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ECONOMIC GROWTH AND FEMALE LABOR FORCE PARTICIPATION IN SRI LANKA: AN ANALYSIS OF THE U-SHAPED HYPOTHESIS (1990–2024)

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Abstract
Female labor force participation is widely recognized as a critical driver of economic growth. However, Female labor force participation rates remain low in many developing economies including Sri Lanka. The study scrutinizes the relationship between female labor force participation and economic development over the period 1990–2024 in Sri Lankan Context. with particular focus on the U-shaped hypothesis. Annual time-series data were obtained from the World Bank, the Central Bank of Sri Lanka, and the Department of Census and Statistics. The Autoregressive Distributed Lag (ARDL) model bounds test and Error correction model is employed to examine both the long-run and short-run dynamics between female labor force participation and GDP per capita while controlling for fertility and unemployment rates. The results of the study indicate long-run cointegrating relationship among the variables and provide evidence supporting the U-shaped hypothesis. Specifically, economic development initially reduces female labor force participation but increases it beyond a certain level of economic growth. Furthermore, Female labor force participation in Sri Lanka is negatively affected by while fertility affects female labor force participation mainly in the short run. These findings suggest that more attention should be given to policies that encourage women to join and remain in the workforce. In particular, improving access to skills training and reducing structural barriers can help women participate more actively in the labor market. Policies such as flexible working arrangements, greater support for women in important sectors, and better access to childcare and education could play an important role in increasing female labor force participation. Addressing these issues is essential for unlocking women's potential and promoting more inclusive economic growth in Sri Lanka.

Keywords: Economic Development, Female Labor Force Participation, Fertility, U- shaped hypothesis

Introduction

Female labor force participation is widely recognized as a key driver of comprehensive and sustainable economic growth. It reflects how much women contribute to the economic output of a country. Higher level of female labor force participation not only increase the overall labor supply but also enhance household incomes, reduce poverty, and contribute to social stability (Verick, 2025). It increases the available

workforce, empowers women economically, and enhance overall efficiency in the economy. From an equity perspective, higher female participation improves women's economic position and reduces gender in equality (Tansel, 2002). From an economic perspective, enhance country's productivity and development potential. Additionally, women who participate in the workforce are more likely to make decisions that benefit their families, especially in terms of children's education and health. When women earn an income, they prioritize spending on school fees, learning materials, and health care which improves children's overall well-being future opportunities. Such investment not only improve family well-being in the present but also supports future social and economic development. (International Bank for Reconstruction and Development and State Planning Organization, 2009). Considering all these factors, it is clear that female labor force participation plays a significant role in driving economic growth across multiple dimensions.

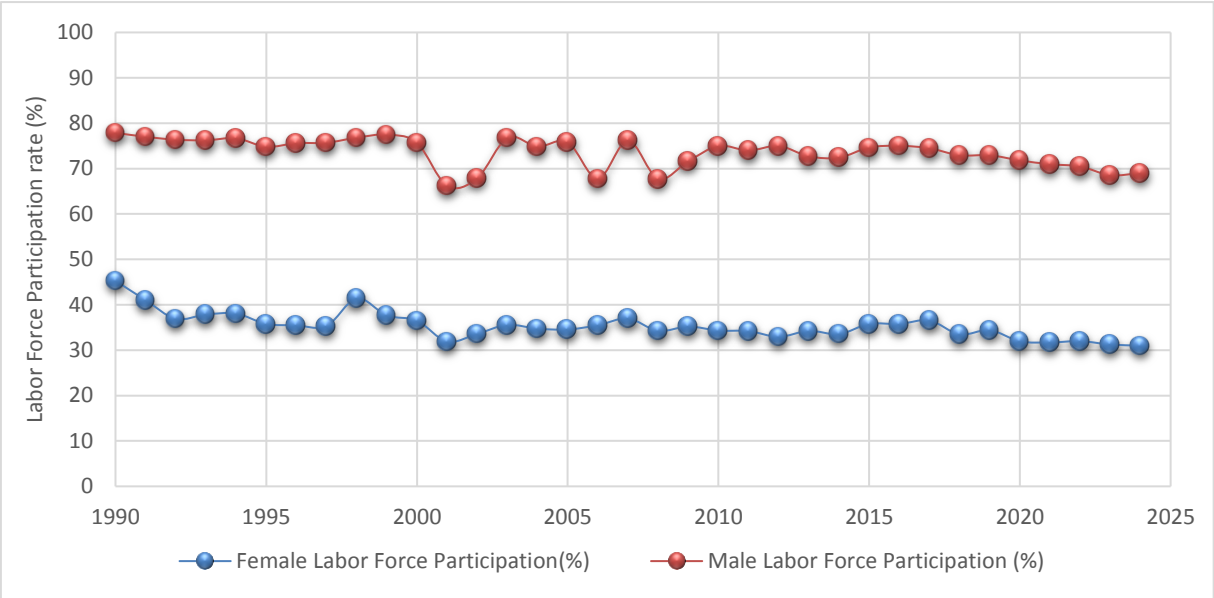
Moreover, economist have observed a U-shaped relationship between female labor force participation and long run economic development. This means that in the early stage of development, most work only out of necessity, usually in informal or agriculture jobs. As economics grows and industrialization, more opportunities in formal and service sectors became available. Therefore, women encourage to join the workforce. Higher education levels and lower fertility rate also make it easier for women to participate in stable and productive sectors, such as services and industry (Sinha, 1965). Several empirical research shows that the relationship between female labor force participation and economic development varies across countries and regions. Examining this relationship is significant for several reasons. One, the U-shaped pattern shows that promoting gender equality may sometimes come with short-term trade-offs in economic growth in developing countries. Two, understanding how female labor force participation interacts with economic development helps researchers and policymakers track trends and create policies that effectively support women's employment and contribution to economy (Chapman, 2015).

Female labor force participation differs widely across the world, yet a consistent gender gap remains. Globally, women participate in the labor market at much lower rates than men. According to the world bank data, the global labor force participation rate is about 49.1% for women, compared to 73.2% for men (World Bank, 2025). Similarly, international labor organization, reports that women are less likely to be employed. They are more often concentrated in informal, low paid and, vulnerable forms of work. In South Asia more than 95% of women working outside agriculture are employed in the formal sector, while figures are 89% in Sub-Saharan Africa and 59% in Latin America and the Caribbean (UN women, 2022). These statistics clearly show that deep-rooted structural barriers continue to prevent women from fully participating in the economy.

Although women's education and health have improved over the year, there is still a large gap between men and women in employment. In addition, women spend much more time than men on unpaid household and care work. According to the Human Development Report, women spend considerably more time than men on unpaid household activities, which restrict their ability to engage in paid employment. As a result, women's overall economic contribution is often underestimated. Even though their total working time, including unpaid labor is greater than those men (World Economic Forum, 2016). Figure 1 illustrate the trends in female and labor force participation rate in Sri Lanka from 1990 to 2024. It clearly shows that the female labor force participation rate has remained significantly

lower than male participation throughout the entire period. Male labor force participation fluctuates between 65% and 78%. In recent years, however, there appears to be a gradual decline. In contrast, female labor force participation is significantly lower. Generally ranging between 30% and 45%.

Figure 1: Labor Force Participation rate, by sex in Sri Lanka 1990 -2024



Source: World Bank

Initially, the rate was higher in the early 1990s however it has declined in the following years. The following decline in female labor force participation is result of the several factors, as including social norms that prioritize women's domestic responsibilities, limited access to flexible work arrangements and a lack of affordable child care facilities (ILO, 2022).

Although there were slight improvements after 2010, Basically due to higher levels of female education attainment expanding employment opportunities in the service sector (Samarakoon, 2018). In following recent years, the female participation rates have shown a downward trend again. The downward trend may be associated with the instability of economic factors, rising living costs, and structural labor market challenge particularly during the period of financial crisis (Central Bank of Sri Lanka, 2023).

Although female labor force participation plays an important role in economic development, its contribution to long-run growth in Sri Lanka has not been widely explored. Most empirical studies focus either on general labor trends or social factors affecting women's work, without linking female labor force participation directly to economic performance. This study aims to fill this gap by analyzing secondary data to examine how female participation in the labor market influences economic growth and to identify the key factors that support or hinder women's employment in Sri Lanka.

Literature Review

The relationship between female labor force participation (FLFP) and economic growth has long been a key topic in macroeconomic research and policy debates. Although labor is a crucial driver of economic development, the way in which FLFP contributes to growth is not clearly

defined. Economic theory offers several explanations. The human capital approach argues that the participation of educated females can enhance productivity and economic performance, as their contribution to the GDP is direct (Boserup, 1970; Verick, 2018). The classical growth models, like the Solow model, consider labor an essential input for economic growth. The model argues that the participation of females can increase the workforce and promote economic growth.

A most discussed framework in the literature is the U-shaped hypothesis. According to this hypothesis suggest that female labor participation tends to decrease as economies transition from low-income to middle-income levels. When it comes to early phase of development, mechanization in agriculture and greater household specialization reduce the need for women's labor, particularly in subsistence and family-based production. As a result, participation rates often fall during this transitional period. However, this pattern does not persist indefinitely. With further economic development, the expansion of the formal sector and the growth of education create new employment opportunities for women, especially in services and professional occupations. At this stage, female labor force participation begins to rise again, forming the upward side of the "U" (Mammen & Paxson, 2000). In addition, several factors have influenced to this U-shaped pattern. Education levels, fertility rates, and prevailing social norms play a crucial role in shaping women's decisions to enter the workforce. At the same time, broader macroeconomic conditions, such as unemployment and inflation, can affect the pace and direction of these changes (Tansel, 2002; Hare, 2016).

As because the empirical research has reported mixed and occasionally conflicting results, the relationship between female labor force participation and economic growth remain debated. Those are reflecting the complexity of this relationship. Most studies support the U-shaped hypothesis. It explains that, at initial level, female labor force participation decreases when economies transition from low- to middle-income levels. But it rises again when development progresses and formal sector employment expands. For instance, Mammen and Paxson (2000) conclude that U-shaped pattern in Thailand and India using data from 1970 to 1985. Similarly, Lechman and Kaur (2015) described that in high-income countries, the Female Labor Force Participation rate follows the same path, whereas in low-income countries like India, the Female Labor Force Participation rate is still low. Research conducted by Olivetti (2013) and Shahid (2014) proved that the relationship between Female Labor Force Participation rate and economic growth in high-income countries is in the shape of the letter 'U.'

Nevertheless, not all studies confirm the Female Labor Force Participation rate theory. Research conducted by Tam (2011), Lahoti and Swaminathan (2013), and Gaddis and Klasen (2014) failed to find the relationship between Female Labor Force Participation rate and economic growth in developing or non-OECD countries. For example, in India, the service sector has been the growth engine, but it has high skill requirements, limiting female participation. Additionally, labor-intensive industries like agriculture have not been contributing significantly to female participation in the labor force (Lahoti & Swaminathan, 2013). More country-specific research results are as follows: In Turkey, Ansel (2002) found that after the initial decline in FLFP rates, the rates started to stabilize, which indicated a potential for future growth. Tansel (2002) pointed to the positive impact of education and the negative impact of unemployment on women's labor participation. On the other hand, Özer & Biçerli (2004) found

no direct impact from macroeconomic factors such as growth, inflation, or unemployment rates; instead, the traditional role of women was highlighted.

Regional studies also yielded mixed results: Verme (2015) investigated the Middle East and North African regions from 1990 to 2012 and failed to find any evidence for the U-shaped relationship despite the improvement in factors theoretically expected to support the FLFP hypothesis. In contrast, Chapman (2015) confirmed the U-shaped pattern in the same region, noting that low participation rates were largely driven by education and fertility constraints, reflecting countries in transition along the curve. The highlights of other researches emphasis the importance of supportive policies, alike access to childcare, flexible work arrangements, and labor market reforms, in boosting FLFP (Verick, 2018; Chen et al., 2014).

All in All, these findings suggest that FLFP is shaped not only by economic growth but also by education, fertility, social norms, labor market policies, and structural economic factors. While the U-shaped hypothesis appears robustic in many high-income countries, its applicability in low- and middle-income contexts remains uncertain. These mixed results underscore the need for updated, country-specific studies that combine macroeconomic data to better understand how female labor participation can contribute to sustainable economic growth.

Methodology

This study employs a quantitative research design using time-series data to examine the U-shaped hypotheses between female labor force participation and GDP per capita. Study used time series secondary data covering the 1990 to 2024. Female labor force participation defines as the share of women aged 15 and above in the total labor force including both those employed and those actively seeking work. These data obtained from the department of census and studies and central bank of Sri Lanka. Gross domestic product per capita shows the country's total economic output divided by it mid-year population. This study used GDP per capita based on purchasing power party to capture the level of economic development. This data utilizes from the world bank's open data source. Fertility rate, the unemployment rate and education rate were included as a control variable. The total fertility rate represents the average number of children a women would have if she experienced the age-specific fertility rate of a particular year throughout her reproductive life (Altuzarra et al., 2019). This data was obtained from the World Bank. In this study, Gross Domestic Product per capita was considered as the independent variable and female labor force participation as the dependent variable. GDP per capita transformed in to its logarithmic form, which helps in capturing growth pattern more effectively.

The Model Specification

This study used model to understand what factors female labor force participation in Sri Lanka, building on previous research (Niranjala & Hettiarachchi, 2021; Verme, 2014; Gaddis & Klasen, 2013). Most empirical studies suggest a U-shaped relationship between economic development and women's participation. It is meaning that female labor force participation is high at low levels of development, decrease at middle-income stages, and rises again at higher levels of development. To analysis this, the model includes Gross domestic product per capita and its square, with GDP per capita expressed in natural logarithms to make the data easier to interpret. The squared term of GDP per capita is included to capture the possible nonlinear (U-shaped) relationship between economic development and female labor force

participation, allowing the effect of income to change at different stages of development. In addition to economic development, demographic and labor market factors are considered as a control variable. Both Fertility rate and unemployment are included. Because higher fertility can limit women's ability to work, while higher unemployment makes it harder for women to find jobs (Altuzarra et al., 2019; Chapman, 2015; Niranjala & Hettiarachchi, 2021). More education increases women's participation by giving them skills and access to better jobs, therefore female education is also included as control variable (Goldin, 1995). A time trend and fixed effects are added to account for social, cultural, and institutional factors that might influence women's participation over time.

This study employs the Autoregressive Distributed Lag framework (ARDL) to examine both short-run adjustment and long rung relationship between economic development and female labor force participation using EViews software. This framework suitable for small sample and variables integrated of different orders (Pesaran et al., 2001). This approach looks at both long-term relationship is estimated using the lagged values variables. The study first selected the appropriate lag length using the Akaike Information criterion (AIC), a widely accepted criterion for model selection in time series analysis. Subsequently, a unit root test is conducted to test for the stationarity of the variables over the study period. Unit root test was employed to estimate whether time series data were stationary or not. Augmented Dickey Fuller (ADF) test was used to examine for unit roots. Auto Regression Distributed lags (ARDL) bound test was used to analyze cointegration between variables.

The long-run model can be expressed as:

$$FLFP_t = \propto_0 + \beta_1 lnGDP_{pc_t} + \beta_2 (lnGDP_{pc_t})^2 + \beta_3 FR_t + \beta_4 Unemp_t + \delta_t + u_t \ldots\ldots 01$$

In this long-run model, $\propto\_0$ represents the constant term, while β_1,β_2,β_3,β_4 and β_5 are long run coefficient. The model will be estimated using bounds test approach for cointegration. This test can be used to analyze both short run and long run relationship among the variable.

H0: β_1= β_2= β_3=β_4= β_5= 0

H1: β_1≠ β_2≠ β_3≠ β _4≠ β_5≠ 0

The null hypothesis state that there is no cointegration and alternative hypothesis state that the existence of cointegration between variables. The bound test results used to analyze long run relationship. This investigated by comparing F – statistic with upper and lower bound critical values. If calculated F value greater than upper bound critical value, the null hypothesis rejected, indicating that a long run relationship exists between the variables. If the F-statistic is lower than the lower bound value, the null hypothesis is accepted, meaning there is no long-run relationship. However, if the F-statistic falls between the lower and upper bounds, the result is inconclusive and no clear decision can be made.

The Error Correction model shows how fast the system returns to equilibrium after a short-term shock. The Error Correction Model can be expressed as follow.

$$\Delta FLFP_t = \propto_0 + \sum_{i=1}^{p} \propto_1 \Delta FLFP_{t-1} + \sum_{i=0}^{q1} \propto_2 \Delta lnGDP_{pc_{t-i}} + \sum_{i=0}^{q2} \propto_3 (\Delta lnGDP_{pc_{t-1}})^2 + \sum_{i=0}^{q3} \propto_4 \Delta FR_{t-1} + \sum_{i=0}^{q4} \propto_5 \Delta Unemp_{t-1} + \gamma ECM_{t-1}\, u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 02$$

Where Δ denotes the first difference of the variables, α0 is the intercept, βi and γi are the short-run coefficients, and μt is the error term. Additionally, diagnostic tests, including tests for autocorrelation, heteroscedasticity, and normality, were conducted to ensure the robustness of the model estimates. Furthermore, CUSUM and CUSUM of Squares tests were use to analyze to find stability.

Results and Discussion

The table 1 shows the descriptive statistics for the variables used in the analysis, including female labor force participation (FLFP), GDP per capita (GDP_PC), fertility rate, and unemployment rate (UNEMP) for the period 1990 – 2024.

Table 1 : Descriptive Statistics

	FLFP	*GDP_PC*	*FR*	*UNEMP*
Mean	33.42432	384324.5	2.202657	7.515257
Median	33.11461	349841.8	2.179000	5.970000
Maximum	36.59636	610773.3	2.541000	15.90000
Minimum	32.21934	188761.8	1.964000	3.880000
Std. Dev.	0.913768	150002.9	0.158311	3.615377
Skewness	1.634665	0.249764	0.369251	0.890175
Kurtosis	5.909440	1.452354	2.387821	2.546322
Jarque-Bera	27.93199	3.856908	1.341881	4.922563
Probability	0.000001	0.145373	0.511228	0.085326
Observations	35	35	35	35

Source: Author's calculation using EViews

According to the descriptive statistics table, the mean value of female labor force participation in Sri Lanka is 33.42 percent with a median of 33.11 percent, indicating that the distribution is relatively centered around the mean. The minimum and maximum values range from 32.22 percent to 36.6 percent. The standard deviation was 0.91, illustrating relatively low variation. GDP per capita shows a relatively higher standard deviation. It was 150002.9. Mean value of the GDP per capita is 384324.5 with a median of 349841.8, with value ranging between 188761.8 and 610773.3. The fertility rate records a mean of 2.20 and shows low dispersion, while the unemployment rate has an average of 7.52 with a standard deviation of 3.62, indicating noticeable fluctuations. The Jarque–Bera test shows that GDP per capita, fertility rate, and unemployment rate are approximately normally distributed, whereas FLFP deviates from normality.

Unit Root results

A unit root test is used to determine whether a time series variable is stationary or non-stationary. The Augmented Dicky Fuller (ADF) was used to check the order of integration for each variable. The results of Augment Dicky Fuller unit root test is showed in Table 02.The results show that Female Labor Force Participation is stationary at level, regardless of whether a trend and intercept are included GDP per capita, GDP per capita squared , fertility rate , and unemployment are not stationary at level but become stationary after first differencing, indicating that they are generally integrated of order one, I(1). Some variables, such as GDP per capita squared, fertility rate, and unemployment, show stationarity under certain specifications after differencing, highlighting a mixed order of integration across the dataset.

Table 2 : Unit root test results

Variable	Level				Order of Integration
	Trend		Trend and Intercept		
	t statistics	Prob	t statistics	Prob	
FLFP	-5.83424	0.0000	-8.1847	0.0000	I(0), I(1)
GDP_PC	-0.52797	0.8731	-3.53647	0.0131	I(1)
GDP_PC2	-0.99968	0.7418	-3.54724	0.0128	I(1)
FR	2.427755	0.9999	-4.68369	0.0007	I(1)
Unemp	-3.51484	0.0136	-4.7537	0.0005	I(1)

Variable	First difference				Order of Integration
	Trend		Trend and Intercept		
	t statistics	Prob	t statistics	Prob	
FLFP	-8.1847	0.0000	-8.14534	0.0000	I(0), I(1)
GDP_PC	-3.53647	0.0531	-3.6071	0.0446	I(1)
GDP_PC2	-3.54724	0.0128	-3.59328	0.0459	I(0), I(1)
FR	-4.68369	0.0007	-4.69041	0.0036	I(0), I(1)
Unemp	-4.7537	0.0005	-5.61378	0.0003	I(0), I(1)

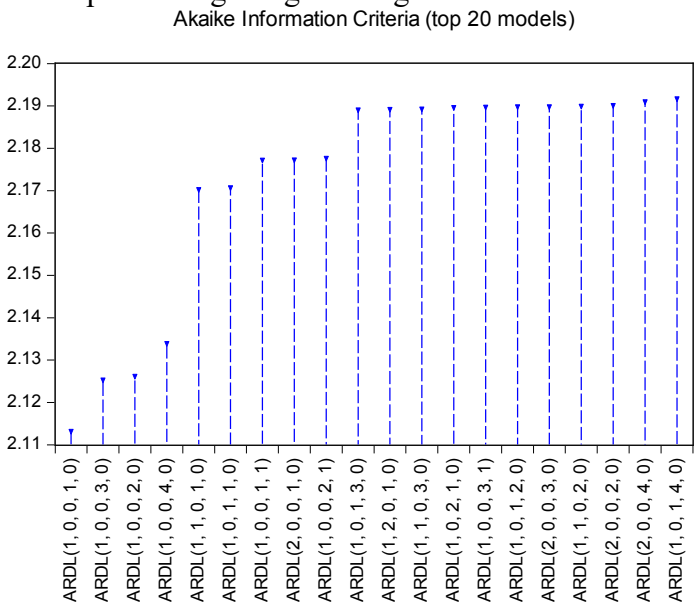
Source: Author's calculation using EViews

Given this mixture of integration order, I(0) and I(1), the Autoregressive Distributed Lag (ARDL) model is well-suited for this analysis, as it enables to examine both short-term dynamics and long-term relationships among the variables.

Lag Length Criteria

Before applying the ARDL test, it is important and essential to select an appropriate lag length, as an incorrect choice can lead to spurious results. In this study, the optimal lag length for the variables was determined using the Akaike Information Criterion (AIC), which evaluates and ranks the top twenty models (Figure 3). For the ARDL analysis, the model with the lowest AIC, (1,1,1,1,0), was selected.

Figure 2: Selection of Optimal Lag Length Using the Akaike Information Criterion (AIC)



Source: Author's calculation using EViews

Diagnostics test results

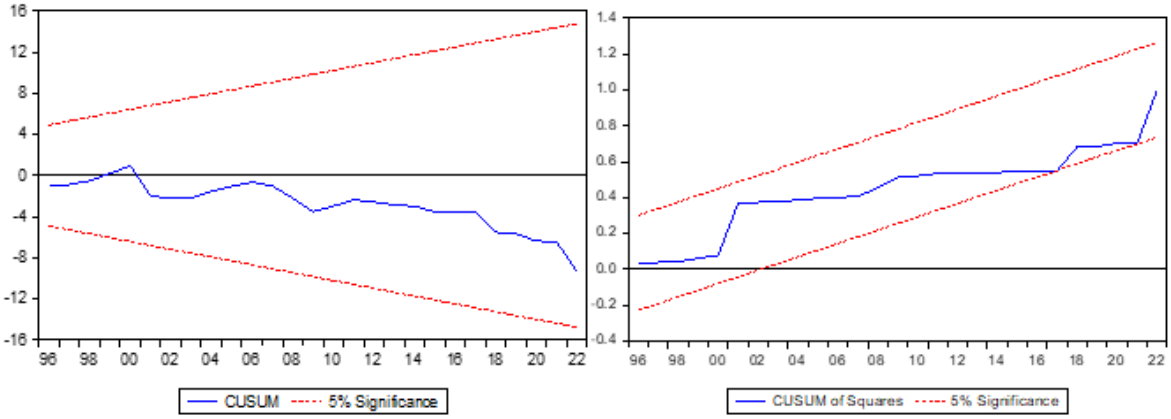
The diagnostic tests indicate that the regression model for female labor force participation is reliable and archives the key assumptions of regression. The Breusch-Godfrey test for serial correlation illustrates an F-statistic of 2.08866 with a p-value of 0.1152. These results indicate that the residuals are not significantly correlated over time and that the model errors are independent. The Breusch-Pagan-Godfrey test for heteroscedasticity yields an F-statistic of 3.0367 and a p-value of 0.0609. These shows the variance of the residuals is reasonably constant, with only a slight possibility of heteroscedasticity. Finally, the Jarque-Bera test for normality has a statistic of 0.1071 and a p-value of 0.9479, strongly indicating that the residuals are normally distributed. Overall, these results suggest that the model is well-specified and the regression estimates can be interpreted with confidence.

Table 3 : Diagnostics tests

	Diagnostic test	F-statistics	Probability
Serial correlation	Breusch-Godfrey Serial Correlation LM Test	2.08866	0.1152
Heteroscedasticity	Breusch-Pagan-Godfrey	3.036705	0.0609
Normality	Jarque Bera	0.107051	0.9479

Source: Author's calculation using EViews

Figure 3: Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares Recursive Residuals (CUSUMSQ)



Source: Author's calculation using EViews

Bound Test

The ARDL bound test result was used to determine whether a cointegration exists among the variables. The bound test examines the null hypothesis that there is no long-run relationship (cointegration) between the variables. The null hypothesis is rejected if the calculated F value is higher than upper bound. According to the results presented in Table 3, the calculated F-statistic is 9.274, with the number of four explanatory variables. The critical values are 3.09, 3.49, 3.87 and 4.37 at the significance level of 10%, 5%,2.5 and 1% respectively. Therefore, calculated F – statistic is greater than all critical values for the upper bound, the null hypothesis of no long-run relationship is rejected

Table 4: Bounds Test result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	9.274320	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Author's calculation using EViews

This finding suggests that the Female labor force participation, GDP per capita, GDP per capita squared, fertility and unemployment rate in Sri Lanka move together in the long run despite short-term fluctuations. Consequently, the confirmation of cointegration justifies the estimation of both long-run ARDL model and associated Error Correction Model (ECM).

Long-run ARDL estimation results

The ARDL long-run form results examine the relationship between labor force participation, GDP per capita, Squared GDP per capita, fertility and unemployment using annual data from 1990 to 2024. The estimated model is ARDL (1,0,0,1,0), with female labor force participation as dependent variable.

Table 5 : Long-run coefficients

Dependent Variable: D(FLFP) Selected Model: ARDL (1, 0, 0, 1, 0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_PC	-293.8664	87.24207	-3.368402	0.0023
LNGDP_PC^2	11.27536	3.339629	3.376231	0.0022
FR	1.966703	1.824599	1.077882	0.2906
UNEMP	-0.831670	0.275252	-3.021483	0.0055
C	1947.331	569.8015	3.417560	0.0020

Source: Author's calculation using EViews

According to the Table 05 result, the coefficient of LNGDP_PC and LNGDP_PC2 are -293.87 and 11.28 respectively, and also statistically significant at 5% level (p = 0.0023, p = 0.0022). The result indicates that GDP per capita has a negative and statically significant effect on female labor force participation while the squared term GDP per capita is positive and significant at 5% level. This confirms the presence of a non-linear (U-Shaped) relationship between economic growth and female labor force participation in the long run. In the early stages of economic development, increases in income may reduce female labor force participation. However, beyond a certain level of economic development, further encourages greater participation of women in the labor market. This pattern is consistent with previous studies showing that industrialization and household specialization initially limit female employment, while education, service sector opportunities, and changing social norms eventually increase participation (Goldin, 1995; Esteve-Volart, 2000; Klasen & Lamanna, 2009; Seguino, 2000).

Moreover, the results indicate that unemployment rate has a negative coefficient of -0.8317, which is statistically significant at the 5% level (p = 0.00055) This implies that higher unemployment rate is associated with lower female labor force participation in the long run. In other words, challenging labor market conditions may discourage women from entering or remaining in the workforce. These finding aligns with previous empirical evidence. Empirical study has shown that raised unemployment reduces women's labor supply by lack of job opportunities and increasing economic uncertainty (Burda, 1993; García-Peñalosa & Turnovsky, 2007).

In contrast, fertility rate has positive coefficient of 1.967, but it is not statistically significant (p = 0.291), suggesting that fertility does not have a strong long-run effect on female-on-female labor force participation in this model. Previous empirical evidence has showed that higher fertility can reduce women's participation in the labor market (goldin,1995) However, this effect often depends on context and can be mitigated by institutional factor such as child care availability and family support policies. In this study, fertility appears to have only a modest long-term effect on female labor force participation, consistent with evidence from middle- and high-income economies where structural labor market changes reduce the negative effect of fertility on women's employment (Klasen & Lamanna, 2009).

Estimation of Short- and Long-Run Dynamics Using (ECM) and (CECR)

The short-run effects of fertility on female labor force participation were examined using an Error Correction Model (ECM). According to the

Table 6 results, Changes in fertility rate have a significant negative impact on female labor force participation (-7.56, p = 0.008), suggesting that higher fertility rate temporarily reduces women's participation, likely due to increased caregiving responsibilities.

Table 6 : Error correction model (ECM) results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FR)	-7.559723	2.657478	-2.844698	0.0084
CointEq(-1)*	-0.929249	0.114425	-8.121005	0.0000
R-squared	0.676072	Mean dependent var		-0.094343
Adjusted R-squared	0.665949	S.D. dependent var		1.025823
S.E. of regression	0.592897	Akaike info criterion		1.849429
Sum squared resid	11.24885	Schwarz criterion		1.939215
Log likelihood	-29.44029	Hannan-Quinn criter.		1.880049
Durbin-Watson stat	2.145707			

Source: Author's calculation using EViews

The lagged error correction term (CointEq(-1)) is highly significant and negative (-0.93, p < 0.01). This indicates nearly 93% of deviation from the long-run equilibrium is corrected within a single period. This shows a strong short-run adjustment mechanism, where temporary shocks are quickly absorbed, and female labor force participation returns to its long-term path. The model explains a substantial portion of short-term variation, with an adjusted R^2 of 0.666, and the Durbin-Watson statistic of 2.146 indicates no evidence of autocorrelation in the residuals.

The conditional error correction regression illustrates both short- and long-term effects together. In the short run, fertility rate changes still have a small negative effect (-7.56, p = 0.060), and unemployment reduces female labor force participation (-0.77, p = 0.005).

Table 7: Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1809.556	572.9862	3.158114	0.0039
FLFP(-1)*	-0.929249	0.148813	-6.244415	0.0000
LNGDP_PC**	-273.0752	87.68825	-3.114159	0.0043
LNGDP_PC2**	10.47762	3.364287	3.114365	0.0043
FR(-1)	1.827557	1.751750	1.043275	0.3061
UNEMP**	-0.772829	0.253493	-3.048722	0.0051
D(FR)	-7.559723	3.856740	-1.960133	0.0604

Source: Author's calculation using EViews

In the long run, the lagged female labor force participation variable (FLFP(-1): -0.93, p < 0.01) confirms a strong tendency to return to equilibrium. Economic growth affects participation in a non-linear way: lower per capita GDP reduces female labor force

participation (-273.08, p = 0.0043), but higher GDP increases it (LNGDP_PC²: 10.48, p = 0.0043), showing that women participate more as the economy develops. Past fertility rate (FR(-1)) does not have a significant long-term effect.

The estimated long-run model, cointegrating equation, and short-run error correction model are presented as follows.

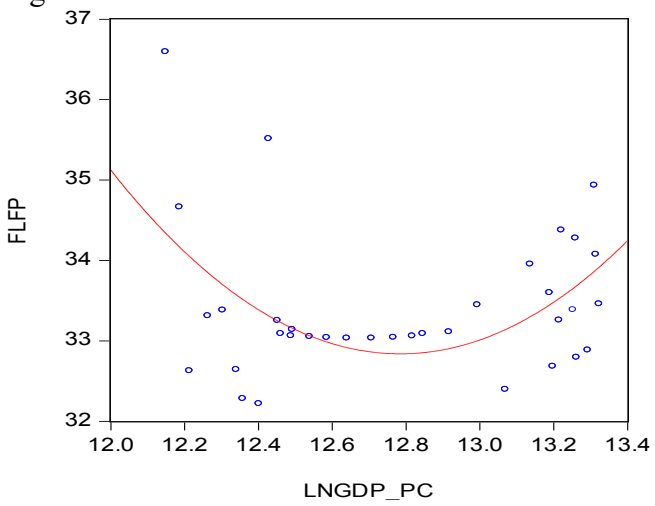
$$FLFP = 0.071FLFP(-1) - 273.075lnGDP\_PC + 10.478lnGDP\_PC^2 - 7.5597FR + 9.387FR(-1) - 0.773UNEMP + 1809.556$$

$$D(FLFP) = 1809.556 - 0.929 * FLFP(-1) - 273.0752lnGDP\_PC + 10.478lnGDP\_PC^2 + 1.826FR(-1) - 0.773(FLFP - (-293.866lnGDP\_PC(-1) + 11.275lnGDP\_PC2(-1) + 1.9667FR(-1) - 0.832UNEMP(-1) + 1947.331) - 7.5597D(FR))$$

$$EC = FLFP - (-293.8664lnGDP\_PC^2 + 11.2754lnGDP\_PC^2 + 1.9667FR - 0.8317UNEMP + 1947.3306)$$

Figure 04 scatter plot aligns with the estimated model results. That demonstrate a U-shaped pattern between the GDP per capita and female labor force participation rate in Sri Lanka. In other words, these results confirm a U- shaped relationship between economic growth and female labor force participation in Sri Lanka.

Figure 4



Source: Author's calculation using EViews

This study suggests important policy insights for enhancing the link between economic growth and female labor force participation in Sri Lanka. This result suggests that a U-shaped relationship, where female participation initially decreases in early development stages but rises as the economy matures. These findings highlight the essentiality of policies that encourage inclusive growth and create meaningful employment opportunities for women. Government Policies should focus on industries that have traditionally employed more women, such as services, information technology, tourism, education, and healthcare and other sector. As the economy becomes more service-oriented, these sectors able to provide more flexible and skilled employment opportunities that are particularly accessible to women.

Subsequently, the skill development programs should be enhanced and aligned with the demands of a knowledge-based economy. Improving women's digital literacy, STEM competencies, and professional training equips them to benefit from emerging opportunities in a modern labor market. Integrating women into formal employment remains critical. Because many Sri Lankan women continue to work in informal or unpaid family roles. To encourage

sectors to hire female labor, government should intervene the labor market. Incentivizing firms to hire women, improving workplace policies, and offering flexible arrangements can facilitate greater female participation in the formal sector. Regional disparities in Female labor force participation must be addressed, as rural areas lag behind continue to lag behind urban centers in female employment. Promoting rural industrialization, supporting small and medium enterprises (SMEs), and encouraging local entrepreneurship can distribute economic opportunities and create job opportunities outside major cities. Finally, an enabling environment is essential. Investments in public transportation, workplace safety, and supportive labor regulations can reduce barriers to women's participation and ensure that economic growth benefits everyone. Taken together, these strategies can help Sri Lanka achieve more inclusive economic growth, allowing women to play a greater role in the labor market while contributing to national development.

Conclusion

Female labor force participation in Sri Lanka is much lower than male participation that showing a persistent gender gap. Sri Lanka underutilizes of women's potential in the economy. This study highlights the importance of addressing this problem, as low participation limits economic growth. This study analysis the relationship between labor force participation and economic development in Sri Lanka over the 1990 – 2024. In this study economic development measured by GDP per capita. For analyzing the long-run and short-run relationship, the ARDL model, Bound test and Error Correction Model (ECM) were employed. The findings confirm a U-shaped relationship between female participation and economic growth. At initial stage rising incomes reduce women's involvement due to and limited job opportunities, but as the economy develops, higher income, and service-sector jobs encourage women to rejoin the workforce. Unemployment reduces participation, while fertility has only a short-term effect. These results emphasize that policies promoting skills, flexible work, and reducing structural and social barriers are essential to fully harness women's contribution to Sri Lanka's inclusive growth.

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