FEMALE LABOUR FORCE PARTICIPATION AND ECONOMIC GROWTH IN SRI LANKA

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Introduction

Labour Force Participation (LFP) plays a vital role in the economic growth of a country. LFP is composed of a currently economically active population of 15 years of age and over (Sri Lanka Labour Force Survey, 2021). The Sri Lankan economy was impeded and impotent to achieve the expected outcome due to the rapid changes in the Sri Lankan economy. Sri Lankan economy was impacted due to civil war, introduction of open economy, which converted the agriculture-based economy into an industry-based economy, and the COVID-19 pandemic in 2019 (Shiyalini and Bhavan, 2021). This inability to maintain the main goal of the economy of focusing sustained economic growth over a long period of time, reducing the unemployment rate, and maintaining price stability of the country appeared as an economic crisis in 2022, reporting the highest inflation rate as 49.72% and the lowest gross domestic production (GDP growth rate) as -7.22% in Sri Lankan history with the poor assistance of the economic process in Sri Lanka (Central Bank of Sri Lanka, 2022). On the other hand, population growth rate is increasing over a decade. To fill this economic gap, it is important to increase the LFP in the Sri Lankan context to maintain a stable economic process, reducing the dependency ratio of the country. Population gender structure and labour force participation rate (LFPR) make strong evidence that the maximum use of labour force has not been utilized in Sri Lankan context even though the country was not financially stable (International Monetary Fund, 2020). Majority among the economically inactive population: all persons who neither worked nor were available or looking for work during the reference period are females (73.3%). That is about 6.3 million (Department of Census and Statistics, 2021). Only a lesser percentage of females are engaging in LFP in the country. Female labour force participation rate (FLFP) is 31.8% in Sri Lanka in 2021 (Department of Census and Statistics, 2021). The significant gender gap persists in terms of the labour force, which has remained low for decades. Even though FLFP is 48.97% from total in 1990, it has been decreased to 32.1% in 2022. Hence, it is important to identify the impact of FLFP on the real economic growth in Sri Lanka within the crucial situation of the country. However, the results of the study can be utilized to implement the existing policies with special reference to enhancing FLFP in the future in order to obtain an expected economic growth of the country.

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This may support preplanning designed programs and projects that are compatible with the existing trend of FLFP and avoiding the mismatch between the provided male contribution to LF and the female contribution to LF in Sri Lanka.

Research problem

Economic growth of a country confirms the stability of the economic process, assuming the country is financially strong enough to achieve the ultimate goal of the economy. In the Sri Lankan context, it is an essential requirement to utilize a female labour force whose representative is approximately half of the Sri Lankan population for the economy to maintain a stable economic process. The female population in Sri Lanka was 53.8% of the total population, even though the FLFPR is only 31.8% compared to the male population (Department of Census and Statistics, 2021). Therefore, it should be initially examined the impact of FLFP on the real economic growth of the country as the initial stage to enhance the future implications to enhance the female contribution in LF in the country to be utilized as the strategy for an expected economic growth of the country.

Objectives

The main objective of the study was to identify the impact of FLFP on GDP. As the specific objectives to achieve the main objective were set as forecasting GDP with the use of FLFP, inflation rate, The exchange rate (US$), public Investment and Population growth rate.

Literature review

Seneviratne (2017) carried out a study on FLFP and economic development in labour-abundant countries with special reference to Sri Lanka, investigating the determinants and trends of married women's labour force participation. The study was based on a cross-sectional survey in the period of 1992 to 2014 utilizing regression analysis technique and detected FLFP decision was influenced by fertility, household income, and education level. Educational attainment and falling fertility had a significant effect on drawing more women into the labour force. Limited opportunities in high-skill jobs could further discourage educated women from market activity and reduce private incentives for investing in higher education. Optimism Participation levels remain low relative to GDP, and many women cannot access stable jobs in the formal sector commensurate with individual skills. Even where economic growth has been robust and women have made substantial gains in education and family planning, aging populations bring economic slowdowns and rising fiscal burdens in the next 20–30 years. The researcher had shown an urgent need to absorb more women into productive market work.

The impact of female labour force participation in African countries was studied by Obodoechine (2019), considering the period of 1991 to 2017, based on secondary data in World Bank indicators. The study depicted that a 10 percent increase in female labour participation increases on average gross domestic product by 2.7 percent, and female labour participation in the service sector had the largest impact on economic growth. These programs had conferences and sponsored events to bring education to women, helping them to be better equipped for the workforce. The study suggested that policies should be directed toward female training, especially in the service sector, which should have the potential to significantly improve economic growth in African countries.

Shiyalini and Bhavan (2021) studied the economic growth of Sri Lanka from another perspective, considering not the FLFP but the unemployment rate and inflation rate of the country, setting the core objective to investigate the effects of unemployment and inflation on economic growth in Sri Lanka. Annual time series data had been extracted from the World Bank Development Indicators for the period of 1990–2016. This study used the augmented Dickey-Fuller test to test the stationary properties of the time series variables, while the long-run and short-run elasticities of the variables were examined using the autoregressive distributed lag (ARDL) bounds test co-integration method. The ARDL bounds test results confirmed that a long-run co-integrating relationship exists among inflation, unemployment, and GDP growth rate. The estimated empirical results made statistical evidences that unemployment and GDP growth rate have a strong negative significant relationship, whereas inflation and GDP growth rate have a positive significant relationship in the long run.

Tsani et al. (2013b) carried out a study on the relationship between female labour force participation and economic growth using the South Mediterranean countries, utilizing a two-step methodology of econometric exercise and general equilibrium modeling. The analysis of econometric estimations on female labour participation confirmed the U-shaped function and detected region-specific barriers. Results suggested that while the first may lead to marginally lower economic growth, the second may have a considerable positive impact on growth (Tsani et al., 2013b).

Choudhry and Elhorst (2018) studied female labour force participation and economic development from a different perspective, establishing the core objective as presenting a theoretical model aggregated across individuals to analyze the labour force participation rate. The U-shaped relationship between two variables was investigated utilizing a panel data approach of 40 countries around the world over the period 1960–2005. It made statistical evidence in a U-shaped relationship. According to the results, a particular point was found where the regime of falling participation rates of females made changes into a regime of rising participation rates in each considered age group and explanatory variable in the model, Choudhry and Elhorst (2018).

A research gap persisted due to relevance and the period considered. Seneviratne (2017) carried out a study on FLFP and economic development in Sri Lanka, limiting the study only to the married women's labour force participation and period concluded from 1992 to 2014. On the other hand, Shiyalini and Bhavan (2021) studied the economic growth of Sri Lanka considering the unemployment rate and inflation rate without focusing on FLFP. In addition to that, Choudhry and Elhorst (2018) and Tsani et al. (2013b) conducted studies based on world and South Mediterranean countries, respectively, before the economic crisis and COVID-19 pandemic. Hence, there is a noticeable gap for research on FLFP and economic growth in Sri Lanka.

Limitation of the study

As Sri Lanka is a multi-cultural country, FLFP might be impacted by the sociocultural diversities. The study carried out without considering those factors, such as different regions, ethnic groups, and other important demographic variables, and considered the whole country as one unit. In addition to that, only the population of age between 15 and 64 was utilized in the study, ignoring the slight economic contribution of the female population below 15 years or above 64 ages. Further, impact of government policy decisions, human resource, natural resources, capital formation development of science and technology and all other social and political factors which are beyond control of the country has not been considered for the analysis.

Materials and methods

Annual GDP growth rate, The annual FLFPR between ages 15 and 64, inflation rate (Inflation, consumer prices (annual%), the annual exchange rate (US$), annual public Investment (% to GDP) and annual population growth rate related to Sri Lanka from 1990 to 2022 were extracted from the World Bank Development Indicator and Central Bank of Sri Lanka as the secondary data source. Data from 1990 to 2022 were selected as it was recorded the largest FLFP in 1990 and the lowest FLFP in 2022. As the analyzing technique, multivariate time series analysis was employed under the quantitative aspect using R statistical software. Under statistical analysis, the stationary test was utilized in order to use the probabilistic approach in multivariate time series analysis, as the stationary test Zivot & Andew unit root test was utilized to determine whether the time series is stationary or not. Optimum lag selection was done based on criteria named AIC, HQ, SC, and FPE. Cointegration was tested using the *Phillips-Ouliaris Cointegration Test*.

The specified time series model used in the analysis was the *Vector Autoregressive model (VAR):* VAR models is used for multivariate time series, where each variable can be influenced by its own past values and the past values of other variables in the system.

VAR model for the differenced series can be used when the all the original variables are non-stationary and when there is no *cointegration* association. The VAR model related to differenced series is given by:

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta y_{t-1}^{(1)} + \alpha_2 \Delta y_{t-1}^{(2)} + \alpha_3 \Delta y_{t-1}^{(3)} + \alpha_4 \Delta y_{t-1}^{(4)} + \alpha_5 \Delta y_{t-1}^{(5)} + \alpha_6 \Delta y_{t-1}^{(6)} + z_{yt} \quad (1)$$

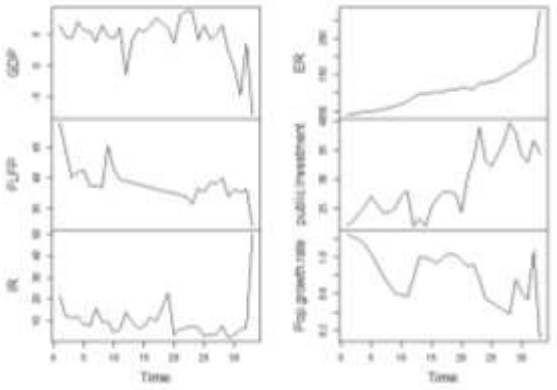
$\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ are coefficients.

Results and discussion

Preliminary Analysis

GDP shows slight variations from 3.7 to 6.00 in the period of 1990 to 2000. After having an irregular shock in 2001, the time series shows an increasing trend from 2002 to 2012. After 2012, it shows a decreasing trend up to 2022 when considering GDP time series. FLFPR shows a decreasing trend from 1990 to 2012 with slight variations, while the time series shows an increasing trend from 2012 to 2017. After 2017, FLPFR converted the behavior with a downward trend. Further, inflation rate shows slightly decreasing trend and recorded irregular fluctuation in 2022. Exchange rate illustrates a clear increasing trend over the period and reached the peak in 2022. Public investment rate is also illustrate an increasing trend fluctuation while population growth rate shows a decreasing trend over the considered period and it recorded its' peak in 1990. The preliminary analysis results are shown in Figure 1.

Figure 1: Preliminary Analysis from 1990 to 2022



Source: Compiled by the researchers using secondary data, 2024

Stationary test

Optimum lag selection was done based on the lowest lag value given in different criteria named AIC, HQ, SC, and FPE. According to Table 1, series integrated at the 1st difference I (1); selected based on the given lowest value by the criteria.

Table 1: Optimum lag selection

Criteria	Selected Lag value
AIC	3
HQ	1
SC	1
FPE	3

Source: Compiled by the researchers using secondary data, 2024

Zivot & Andew unit root test revealed the original series of all the considered time series were not stationary. The series were converted into stationary series by taking the first differencing. According to Table 2, the test statistics of intercept and trend and both intercept and trend were greater than the critical value; the null hypothesis was rejected (H_0 : Series is not stationary).

Table 2: Results of Zivot & Andew unit root test for 1st differenced time series

Category	Test Statistics	Critical value $\alpha = 0.05$	Critical value $\alpha = 0.10$
GDP growth rate			
Intercept	-9.91	-4.80	-4.58
Trend	-9.27	-4.42	-4.11
Intercept and trend	-9.69	-5.08	-4.82
FLFPR			
Intercept	-7.12	-4.8	-4.58
Trend	-7.12	-4.42	-4.11
Intercept and trend	-7.57	-5.08	-4.82
Inflation rate			
Intercept	-7.34	-4.80	-4.58
Trend	-7.34	-4.42	-4.11
Intercept and trend	-7.34	-5.08	-4.82
Exchange rate			
Intercept	-5.33	-4.80	-4.58
Trend	-5.33	-4.42	-4.11
Intercept and trend	-5.33	-5.08	-4.82
Public Investment			
Intercept	-5.94	-4.80	-4.58
Trend	-5.65	-4.42	-4.11
Intercept and trend	-6.01	-5.08	-4.80

Table 2 continued from the previous table

Category	Test statistics	Critical value $\alpha = 0.05$	Critical value $\alpha = 0.10$
Population growth rate			
Intercept	-7.05	-4.80	-4.58
Trend	-6.75	-4.42	-4.11
Intercept and trend	-6.92	-5.08	-4.82

Source: Compiled by the researchers using secondary data, 2024

Cointegration Test

According to Table 3, the *Phillips-Ouliaris Cointegration Test* indicated that there was no cointegration relationship among the time series. Hence the P value was greater than the significant level $\alpha = 0.05, H_0$ was not rejected. (H_0: There is no cointegration relationship).

Table 3: Results of Phillips-Ouliaris Cointegration Test

Test	Value	P value
Phillips-Ouliaris Cointegration Test	-21.559	0.15

Source: Compiled by the researchers using secondary data, 2024

Parameters Estimation and model identification

The VAR model was utilized to identify impact of considered variables on GDP.

The fitted VAR models were as follows;

$$\Delta y_t^{(1)} = 0.8571 - 0.53148 y_{t-1}^{(1)} + 0.07432 y_{t-1}^{(2)} - 0.11427 y_{t-1}^{(3)} - 0.13219 y_{t-1}^{(4)} - 0.05014 y_{t-1}^{(5)} + 10.966 y_{t-1}^{(6)} \quad (2)$$

$$\Delta y_t^{(2)} = -1.2685 + 0.6583 y_{t-1}^{(1)} - 0.2350 y_{t-1}^{(2)} + 0.0875 y_{t-1}^{(3)} + 0.2370 y_{t-1}^{(4)} - 0.43686 y_{t-1}^{(5)} - 9.192 y_{t-1}^{(6)} \quad (3)$$

$$\Delta y_t^{(3)} = -1.9868 + 0.469 y_{t-1}^{(1)} - 0.5869 y_{t-1}^{(2)} - 0.2115 y_{t-1}^{(3)} + 0.279 y_{t-1}^{(4)} + 0.008 y_{t-1}^{(5)} - 4.887 y_{t-1}^{(6)} \quad (4)$$

$$\Delta y_t^{(4)} = 5.020 - 0.1731 y_{t-1}^{(1)} - 0.0941 y_{t-1}^{(2)} - 0.1277 y_{t-1}^{(3)} - 0.2358 y_{t-1}^{(4)} + 0.040 y_{t-1}^{(5)} + 7.489 y_{t-1}^{(6)} \quad (5)$$

$$\Delta y_t^{(5)} = 1.843 - 0.4919 y_{t-1}^{(1)} + 0.345 y_{t-1}^{(2)} - 0.244 y_{t-1}^{(3)} - 0.328 y_{t-1}^{(4)} + 0.2719 y_{t-1}^{(5)} + 11.030 y_{t-1}^{(6)} \quad (6)$$

$$\Delta y_t^{(6)} = -0.0126 - 0.005 y_{t-1}^{(1)} + 0.0005 y_{t-1}^{(2)} + 0.0032 y_{t-1}^{(3)} + 0.0009 y_{t-1}^{(4)} - 0.0098 y_{t-1}^{(5)} + 0.5031 y_{t-1}^{(6)} \quad (7)$$

The model made statistical evidences to depict that 1st lag of FLFPR, exchange rate (LCU per US$), public Investment (% to GDP) and population growth rate made significant impact on GDP growth rate at 5% of significant level (P value > 0.05).

Model diagnostics

Under model diagnostics, it was diagnosed three main requirements for the confirmation the fitted model as the most fitted model to forecast the future GDP growth rate in Sri Lanka. The first requirement was the residuals of the series should be independently distributed. The second requirement was the variance of the residuals should be constant around the mean value, which is zero. The third requirement was the residuals should be normally distributed.

Randomness of the residuals: It was used a Portmanteau asymptotic test to check whether the residuals were independently and identically distributed or having serial correlation. The test made statistical evidence for satisfying the requirement. Hence, the P value was greater than significant level 0.05 and H_0 was not rejected (H_0 : residuals are independently distributed or white noise). That indicates the residuals were random. The following Table 4 shows the results. The first requirement was satisfied.

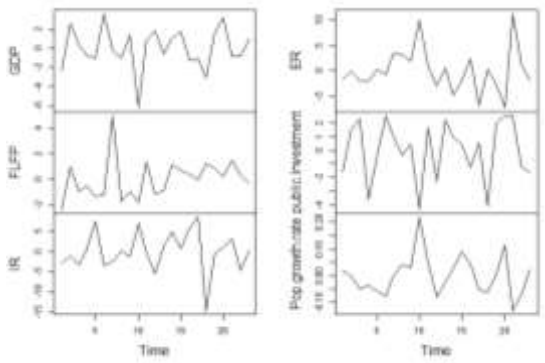
Table 4: Portmanteau asymptotic Test

Test	Chi- Squared value	P value
Portmanteau asymptotic Test	117.7	0.2462

Source: Compiled by the researchers using secondary data, 2024

Variance of residuals and mean of residuals: The residuals plot of the time series varied within a constant band, which indicated that the variance of the residuals was constant at a mean value of zero. Therefore, the second requirement of constant variance of residuals around the mean value zero was also satisfied based on Figure 2.

Figure 2: Residuals plot of the time series



Source: Compiled by researchers using secondary data, 2024

Normality of residuals: Table 5 indicated that J B Multivariate Test was utilized to determine whether the residuals were normally distributed or not. The residuals followed a normal distribution marginally hence P value (P value =0.0049) was less than significant level 0.05 (H_0 : Residuals are normally distributed).

Table 5: JB Multivariate Test

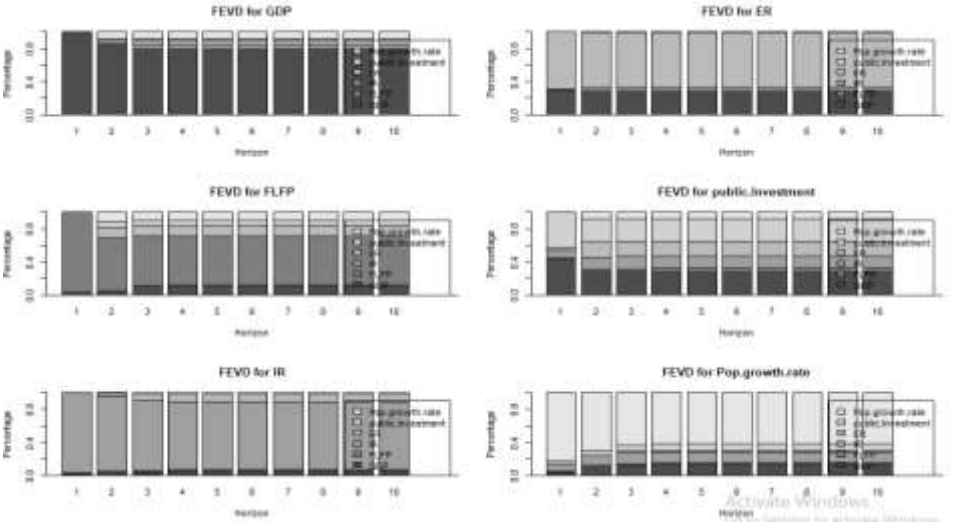
Test	Chi- Squared value	P value
J B Multivariate Test	27.926	0.0049

Source: Compiled by researchers using secondary data, 2024

Forecast Error Variance Decomposition (FEVD)

Forecast Error Variance Decomposition (FEVD) allows to detect the proportion of the forecast error variance of a variables that is attributed to shocks in each of the other considered variables. According to Figure 3, FLFP is contributed somewhat proportion of the forecast error variance of GDP.

Figure 3: Forecast Error Variance Decomposition (FEVD)

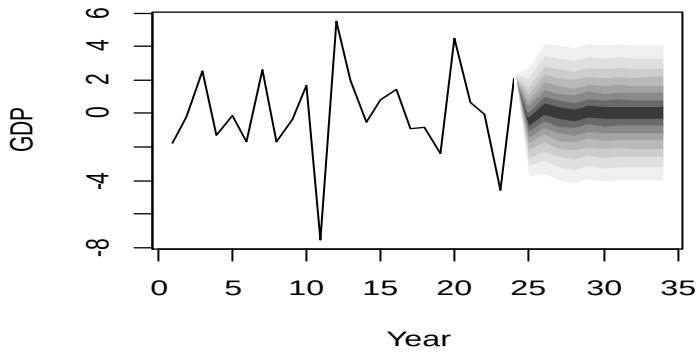


Source: Compiled by researchers using secondary data, 2024

Forecasting GDP using VAR model

The series of GDP of Sri Lanka from 1990 to 2014 was used as the training set to fit the model. And series of GDP of Sri Lanka from 2015 to 2022 were used to test the accuracy of the estimated GDP values corresponding to the real GDP values in Sri Lankan context. Further, Figure 4 shows that it was used 2023 to 2026 as the forecasting period.

Figure 4: Forecast of GDP for 2023-2026 using VAR



Source: Compiled by researchers using secondary data, 2024

Conclusion

Preliminary analysis detected that GDP shows slight variations from 3.7 to 6.00 in the period of 1990 to 2000. After having an irregular shock in 2001, the time series shows an increasing trend from 2002 to 2012. After 2012, it shows a decreasing trend up to 2022 when considering GDP time series. FLFPR shows a decreasing trend from 1990 to 2012 with slight variations, while the time series shows an increasing trend from 2012 to 2017. After 2017, FLPFR converted the behavior with a downward trend. Further, inflation rate shows slightly decreasing trend and recorded irregular fluctuation in 2022. Exchange rate illustrates a clear increasing trend over the period and reached the peak in 2022. Public investment rate is also illustrate an increasing trend fluctuation while population growth rate shows a decreasing trend over the considered period and it recorded its' peak in 1990. All-time series were stationary tests at I (1) according to Zivot & Andew unit root. Optimum lag selection was done based on two criteria named SC and HQ. *Phillips-Ouliaris Cointegration Test* indicated that there was no cointegration relationship among the time series. The specified time series model used in the analysis was the VAR model. The analysis confirmed that there was 1st lag of FLFPR, exchange rate (LCU per US$), public Investment (% to GDP) and population growth rate made significant impact on GDP growth rate at 5% of significant level (P value > 0.05).

Hence, it could be identified FLFP has significant impact at individual level. It is recommended that implementing existing policies with special reference to enhancing FLFP in the future in order to obtain an expected economic growth of the country to settle the gender inequality in LFP in Sri Lanka.

This may support preplanning designed programs and projects that are compatible with the existing trend of FLFP and avoiding the mismatch between the provided male contribution to LF and the female contribution to LF in Sri Lanka. Including the economic contribution of females below 15 years of age or above 64 for the analysis is suggested for future implementation of the study.

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