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Economic Growth-Women Labour Force Participation Nexus: An Empirical Evidence for Pakistan

Nooreen Mujahid[1] Sulaiman D. Muhammed[2] Muhammad Noman[3]
1. Assistant Professor, Department of Economics, University of Karachi.
E-mail of the first author: nooreenmujahid111@yahoo.com
2. Dean Faculty of Arts, Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan * E-mail of the second author: sulaiman1959@gmail.com
3. Visiting Faculty, Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan
* E-mail of the corresponding author: noman.atiq19@gmail.com

Abstract:
The immense focus of the study is to investigate the impact of economic growth on women labour force participation nexus. Women labour force participation (WLFP), (Real) GDP per capita (RPCY) are chosen as variables for this selected study. Material and data have been taken from 1980 to 2011. The result of this study depicts that long run and U-shaped association between economic development and women labour force participation in case of Pakistan. Our study shows that an increase in education and dynamics of economic activity increases the Women Labour Force Participation in later stage of growth.
Keywords: Economic Growth, (Real) GDP per Capita, Women Labour Force.

1. Introduction:

Economic literature shows significant attention towards the role played by women work force in the economic development of nations. The structural changes of economies from agriculture to industrial and services sector reduce the women labour force participation in case of developing nations. The activities of women work force increases in the later stage of economic development due to increase in education and dynamics of economic activity. As the size of the economy expands women have easier and better access of jobs thus are encouraged to become economically active, it leads to increase women participation in the productive activities. The participation of women labour force is desirable for both equity and efficiency reasons. As far as the equity feature depict that the women's participation in the labour market ultimately improves economic situation, increase the relative economic efficiency in general augmented by enhancing the improvement potential of the country. Moreover, the increasing integration of women in the economy helps in reducing gender disparities in education, improving maternal health, increasing sectoral share of women jobs in various sectors of the economy, demonstrating the hidden contribution of women as unpaid family worker especially in agriculture sector. According to the modernist, economic development is affirmatively associated with women labour force participation through change in the case of the professional structure and increase in educational opportunities along with the acceptably at household. On going process of modernist has linked with increase labour demand and generally social acceptance of women education and jobs in addition to lower family [Heckman (1980); Standing (1981); Bauer and Shin (1987)]. A body of theoretical and empirical literature provides evidence that women labour force participation has an affirmative and significant association with economic growth (Tansel (2002) and Fatima and Sultana (2009).

Pakistan is going through a demographic transition where the proportion of productive young persons is increasing. It is in fact the demographic dividend for future development of Pakistan. The economic development of the country reveals the fact that both man and women are contributing in the market activities. It is evident from various studies that in the early phases, women participation increases due to economic development especially as unpaid family worker in the agriculture sector. Later, their employment increases in the manufacturing and services sector. As women's education improves so do their opportunities in the services sector. Education not only guarantees higher income but also provides opportunities in the labour market. Therefore, there exists a strong causality between the level of economic development and women labour force participation.

The objective of the study is to investigate the association between women labour force participation and the phase of economic development with respect to Pakistan span from 1980-2011. Johansen Co-integration and Error Correction Model (ECM) techniques are applied to study the long run and short run association between women labour force and economic development.

Rest of study is allocated as follows: section: 2 design for theoretical and empirical consideration. Section: 3 explains analytical frame work, modeling and data sources. Section: 4 illustrates the Methodology and empirical results and the conclusion and policy implication is mentioned in section 5.

2. Theoretical and Empirical Review of Literature:

The association between women labour force and economic development is an empirical issue discussed both in time series and cross country literature. A theoretical exposition of economic development is discussed by Mincer et.al (1962).The U-shaped, also known as U curve hypothesis[1] establishes a long-term association between women labour force participation and economic development has been alluded in voluminous studies. Boserup (1970), Durand (1975), Pampel et.al (1986), that the countries on the left side of the U curve represents the share of labour force associated in the agriculture sector and the gross domestic product generated from the agrarian economy while the countries on the right side portion shows that industrial activities are dominant and the share of GDP is high as compare to the GDP from the agriculture sector. Psacharopoulos and Tzannatos (1989) stressed the definitions and theories of labour supply of women and examine them with respect to the data of 136 countries including developed and developing nations for the period 1960 and 1980. The findings of the paper confirmed the U-shaped pattern of women labour supply in the course of economic development. It is evident in the course of transition from agro subsistence economy to industrial economy; the women employment represents a U-pattern curve. The author found that during the last twenty years, the women labour supply increased by 10% in the industrialized countries while it decreased by 7% in the developing countries. Pampel and Tanaka (1986) postulate that "high-income and low-income countries have the highest women participation rate; however their participation is lowest in the middle-income countries". The authors employed the cross- national data on 70 nations for the periods 1965 and 1970. They used the consumption of energy per capita as a yardstick of development and conclude that it has a curvilinear impact on women labour supply.

Goldin (1994) reveals that the supply of labour with regard to the married women is U-shaped as the countries move on the path of development. Initially, the women labour supply decreases and then later on it increases. This U-shaped association between women labour force participation and economic development is also evident through the histories of recently advanced countries. The author employed the data of more than 100 countries and the history of United States is used to expose the U-shaped women labour supply curve. In the initial stages of development, less educated women only and mostly work in the household, agriculture sector as well as in family farm with which a strong social stigma exists. With the overall development, women becomes more educated and there exist more job opportunities for white-collar jobs for women especially of secondary education level, for which no social stigma exists. With the introduction of new technologies and the expansion of the markets, family income rises so the rate of women participation in the labour market declines while their domestic activity increases. The reduction in the women labour supply owes to an income effect but finally the substitution effect dominates the income effect at some level in time. Goldin (1995) explores the U-patterned hypothesis by employing data for 180 countries for the period 1985 and taken (Real) GDP Per Capita as a measure of development. The falling portion of the U-shaped curve shows the existence of the backward countries of the world while the wealthier nations are on the rising portion and the middle income countries are at the bottom. Mammen and Paxson (2000) explores evidence of the U-shaped curve using the cross country data for 90 countries for the years 1970,1975,1980 and 1985.The authors finds a U-pattern, the richest and the poorest countries represents more than 50% participation rates and 35% for the middle income countries which is in line with the findings of Goldin (1995). Tansel (2002) affirms the U-shaped hypothesis between economic development and women labour supply for Turkey. The author used the time series data and considers its cross-provincial factors to determine the women participation rate. Data was applied for 67 units for three different levels in time i.e. 1980, 1985 and 1990. The findings are positive and strong effect on women labour supply while negative effect on unemployment. Onzur Cakir (2008) focuses the effects of economic development on women labour supply Appling time series data span from 1980-2000 in Turkey. The study incorporates 5 different models to measure different determinants of women labour supply. The study concludes that Turkey is facing the

[1]In the early stages and process of economic development, there is a rapid increase in the blue collar jobs which raises the employment due to industrialization and urbanization which is reflected in the growth of the manufacturing sector. Because of the opportunities in the blue collar jobs, male labour force participation increases so do their earnings and wages. On the other hand, female labour force participation declines because of the income effect (as male's employment raises family income) and due to the demarcation between female household chores and male productive work. As the development takes place in the economy, introduction of technology and household appliances minimize the opportunity cost of time of female in the household leads to increase in education which in turn leads to the increase in the demand for women in the white collar jobs. The higher demand for females increases female's earnings. Therefore, during rapid industrialization the substitution effect of the wage rate increases and dominates the income effects which resultantly increase the female labour supply.

declining portion of U-shaped curve but it is expected that the country will move to the rising portion of U-shaped curve in the future. Fatima and Sultana(2009) find the U pattern association between women labour force participation and economic development using cross- sectional data for 4 provinces with respect to regions (urban/rural) are pooled for three periods 1992-93, 1996-97 and 2001-2002 using a fixed effect test and affirms the U-shaped existence in Pakistan. The authors used household expenditure on fuel consumption which is used to measure the stage of economic development as the data on GDP are not available at the provincial level. Sanjukta (2010) revisits the U-shaped hypothesis for 172 countries from 1990 to 2007, with the total observations 3060 for the South Asia and South East Asia. The study concludes that both the regions are on the falling portion of the U-curve. Roughly, the SAC (South Asian countries) are below the U-curve while the SEAC (South East Asian countries) are slightly above the curve as far as Pakistan having the lowest women labour supply and countries like Cambodia and Vietnam having the highest women participation rates.

The pattern and amplitude of the U-shaped trend varied among the countries and with the passage of time. The U-shaped curve for the women labour force participation especially during the process of economic development is not agreed by all the researchers. Standing (1978) stresses that the factors of women labour force supply is too complicated and complexed to be explained by the U-shaped hypothesis. Such as Durand (1975:150)[2] finds that in the case of developing countries, the U-shaped phenomenon is not a general trend of women labour supply. Economic development can have affirmative and negative effect on women labour force supply depending on the share of women participation rate employed in the growing and expanding sector. Steel(1981:163)[3] argues that in the 1960s, as Ghana modernized its economy in terms of rapid manufacturing employment but does not experience the U-shaped curve for women participation rate in fact the women labour supply rose because of industrialization.

2.1 Analytical Framework:

This study explains the association between economic growth and women labour force participation. So, this study expects that better economic conditions motivate women to enter into the labour market for earnings. According to Kuznets, (1955) economic progress measured by income per capita, first increases inequality but as the benefits from development is accrued and spread in the society the disparities starts declining. Goldin (1994) and Mammen and Paxson (2000) reveal that "there is a U-shape association between women labour force and economic growth with the view that developing countries are mostly agrarian in nature where the contribution of women in the fields are dominant". The women in these poor countries are burden laden as they contribute not only in the fields but are also involved in rearing and bearing of children and in domestic chores. Due to industrialization, there is an expansion in the manufacturing sector with the introduction of the technologies, the family income rises so that women labour force participation squeezes. This is said to be an unearned income effect that reduces the women labour supply.

2.2 The model:

On the basis of theoretical literature and empirical studies we use the GDP and its square for the estimation of U-shaped association between women labour supply and economic development. Based on the general form of U-shaped association between women labour force participation and economic growth is modeled as follows:

$$WLFP = f(Y, Y^2)$$

2.3 Data Sources:

The study coves the span from 1980-2011 due to availability of data on women labour force participation from 1980. Data women labour force participation is collected from webpage of International Labour Organization (ILO) and the WDI.

3. Methodology and Empirical Results:

This study use time series data, which always show some trends that's why the properties of stationarity are necessary. Stationarity properties of the macroeconomic variables can be investigated by applying a variety of unit root tests which are available in applied economics. We use unit root test (ADF) 1979. The explanation of test is given below:

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[2] Durand, J.D.(1975)"The Labour Force in Economic Development", Princeton: Princeton University Press(seen in "Economic Development and Female Labour Force Participation in Turkey: Time-series Evidence and Cross-Province Estimates", Aysit Tansel (2005).

[3] Steel, W.F (1981)"Female and small scale employment under Modernization in Ghana".Economic Development and Cultural change, 30:153-167(seen in Tansel, Aysit (2005).

3.1 ADF Unit Root Test:

We start from widely used unit root test i.e. ADF developed by {Dickey and Fuller, (1981)} which can be applied if residual term seems to be time variant. The knowledge about unit root properties is necessary to make times series reliable and efficient. The estimable equation is modeled as following:

$$\Delta Y_t = \beta_1 + \beta_2 T + \delta Y_{t-1} + \alpha_j \sum_{i=1}^{m} \Delta Y_{t-i} + \varepsilon_i$$

Where Δ is difference operator and ε is residual term following the assumption of normality.

$$\Delta Y_t = (Y_t - Y_{t-1}), \Delta Y_{t-1} = (Y_{t-1} - Y_{t-2}), \Delta Y_{t-2} = (Y_{t-2} - Y_{t-3}) \text{ etc.}$$

The main objective here is to test whether δ is equal to zero or not. The critical T-statistics are generated by Dickey and Fuller, (1979) to examine unit root problem. The series Y is said to be stationary, if the estimate of δ is less than tabulated T-statistics.

3.2 The Co-integration Test:

If the variable(s) under study are found stationary at level then Ordinary Least Square (OLS) method will be applied without losing any useful long run information.

Johansen Co-integration test is one of the most dominant tests for Co-integration, which evaluates the postulation of linear deterministic drift in the data. The LR (likelihood ratio) is applied for testing the number of Co-integrating vectors. The Likelihood Statistic Ratio (LSR) for the trace test is:

$$LSR = - T \sum_{i=x+1}^{p-x} \ln (1-g_i)$$

here gx+1, gp are the estimated p-x eigenvalues. There are at most x Co-integrating vectors is the null hypothesis (H_0) of this test, here x is 0, 1, or 2. In this study, the H_0 is tested adjacent to the general alternative hypothesis (H_1) of x+1 Co-integrating vectors. So, the H_0 x=0 is treated adjacent the H_1 x=1, x=1 against the H_1 x=2 and so onwards

3.3 The Error Correction Modal (ECM):

Once long run association between economic development and women labour force participation is established then it is necessary to find short run impact of economic development on women labour force participation in case of Pakistan. In doing so, we apply ECM. The empirical equation of ECM is modeled as follows:

$$ECM=\Delta WLFP=\alpha+ \alpha_2 \Delta RPCY_i+ \alpha_3 \Delta RPCY^2_i+ \alpha_4 ECM_{t-1}+\varepsilon$$

Where, ECM_{t-1} is lagged disturbance term α_4 is estimate of lagged error term captures the pace of adjustment from short run towards long run equilibrium path. Here, we say that differenced of women labour force participation is explained by differenced of linear (non-linear) term of (Real) GDP per capita plus lagged disturbance term and stochastic term. We have conducted diagnostic tests to test the CLRM assumptions such as normality of error term, serial correlation, autoregressive conditional heteroscedasticity, white heteroscedasticity and specification of short model.

3.4 Empirical Results:

Our empirical discussion starts from descriptive statistics. The results are exhibit in Table no.1. The results specify that entire series have been normally distributed. The mean and variance are constant of the residual terms of the series. The correlation matrix reveals that there is a positive and strong correlation exists between economic development and women labour force participation in case of Pakistan.

Table no.1: Descriptive Statistics

	WLFP	RPCY	RPCY2
Mean	4.294255	25247.30	6.86E+08
Median	3.801188	24039.74	5.78E+08
Maximum	7.152789	37309.72	1.39E+09
Minimum	3.208007	15550.01	2.42E+08
Std. Dev.	1.121057	7058.435	3.82E+08
Skewness	1.400881	0.475927	0.731343
Kurtosis	3.794567	1.914293	2.139262
Jarque-Bera	10.95489	2.692849	3.720414
Probability	0.004180	0.260169	0.155640
Sum	133.1219	782666.5	2.13E+10
Sum Sq. Dev.	37.70306	1.49E+09	4.38E+18
Observations	31	31	31

Source: Author's Estimation

The next step is to test the unit root properties of women labour force participation and economic development, in doing we have applied ADF (Dickey and Fuller, 1979) unit root tests.

Table no. 2: Unit Root Analysis

Variables	Calculated value	1% Critical value	5% Critical value	Probability
WLFP(0)	0.055700	-4.296729	-3.568379	0.9952
Δ(WLFP)(0)	-5.170567	-4.309824	-3.574244	0.0013
Δ(WLFP,2)(0)	-5.401823	-4.339330	-3.587527	0.0009
RPCY(0)	-2.102496	-4.296729	-3.568379	0.5237
Δ(RPCY)(0)	-5.505664	-4.309824	-3.574244	0.0006
Δ(RPCY,2)(0)	-6.094814	-4.356068	-3.595026	0.0002
$RPCY^2$(0)	-1.645074	-4.296729	-3.568379	0.7503
Δ($RPCY^2$)(0)	-5.342090	-4.309824	-3.574244	0.0008
Δ($RPCY^2$,2)(0)	-5.842329	-4.356068	-3.595026	0.0003

Source: Author's Estimation

The results indicate that women labour participation per capita and (Real) GDP Per Capita contain unit root problem at level with constant and trend. Both series are stationary at 1st difference indicated by statistics of ADF unit root test. This shows that series have same order of integrated i.e. (1).

After that to evaluate the Co-integration among the variables, Johansen Co-integration test is used, two LSRs have been developed by Johansen: TS (Trace Statistics) and MEVS (Maximum Eigen Value Statistic). The results of Co-integration tests are reported in Table no. 3.

Table no. 3: Johansen Test for Co-integration TS

Probability	TS	5% Critical Value	No of Co-integration Equation
0.0718	**28.40249**	**29.79707**	**None ***
0.5180	**7.520351**	**15.49471**	**At most 1**
0.4315	**0.618862**	**3.841466**	**At most 2**

Source: Author's Estimation *significance at 10% level

Illustration of Table No. 3: Johansen Co-integration test: TS shows refusal of the H_0 of no Co-integration at 5% significance level, and the LR test indicate the existence of single Co-integrating equation at 10% level of significance. So the variables are co-integrated.

Table no. 4 Johansen Test for Co-integration MEVS

Probability	MEVS	5% Critical Value	No of Co-integration Equation
0.0541	20.88214	21.13162	None *
0.5009	6.901489	14.26460	At most 1
0.4315	0.618862	3.841466	At most 2

Source: Author's Estimation *significance at 6% level

Illustration of Table No. 4: Johansen Co-integration test: MEVS also shows the refusal of the H_0 of no Co-integration at 5% level of significance, and the LR test indicates the existence of single Co-integrating equation at 10% level of significance. So the variables are co-integrated. The existence of long run association between the variables leads us to evaluate long run impact of independent variables on dependent variable. The empirical evidence of marginal impact of economic development on women labour force participation is tabulated in Table no. 5.

Table no. 5 long run Co-integration equation (normalized first Co-integration vector)

Variables	Coefficient	Stnd Error	t values
RPCY	-0.000251	6.7E-05	-3.7462686
$RPCY^2$	7.99E-09	1.3E-09	7.1461538

Source: Author's Estimation

Illustration of Table No. 5: Our results show that both linear and non-linear terms of (Real) GDP Per Capita are statistically significant. This finding validates the existence of U-shaped association between women labour force participation and economic development. It is noted that a 1 per cent rise in economic growth is linked with -2.51E-04 per cent decline in women labour force participation shown by estimate of linear term while positive sign of non-linear (squared) term of (Real) GDP Per Capita indicates the joining point of women labour force participation and (Real) GDP Per Capita with a rise economic growth to higher levels. The estimate of non-linear term of (Real) GDP Per Capita is 7.99E-09.

To evaluate the short run impact of economic development on women labour force participation in case of Pakistan. For this purpose we have used ECM. The outcomes are reported in Table no. 6.

Table no. 6 Error correction model

Variables	Coefficient	Stnd Error	t - Stat	Probability
D(RPCY)	-0.000341	0.000234	-1.456593	0.1572
D(RPCY^2)	6.72E-09	3.98E-09	1.689264	0.1031
ECM(-1)	-0.471853	0.163804	-2.880602	0.0078
C	0.111751	0.050167	2.227577	0.0348
R^2 0.393414	D-W 1.66	Adj R^2 0.323424	F-stat (Prob)	5.62(0.0041)

Source: Author's Estimation

The estimate of error correction term i.e. ECM_{t-1} has negative sign and it is statistically significant at 1 per cent level of significance. The coefficient of ECM_{t-1} shows the speeds of adjustment from short run towards long run equilibrium path. If speed of adjustment is higher than greater would be correction in deviations from short run towards long run (Banerjee, et al. 1993). It is also pointed by Bannerjee et al (1998) that we can validate our established long run association between the variables by mean at the statistical significance of error correction term. The coefficient of ECM_{t-1} is -0.471853 and it is statistically significant at 1 per cent level of significance. This confirms our long run established association between economic development and women labour force participation in case of Pakistan.

Table no. 7 (BG) Breusch-Godfrey Serial Correlation LM Test

F-stat	0.410401	Probability	0.667952
Obz*R^2	0.992074	Probability	0.608939

Source: Author's Estimation

Because the Dur–Wat stat is 1.666, so it creates ambiguity about autocorrelation, BG Serial Correlation LM Test is performing to evaluate Serial Correlation in the modal. Its H_0 is the error term has no Serial Correlation and H_1 error term has Serial Correlation the probability of F test and chi-square is greater than 10 percent so we accept the H_0.

4. **Conclusion and Policy Implications:**

In this study the association between economic development and women labour force participation investigate empirically with reference to Pakistan over the period of 1980-2011. ADF test have been applied to test the stationarity properties of the chosen variables. Johansen co-integration test is executed to examine Co-integration between women labour force participation and economic development. Our results confirm long run and U-shaped association between both variables long run as well as in short run in case of Pakistan. Pakistan is undergoing on the severe economic crisis that has produced a lot of social and economic problems within the country. Due to which the marginalized segment of the population which is in the form of women and children have become more actively associated in the marginalized activities. The participation of women is understated due to the exclusion of marginal activities and the invisible contribution of women in the economy. In case of Pakistan, it is desirable as well as the need of the day to narrow the gap between men and women through providing equal opportunities to women in terms of better market opportunities, better wages, more job opportunities etc. A strong association between economic growth and women labour supply force is found as policy maker ought to concentrate on increase and improving women education and skills. The adoption of gender specific wage laws may be reduced the earning gap between both the genders. Moreover, measures to improve the employment opportunities along with the expansion of the manufacturing and industrial sector will contribute to increase the women labour supply. The policy makers should focus on cottage industries where the role and participation of women can easily be increased due to our cultural and traditional skills. To encourage the women labour supply in the labour market the government must provide child care subsidies especially in the form of day care centers, pri-school education etc, which may ultimately supports the women and encourage them to participate in the economic activities.

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First Author Nooreen Mujahid:

She is assistant professor in University of Karachi, and she is also visiting faculty of many Institutions and Author of many national and international articles. Currently she is working as Additional Directing Staff at the national Institute of management (Training institute for the civil servant), Karachi for almost five years.

Second Author Sulaiman D. Muhammed:

He is working as Dean Faculty of Arts, Federal University of Karachi. He is also author of many national and international articles.

Third and Corresponding Author Muhammad Noman:

He is working as a lecturer in Federal Urdu University and research scholar in University of Karachi and Federal Urdu University.

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