Research Paper

Gender Inequality and Falling Sex-Ratio in India: An Inter-State Analysis

Tanya Nautiyal[1]*

ABSTRACT

The study focuses on gender inequality that exists among India and prevents the growth of the economy. Gender inequality is diverse because it exists in almost every field like employment, income, health, education, political issues etc. Rapid decline in sex ratio (number of females per 1000 of males) and child sex ratio (number of girls per 1000 boys in between 0-6 years of age) has been a serious problem in India with severe demographic, socioeconomic and cultural implication. Sex ratio is an important social indicator to measure the inequality between males and females in a society at a given point of time. Obnoxious cultural preferences for sons, dowry system, social norm of smaller family size and various patriarchal cultural factors have resulted in male preference. The study is purely based on secondary data collected from various sources. The aim of this paper is to examine the inequality in the overall sex-ratio and child sex-ratio state-wise in India. The research has also shown the trend line of Gender Inequality Index of India for ten years. The trend line of GII reveals continuous downfall by India in gender equality. The research also shows sex ratio and child sex ratio in 2019-20 of 11 states and UT's. The research unveils that there exists huge inter-state disparity in overall sex ratio as well as child sex ratio where among the 11 states the worst performing states in sex ratio are Dadra & Nagar Haveli, J&K, A&N Island, Gujarat and Maharashtra. Looking at the other side of the coin the research shows Lakshwadeep, Kerala, Bihar, Manipur and Telangana as the best performing states. On the other hand, for child sex ratio the figure shows Dadra & Nagar Haveli, Goa, Himachal Pradesh, Telanagan and Bihar as worst performing states. Further, the best performing states in child sex ratio is Ladakh, Lakshwadeep, Tripura, Meghalaya and Karnataka. The study also analyzes the degree of relationship between sex-ratio and other growth and health indicators. Empirical analysis has been done undertaken using panel data regression with fixed effect model and random effect model. In Fixed effect regression, only PCNSDP is significant variable indicating the influence of PCNSDP on Sex-Ratio. The other two variables i.e., IMR and TFR are found to be insignificant. However, the random effect result shows IMR to be significant, while TFR and PCNSDP to be insignificant. It is important to choose appropriate panel model for estimation from a fixed effect or random effect models. For selection of model, Hausman specification test has been applied. Lastly, the study has tried to suggest some important policy implications for overcoming gender inequality in India. The government can make laws and policies for improving gender equality and female participation in labour sector. On the policy front it is also recommended to increase

[1]PhD Scholar, Jamia Millia Islamia, Department of Economics, New-Delhi, India
*Corresponding Author

women's participation in social, political and economic roles. Also changing deep-rooted psychology of older generation is difficult therefore attempts should be made to educate the younger generation and coming generation regarding the adverse effect of gender imbalance. Besides this, Government can design more result-oriented cash transfer schemes like Sukanya Samridhi Yojana, Balika Samridhi Yojana, Udaan etc.

Keywords: Sex ratio, Child sex ratio, Panel data regression, Hausman specification test, Gender imbalance, Per Capita Net State Domestic Product, Infant Mortality Rate

In India, Gender inequality continues to be a massive concern despite its achieving higher rates of economic growth in recent times. For all the gender issues, gender inequality is the most common in India. Gender inequality means disparity in different economic, social, cultural, political and legal aspects among men and women. Gender inequality is reflected in most of the parameters like labor force participation rate, education, financial independence, health, nutrition and economic participation. Apart from all the mentioned parameters, gender inequality is now prevalent in Government, politics and Non-government organizations. A lot of discussions are going since the last few decades on development of women. Thus, several organizations are promoting the participation of women in income generating activities and development process. The relevance of feminism has been steadily going up and gaining intellectual licit (Jha & Nagar, 2015).

If we discuss the history of gender inequality in India, women were in a position of high esteem and respect in ancient India. The practice of polygamy, purdah system, sati and dowry system has deteriorated the status of women. The status of the girl child seems to have degraded after the first millennia, especially in the north Indian states, due to a change in political equations. However, the reformists advocated a ban on early marriage of girls, opened schools for girls and supported widow remarriage. The effort was continued more aggressively in the twentieth century with Indian national congress support leading the struggle for independence. In spite of all the efforts gender equality has not been achieved and girls are discriminated in all the spheres of life (Kohli, 2017).

According to Nobel Laureate Prof. Amartya Sen (2001), there exist seven types of gender inequalities in India presently. These seven types of inequalities are: natality inequality, ownership inequality, mortality inequality, employment inequality, special opportunity inequality, basic facility inequality and household inequality.

It has been generally acknowledged that the sex-ratio i.e., number of females born per 1000 males is an adjuvant indicator to measure the various aspects of a population, mainly human development. Sex ratio is an important social indicator to measure the equity between males and females in a society at a given point of time. Besides this, sex ratio is a powerful indicator of social health of any society and is a sensitive indicator of women's status in India. The decreasing child female to male ratio has been one of the important concerns in India's demography in recent times. In 1901, there were 3.2 million fewer women than men in India - a hundred years later the deficit increased over 10 times to 35 million (Census 2001) and this decline was visible in children of age between 0-6 years.

Other things being same, women would outnumber men; the girl child is more likely to survive in infancy than the male child. From 939 women to 1,000 men in 2011 it is projected to fall to 898 by 2031. This is a matter of great concern in civil society groups, law and the

government. This sex-ratio is man-made through selective sex determination with the aim of getting rid of the girl child, early death due to neglect and infanticide.

The consequences of this declining sex ratio are already evident in the country. The shortage of women has led to a sharp rise in violence and crime against them. This has led to a situation where, apart from the deep-rooted son preference, people don't want girls all the more as they feel that it is difficult to keep the girl child safe. Centre for Social Research in Haryana says that fear of violence is a cause for female feticide. Also, the women who give birth to daughters face much more domestic violence. The ugly social practice of polygamy has made a comeback in certain areas as well as forcible marriages of widows and purchasing of brides from poor areas. With the advances in technology, sex determination has become easier very early on in pregnancy with fatal consequences for the girl child.

Amartya Sen analyzed that more than 100 million women in this planet have gone missing because of the consequences of worsening gender ratio in India, China, South Asia, West Asia, and North Africa. Sen, on the basis of research argued that if men and women receive similar nutrition, healthcare, medical attention than women will tend to live more comparative to men. Besides these there are many other factors which are responsible for fall in sex ratio. While it may be expected that rich countries where number of literate people and rich people are more would have less deficit on women on account of healthcare, medical attention and gender biased but this is not true because the gender biased issue is found more in urban areas than in rural areas. Discrimination among girls is much higher in areas where women are literate, by literacy we mean a degree not a mature mind. In today's world, one can easily detect the sex of the child by the use of new machines and technology and nuclear families make frequent use of sex determination techniques in order to get rid of the female child. This study assures that sons are preferred to daughters, especially by couples who prefer a single child.

Probable factors influencing Low Sex-ratio in India
There are many Social, Economic and cultural factors responsible for skewed sex-ratio and gender inequality in India. Unchanged economic valuation of sons and daughters and their rigid societal role sustains the desire for sons against daughters. This unchanged economic valuation includes son is a support in old age, he will bring dowry instead of draining which will take place if a girl is born, perpetuate family name etc. Existing practice of dowry and investment in girl child without any return make preference for sons and not daughters. Besides these various other religious beliefs like attainment of Nirvana which means moksh after death is also a factor responsible for son preference as sons are given the right to burn the dead body of parents. Further a girl needs to be protected more than boys and the belief that daughters can bring disgrace to the family are responsible of daughter neglecting and son preference.

In many parts of India strong patriarchal customs are followed, where men hold the authority over the female members of the family. Though this reason has less dominance with the changing thinking ideology of the people, but many of the interior rural areas still have a traditional belief of son's preference. It acts as the strongest reason for falling sex ratio. The main reasoning behind such thinking is that people still believe a son perpetuate the family's name and inherent property, they are support at old age, when investing on sons like on education and business wealth remains within the family. Various rituals are performed to get a son. Son preference has led to masculinity in sex ratios.

In some parts of India, crimes against women are very common. Women often become victims of domestic violence, dowry related killings, honor killings, rape, eve teasing. This takes the prestige of the victim's family on stake which further discourages parents to have a girl child. Another big reason for son preference is dowry. The dowry is not the end, but continuous unidirectional flows from bride's parents to her in-laws are seen as a sacred practice in Indian society. (Shekhar & Ram, 2003)

Gender Inequality Index (GII)
GII was developed in 2010 Human Development Report. It provides insights into gender disparities in three dimensions: reproductive health, empowerment and the labor market. The index shows the loss in human development due to inequality between female and male achievements in these dimensions. (UNDP Report)

- Health – This dimension is measured by the maternal mortality ratio and adolescent fertility rate
- Labor market– The labor dimension is measured by women's participation in the work force.
- Empowerment– The empowerment dimension is measured by the share of parliamentary seats held by each gender and by secondary and higher education attainment levels.

It ranges from 0, which indicates greater achievements i.e., men and women fare equally and 1 which indicates worst achievement of the region in terms of gender equality. Gender inequality remains a major barrier to human development. It is framed to show the range to which national Human development achievements are dissolved by gender inequalities.

Figure 1 below shows the value of GII of India from 2012 to 2021. The trend line of GII reveals continuous downfall of India in gender equality. The major downward trend is seen in the years 2014-2016 and 2018 to 2019. After 2019 the index has made a slow progress.

As per the latest Global Gender gap Report 2022, India ranks 135 among 146 countries in Global Gender Gap Index 2022 and is the worst performer in health and survival in the world. In 2021, India ranked 140 out of 156 countries on the index. Not only does India ranks poorly in the index but it also ranks poorly among its neighboring countries and its far behind Nepal (96), Bangladesh (71), Bhutan (126) and Maldives (117). Only Pakistan, Iran and Afghanistan perform worst than India in South Asia.

Fig:1 GII trend line
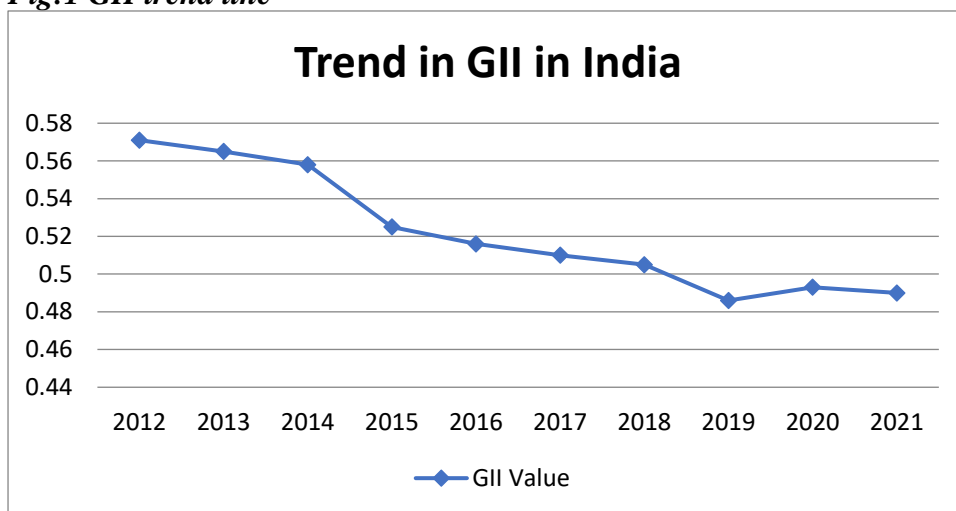
Source: Human Development Report

The figure below shows the state and UT wise GII of India for the year 2011-12 and 2017-18. The figure reveals huge inter-state disparity in terms of gender equality. On one hand in 2011-12, we have states and UTs like Arunachal Pradesh, Nagaland, Haryana Daman & Diu, Manipur and Andaman & Nicobar Island where gender inequality is the highest. And on other hand we have states like Tamil Nadu, Puducherry and Maharashtra where gender inequality is the least. Comparing the index value in 2017-18 the data reveals Maharashtra as the best performing states in gender equality followed by Tamil Nadu Miller (1981). Mostly the states in the southern part of India are performing better on gender parameters. Among the worst performing states and UTs we have Arunachal Pradesh followed by Nagaland, Meghalaya and Bihar.

Fig:2 Gender Inequality Index State-wise in India
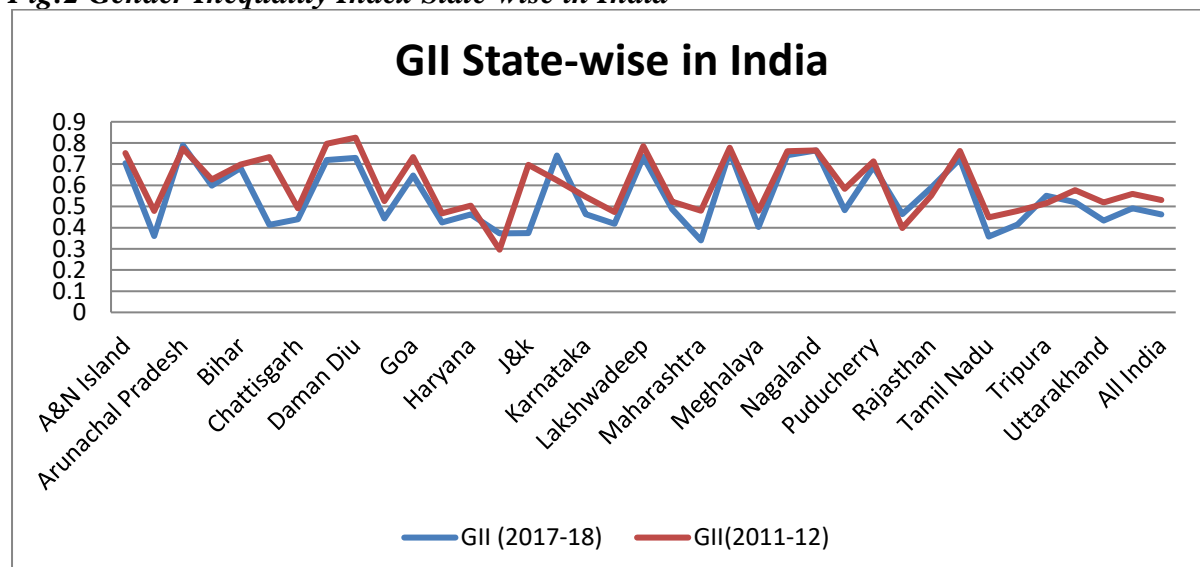
Source: indiastats

REVIEW OF LITERATURE

Srivastava et.al (2005) conducted a study in Bhopal on two hundred married man and woman to evoke their attitude towards girl child and falling sex ratio in Bhopal found that

the reason for not wanting girl child is that bringing up girls is a costly affair and wasted investment in comparison of sons. According to the people investing money on boys is more profitable than girls because boys will remain in the house and girls will go to her husband house.

National Institute of Public Cooperation and Child Development (2008) prepared a report of falling sex ratio. According to this report, son preference was one of the biggest reasons of falling sex ratio in India. Son preference is found to be strongest among middle income groups and is found to be strongest in urban areas than rural areas. The reasons of son preference are the same as discussed above that they perpetuate family name, they will bring dowry instead of giving out, inherent property. Other reason of having son is to attain power and prestige in society.

There are many studies in history which shows association among increasing economic growth and reducing gender gap in the country (Jayachandran, 2014), (Rustagi, 2005). The mentioned studies have presented the huge potential of economic growth and development that can help improve and raise the standard of women in the society. Moser (1993) focused on the interrelationship between gender and development, formulation of gender policy and implementation of gender planning and practices.

Gender inequalities in nutrition are evident from childhood to adulthood. In fact, gender has been one of the most statistically significant determinants of malnutrition among young children (Chatterjee, 1989) and malnutrition is a frequent and underlying cause of death among girls below the age 5. Girls are breastfed less frequently and for shorter durations in infancy; in childhood and adulthood, males are fed first and better (Das Gupta, 1987; Khan et al., 1988). Comparison of household dietary intake studies in different parts of the country shows that nutritional equity between males and females is lower in northern than in southern states (World Bank, 1991; Basu, 1992). Additionally, adult women consume approximately 1000 fewer calories per day than men according to one estimate from Punjab (Horowitz and Kishwar, 1991).

Tipandjan et.al (2014) in his study tried to observe the regional pattern of the society. Son preference is deep rooted in the culture of India, as it is seen since a long time. It is a matter of concern because it produces an imbalanced sex ratio which means more boys in comparison to girls. Decision to have children is based on the calculus of benefits and costs related to their studies, expenses. Taking into consideration socioeconomic and socio-cultural background of Indian society, it can be very well said that parents expectation of benefits and costs are biased in favor of sons because even daughters can take care of their parents after marriage and investing on girls education is equally profitable as girls can earn the same as boys. There are many similar types of research.

Miller (1981) in her book 'Endangered sex' emphasized the socio-cultural discrimination against female children as the main reason for female mortality. She examined three factors which could result in differential mortality rates nutrition, medical care, and love. Miller hypothesis is that the worth of the child is related to work done by him or her. In North India there are more boys than girls in comparison with south, reason being that women are more likely to do agricultural work in South India than in North India. The book had a message that women in India must be saved before it is too late.

Shekhar & Ram (2003) in their study examines the declining sex-ratio in India. The authors investigate the probable reason of this decline; some of them are son preference, deep rooted cultural beliefs, crime against women etc. Lastly the authors show a continuous decline in sex-ratio particularly in the age group of 0-4 years at the national and the state level.

Sarap et.al (2013) in his paper highlights the socio-cultural factors responsible for reducing the role of women in decision-making in household and outside the household. This reduced role of women further results in unequal access to resources mainly health related facilities. The authors also analyzed the overall sex ratio and child sex ratio of all the states of India and found that states located in Northern and Western region of the country have the lowest sex ratio and child sex ratio. Lastly, the authors suggested that effective implementation of the on-going women and children related policies are required to empower women.

Research Gap

To the best of my knowledge and literature reviewed there are very few studies analyzing the relation between gender inequalities and other socio-economic variables like literacy rate, GDP etc. In this backdrop, the present study has made an attempt to analyze the relation between them.

RESEARCH METHODOLOGY

The present study is based on secondary data. The secondary information for the research is collected from Census 1951 to Census 2011, National Family Health Survey 2014-15 Report, National Family Health Survey 2019-20 Report, indiastats, RBI website and various research papers and journals.

In the present study, state and UT wise analysis will be done for India. Sex ratio and Child sex ratio, Infant mortality rate (IMR) and Per capita net state domestic product (PCNSDP) of all the states and UTs is collected and analyzed using graphs, tables, correlation and regression. The decadal data for sex ratio and child sex ratio for all the states is collected from Census of India. TFR, Sex Ratio and IMR for 2013-2018 are collected from Sample Registration System. And PCNSDP data is collected from RBI website.

To test the linkages between gender inequality, health and economic growth, the present study has taken data on sex ratio as a proxy for gender inequality, per capita net state domestic product (PCNSDP) as a measure for growth, IMR and TFR as a measure for health. The data on all these variables has been collected from 2013-2018. As the research consists of 22 cross-sectional units with 6 years of time dimensions panel estimation technique was found to be more suitable. Panel data regression is expected to deal better with the problem of measurement bias. In panel framework the relation between the variables can be expressed as follows:-

$Log\ (SR_{it}) = \alpha + \beta_1 Log(IMR) + \beta_2 Log(TFR) + \beta_3 Log(PCNSDP) + \varepsilon_{it}$

Where for $i = 1, 2, …, N$; $t = 1, 2, …, T$ and ε_{it} is a disturbance term.

It is important to choose appropriate panel model for estimation from a fixed effect or random effect models. A fixed effect model controls for all time-invariant differences whereas random walk model includes time invariant variables. For selection of model, Hausman specification test has been applied. The Hausman test statistic follows Chi-square distribution with k degrees of freedom. If p-value of Chi-square statistics is < 0.05, then we reject the null and conclude fixed effect model is the appropriate choice for panel estimations. However, if p-value > 0.05 we will accept the H_0 concluding that random effect model is the right choice.

Fig 3 below shows the sex ratio and child sex ratio of the 11 states and UTs of India for 2019-20. Among the 11 states the worst performing states in sex ratio are Dadra & Nagar Haveli, J&K, A&N Island, Gujarat and Maharashtra. Looking at the other side of the coin the figure shows Lakshwadeep, Kerala, Bihar, Manipur and Telangana as the best performing states. On the other hand, for child sex ratio the figure shows Dadra & Nagar Haveli, Goa, Himachal Pradesh, Telanagan and Bihar as worst performing states. Further, the best performing states in child sex ratio is Ladakh, Lakshwadeep, Tripura, Meghalaya and Karnataka.

Fig 3: Sex ratio and Child sex ratio
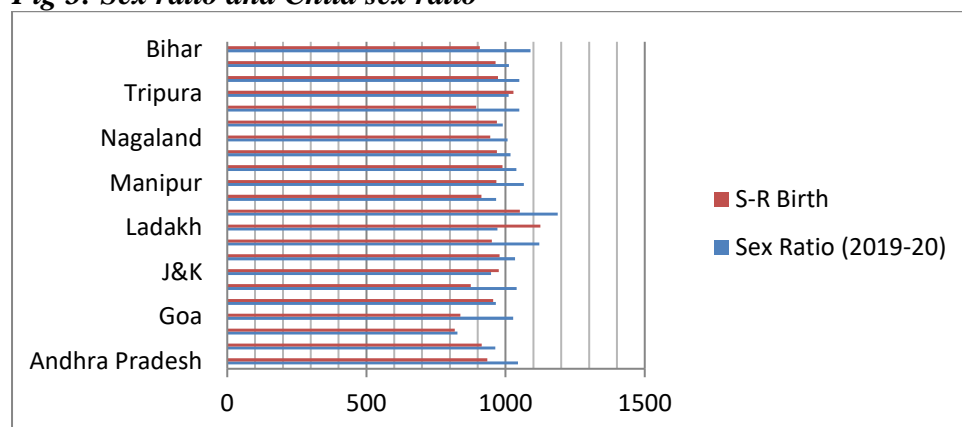
Source: Census of India and SRS Reports

DATA ANALYSIS

The table below presents both fixed effect and random effect results. However, fixed effect model is valid on the basis of Hausman specification test. Table 5 below present panel data fixed effect and random effect results. In Fixed effect regression, only PCNSDP is significant variable indicating the influence of PCNSDP on Sex-Ratio. The other two variables i.e., IMR and TFR are found to be insignificant. Whereas the Random effect results show IMR to be significant, while TFR and PCNSDP to be insignificant.

Table 5: Panel Regression Results: Dependent Variable- Log (Sex Ratio)

Independent Variables	Fixed effect	Random effect
Log (IMR)	0.546	0.030
Log(TFR)	0.588	0.973
Log(PCNSDP)	0.018	0.293
Constant	6.399	6.800
R-square within	0.3249	0.3015
R-square between	0.0005	0.0030
R-square overall	0.0077	0.0232
N	130	130
F-statistic	16.84	22.11
Prob>F	0.000	0.0001

Authors' calculation

It is important to choose appropriate panel model for estimation from a fixed effect or random effect models. A fixed effect model controls for all time-invariant differences whereas random walk model includes time invariant variables. For selection of model, Hausman specification test has been applied. The Hausman test statistic follows Chi-square

distribution with k degrees of freedom. If p-value of Chi-square statistics is < 0.05, then we reject the null and conclude fixed effect model is the appropriate choice for panel estimations. However, if p-value > 0.05 we will accept the H_0 concluding that random effect model is the right choice. In the present model the null hypothesis is rejected and we conclude that fixed effect results are more appropriate.

Table 4: Hausman Specification

Model 1(a): Dependent Variable-Sex Ratio		
Null Hypothesis	Chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)	Prob.
Ho: difference in coefficients not systematic	43.18	0.000

Authors' calculation

CONCLUSION AND POLICY IMPLICATIONS

From the above research we can interpret that economic, political, social and cultural factors are responsible for gender disparity in the country. The study attempts to examine the status of sex ratio and gender inequality state wise in India. The study shows huge inter-state disparities in India, where on one hand there are states like Lakshwadeep, Kerala and Telangana which are leading in sex ratio and on the other hand we have states like Dadra & Nagar Haveli, J&K and Gujarat who are among the worst performing states. The study has also examined child sex ratio state wise in India, where Ladakh, Lakshwadeep and Tripura are the best performing states and Dadra & Nagar Haveli, Goa and Himachal are the worst performing states. It is worth noting that child sex ratio is much lower than sex ratio in all the states showing huge imbalance in sex ratio from birth. Son preference is deep rooted in the Indian society since ages. Although, nowadays the extent of son preference is not to the same pace but still exists in many parts of the country.

The study has also analyzed the degree of relationship between Sex ratio, PCNSDP, IMR and TFR. The analysis shows significant relationship between Sex ratio and PCNSDP (in fixed effect model) and significant relationship between Sex ratio and IMR (in random effect model). The study has also used Hausman specification test to choose the most appropriate model among the two. The result of the Hausman specification test show that fixed effect is most appropriate which means PCNSDP has more influence on Sex ratio. This means higher the economic growth higher will be the Sex ratio.

On the policy front as suggested by Tavares & Mishra, (2016) efforts and policies are needed to ensure that planning, budgeting and implementation processes contribute to gender equality. Various programmes for skill up gradation of women can help towards women empowerment. Changing deep-rooted psychology of older generation is difficult therefore attempts should be made to educate the younger generation and coming generation regarding the adverse effect of gender imbalance. Gender related studies should be made compulsory in schools and colleges. Besides this, Government can design more result-oriented cash transfer schemes like Sukanya Samridhi Yojana, Balika Samridhi Yojana, Udaan etc.

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