

# How trade diversification and economic growth affect gender inequality in female labour market participation? The case of India

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## Abstract

**Purpose** – This paper attempts to investigate through empirical exercise how the chances of female employment opportunities rise in a developing country like India, against the backdrop of changes in institutions that are associated with globalization.

**Design/methodology/approach** – The paper develops a simultaneous equation model through a growth equation, gender equation and globalization equation to identify the factors impacting female labor market opportunities in India, based on annual time series data 1991–2019.

**Findings** – The major results of this study are as follows: (1) It is social globalization that positively impacts gender equality in employment opportunities apart from economic growth and trade diversification; (2) Evidence of “feminization of labor force” in the context of trade diversification is found; and (3) Equal gender opportunities reflect in equalizing outcomes in the labor market.

**Practical implications** – Growth strategies need to be constructed in such a way in India that it has redistributive implications and benefits women. The state agency needs to optimize the productive base of human resources and increase women’s empowering capability through social and legal sanctions.

**Originality/value** – The uniqueness of the present paper lies in contributing to the existing literature on how gender inequality impacts trade diversification and how trade diversification impacts gender.

**Keywords** Globalization, Social, Economic growth, Trade diversification, Gender inequality, India, Opportunities, Time series, Simultaneous model, Education

**Paper type** Research paper

## 1. Introduction

The major developing countries of the world for example (India, Bangladesh, Pakistan, Cambodia and Mauritius) among others continue to face conditions of underemployment, poverty and inequality in terms of access to formal employment opportunities, particularly among women. The recent export-led development approaches in many developing economies of the world have led to a diversification in the economy and have accelerated the process of job creation where an increasing number of women have been employed. Owing to the increasing stride in the process of globalization, many women in developing countries have been experiencing access to the labour market particularly in the export sector. The export intensive employment opportunities for women have been primarily visible in the “export processing zone”. To get an in-depth understanding, the export dynamism and economic growth generated due to globalization and its impacts on gender



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equality more empirical analysis is required. Furthermore, in terms of gender dimensions more gender-based analysis is needed to better understand how access to employment improves women's well-being and which may have positive implications for economic growth. The extant literature is still ambiguous on the impact of exports, international trade on economic growth and behaviour of the labour market opportunities and globalization's impact on gender equality. So the gender aspect of economic growth in the era of export diversification needs further understanding. This paper explores the feasibility of such export-led development processes in terms of contribution to the gender dimensions in the context of India. It further examines how economic growth at the backdrop of trade opportunities is impacted by gender-based opportunities. It must be important to note that India presents a distinctive example for country-based exploration on the impact of trade on gender equality and further economic growth at the backdrop of globalization primarily due to (1) changes in the Indian economy after the 1990s where the extent of trade openness and liberalization was huge even more far-reaching than the other developing economies for example (Bangladesh, Mauritius, Brazil and Colombia) and (2) in many instances the reform process was exogenously determined. Export-led growth has the potential to favour greater gender equality in the labour market however export intensification alone cannot lead to the end of inequality in gender opportunities. Globalization as an agency and state policies are of equal importance to close formidable gender gaps in opportunities and outcomes in India. Only then will India be able to take the optimum advantages of the potential contribution of export diversification and economic growth as tools for more gender equality.

In this paper, we study empirically how chances of female employment opportunities arise in a developing country like India against the backdrop of changes in trade diversification and economic growth. Trade as explained in the literature is a crucial aspect of globalization and is an engine of growth in developing countries like India. Expansion of trade and subsequent augmentation in the growth of a country can impact gender equality. Trade generates newer employment opportunities however as women are vulnerable to the adversaries of shocks any negative impact from trade may impact gender inequality. Gender inequality has many extent and magnitude which include equality of opportunity and outcomes. These can be summed up as follows:

educational opportunities; access to better health and empowering opportunities.

These opportunities may help women to remove inequalities in human capital formation and avail themselves of opportunities in the labour market. The impact of human capital formation would be translated into reducing gender inequality which would have a positive bearing on productivity and economic growth. The study by [Dreher et al. \(2012\)](#) observes that social globalization measured by the KOF Index of Globalization) has been a crucial explanatory factor in increasing women's empowerment. We follow the idea of [Dreher et al. \(2012\)](#) in the current study to capture how institutional arrangements proxied by political, cultural and social globalization along with economic growth impact women's labour force participation. The KOF Index of Globalization is a ranking of the countries based on the scopes of globalization: economic globalization, social globalization and political globalization. This index is postulated by [Dreher \(2006\)](#). The database is available from the KOF Swiss Economic Institute.

Globalization is a complex phenomenon that is associated with dissemination of technology, the spread of information, social, institutional and political patterns, and economic interactions. According to [Feenstra \(2003\)](#), globalization enables countries to diversify their production process and enjoy gains from specialization. It is important

to note that the concept of globalization being indeed complex is quite possible that its effect on gender inequality depends on the way we examine the nexus across globalization and gender. Globalization is a process where the world economies are increasingly getting integrated which has led to the increase in the volume of trade and its diversification. However, the complexity of globalization lies in considering the economic, social and political aspects of it. Social globalization is concerned primarily with culture and norms, political globalization discusses how the country's political system gets integrated into the global political level. Furthermore, economic globalization discusses how trade openness and investment impact countries (Dreher, 2006). In a globalizing world, it is indeed important to understand how trade diversification can contribute to enhancing gender equality in labour market outcomes.

This paper develops a simultaneous equation model to study how economic growth, trade diversification and gender-based opportunities in health and education impact gender outcomes in the labour market participation for women, based on annual time series data 1991–2019. Since there are interdependencies between economic growth, trade and gender inequality, the simultaneous equation model is chosen. In particular, the paper has three-fold contribution:

- (1) We first present through an empirical model building exercise how gender inequality in labour market opportunities is impacted by trade diversification and economic growth. A wide-ranging theoretical and empirical literature exists that discusses the role of trade diversification in impacting productivity changes, sectoral allocation of resources and hence growth in the developing countries (Teignier, 2018). Trade diversification can play a crucial role in a developing country like India but whether it fosters gender equality in the labour market or hinders is to be explored here. Gender inequality hinders trade diversification in a developing country like India which is empirically explored in this paper. The uniqueness of the present paper lies in contributing to the existing literature on how gender inequality impacts trade diversification and how trade diversification impacts gender.
- (2) We try to demonstrate that low economic growth is associated with inequality in gender-based opportunities and outcomes.
- (3) Subsequently, we try to establish the evidence of interlinkages by empirically studying gender inequality and trade diversification and gender inequality and economic growth in an interlinked exercise.

The paper henceforth is designed as follows: [Section 2](#) delves on the findings of the current literature. The methodology, choice of variables and datasets are discussed in [Section 3](#). The empirical results are found in [Section 4](#). The discussion is found in [Section 5](#), and the paper is finally concluded in [Section 6](#).

## 2. Review of literature

### 2.1 Trade and gender inequality

The literature has discussed numerous ways through which trade liberalization may impact female labour force participation. The first conduit explains that trade is essentially non-discriminatory. The pioneering work by Becker (1957) explained that when employers have market power then there arise discriminatory practices otherwise under conditions of perfect competition the market is neutral. The studies by Black and Brainerd (2004) for the United States and Ederington *et al.* (2009) for Colombia verified empirically Becker's (1957) postulate. The study by Schultz (2007) discussed that trade openness generates investment in human

capital formation and hence gender equality. The studies by [Goldin \(1995\)](#) and [Wang et al. \(2020\)](#) discussed that trade liberalization is accompanied by gender-specific shifts in employment patterns owing to structural transformation. The study by [Hyder and Behrman \(2011\)](#) for Pakistan demonstrated that trade openness negatively impacts female labour force participation owing to problems in resource allocation. Furthermore, technological changes affect women's productivity which impacts the wages and employment pattern ([Juhn et al., 2014](#)).

Trade diversification and particularly export diversification enables a country to circumvent uncertainty of earnings in export. It expands revenue ([Breton and Newfarmer, 2007](#)). According to the studies by [Melitz \(2003\)](#) and [Bernard et al. \(2007\)](#), trade diversification helps in the allocation of resources in productive ways which boosts productivity levels of industries. According to [Lawless \(2010\)](#), trade diversification raises export productivity and also raises export earnings. The pioneering study of [Hausmann and Hidalgo \(2011\)](#) explained the diversity of trade in an economy as the extent to which a country can compete in the international markets as far as its export performance is concerned. The process of diversification indicates the country's ability to take part in the global system of value chains. The study by [Hausmann and Hidalgo \(2011\)](#) measured diversity of performance through the wide-ranging technical capacities and other factor endowments which enables some countries to acquire greater share in the global markets. Trade diversification explains not only the complexity of product specialization of the goods exported but a move towards high-quality exports which gives the scope of entering newer markets. The diversification index follows the classification of [Hausmann and Hidalgo \(2011\)](#) who utilized the Harmonized System (HS) to categorize goods that are traded. The important indicator of product diversification is the ability of a particular country to acquire a wide-range of markets for a long time.

The diversification index is explained as:

$$HSDIV_{m,y} = \ln \left( \sum_j^y = y - 3 \sum_{i=1}^{NHIS} = N_{m,j,i} \right)$$

Here,  $HSDIV_{m,y}$  is HS product diversification index for country  $m$  in the year  $y$ ;

$NHIS$  is the number of HS subheadings exported in year  $j$ ;

$N_{m,j,i}$  is the number of markets country  $m$  exported to in year  $j$ .

It is constructed by taking into consideration three specific factors, (a) number of product classification within the list of country's exports; (b) the scope of markets available and (c) the levels of past performance which is called the historical performance.

The discussion by [Balavac and Pugh \(2016\)](#) argued that there is a lack of unambiguous definition of trade diversification. In most of the existing studies concentration indices are utilized to measure trade diversification. Furthermore, the study explained that to analyse growth of exports one has to measure diversification at the extensive or intensive margin.

From the foregoing discussion, we find that trade diversification enables an economy to obtain economic resilience and macroeconomic security. However, how trade diversification impacts gender concerns in a developing country like India, such explorations are scant. This study makes a unique attempt to add to the existing gap in the literature. Inequalities in gender opportunities may constrain the diversification process by reducing the pool of human capital formation and labour market participation. This study, therefore, attempts to ascertain to what extent gender inequality responds to trade diversification. Furthermore, the study also tries to investigate how trade diversification and economic expansion impacts gender inequality.

## 2.2 Economic growth and gender inequality

The literature discussing the relationship between economic growth and female labour force participation appears to be scant and rather inconclusive. The existing studies always do not present uniform results owing to data concerns, differences in econometric modelling exercises and problems associated with reverse causality. The study by [Klasen and Lamanna \(2009\)](#) using two measures of labour force participation for 93 countries over 1960 to 2000 obtained a negative relationship of gender inequality in labour market participation upon economic growth. The studies by [Verick \(2014\)](#) and [Yildirm et al. \(2019\)](#) discussed that educational opportunities lead to higher human capital investment which raises female labour force participation thereby contributing positively to economic growth.

Several studies in the literature for example ([Tansel, 2002](#); [Fatima and Sultana, 2009](#)) obtain a kind of “U”-shaped behaviour between economic growth and women’s labour force participation. These studies show that female labour force participation initially declines with economic growth and after growth reaches a threshold the participation of female labour again rises.

The extant literature presents two major postulates on economic growth and female labour force participation. The first postulate states that there may be a direct or inverse relationship between economic growth and female labour force participation depending upon the context of structural transformation, educational opportunities for women and industry specification. The second postulate confirms the feminization “U” hypothesis. According to the “U” hypothesis, there exists a convex association between economic growth and female labour force participation. Following the pioneering study of [Boserup \(1970\)](#), three stages in economic growth and its association with female labour force participation justify the “U”-shaped behaviour. The first stage is associated with women working in agriculture at low levels of economic development. During this stage, women have high fertility levels and lack specialization in the workforce, they usually work from home. In the second stage, industrialization occurs which leads to rising inequalities between men and women. This is because owing to low educational opportunities women drudge in low economies of scale. It is only at the third stage further structural shifts to the service industry occur where women’s labour force participation rises.

*2.2.1 Research gaps and hypotheses to be tested.* The findings from the literature confirm that trade and female labour force participation are important drivers of economic growth. However, the literature does not obtain any unambiguous findings on gender dimension and impacts of trade. In this paper, we discuss the dimensions of gender gaps and their drivers and how they may impact trade diversification in the context of India. Accordingly our hypotheses of study:

*H1.* Trade diversification impacts gender inequality in a nonlinear way.

*H2.* Economic growth impacts female labour force participation in a “U”-shaped way.

As discussed earlier, India has undergone a series of structural transformation which impacts the interlinkages between trade diversification and economic growth. Thus, we frame the third hypothesis of the study:

*H3.* There exists a non-linear relationship between trade diversification and economic growth.

## 3. Materials and methods

### 3.1 Theoretical framework

The theoretical framework of this study follows the study of [Dollar and Gatti \(1999\)](#). [Equation \(1\)](#) explains how gender inequality in labour market participation is affected by

economic growth and trade diversification. Furthermore, Equation (2) explains how economic growth is impacted by gender inequality and trade diversification. Last Equation (3) explains how trade diversification is impacted by gender inequality and economic growth. In all three cases, there are a set of control variables to check for misspecification bias.

$$\begin{aligned} \text{Gender Inequality in labour market}_t &= \sigma + \beta_1 \text{Gross Domestic Product}_t \\ &+ \beta_2 (\text{Gross Domestic Product}_t)^2 + \beta_3 \text{Economic Growth}_t + \beta_4 \text{Trade Diversification} \\ &+ \beta_5 (\text{Trade Diversification})_t^2 + \beta_6 Z_t + \varepsilon_t \end{aligned} \quad (1)$$

Here, gender inequality is impacted by gross domestic product and its squared component to examine the existence of non-linearities for verification of the scope of “U”-shaped hypothesis in the context of gender inequality. Furthermore, gender inequality is also impacted by trade diversification and its squared component to consider the scope of “U”-shaped hypothesis in the context of gender inequality and trade diversification.  $Z$  explains the set of control variables and  $\varepsilon_t$  is the usual error term.

$$\begin{aligned} \text{Economic Growth}_t &= \delta + \gamma_1 \text{Gender Inequality in the labour market}_t \\ &+ \gamma_2 \text{Trade Diversification} + \gamma_3 (\text{Trade Diversification})_t^2 + \gamma_4 K_t + u_t \end{aligned} \quad (2)$$

Here, economic growth is affected by gender inequality in the labour market, trade diversification and its squared component to explore the scope of convex relationship as suggested in the literature, for example (Huchet-Bourdon *et al.*, 2018; Munir and Kanwal, 2020).  $K$  is the set of control variables.  $u_t$  is the usual error term.

$$\begin{aligned} \text{Trade diversification} &= \sigma + \lambda_1 \text{Gender Inequality in the labour market}_t \\ &+ \lambda_2 \text{Gross Domestic Product} + \lambda_3 (\text{Gross Domestic Product})_t^2 \\ &+ \lambda_4 \text{Economic Growth}_t + \lambda_5 X_t + \omega_t \end{aligned} \quad (3)$$

Here, trade diversification is impacted by gender inequality, gross domestic product and its squared component to explore possibilities of convex association for example (Osei *et al.*, 2019),  $X$  is the set of control variables and  $\omega_t$  is the usual error term.

### 3.2 Estimation methodology

The paper estimates how female labour force participation is impacted by economic growth and trade diversification and further how economic growth and trade diversification is impacted by female labour force participation. We applied the simultaneous equation model (SEM) in this context. The system of equations (1)–(3) are solved following the usual rank and order conditions. Since the system of equations is related, we need to calculate both the direct impact and indirect impact of changes in the explanatory variable impacting the dependent variable. In the SEM model analysis, we can classify the impact and association of variables with another as the impact of net of direct effect and indirect effect mediated through other variables. The total impact is the sum of both direct and indirect effect.

Equation (4) explained how gender inequality in the labour market is impacted by trade diversification.

$$\frac{\partial(\text{Gender Inequality in labour market}_t)}{\partial(\text{Trade Diversification})} = \frac{(\beta_4 + 2\beta_5) + \beta_3(\gamma_2 + 2\gamma_3)}{(1 + \gamma_1 + \lambda_1)\beta_3} \quad (4)$$

The impact of trade diversification on gender inequality in the labour market can be decomposed into two parts (1) direct impact through the coefficients  $\beta_4$  and  $2\beta_5$ , and the

indirect impact can be measured through trade diversification impacting economic growth which is expressed in the second part of the expression in the numerator namely  $\gamma_2 + 2\gamma_3$  and its multiplicative component  $\beta_3$ . Trade diversification impacts economic growth which further has repercussions on gender inequality in labour market participation.

Equation (5) explained how economic growth is impacted by gender inequality by explaining the direct and indirect pathways.

$$\frac{\partial(\text{Economic Growth}_t)}{\partial(\text{Gender Inequality in the labour market})} = \frac{\gamma_1 + \lambda_1(\gamma_2 + 2\gamma_3)}{(1 + \lambda_1 + 2\lambda_2)(2\beta_5 + \beta_4)} \quad (5)$$

Gender inequality in the labour market impacts economic growth directly through the  $\gamma_1$ . Further by impacting trade diversification gender inequality impacts economic growth through an indirect channel. This is expressed through the  $\gamma_2 + 2\gamma_3$  and the multiplicative term  $\lambda_1$  shows the interactive impact.

Equation (6) explained through the direct and the indirect pathways how trade diversification is impacted by gender inequality:

$$\frac{\partial(\text{Trade Diversification}_t)}{\partial(\text{Gender Inequality in the labour market})} = \frac{\lambda_1 + \lambda_4(\gamma_2 + 2\gamma_3)}{(1 + \lambda_2 + 2\lambda_3 + \lambda_4)(2\gamma_3 + \gamma_2)} \quad (6)$$

The direct effect of gender inequality upon trade diversification is impacted by  $\lambda_1$ , and the indirect component is measured by  $\lambda_4(\gamma_2 + 2\gamma_3)$ . Gender inequality in the labour market impacts economic growth which has further impacts on trade diversification.

The direct and indirect effect of economic growth on gender inequality is found in Equation (7).

$$\frac{\partial(\text{Gender Inequality}_t)}{\partial(\text{Economic Growth})} = \frac{\beta_3 + \lambda_4(\beta_4 + 2\beta_5)}{(1 + \lambda_1 + \gamma_1)(2\beta_5 + \beta_4)} \quad (7)$$

Equation (8) explains the direct and indirect (occurring through impacting gender inequality) impact of economic growth on trade diversification.

$$\frac{\partial(\text{Trade Diversification}_t)}{\partial(\text{Economic Growth})} = \frac{\lambda_4 + \beta_3\lambda_1}{(1 + \gamma_2 + 2\beta_5 + \beta_4)\lambda_4} \quad (8)$$

Equation (9) explains how economic growth is impacted directly by trade diversification and further indirectly through trade diversification impacting gender inequality which furthermore impacts economic growth.

$$\frac{\partial(\text{Economic Growth}_t)}{\partial(\text{Trade Diversification})} = \frac{(\gamma_2 + 2\gamma_3) + \beta_3\gamma_1}{(1 + \gamma_1 + \beta_3)\lambda_4} \quad (9)$$

### 3.3 Simultaneity bias problem

In the existing literature, we have found interdependence between trade, economic growth and gender inequality. However, the extant discussion in the empirical literature fails to sufficiently explore the interdependence and report only a part of the interdependence. This problem occurs owing to the application of a single equation. A simultaneous equation system enables in exploring the interdependencies appropriately. Simultaneity occurs when one or more of the explanatory variable (on the right-hand side of the equation) are jointly determined with the dependent variable (on the left-hand side of the same Equation). So the dependent and the explanatory variables explain each other at one particular point in time. The simultaneity bias in the model can be dealt with by building the SEM. The study by

Van de Berg and Lewer (2007) discuss that the SEM is more suitable than the existing methodologies in the literature because it captures the two-way relationship across the dependant and explanatory variable.

The simultaneity problems arise because gender inequality in the labour market is impacted not only by trade diversification but also by impact of gender inequality in the labour market on trade diversification. Further trade diversification impacts economic growth and economic growth is also impacted by gender inequality in the labour market. This indirectly impacts further gender inequality in the labour market.

There are direct and indirect pathways whereby trade diversification impacts gender inequality in labour market. Direct effect relates largely to the question of optimal use of the benefits of trade diversification. The indirect effect revolves around various positive externalities of equal opportunities related to health, education which furthermore impacts economic growth. This has an impact on trade diversification and hence gender inequality in the labour market.

Thus, we note a problem of direction of causality which is the particular focus of this paper. We expect to obtain a recursive association between gender inequality in the labour market and trade diversification with trade diversification leading to greater gender equality and gender equality contributing to further trade diversification.

### 3.4 Choice of variables and datasets

The major data for the variables like the ratio of female to male labour force participation, gross domestic product, gender parity index for enrolment, fertility rate and seats held by women in the parliament are obtained from World Development Indicators, World Bank. The data for the export diversification index are obtained from International Monetary Fund. The data on the index for financial, social and political globalization are available at the Swiss Economic Institute. Data on physical and human capital formation are obtained from the Penn World table. The index on economic freedom is obtained from Fraser Institute datasets.

Table 1 provides an overview of the basic descriptive statistics of the time-series observations. The dataset [1] is balanced with 30 observations for India from 1990 to 2019. Furthermore, Table A1 explains on the choice of variables and datasets in detail.

## 4. Results

### 4.1 On identification problems

It is necessary to examine the identification problems of the SEM so that the rank condition and order condition are met enabling the parameter coefficients of the structural form to have a unique solution. Table 2 explains that the equation system is identified.

### 4.2 Unit root testing

It is important to obtain whether the observations are stationary or not (Newbold and Granger, 1974). To find the stationary properties of the time series, the unit root test of augmented Dickey and Fuller (1979) unit root test (ADF test), the Phillips–Perron unit root test (PP), Phillips and Perron (1988) and the Dickey–Fuller Generalized Least Square (DF-GLS) test, Elliott *et al.*'s (1996) ERS are performed. The results show that the variables are of order I(1). Table A2 shows the results.

### 4.3 Results of the simultaneous model

4.3.1 Impact of economic growth and trade diversification on gender inequality in labour force participation (Equation 4). Female labour force participation is negatively impacted by gross domestic product per capita (in logarithmic terms), 1% rise in LGDP leads to a decline in female labour force participation by 4.09, however when the squared component is

**Table 1.**  
Descriptive statistics:  
summary

Variables	Observations	Average	Standard deviation	Minimum	Maximum
<i>FL/ML</i>	30	0.31	0.06	0.22	0.38
<i>LGDP</i>	30	3.01	0.18	2.76	3.32
<i>EXPD</i>	30	1.94	0.098	1.81	2.16
<i>KOFSOGI</i>	30	34.85	13.87	14.92	52.08
<i>KOFPOGI</i>	30	85.72	8.23	66.82	92.96
<i>GPITERT</i>	30	0.73	0.17	0.52	1.06
<i>FERT</i>	30	52.96	27.94	12.07	98.78
<i>PAR</i>	30	10.85	2.27	7.2	14.39
$\Delta K$	30	0.60	0.012	0.04	0.92
$\Delta HC$	30	1.95	0.15	1.64	2.12
<i>ICT</i>	30	1.42	0.55	0.86	3.45
<i>KOFFiGI</i>	30	32.69	11.44	10.96	44.91
<i>FDI</i>	30	0.40	0.46	0.01	1.60
<i>FRI</i>	30	6.53	0.40	4.82	6.91

**Note(s):** Calculation author

Equation	Order condition			Rank condition	Conclusion
	<i>K1</i>	<i>K-K1</i>	<i>G1</i>		
1. On gender <a href="#">Equation (4)</a>	5	19-5 >	2	2	Identified
2. On growth <a href="#">Equation (5)</a>	5	19-5 >	2	2	Identified
3. On trade diversification <a href="#">Equation (6)</a>	4	19-4 >	2	2	Identified

**Note(s):** *K* = Number of predetermined variables; *K1* = Number of predetermined variables in the specified equation; *G1* = Number of endogenous variable in specified equation. Compilation Author**Table 2.**  
Examination on the  
identification problem

considered the impact is positive, [Table 3](#), Col.2. Such findings verify the existence of a nonlinear relationship between GDP and female labour force participation rate, confirming the findings of [Elborgh-Woytek et al. \(2013\)](#) and [Kazandjian et al. \(2019\)](#). To obtain the threshold level of *LGDP* for the turning point in the estimation for the existence of a “U”-shaped behaviour the first derivative of [Equation \(4\)](#) with respect to *LGDP* is obtained and setting it equal to 0, we obtain the threshold level of *LGDP* in per capita terms as 3.35. Furthermore, the study also obtains a “U”-shaped behaviour as far as the impact of *EXPD* on female labour force participation is concerned. 1% decline in fertility rate leads to rising in the female labour force participation by 0.02%. Furthermore, the impact of social globalization is positive and significant upon female labour force participation in India, [Table 3](#) Col. 2. The results confirm [Hypothesis 1 and 2](#), respectively.

**4.3.2 Impact of gender inequality and trade diversification on GDP ([Equation 5](#)).** Based on the results of [Table 3](#), Col. 3, we find that a 1% rise in female labour force participation leads to economic growth by 1.75%. Expansion in educational opportunities for women expressed through *GPITERT* leads to a rise in economic growth by 0.36%. The relationship between trade diversification and economic growth is nonlinear. 1% rise in growth of physical capital leads to a rise in economic growth by 0.12%. The impact of economic globalization and foreign direct investment upon economic growth is also significant and positive, [Table 3](#), Col. 3. These results confirm [Hypothesis 2 and 3](#), respectively.

**4.3.3 Impact of gender inequality on trade diversification ([Equation 6](#)).** Export diversification rises by 1% owing to a decline in fertility by 0.20%, further rise in women representation in the parliament raises export diversification by 0.03%, [Table 3](#), Col. 4. However, the impact of female labour force participation appears to be insignificant. The

Variable	Eq (4) Dependent variable $\frac{F_L}{M_L}$	Eq (5) Dependent variable $\Delta LGDP$	Eq (6) Dependent variable $EXPD$
Constant	7.19 (1.78)	-3.60 (-1.65)	26.48*** (6.59)
$\frac{F_L}{M_L}$		1.75*** (6.88)	-0.66 (-0.92)
$LGDP$	-4.09** (-6.88)		-13.85*** (-6.42)
$LGDP^2$	0.61** (2.19)		2.19*** (6.38)
$\Delta LGDP$	0.05** (1.94)		0.12 (1.78)
$EXPD$	-3.05*** (-2.38)	-7.20 (-3.14)	
$EXPD^2$	0.79*** (2.40)	1.86* (3.21)	
$KOFSOGI$	0.04*** (3.95)		
$KOFPOGI$	-0.01 (0.28)		
$GPITERT$	0.03 (0.89)	0.36*** (4.67)	0.20 (0.64)
$FERT$	-0.02** (-6.42)		-0.20** (-1.98)
$PAR$	0.02 (0.46)		0.03** (1.89)
$\Delta K$		0.12** (2.12)	
$\Delta HC$		0.21 (1.13)	
$ICT$		0.11 (1.54)	
$KOFFiGI$		0.01** (0.08)	
$FDI$		0.39** (2.30)	
$FRI$			-0.11 (-0.37)

**Table 3.**  
Estimation results:  
gender inequality,  
economic growth and  
globalization, India

**Note(s):** Number in curved brackets are the z ratios. (\*\*\*), (\*\*), and (\*) denotes that the coefficients are statistically significant at 1%, 5% and 10% significance level, respectively. Compilation Author

relationship between  $LGDP$  and  $EXPD$  as per expectations is nonlinear, Table 3, Col 4. The results confirm Hypothesis 3.

The findings confirm the importance of economic growth and trade diversification upon female labour force participation in India. There exists the feminization of the “U”-shaped hypothesis across female labour force participation and economic growth and further with trade diversification. Fertility rate and educational opportunities are also statistically significant variables that impact our study. In addition, gender equality impacts economic growth positively and significantly, and there are significant linkages across economic growth and trade diversification. The results from the SEM bring into an establishment that studies on the exploration of interactions between international trade and female employment issues and further economic growth and female employment opportunities are crucial. This is because female employment opportunities are important for international competitiveness and economic growth. Neglect of investment in female opportunities may cause India to pay a price for gender inequality in terms of slow economic growth.

## 5. Discussion

The results of the present study distinct from the major early studies (which obtains a linear relationship between female labour market opportunities and trade opportunities) obtain a “U”-shaped behaviour between female labour force participation and trade diversification. The existence of a non-linear relationship confirms the studies of Hesse (2009) and Lee and Zhang (2019). The rapid export diversification in the developing countries particularly towards the manufacturing sector has comparative specialization for women and hence as export diversification rises impact on female labour opportunities also improves. According to Athukorala (2012) and Crozet and Orece (2017) rapid expansion in trade is an important characteristic feature of the Asian countries process of globalization and this has positive distributive implications as far as gender-based labour force participation is concerned. The studies of Bloom *et al.* (2009) and Madanizadeh and Pilvar (2019) have also obtained non-

linearity across female labour force participation and trade liberalization. These studies discuss that such occurrences is due to externalities and endogeneity issues. The rise in gender-based opportunities for women expressed through a decline in the fertility rate and rising educational opportunities also help the women to reap the benefits of expanding opportunities in the job market. These findings confirm the findings of Verick (2014) and Yildirim *et al.* (2019). This study establishes that different aspects of gender inequality have essential implications for the linkage between gender inequality in the labour market and economic development. Gender inequality as commonly discussed in the literature leads to inefficient allocation of talent which reduces income and economic growth. Furthermore, on the relationship between trade and gender equality, the results confirm that trade impacts initially negatively and further positively. This implies that with rising specialization and diversification the benefits of trade are favourable for women. On the other side gender-based inequalities significantly impact trade outcomes.

## 6. Conclusion and policy suggestions

Our study based on the empirical methodology in the context of India provides corroboration to the hypothesis that gender inequality is a detriment to the diversification of exports and structural transformation of the economy. This paper utilizes a SEM with a growth equation, gender equality-based equation and equation based on trade and gender to explore how female labour market opportunities are impacted, using annual time series data 1991–2019. The study explores that a drop in gender inequality in opportunities explained in terms of educational access, fertility behaviour and political empowerment impacts economic growth and export diversification positively. Since the association between female labour force participation, economic growth and further economic growth and export diversification is quite complex, suggesting a two-way relationship, the paper adopts a SEM to overcome the problems related to bias in simultaneity. 1% rise in female employment leads to a rise in economic growth by 1.75%. However, the *LGDP* impacts female labour force participation in a nonlinear manner. 1% rise in *LGDP* leads to a decline in female employment by 4.09%, while 1% rise in *LGDP*<sup>2</sup> leads to an expansion in female employment by 0.61%. Further, the association between export diversification and female labour force participation also exhibits nonlinearities. 1% rise in *EXPD* leads to a fall in female labour force participation by 3.05%, but 1% rise in its squared component leads to a rise in female employment by 0.79%. Our study also shows that enhanced gender opportunities explained by higher access of the female population to educational opportunities also contributes to economic growth. 1% rise in *GPITERT* leads to an expansion in economic growth by 0.36%. The results demonstrate that increasing access to economic opportunities, trade diversification and economic growth have raised women's labour market participation in India.

The evidence from the current study is that gender equality particularly in the context of employment and education contributes to economic growth, this necessitates from the perspective of growth to promote certain dimensions that will address the critical areas of gender inequality. Growth strategies need to be constructed in such a way in India that it has redistributive implications and benefits women. The state agency needs to optimize the productive base of the human resources and increase women's empowering capability through social and legal sanctions. Furthermore, the results based on the positive impacts of trade diversification on gender equality generate the strong need to incorporate in the Indian context a gendered vision in trade policy. This means instrumenting policies that would address: (1) challenges and opportunities that women in India face; (2) making possible the successful incorporation of women labourers into the technologically upgraded sector and (3) the thrust of emphasis on the need for investments for social protection system in India so that women from this country can balance work opportunities and the family.

### 6.1 Limitations

This study explored the gender-based employment linkages with trade diversification and economic growth but owing to a paucity of data in the context of a developing country like India could not explore how different characteristics of trade measured by policy changes, the volume of trade and changes in nature of integration could impact the structural transformation of the economy and hence gender-based opportunities. Such aspects leave scope for future research and discussions. Second, the study has not explored the role of individual firms' performance in impacting gender-based employment opportunities because the availability of a firm-level database in India is still at its infancy particularly over large periods.

### Note

1. The data utilized for this study has been deposited in the public repository figshare URL: <https://figshare.com/s/ce8d72bdf74fbcbbde8c>

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## Appendix

Endogenous variables	Data Source
Ratio of female to male labour force participation	World Development Indicators, World Bank
Gross domestic product	
Export diversification index	International Monetary Fund
Exogenous variables	
Gender parity index for enrolment	World Development Indicators, World Bank
Fertility rate	
Seats held by women in the parliament	
Financial globalization	KOFF Index, Swiss Economic Institute
Social globalization	
Political globalization	
Physical capital formation	Penn World Table
Human capital formation	
Information communication technology	World Development Indicators, World Bank
Foreign direct investment	
Economic freedom index	Fraser Institute Data Sets

**Table A1.**  
Description of  
variables and source  
of data

Variables at level	ADF test statistic	PP test statistic	DF-GLS test statistic	Results
Ratio of female to male labour force participation	-2.96	-3.52	-2.89	Non-stationary
Gross domestic product	-0.73	-7.08	-2.27	Non-stationary
Export diversification index	-2.06	-6.01	-1.90	Non-stationary
Gender parity index for enrolment	-1.69	-1.70	-2.22	Non-stationary
Fertility rate	-1.02	-6.08	-1.08	Non-stationary
Seats held by women in the parliament	-0.94	-1.38	-2.03	Non-stationary
Financial globalization	-0.78	-3.50	-1.39	Non-stationary
Social globalization	-1.45	-3.31	-2.83	Non-stationary
Political globalization	-1.94	-4.94	-1.34	Non-stationary
Physical capital formation	-2.82	-5.42	-5.01	Non-stationary
Human capital formation	-0.95	-1.61	-0.79	Non-stationary
Information communication technology	-2.76	-1.32	-5.02	Non-stationary
Foreign direct investment	-1.91	-1.81	-1.92	Non-stationary
Economic freedom index	-1.89	-8.03	-1.37	Non-stationary

  

Variables in the first differenced form	ADF test statistic	PP test statistic	DF-GLS test statistic	Results
Ratio of female to male labour force participation	-5.48*	-26.25*	-8.01**	Stationary <i>I</i> (1)
Gross domestic product	-7.51*	-38.69*	-8.43**	Stationary <i>I</i> (1)
Export diversification index	-6.88*	-38.45*	-8.65**	Stationary <i>I</i> (1)
Gender parity index for enrolment	-8.72*	-21.83*	-6.31**	Stationary <i>I</i> (1)
Fertility rate	-6.78*	-37.94*	-8.03**	Stationary <i>I</i> (1)
Seats held by women in the parliament	-6.02*	-29.26*	-6.94**	Stationary <i>I</i> (1)
Financial globalization	-9.73*	-44.03*	-5.73**	Stationary <i>I</i> (1)
Social globalization	-5.00*	-31.23*	-6.83**	Stationary <i>I</i> (1)
Political globalization	-5.88*	-40.27*	-7.92**	Stationary <i>I</i> (1)
Physical capital formation	-9.22*	-28.12*	-8.92**	Stationary <i>I</i> (1)
Human capital formation	-5.89*	-31.02*	-4.91**	Stationary <i>I</i> (1)
Information communication technology	-11.02*	-41.83*	-8.24**	Stationary <i>I</i> (1)
Foreign direct investment	-9.01*	-35.37*	-5.32**	Stationary <i>I</i> (1)
Critical values	1% -4.12 5% -3.48 10% -3.17	1% -19.13 5% -13.40 10% -10.77	Critical values at 5% level of significance -3.05, lags 4	

**Notes:** \* and \*\* denotes that the coefficients are statistically significant at 5% and 10% significance level, respectively

**Table A2.**  
Unit root test results

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