

The female labor force participation rate and India's economic development: tracing the U feminization hypothesis.

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Abstract— During the last twenty years, India has witnessed consistent economic growth, despite a continuous drop in female labor force participation rate. This paper analysis delves into the widely held Feminization Hypothesis or the U-shaped theory of Female Labor Force Participation Rate in India. The hypothesis describes an India's U-shaped link between economic development and female labor force participation rate. The paper examines the critical factors that affect the Female Labor Force Participation Rate in India and then creates an econometric model using Excel and XLSTAT based on World Bank data from the previous two decades (1990-2020). The findings indicate that there are no significant relationships between economic development and female labor force participation rate (FLFPR), which contradicts previous studies conducted in other parts of the world. These findings are especially important for developing policies to increase women's labor-force participation rates so that India can fully benefit from its upcoming demographic dividend. The main objective is therefore to enhance female labor-force participation, and also to maintain an atmosphere that provides independence and possibilities for women to obtain respectable and honorable work, which would also directly contribute to employment generation and thorough development of women, making sure inclusivity in the Indian labor market.

Keywords— Female Labor Force Participation Rate, U shape hypothesis, Economic Development, Heteroskedasticity, Normality tests.

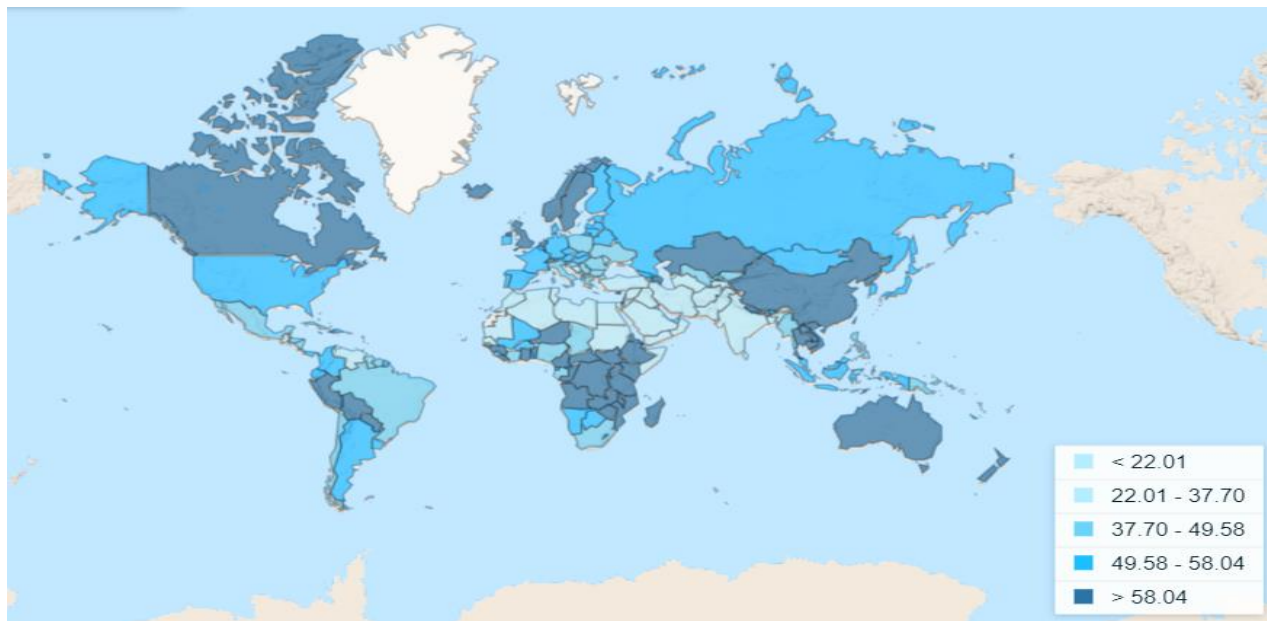
I. INTRODUCTION

An estimation of the size of the female working population in a nation is called the female labor force participation rate. The calculation is the proportion of the working-age non-institutionalized population, aged 16 and above, who are having employment or searching for a job. The female labor force participation rate tumbles with growth before rising over time. As per World Bank data, the number of working women in India fell from 26 percent to 19 percent between 2010 and 2020. The continuous downturn in female labor force participation rate (LFPR) in India despite substantial growth in the economy is perplexing.

Despite repeated attempts and policy support, female labor force participation has been still roughly 20% for a few decades and continued to stand at 22.8 percent in FY20, a slow increase from 18.6 percent in FY19 and 17.5 percent in FY18, according to the Ministry of Statistics and Programme Implementation's Periodic Labor Force Survey (PLFS). According to researchers, India must provide coherent institutional strength and comfort to female workers while shifting its technique to the female workforce. Some structural initiatives that could also be implemented usually involve increasing enrolment and successful completion of academic achievement for all girl children, capturing data for unsalaried economic activities by women throughout overall workforce information, and significantly improving social security for unskilled female labor workers, who account for 90% of the entire female work force in India.

According to the figure below, South Asian and Northern African nations have much lower FLFP rates than those of China, United States of America, Canada, and south-eastern African nations. The map also shows that in 2021, countries with labor force participation rates for women that are significantly lower than India's (19.2 percent) include Afghanistan, Djibouti, Algeria, Egypt, Arab Republic of Iran, Islamic Republic of Iraq, Jordan, West Bank and Gaza, Syrian Arab Republic, Middle East & North Africa (IDA & IBRD countries), Yemen, and Algeria.

Despite a growing GDP, greater gender equality in terms of declining birth rates and higher educational aspirations among Indian women, the female labor force participation rate in India continues to plummet. The COVID-19 pandemic outbreak has made things worse in various parts of India, causing work stagnation and skyrocketing unemployment. Much more than in any other case of men, female's labor force participation varies widely between in developing nations and emerging economies. Less than one-third of women working population in the Middle East, North Africa, and South Asia, compared to about two-thirds in East Asia and sub-Saharan Africa. Numerous economic and social factors, such as economic growth, rising educational attainment, declining fertility rates, and societal standards are responsible for this difference. In addition to the labor market, developing nations have more prominent gender disparities, with South Asian nations having the greatest levels of inequality.

Figure1: Labor force participation rate, female (% of female population ages 15+) (modeled ILO estimate) in 2021.

Source: International Labour Organization, World Bank data bank, ILOSTAT database.

Women's labor-force participation is critical to a country's economic development. In a country like India, a dwindling female labor force participation rate may hinder the country's economic stability. The relationship between female labor force participation and its causes should be investigated for trends and patterns. According to Eckstein & Lifshitz(2009) in industrialized nations, study on the topic of female labor force participation is quite common, but this has not been thoroughly examined from the viewpoint of emerging nations. It is indeed debatable whether the neoclassical labor supply model is applicable to developing nations.

Sinha (1967) developed the Feminization U hypothesis. As a nation develops, the female labor force participation rate is assumed to obey a nonlinear 'U' shaped pattern. Several studies have depicted the 'U' shaped form of female labor force participation as a country develops. In a country like India, a declining female labor force participation rate may seriously damage the country's wellbeing and advancement. The goal of this study is to provide a time series analysis of the various factors that may influence the Female Labor Force Participation Rate in India, and also to identify the U-shaped relationship for India. To begin, we'll go over each of the variables we looked into to see how they relate to female labor force participation. Furthermore, we will use the U-shaped function to find out the association between Female Labor Force Participation Rate and economic progress, as well as how it has changed over time. It will also help determine how accurately this model describes the variation in Female Labor Force Participation Rate caused by the variables.

The main objective is therefore to enhance female labor-force participation, and also to maintain an atmosphere that provides independence and possibilities for women to obtain respectable and honorable work, which would also directly contribute to employment generation and thorough development of women, making sure inclusivity in the Indian labor market. This 'U' shaped concept has been proposed as an explanation for women engaged in subsistence farming in a poor country. As the country grows, people's economic activity shifts from agriculture to industry. According to the feminization "U" hypothesis, growth will have a convex impact on female labor force participation rates.

II. LITERATURE REVIEW

The previous work confirms the existence of the U-shaped hypothesis. The first group of articles tested this association using cross-national cross-sectional information (Mammen and Paxson, 2000; Goldin, 1994). Tansel (2002) examined this connection within Turkish regions over three phases, and the findings bolster the U-shaped theory. Cross-sectional information is criticized as troublesome because it can result to the 'Kuznets fallacy',¹ in which the association is an artifact of the info and that is not substantiated employing time series analysis (Tam, 2011). This worry was alleviated through use of panel methodologies in multiple studies, one that discovered data backing the U-shaped trend of women's LFPR within such a country once more (Tam, 2011; Luci, 2009)

Ambreen Fatima (2009) In her study, she examined the U-shape association among female labor force participation as well as sustainable growth using pooled data. As an outcome, female labor force participation has risen dramatically in last several years, whereas economic progress has also increased. The evaluation final outcome indicates that a large level of economic growth encourages female labor force participation through increasing production employment options for women. Some other significant

results of the study were that salaries and parental status have a detrimental effect on female labor force participation. The deleterious coefficients of the both men and female wage levels indicate that pay rises boost free time rather than duty hours, having provided huge backing toward the reverse bending quantity supplied.

Surjit S. Bhalla and Ravinder Kaur (2011) contribute to the research by claiming that income growth (as measured by real per capita consumption growth) has a long-term favorable impact on female involvement. In urban India, there is virtually no evidence of a U-shaped link between LFPR and income. Indeed, the result is an inverted U, with the inflexion point occurring at extremely high-income levels.

According to Rahul Lahoti and Hema Swaminathan (2013), a related study conducted in India, growth alone is insufficient to increase women's economic participation, but growth patterns are important. In this study, there was no significant relationship between economic growth and women's labor-force participation rates. According to Preet Rustagi's (2013) research, the low rate of women's labor force participation (LFPR) in India is really nothing new, however its downturn is reason for worry, unless it indicates a shift away from labor participation due to women's pursuit of education or even due to household income effects.

According to Sher verick (2014), including in nations where labor force participation rates are nearly on par, the standard of recruitment and prospects for decent wages persist to be disproportionately distributed among males and females. The complexity of female labor force participation in emerging nations was addressed in this research, which provided observations mostly on key issues and patterns that influence women's labor market interaction and livelihood opportunities, particularly the involvement of academic achievement. His research also looked into detailed results from countries such as Brazil, Indonesia, India and Turkey. Over all else, it is important to consider the effectiveness of workforce with the need to concentrate on encouraging greater labor-market outputs for females.

A variety of factors, according to Andrea Silberman (2014), have contributed to India's working-age women's recent sharp decline and long-term stagnation in labor force participation rates. Some of these elements, such as increased educational attainment and family income levels, are undeniably beneficial to society and are indicative of India's rapid economic progress. In the long run, however, the most pressing issue for India's women has been a lack of job opportunities. Work prospects for both men and women are hampered by persistent informality and poor development in wage and salaried jobs. Women in India, on the other hand, face additional challenges as a result of societal norms such as gender discrimination and occupational segregation. According to Sonalde Desai and Omkar Joshi (2019), in order to reap the gender dividend, India should prioritize increasing women's economic participation by not only supporting the creation of new opportunities for women, but also improving their access to existing jobs. Only sustained efforts in these areas will assist India in overcoming its alarmingly low female WPRs and ensuring gender equality in labor allocation.

III. RESEARCH METHODOLOGY:

The data used for this study came from a variety of sources, including daily newspapers, publications, and the World Bank Data Bank. Initially, Female Labor Force Participation is defined as women's (aged 15 and higher) proportion of overall labor group in the country. Labor force participation (LFP) is defined as the sum of salaried and people searching actively for a job/employment. Furthermore, we used GDP per capita to estimate the growth of the economy (GDP). GDP is defined as the gross domestic product divided by the nation's half year population. These are all data from the World Bank's open data repository. In addition, we investigated how much some different factors, such as fertility rate, life span, female unemployment rate, and education, impact Female labor force participation.

The fertility rates denotes the proportion of kids that would have been conceived by a woman if she lived to the end of her pregnancy period and bore toddlers in compliance with the year and the maturity level birth rates. Average life expectancy is the number of years a new-born baby will further live if mortality trends at the time of childbirth remained constant during its life. The unemployment rate is the ratio of the labor force that is unemployed but accessible for and actively looking for job. These relevant factors were obtained from the World Bank's open data repository. Secondary and tertiary educations were literacy parameters.

The research is based on the confounded presence of India's continuous decline in female labour force participation rate (LFPR) despite continuous economic progress. The research main task is to determine factors that influence female labor-force participation and then to develop an econometric model to test the existence of the U-shaped hypothesis in the Indian scenario. To come to conclusions, the study employs time series analysis (1990-2020) on a set of secondary data collected from the World Bank Data Bank, as well as regression analysis on the Microsoft Excel. The main objective is therefore to enhance female labor-force participation, and also to maintain an atmosphere that provides independence and possibilities for women to obtain respectable and honourable work, which would also directly contribute to employment generation and thorough development of women, making sure inclusivity in the Indian labor market. Initially, we examined and analyzed the various factors and variables that comprise our model in this study and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

IV. DISCUSSION OF VARIABLES INVOLVED:

1. GDP per capita (GDPPC):

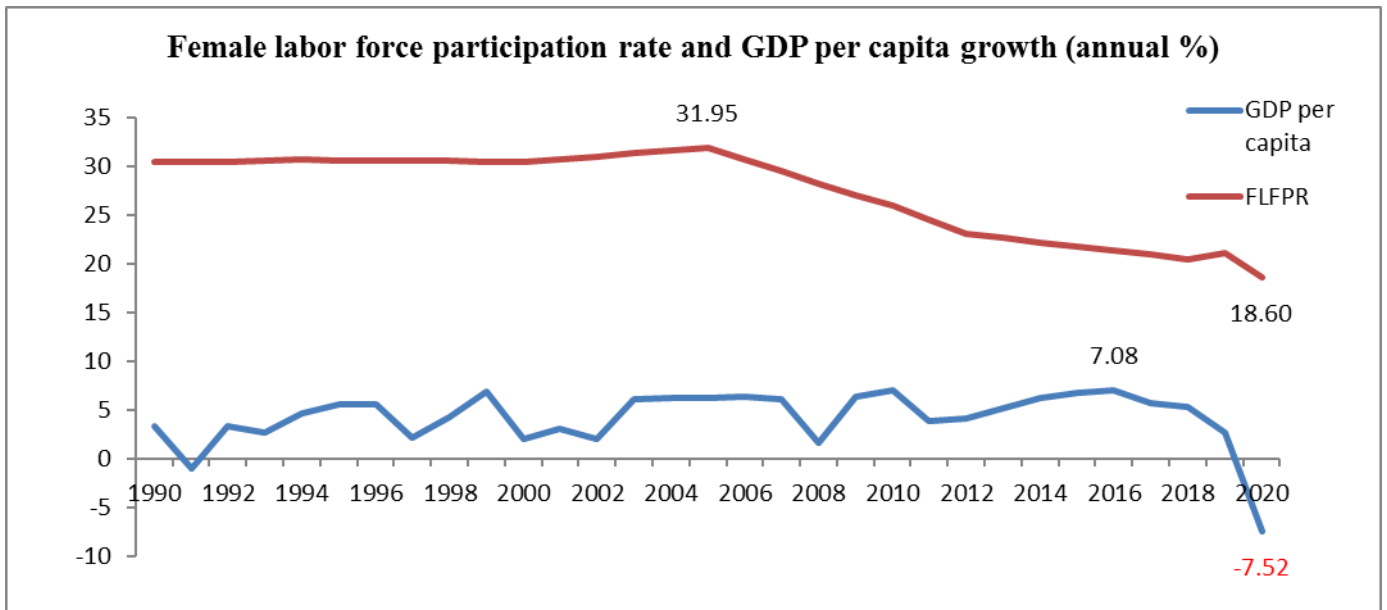


Figure2: Female labor force participation rate and GDP per capita growth (annual %)

Females who are not in the working population are underutilized skilled labor who mitigates the nation's possible future growth in the economy. Numerous studies agree that poor FLFPR is indeed a barrier to Gross domestic product. Women currently make a contribution only 18-19% of the nation's GDP. Furthermore, by balancing male and female workforce participation rates at twenty seven percent of GDP (Aguirre et al., 2012), possible financial profits can be realized. According to the National Statistical Office's (NSO) first amended Represented, the Indian economy plummeted by approx. 7% in 2020-21, potentially raised due to the COVID-19 disease outbreak and government-imposed country wide quarantine barriers.

2. Female Labor force participation rate (FLFPR):

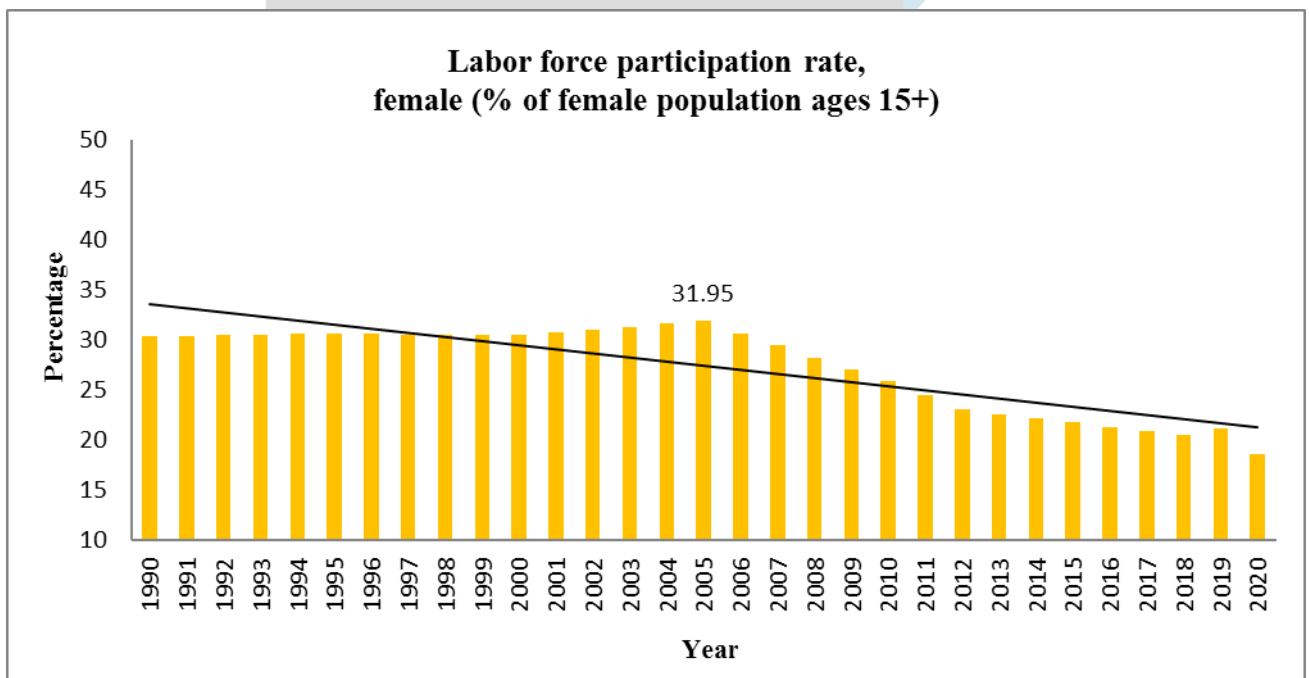


Figure 3: Female labor force participation rate

On a global scale, India is a global economic powerhouse. It was duly named the world's fastest-growing major economy in 2017, and it has maintained a strong rate of GDP growth since then. The year was significant for Indian women for another reason: it was the year in which the country's female labor force participation rate fell to its lowest level since independence. This widespread repercussion is not surprising; women's labor-force participation has been steadily declining for decades. This raises the question, why aren't there more women in the workforce in a country that has made enormous advances in female education, phenomenal reductions in fertility rates, and accelerating economic growth?. According to World Bank statistics, India has one of the lowest FLFPRs in the world, with only parts of the Arab world having lower FLFPRs.

3. Fertility Rate (FRTR):

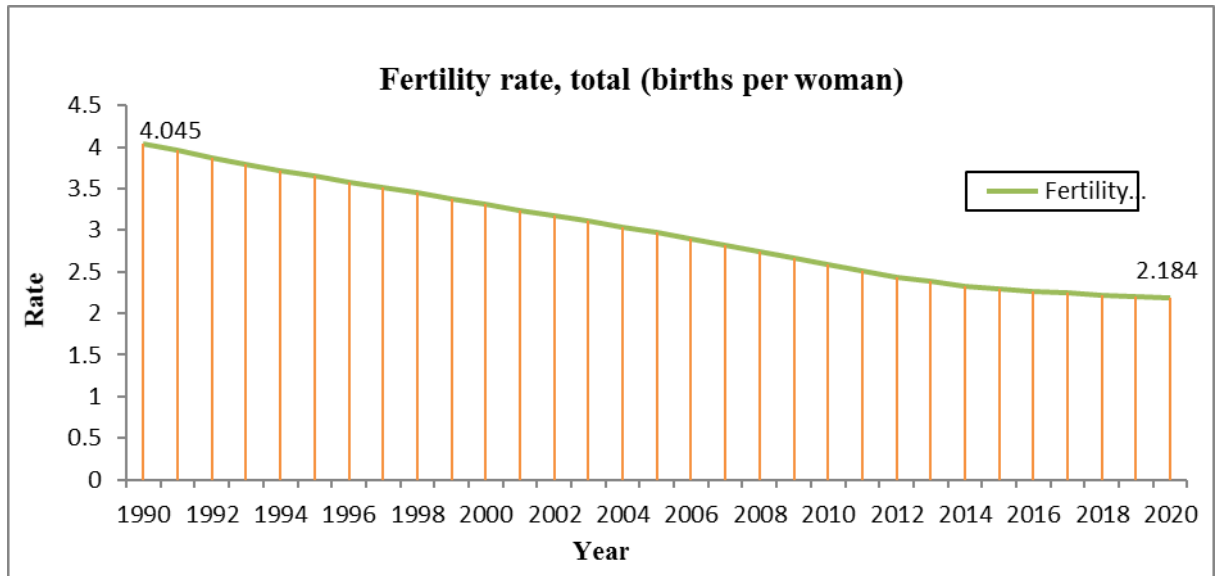


Figure 4: Fertility rate

The global fertility rate has been steadily declining over the last five decades or so, according to World Bank data. Fertility has also decreased significantly in many parts of India since the early 1980s (Dreze, J., & Murthi, M, 2001) As a result of societal modernization, the number of children per woman has nearly halved. There has been research into the relationship between female labor force participation and various other theories. Having children naturally affects a woman's ability to work, though the impact of fertility on female labor participation varies by country.

4. Life expectancy (LIFEEXPT):

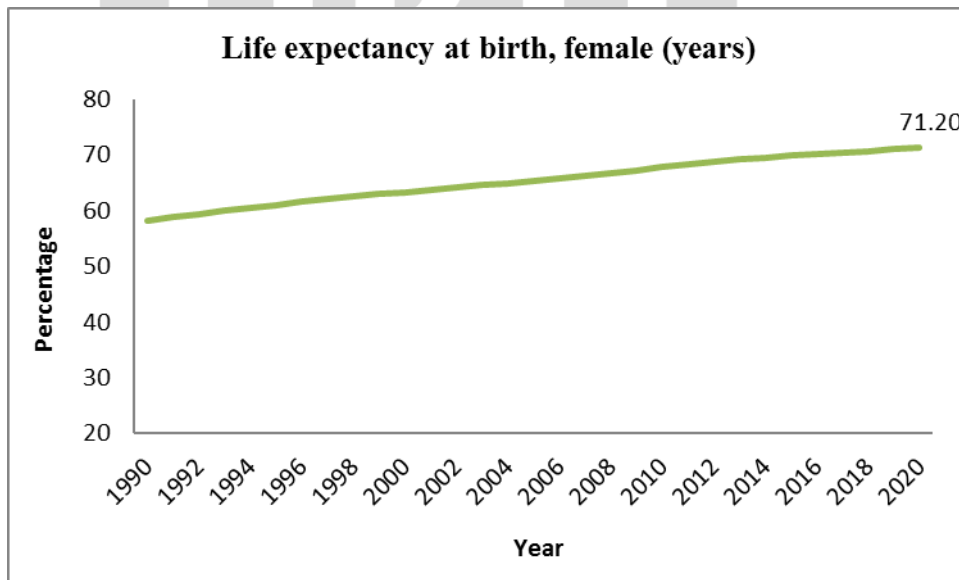


Figure 5: Life expectancy

In 2019, men had an average lifespan of 69.5 years as well as women had a life span of 70.95 years, that also enhanced to 71.20 years for females in 2020 and reduced for males. again the coronavirus disease outbreak, that have adversely

affected people from various stages, has indeed caused a decline in the country's average lifespan, as per a statistical data analysis conducted by scientists at the metropolitan area International Centre for Population Studies.

5. Education (EDUCT):

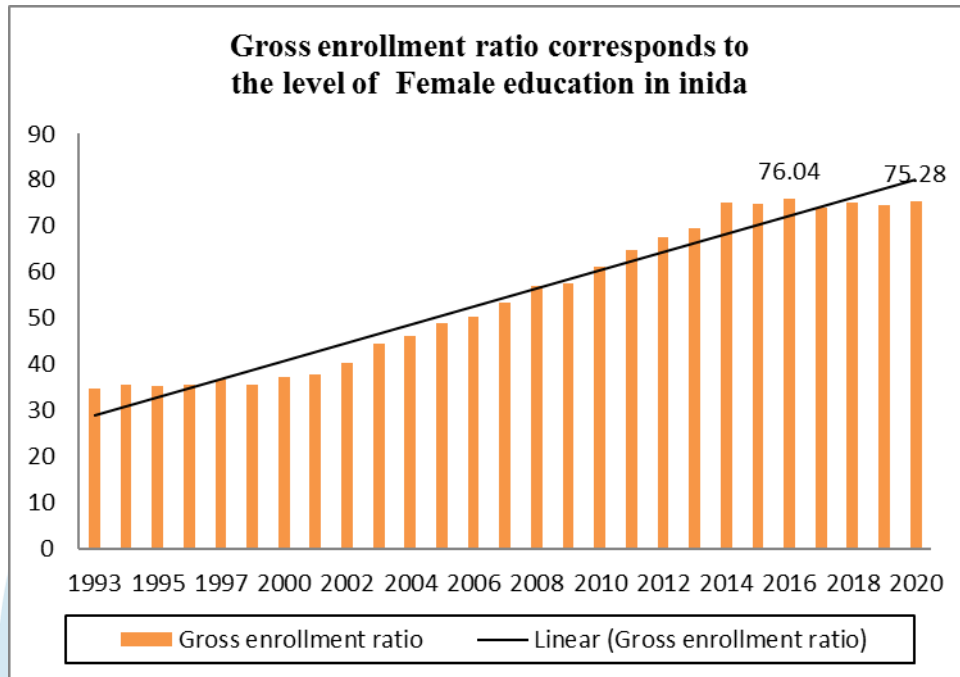


Figure 6: Gross enrollment ratio

There are number of factors can affect the U-shaped association among female labour force participation & economic progress. The level of female academic achievement has been the most crucial of those same. The above figure also demonstrates that the majority of female gross enrolment in to primary schools is in 2016 (76.04 percent) and minimum in 1999 (35.54 percent). It is therefore important to keep in mind that the rise is greatest for primary academic achievement and minimum for higher secondary (World Bank data). On the whole, it is reasonable to suggest that such steep rise in female academic achievement will contribute in a U-shape association between female labour force participation and sustainable growth, as indicated in previous research.

6. Unemployment (UNEMP):

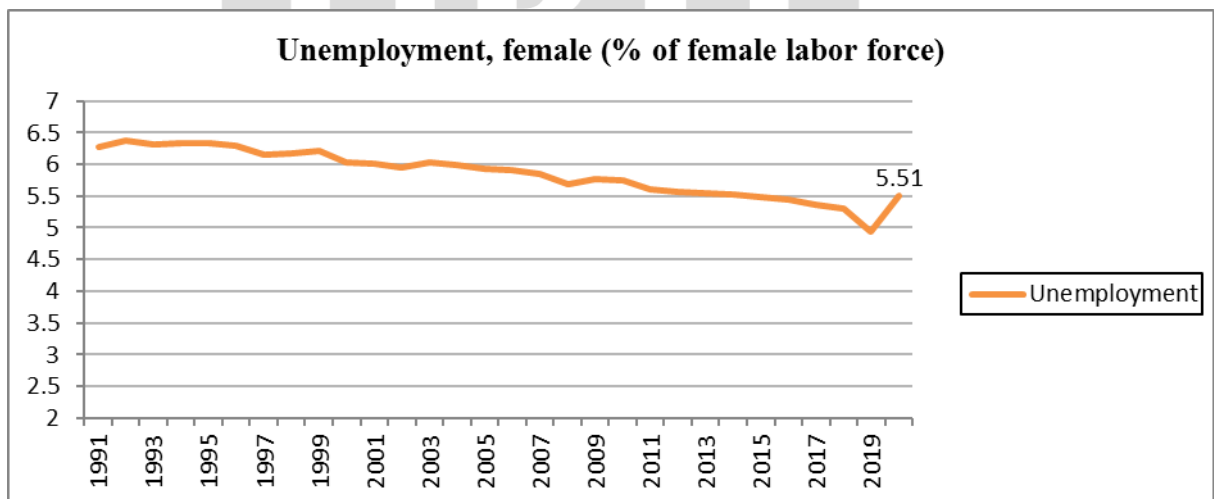


Figure 7: Female Unemployment rate

Another important factor influencing female labour force participation is unemployment. It may have an effect on a woman's ability to enter the labour force. The above graph also depicts that the unemployment of female labor force is lower in 2019 (4.93%). Many women will be discouraged from entering the labour force if female unemployment is high. A discouraged worker would stop looking for work, quit, or not enter the labour market as a result of the decline in prospective wages and employment opportunities. This is known as the "disgruntled worker effect." Economists believe that the impact of discouraged workers will keep unemployment high. According to Klasen and Pieters (2012), women of

lower educational attainment are compelled to work in ways that add value to housing costs, whereas women including very advanced degrees are drawn to the labour due to rising wages. Women in both clusters encounter societal taboos linked with female work experience in the absence of a financial need for one's revenue.

V. MODEL AND ESTIMATION TECHNIQUE:

We decided to follow the early study results on the feminization hypothesis and applied OLS estimations. Based on the above mentioned indicators of the Female Labor Force Participation Rate in India, the following basic econometric time series model is developed:

$$Y_t = a + X1_t b + X2_t c + X3_t d + X4_t e + X5_t f + X6_t g + ut$$

Where, Y_t represents the Female Labour Force Participation Rate in India (1990-2020), $X1_t$ represents the log (GDP per capita), $X2_t$ denotes $[\log(\text{GDP per capita})]^2$, $X3_t$ represents FRTR (Fertility rate, total (births per woman)), $X4_t$ denotes EDUCT (Gross enrollment ratio corresponds to the level of Female education in India), $X5_t$ represents LIFEEXPT (Life expectancy at birth, female (years)), $X6_t$ denotes UNEMP (Unemployment, female (% of female labor force) (modelled ILO estimate)), ut = error term accounting for the effect of other factors such as marital status, urbanization, etc.

Moreover, while applying an OLS estimator, it does have significance because it is a clear way to define the information, and it's well notable that this can be slightly skewed in the involvement of time-invariant heteroscedasticity. As a result, we used White's test for heteroskedasticity and the Normality of residual term to assess the model's variability in this research.

Table 1

Regression Statistics	
Multiple R	0.896228974
R Square	0.803226374
Adjusted R Square	0.754032967
Standard Error	2.136037907
Observations	31

Table 2: ANOVA

	df	SS	MS	F	Significance F
Regression	6	446.9924865	74.49875	16.32793	2.05E-07
Residual	24	109.5037905	4.562658		
Total	30	556.4962771			

Table 3

	Coefficients	Standard Error	t Stat	P-value
Intercept	66.80924106	197.8967431	0.337596	0.738602
GDPpercapita	0.315648911	0.172914989	1.825457	0.080402
SQ.GDPpercapita	0.006362655	0.029665507	0.21448	0.831985
EDUCT	-0.039097714	0.038121996	-1.02559	0.315309
UNEMP	0.719175022	0.357943135	2.009188	0.055892
LIFEEXPT	-0.681480939	2.343421325	-0.29081	0.773698
FRTR	0.490281442	15.13782896	0.032388	0.974431

5.1 Tests of Normality:

The normality tests support the simple visual evaluation of normality. The types of tests for determining normality are the Lilliefors test, the Shapiro-Wilk test, the Anderson-Darling test, and the Jarque-Bera test. The null hypothesis states that the distribution of the samples is normal. A few experts suggest that the Shapiro-Wilk test is the best alternative for determining normal distribution of data.

The error terms from a linear regression model are one utilization of normality tests. If such error terms are not normally distributed, the dependent variables might have had incorrect functional form, crucial factors could be seriously lacking or unavailable. Rectify some or all of these discrepancies may result in normally distributed error terms (These tests were carried out in XLSTAT).

1. Shapiro-Wilk test (Residuals):

Table 4

W	0.958
p-value (Two-tailed)	0.260
alpha	0.05

2. Anderson-Darling test (Residuals):

Table 5

A ²	0.488
p-value (Two-tailed)	0.208
alpha	0.05

3. Lilliefors test (Residuals):

Table 6

D	0.107
D (standardized)	0.595
p-value (Two-tailed)	0.490
alpha	0.05

4. Jarque-Bera test (Residuals):

Table 7

JB (Observed value)	1.523
JB (Critical value)	5.991
DF	2
p-value (Two-tailed)	0.467
alpha	0.05

Table 8

Variable/Test	Shapiro-Wilk	Anderson-Darling	Lilliefors	Jarque-Bera
Residuals (p- value)	0.260	0.208	0.490	0.467

Test interpretation:**(H0: Null Hypothesis; Ha: Alternative Hypothesis)****H0:** The variable from which the sample was extracted follows a Normal distribution.**Ha:** The variable from which the sample was extracted does not follow a Normal distribution.

As the computed p-value is greater than the significance level $\alpha=0.05$, one cannot reject the null hypothesis H0. Hence, model supports the null hypothesis of normality of residuals.

5.2 Tests of Heteroscedasticity:

When it is presumed that the variances really aren't uniform (an interpretation of the error terms against the independent variable may disclose heteroscedasticity), a heteroscedasticity test must be performed. The Breusch-Pagan and White's tests are carried out under the supposition that the discrepancies are independent and distributed normally. If the null hypothesis(H0) is rejected, the data must be altered prior to conducting regression, or modelling methods must be used to account for variance variability.

Table 9: Residual Output

Observation	Predicted FLFPR	Residuals
1	30.24675068	0.196250115
2	32.90613839	-2.45313927
3	34.00396542	-3.510965389
4	31.94169925	-1.37169955
5	32.19766416	-1.505664722
6	32.15021349	-1.494213355
7	31.73292441	-1.111924122
8	29.97498162	0.609018016
9	30.44125975	0.106740591
10	31.08864026	-0.57664113
11	28.79236875	1.684630529
12	28.72288588	2.048114031
13	27.86678912	3.198211412
14	29.03558996	2.326409548
15	28.62757026	3.030430682
16	28.2480053	3.706994621
17	27.83783074	2.874169152
18	27.16457481	2.325424958
19	27.27824657	1.011754342
20	26.46082864	0.65317168
21	26.19973801	-0.23473786
22	24.38109376	0.127907017
23	23.98830419	-0.889303262
24	23.94424125	-1.294241635
25	23.83292262	-1.624922436
26	23.8115001	-2.036500486
27	23.6188152	-2.267815372
28	22.86539496	-1.931394946
29	22.47567954	-1.949680471
30	21.06692982	0.112071036

1. Breusch-Pagan test:

Table 9	
LM (Observed value)	4.013

LM (Critical value)	12.592
DF	6
p-value (Two-tailed)	0.675
alpha	0.05

2. White test:

Table 10

LM (Observed value)	28.666
LM (Critical value)	40.113
DF	27
p-value (Two-tailed)	0.377
alpha	0.05

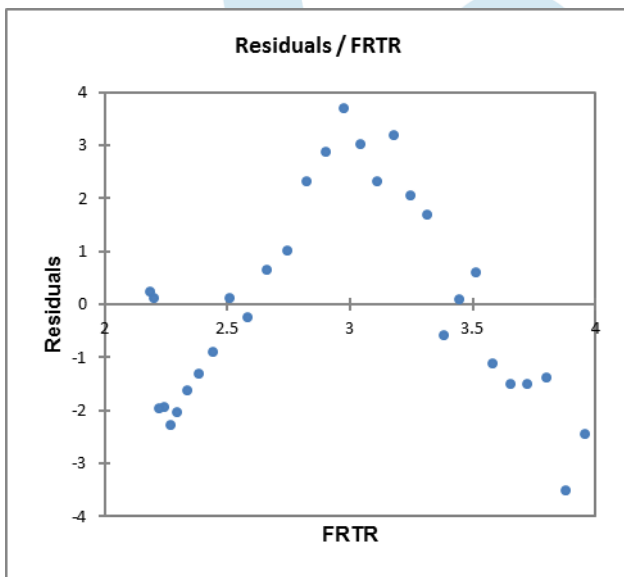


Figure 8: Residuals/Fertility rate

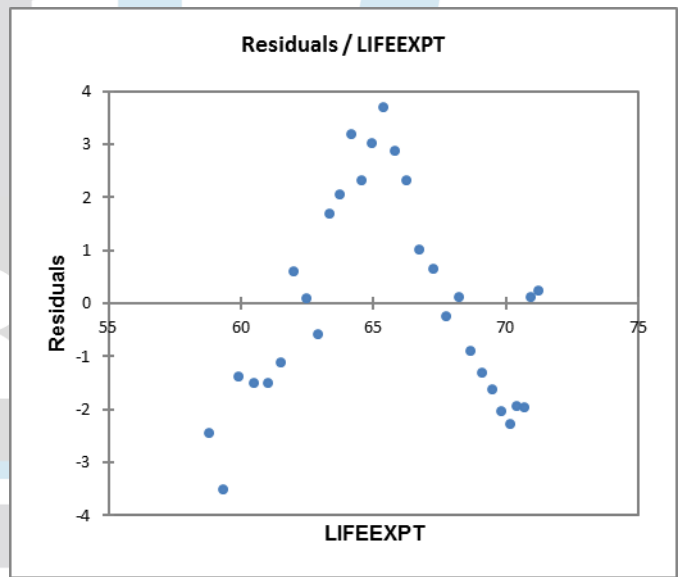


Figure 9: Residuals/ Life expectancy

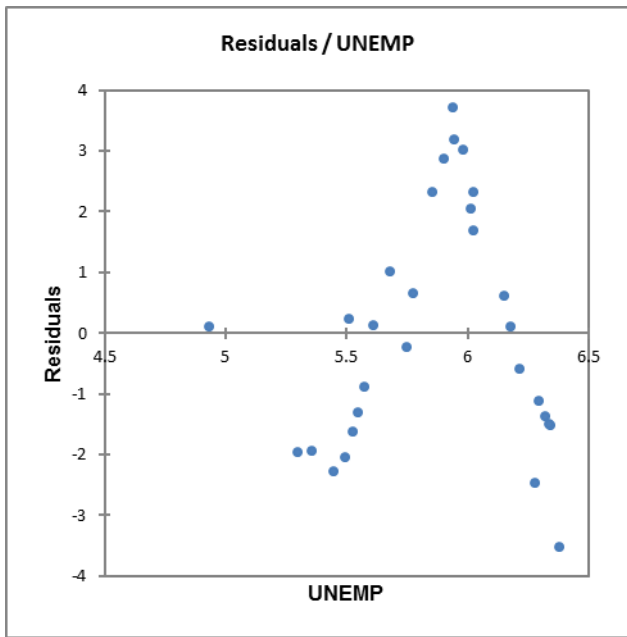


Figure 10: Residuals/Unemployment

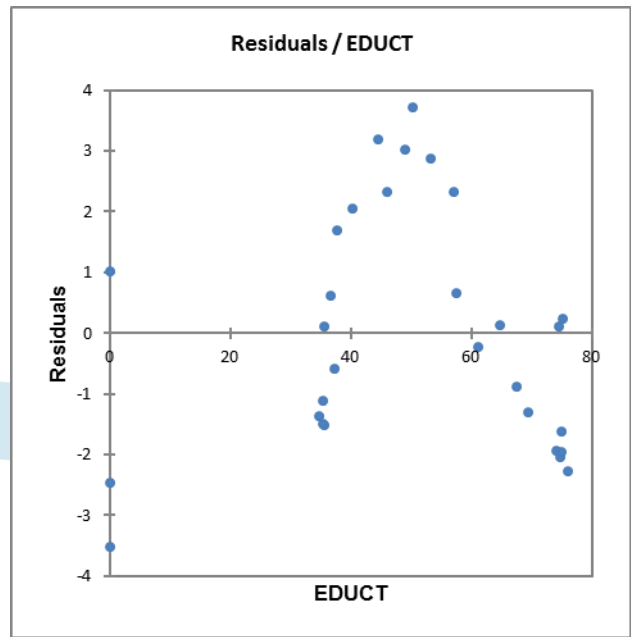


Figure 11: Residuals/Education

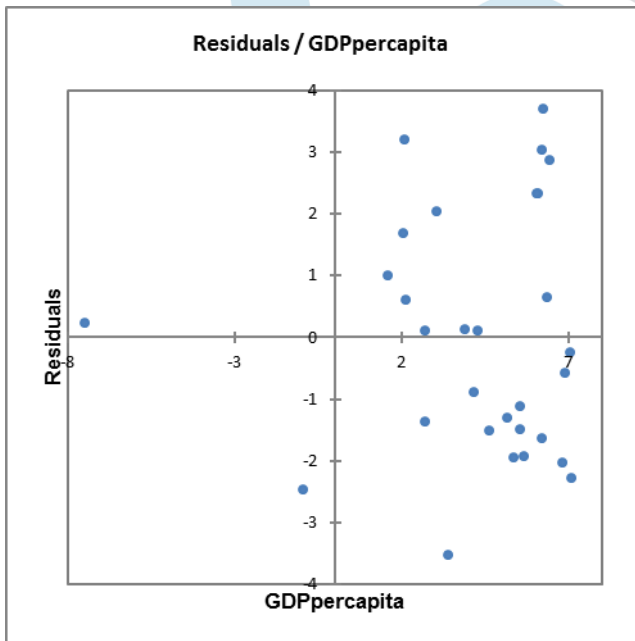


Figure 12: Residuals/GDPPC

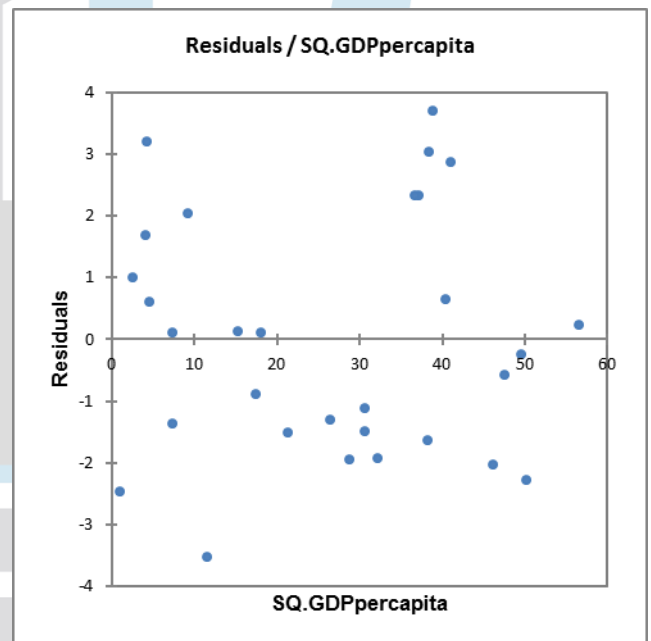


Figure 13: Residuals/SQ.GDPPC

Test interpretation:

H0: Residuals are homoscedastic

Ha: Residuals are heteroscedastic

As the computed p-value is greater than the significance level $\alpha=0.05$, one cannot reject the null hypothesis H0. Hence, tests align with the null hypothesis of no heteroskedasticity present in the model.

VI. FINDINGS:

1. According to theoretical arguments and empirical evidences from other countries, there is a U shape relationship between Female Labor Force Participation Rate and Economic Development, inferring that the coefficients of $\ln(\text{GDPPC})$ 0 and $[\ln(\text{GDPPC})]^2 > 0$ i.e., $b < 0$ and $c > 0$. Whereas our results show that there is an inverted U-shaped relationship between FLFPR and Economic development as shown in the above figure. Hence, we can say that there is no realistic link between India's economic growth and FLFPR.
2. Results suggest a strong positive relation between Life expectancy and the Female Labor Force Participation Rate. It is clearly shown that P-value (0.773698) is more than the t- value (-0.29081). Hence, we can say that there is a significant impact on female labor force participation rate.
3. FLFPR and Unemployment, female (% of female labor force): In this case, the results proved that the unemployment rate is statistically non-significant .It is observed that p-value (0.055) is less than the t-value (2.009). Hence, we fail to accept null hypothesis.
4. Our findings suggest a positive relationship between fertility rate total (births per woman) and female labor force participation rate. There is U-shaped relationship between FLFPR and fertility rate, which implies that there is a significant impact on women participation in workforce. It is observed that the p-value(0.974) is more than the t-value (0.032). Moreover, no evidence based support has been found for the alleged negative relationship between fertility and female labor force participation rate in several developing countries. In countries such as India, Bangladesh, and Jordan, women's decisions to enter or leave the labor force are made at the time of marriage, with having a child having no additional effect.
5. The results show a positive relation between Gross enrollment ratio corresponds to the level of Female education in India and Female Labor Force Participation Rate. It is observed that the p-value (0.31) is more than the t-value (-1.02). There is a U-shaped relationship between the gross enrollment ratio of females and FLFPR. From this we can infer that the educational attainment of women perhaps increases their chances of getting better employment opportunities and therefore increase Female Labor Force Participation Rate..

VII. CONCLUSION:

Our study is intended to empirically analyze and validate the feminization hypothesis in India by establishing the existence of a U-shaped relationship between Female Labor Force Participation Rate and Economic Development in India.

Moreover, the time series econometric analysis conducted could not establish the existence of any U-shaped relationship between the Female Labor Force Participation Rate and the country's Per Capita GDP. In our analysis, as in previous studies, the U-shaped trend is not observed with Indian data. Indeed, the data strongly suggest that family income has a positive effect on LFPR; subsequent periods show signs of an inverted U curve, though the inflexion point is at extremely high per capita consumption levels. This indicates that the relationship between labor force participation and income is both static and positive.

Education in this country function needs more research. It does seem that improved female academic achievement is often not accompanied by a rise in labor-force participation. The roles of internal and external policies must be studied more thoroughly. current trade and systemic policies' roles must be researched furthermore. Initiatives should aim to reduce barriers to employment in India by dissuading discrimination hiring practices and boosting skills training for women in areas of work with the highest employment growth prospects. This necessitates additional research in this area. Emphasis should be given to measures to increase female labor-force participation.

REFERENCES

- [1] Jean Dreze and Mamta Murthi, "Fertility, Education, and Development: Evidence from India", *Population and Development Review*, JSTOR, Vol. 27, No. 1 (Mar., 2001), pp. 33-63 (31 pages).
- [2] Nikore, Mitali. (2021), "India's Missing Working Women: Tracing the Journey of Women's Economic Contribution Over the Last Five Decades, and During COVID-19. 7th International Conference on Gender & Women Studies 2020" ISBN 978-1-988652-36-8.
- [3] Hosney, Sara Hassan, "Factors influencing female labor force participation in Egypt and Germany: A comparative study," SOEP papers on Multidisciplinary Panel Data Research, German Institute for Economic Research (DIW Berlin), June 2015.
- [4] Prasant Kumar Behera, Jnyan Ranjan Sahoo, "Multidimensional disparity in elementary education: a study of east and south Indian states," *Indian Journal of Economics and Development*, April 2019, Vol 7 (4)
- [5] Suravikar Roy, "An Endeavour to empirically verify the 'Feminisation 'U' Hypothesis' of female labour force participation rate in India (1991-2016)". *Indian Journal of Economics and Development*, Vol 6 (9), September 2018.

- [6] Rahul Lahoti and Hema Swaminathan, "Economic Growth and Female Labour Force Participation in India" Indian institute of management, working paper, June 2013.
- [7] Ambreen Fatima and Humera Sultana, "Tracing out the U-shape relationship between female labor force participation rate and economic development for Pakistan", International Journal of Social Economics, Vol. 36 Nos 1/2, 2009 pp. 182-198, January 2009.
- [8] Tam, Henry, "U-shaped Female Labor Participation with Economic Development: Some Panel Data Evidence." Economics Letters 110 (2) (February 2011): 140–142.
- [9] Olsen, Wendy, and Smita Mehta, "A Pluralist Account of Labour Participation in India", Working Paper Global Poverty Research Group, 2006.
- [10] Ravallion, M., and G. Datt, "How Important to India's Poor Is the Sectoral Composition of Economic Growth?" The World Bank Economic Review 10 (1) (January 1996): 1–25.
- [11] Kottis, AP., "Shifts over Time and Regional Variation in Women's Labor Force Participation Rates in a Developing Economy: The Case of Greece." Journal of Development Economics, 33: 117–132, 1990.
- [12] Steven Kapsos, Evangelia Bourmpoula, and Andrea Silberman, "Why is female labour force participation declining so sharply in India?", ILO, 2014.
- [13] Ruchika Chaudhary and Sher Verick, "Female labour force participation in India and beyond", ILO, October 2014.
- [14] Surjit S. Bhalla and Ravinder Kaur, "Labour Force Participation of Women in India: Some facts, some queries", London school of Economics (LSE), 2011.
- [15] Sonalde Desai and Omkar Joshi, "The Paradox of Declining Female Work Participation in an Era of Economic Growth", The Indian Journal of Labour Economics (2019) 62:55–71
- [16] Suravi Kar Roy, "Female labor force participation in India-A gloomy picture". Indian Journal of Economics and Development, 5(5), 1-7, 2017.
- [17] Zote, R., & Thanga, J. L., "Levels of women empowerment among the Indian states assessing the impact of unemployment", Indian Journal of Economics and Development, 7(8), 1-6, 2019.
- [18] Santosh Mehrotra and Jajati K. Parida, "Why is the Labour Force Participation of Women Declining in India?", World Development, 2017, vol. 98, issue C, 360-380.
- [19] Basu, A. M., & Desai, S., "Hopes, Dreams and Anxieties: India's One-Child Families. Asian population studies", 12(1), 4–27, 2016.
- [20] Verick, S. "Female labor force participation and development". IZA World of Labor 2018: 87.
- [21] Behera, P. K., & Sahoo, J. R., "Multidimensional disparity in elementary education: a study of east and south Indian states", Indian Journal of Economics and Development, 2019, 7(4), 1-15.
- [22] Singh Bhanu Pratap, "Nexus of financial development and economic growth in India: Revisiting Schumpeter.", Indian Journal of Economics and Development, 2014.
- [23] Aditi Ratho, "Promoting Female Participation in Urban India's Labour Force," ORF Issue Brief No. 348, March 2020, Observer Research Foundation.
- [24] Ronojoy Mazumdar and Archana Chaudhary, "Trillions at stake as women disappear from India's workforce", Economic times, Jun02,2022.

APPENDIX

1. **FLFPR:** Female Labor Force Participation Rate
2. **EDUCT:** Education (Gross Enrolment ratio corresponds to the level of Female education in India)
3. **LIFEEXPT:** Life expectancy at birth, female (years)
4. **FRTR:** Fertility rate, total (births per woman)
5. **GDPpercapita:** GDP per capita growth (annual %)
6. **SQ.GDPpercapita:** Square of GDPpercapita.
7. **UNEMP:** Unemployment, female (% of female labor force)

YEAR	FLFPR	GDPpercapita	SQ.GDPpercapita	EDUCT	UNEMP	LIFEEXPT	FRTR
1990	30.44300079	3.36507256	11.32371333	-	-	58.226	4.045
1991	30.45299911	-0.98357369	0.967417203	-	6.276000023	58.774	3.959
1992	30.49300003	3.390418193	11.49493552	-	6.379000187	59.337	3.877
1993	30.56999969	2.706727295	7.326372649	34.67184067	6.320000172	59.9	3.799
1994	30.69199944	4.606289449	21.21790249	35.516819	6.342000008	60.454	3.723
1995	30.65600014	5.529881349	30.57958774	35.30038071	6.334000111	60.991	3.651

1996	30.62100029	5.53041633	30.58550478	35.47174835	6.295000076	61.503	3.582
1997	30.58399963	2.12301449	4.507190526	36.63829041	6.150000095	61.992	3.514
1998	30.54800034	4.248843461	18.05267076	35.54740906	6.176000118	62.46	3.446
1999	30.51199913	6.89811623	47.58400753	37.32382965	6.217000008	62.906	3.379
2000	30.47699928	2.021088595	4.084799109	37.77647018	6.026000023	63.334	3.311
2001	30.77099991	3.027376664	9.165009468	40.27975082	6.013999939	63.745	3.244
2002	31.06500053	2.064876099	4.263713304	44.49547958	5.943999767	64.145	3.176
2003	31.36199951	6.0937051	37.13324185	46.13367081	6.021999836	64.543	3.109
2004	31.65800095	6.193652699	38.36133376	49.01576996	5.981999874	64.943	3.041
2005	31.95499992	6.231949735	38.83719749	50.23820114	5.93900013	65.357	2.972
2006	30.71199989	6.403284237	41.00204902	53.30596924	5.903999805	65.793	2.899
2007	29.48999977	6.04817415	36.58041055	57.01189041	5.852000237	66.253	2.823
2008	28.29000092	1.587598304	2.520468376	-	5.681000233	66.735	2.743
2009	27.11400032	6.351088271	40.33632223	57.51856995	5.771999836	67.231	2.661
2010	25.96500015	7.04234767	49.5946607	61.10480118	5.745999813	67.73	2.581
2011	24.50900078	3.893966041	15.16297153	64.66925049	5.611000061	68.218	2.506
2012	23.09900093	4.165673052	17.35283198	67.63686371	5.571000099	68.68	2.439
2013	22.64999962	5.135074506	26.36899019	69.48177338	5.547999859	69.106	2.381
2014	22.20800018	6.186679513	38.27500339	75.03926086	5.526000023	69.491	2.333
2015	21.77499962	6.796759064	46.19593378	74.68528748	5.491000175	69.835	2.295
2016	21.35099983	7.082227583	50.15794754	76.03894806	5.447000027	70.142	2.266
2017	20.93400002	5.665781149	32.10107603	74.05850983	5.356999874	70.425	2.243
2018	20.52599907	5.35475685	28.67342092	74.95496368	5.297999859	70.692	2.222
2019	21.17900085	2.692089827	7.247347635	74.52295685	4.93200016	70.95	2.202
2020	18.60300064	-7.515674992	56.48537059	75.28150177	5.506999969	71.202	2.184

Data source: World Bank data bank.

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