the biggest advantage to young people. As the younger generation is more adaptive, they may particularly be more attractive in the new and growing sectors (Awad, 2019). In short, FDI can generate employment opportunities for young people. Hence, an increase in FDI will reduce the youth unemployment rate (Hasan & Sasana, 2020; Imtiaz et al., 2020).

In contrast, FDI can have a reverse effect on employment when high-productivity foreign firms with advanced technologies require fewer unskilled workers (Mkombe et al., 2020). Using advanced technology, foreign firms focus on hiring skilled laborers, which may trigger a decrease in demand for unskilled labor. Younger people are generally more familiar with technology than older people. Even so, at the same time, technological anxieties are more pronounced among them. These anxieties result from the fact that the entry-level of the occupation offered to youth tend to have a greater proportion of automatable tasks (International Labour Organization, 2020). This effect becomes severe when domestic firms that gain advanced knowledge imitate foreign firms' behavior and focus more on recruiting experienced ones. Countries with abundant unskilled labor will have a more severe impact. In addition, knowledge and technology from foreign firms can raise the competitive tension in the domestic market. As consumers have more options to buy the product, it requires firms to be more efficient and innovative. Less efficient domestic firms may have difficulty competing in this tough competition (Kim, 2019; Nxazonke & Van Wyk, 2020). Hence, unemployment may increase due to market stealing and a higher barrier of entry from foreign firms. Increased youth unemployment due to FDI conquers with the findings of Monari et al. (2020). The sector of countries majorly exported can influence the condition of the labor market.

Another issue related to FDI is inequality in unemployment. Female workers with the same experience and education as male workers earn about 81% of the wage received by male workers. However, either working in the formal or informal sector, female workers are treated differently. They receive poorer work conditions in formal sectors and get lower wages in informal sectors (Siregar, 2020). In addition, young female workers also have constraints due to their dual roles as workers and homemakers at the same time. Considering those ages, they generally come to marriage age. Hence, the time for taking care of the household will lower the time they can spend working outside (Arfah & Putra, 2019).

FDI is associated with higher productivity and wages due to their advanced technology. They pay more than domestic firms to prevent the leakage of their knowledge and technology acquired during the working process. Hence, this incentive can reduce worker turnover (Peluffo, 2015). This condition offers opportunities for young people, especially women. On one side, foreign firms that come into a country seeking efficiency can increase the demand for female workers. The higher quantity demand is motivated by the lower wages of female workers that they receive on average. They enable firms to compete in international markets (Siegmann, 2006). Conversely, foreign firms require skilled laborers to operate their technology. This acquisition skill may discourage female workers due to their stereotype as low-skilled laborers (Jamielaa & Kawabata, 2018; Pham et al., 2021).

Drawing from Indonesia's experience in attracting FDI, the efforts of the Indonesian government in the last two decades have gained a surge of FDI inflow, putting Indonesia at the rank of 18th of the highest FDI inflow country in the world (UNCTAD, 2019). The high inflow of FDI walked hand in hand with economic growth, as pictured in a consistently stable economic growth of Indonesia at around 5 to 5,5% and 5,2% in 2019. It was significantly higher than the average world growth of 3,2% (The World Bank, 2019). Despite the positive effect of FDI on economic growth, the FDI effect on the unemployment rate in Indonesia is still questioned. The theoretical study highlights the possibility of FDI to reduce unemployment through increased economic growth (Hisarciklilar et al., 2014). However, the data show that the huge inflow of FDI in Indonesia intuitively does not directly affect unemployment reduction as the unemployment rate, especially the youth unemployment rate, gets higher and reaches 41,76% of the total unemployment (Statistics Indonesia, 2019). The gap between the theoretical relationship and the fact from the published data needs to be assessed further using a comprehensive statistical analysis to find the relationship between FDI and youth unemployment rate.

The research contributes to the literature in several ways. Firstly, it provides a thorough analysis of the impact of FDI on youth unemployment, which is still debatable, as mentioned previously. Secondly, unlike the previous results that mainly focus on total unemployment, the research focuses specifically on youth unemployment because this age group of unemployment is the biggest part of the total

unemployment in Indonesia. Third, the research also complements previous research by providing analysis related to the specific gender of FDI.

METHODS

The previous section has established the predicted relationship between dependent, independent, and control variables. The research uses World Development Indicator (WDI) data from 1991 to 2019 to prove the relationship. It is selected based on the availability of data. The description of variables is given in Table 1.

When modeling time series data, a unit root test should be performed to test the stationarity of each variable. After that, Auto-Regressive-Distribution-Lag (ARDL) is employed to check the cointegration or long-run relationship between variables. If cointegration is found, an Error Correction Model (ECM) needs to be established to examine short-run conditions. If there is no cointegration between variables, the first-order ARDL will be used to analyze the condition in the short run. Last, several diagnostic tests are conducted for robustness checks.

The research also uses Augmented Dickey-Fuller (ADF) to test for the stationarity of the data. There are three models of the ADF test: (1) no constant and no trend; (2) constant with no trend; (3) constant and trend. The data pattern needs to be observed to use a particular model. Figure 1 shows the plots of the main variables. Based on Figure 1, it shows that FDI and youth unemployment fluctuate around a constant without showing any trend. Hence, it can be concluded

Table 1 Descriptive Statistic of Variables

Variable	Definition	Mean	Std. Dev
FDI	It is net inflows of investment (% of GDP). The data are transformed into a natural logarithm.	0,3279	0,7206
Youth Unemployment	The share of the labor force ages 15–25 without working but is available and seeks a job (modeled ILO estimate).	16,7396	4,3290
Female Youth Unemployment	The share of the female labor force ages 15–25 without working but is available and seeks a job (modeled ILO estimate).	18,1776	5,3390
Male Youth Unemployment	The share of the male labor force ages 15–25 without working but is available and seeks a job (modeled ILO estimate).	15,9669	4,0528
Population Growth	It is the population growth of the total residents of a country (annual %).	1,3792	0,1502
Gross Domestic Product (GDP) Growth	It is the growth rate of GDP (annual %).	4,8643	3,7268
Inflation	It is the consumer price (annual %).	9,2997	10,1571
Domestic Investment	It is the gross capital formation (% of GDP).	29,3509	4,4154

(Source: Authors' Calculation)

that the appropriate model for both variables is model 2. The results for the unit root test are displayed in Table 2. ADF test shows that FDI, GDP growth, and inflation are stationary at a level that is I(0). However, youth unemployment, female youth unemployment, male youth unemployment, population growth, and domestic investment are stationary at the first difference, I(1). Since the unit root test results indicate that all variables are I(0) or I(1), the ARDL technique can be employed. ARDL is a method developed by Pesaran et al. (2001), which requires variables to be either I(0) or I(1) or a mix of both.

The ARDL bounds testing is employed to check the cointegration or long-run relationship in the model. For testing the cointegration, the research uses Equation (1). The β_1 until β_6 represents a short-run dynamic relationship, and γ_1 until γ_6 represents a long-run dynamic relationship. Then, p and q_i ($i = 1, 2, 3, 4, 5$) are the lag period of each explanatory and explained variable. It also shows YU as youth unemployment, FDI as Foreign Direct Investment, Pop_Growth as

population growth, GDP_Growth as GDP growth, $INFL$ as inflation, DI as domestic investment, and ε_t as white noise error term. The appropriate value for the lag period is determined using one or more of the “information criteria” – Schwarz Criterion (SC), Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), Hannan Quinn (HQ), and others.

$$\begin{aligned} \Delta YU_t = & \alpha_1 + \sum_{i=1}^p \beta_1 \Delta YU_{t-i} \\ & + \sum_{i=0}^{q_1} \beta_2 \Delta FDI_{t-i} + \sum_{i=0}^{q_2} \beta_3 \Delta Pop_Growth_{t-i} \\ & + \sum_{i=0}^{q_3} \beta_4 \Delta GDP_Growth_{t-i} + \sum_{i=0}^{q_4} \beta_5 \Delta INFL_{t-i} \\ & + \sum_{i=0}^{q_5} \beta_6 \Delta DI_{t-i} + \gamma_1 YU_{t-1} + \gamma_2 FDI_{t-1} \\ & + \gamma_3 Pop_Growth_{t-1} + \gamma_4 GDP_Growth_{t-1} \\ & + \gamma_5 INFL_{t-1} + \gamma_6 DI_{t-1} + \varepsilon_t \end{aligned} \quad (1)$$

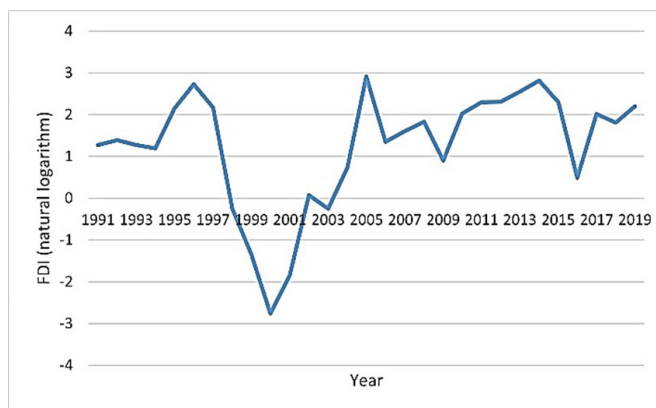
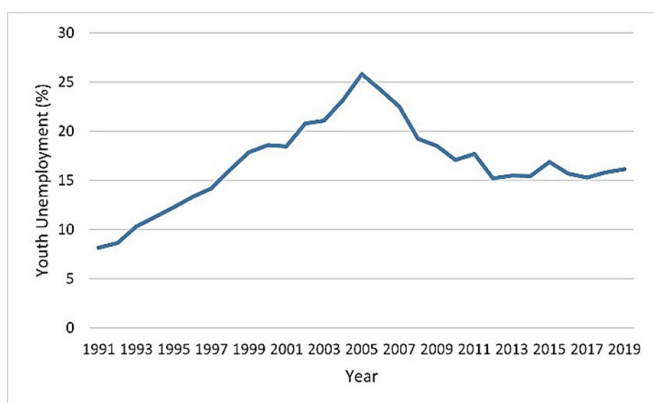


Figure 1 Youth Unemployment and FDI in Indonesia from 1991-2019 (The Data for Youth Unemployment are in Percentage, While FDI is in Natural Logarithm) (Source: The World Bank, 2020a, 2020b)

Table 2 Unit Root Test Results

Variables	Level	First Difference	Result
FDI	-4,1014***	-8,7091***	I(0)
YU	-2,1294	-3,5539**	I(1)
Female YU	-0,0822	-4,2658***	I(1)
Male YU	0,2201	-4,3967***	I(1)
Pop_Growth	-1,3996	-1,8844*	I(1)
GDP_Growth	-3,8115***	-3,0000**	I(0)
INFL	-4,2018***	-11,7814***	I(0)
DI	0,0385	-4,3752***	I(1)

Note: *, **, and *** indicate significant level 10%, 5%, and 1%, respectively. It shows YU as youth unemployment, Pop_Growth as population growth, GDP_Growth as GDP growth, INFL as inflation, and DI as domestic investment.

The null hypothesis is no existing cointegration, which indicates no long-run relationship. This hypothesis is checked using the value of the F-test for the joint significance of the coefficients. In each case, the lower bound of value is based on the assumption that all series are stationary at level, and the upper bound of value is based on the assumption that all series are stationary at first difference. If the value of the F-test statistic is smaller than the lower bound, the null hypothesis cannot be rejected. It implies that no long-run relationship exists. On the other hand, if the value of the F-test statistic is greater than the upper bound, the null hypothesis can be rejected. It implies that a long-run relationship exists among the variables. Finally, if the value of the F-test statistic is between the lower bound and upper bound, it can be concluded that the result is inconclusive.

Short-run parameters are estimated using the regular Error Correction Model (ECM), as written in Equation (2). The θ_1 until θ_6 represent short-run dynamics. Error Correction Term (ECT) indicates the speed of adjustment back to the long-run equilibrium after a short-run shock. The expected value of the coefficient of ECT (φ) is negative and significant. It implies that the disequilibrium due to shocks in the previous period is adjusted in the long-run equilibrium.

$$\begin{aligned} \Delta YU = & \alpha_2 + \sum_i^p \theta_1 \Delta YU_{t-i} \\ & + \sum_i^{q_1} \theta_2 \Delta FDI_{t-i} + \sum_i^{q_2} \theta_3 \Delta Pop_Growth_{t-i} \\ & + \sum_i^{q_3} \theta_4 \Delta GDP_Growth_{t-i} + \sum_i^{q_4} \theta_5 \Delta INFL_{t-i} \\ & + \sum_i^{q_5} \theta_6 \Delta DI_{t-i} + \varphi ECT_{t-i} + \mu_t \end{aligned} \quad (2)$$

Several diagnostic tests are also applied to check the validity of the results. First, the Breush-Godfrey Lagrange Multiplier (LM) test is conducted to check for serial correlation. Second, the Breush-Pagan Godfrey test is applied to check residual heteroskedasticity. Third, the normality of the error of the models is checked using the Jarque-Bera test. A normal distribution has a coefficient of kurtosis of less than three and is not skewed.

Ramsey Regression Equation Specification Error Test (RESET) test is also performed to check a model specification test. This method combines the original explanatory variables and higher-order terms of fitted value into auxiliary regression. Furthermore, the Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Recursive Residuals of Squares (CUSUMSQ) are employed to ensure the stability of the model. If the plots of CUSUM and CUSUMSQ curves are between 5% of critical bounds, it can be concluded that the stability of the model is proven.

RESULTS AND DISCUSSIONS

The cointegration relationship between the variables is tested using the ARDL test based on Equation (01). The research uses Akaike Information Criterion (AIC) to select the optimum lag length for the equation. Based on the lag selection criteria results, the maximum lag is two. The result of long-run ARDL is displayed in Table 3 (see Appendices). FDI has a significant impact on youth unemployment. The negative and significant value of FDI implies that FDI can be used to reduce youth unemployment in Indonesia. In terms of economic significance, a percentage increase in FDI is associated with a reduction of youth unemployment by 0,6677%. One thing that needs to be mentioned is that the effect of FDI is significant in FDI (-2), indicating that the impact of FDI on youth unemployment requires time. The result from the lag of FDI supports the argument from the previous research that FDI can provide employment opportunities for young people (Hasan & Sasana, 2020; Khan et al., 2022).

Furthermore, youth unemployment is classified into two categories: female and male. The impact of FDI on female youth unemployment is negative and significant. There is evidence that lower wages received by female workers attract foreign firms to hire them. Recruiting female workers enables firms to compete more successfully in the world market. It confirms the results of Siegmann (2006) that foreign firms hire female workers to compete in the world market. The lower wages received by female workers enable firms to be more cost-efficient. The negative impact supports the argument that FDI in developing countries seeks low-cost, unskilled labor (Sharma, 2021).

On the other hand, FDI does not significantly impact male youth unemployment. This finding indicates that the criterion for FDI to hire young people focuses more on the cost consideration. Similar to FDI, domestic investment has a negative and significant effect on youth unemployment. This finding supports the argument of Onifade et al. (2020) that the effect of domestic investment is crucial as it will not just create a multiplier effect alone but also the aggregate employment level.

Table 4 (see Appendices) presents the ARDL bounds test, both statistical and critical values. The critical value is based on CII(iii): unrestricted and no trend. Due to a small sample size, the research adds additional critical value from Narayan (2005). The F-statistic for model 1 is 6,8125. This value is greater than the critical values from Pesaran et al. (2001) and Narayan (2005). Hence, it can be concluded that there is cointegration between the variables in this model. On the other hand, for model 2, the value of the F-statistic is 4,6302. As this value is between the lower and upper bound, it can be concluded that the result is inconclusive. Last, the value of the F-statistic in model 3 is 3,7286. This value is less than the lower

bound from Pesaran et al. (2001) and Narayan (2005). Therefore, it implies that a long-run relationship does not exist among the variables.

Short-run dynamics can be analyzed using an error correction model (ECM) and first-difference ARDL. The method is selected based on the results in cointegration between the observed variables. When a cointegration does exist between variables, the ECM is the correct method to perform. However, if a cointegration does not exist between the observed variables, the first difference is that the ARDL method is the suitable one. Therefore, for model 1 and model 2, the ECM is applied. Meanwhile, for model 3, since there is no cointegration, the first difference ARDL is employed.

The results of ECM are presented in Table 5 (see Appendices), reflecting the short-run dynamics. The coefficients of ECT in both model 1 and model 2 are negative and significant at a 5% level. It indicates the convergence of the short-run relationship to the long-run equilibrium. Unlike long-run relationships, FDI is found to have a positive and significant impact on youth unemployment. This finding implies that unemployment reduction due to FDI is not applicable in the short run. One possible explanation of the result can be because of trade liberalization. Workers are reallocated from shrinking to expanding sectors, requiring an adjustment period. Further, they need time to improve their skills to satisfy the requirements of those expanding sectors (Awad & Youssof, 2016). Domestic investment is found to have a consistent effect in the short and long run with a negative and significant impact on youth unemployment. It shows the importance of domestic investment in tackling this issue. FDI can help to reduce unemployment, but domestic investment needs to be maintained to ensure the youth unemployment issue is not exacerbated. Domestic investment is important in creating decent jobs for young people (Thioune & Kane, 2018).

Two important assumptions in relation to the implementation of the ARDL bound test are that the residuals are homoscedastic and are not serially correlated. The research employs the Breusch-Godfrey LM test to check the serial correlation and the Breusch-Pagan Godfrey test to check for heteroscedasticity. The results in Table 6 (see Appendices) show no heteroskedastic and sequence correlation in both model 1 and model 2. Furthermore, the results for the Jarque-Bera test imply that the residuals from model 1 are not normally distributed. Meanwhile, model 2 and model 3 are normally distributed. Next, the Ramsey RESET test is conducted to check that the functional model is well specified. The probability values of the Ramsey test in model 1 until model 3 are 0,8165, 0,8935, and 0,7535, respectively. as displayed in Table 6 (see Appendices). Both models are well-specified since the results show that the probability values are greater than 10%.

After confirming that the models are well specified, the research precedes to stability test in checking the existence of a structural break in the

series. The stability of the model is tested by using CUSUM and CUSUMSQ. As shown in Figure 2 (see Appendices), the lines of CUSUM and CUSUMSQ remain within the 5% critical value (red lines), suggesting that the stability of the models is proven.

CONCLUSIONS

The research examines the relationship between youth unemployment and FDI in the case of Indonesia from 1991 until 2019. The research shows that new technology transfer from FDI can create new demand in the domestic market. Based on the result, FDI can reduce youth unemployment in Indonesia. Hence, it means that new demand from FDI effectively provides employment opportunities for youth. Finally, it indicates that the criteria for FDI to recruit young people are based on cost considerations.

Moreover, using the ARDL technique helps to capture the different situations in the short and long runs. In the short run, there is evidence that FDI can increase youth unemployment in Indonesia. It may be explained due to the reallocation industry that requires adjustment from workers. However, in the long run, it is found that FDI can reduce the youth unemployment rate.

Furthermore, due to the different situations faced by female and male workers, the research also extends the impact of FDI into gender-specific effects. As a result, FDI has a negative and significant effect on female youth unemployment. Meanwhile, there is no significant effect found in male youth unemployment.

The policy implications of these findings are as follows. Firstly, policies in favor of FDI in Indonesia have been on the right track. Although the number of youth unemployment is still relatively high in Indonesia, the current FDI is proven to solve the youth unemployment issue. However, it means that the current situation still has some room for improvement. For example, the incoming FDI can be selected based on the sectors that can highly absorb youth unemployment and expand other sectors with low youth employment. Secondly, not only attracting foreign investment but also domestic investment needs to be maintained to ensure that the youth unemployment issue is not exacerbated.

The research contributes to the available literature related to international business by answering the debatable questions about the relationship between FDI and youth unemployment, as discussed previously. It also provides additional analysis related to gender-specific FDI that is rarely discussed in terms of foreign recruitment. However, then, like other studies, the research also has limitations. Due to current data limitations, analysis regarding the condition of FDI and youth unemployment in specific areas cannot be conducted. Meanwhile, the condition of the regional area can influence the level of FDI absorption. For example, the labor conditions in Jawa and Kalimantan may be different. Hence, this condition can be an opportunity for future research.

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APPENDICES

Table 3 Estimation of Long-Run ARDL Models

	YU (1)	Female_YU (2)	Male_YU (3)
YU (-1)	0,6908*** (7,5347)		
Female_YU (-1)		0,7681*** (6,5723)	
Male_YU (-1)			0,7599*** (6,3586)
FDI	0,1732 (0,4365)	-0,1533 (-0,2357)	-0,1761 (-0,3832)
FDI (-1)	-0,1037 (-0,2915)	-0,3413 (-0,5958)	-0,1052 (-0,2579)
FDI (-2)	-0,6677* (-1,8873)	-1,3233** (-2,3309)	-0,6984 (-1,7238)
Pop_Growth	-4,0572 (-1,0716)	1,0923 (0,1902)	-1,6101 (-0,3605)
GDP_Growth	0,0061 (0,0272)	0,0698 (0,1926)	0,1043 (0,4126)
INFL	0,0293 (0,3507)	0,1088 (0,8058)	0,0939 (1,0002)
DI	-0,1959* (-1,9766)	-0,0532 (-0,3222)	-0,0652 (-0,5653)
C	16,6524** (2,2143)	3,8028 (0,3330)	7,1682 (0,7806)
R-squared	0,9327	0,8893	0,8910
Adjusted R-squared	0,9028	0,8401	0,8425
F-statistic	31,1995	18,0796	18,3860

Note: *, **, and *** indicate significant level 10%, 5%, and 1%, respectively. It shows C as constant, YU as youth unemployment, Pop_Growth as population growth, GDP_Growth as GDP growth, INFL as inflation, and DI as domestic investment.

Table 4 The Results of the ARDL Bounds Test

Dependent variable: YU (1)	F-statistic		6,8125	
Dependent variable: Female_YU (2)	F-statistic		4,6302	
Dependent variable: Male_YU (3)	F-statistic		3,7286	
	Pesaran et al. (2001)		Narayan (2005)	
	F-test			
	I(0)	I(1)	I(0)	I(1)
1%	6,84	7,84	8,170	9,285
5%	4,94	5,73	5,395	6,350
10%	4,04	4,78	4,290	5,080

Table 5 Short-Run Dynamics Results

	YU (1)	Female_YU (2)	Male_YU (3)
C	16,6524** (2,7442)	3,8028 (0,5568)	-5,0480 (-1,0866)
FDI	0,1732 (0,5871)	-0,1533 (-0,3082)	0,0646 (0,1651)
FDI (-1)	0,6677** (2,2113)	1,3233** (2,5797)	0,3382 (0,8779)
Pop_Growth	-4,0572 (-1,1517)	1,0923 (0,2255)	4,6819 (1,3268)
GDP_Growth	0,0061 (0,0279)	0,0698 (0,1999)	-0,0893 (-0,3264)
INFL	0,0293 (0,3622)	0,1088 (0,8293)	0,0255 (0,2500)
DI	-0,1959** (-3,0703)	-0,0532 (-0,6116)	-0,0306 (-0,4269)
ECT	-0,3092** (-3,7924)	-0,2319** (-3,1265)	
R-squared	0,5654	0,5353	0,3316
Adjusted R-squared	0,4053	0,3641	0,1311
F-statistic	3,5310	3,1264	1,6537

Note: *, **, and *** indicate significant level 10%, 5%, and 1%, respectively. It shows C as constant, Δ as a first difference operator, YU as youth unemployment, Pop_Growth as population growth, GDP_Growth as GDP growth, INFL as inflation, and DI as domestic investment.

Table 6 Diagnostic Test Results

Dependent variable	Breusch-Godfrey LM test		Breusch-Pagan-Godfrey		Ramsey		Jarque-Bera	
	F-stat.	Prob.	F-stat.	Prob.	F-stat.	Prob.	Stat.	Prob.
YU	0,1039	0,9019	0,9161	0,5256	0,0556	0,8165	7,4927	0,0236
Female_YU	2,0642	0,1594	0,7922	0,6164	0,0185	0,8935	1,2549	0,5339
Male_YU	1,2328	0,3177	0,6297	0,7428	0,1019	0,7535	0,0756	0,9629

Note: It shows YU as youth unemployment.

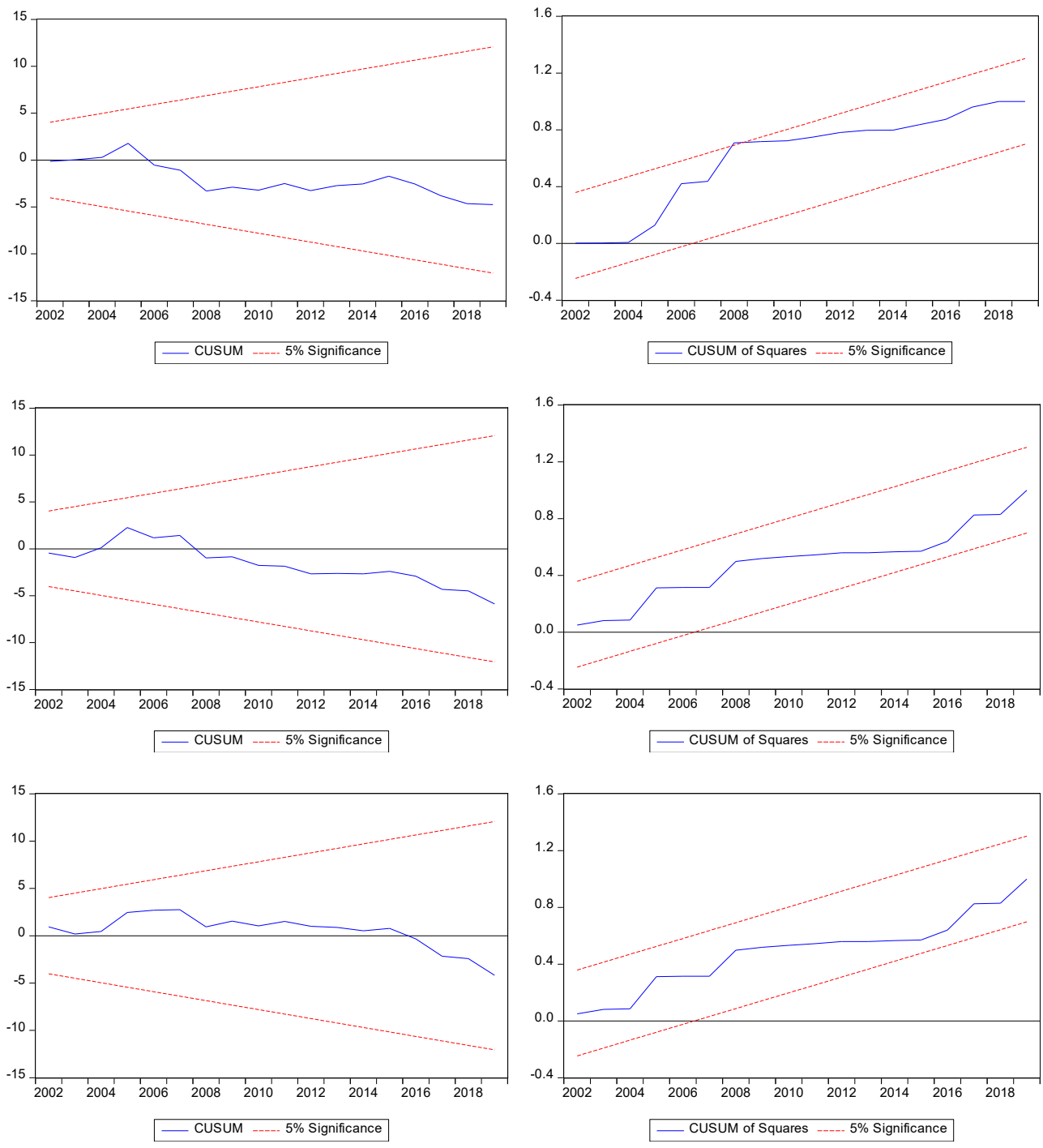


Figure 2 Plot of CUSUM and CUSUM of Squares for Model 1 (Above), Model 2 (Middle), and Model 3 (Below)