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Female Labor Force Participation in the Economy of Pakistan

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Abstract

This study investigates the determinants of female labor force participation (FLFP) in Pakistan from 1980 to 2020. Access and growth in the participation of women in the labor force is essential for the economic development of any country and can make a significant contribution to the progress of the country. This study utilizes the bounds testing approach of Autoregressive Distributed Lag (ARDL) with annual time-series data obtained from the World Development Indicators (WDI 2021) to examine both the long-run and short-run relationship between FLFP and the selected macroeconomic variables such as the Consumer Price Index (CPI), GDP per capita (GDPPC), Foreign Direct Investment (FDI), External Debt (ED), and Trade Openness (TOT). Before estimating, this is followed by a unit root test called Augmented Dickey-Fuller (ADF) test to check for stationarity. The results suggest that CPI has a positive and significant long run relationship with FLFP, while FDI and external debt have significant negative relationships, and trade openness has a significant negative relationship. The relationship of GDP per capita is positive but non-significant. The error correction model validates that around 71 percent of the deviations from the SR are corrected every year. These results indicate that macroeconomic stability and targeted policy measures are particularly important in improving the employment status of women in Pakistan.

.**Keywords:** Female Labor Force Participation, ARDL, Pakistan, FDI, Consumer Price Index, External Debt

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1. Introduction

Women's labour force participation (FLFP) is an important component of economic empowerment and sustainable development. Women make up about half of the population but are under-represented both in terms of numbers and quality in the formal labor market. Therefore, it is important to understand macroeconomic factors influencing FLFP for the formulation of evidence-based policies so as to narrow gender gaps and boost economic growth. The theory that guides the analysis of FLFP is the neoclassical labor supply model which assumes that a person can allocate his or her time among market work, household production, and leisure depending on relative wages and opportunity costs. Within this perspective, macroeconomic parameters like inflation (measured with CPI), trade openness, FDI, GDP per capita, and external debt affect women's participation in labor force through their impact on real wages, job opportunities, and household income. For example, inflation (CPI) decreases households' real purchasing power, causing women (mainly from low-income households) to look for paid jobs as a coping mechanism.

On the other hand, external debt can divert funds from government spending on education and childcare to the cost of accessing the labor market. FDI can compete with the informal sector jobs that are heavily staffed by women, and openness of trade can reshape the demand for labor, either positively or negatively, for women. Women's participation in informal industries mainly in agriculture is high in Pakistan and structural obstacles, which are deeply embedded in political, legal, economic and social context, persist. This study is a welcome addition to empirical literature because the study uses a systematic framework of time-series analysis to explore these macro-economic determinants.

1.1 Objectives

The main objectives of this study are:

- To examine the long-run and short-run determinants of female labor force participation in Pakistan from 1980 to 2020.
- To identify the direction and significance of the relationship between FLFP and macroeconomic variables including CPI, FDI, GDP per capita, Trade Openness, and External Debt.

- To derive targeted policy recommendations based on empirical findings.

1.2. Structure of the Study

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature. Section 3 presents the theoretical framework and model specification. Section 4 describes the data and methodology. Section 5 reports and interprets empirical results. Section 6 concludes with policy recommendations.

2. Literature Review

Empirical studies in the field of women and work are abundant and cover micro-level household surveys as well as macro-level panel and time-series studies. This section summarizes studies most relevant to the Pakistani situation and places the present work in the context of the international literature. On the other hand, Faridi, Malik and Basit (2009) estimated the determinants of FLFP at micro level using the data for Bahawalpur district of Punjab and found educational attainment as highly significant determinant whereas having young children significantly reduced participation in the role.

Likewise, Ejaz (2007) found that age, education and marital status had significant positive impact whereas transportation increased participation and number of children decreased participation using Pakistan Social and Living Standards Measurement Survey (2004-05). Ahmad and Hafeez (2007) analyzed married women of Mandi Bahauddin and found that human capital variables like education and financial tensions are playing prominent role in women's labor market choices. Naqvi and Shahnaz (2004) studied Pakistan Integrated Household Survey (1998-99) and concluded that age and education were positively associated with FLFP, whereas married women were significantly less likely to be involved in the labor force. Adiqa (2009) also employed OLS and Tobit models to examine the effect of education and expenditure on FLFP using data from Labor Force Survey and HIES and found that education and household expenditure were positive factors while household income and household headship were negative factors.

Maqbool et al. (2019) used survey data from Sargodha and applied double logit modeling to determine that education of the household, family network and nepotism were significant factors

affecting FLFP in the private sector. Zaheer and Qaisar (2016) analyzed the effect of the mortality rate, GDP growth, fertility rate and unemployment rate on FLFP at macroeconomic level between 2004 and 2013, and results indicated that, the mortality rate and the unemployment rate had negative impacts on FLFP, whereas GDP growth and the fertility rate had negative but insignificant impact on FLFP. Hussain, Rabbi and Ali (2012) accounted for higher education infrastructure and the visibility of jobs in the formal sector as prerequisites for increasing the participation of women in the formal sector.

In Pakistan, the informal nature of agricultural labor for women was also pointed out by Mohiuddin et al. (2020), who reported that women's participation in traditional farming is steadily decreasing with the advent of mechanization as it is more likely to lead to unemployment. In international literature, Bloom et al., (2009), showed that developing countries had a strong negative relationship between FLFP and fertility rate, with the demographic dividend as the intervening variable. Fogli and Veldkamp (2011) were able to demonstrate that social learning and culture norms are strong influencing factors on geographic FLFP patterns. Panel data for Morocco was used by Verme, Barry and Guennouni (2019) to demonstrate that the factors behind growing women's participation in that Arab-dominated country were education and declining fertility. Tsani et al. (2012) estimated that the potential increase in GDP from the expansion of FLFP in southern Mediterranean countries would significantly increase GDP by 2030.

Obayelu, Ogbe and Edewor (2019) reported the gender inequality in farming activities in Nigeria and emphasized the importance of land access and agricultural extension services. Collectively, the literature discussed above shows that education, household structure, macroeconomic conditions, and institutional factors are the major factors associated with FLFP. But few studies in Pakistan have focused on time-series dynamics of the macro-level determinants of FLFP under the framework of ARDL. This study aims to fill that void.

3. THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

3.1 Theoretical Framework

This study is based on the neoclassical theory of labor supply which treats the labor supply choice as a utility maximization problem constrained by a budget and time constraint. In the

standard model, an individual divides his endowment of time between working in the market, producing at home, and leisure. The shadow price of home production and the level of non-labor income determine the reservation wage, the minimum wage at which participation is worthwhile to the worker.

Several macroeconomic channels link the chosen explanatory variables to FLFP. First, CPI (inflation) affects the real income of households which decreases the reservation wage and encourages distress response by women to enter the paid labor market. Second, higher GDP per capita reflects overall economic development, and an increase in income level may have a negative income effect on financial necessity for women to work, but a positive substitution effect that may offset this. Third, FDI can increase the wages and employment in the formal sector, while reducing the employment in the informal and agricultural sectors, which are dominated by women. Fourth, external debt can compete with government expenditure on social services, education and childcare, increasing the costs of externalizing the labor market for women. Fifth, the sectoral composition of the economy is altered by trade openness, with either an improvement or deterioration of FLFP depending on whether the sectors that are more likely to be export-oriented are female-intensive or male-intensive.

3.2 Econometric Model

Based on the theoretical framework, the empirical model is specified as follows:

$$\mathbf{FLFP_t = \beta_0 + \beta_1\, CPI_t + \beta_2\, GDP_t + \beta_3\, TOT_t + \beta_4\, FDI_t + \beta_5\, ED_t + \varepsilon_t} \quad \mathbf{.....(1)}$$

FLFP refers to female labor force participation (% of total labor force), the consumer price index (annual growth rate), GDP (in constant 2015 USD), trade openness (sum of imports and exports as a percentage of GDP), net foreign direct investment inflows (% of GDP), and external debt (% of GNI), while ε_t represents the stochastic error term. Time period (1980-2020) is indicated by the subscript t.

Variable definitions and expected signs based on the theoretical framework are summarized in **Table 1**.

Table 1: Variable Definitions and Expected Signs

Variable	Description	Measurement Unit	Expected Sign
FLFP	Female Labor Force Participation (Dependent)	% of total labor force	—
CPI	Consumer Price Index	Annual growth rate (%)	+
GDP	GDP Per Capita	Constant 2015 USD	+/−
TOT	Trade Openness	(Imports + Exports) / GDP (%)	+/−
FDI	Foreign Direct Investment	Net inflows (% of GDP)	−
ED	External Debt	% of GNI	−

Source: Authors' compilation based on WDI (2021) and theoretical priors.

4. DATA AND METHODOLOGY

4.1 Data Source and Sample

The World Development Indicators (WDI) data set from 1980 to 2020 is used from the World Bank (2021) database. The dependent variable is the percentage of the total labor force that is employed in the FLFP. Independent variables are annual growth of the CPI, GDP per capita (constant 2015 USD), trade openness (imports + exports as % of GDP), net FDI inflows as % of GDP and external debt as % of GNI. This period of 41 years is enough to obtain adequate degree

of freedom for ARDL analysis as well as cover some important structural changes of the Pakistani economy.

4.2 Estimation Strategy

Since the variables are of the time-series type, the estimation process has to be carried out in three steps: (i) a unit root test (Augmented Dickey-Fuller (ADF) test) to determine the order of integration; (ii) a test for cointegration (ARDL bounds test); and (iii) estimation of both, the long-run and short-run parameters, together with the ECM. All estimates are made in EViews software.

The ARDL bounds test of Pesaran, Shin, and Smith (2001) is best suited for the present study as it is applicable irrespective of whether variables are of order I(0), I(1), or are a combination of both, the scenario the study will find itself. The approach test for discovering the existence of a long run relation is based on the comparison of the F-statistic with the asymptotic critical value bounds. When the F-statistic value is greater than the upper bound I(1) critical value, the null hypothesis (no cointegration) is rejected.

5. EMPIRICAL RESULTS AND DISCUSSION

5.1 Unit Root Test Results

Table 2 shows the results of the ADF unit root test conducted on all the variables in levels and first differences. If the null hypothesis of a unit root is rejected in levels, then the variable is stationary (integrated of order zero, I(0)); if stationarity is found after first differencing, then the variable is integrated of order one (I(1)).

Table 2: Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variable	T-Statistic	P-Value	Order of Integration	Decision
GDP Per Capita	−2.9447	0.0494	I(1)	Reject H_0 at 5%
CPI	−3.0255	0.041	I(0)	Reject H_0 at 5%
FDI	−2.9924	0.0444	I(0)	Reject H_0 at 5%

FLFP	−5.5207	0.0001	I(1)	Reject H₀ at 1%
External Debt	−5.3766	0.0001	I(1)	Reject H₀ at 1%
Trade Openness	−3.0716	0.0369	I(0)	Reject H₀ at 5%

The null hypothesis of the ADF test is that the variable contains a unit root. All tests include a constant and trend term.

The findings suggest that CPI, FDI and Trade Openness are stationary at level (I(0)) and FLFP, GDP per capita and External Debt are stationary after first differencing (I(1)). The ARDL bounds testing method is suitable because the variables are mixed order of integration (I(0) and I(1)), which can be incorporated into the ARDL cointegration technique (Pesaran et al., 2001). There are no variable of order I(2) which is a prerequisite for ARDL approach.

5.2 ARDL Bounds Test for Cointegration

Table 3 presents the results of the ARDL bounds test. The null hypothesis is that no long-run relationship exists among the variables.

Table 3: ARDL Bounds Test Results

F-Statistic	Significance Level	Lower Bound I(0)	Upper Bound I(1)	Decision
5.1525	0.1	2.08	3	
	0.05	2.39	3.38	Cointegration exists
	0.025	2.7	3.73	
	0.01	3.06	4.15	

Note: Critical value bounds are from Pesaran et al. (2001), Table CI, Case III.

The computed F-statistic value is 5.1525, which is greater than the upper boundary critical value of 3.38 at 5% significance level, implying that there exists a long run cointegrating relationship

among the study variables. Thus, the long run ARDL coefficients and the corresponding Error Correction Model are estimated.

5.3 Long-Run ARDL Estimates

Table 4 presents the estimated long-run coefficients from the ARDL model.

Table 4: ARDL Long-Run Coefficient Estimates

Variable	Coefficient	Std. Error	T-Statistic	P-Value	Significance
GDP Per Capita	0.0034	0.0024	1.3758	0.1841	Insignificant
FDI	−0.7325	0.2245	−3.2631	0.0039	Significant***
External Debt	−0.1733	0.0376	−4.6025	0.0002	Significant***
CPI	0.1915	0.047	4.0743	0.0006	Significant***
Trade Openness	−0.0049	0.0018	−2.7725	0.0117	Significant**
Constant	21.535	4.007	5.374	0	Significant***

*Note: *** p<0.01; ** p<0.05; * p<0.10. Dependent variable: FLFP (% of total labor force).*

The long run results show some key trends. CPI is positively and significantly associated with FLFP. For a one percentage point change in CPI, FLFP will change by 0.19 percentage points, controlling for other factors. This result is in line with the distress-push hypothesis that an increase in the price of goods and services reduces household purchasing power, which in turn

leads to an increase in the number of women in the labor market designed to provide additional income.

There is a negative and significant long-run relationship between FDI and FLFP. The relationship between FDI inflows (as % of GDP) and FLFP is negative with a coefficient of -0.73.The correlation between the FDI inflows (as % of GDP) and FLFP is -0.73. The seemingly paradoxical finding could be because of structural displacement, in the sense that the FDI so far has been directed toward the capital-intensive sectors and formal industry, and has squeezed women out of the informal sector but not offered them an alternative formal job.

External debt has a negative and significant impact. Every 1 per cent increase in external debt (as a per cent of GNI) is correlated with a 0.17 per cent decrease in FLFP. Increased debt could reduce the government budget for childcare, health and education services, and thus raise the opportunity cost of female entry into the labor market.

Long term openness of trade has a strong negative impact as well. There is a 0.0049 percentage point decrease in FLFP for every 1 percentage point increase in the trade openness ratio. This could be because those export industries that are predominantly male oriented have benefited from the increased trade integration, or perhaps because the increased competition has affected the female dominated informal sector.

There is a positive but insignificant correlation between GDP per capita and FLFP ($p = 0.184$). The income effect and substitution effect seem to balance each other out in the Pakistani context and as found in cross-country studies, the relation between FLFP and income is U-shaped.

5.4 Short-Run Dynamics and Error Correction Model

Table 5 presents the short-run ARDL estimates and the error correction term.

Table 5: Short-Run ARDL Estimates and Error Correction Model

Variable	Coefficient	Std. Error	T-Statistic	P-Value	Significance
Δ External Debt	−0.0270	0.0209	−1.2933	0.2107	Insignificant

Δ CPI	0.021	0.026	0.8062	0.4296	Insignificant
Δ CPI (−1)	0.1022	0.0315	3.2477	0.004	Significant***
CointEq (−1)	−0.7128	0.1041	−6.8474	0	Significant***
$R^2 = 0.582$ Adj. $R^2 = 0.534$ D-W = 1.885					

*Note: *** p<0.01. Δ denotes first difference. CointEq(−1) is the error correction term.*

The change in external debt and CPI is not statistically significant in the short run. The coefficient, however, of the one-period lagged change in CPI is positive and statistically significant (0.102; 0.004), suggesting that a one-year lag exists between inflation changes and movement in female labor supply, as expected from the gradual adjustment of households' behavior.

The error correction term, CointEq(−1), is negative (−0.713) and very significant (p = 0.000), indicating that the short-run deviations from long-run equilibrium are corrected by around 71.3% in a year. The relative speed of adjustment is relatively high, suggesting that the system reaches its long run equilibrium in about 1.5 years after an external shock.

For a parsimonious time-series model, the $R^2 = 0.58$ and adjusted $R^2 = 0.53$ are reasonable measures of the explanatory power of the model. The Durbin-Watson statistic value of 1.885 indicates that there is no first order serial correlation.

5.5 Diagnostic Tests

A set of diagnostic tests were performed to guarantee reliability of the estimates. The Breusch-Godfrey LM test for serial correlation was used, and the null hypothesis that there is no serial correlation was not rejected at the standard levels of significance, thus the lag structure was deemed adequate. The Breusch-Pagan-Godfrey test for heteroskedasticity did not reject the null of homoscedastic errors either. The stability of the model was tested using CUSUM and

CUSUM of squares tests (Brown, Durbin and Evans, 1975) and both statistics did not breach the 5% critical bounds over the sample period, thus showing that the parameters of this model are stable. Overall, these diagnostic results are consistent with the strength of the empirical results.

6. CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Conclusion

In this study, the macroeconomic factors which affect female labor force participation in Pakistan since 1980-2020 were investigated using ARDL bounds testing method to bring out long and short run relationships. Based on the ADF unit root tests, the variables were found to be a combination of I(0) and I(1), which supports the application of ARDL framework. The bounds test results showed that there is a long-term cointegrating relationship between the study variables.

The empirical results show that CPI (inflation) positively and significantly affects FLFP in the long run, as predicted by the distress-push hypothesis that increasing prices force more women into the labor force. The long-run negative impact of FDI, external debt and trade openness on FLFP is significant, indicating that the current trend of foreign investment, debt accumulation and trade integration policies in Pakistan have not been beneficial for women's participation in the labour market. There is also a positive relationship with GDP per capita though this is not statistically significant. The lagged CPI effect is positive and significant in the short run, and the error correction term provides further confirmation of the fast convergence speed of about 71% per year.

6.2 Policy Recommendations

The findings resulting from empirical research suggest the following focused policy implications:

- Macroeconomic stabilization policies with a focus on controlling inflation through prudent fiscal and monetary policy are crucial to enhance the quality of women's employment not just quantity, as higher prices can spur women's distress-related labor market entry, instead of well-being.
- Incentivizing FDI in female labor-intensive industries: As FDI is negatively associated with FLFP, policy makers should consider providing investment incentives for FDI to be invested in female labor-intensive sectors like textile, agro-processing and services.

Special economic zones (SEZ) with gender sensitive employment measures may be useful to direct foreign investment to sectors that provide gender-inclusive employment.

- The external debt effect on FLFP is likely to be mediated through the fiscal channel, and debt service squeezing social spending. The costs of female labor market entry are reduced by protecting investments in girls' education, vocational training and childcare facilities.
- Gender impact assessment in trade policy: Trade negotiations and export-oriented policy measures should include gender impact assessments to avoid displacing women from informal jobs and ensure employment opportunities for women, especially in the formal sector, in the wake of trade liberalization.
- Skills development and institutional reform: Long-term investment in women's education, technical and vocational education and training, and the implementation of equal pay and anti-harassment policies are key to long-term FLFP improvement. Legislation and regulations to facilitate women entrepreneurs in the ownership of businesses, credit facilities, and formal employment should be strengthened.

Conflict of interest

Authors have no conflict of interest

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Data Availability

All the data is available in the manuscript. And the datasets used and or analyzed during the current study are available from the corresponding author on reasonable request.

Authors contributions

All authors have contributed to various sections of this manuscript.

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