Understanding The Impact Of Female Fertility On The Economy Through Female Employment: A Study Of India

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Abstract

The paper studies the relationship between female fertility rates and GDP by studying its impact on female employment rates. I use panel data for all 36 Indian states and union territories, for the period 2011-2020, to study how fertility affects GDP and what factors contribute to this relationship. I perform various panel OLS regressions using first differences. The results signify that an increase in female fertility would decrease female labor force participation which would further decrease NDP. The paper studies the empirical effect of an invisible societal institution that influences/forces women to quit their jobs after they become mothers. The paper finds that there is a negative impact of this norm on the economy, which prevents the country from utilizing its entire labor force.

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Contents

1 Introduction

Population is considered to be an obstacle to development. The increasing fertility rate has a negative effect on GDP due to various factors, for example, the pressure exerted on resources by an increasing population. However, a big population also means a bigger labor force to contribute to the economy. India is set to be the most populous country in 2023, and addressing the factors that are obstacles to development become of vital importance. One such factor is India is unable to utilize its entire workforce. In the 21st century, gender equality is still a dream throughout the world. This paper aims to study the relationship between female fertility rates and GDP by studying its impact on female employment rates.

India is a secular democracy, located in southeast Asia. It is divided into 28 states and 8 union territories. It is on course to become the third-largest economy by the year 2030. Favorable policies, subsidies, developing infrastructure, labor market conditions, and the availability of cheap and educated labor are making India an attractive place for various companies to invest and shift their manufacturing units to the country. The country's female labor force participation rate stands at 32.8 % in 2022. This motivated this study to look into the factors that contribute to such a low participation rate for women in India.

Like all countries, India is also run by its unique traditions and societal norms. One such societal norm is forcing or influencing women to leave their jobs after they become mothers specifically in the northern part of the country. This has become an invisible institution that is deep-rooted in the people of the country. There has been minimal research done on the effect of this institution on the economy due to the normalization of this institution. The reason this study is important is that it aims at bringing this issue forward so it can be addressed and improved. Even with government policies and their continuous effort to increase and encourage women to participate in the labor force, there has been minimal improvement. This is due to how deeply rooted this invisible institution has become and now that stands as an obstacle to development.

The main hypothesis this paper studies is that female fertility negatively impacts GDP through its negative impact on female labor force participation. Along with this, I test for the effect of education and religion on fertility and its further impact on labor force participation rate and income levels. I have collected panel data from various government websites for

36 states and Union territories for a period of 10 years from 2011 to 2020. I have performed various panel OLS regressions using first differences on 13 variables of interest. The data set has been collected from official government websites including the Ministry of Education, Niti Aayog, Reserve Bank of India, and the Labor Bureau. Using first differences allows me to eliminate any biases that might arise due to external time shocks that might affect the variables. Furthermore, I have clustered the standard errors by states to eliminate the risk of bias.

The estimated regressions show that female fertility and female employment share an inverse relationship, whereas income levels and female employment share a statistically significant and direct, causal relationship. The birth rate decreases female employment by 0.0481 % and female employment increases income by 2.89 %. Birth rate and female employment together affect income levels more strongly with an increase in employment. Education levels are not statistically significant in the models. However, an increase in men's education level decreases female labor force participation and an increase in female's education level increases labor force participation. Religion does not seem to have a statistically significant effect on female labor participation. However, all religious dummies decrease income levels by different amounts.

The government of India has taken various steps to encourage women to join the workforce and has made policies specifically for working mothers. The Maternity Benefit Act came into place in 1961 and has been amended a few times over the years. The latest amendment was done in 2017 which increased paid maternity leave from 12 to 26 weeks. This amendment also made provisions for putting penalties on the company if failed to adhere to the rules. This act also provides for maternity leave for 12 weeks for women who adopt children below the age of 3 months. The act also has a provision that allows for work from home after the maternity leave is over for a period that is agreed upon by both parties. In addition, the act also introduces a rule that firms with more than 50 employees must provide crèche facilities in the workplace. Yet, there are various loopholes in this policy for example companies with less than 50 employees are not legally required to provide daycare services in the workplace. In addition to the Maternity Benefit Act, the government has also reserved 1/3 of the seats in the lower house of the parliament and is continuously promoting the scheme 'Save daughters, Educate daughters'.

This policy is meant to promote education for girls. However, the implementation of these programs is still week and not fully adopted by the public.

The paper is divided as follows the second section examines and understands existing literature on the topic. There are many studies that research and empirically test the relationship between female fertility and female employment and they suggest that the two variables share an inverse relationship. They suggest that due to the burden of balancing both personal and work lives, most women end up leaving their jobs after becoming mothers. The decision to reproduce is usually taken in the context of the entire household and therefore, family characteristics contribute to a woman's decision to work. The third section contains information about the data used. The section includes the data sources and dwells on the shortcomings of the data set. The fourth section comprises the methodology used for research. The next section comprises of the estimated results. Lastly, I conclude my findings and discuss policy implications.

2 Literature Review

The motivation behind this study is that in India, there is a strong influence of the man's family on a marriage and the woman's life; most women are influenced/ forced to leave their jobs, either after marriage or once they give birth to a child. Research by Buddhapriya suggests that women in India are expected to leave their jobs, in the name of 'Family Responsibility', as soon as they give birth to children; hindering any career advances that they put work in to achieve (Buddhapriya 2009). This paper aims to examine the variables that contribute to the drive and affect women's decision to participate in the work force.

Majorly, the research, previously, suggests that female fertility and female employment share a negative relationship; where increase in employment leads to a decrease or causes delays childbirth. An additional birth of a child would decrease women's labor supply by 2 years on an average during their reproductive phase (Bloom et al., 2009).

Empirical evidence from a panel dataset containing 28 OECD countries suggests that one potential reason for the inverse relationship between fertility and female employment is the strain exerted on women to play both roles of a mother and worker (Mishra & Smyth, 2010). However, for about two decades after 1985, the relationship between fertility and employment turned positive in OECD countries (Adserà, 2004).

A significant amount of work has been done to examine the impact of employment of fertility decisions. Bhattacharjee tests for the impact of employment on fertility in India. The study concludes that female employment in agriculture does not have a statistically significant effect on fertility rates but increased female employment in the manufacturing sector decreases fertility rate (Bhattacherjee, 2016). This paper examines the relationship between fertility and employment by using India's financial crisis as an instrument variable. The author finds that employment leads to decrease in fertility. Various other research also shows similar results for the relationship between female employment and fertility. Women make decisions about giving birth to a child based on market conditions that might affect their employment status. Unemployment leads to the decision to postpone becoming a mother (María & Fuster, 2006).

Even after having various facilities to handle housework and careers together, becoming a mother has a significant negative effect on their decision to work. Furthermore, the husband's

income also has a negative effect on a women's decision to work after becoming a mother (Herrate et al., 2012). This paper also finds that the seniority and job characteristics affect a women's decision to leave their jobs. A woman in a high paying job and a family-oriented firm are less likely to leave their jobs. The study also finds that there is a significant negative impact of availability of childcare facilities on the women's decision to leave work. This signifies that providing facilities in workplace for children like crèches would give women the chance to manage their work and personal life together. This paper considers that giving birth to a child is not an individual decision, but a decision taken by both the parents, therefore, they include the father's job characteristics in the model. This is similar to the model I have created in this research; however, this study also takes into account family characteristics that mainly includes the husband's family as family structures in Spain and India are very different. This is because Indian children share a very close relationship with their parents and give high value to their parent's advice.

A study done in USA suggests that about 60% of the women who worked full time return to the same employer after their maternity leave (Klerman & Leibowitz, 1999). They also suggest that paid maternity leave does not have a significant effect on the women's decision to return to work. Furthermore, they also suggest that new mothers have a higher probability to not return to work.

High fertility rates have always been considered a hindrance for developing nations. Reducing fertility rates would increase GDP by 5.6% in several years (Ashraf et al., 2013). However, looking from another perspective, high fertility rates would also suggest a bigger labor force for the economy. Further, providing facilities and infrastructure for childcare in the workplace, mothers would not be forced to leave work. This would help the country use its full potential by creating a big working labor force.

A natural experiment conducted in Japan shows that even with cash benefits, institutions and labor market conditions lead to women leaving their jobs. Furthermore, shortage of childcare infrastructure also negatively impacts the women's decision to work. In a traditional society like Japan, the father minimally contributes to raising the child and household work which also leads to women leaving their jobs due to the immense pressure to balance their lives. Moreover,

women are seen to withdraw from jobs that require immense commitment (Asai, 2015). In this regard, Japan can be compared to India as they have somewhat similar traditions; both countries are extremely family oriented with father's contribution to raising their children is minimal. This research suggests that even if there are reforms, societal norms and lack of childcare infrastructure discourage mothers to keep working.

Understanding the effect of fertility on female employment is important to address a societal norm and examine existing policies. Due to lack of research on this topic specifically for India, this study becomes even more vital.

3 Data

In this study, I have collected a panel data set to investigate the relationship between fertility and economic output in India. This secondary data was compiled using existing government data. The Indian government collects data by conducting a census every 10 years. To fill the gap between the two census surveys, the government department conducts annual surveys. The last official census done by the Indian government was in 2011 and was supposed to be conducted again in 2021, however, due to the Covid19 pandemic it is still to take place.

The dataset includes 36 units with 28 states and 8 Union territories and 14 variables. The dataset has a total of 361 observations for the years 2011 to 2020; data after the year 2020 has not been updated, therefore, the dataset only contains data till 2020.

I have compiled data from website data banks including the Reserve Bank of India, Census India, Ministry of Education, Ministry of Labor and Employment, Directorate General of Employment, Individual state websites, Ministry of Statistics, Niti Aayog. Furthermore, the data was collected using various surveys conducted by the state and central government including annual labor and employment statistics, Census of India 2011, annual All India Survey of higher education (AISHE reports), and Periodic Labor Force Survey.

The main variables of interest include birth rates, female labor force participation rate, and NDP per capita. The dependent variable in this study is NDP per capita which is a proxy to measure economic output to establish a relationship with the dependent variables. NDP per capita stands for net domestic product, which is calculated by adjusting for depreciation in gross domestic product.

The independent variable 'birth rate' is defined as the number of live births per thousand people per year. This variable is used as a measure of fertility among women in India; this variable is suitable for this study as it would fit in the theory to study if giving birth to children affects women's participation in the labor force. The female labor force participation rate is defined as the proportion of the female working age (15-59 years) population that is actively engaged in the labor force, including women who are unemployed but looking for a job. This variable is intended to establish a relationship between fertility among women and its effect on their participation in the labor force. The female working force participation rate refers to the

proportion of the female working-age population who are employed and working. The female unemployment rate refers to the number of women that are eligible to work but are unemployed.

The following variables were collected to see if there are factors that might affect women's decision to work and reproduce. The first variable taken into account is Religion. Religion plays an important factor in people's lives to shape their customs and tradition. This variable is taken as a dummy variable and drops Christianity from regressions to avoid multicollinearity. Hinduism is the religion practiced by most Indians; however, it is not the state religion of the country. India is a secular country with various religions practiced by its citizens; every state has a different majority religion. The way this variable is measured is by taking a relative majority in Indian states, for example, Haryana is a Hindu majority state but Arunachal Pradesh is a Christian majority state. India is home to several religions, however, for the sake of ease, the study only considers 4 majority religions in the country including Hinduism, Sikhism, Christianity, and Islam.

Literacy rate and enrollment in higher education are taken as proxies for the education level of families. The enrollment rate in colleges is measured by collecting the data for students enrolled in higher education after a high school diploma. The study includes variables for female enrollment and male enrollment. This is to see if the education level in families affects women's decision to participate in the economy. The variable of urban population measures how many people, in a particular state, live in the urban part of the state. It is measured by taking the proportion of residents who live in the urban part of the state or the rural to the entire population. The study expects the coefficient of this variable to go either way. One could argue that the sign would be positive because families in urban cities often can afford and hire nannies to take care of their children whereas women can go to work. Furthermore, with the presence of a formal sector in the urban cities, women working in big corporations would have access to daycare systems mandated by the Indian government. Moreover, one would expect more open-mindedness and education among urban families. However, one could further counter this that the sign could also be negative because people in rural areas, regardless of gender, must contribute to the income of the house. Furthermore, people would be more passionate about making a livelihood to get out of the poverty cycle. This is based on the assumption that

people in urban cities would have a greater income per capita as compared to residents of rural towns. There are a few limitations in the data set. With the last census done in 2011, there are a wide range of gaps in the data, that were filled by using private data company data banks. Furthermore, data has not been compiled by the government for the duration of the Covid 19 pandemic.

Three Union territories were dropped before regressing because of missing data. Ladakh became a union territory in 2019, it was a part of the state of Jammu and Kashmir before being established as a union territory. So specific data for Ladakh could not be compiled for the study. In addition, Daman, Diu, and Dadra Nagar Haveli merged in the year 2020, making it hard to find data.

Moreover, even though official surveys were done by all ministries for their focus area, official government websites are not updated for the results of the survey.

In addition, since the BJP came to power in 2014, the country saw the introduction and removal of various old and new departments. This also led to a disruption in the data set because the new departments changed the way major indicators were measured, for example, the unemployment rate. In 2016, the Ministry of Statistics and program implementation changed the way they calculated the unemployment rate in Periodic Labor Force Surveys. This was done to get closer to the universal way of measuring the variable according to international standards. The huge official survey before 2016 was done in 2011 by the National Statistics Office and MOSPI. To fill in the gap for the missing data, the labor bureau conducted its annual employment surveys. Therefore, the variable unemployment rate has two different measures in the data set: before and after 2016.

4 Empirical Strategy

The Hypotheses that are being tested are as follows:

Hypothesis 1: Female fertility negatively impacts income levels through its negative impact on female labor force participation.

This hypothesis is tested by equations 4.1, 4.2, and 4.3. In these regressions, I would expect female fertility to have a negative coefficient and female labor force participation to have a positive coefficient.

Hypothesis 2: Male Education has a positive effect on female fertility and female labor force participation which further has a positive impact on income levels.

Hypothesis 3:: Female Education has a positive effect on female fertility and female labor force participation which further has a positive impact on income levels.

Hypotheses 2 and 3 are tested by equation 4.5. I expect both variables to have positive coefficients.

Hypothesis 4: Religion has a negative effect on female fertility and female labor force participation which further has a negative impact on income levels.

This hypothesis is tested by the last equation. I expect all religion dummies to have negative coefficients.

I perform various regressions to understand the relationship between the variables and test the hypothesis. The first regression is the most basic way of understanding the association between the variables and makes way for the later regressions. It serves as the fundamental framework for this thesis. This is done to examine and establish a relationship between fertility and its impact on economic output through its impact on labor force participation. The use of various regressions for the analysis paves the way for a comprehensive and robust analysis. To account for the differences arising due to the panel data set, I cluster the Standard errors by state and use the first difference to estimate regressions. Standard errors are clustered by states to avoid heteroskedasticity and to avoid any potential correlation between the variables. The data is collected for all states and union territories of India; the data has the potential risk of having a high correlation in the state variable. Every state has a different culture and norms, controlling for heteroskedasticity also accounts for any differences in the dependent variable

between the states. Furthermore, the first difference accounts for the time differences in the data set. The data is collected for the years between 2011 and 2020 which could potentially cause a time trend. First differences eliminate this risk of non-stationarity Moreover, it also eliminates the time-based shocks that might affect the variables that are caused by unobserved factors.

Firstly, I regress the female labor force participation rate on the birth rate. Then I regress Log NDP per capita the on female labor force participation rate.

$$FemalePartRate = \beta 0 + \beta 1 BirthRate_{it} + \epsilon \tag{4.1}$$

$$LogNDPpercapita = \beta 0 + \beta 2 FemalePartRate_{it} + \epsilon \tag{4.2}$$

The first regression will establish a relationship between the variables and give suggestive evidence for the working of the mechanism for the hypothesis. By regressing the birth rate on the female participation rate, the equation establishes a causal relationship between the two variables, and this suggests how the birth rate might affect the female participation rate.

Further, by regressing per capita income on the female participation rate, the equation establishes the causal relationship between the two variables and suggests how female labor force participation affects income in states. The first equation would provide evidence on if giving birth to children does affect women's decision to work and establish a relationship between the two variables. The second equation would provide evidence of how labor force participation affects income. Jointly, taking the two regressions into account, this would provide suggestive evidence for the mechanism in a way that if the birth rate affected labor force participation, it would affect income as well. This mechanism is being used on the sole assumption that other factors do not affect the variables. It is also assumed that birth rate only affects income levels through female fertility.

For evidence that the mechanism is working, the study expects the coefficient of birth rate to be negative in the first regression and the coefficient of female labor force participation to be positive in the second regression.

In all the equations, subscript 'i' stands for state and union territories and t stands for time.

Secondly, I regress Log NDP per Capita on birth rate with the introduction of an interactive term: Birth Rate X Female participation rate.

LogNDPperCapita = $\beta 0 + \beta 1 BirthRate_{it} + \beta 2 FemalePartRate_{it} + \beta 3 BirthRateX FemalePartRate_{it} + \epsilon$ (4.3)

This regression would suggest how birth rate and female labor force participation rate affect income and how the effect of the combination affects the dependent variable. This interaction term would suggest how change in one variable changes the other variable to affect the dependent variable.

FemalePartRate = $\beta 0 + \beta 1 BirthRate_{it} + \beta 2 Hindu_{it} + \beta 3 Muslim_{it} + \beta 4 Sikh_{it} + \beta 5 MaleEnrollment_{it} + \beta 6 FemaleEnrollment_{it} + \beta 7 LogNDPperCapita_{it} + \epsilon$ (4.4)

Equation 4.4 is meant to examine the relationship between the independent variables and the female labor force participation rate. It includes various independent variables including religion and education levels. In this regression, NDP per capita is taken as a proxy for income levels. This regression is to study what factors contribute to women's decision to participate in the workforce.

FemalePartRate = $\beta 0 + \beta 1 BirthRate_{it} + \beta 2 Hindu_{it} + \beta 3 Muslim_{it} + \beta 4 Urbanpop_{it} + \beta 5 Sikh_{it} + \beta 6 MaleEnrollment_{it} + \beta 7 FemaleEnrollment_{it} + \epsilon$ (4.5)

Equation 4.5 takes into account urban population in the regression. Log NDP per capita and

Urban population are not included in the same regression because of high correlation. Next, I regress Log NDP per capita on birth rate, religion dummies, and interaction terms between religion and fertility. The interaction terms are included to establish the effect of their combination on the dependent variable. This is to examine the effect religion might have on income levels and how religion affects a women's decision to continue in the workforce after becoming a mother. This regression is estimated to check for if religion in India affects the decision of giving birth and further the decision to withdraw from the labor force. This regression is important because it is a way to include family characteristics in the regressions to understand if this factor plays any role in this invisible institution.

$$\text{LogNDPperCapita} = \beta 0 + \beta 1 BirthRate_{it} + \beta 3 Hindu_{it} + \beta 4 Muslim_{it} + \beta 5 Sikh_{it} + \beta 6 MFemaleParticipationRate_{it} + \beta 7 BirthRateXFemalePartRate_{it} + \beta 8 BirthRateXHinduXFemalePartRate_{it} + \beta 9 BirthRateXMuslimXFemalePartRate_{it} + \beta 10 BirthRateXSikhXFemalePartRate_{it} + \beta 11 BirthRateXHindu_{it} + \beta 12 BirthRateXMuslim_{it} + \beta 13 BirthRateXSikh + \epsilon \quad (4.6)$$

Lastly, I estimate the regression to include education level. This regression would provide us with the explanation of how birth rate and female labor force participation rate are affected by education level in the family, and how they further, jointly, impact income in each state. The interaction terms also examine any changes in income levels due to a change in education level that might affect the birth rate and/or labor force participation rate. This regression would tell us how education level affects fertility and labor force participation rate and what relationship the three variables share with the dependent variable.

LogNDPperCapita = $\beta 0 + \beta 1 BirthRate_{it} + \beta 3 FemaleParticipationRate_{it}$
$+\beta 4 BirthRateXFemalePartRate_{it} + \beta 5 FemaleEnrollmentRate_{it} + \beta 6 MaleEnrollmentRate_{it} +$
$\beta 7 BirthRXMaleEnrollmentXFemalePartRate$
$+\beta 8 BirthRXfemaleenrollmentXFemalePartRate_{it} + \beta 9 BirthRateXFemaleEnrollment_{it}$
$+ \beta 10 BirthRateXMaleEnrollment_{it} + \epsilon$ (4.7)

To study how the education levels of different family members affected the decision for women to work after giving birth to a child. Equation 4.7 takes into account the effect of male enrollment and female enrollment. Enrollment in higher colleges is used as proxies for a family's education level. Male Enrollment signifies the impact of male education on the decision of the female members in the family working after becoming a mother; this would take into account the husband, brothers-in-law, and father-in-law. I expect the sign of male enrollment to be positive. This would be consistent with the assumption that more educated family members would not force the women of the house to leave their jobs.

The variable of female enrollment signifies the impact of female education on their decision to work after becoming mothers. This shows the results of how the decision to work is affected due to the female member's education level; this would include the wife, the sisters-in-law, and the mother-in-law. This variable is of vital importance as this would show the impact of education on women and their decision to continue work. I expect the sign of this coefficient to be positive.

The identifying assumptions for the models include linearity, absence of multicollinearity, endogeneity, auto correlation, heteroscedasticity, presence of homoscedasticity, and normality. Controlling for time variations using first differences eliminates the risk of heteroskedasticity. I created a correlation matrix to check for multicollinearity; the variables are minimally correlated as can be seen in the heat map. The variables with more than 0.4 correlation have not been included in the same regression to avoid violating the assumptions. It is assumed that the dependent variable is not correlated or influenced by any variable in the error term. The residual plot shows no clear pattern and the points are clustered around 0, suggesting that heteroskedasticity

is not present in the data.

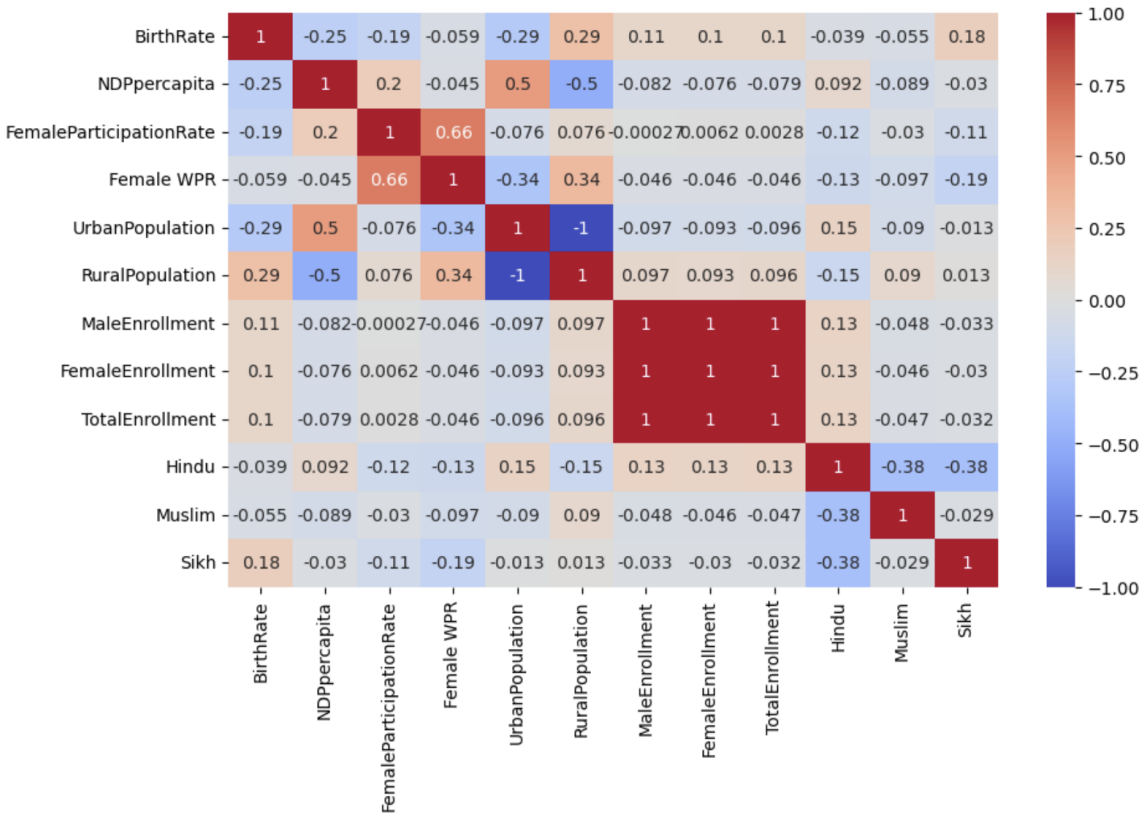

Figure 1: Correlations Matrix

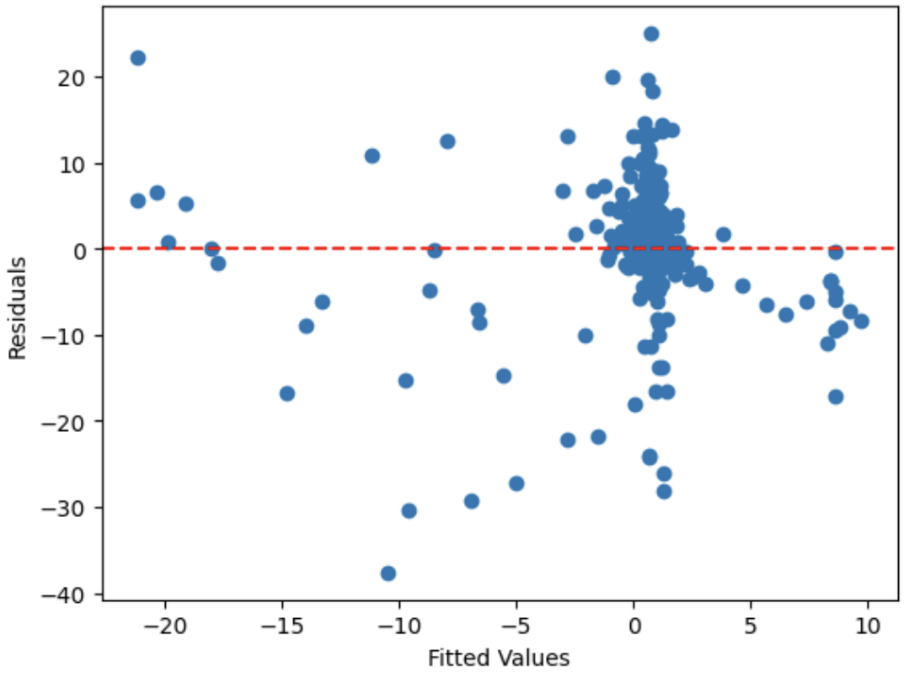

Figure 2: Residual Plot

5 Results and Discussion

Table 1 represents the regression results for the first two equations: 4.1 and 4.2; it is meant to represent the mechanism of how fertility affects GDP through its impact on labor force participation decisions.

In Table 1, the first column regresses the Female labor force participation rate on birth rate and the second column regresses the income level on the female labor force participation rate. The first regression output is to capture the basic relationship to test the hypothesis.

Column 1 suggests that birth rate and female participation in the labor force share a negative relationship. For a 1 unit increase in birth rate, female labor force participation would decrease by 0.0481 % holding everything else constant. The coefficient is not statistically significant at any level. The independent variable can account for 0.2% variation in the model.

The second column suggests that female participation in the labor force and income levels share a positive relationship. For every additional percent increase in female labor force participation, income levels increase by 2.89%. The coefficient is statistically significant at all levels, including at 1%. The R-squared is 21.17%, which suggests that female labor force participation can explain 21.17%, of the variation in income levels.

The F statistic in the second column suggests that the predictors are jointly significant at all levels; however, The F statistic in column 1 is not statistically significant.

As expected, these empirical results show that the birth rate is negatively correlated to female labor force participation. It can be inferred that women opt out of working when they give birth to kids in India. In addition, the second column suggests that labor force participation and income levels are positively correlated, which makes sense intuitively as well. This suggests that as more women enter the labor force, income levels of residents in all regions are bound to increase by almost 3%. It can be inferred from these two columns that the birth rate would have a negative effect on income levels through labor force participation. An increase in the birth rate affects the decision of women to join the workforce where they chose to opt out of the workforce, which would negatively impact income levels as it shares a direct relationship with labor force participation.

Table 1: Estimated results for regressions: female participation rate on birth rate & NDP per capita on female participation rate

	Female Participation Rate	Log NDP per capita
	(1)	(2)
Birth Rate	-0.0481	
	(0.0419)	
Female Participation Rate		0.0289***
		(0.0048)
const	0.1736	0.0040***
	(0.2715)	(0.0229)
Observations	337	337
R^2	0.0020	0.2117
F Statistic	1.3193 (df = 1.0; 335.0)	89.944*** (df = 1.0; 335.0)
Note:		*p<0.1; **p<0.05; ***p<0.01

The second table represents equation 4.3; it is meant to analyze and examine the relationship between the three variables using a different regression method.

It regresses Log NDP per capita on birth rate, female labor force participation rate, and interaction term on birth rate and labor force participation rate.

Table 2: Estimated results for regression of NDP per capita on Birth Rate X Female Participation Rate

	Dependent variable:
	Log NDP per Capita
	(1)
Birth Rate	-0.0066
	(0.0048)
Female Participation Rate	0.0248***
	(0.0036)
Birth Rate X Female Participation Rate	0.0061***
	(0.0013)
constant	0.0232
	(0.0197)
Observations	337
R^2	0.3346
F Statistic	55.809*** (df = 3.0; 333.0)
Note:	*p<0.1; **p<0.05; ***p<0.01

Column 1 suggests that a one percent increase in female labor force participation rate would increase income levels by 2.48%. The coefficient is statistically significant at all levels. The interaction term has a coefficient of 0.0061 with a standard error of 0.001. This suggests that an increase in the variable would lead to a 0.6% increase in the income level. The coefficient is statistically significant at all levels. This suggests that birth rate and female labor force participation jointly have a greater effect on the dependent variable and further impacts the dependent variable negatively. This suggests that jointly the two independent variables positively affect income levels. An increase in interaction between the two terms positively impacts income levels. Like existing research, birth rate has a negative impact on income levels and labor force participation has a positive impact on income levels. However, I expected their interaction term to be negative and negatively impact the dependent variable. This variable can be interpreted in a way that for higher levels of birth rate and labor force participation, jointly they would have a greater impact on income levels.

In addition, the coefficient for birth rate stands at -0.0066 and is statistically insignificant. This suggests that for every percent increase in birth rate, income levels would increase by 0.66%. The R-square of the model is 33.46%, which suggests that the independent variables can explain 33.46% of the variation in NDP per capita. The F statistic in the table is statistically significant at all levels.

This provides evidence for the hypothesis that birth rate and a woman's decision to work in the economy are negatively correlated. Increased interaction between the two variables leads to a greater impact on NDP per capita. Further, the interaction term suggests that the relationship between fertility and labor force participation impacts income levels positively. However, the other two coefficients suggest that an increase in birth rate would decrease income levels and an increase in female labor force participation would increase income levels. Inferring from this, the two independent variables would impact income levels negatively if fertility increases.

The third table represents equations 4.4 and 4.5. It studies the impact of various independent variables on the female labor force participation rate. It examines how the female labor force participation rate changes as the other variables change. The independent variables include religious dummies, urban population, education level, and income.

Table 3: Estimated regression results of Female Participation Rate on independent variables

	Dependent variable: Female Participation Rate	
	(1)	(2)
Birth Rate	0.0446	-0.0072
	(0.0464)	(0.8377)
Female Enrollment	8.209e-06	1.472e-05
	(7.359e-06)	(9.93e-06)
Hindu	0.1828	-0.1204
	(1.3800)	(1.0084)
Log NDP per Capita	7.2049***	
	(1.3159)	
Male Enrollment	-6.394e-06	-1.186e-05
	(5.957e-06)	(8.023e-06)
Muslim	-1.3289	-2.2372**
	(1.3543)	(0.9633)
Sikh	-0.6603	-0.7199
	(1.4591)	(1.0630)
Urban Population		0.0510
		(0.0890)
const	-0.9132	0.3331
	(1.4508) * (0.9899)	
Observations	337	337
R^2	0.2626	0.0285
F Statistic	13.504*** (df = 7.0; 329.0)	1.3786 (df = 7.0; 329.0)
Note:	*p<0.1; **p<0.05; ***p<0.01	

First, looking at the religion dummies, we see that Hinduism has a positive coefficient but the other two religions: Islam and Sikhism have negative coefficients. Female labor force participation would increase by 0.1828% for an individual following Hinduism. On the contrary, being a Sikh and Muslim would decrease the female labor force participation rate by 0.6603 % and 1.3289 % respectively. None of the religion dummies have a statistically significant coefficient.

The birth rate has a statistically insignificant coefficient of -0.0446 at the 5% level. For an additional birth, female labor force participation would decrease by 0.0446 %.

With greater income levels, one would expect that due to low incentives for mothers to work, income and labor force participation rate would share a negative relationship. However, the variable shares a positive relationship with the dependent variable and is statistically significant at all levels. For a 1% increase in Log NDP per capita, the female labor force would increase by 7.2049 %. Female enrollment has a positive coefficient which suggests that with higher levels of education, female workforce participation increases. This would be consistent with previous research (Heath & Jayachandran, 2017). They suggest that an increase in education encourages more women to join the workforce. Moreover, an increase in education levels would increase awareness to move toward equality.

The male enrollment rate has a negative coefficient, which is not what was expected. This would suggest that for higher levels of education for men, labor force participation for women would decrease. This means that more educated men in the family would discourage women from working. This could also be due to the fact that with higher education, the men would earn a decent amount of money which would incentivize the household members to discourage women to work and encourage them to look after their children instead.

In the second column, urban population has a positive coefficient which suggests that for a greater number of people living in urban areas, female labor force participation would increase. This could be due to the fact that many people migrate to urban areas for work. Furthermore, families in urban areas might be more open minded and adjust to the changing times.

The fourth regression table represents the last two equations. The regression is meant to examine the effect of various variables on birth rate and labor force participation and how they

Table 4: Estimated regression results with Religion dummies and Education

	Dependent variable: LogNDPpercapita	
	(1)	(2)
Birth Rate × Hindu × Female Participation Rate	0.0041	
	(0.0035)	
Birth Rate × Muslim × Female Participation Rate	0.0040*	
	(0.0030)	
Birth Rate × Sikh × Female Participation Rate	0.0024	
	(0.0024)	
Birth Rate × Female Enrollment × Female Participation Rate		1.428e-08
		(2.494e-08)
Birth Rate × Male Enrollment × Female Participation Rate		-1.039e-08*
		(2.023e-08)
Birth Rate × Hindu	0.0484	
	(0.0499)	
Birth Rate × Muslim	0.2211***	
	(0.0286)	
Birth Rate × Sikh	0.1516***	
	(0.0261)	
Birth Rate × Female Labor Force Participation Rate	-0.0019	0.0053
	(0.0024)	(0.0021)
Birth Rate × Female Enrollment		3.194e-07
		(4.174e-07)
Birth Rate × Male Enrollment		-2.546e-07
		3.399e-07
Birth Rate	-0.1516***	-0.0081
	(0.0260)	(0.0063)
Female Labor Force Participation Rate	0.0251	0.0239
	(0.0036)	(0.0035)
Female Enrollment		5.653e-07
		(3.602e-07)
Hindu	-0.0323*	
	(0.0631)	
Male Enrollment		-4.452e-07*
		(3.858e-07)
Muslim	-0.0130*	
	(0.0576)	
Sikh	-0.0434***	
	(0.0599)	
const	0.0370	0.0197
	(0.0601)	(0.0206)
Observations	337	337
R^2	0.4499	0.3464
F Statistic	22.079*** (df = 12.0; 324.0)	19.2605*** (df = 9.0; 327.0)

jointly affect the dependent variable. This regression table includes 2 columns: the first column represents equation 4.5 and it includes the religion dummies, and the second column represents equation 4.6. It includes education levels.

In the first column, the birth rate is statistically significant at all levels and shows that for every additional percent increase in birth rate, income levels would decrease by 15.6%. In the second column, the birth rate is statistically insignificant. It suggests that for a 1 % increase in birth rate, income levels would decrease by 0.81 %. This signifies that the birth rate shares an inverse relationship with the dependent variable. The variable Hindu has a coefficient of – 0.032, which suggests that an individual who practices the religion Hinduism has 3.2 % less income when compared to others. The variable is statistically significant at a 90 % confidence interval. Islam has a coefficient of -0.0130, which suggests that an individual who practices Islam will have 1.3 % less income than compared to others. Sikh has a coefficient of -0.434 and is statistically significant at all levels. This suggests that Sikhs would have approximately 43.4 % less income when compared to others. The interaction term between Hindu, Birth Rate, and female labor force participation rate suggests that the three variables jointly increase income levels by 0.41 %. This means that they share a positive relationship with the dependent variable. It also signifies that, jointly, the birth rate and labor force participation rate have a greater positive effect on Hindus. This would further suggest that for a Hindu with a high level of female participation rate, income levels would increase. The interaction term between Muslim, Birth Rate, and female labor force participation rate suggests that the three variables jointly increase income levels by 0.4%. This also shows that they jointly share a positive relationship with income levels. This variable is statistically significant at a 90% confidence interval.

The interaction term between Sikhs, Birth Rate, and female labor force participation rate suggests that the three variables jointly increase income levels by 0.24%. This coefficient is not statistically significant. The interaction terms between birth rate and all religion dummies have a positive coefficient which suggests that they share a positive relationship. This suggests that they share a strong relationship with the dependent variable.

The interaction term between Muslims, birth rate, and labor force participation have a statistically significant coefficient at a 90 % confidence level.

From column 1, we can conclude that religion plays a vital role in determining if a mother continues to work after giving birth. Positive coefficients for all the interaction terms suggest that when the religion dummy changes to 1, the impact of the independent variables increases on the dependent variable. This signifies a strong relationship between the variables. Moreover, this also suggests that together the variables would affect the dependent variable in a positive way, which is the opposite of what I expected.

However, because of statistically insignificant coefficients, I cannot conclude that there is a causal relationship at play in this model. The R-square is 0.4499 which suggests that the independent variables can explain 44.99 % of the variation in the dependent variable. In column 2, female enrolment has a very small and statistically insignificant coefficient. However, it has a positive effect on income levels, which is consistent with previous studies that correlate higher education levels with higher income levels. Male enrollment has a negative coefficient which is statistically significant at a 90 % confidence level. This could also be due to a direct effect on income levels. A higher education level for men would increase household income which would reduce women's incentives to work. Furthermore, other family members would encourage the mothers to take care of the children instead of working because they would not have incentives to increase household income. However, I expected this sign to be positive because I expected that with higher levels of education, men would be more aware and open-minded and would want women to make their own decisions. This estimated coefficient signifies that, even though male education level is statistically significant to the model, other family members also weigh in their opinions on the women's life.

The interaction term between birth rate and female education level is positive which suggests that as female enrollment increases, birth rate would affect income levels more strongly. However, the coefficient is not statistically significant. Consequently, the interaction term between birth rate, female enrollment rate, and female education also has a positive coefficient. This suggests that an increase in female education level birth rate and female labor force participation would together have a greater positive impact on the dependent variable. This means that with greater levels of education for women, birth rate and female labor force participation have a positive impact.

The interaction term between male education level and the birth rate is negative and statistically insignificant. I expected the sign for this variable to be positive as higher male education could be linked to men earning more income which affects the couple's decision to get married. (Herrate et al., 2012) suggested that a man's income has a negative impact on the women's decision to continue work after giving birth. The model has an R-square of 0.3464 which means that the independent variables together can explain about 34 % of the variation in the dependent variable. However, all the coefficients in this model are not statistically significant, so I cannot conclude that there is a causal relationship between education levels and the decision to discontinue working after giving birth. Male enrollment has a statistically significant coefficient which suggests that there is some causal relationship between the variables.

This gives evidence for my theory that women's lives in India are highly influenced by the male members of the family. The surprising result is that women's education level is not significant. I expected the results to be significant due to the fact that with higher levels of education, a woman would be ambitious toward her career and more aware.

6 Conclusion

The estimated regressions suggest that female labor force participation and fertility share an inverse relationship, whereas female labor force participation and NDP per capita share a direct relationship. This suggests that an increase in fertility would decrease the labor force participation rate which would decrease NDP. Moreover, table 2 provides evidence for the hypothesis. I fail to reject hypothesis 1. The results suggest that men's education level would negatively impact female participation rate, whereas women's education level would positively impact labor force participation. Hypothesis 2 can be rejected as there is evidence against it, whereas I fail to reject hypothesis 3. Not all religions negatively impact labor force participation. In addition, jointly with labor force participation and birth rate, religion impacts income levels negatively.

This study was conducted to examine the impact of India's societal norms on the economy and the factors that contribute to these norms. The evidence suggests that women quitting their jobs would have a significantly negative impact on the country's GDP.

The existing policy for mothers in India has various loopholes. One of the main issues with the policy is that small and medium-size firms with less than 50 employees are not legally mandated to provide female workers with any maternity benefits. India is a developing nation with a significant number of small and medium-size firms. This potentially plays an important role in the decision and would have a negative effect. Furthermore, there is a weak implementation of the act and acceptance from the public.

Some policy suggestions are making the maternity benefit act mandatory for all firms regardless of firm size. Stricter implementation of women empowerment acts. Making fast track courts available for women if they want to report family pressure to leave their job. Providing benefits to children of working women like reduction in school fees to provide an incentive for families to not force mothers to give up their careers.

India is a country with immense potential to become one of the leading powers in the world. It has become the hub for foreign direct investment because of favorable policies, market conditions, and, most importantly, a young, educated, and English-speaking workforce. For the country to unlock its full potential, the country needs to utilize the other 50 % of its population. This can be done by slowly changing societal norms and providing infrastructure to accelerate

it. By moving towards equality, the country would be moving towards development.

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7.1 Data Sources

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