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Assessing the Nexus between Female Labor Force Participation and Economic Development in Sri Lanka

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Abstract

The labor force's active participation is vital for boosting economic growth of a country in the precise direction. The participation of women in the labor force leads to higher living standards and increased aggregate output. Thus, the present study investigates the relationship between economic growth and female labor force participation, by considering economic growth as dependent variable and female labor force, fertility rate, population growth, and gross capital formation as independent variables, with a focus on Sri Lanka by using time series data from 1990-2020 and evaluating the long-term and short-term relationship between the variables through the Autoregressive distributed lag approach. The findings of the study confirm that women's labor force participation have a significant negative impact on Sri Lanka's economic growth in the long run at the 10% significant level but no relationship between in the short run. Further the Error Correction Term (ECT (-1)) value of 95.56 indicates that the short-term imbalance in economic growth due to external shocks will be corrected every year at a rate of 95.56 and move towards long-term equilibrium. Higher education and potential skills and availability of suitable jobs creating avenues to females increase their participation in the labour market. Hence, policymakers must create strategies to harness the economic potential of women in the workforce.

Keywords: *Autoregressive distributed lag approach, economic development, Labor force participation, women*

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Introduction

Developing nations benefit from women's labour force participation since it empowers them economically and increases the availability of the workforce (Rahman and Islam 2013; Verick 2018). Women in underdeveloped nations are less likely to participate in the work market due to poor employment conditions. There is a 25% gender imbalance in the labour force participation rate, with just 47% of women actively participating (ILO, 2022). Additionally, in comparison to males, women are more likely to work in unofficial, low-paying, exposed, or devalued jobs. Over ninety-five percent of South Asian women who work outside of agriculture do so in the informal economy. According to UN Women (2022), the equivalent figures for sub-Saharan Africa and Latin America and the Caribbean are 89% and 59%, respectively. Tsani et al., (2013) argues that a nation's overall growth depends on women's participation in the labour force. Additional research from Pakistan (Khaliq et al., 2017), Thailand (Deuntemduang, 2018), and Malaysia (Noorasiah et al., 2023) has corroborated these findings. Increased salaries are a direct result of more job options created by a thriving labour market, which in turn encourages more women to join the workforce. This adds to a country's positive economic growth further. Even though women make up over 50% of Sri Lanka's population, they aren't making nearly as much of an impact on the country's growth as they could be (Central Bank Annual Report, 2022). According to the same source, the female labour force participation rate in 2022 was a meagre 33.09 percent. The result is a massive gender pay gap in Sri Lanka (World Bank, 2022). Consequently, the government must pay notice and intervene if the female labour force participation rate is to be increased so that the nation can reap the benefits of this potential resource. If women are given equal chances in the labour market, it would encourage more of them to join the workforce, which will boost the country's economy. Also, women have it tough when it comes to managing their finances, what with the rising cost of goods and services, inflation, and the depreciation of the rupee.

Research problem

Encouragement of women's participation in the employment market and their initiative to acquire new skills is, hence, crucial. According to the hypothesis, women's labour market involvement increases when there is a structural shift, fertility rates decline, and female education levels rise. Nevertheless, according to the World Bank (2022), the most important factor decreasing labour market participation is the presence of rigid historical, economic, and social norms and structures. Labour force participation in day-to-day economic activity by the country's residents is vital to the country's economic growth. The contribution of women to the workforce is especially important. Encouraging women’s participation in formal and high-productivity sectors is crucial for ensuring that the benefits of economic growth benefit to society. Despite achievements in education and health, Sri Lanka's FLFP rate, at approximately 36%, is below the South Asian average of 44% World Bank (2022).

Low female labor force participation (FLFP) in Sri Lanka represents a significant economic opportunity cost. Studies indicate that closing gender gaps in employment could result in substantial economic gains. Further, achieving gender parity in the labor force by 2025 could

increase annual GDP growth in South Asia by over one percentage point, suggesting comparable benefits for Sri Lanka. To bridge this gap this study try to examine how women's labour force participation affected Sri Lanka's GDP development from 1990 to 2020.

Theoretical and Empirical Review of Literature

Goldin, (1994) explains that female labor force participation initially declines during the early stages of economic growth as household incomes rise, reducing the necessity for women to work. Over time, as economies developed and opportunities in education and formal employment expand, female labour force participation increases.

Sri Lanka may currently be in the downward phase of this U-shaped curve, where economic growth has not yet translated into sufficient formal, accessible, and attractive job opportunities for women.

With economic growth as the dependent variable and labour force participation rate and gross capital creation as the independent variables, Shahid (2014) set out to determine the effect of labour force participation on Pakistan's economic development. The results of the Johnson co-integration test proved that the variables have been related for some time. In Malaysia, Qinfen (2017) demonstrated a long-term positive correlation between economic growth and female labour force participation. Kesuh et al. (2022) used 42 sub-Saharan African nations' development indicators data from 1991 to 2019 to look at how female labour force participation correlated with economic growth. Researchers looked at how the female labour force affected GDP growth using the Autoregressive Distributed Lag model. According to the findings, female labour force participation in sub-Saharan Africa has a negative influence on GDP development in the long run, but no such effect in the short term. By analysing yearly time series data from 1990 to 2016, Gunarathne and Perera (2018) looked at how female labour force participation affected economic growth in Sri Lanka. They found that female labour force participation contributed significantly to economic growth during that time. The impact of women's labour force participation on Nigeria's economic growth was studied by Anyanwu et al. (2021) using time series data spanning 1981–2015. Based on their research, it appears that the two elements are inversely related. By analysing yearly time series data from 1990 to 2016, Gunarathne and Perera (2018) looked at how female labour force participation affected economic growth in Sri Lanka. They found that female labour force participation contributed significantly to economic growth during that time. When women in Sri Lanka participate in the labour force, it has a favourable effect on the GDP, as Semasinghe demonstrated.

The economic growth and labour force participation rates of men and women in Bangladesh from 1991 to 2017 were examined by Ryangarana Na Yada, 2019. While the study did find a favourable correlation between labour participation and economic development, it also revealed a detrimental correlation in the long term. According to Lahoti (2013), women's labour force participation in India does not correlate with the country's economic development level. Ahasan et al. (2019) looked at data from 1991–2017 to determine how gender in the labour force affected GDP growth in Bangladesh. One of the two directional relationships found in the study ties economic growth to overall labour

force participation. They also found that while female labour force involvement and overall labour force participation both have beneficial short-term benefits on Bangladesh's economic development, the long-term implications are negative.

Using a GMM technique using worldwide panel data, Diogo et al. (2021) discovered that an increase in FLFP had a positive and statistically significant impact on GDP growth. But research by Swayam Prava Mishra (2018) showed that between 2001 and 2011, the female labour force participation rate was significantly lower than the per capita GDP in several Indian states. Stella (2013) used general equilibrium modelling to examine the relationship between female labour force involvement and economic growth in the South Mediterranean. The results showed that greater rates of female labour force participation positively affected GDP, as predicted by the U-shaped female labour force function. Adnan et al. (2017) used the error correction model (ECM) and Johansen co-integration tests to examine the correlation between economic development and the female labour force participation rate in Pakistan. Over the long term, from 1990 to 2014, they verified a U-shaped relationship. In addition, they found that Pakistan's economic growth is positively correlated with the labour force participation rate of women. Due to the failure of the labor-intensive agricultural and industrial sectors to contribute to economic growth, Rahul (2016) found that GDP does not significantly affect the female labour force participation rate in India. A high degree of expertise is required by the service industry, which is vital to economic development but is underrepresented among women. Using the vector error correction model, Muhammad (2014) verified that, in the short run, there is a negative and statistically significant relationship between labour force participation and economic growth. The idea that involvement in the labour force significantly reduces economic development in Nigeria is backed by Muhammad et al. (2020). In addition, the VECM model verified that there is a long-term causal link between Nigeria's economic development and the labour force participation rate. Using quarterly data from 2000 to 2013, with a focus on the Kuznets (1955) curve, Buhari and Mürsel (2017) examined the effect of economic growth on the labour force participation rate of women in Turkey. The ARDL method shown that, although women's labour force participation increases at the outset of an economic expansion, it falls in the long run. In emerging nations of Sub-Saharan Africa (SSA) between 1975 and 2015, Elizabeth (2018) discovered that female labour participation positively affects economic growth.

Methods

This study takes gross fixed capital formation, population growth, female labour force participation rate, fertility rate, and economic growth rate as independent variables, and uses them to find the contribution of the female labour force to the economic development of Sri Lanka. In addition, the study included yearly time series data from 1990 to 2020. A literature research served as the basis for the selection of the variables included in this analysis, with data for the variables under consideration also coming from sources such as the World Bank and Central Bank Annual Reports and Statistics. You can see a breakdown of the data sources and variables in Table 1.

Econometric Model

Econometric techniques have been used in order to achieve the objective of this study as well as investigate the long-term and short-term relationship between the variables. Further, to analyze the impact of women's labor force participation on economic growth the following econometrics model is applied.

$$GDP_t = \delta_0 + \beta_1 FLF_t + \beta_2 FR_t + \beta_3 LNGFCF_t + \beta_4 POG_t + u_t$$

Where, $\beta_1, \beta_2, \beta_3, \beta_4$ are estimators, δ_0 = Intercept> GDP_t = GDP Growth Rate, FLF_t= female Labor force participation rate, FR_t= Fertility Rate, $LNGFCF_t$ = Gross Fixed Capital Formation, POGt = Population growth and is u_t= Error Term

Unit Root Test

The unit root test, introduced by Dickey and Fuller in 1979, is used to determine whether the variables are stationary or non-stationary. This is explained by the following equation.

$Y_t = \beta_0 + \beta Y_t - 1 + e_t$

$\varepsilon t \sim (0, \sigma^2)$

H_0: $\beta = 1$ (Variable Y_t has stationary)

H_1: $\beta < 1$ (Variable Y_t has not stationary)

If TS < CV or P - value < α, H_0 will rejected which means Y_t has not stationary.

ARDL Approach

The following ARDL model was established to investigate the long-run correlation between the variables when the variables found in I(0) and I(1), Pesaran et al. (2001).

$$\Delta GDP_t = \beta_0 + \beta_1 FLF_{t-1} + \beta_2 FR_{t-1} + \beta_3 LNGFCF_{t-1} + \beta_4 POG_{t-1} + \sum_{t=1}^{q1} \beta_1 \Delta GDP_{t-1} + \sum_{t=1}^{q2} \beta_2 \Delta FLF_{t-1} + \sum_{t=1}^{q3} \beta_3 \Delta FR_{t-1} + \sum_{t=1}^{q4} \beta_4 \Delta LNGFCF_{t-1} + \sum_{t=1}^{q5} \beta_5 \Delta POG_{t-1} + u_t$$

GDP_t = GDP Growth Rate

FLF_t= female Labor force participation rate

FR_t= Fertility Rate

$LNGFCF_t$ = Gross Fixed Capital Formation

POG_t= Population growth

Δ = 1st difference

δ_0 = Intercept

ε_t = Error term

$\delta_1 \rightarrow \delta_3$ = Long term coefficients

$\beta_1 \rightarrow \beta_3$ = short term coefficients

ARDL Bounds Test

ARDL Bound Test approach is used to estimate the long-run relationship between variables. If the calculated F-statistic is greater than the upper bound I(1) value, then the null hypothesis is rejected and it is concluded that the variables have a cointegration relationship. Conversely, if the calculated F-statistic is less than the lower bound I(0) value then the null hypothesis is accepted and it is concluded that there is no cointegration relationship between the variables. Also, if the calculated F-statistic is between the upper bound I(1) value and the lower bound I(0) value then the result cannot be conclusive.

Error Correction Model

The Error Correction term has been used to identify short-term dynamic relationships and long-term adjustments. Accordingly, the Error Correction model equation for the study is as follows.

$$\Delta \mathbf{GDPG_t} = \beta_0 + \sum_{t=1}^{q1} \beta_{1t}\ \Delta \mathbf{GDPG_{t-1}} + \sum_{t=0}^{q2} \beta_{2t}\ \Delta \mathbf{FLF_{t-1}} + \sum_{t=0}^{q3} \beta_{3t}\ \Delta \mathbf{FR_{t-1}} + \sum_{t=0}^{q4} \beta_{4t}\ \Delta \mathbf{LNGFCFC_{t-1}} + \sum_{t=0}^{q5} \beta_{5t}\ \Delta \mathbf{POG_{t-1}} + \lambda \mathbf{ECT_{t-1}} + \mathbf{u_t}$$

GDP = GDP Growth Rate
FLF = female Labor force participation rate
FR = Fertility Rate
LNGFCF = Gross Fixed Capital Formation
POG = Population growth
λ= Error Correction Term
λECT_{t-1} = lag value of residuals derived from joint cointegration

Diagnostic Test

Diagnostic test for confirm the better model selection include Breusch-Godfrey Serial Correlation LM Test
Based on the results of the unit root test, except the female labor force participation rate (FLFP) all other the variables such as GDP Growth Rate (GDP), Gross fixed capital formation, fertility rate (FR) and Population Growth Rate (POG) are stationary in the first difference I(1). Further the findings suggest the ARDL approach since the dependent variable is stationary at first difference and other variables are fixed in level I(0) and first difference I(I).

Table 3 illustrated the optimal lag length selection criteria for model of the present study. According to the above Table LR, SIC and HQ criteria suggest the one lag and FPE and AIC criteria suggest the two lags. Since most of the literature has considered the Schwarz information criterion (SIC), this study also considered the SIC to select the appropriate lag length and lag one is chosen to achieve the objectives of the study.

The above Figure 1 suggests the ARDL (1, 0, 0, 1, 0) model as the best model among the top 20 models of AIC based on the assumption. Therefore, to investigate the relationship between economic growth and female labour force participation rate in Sri Lanka the study applies the ARDL (1,0,0,1,0) model with optimum lag length value.

Table 2 shows the results of the Bounds test performed to evaluate the cointegration and long-term relationship between the variables based on the ARDL (1,0,0,1,0,) model chosen based on the above data.

Table 4 Findings of the ARDL bound Test

The results of the Bounds test to find out the co-integration relationship between the variables are explained by Table 4. The calculated F - statistic of 8.361305 is greater than the upper bound I(1) value of 3.49 at 5% significance level which based on the null hypothesis of no relationship between variables is rejected. And confirmed that there is long run co-integration relationship between the economic growth and female labour force participation in Sri Lanka during the study period.

Long Run Relationship between the variables

With that said the ARDL (1,0,0,1,0) model's long-run variable coefficients, together with their statistical and probability values, are shown in Table 5. If all other variables stay the same, the probability value of women's labour force participation rate (0.0897) is statistically significant at the 10% level of significance, suggesting that this variable has a negative impact on economic growth over the long term. The long-term economic development is prevented by 0.549 percent by a one percent rise in the female labour force participation rate (FRP), according to the calculated coefficient value of 0.549727. The findings are consistent with those of other studies conducted in Turkey, including those of Mishra (2018), Altarawneh (2020), Thaddeus et al. (2022), Porter and King (2009), Akyeampong and Fofack (2013), Forgha and Mbella (2016), and Ustabas (2017). In Bangladesh (Haque et al., 2019), Egypt (Omar and Bilan, 2022), Nigeria (Thaddeus et al., 2022), India (Mishra, 2018), and Turkey (Forgha and Mbella, 2016). Additionally, there was no statistically significant influence of fertility rate on economic growth of the country throughout the research period, as the probability value of 0.1029 of fertility rate (FR) explains, even if there is a positive association between fertility rate and economic growth. The study conducted in medium income nations by Durmus and Hilal (2021) corroborated these findings. Equally unfavorable to economic growth are the coefficients of gross fixed capital creation and population increase, but these two variables do not affect economic growth statistically significantly.

Short run Relationship between the variables and Error Correction Model

Table 6 provides an explanation of the variables' short-term relationships with the Error Correction Model. The error correction term ECT-(1) has a negative coefficient value (-0.955694) and a probability value of 0.0135, both of which are statistically significant at the 5% level of significance. When the response variable for economic growth has a negative sign, it means it follows the long-run equilibrium trajectory. A yearly adjustment for mistakes of 95.5% is shown by the predicted coefficient of the error correction term, which is (-0.955694). Additionally, during the research period, no variable had a substantial effect on economic development, with the exception of gross fixed capital creation, in the short term. Furthermore, the dependent variable accounts for 76.1% of the variance, whereas the independent variable accounts for 23.9% (the error term), according to the R2 value of 0.761324. Since the second half of this model is more thorough, it is superior.

Diagnostic Test of the Model

In order to achieve the objectives of the study, a diagnostic test was performed to find out that the estimated ARDL (1,0,0,1,0) model is the best. According to this, Breusch-Godfrey Serial Correlation LM Test, Heteroskedasticity Test: ARCH, normality test and stability test were performed. The finding of the diagnostic test is shown by Table 5.

The outcomes of the Breusch-Godfrey Serial Correlation LM Test, the Heteroskedasticity Test (ARCH), and the normalcy test are displayed in Table 7. In this case, at the 5-level significance level, the probability values of the Breusch-Godfrey Serial

Correlation LM Test for autocorrelation issue, the heteroskedasticity test (ARCH), and the normality test are different from 0.05: 0.4455, 0.7139, and 0.1654, respectively. The estimated ARDL (1,0,0,1,0) model's homoscedasticity and regularly distributed residuals provide strong evidence that autocorrelation is not an issue.

Below, you can see Figure 2 which displays the experimental outcomes for the CUSUM of the estimated ARDL (1,0,0,1,0) model. Here, we can see the trend line (blue line) and the 95% confidence interval (red lines) on the graph. The regression line needs to be inside the 95% confidence interval's top and lower bounds for the model to be considered robust. This indicates that the crucial boundaries, based on the CUSUM plot's results, fall somewhere between the 5% significance level. The predicted model remains stable, then.

Conclusion

Using an ARDL bound test technique and an error correction term, this study analyses the impact of Sri Lanka's female labour force on the country's economic development from 1990 to 2020. This research established a negative but statistically significant association between the labour force participation rate of women and economic growth over the long run, but no such relationship found over the short run. On top of that, at the 5% level of significance, the error correction term Error Correction Term (ECT (-1)) is negative (-0.955694). Thus, from the first year onward, the short-run imbalance in economic growth caused by external shocks is rectified by 95.5% annually, and the economy approaches the long-run equilibrium. Nevertheless, in order to foster economic growth and development as a whole, this study argues that measures should be taken to encourage women to participate in the labour market particularly considering policies promoting flexible work arrangements, childcare support, and skills development programs for women.

Author Contributions

Both Authors equally contributed to develop the conceptualization, the methodology, the analysis and the writing and editing.

Competing Interests (If any)

The authors declare that they have no competing interests.

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Figures and Tables

Table 1 Explanations of Variables

Variables	Explanations	Source
GDP	Gross domestic product growth (annual %)	World bank
FLFP	female Labor force participation rate	World bank
FR	Fertility Rate	World bank
GFCF	Gross Fixed Capital Formation	World bank
POG	Population growth	World Bank

(Source: Developed by researcher)

Table 2. Results of ADF Unit root test

Source: Researcher prepared using by research data, 2023

Variables	Augmented Dickey – Fuller (Intercept only)		
	Level	1st Difference	Conclusion
GDP	0.2626	0.0000***	I(1)
FLF	0.0010***	0.0000***	I(0)
FR	0.2718	0.0439***	I(1)
LNGFCF	0.6095	0.0012***	I(1)
POG	0.4491	0.0025***	I(1)

*Note: *, **, *** indicate significant at 10%, 5%, 1% level respectively.*

Table 3 Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-82.40607	NA	0.000286	6.028004	6.263745	6.101836
1	27.94335	175.0370*	8.17e-07	0.141838	1.556282*	0.584824*
2	58.01979	37.33628	6.82e-07*	-0.208262*	2.384886	0.603880

Source: Researcher prepared using by research data, 2023

*Note: Here * represents the number of optimal lags selected by each optimal lag selection criteria.*

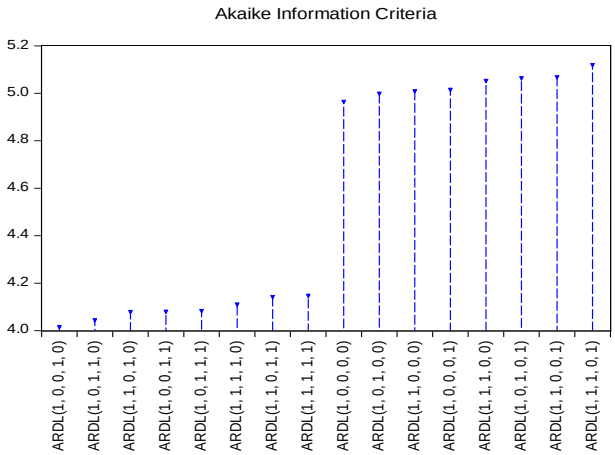

Figure 1. Graph of AIC model selection criterion

Source: E-views software

Table 4 Findings of the ARDL bound Test

ARDL Bounds Testing Approach, ARDL (1, 0, 0, 1, 0)				
Test statistic	Value	Significance	Lower Bound I (0)	Upper Bound I (0)
F- statistic	8.361305	10%	2.2	3.09
		5%	2.56	3.49

Source: Researcher prepared using by research data, 2023

Table 5 Findings of the Long Run Relationship

ARDL Bounds Test Long Run Coefficients ARDL (1, 0, 0, 1, 0) Dependent Variable: GDP, Time Period: 1990-2020			
Variable	Coefficient	t-Statistic	Prob
FLF	-0.549727	-1.771932	0.0897*
FR	12.71679	1.698459	0.1029
LNGFCF	-0.431728	-0.318691	0.7528
POG	-4.477433	-1.323732	0.1986
C	7.993613	0.170172	0.8664

Source: Researcher prepared using by research data, 2023
*Note: *, **, *** indicate significant at 10%, 5%, 1% level respectively.*

Table 6 short run relationship between the variables

Error Correction Model (ECM), Time Period: 1990 – 2020			
Variable	**Coefficient**	**t-Statistic**	**Prob**
C	-0.494597	-0.863393	0.3977
D(GDP(-1))	-0.061871	-0.300470	0.7668
D(FLF)	-0.313562	-1.591976	0.1263
D(FR)	1.743804	0.194560	0.8476
D(LNGFCF)	27.38837	6.806315	0.0000***
D(LNGFCF (-1))	-21.26557	-3.350744	0.0030***
D(POG)	-0.818337	-0.274161	0.7866
ECT(-1)	**-0.955694**	**-2.696505**	**0.0135****
R-squared	**0.761324**	**Adjusted R-squared**	**0.681765**

Source: Researcher prepared using by research data, 2023
*Note: *, **, *** indicate significant at 10%, 5%, 1% level respectively*

Table 7 Diagnostic Test

Type of Test	**F-statistic**	**Prob.**
Breusch-Godfrey Serial Correlation LM Test	0.598167	0.4455
Heteroskedasticity Test: ARCH Test	0.137318	0.7139
Normality Test	3.601781	0.1651

Source: Prepared by researcher from survey data (2023)

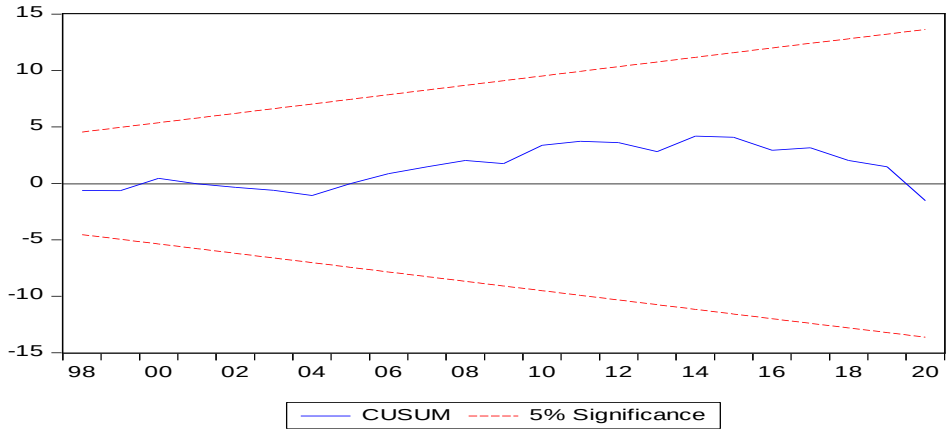

Figure 2: CUSUM Test

Source: Derive from research data

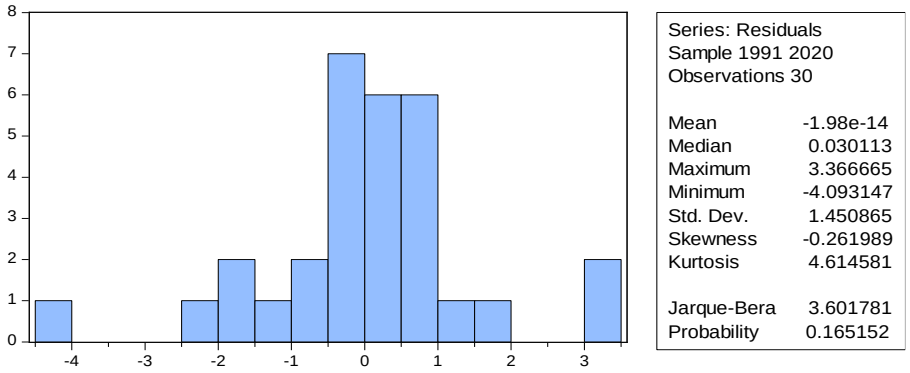

Figure 3: Normality Test

Source: Researcher prepared using by research data, 2023

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