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An Endeavour to empirically verify the 'Feminisation 'U' Hypothesis' of female labour force participation rate in India (1991-2016)

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Abstract

Objectives: This paper aims at empirical investigation of the 'U' pattern of association between female labour force participation rate in India and its determinants using secondary data for the period (1991-2016).
Methods/Statistical analysis: To test the validity of this 'feminisation 'U' hypothesis' a scatter diagram has been presented to display the association between FLFP and GDPPCPPPCONST for the period (1991-2016). Contrary to the earlier studies two distinct 'U' pattern of movement for two different periods period 1: (1991-2005) and period 2: (2005-2016) have been noticed and separate OLS regression using linear and quadratic models for period 1 and period 2 respectively have been carried out.
Findings: Regression results suggest that for both the periods quadratic models explain the influence of GDP per capita better on female labour force participation rate and this verifies the 'feminisation 'hypothesis'. This is consistent with the existing literature and adds value to them as it is based on updated data. Some other factors like school enrolment, secondary, female (% gross) (FSC), school enrolment, secondary, male (% gross) (MSC), Employment to Total Population Ratio (ETPR), fertility rate (FERT) are also incorporated for analysing their possible influence causing this pattern of association. The 'U' pattern of association between FLFP and FSC and FLFP and FERT, FLFP and MSC are also noticed which proves the nonlinearity between i. FLFP and FSC and ii. FLFP and FERT, iii. FLFP and MSC.
Application/Improvements: We find twice the evidence of 'U' shaped pattern of association between FLFP and GDPPC PPP cost which might indicate that the association might be oscillatory in nature which can be empirically tested.
***Keywords*:** Female, Labour force, India, Feminisation, 'U' shaped.

1. Introduction

The participation of women in the workforce has an essential role to play in the development process of a country. A declining trend of female labour force participation rate in a country like India may jeopardise the growth of the country. It is pertinent to analyse the trend and pattern of association between female labour force participation rate (FLFP) and its determinants. FLFP is hypothesised to follow a nonlinear 'U' shaped pattern as a country develops. A couple of studies have tried to sketch this 'U' shaped picture of female labour force participation rate as a country develops [1-4].

According to the 'feminisation 'U' hypothesis' the influence of growth on female labour force participation rate is supposed to be convex. i.e., FLFP initially declines with growth and then rises in the long run [1]. Explanations for this 'U' shaped hypothesis has been provided as-in a poor country, women engage themselves in subsistence farming. With further development of the country, people shift their economic activity from agriculture to industry.

There is a rise in level of education, fall in fertility rate and weakening of social stigma. So women become able to take advantage of new jobs in the emerging sectors which are now more family friendly. At a household level with increase in a husband's wages, negative income effect dominates the supply of female labour, when wages for women start to increase, however, the substitute effect becomes dominant and women are encouraged to increase their labour supply [5].

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There is a stream of research on the investigation of Feminisation 'U' hypothesis. Some have used econometric techniques for verifying the Hypothesis [1], [2], [12]. Many studies confirm the existence of feminisation 'U' hypothesis [6], [7]. The various findings of their research suggest the following: It is suggested that policies to enhance growth alone may be ineffective mostly in developing countries to promote women's labour force participation. In addition to that, better labour market policies are required to get any desirable outcome as far as female labour force participation is concerned.

In [1] South Mediterranean countries, removing barriers for the entry of females in the labour force has the effect of increase in their participation. The resulting economic benefit has growth enhancing effect in South Mediterranean countries [2]. In the Indian context, there are relatively few empirical studies to verify this hypothesis. In [8] was the first to mention that India is behaving according to feminisation 'U' hypothesis and it was made popular by [9]. Some researchers have tried to empirically identify the causes responsible for this pattern of association. Some researchers state that "other family income' has a strong role to play in falling female labour force participation. Women with more education generally marry into rich families which induce them to withdraw from labour force [3]. In addition to improvement in literacy rate in states like Uttarakhand, efforts to create employment opportunities for the educated females are essential for encouraging female labour force participation in rural as well as urban regions [2].

In [10] noticed a strong 'U' shape in the relation between education and female labour force participation, and there is a turning point in urban areas having shifted from completion of middle school to completion of secondary education[10-11]. However, there are some studies which questioned the validity and existence of 'U' shaped hypothesis [13-14]. A study found that the Middle East and North America (MENA) region did not reveal a 'U' shaped relationship between female labour force participation and gross domestic product [2]. Some studies have found that in high income and upper middle income economies, the existence of the 'U' shaped relationship was verified positively, but in the low-income economies, the 'U' shaped curve was instead found to be an inverted one [13]. Some other study has also detected an inverted U shaped relationship between income and female labour force participation rate [15]. In [16] their research has also conducted a state level analysis and they did not find much support for a 'U' shape of female participation in the Indian case. So there is a growing debate among the researchers on the verification on 'U' shaped feminisation hypothesis. This calls for an extensive research on the said topic incorporating other factors also which might have influence on this pattern of association.

This paper focuses on empirical verification of 'U' shape hypothesis and also incorporating factors like female and male school enrolment, fertility rate, employment to population ratio etc. To give a comprehensive analysis of the 'U' shaped feminisation hypothesis, a recent data has been used to enrich the work and to get an up-to-date analysis.

2. Data source and Methodology

1. Data source

Secondary data has been used in this paper obtained from 'World Development Indicator', World Bank. Time series regression analysis has been carried out to prove the convexity of the hypothetical relationship between female labour force participation rate and GDPPCCONST for the period [1991-2016]. MS EXCEL software has been used to perform the regression.

The definition of the variables: FLFP: Labour force participation rate, female (% of female population ages 15+) (modelled ILO estimate): Labour force participation rate is the proportion of the population ages 15 and older that is economically active: all people who supply labour for the production of goods and services during a specified period. GDPPCCONST: GDP per capita, PPP (constant 2011 international $): GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates.

An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.

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It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2011 international dollars. FSC: school enrolment, secondary, female (% gross): Gross enrolment ratio is the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers.

FERT: Fertility rate, total (births per woman): Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year. MSC: school enrolment, secondary, male (% gross): Gross enrolment ratio is the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject or skill oriented instruction using more specialised teachers.

ETPR: Employment to population ratio, 15+, total (%) (Modelled ILO estimate): Employment to population ratio is the proportion of a country's population that is employed. Employment is defined as persons of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit, whether at work during the reference period (i.e. who worked in a job for at least one hour) or not at work due to temporary absence from a job, or to working-time arrangements. Ages 15 and older are generally considered the working-age population.

3. Discussion

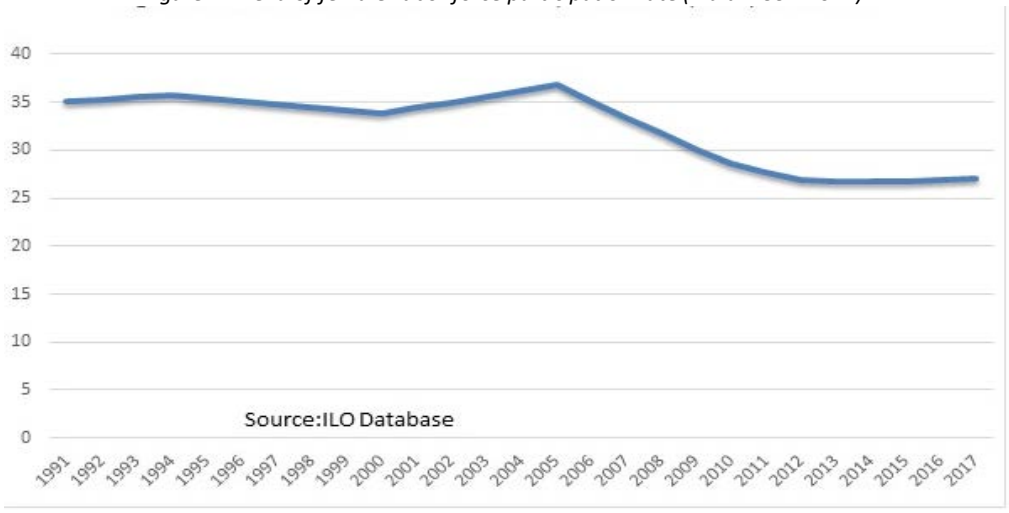
1. Analysis of the nonlinear association of FLFP

This paper aims at empirical investigation of the pattern of association between female labor force participation rate in India and its determinants. Existing literature suggests that there is evidence of a 'U' shaped pattern of association between FLFP and economic development.

To test the validity of this 'feminisation hypothesis' a scatter diagram (Figure 1) has been presented to display the association between FLFP and GDPPCPPPCONST for the period (1991-2016).

Figure 1 reveals that in the period 1991-2017 there are two distinct 'U' pattern of movement, one from 1991 to 2005 another from 2005 to 2017. There is a hypothesis that the relationship between female labor force participation rate and development has been 'U 'shaped. To see the association we consider.

Figure 1. Trend of female Labor force participation rate (India: 1991-2017)



The scatter diagram (Figure 2) shows that for the period considered here (1991-2016) there has been two distinct 'U' pattern of movement. So two different periods has been considered (1991-2005) and (2005-2016). We run separate regressions for the two periods concerned as below: Period 1: 1991-2005.

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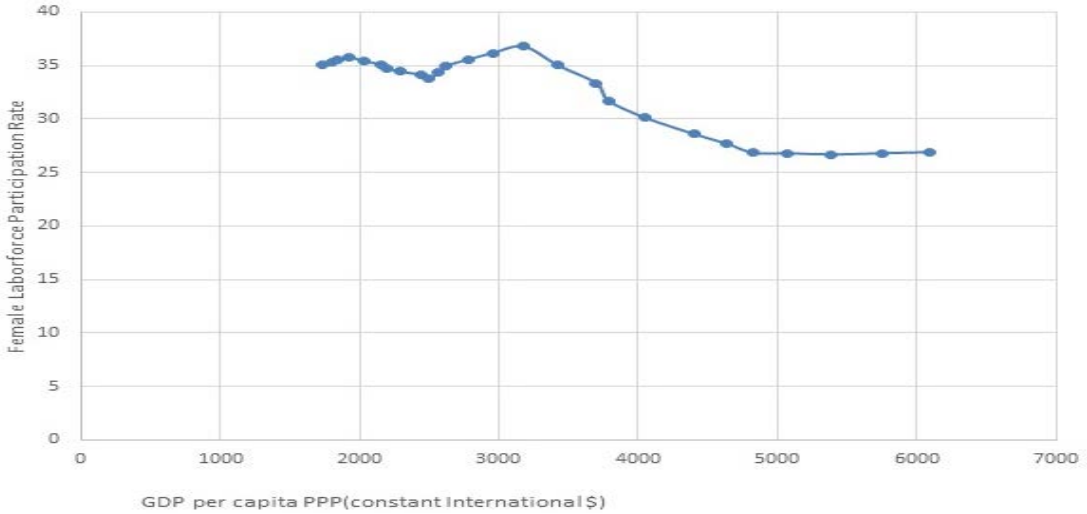
Figure 2. Scatter diagram showing association between GDP per capita PPP (constant 2011 International $) and Female labor force participation rate (India: 1991-2016)



Source: World Development Indicator, World Bank

1.1. Linear model

$FLFP_t=a+bGDPPC_t+U_t$t=at time period t, U_t=Disturbance term at period t, regression results can be summarised in (Table 1,2): Regression coefficient is not statistically significant at 5% level of significant (t tabulated at 5% level of significance for 14 d.f is 2.144). Moreover R^2 value is only 0.07 very low. This suggests that the linear regression is not the best fit. The model is improved by incorporating square of GDPPCPPPCONST, i.e, run a quadratic regression as follows:

Table 1. Female Labor force participation rate and GDP per capita, PPP (constant 2011 International $)

Year	FLFP	GDP per capita, PPP (constant 2011 international $)
1991	35.033	1737.615
1992	35.258	1796.532
1993	35.488	1845.149
1994	35.722	1930.113
1995	35.408	2036.796
1996	35.083	2149.366
1997	34.76	2194.903
1998	34.439	2288.048
1999	34.124	2445.751
2000	33.816	2495.047
2001	34.391	2570.428
2002	34.975	2623.33
2003	35.566	2783.004
2004	36.167	2955.205
2005	36.777	3178.829
2006	35.032	3419.931
2007	33.341	3698.777
2008	31.703	3786.633
2009	30.114	4049.805
2010	28.576	4404.697
2011	27.69	4635.879
2012	26.829	4827.56
2013	26.797	5073.605
2014	26.686	5389.904
2015	26.8	5754.065
2016	26.908	6092.648

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Table 2. Regression results: regression of FLFP on GDPPC (linear model) (period 1)

Summary output								
Regression Statistics								
Multiple R	0.2672							
R Square	0.0714							
Adjusted R square	-1E-05							
Standard error	0.7785							
Observations	15							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.606	0.61	1	0.3			
Residual	13	7.879	0.61					
Total	14	8.4849						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	34.021	1.1307	30.1	2E-13	32	36.46	32	36
GDPPCPPPCONST	0.0005	0.0005	1	0.336	-0	0.002	-0	0

2.2. Quadratic model

$FLFP_t=a+bGDPPC_t+c\ (GDPPC)^2_t+U_t$, t=at time period t, U_t=Disturbance term at period t. Regression results (Table 3) can be summarised as follows: Regression results are much better than the earlier linear regression. The R^2 is 0.67 so good fit. GDPPCPPPCONST and GDPPCPPPCONST2 are statistically significant at 5% level. GDPPCPPPCONST has negative coefficient meaning FLFP decreases with increase in GDP Per capita initially. This can be explained as when per capita income increases female join less in the laborforce.GDPPCPPPCONST2 has a positive coefficient which indicates that after a specific level of GDP Per capita the returns to FLFP by increasing GDPPCPPPCONST are increasing, i.e, the change in slope of FLFP is positive for further increase in GDPPCPPPCONSTANT which proves the convexity and hence the 'U' shaped pattern.

Table 3. Regression results: regression of FLFP on GDPP (Quadratic model) (period 1)

Summary output								
Regression statistics								
Multiple R	0.8199							
R Square	0.6723							
Adjusted R square	0.6177							
Standard error	0.4814							
Observations	15							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	5.7044	2.85	12.31	0			
Residual	12	2.7805	0.23					
Total	14	8.4849						
	Coefficients	*Standard error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	52.269	3.9524	13.2	2E-08	44	60.88	44	61
GDPPCPPPCONST	-0.0152	0.0034	-4.5	7E-04	-0	-0.008	-0	-0
GDPPCPPPCONST2	3E-06	7E-07	4.69	5E-04	0	5E-06	0	0

The period (1991-2005) can be viewed as the immediate post liberalisation period when it was expected that with liberal policies, easy entry of foreign investment, more emphasis on export production, employment generation and labour force participation would increase. But initially the Indian economy faced a fall in labor force participation rate till 2000, after which it started to increase in the period between 1999-2000 and 2004-05[NSSO 55th round and 61st round]. Major employment was created in the services (hotel, business, transport, banking services), trade, mining and quarrying, manufacturing. There was a fall in employment generation in agriculture though a significant proportion of population was still preoccupied in agriculture. The major share of this employment was informal sector employment period 2, period: (2005-2016).

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1.1. Linear model

$FLFP_t=a+bGDPPC_t+U_t$

t=at time period t,U_t=Disturbance term at period t

Regression results are summarised in (Table 4). The estimated regression coefficients seem to be good enough to convince us to use the linear model. This is evident by the high R^2 value (0.80), statistically significant t value (t tabulated value for 5% level of significant at 11 d.f is 2.20). Regression coefficient is –live as expected. But if we again use the quadratic model we get better results as shown below:

Table 4. Regression results: regression of FLFP on GDPPC (Linear model) (period 2)

Summary output								
Regression statistics								
Multiple R	0.8945							
R square	0.8002							
Adjusted R square	0.7802							
Standard error	1.6912							
Observations	12							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	114.55	115	40.05	0			
Residual	10	28.602	2.86					
Total	11	143.16						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	45.387	2.5154	18	6E-09	40	50.99	40	51
GDPPCPPPCONST	-0.0035	0.0005	-6.3	9E-05	-0	-0.002	-0	-0

2. Quadratic model

$FLFP_t=a+bGDPPC_t+c(GDPPC)^2{}_t+U_t$

t=at time period t, U_t=Disturbance term at period t

Regression results are summarised in (Table 5). R^2 value has been as high as 0.99 coefficients of GDPPCPPPCONST and GDPPCPPPCONSTANT2 are highly statistically significant (Very high t ratios). As evident GDPPCPPPCONST has negative coefficient showing the negative impact on FLFP. GDPPCPPPCONST2 has positive coefficient which proves the convexity and 'U' pattern of association. Now we proceed to determine the other factors responsible for this pattern of movement of FLFP.

Table 5. Regression results: regression of FLFP on GDPP (Quadratic model) (period 2)

Regression Statistics								
Multiple R	0.9961							
R Square	0.9922							
Adjusted R Square	0.9905							
Standard Error	0.3514							
Observations	12							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	142.05	71	575.1	0			
Residual	9	1.1114	0.12					
Total	11	143.16						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	87.27	2.8552	30.6	2E-10	81	93.73	81	94
GDPPCPPPCONST	-0.0223	0.0013	-18	3E-08	-0	-0.019	-0	-0
GDPPCPPPCONST2	2E-06	1E-07	14.9	1E-07	0	2E-06	0	0

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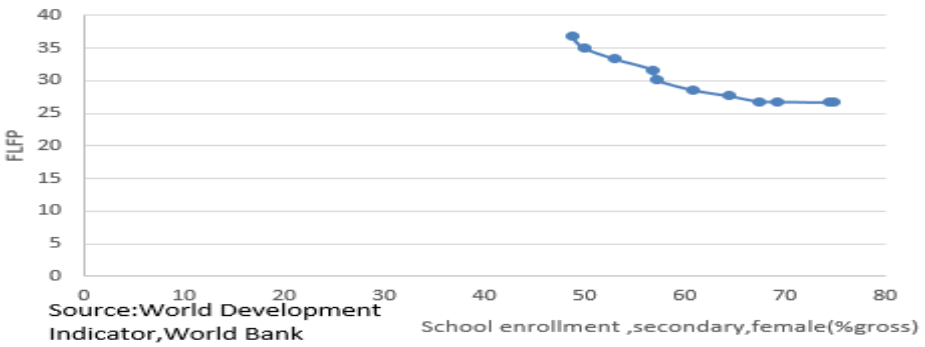
We include factors like school enrolment, secondary, female (% gross) (FSC), school enrolment, secondary, male (% gross) (MSC), Employment to Total Population Ratio (ETPR), fertility rate (FERT). Period considered is (2005-2015). Because of lack of availability of data we consider this period only for analysis. The empirical regression model used here is furnished below:

FLFPt=a+bGDPPCPPPCONSTt+GDPPCPPPCONST2+cFSCt+dMSCt+eETPRt+fFERTt+Ut
t=at time period t,U_t=Disturbance term at period t

Figure 3. Association between FLFP and school enrolment, secondary, female (%of Gross)



Source: World Development Indicator, World Bank

Table 6. Regression results: regression of FLFP on GDPPC, FSC, MSC, ETPR, FERT

Summary output								
Regression Statistics								
Multiple R	0.9997							
R square	0.9995							
Adjusted R square	0.9986							
Standard error	0.1354							
Observations	11							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	6	134.141	22.35684	1219.7	1.79E-06			
Residual	4	0.073317	0.018329					
Total	10	134.2143						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-17.45	23.29723	-0.74902	0.4955	-82.1335	47.2334	-82.1335	47.2334
GDPPCPPPCONST	-0.009	0.003115	-2.8047	0.0486	-0.01738	-8.8E-05	-0.01738	-8.8E-05
GDPPCPPPCONST2	8E-07	2.36E-07	3.421579	0.0267	1.52E-07	1.46E-06	1.52E-07	1.46E-06
FSC	0.0898	0.104034	0.863249	0.4367	-0.19904	0.37865	-0.19904	0.37865
MSC	-0.048	0.083536	-0.57253	0.5976	-0.27976	0.184106	-0.27976	0.184106
ETPR	1.2205	0.727729	1.677128	0.1688	-0.8	3.240994	-0.8	3.240994
FERT	0.5641	16.86215	0.033456	0.9749	-46.2527	47.38098	-46.2527	47.38098

Regression results can be summarised in (Table 6) only ETPR is statistically significant at 20% level of significance. FSC, MSC and FERT coefficients are not insignificant at 5% level of significant. FSC is not statistically significant. This may be due to the feminisation hypothesis. We can see the scatter graph between FLFP and FSC as given in (Figure 3). The scatter diagram (Figure 3) again shows the 'U' shaped association. So we rather include a nonlinear, quadratic relation between FLFP and FSC. Let us consider the following regression model:

$FLFP_t=a+bFSC_t+c(FSC_t)^2+U_t$
t=at time period t,U_t=Disturbance term at period t

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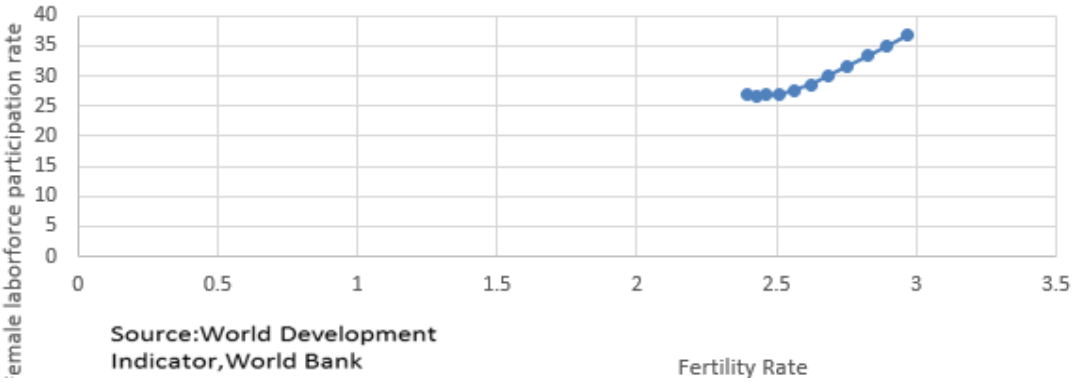
Table 7. Regression results: regression of FLFP on FSC (Quadratic model)

Summary output								
Regression Statistics								
Multiple R	0.994926							
R Square	0.989878							
Adjusted R Square	0.987347							
Standard Error	0.412093							
Observations	11							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	132.8558	66.42789	391.1645	1.05E-08			
Residual	8	1.358567	0.169821					
Total	10	134.2143						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	122.1826	7.189526	16.99452	1.46E-07	105.6035	138.7616	105.6035	138.7616
FSC	-2.65685	0.235564	-11.2787	3.43E-06	-3.20006	-2.11364	-3.20006	-2.11364
$(FSC)^2$	0.018461	0.001898	9.727696	1.04E-05	0.014084	0.022837	0.014084	0.022837

The regression results can be summarised in (Table 7). Both FSC and $(FSC)^2$ coefficients are statistically significant at 5% level of significance. This proves the nonlinearity ['U' shaped association] between FLFP and FSC. The insignificant t ratio for FERT coefficient also calls for a similar scatter graph and regression as presented in (Figure 4).

Figure 4. Association between fertility rate and female labor force participation rate



Source: World Development Indicator, World Bank

This also shows a 'U' shaped pattern of association.
The regression model:
$FLFP_t = a + bFERT_t + c\,(FERT_t)^2 + U_t$
t=at time period t, U_t=Disturbance term at period t

Regression results can be summarised in (Table 8). Fertility rate coefficient is very highly negatively related to FLFP and statistically significant at 5% level of significance. But positive $(FERT)^2$ indicates that after a certain rate of FLFP decline any further increase in fertility rate will increase FLFP giving a 'U' shaped association. May be this rising portion can be explained as with further increase in fertility rate and as education increases, with more educated and skilled female population FLFP will start increasing. The association between MSC and FLFP has been portrayed in (Figure 5) given after references. To model the association between MSC and FLFP following regression has been run:

$FLFP_t = a + bMSC_t + c(MSC_t)^2 + U_t$
t=at time period t,U_t=Disturbance term at period t

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ISSN (Print): 2320-9828

Table 8. Regression results: regression of FLFP on FERT (Quadratic model)

Summary output								
Regression Statistics								
Multiple R	0.996719							
R Square	0.993448							
Adjusted R Square	0.99181							
Standard Error	0.331544							
Observations	11							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	133.335	66.66748	606.5013	1.84E-09			
Residual	8	0.879371	0.109921					
Total	10	134.2143						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	150.6744	24.74028	6.090247	0.000293	93.62325	207.7256	93.62325	207.7256
FERT	-108.918	18.58466	-5.86063	0.000378	-151.774	-66.0616	-151.774	-66.0616
(FERT)2	23.81273	3.475793	6.851021	0.000131	15.79754	31.82793	15.79754	31.82793

Regression results have been summarised in (Table 9). MSC coefficient has become statistically significant proving the 'U' pattern of association between MSC and FLFP.MSC has a negative coefficient which can be explained as when male education increases their employment as well as earning increases which induces female not to join outside employment opportunities.

$(MSC)^2$ coefficient is positive. This indicates that after falling shape there is a turning point in FLFP after a certain level of MSC any further increase in MSC will increase FLFP.

This can be explained as when male education increases they realise the importance of female employment, there is receding social stigma against working women and all these contribute to rising FLFP.

Table 9. Regression results: Regression of FLFP on MSC (Quadratic model)

Summaryoutput								
Regression Statistics								
Multiple R	0.970348							
R Square	0.941575							
Adjusted R Square	0.926969							
Standard Error	0.990041							
Observations	11							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	126.3729	63.18645	64.46409	1.17E-05			
Residual	8	7.841444	0.980181					
Total	10	134.2143						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	337.7214	64.56568	5.230664	0.000792	188.8327	486.6101	188.83	487
MSC	-8.6757	1.94936	-4.45054	0.002138	-13.1709	-4.18047	-13.17	-4.2
(MSC)2	0.060477	0.014643	4.130176	0.003298	0.026711	0.094244	0.0267	0.09

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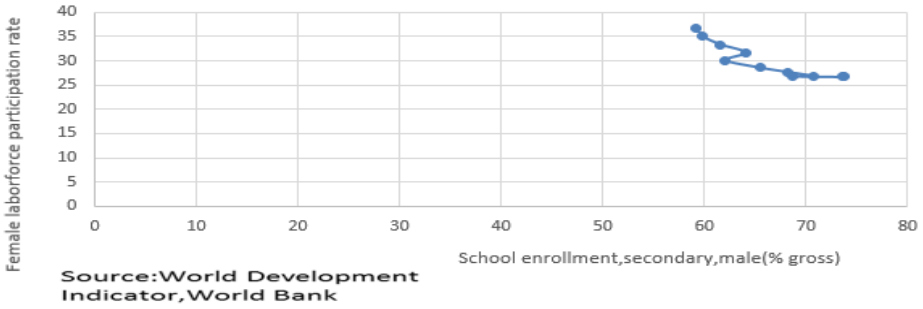
Figure 5. Association between school enrolment, secondary, male and female labor force participation rate



Source: World Development Indicator, World Bank

3. Summary of findings

This paper aims at empirical investigation of the pattern of association between female labor force participation rate in India and its determinants. Existing literature suggests that there is evidence of a 'U' shaped pattern of association between FLFP and economic development. To test the validity of this 'feminisation hypothesis' a scatter diagram has been presented to display the association between FLFP and GDPPCPPPCONST for the period (1991-2016) which shows that (Figure 2) for the period considered here there has been two distinct 'U' pattern of movement for two different periods period 1: (1991-2005) and period 2: (2005-2016). We run separate regressions for the two periods considered. We run OLS regression using linear and quadratic models for period 1 and period 2 respectively. Regression results suggest that for both the periods' quadratic models explain the influence of GDPPCPPPCONST better on FLFP. So this verifies the 'feminisation hypotheses, i.e. the 'U' pattern of nonlinear association between FLFP and GDPPCPPPCONST.

To analyse the factors other than GDPPCPPPCONSTANT which impact FLFP we include factors like school enrolment, secondary female (% gross) (FSC), school enrolment, secondary, male (% gross) (MSC), Employment to Total Population Ratio (ETPR), fertility rate (FERT) as independent variables. Due to lack of available data we can only analyse for the period (2005-2015), i.e., the second period. We use a linear model and find only ETPR is found statistically significant at 20% level of significance. This necessitates seeing the pattern of association between i. FLFP and FSC and ii. FLFP and FERT, iii. FLFP and MSC. The scatter diagram reveals the nonlinear association ['U' shaped] between i. FLFP and FSC and ii. FLFP and FERT, iii. FLFP and MSC. When we use quadratic models we get better significant statistical results. This proves the nonlinearity ['U' shaped association] between i. FLFP and FSC and ii. FLFP and FERT, iii. FLFP and MSC.

3. Conclusion and Scope of Further Research

All these results highlight the fact that there is a need to encourage education for both men and women, development of skill, access to better training programmes, access to childcare as well as other supportive institutions and legal measures to ease the burden of domestic duties, enhance women's safety, and encourage private sector development in industries and regions that can increase job opportunities for women in developing countries. Emphasis is needed on keeping young girls in school and ensuring that they receive a good quality education, beyond junior secondary level, and are able to take advantage of training opportunities. Removal of societal barriers, progressive thinking and mind-set are critical to boost up FLFP in India. For the period (1991-2016) as a whole we find twice the 'U' shaped pattern of association between FLFP and GDPPCPPPCONST. So this indicates that the association might be oscillatory in nature which can be empirically tested. Also the impact of physical and social infrastructure on FLFP can be empirically analysed. The role of education needs further investigation. It appears that increased female education is not always associated with commensurate rise in labour market participation. The role of both micro and macro policies need to be investigated more clearly. The role of trade and structural policies need to be investigated. Policies should have the target of reducing occupational segregation in India such as discouraging discriminatory employment practices and promoting skills development for women in industries and occupations with the greatest potential for employment growth. This requires further analytical work in this area. Measures to boost up female labour force participation should be accorded utmost priority.

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