TRADE LIBERALIZATION AND GENDER INEQUALITY IN EMERGING ECONOMIES – FROM THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT

The study identifies the effect of trade liberalization on gender inequality in labor market, welfare, and empowerment in the emerging economies considering the significance of gender inequality issue in sustainable development goals (SDGs). It uses global gender gap index (GGGI) and its four sub-indexes namely economic participation and opportunity, education, health and politics as indicators of gender inequality in different aspects. Due to the problem of endogeneity and the presence of time-invariant variables Hausman-Taylor estimation technique has been applied to a panel data set of 40 countries for the period of 2006-2014. The results of the study suggest that trade openness significantly reduces gender inequality in labor market in high growth EAGLE and NEST countries but increase the inequality in other emerging economies. The effect of trade openness in reducing gender inequality in welfare and empowerment is positive, but higher trade increases health gap in other emerging economies. The effects of culture and religion on gender inequality are mixed and differ substantially across countries. According to the findings of the study, trade and government expenditure can be used as essential tools to achieve gender equality goal of SDGs if the proper policy is adopted.

1. INTRODUCTION

Gender inequality is one of the most significant priorities around the world nowadays. No countries can be found that has achieved the significant level of gender equality in various aspects of social life despite the greater international awareness. During the period of implementing Millennium Development Goals (MDGs) from 2000-2015, the world experienced a substantial progress which benefitted women and girls. However, there are still many areas where these advances have not reached yet for this segment. Therefore, it can be easily stated that in all cases of human society gender inequality remains in the extreme situation which influences women and girls all over the world.

As a result gender equality and women rights have received special focus in Sustainable Development Goals (SDGs) adopted by UN member states as the successor of MDGs and there is a stand-alone SDG- Goal 5- regarding these issues. The goal 5 of SDGs was formulated in such a way which interconnects a strong gender

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analysis focusing on removing gender inequality from economic, political and social aspects. Consequently, the gender concerns become one of the crucial issues in achieving sustainable development and the gender inequality is one of the major challenges for SDGs (Stuart and Woodroffe, 2016).

The 2030 Agenda for SDGs takes GDP growth as the key tool for achieving sustainable development since it leads to economic growth with societal progress (Adams and Tobin, 2014). Economic growth is the first and foremost generator of domestic resources needed to achieve the SDGs (UN, 2015) and international trade is the key engine of economic growth. Moreover, trade is considered as a central mechanism for achieving a number of the specific goals and targets of SDGs (Hoekman, 2016).

Now the question is that whether growing international trade can have a substantial positive effect on reducing the gender inequality around the world. The impact of trade liberalization on gender inequality can be explained from two mainstreams of theories of international trade. According to Heckscher-Ohlin theorem, countries should specialize in the production of goods for which it has abundant factors of production. This theory implies that less developed countries will produce labor-intensive products due to their comparative advantage in unskilled labor. The Stolper-Samuelson theory says that the owners of abundant factor are benefited from free trade. So, the workers in the countries with abundant labor will benefit from trade liberalization. As working women comprise a significant segment of the total unskilled labor force in the developing countries, they should be benefited more compared to male employees in the labor abundant developing countries and the gap between male and female in the labor market should fall.

Moreover, increasing participation of women will raise their income which in turn increases their ability to spend on education and health care services. Thus, trade openness also improves female conditions in education and health. Moreover, trade increases government income which consequently raises government abilities to spend for education, health, and other social services. If these expenditures are properly allocated for female advancement, it will reduce the gap between male and female.

The relevant background of the study is that SDGs is a global agenda to ensure human progress through eradicating human disparities and deprivations in the world by the next decade and a half. Achieving gender inequality is one of the major goals and challenges of SDGs because sustainable development cannot be achieved if half of the humanity is denied. Thus considering the significance of gender inequality and trade in sustainable development goals this study will address three questions: firstly whether trade has a positive effect on women welfare and empowerment by reducing the gap between male and female, and secondly whether trade reduces the gender inequality in labor market. Finally, the study will identify the effect of trade liberalization on overall gender inequality in the society.

The study takes emerging economies as the research focus for three reasons. Firstly, from the beginning of the twentieth century, the role of emerging economies is increasing drastically in the global arena and the contribution of these economies to world GDP surpasses the advance economies and Eurozone. Secondly, these economies experience high economic growth and significant scale of economies and they constitute 80% of global population and 50% of world trade. Thirdly, these countries are considered to be in a transitional phase between developing and developed status, and these economies involve countries from Africa; Eastern Europe; Latin America; Middle East; Central Asia; and Southeast Asia.

This study uses panel data set of 40 emerging economies for the period 2006-2014. It uses global gender gap index (GGGI) and its four sub-indexes as indicators of gender inequality in different aspects. Economic participation and opportunity gap index indicates gender inequality in labor market and other three sub-indexes namely education, health and political empowerment gap index measure gender inequality in welfare and empowerment and composite global gender gap index (GGGI) represents overall gender inequality. Hausman-Taylor estimation technique has been applied due to the problem of endogeneity and the presence of time-invariant variables. The impact of trade liberalization on gender inequality has been identified for all the emerging economies

as a whole as well as for their three sub-groups namely EAGLE, NEST and other emerging countries to have a robust analysis.

The remainder part of the paper is designed as follows: Section 2 and 3 broadly discuss theoretical underpinning and literature in the related field; Section 4 describes the sample, measures of trade liberalization and gender gap, and econometric methodology and estimation procedure used in the study followed by section 5 which reports the regression results and analysis. Finally, section 6 draws the concluding remarks and suggests policy implications.

2. TRADE LIBERALIZATION AND FEMALE PARTICIPATION IN THE LABOR MARKET

It is frequently assumed that globalization brings benefits to some people while leave other as losers and women pay the cost of trade liberalization directly through losing the job or getting lower paid jobs (Bussmann, 2009). Although most of the economic theories don't study the effects of globalization on welfare and economic growth through gender lens, conventional trade theories generally imply that economic integration is advantageous for women in the developing countries because of their core competency in the unskilled labor. Many studies support the beneficial effects of trade openness on economic growth for example (Sachs *et al.*, 1995; Klasen, 2002). Free flow of goods, services, and capital helps countries to specialize in producing the goods and services at lower cost in which they have a comparative advantage and import those goods which can be produced by the other countries efficiently. Trade liberalization unlocks a large market as well as facilitates producing goods and services at a lower average cost due to specialization and economies of scale which results in more efficiency and higher productivities, higher national output, and thus higher real income. Moreover, trade openness brings new technologies to the developing countries that consequently allow consumers to buy goods and services at a lower price. However, the dilemma, in this case, is that whether everyone from society especially women will benefit from economic growth resulting from growing trade. Many scholars argue that increasing national growth rate hardly increase the income of the poor (Dollar and Kraay, 2002; Kraay, 2006) whereas other studies identified contrasting result (Lubker *et al.*, 2002; Amann *et al.*, 2006).

According to trade theory, free trade benefits the factor of production that is used abundantly in producing the good as the relative price of the good produced using abundant factor increases and trade will upsurge the demand for the abundant factor. Thus the workers of the countries endowed with abundant labor rather than capital will be benefited from higher trade openness. In the labor-intensive countries, women constitute a huge segment of the unskilled labor force. When there is competition between skilled and unskilled labor force, the unskilled labor force will be benefited more in the labor-intensive developing countries whereas the benefits of skilled labor will be higher in the industrialized nations. So, female participation in the workforce will increase in the labor intensive countries due to ample use of unskilled labor in the production as well as the availability of huge unskilled female workers. Moreover, according to Gray Backer's theory of discrimination discriminatory behavior can be sustained in the less competitive environment. Trade increases competition in the market and thus reduces firms' ability to discriminate. However, a number studies identified that growing benefit does not ensure the reduction of gender inequality in the labor market rather growing trade openness raises the inequality between male and female in the labor market, for example (Meyer, 2003; Zhang and Dong, 2007; Oostendorp, 2009; Berik, 2010; Buchmann *et al.*, 2010; Dominguezvillalobos and Browngrossman, 2010; Chen *et al.*, 2013; Saure and Zoabi, 2014; Anyanwu, 2016).

In the field of trade and female labor market nexus, most of the studies focused on female labor force participation rate and gender inequality in wage. A number of the studies identified the effect of trade liberalization on changes in female labor force participation rate but they did not focus on gender-based inequality in labor force participation for example (Standing, 1989; Tzannatos, 1999; Łobodzinska, 2000; Ozler, 2000; Maurerfazio *et al.*, 2007; Hyder and Behrman, 2012; Juhn *et al.*, 2012). A vast study has been done to identify the effect of increasing trade on gender-based inequality in wage in the labor market for example but not limited to (Hughes and

Maurerfazio, 2002; Chengze and Lui, 2003; Dong and Zhang, 2009; Oostendorp, 2009; Chen *et al.*, 2013) but they overlooked gender inequality in the labor market in other aspects. Bussmann (2009) identified the effects of economic integration on women work life and welfare. He used absolute measures such as female life expectancy; enrollment rate and female labor force participation rate as indicators of women welfare and work life but he did not identify the gap between male and female in economic participation and well-being.

This study will identify the effect of trade liberalization on gender-based inequality in the labor force in the emerging economies. It takes economic participation gap index as a measure of gender inequality in the labor market as it is a composite index that pools participation gap, remuneration gap as well as advancement gap between male and female in economic participation.

3. TRADE LIBERALIZATION AND WOMEN'S WELFARE AND EMPOWERMENT

Trade liberalization improves women welfare and empowerment especially in educational opportunities, health care, and empowerment mainly in two ways. Firstly, increasing trade openness can flourish the export sectors which create the new job for women and women can benefit from more employment opportunities as it increases their income as well as capability to spend on better education and health care services for them as well as for their families (Grown, 2005; Bussmann, 2009). Educated working women are very busy with their work and sometimes they delay getting married and having children that expand their opportunities to take care of their health and spend in higher education (Amin, 2006). Secondly, growing trade results in the higher income of government which increases the ability of the government to spend on fulfilling the social needs of the population especially education, health care, availability of public goods, welfare services, necessary infrastructure etc. and consequently ensures the wellbeing of all people. Moreover, economic self-dependency will increase the decision-making power in the family as well as create awareness among them about education, participation in the decision making in broad aspects of the country and human rights.

In contrast to benefits of economic integration to everyone, some scholars critically identified the "backlash of globalization" which has a negative effect on women's conditions resulting from quick economic growth in some cases. Increasing economic integration fosters the export of lower cost products produced by cheap female labors in the labor-intensive countries. Growing export increases the productivity and investment, as well as growth which results in the expansion of export oriented female-dominated manufacturing industries as these, can be operated through cheap female workers (Seguino, 2000a; 2000b; Blecker and Seguino, 2002). Thus countries will invest more money in cheap workers instead of human capital of women that can deteriorate the overall condition of the female. Moreover, sometimes women face the problems of work-related accidents and may have an issue in health conditions. In the case of women welfare effects of trade openness, Bussmann (2009) identified that although increasing trade raises the opportunity for females to participate in the labor market women health is deteriorated by their increasing participation in the workforce due to higher stress and double burden.

Very few studies focused on identifying the effect of trade openness on gender inequality in welfare and empowerment. Majority of the studies in this field identified the impact of gender inequality in education on economic growth (Dollar and Gatti, 1999; Lagerlof, 2003; Yumusak *et al.*, 2013) economic development (Klasen, 2002; Knowles *et al.*, 2002) and wage (Shultz, 1994; Galor and Weil, 1996). These studies did not identify the effect of trade on gender inequality in education and health. Gray *et al.* (2006) studied in 180 countries to determine the effect of globalization on female education, employment, and life expectancy. However, they used absolute measures such as female life expectancy, literacy, female labor force participation, female representative in parliament but did not identify the gender-based inequality in these areas.

This paper identifies the effects of trade openness in reducing gender-based inequality in welfare and empowerment in the emerging countries taking three sub-indexes of global gender gap index namely health and

survival gap, educational attainment gap and political empowerment gap as indicator of gender inequality in health, education and political decision making respectively.

4. DATA DESCRIPTION AND MODEL SPECIFICATION

The purpose of the study is to identify whether trade liberalization as measured by trade openness (trade to GDP ratio) positively impact women welfare and empowerment as well as gender inequality in labor market. The focus of the study is the emerging economies instead of only developed or developing or specific country viewpoints. There are different reasons behind selecting emerging economies as the sample to identify the impact of trade liberalization on gender inequality. Firstly, identifying the impact of trade liberalization on the gender inequality in the emerging economies provides a crucial policy decision for achieving gender equality through trade because of the significant role of trade in these economies. Moreover, emerging economies are characterized by high economic growth, significant economic scale and high level of economic openness. They are further divided into three groups based on their characteristics especially economic growth which possibly reduces the problem of heterogeneity of the sample and gives deep insight into the analysis.

The panel data set of the sample consists of 40 out of 45 emerging economies based on the availability of gender gap data for the period of 2006-2014[1]. The study considers the emerging economies list given by the BBVA research because it groups the countries on specific economic characteristics such as economic growth, trade openness and further subdivided them into three groups namely EAGLE; NEST; and other emerging economies based on their economic growth, prospects, and contribution in the world trade which gives more intuition about the emerging economies.

4.1. Measures of Trade Liberalization and Gender Inequality

This study uses trade openness (share of export and import to GDP) as indicator of trade liberalization to examine its effect on different aspects of gender inequality following other previous studies for example (Marquez and Pages, 1997; Artecona and Cunningham, 2002; Bussmann, 2009; Hyder and Behrman, 2012; Mcnabb and Said, 2013). Measuring gender inequality or gap in an economy is really a long debated economic issue as gender inequality covers several economic factors and has several dimensions. A number of indexes are available to measure gender inequality i.e. gender inequality index (GII) proposed by UNDP, the world economic forum's global gender gap index (GGGI), women opportunity index (WEOI) of the economist intelligence unit, the OECD's social institution and gender index (SIGI) and gender equity index (GEI) developed by social watch[2]. This study utilizes global gender gap index (GGGI) and its four sub-indexes as indicators of gender inequality. The reason behind using GGGI as the measure of gender inequality is that it uses 14 indicators that affect inequality between male and female and further subdivided them into four groups namely economic participation and opportunity, educational attainment, health and survival, and political empowerment which describe diverse areas of inequality between female and male.[3]

The study uses economic participation and opportunity gap sub-index of GGGI to identify the effect of trade liberalization on gender inequality in labor market and other three sub-indexes namely educational attainment; health and survival; and political empowerment to identify the effect of trade openness on gender inequality in welfare and empowerment. Economic participation and opportunity gap comprises participation gap, remuneration gap and advancement gap. Participation gap measures the difference between male and female in labor force participation whereas remuneration gap measures the difference in female-to-male earned income and wage equality

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[1] The list of the countries as proposed by BBVA research was given in Appendix A

[2] The detail description of these indices were given in Appendix B

[3] The detail description of GGGI is given in appendix C

for similar work and advancement gap is the ratio of women and men among legislators, senior officials, managers as well as technical and professional workers.

Educational attainment gap index measures the gender gap in access to education at all levels such as primary, secondary and tertiary as well as female-male literacy ratio that indicates the long-term ability of the country to educate female and male. Health and survival gap measures the difference between female and male in sex ratio at birth and life expectancy. Political empowerment gap shows the gender gap in the highest level of political decision-making such as ministerial level, parliamentary positions, and positions in the executive office of prime minister and president. Finally, the study uses the composite GGGI as the measure of overall gender inequality in a country. The GGGI and all of its sub-indexes have a value between 1 and 0 where 1 indicates perfect equality between male and female whereas 0 specifies perfect inequality and the higher value of the index is expected to reduce the gender gap.

4.2. Rationale of the Control Variables

This study uses various control variables to strengthen the linkage between trade liberalization and gender inequality in different aspects. These variables also act as potential determinants of gender inequality. This study controls GDP growth to test economic growth's effect on gender inequality as a number of studies identified significant association between gender inequality and economic growth, for example but not limited to (Klasen, 1999; Forsythe et al., 2000; Matthews and Nee, 2000; Seguino, 2000b; Morrison et al., 2007; Klasen and Lamanna, 2009; Schober and Winterebmer, 2011) per capita GDP to examine effect of average income on gender inequality (Bussmann, 2009) government expenditure as higher trade increases government revenue which directly or indirectly influence women welfare through increasing government expenditure in health, education and social welfare (Rodrik, 1997; Bussmann, 2009) female labor force participation rate to identify the impact of female participation in the labor force on other aspects of gender inequality i.e. education and health (Barro and Lee, 1994; Gray et al., 2006) secondary school enrollment rate as indicator of human capital accumulation which is an important determinant of gender gap (Artecona and Cunningham, 2002; Bishop et al., 2005; Mcnabb and Said, 2013). The study uses two dummy variables such as religion and culture to identify their effects on gender inequality as Cooray and Potrafke (2011) found that both culture and religion have a substantial impact on gender inequality. This study also controls average health expenditure to identify their effect on reducing gender inequality in health and survival (Sinha and Sen, 2016).[4]

4.3. Econometric Methodology and Estimation Procedure

This study applies Hausman and Taylor (1981) estimation approach as this panel data model allows for the endogeneity of time-varying and time-invariant variables with the individual effects. According to Baltagi et al. (2014) Hausman–Taylor estimator is an instrumental variable (IV) panel data estimation technique that adopts the features of both a fixed-effects and random-effects models, and controls the endogeneity of both time-varying and time-invariant variables. Following a number of previous studies (Cornwell and Rupert, 1988; Rice and Contoyannis, 2001; Egger and Pfaffermayr, 2004; Baltagi et al., 2014; Light and Ureta, 2015) this study uses Hausman–Taylor estimator as the variables used in this study includes both time-varying and time-invariant variables to identify their effect on different aspects of gender inequality and Hausman -Taylor estimator will provide an asymptotically efficient estimator of this effect.

The basic econometric model of Hausman–Taylor estimator is as follows:

$$y_{it} = \beta_1 X_{1it} + \beta_2 X_{2it} + \gamma_1 Z_{1i} + \gamma_2 Z_{2i} + \alpha_i + \eta_{it} \quad \ldots\ldots\ldots(1)$$

Where, X_{1it} is a 1 x k_1 vector of observations on exogenous, time-varying variables assumed to be uncorrelated with α_i ;and η_{it} ; X_{2it} is a 1 x k_2 vector of observations on endogenous, time-varying variables assumed to be

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[4] A detailed description of control variables with their sources is provided in the appendix D of this paper.

(possibly) correlated with α_i but orthogonal to η_{it}; Z_{1i} is a 1x g_1 vector of observations on exogenous, time-invariant variables assumed to be uncorrelated with α_i and η_{it}; Z_{2i} is a 1x g_2 vector of observations on endogenous, time-invariant variables assumed to be (possibly) correlated with α_i but orthogonal to η_{it}; y_{it} is the value of gender inequality measured by GGGI/Economic participation gap index / Educational attainment index/ Health and survival index/ Political empowerment index;

i = 1,…, N ("countries") and t = 1,…,T ("time periods"), α_i is an individual specific and time-invariant error component assumed i.i.d N (0, σ^2_α) and η_{it} is a classical mean zero disturbance i.i.d N (0,σ^2_η).

The time-invariant variables are two dummy variables namely religion and culture and all other variables used are time varying. Durbin-Wu-Hausman (DWH) test has been applied to test the endogeneity of the variables. The Hausman-Taylor estimator will be consistent when all regressors are uncorrelated with the idiosyncratic errors, η_{it}, and also a specified subset of the regressors is uncorrelated with the fixed effect term, α_i. This additional strong assumption of Hausman-Taylor estimator has been tested by Sargan-Hansen test of overidentifying restrictions using xtoverid command in stata.

5. REGRESSION REPORT AND ANALYSIS

The regression results have been reported for emerging economies as a whole as well as for other subgroups name EAGLE and NEST combined, and other emerging countries due to the economic significance in the world and level of economic development of two groups compared to other emerging economies as well as to have more insight in the analysis. The regression result cannot be reported for EAGLE and NEST countries separately as the number of countries in the EAGLE group only 7 and due to a small number of countries, Hausman-Taylor regression becomes overidentified. However, the direction and magnitude of the coefficients do not vary significantly when regression is run for these two groups separately. At first, the effect of trade openness on gender inequality in the labor market has been analyzed, and the effects of trade openness on gender inequality in welfare and empowerment have been discussed subsequently. Finally, the effect of trade openness on overall gender inequality as indicated by composite global gender gap index (GGGI) has been described.

Table-1. Hausman-Taylor Estimation Results

Dependent variable: Economic Participation and Opportunity Gap Index

Variables	Emerging Economies	EAGLE and NEST	Other Emerging Countries
Constant	-.09621 (.27223)	-.59633 (.37721)	-.81928 (.48098) *
Trade openness	.06961 (.03291) **	.13005 (.05070) **	-.01247 (.05304)
Government Expenditure	.09607 (.02684) ***	.16645 (.03897) ***	.02375 (.03769)
Female Labor Force Participation	-.18867 (.08290) **	-.20847 (.09959) **	.53094 (.32208) *
GDP growth	-.00055 (.00037)	-.00202 (.00067) ***	-.00025 (.00043)
GDP per capita	.01329 (.03149)	-.02325 (.04594)	.06147 (.04129)
Secondary school enrollment rate	-.09712 (.06526)	-.27078 (.07757) ***	.06404 (.12627)
Religion Dummy	.15295 (1.14581)	.42991 (.87066)	-.52482 (.37713)
Culture Dummy	-.20306 (.70085)	-.21771 (.44311)	.23074 (.27403)
No. of Observations	282	182	100
No. of Groups	36	24	13
Wald chi²	65.75	77.49	51.21
Sargan-Hansen test	0.6615	0.6318	1.00

Note: The table presents the results for the estimated coefficients and their standard errors in parenthesis. Number of observation No. of Groups, Wald chi² and Sargan-Hansen test value are also reported. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

The results of the regression model of trade openness and economic participation gap index are summarized in table 1. The results show that trade openness has significant positive impact in reducing gender inequality in economic participation for emerging economies as whole and EAGLE and NEST countries combined whereas its impact is negative for other emerging countries. On the contrary, the effect of female labor force participation rate on economic participation gap is opposite. The economic participation gap index consists of participation gap, remuneration gap and advancement gap between women and men. So, the results indicate that the countries in the EAGLE and NEST groups are experiencing high economic growth due to higher trade openness and thus participation of skilled labor is going up. That is why trade openness reduces gender inequality in all aspects of economic activities due to high skill of the workforce. On the contrary, as most of the female workers are unskilled, their participation in the labor force is increasing, but the gap in other cases such as remuneration and advancement gap is rising due to lack of skill. However, in the other emerging countries group, the scenario is opposite that is although trade openness increases the gender gap in economic participation, but this gap is offset by the increasing participation of the female in the labor force. The positive effect of government expenditure in reducing economic participation gap between male and female supports the theoretical justification that higher expenditure by the government reduces the inequality between men and women. Higher economic growth is associated with higher inequality between male and female. The reason is that trade in capital intensive sector results in higher economic growth (Lewer and Den Berg, 2003) and women are usually employed in labor-intensive sectors that use mostly cheap unskilled labor (Ozler, 2000; Blecker and Seguino, 2002; Seguino, 2010). Higher per capita income reduces gender inequality in the emerging economies as a whole, but for EAGLE and NEST countries the effect is opposite. Ross (2008) identified that sometimes higher income discourage the female to participate in the outside works. Moreover, secondary school enrolment rate is negatively associated with gender inequality in economic participation for EAGLE and NEST countries but its association is positive for other emerging countries that suggest higher human capital accumulation reduces gender inequality in all aspects of economic activities for other emerging economies but not for EAGLE and NEST countries. Both religion and culture have mixed effect on economic participation gap. However, high standard errors indicate that the effect of religious and culture highly varies across countries. The following three tables summarize the result of the regression models of trade openness and three components of GGGI such as educational attainment, health and survival, and political empowerment respectively to identify the effects of trade openness on women welfare and empowerment.

Table-2. Hausman-Taylor Estimation Results

Dependent variable: Educational Attainment Gap Index

Variables	Emerging Economies	EAGLE and NEST	Other Emerging Countries
Constant	.19862 (.28743)	-.01139 (.16770)	.74388 (.18693)
Trade openness	.02652 (.01655) *	.05218 (.02512) **	.01619 (.02349)
Government Expenditure	.03996 (.01227)***	.06802 (.01840)***	-.00447 (.01636)
Female labor force participation rate	.12835 (.04511)***	.13022 (.05340)**	.10419 (.13228)
GDP growth	-.00011 (.00020)	.00023 (.00036)	-.00038 (.00021)*
GDP per capita	.00429 (.01498)	-.01869 (.02311)	.02181 (.01787)
Religion Dummy	.75908 (2.63235)	.00648 (.38152)	-.02576 (.03748)
Culture Dummy	-.42336 (1.39850)	-.03272 (.16692)	.02355 (.02012)
No. of Observations	328	214	115
No. of Groups	37	24	13
Wald chi²	76.14	68.66	16.61
Sargan-Hansen test	0.8487	1.00	1.00

Note: The table presents the results for the estimated coefficients and their standard errors in parenthesis. Number of observation No. of Groups, Wald chi² and Sargan-Hansen test value are also reported. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

Educational attainment is one of the most important indicators of female welfare because it affects the other aspects of women welfare. According to the regression results summarized in the table 2 trade openness significantly reduces the inequality between male and female in educational attainment at all levels. Higher government expenditure significantly reduces gender inequality in education in EAGLE and NEST countries but the effect is opposite for other emerging countries. It concludes that government spending is not utilized to improve female education in the other emerging economies. This result is supported by the study of Blecker and Seguino (2002) and Seguino (2000b) that countries with abundant unskilled female workers do not spend for the development of overall human capital. Increasing female labor force participation rate causes a significant reduction in educational inequality between male and female. This result supports the theoretical justification that increasing women's participation in the labor market raises their ability to spend for better education for them and their families and reduces the gender gap in educational attainment. Higher economic growth reduces gender inequality in education in EAGLE and NEST countries, but its effect is opposite in other emerging economies. As discussed earlier, higher growth is associated with higher trade in capital intensive industries that are skill based. The effects of other variables are the same direction as in case of economic participation gap. Higher per capita GDP increase gender inequality in education in EAGLE and NEST countries but it reduces the gap in the upbringing in other emerging countries. Religion positively associated with gender inequality in education in EAGLE and NEST group but negatively associated with other emerging countries whereas association of religion with educational attainment gap is opposite.

Table-3. Hausman-Taylor Estimation Results

Dependent variable: Health and Survival Gap Index

Variables	Emerging Economies	EAGLE and NEST	Other Emerging Countries
Constant	.90335 (.02304)	.88269 (.03331)	.98831 (.02358)
Trade openness	-.00043 (.00412)	-.00169 (.00674)	.00335 (.00374)
Female labor force participation rate	.12835 (.04511)***	.13022 (.05340)**	.10419 (.13228)
Public Health Expenditure	.00072 (.00431)	.00215 (.00626)	-.00156 (.00416)
GDP growth	.00001 (.00005)	.00006 (.00010)	-.00004 (.00004)
GDP per capita	-.00805 (.00493) *	-.01105 (.00746)	.00187 (.00451)
Secondary school enrollment rate	.00751 (.00724)	.01035 (.01052)	.01661 (.00881) **
Religion Dummy	.02319 (.01593)	.02812 (.01563) **	-.01097 (.01027)
Culture Dummy	-.02221 (.01099) **	-.02407 (.00996) **	-.00777 (.00912)
No. of Observations	308	191	117
No. of Groups	39	24	15
Wald chi²	37.13	31.23	40.30
Sargan-Hansen test	0.9742	0.6182	0.7022

Note: The table presents the results for the estimated coefficients and their standard errors in parenthesis. Number of observation No. of Groups, Wald chi² and Sargan-Hansen test value are also reported. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

Growing trade has a mixed effect on health and survival gap between male and female in these countries but the magnitude of the effect is very low as well as insignificant. The increasing rate of women's participation in the labor market female significantly reduces the health and survival gap between male and female. The effect of average health expenditure on women health is positive for EAGLE and NEST countries but negative

for other emerging countries and it implies that health expenditure is not properly directed toward improving female health in the other emerging countries. Higher human capital accumulation also reduces the gender gap in health but the effect is significant for other emerging countries. Religion is positively associated with health gap in EAGLE and NEST countries but the association is negative for other emerging countries. It indicates that gender gap in health is lower in the Muslim countries in EAGLE and NEST groups but Muslim countries included in other emerging countries group experience higher gender gap in health. The culture dummy is negatively linked with health gap that indicates Asian emerging countries experience higher gender inequality in health compared to non-Asian emerging countries.

Table-4. Hausman-Taylor Estimation Results

Dependent variable: Political Empowerment Gap Index

Variables	Emerging Economies	EAGLE and NEST	Other Emerging Countries
Constant	-1.26811 (.35469)	-1.19743 (.33480)	-.41324 (.70322)
Trade openness	.10388 (.04573)	.16940 (.06995) **	.14199 (.07778) **
Government Expenditure	.09984 (.03735)	.03119 (.0164) **	.05987 (.06405)
GDP growth	-.00099 (.00051)	-.00234 (.00091)**	-.00090 (.00071)
GDP per capita	.02776 (.04388)	.13142 (.03628) ***	-.02408 (.06425)
Female labor force participation rate	-.09732 (.11497)	-.01003 (.12970)	-.02574 (.35703)
Secondary school enrollment rate	.09449 (.09058)	.12366 (.10984)	-.07849 (.18032)
Religion Dummy	.01308 (1.26762)	-.03922 (.25389)	-.12603 (1.32896)
Culture Dummy	.01908 (.77584)	.04233 (.15695)	.04504 (.81184)
No. of Observations	282	182	101
No. of Groups	36	24	13
Wald chi²	79.37	66.07	8.42
Sargan-Hansen test	0.8583	0.7912	1.00

Note: The table presents the results for the estimated coefficients and their standard errors in parenthesis. Number of observation No. of Groups, Wald chi² and Sargan-Hansen test value are also reported. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

The regression results summarized in the table 4 suggest that trade openness has significant positive association with political empowerment gap index which indicates that higher trade openness significantly reduces the inequality between male and female in political decision making in the emerging economies. Higher government expenditure also reduces political empowerment gap whereas increasing GDP growth results in increasing gender gap in political decision making.

Higher human capital accumulation and per capita income also substantially decreases gender inequality in political empowerment. However, increasing female labor force participation rate has negative effects on political empowerment inequality whereas GDP growth is negatively associated with political g inequality. Negative and positive linkage of religion and culture with gender inequality in political empowerment respectively in EAGLE, NEST, and Other emerging countries indicates that higher gender inequality in political empowerment exist in Muslim countries whereas this inequality is lower in Asian emerging countries but the effects of religion and culture significantly differ across countries.

Finally, the regression results of trade openness and global gender gap index that measures the overall gender inequality in a country are summarized in table 5. In a sum, as discussed in the theoretical part trade openness and government expenditure reduce gender inequality, and the effect is statistically significant for EAGLE and NEST countries. Higher human capital accumulation indicated by secondary school enrollment rate reduces gender inequality whereas increasing female labor force participation rate increases the inequality between male and female. Higher economic growth is negatively associated with gender inequality and the effect of per capita GDP is mixed. Higher gender inequality exists in Asian countries compared to non-Asian emerging countries whereas the effect of religion is mixed.

Table-5. Hausman-Taylor Estimation Results

Dependent variable: Global Gender Gap Index (GGGI)

Variables	Emerging Economies	EAGLE and NEST	Other Emerging Countries
Constant	.05456 (.12351)	−.25395 (.15516)	.33005 (.25436)
Trade openness	.04005 (.01540)***	.06416 (.02374) ***	.03075 (.02511)
Government Expenditure	.05558 (.01254)***	.07519 (.01719)***	.01954 (.01870)
GDP growth	−.00043 (.00017)**	−.00067 (.00032)**	−.00041 (.00020)***
GDP per capita	.00495 (.01471)	−.01095 (.02070)	.03232 (.01999)
Female labor force participation rate	−.01657 (.03878)	−.01186 (.043991)	−.06468 (.155024)
Secondary school enrollment rate	.02939 (.03053)	.01488 (.03820)	.03875 (.06252)
Religion Dummy	.14029 (.48406)	.12576 (.26605)	−.05029 (2.16415)
Culture Dummy	−.10944 (.29609)	−.09474 (.17087)	−.02269 (1.45275)
No. of Observations	282	183	99
No. of Groups	36	23	13
Wald chi²	156.45	121.44	29.62
Sargan-Hansen test	0.9030	0.9466	1.00

Note: The table presents the results for the estimated coefficients and their standard errors in parenthesis. Number of observation No. of Groups, Wald chi² and Sargan-Hansen test value are also reported. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

6. CONCLUDING REMARKS

The relevant background of the study is that SDGs is a global agenda to ensure human progress through eradicating social disparities and deprivations in the world by the next decade and a half. Achieving gender inequality is one of the major goals and challenges of SDGs because sustainable development cannot be achieved if half of the humanity is denied. Trade is considered as the key tool to achieve SDGs as trade is highly linked with some specific goals and targets of SDGs. So, this study aims at finding out the effect of trade liberalization on gender inequality in the labor market, welfare, and empowerment.

It utilizes the global gender gap index (GGGI) as well as its four sub-indexes namely economic participation and opportunity gap index, educational attainment gap index, health and survival gap index and political empowerment gap index proposed and prepared by the World Economic Forum as GGGI. Its sub-indexes focus on almost all aspects of gender inequality and are also consistent with the gender inequality goal of SDGs. The economic participation and opportunity gap index indicates gender inequality in the labor market and other three sub-indexes indicate inequality in welfare and empowerment in different aspects and GGGI measures overall

gender inequality. A number of control variables have been used in the regression model to have robust linkage between explained and explanatory variables.

The study focuses on emerging economies as they are the major players in the world trade who constitute more than 50% share of the world export and import activities. Due to the presence of endogeneity and two time-invariant variables namely religion and culture dummies Hausman-Taylor estimator has been applied to analyze the panel datasets. To identify more diverse and depth insight the regression model has been run for all the emerging economies as well as for EAGLE and NEST combined and Other emerging countries due to the economic significance of the former two groups and to have a deep insight of the analysis.

The results of the study suggest that trade openness significantly reduces gender inequality in the labor market in the high growth of EAGLE and NEST countries but increases the inequalities in other emerging economies. Female labor force participation shows opposite effects that are it increases gender inequality in EAGLE and NEST countries but decrease gender inequality in other emerging countries as most of the female workers are employed in the low-skilled sector for cheap labor. Government expenditure also reduces gender inequality in the emerging economies as a whole as well as in all subgroups. So, the findings of the study partially support the theoretical proposition that both higher trade openness and government expenditure reduce gender inequality. Moreover, it can be concluded that both trade openness and government spending can be used as essential tools to reduce gender inequality goal of SDGs in economic participation.

In the case of women welfare and employment trade openness reduces educational attainment and political empowerment gap but it increases health gap in EAGLE and NEST countries. So trade can be a crucial way to reduce the gap between male and female in welfare and empowerment and can be used to achieve gender equality goal of SDGs. The effect of government expenditure on educational attainment gap and health spending on health gap for other emerging countries are negative whereas in all other cases government expenditure shows a positive effect in reducing gender inequality. It can suggest that public expenditure should be directed properly to improve women welfare to reduce gender inequality. The results also show that human capital accumulation represented by secondary school enrolment rate also reduces overall gender inequality and the inequality between male and female in many aspects. Besides, the study also finds the mixed impact of religion and culture on gender inequality in labor market as well as in welfare and empowerment, but the effect is insignificant and substantially differs across countries.

In fine, from the result of the study, it can be said that trade openness has a positive impact in reducing gender inequality except for few cases like gender inequality in health and survival and the labor market in other emerging countries. As it is evident from the study that trade can help reduce gender inequality in many aspects of human society, trade can be a crucial tool to achieve gender equality goal of SDGs. However, this study uses global gender gap index and its sub-indexes as indicators of gender inequality, but different other measures of gender inequality which look gender inequality from different perspectives are also available. The effect of trade openness can also be identified for each factor used in measuring GGGI to have deep insight, but it will make the study substantially lengthy. Moreover, the sectoral composition of trade can also affect gender inequality. So, these issues can also be considered to identify the impact of trade liberalization on gender inequality. Moreover, SDGs have long listed goals, and this study focuses on gender inequality goal of SDGs and examines that whether trade can helps achieve this goal of SDGs. Further study in this field can be done to examine the effect of trade on other goals of SDGS.

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Appendices

Appendix A

List of Emerging Economics

EAGLEs (emerging and growth-leading economies): Expected Incremental GDP in the next 10 years to be larger than the average of the G7 economies, excluding the US. The countries are: Brazil, China, India, Indonesia, Mexico, Russia, Turkey

NEST: Expected Incremental GDP in the next decade to be lower than the average of the G6 economies (G7 excluding the US) but higher than Italy's. They are : Argentina , Bangladesh, Chile, Colombia, Egypt, Iran, Iraq, Kazakhstan, Malaysia, Nigeria, Pakistan, Peru, Philippines, Poland, Qatar, Saudi   Arabia, South Africa, Thailand, Vietnam

Other emerging markets:

Bahrain, Bulgaria, CzechRepublic, Estonia, Hungary, Jordan, Kuwait, Latvia, Lithuania, Mauritius, Oman, Romania, Slovakia, Sri Lanka, Sudan, Tunisia, United Arab Emirates, Ukraine, Venezuela

Note: The list of emerging economies and their classification was given as per BBVA Research list as of March 2014. Source: Wikipedia access date November 22, 2016

Appendix B

Detail description of the Indices

Name of the Index	Proposed by	Objectives / Focus	Indicators/ Dimensions
Global Gender Gap Index(GGGI)	The World Economic Forum	Measure gender equality.	Four dimensions: economic participation and opportunity, educational attainment, political empowerment, and health and survival.
Gender Inequality Index (GII)	UNDP	Captures the loss of achievement within a country due to gender inequality.	Three dimensions: reproductive health, empowerment, and labor market participation.
Women's Economic Opportunity Index (WEOI)	The Economist Intelligence Unit	Focus on laws and regulations regarding women's participation in the labor market and the social institutions affecting women's economic participation	Five dimensions: labor policy and practice; women's economic opportunity; access to finance, education and training; women's legal and social status; and the general business environment. Each category or sub-category has four to five indicators.
Social Institutions and Gender Index (SIGI)	The OECD	The societal norms and institutions that cause inequalities rather than inequality outcomes.	Twelve indicators based around social institutions, which are grouped into five categories: family code, physical integrity, son preference, civil liberties and ownership rights.
Gender Equity Index (GEI)	Social Watch	The gap in achievements across genders by taking the ratio of performance in each dimension.	Three dimensions—the gap in education, the gap in economic activity and the gap in empowerment. It uses ten indicators.

Appendix C

Detail description of the GGGI

The Global Gender Gap Index examines the gap between men and women in four fundamental categories (subindexes): Economic Participation and Opportunity, Educational Attainment, Health and Survival and Political Empowerment.

Subindexes	Description
Economic Participation and Opportunity	This subindex contains three concepts: the participation gap, the remuneration gap and the advancement gap. • The participation gap is captured using the difference between women and men in labor force participation rates. • The remuneration gap is captured through a hard data indicator (ratio of estimated female-to-male earned income) and a qualitative indicator gathered through the World Economic Forum's Executive Opinion Survey (wage equality for similar work) • The gap between the advancement of women and men is captured through two hard data statistics (the ratio of women to men among legislators, senior officials and managers, and the ratio of women to men among technical and professional workers).
Educational Attainment	• The gap between women's and men's current access to education is captured through ratios of women to men in primary-, secondary- and tertiary-level education. • A longer-term view of the country's ability to educate women and men in equal numbers is captured through the ratio of the female literacy rate to the male literacy rate.
Health and Survival	Provides an overview of the differences between women's and men's health through the use of two indicators. • The first is the sex ratio at birth, which aims specifically to capture the phenomenon of "missing women" prevalent in many countries with a strong son preference. • The gap between women's and men's healthy life expectancy. This measure provides an estimate of the number of years that women and men can expect to live in good health by taking into account the years lost to violence, disease, malnutrition or other relevant factors.
Political Empowerment	• Measures the gap between men and women at the highest level of political decision-making through the ratio of women to men in minister-level positions and the ratio of women to men in parliamentary positions. • It includes the ratio of women to men in terms of years in executive office (prime minister or president) for the last 50 years.

Note: The overall Global Gender Gap Index is constructed using a four-step process which was described in the Global Gender Gap Report in details.

Appendix D

Description of the data and sources

Name of the Variables	Description	Source
Trade openness	Sum of exports/imports of goods and services as a share of GDP.	World Development Indicators (WDI) 2016
Government Expenditure	Total general government expenditure on all sectors (including health, education, social services, etc.	WDI 2016
Secondary School enrollment rate	Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.	UNESCO 2016
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	WDI 2016
GDP per capita	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.	WDI 2016
Female labor force participation rate	% of female population ages 15+	WDI 2016
Health expenditure per capita	Total health expenditure is the sum of public and private health expenditures as a ratio of total population. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation. Data are in current U.S. dollars.	WDI 2016
Religion Dummy	Dummy variable representing religion. It takes 1 for Muslim countries otherwise 0.	
Culture Dummy	Dummy variable representing culture. It takes 1 for Asian countries otherwise 0.	