Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.14, No.8, 2023

How Does Trade Openness and Economic Growth Affect Gender Gap: A Cross-Country Study

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This research paper is award winning of the WTO Chairs Programme 2022 (The University of Jordan)

Abstract
Because Trade Openness, Economic Growth, and Gender Gap have been central to the discussion of development policies in recent decades. This study combined those variables to evaluate the impact of trade openness and economic growth on the gender gap in four selected regions, including 21 countries, using panel data analysis from 1990-2020. Three estimation models such as GMM, FM-OLS, and EGLS, have been used in this study to evaluate the impact between the variables; the findings of the GMM model confirmed a positive effect of trade openness on the gender gap measured by the wage and salaried gap, and a negative impact of economic growth on the gender gap. In contrast, the findings of the FM-OLS model confirmed a positive impact of trade openness on the gender gap measured by the labor gap and the negative impact of economic growth on the gender gap. Finally, the findings of the EGLS model confirmed a negative impact of trade openness on the gender gap measured by the education gap and a positive impact of economic growth on the gender gap.
Keywords: Trade Openness, Economic Growth, Gender Gap, GMM, FM-OLS, EGLS.
DOI: 10.7176/JESD/14-8-04
Publication date: April 30th 2023

1. Introduction:

Several empirical studies have confirmed that trade openness is essential to economic growth. However, only a few studies have focused on trade openness, economic growth, and the gender gap in the countries. According to Hye and Lau (2015), trade openness refers to the sum of the imports and exports normalized by GDP. It is an indispensable enabler of economic growth, poverty reduction, and job creation. Furthermore, it provides new market opportunities for local firms, enormous productivity, and robust innovation techniques by creating competition between local and global firms. Also, it might increase the wages and geopolitical benefits derived from deeper economic integration, and even on the social level, it can increase individual choices and personal freedom (Keho,2017). According to the World Bank annual reports (2020), most governments in developing countries confirmed that only a country could increase its economic growth by increasing the economic openness to international trade, business investment, and the movement of people. Audi and Ali (2017) have argued about the impact and relationship between trade openness and the gender gap and confirmed that the gender gap could refer to two significant levels: the macro and micro. The macro-level usually refers to the gender inequality between the productive sectors in the labor markets. At the same time, the micro-level refers to the discrimination in giving duties and distributing resources, labor, and decision-making as a whole. On the other hand, the gender gap might refer to the disproportionate discrimination between males and females in many aspects, such as the work environment; it is also known as the disparity between the genders based on wages or work opportunities. Usually, in developing countries, men earn greater than women. Similarly, the gender gap might also exist in education as the chances and prospects available for males are much better and more prominent in number than the females. In many countries, females are not allowed to attend schools or universities or get any education. They need to improve their working life with a reasonable salary. According to Goldin and Katz (2009), the gender gap usually refers to the difference in the goals achieved by males and females in the labor market. The situation of gender gap in developing countries is much more critical, especially in the areas of health, education, and human rights. Closely related to this study, a few empirical studies, such as; Yahmed (2012) and Altarawneh (2020), have pointed out the gender gap to examine its impact and relationship between economic growth and trade openness by using the following measurements: wage gap, education gap and the female to male labor force participation. While measuring economic growth, literature usually uses the GDP growth rate to measure trade openness, import, and export as a percentage of the GDP ratio. This cross-country study represents an additional theoretical explanation for the relationship between trade openness, economic growth, and gender gap, using panel data analysis for 21 countries from different regions such as; America, Latin America, Africa, and the Middle East. While the sample, data, and variables of this study have been chosen based on mainstream economic theory and data availability.

2. Literature Review:

Earlier literature has different opinions about whether there is any impact of trade openness and economic growth on the gender gap in countries. The topic began to rise widely among economic researchers. In this regard, Hye and Lau (2015) examined trade openness and economic growth; the findings confirmed that the trade openness index negatively affects economic growth in the long run. On the other hand, Khalid (2016) argued about the impact and relationship between trade openness and Turkey's economic growth. And the results confirmed that trade openness promotes economic growth in the short run, while this relationship does not exist in the long run. The findings also confirmed that, in the long run, the association is positive and statistically insignificant. In another study by Bourdon et al. (2017) which examined the relationship between trade openness and economic growth, results confirmed that trade openness has a negative impact on the economic growth of countries that are specialized in low-quality products and a non-linear relationship between trade openness represented by the export variety and the export ratio and the economic growth. Amirkhalkhali (2019) has also argued about the impact of trade openness on economic growth. The study's findings confirmed the positive impact of trade openness on economic growth. This result came to support Ijirshar's (2019) study, which also examined the impact of trade openness on economic growth, and the results showed that trade openness is having a positive impact on the economic growth in the Economic Community of West African States countries in the long run, but the mixed impact in the short run. According to the previous literature, most of the studies related to the gender gap and trade openness are usually spread among developing countries, which suffer from a lack of resources, increase in the unemployment rates, lack of education, low wages and salaries, and lack of freedom in terms of work and education. Using Pakistan's labor force participation ratio, Hyder and Behrman (2012) have also argued about the trade openness and gender gap. The findings confirmed that increased trade openness would significantly reduce the gender gap between male and female labor force participation. While Yahmed (2012) examined the gender wage gap's impact on trade openness, the findings found a positive impact of the gender wage gap on trade openness. The results came to support, Wamboye's (2014) study, which argued about the gender gap and trade openness in sub-Saharan Africa; findings of this study suggested that trade openness has gendered employment, with the direction depending on the structure of the economy, which implies there is the positive impact of trade openness on the gender gap. Another study by Audi and Ali (2017) examined the impact of the gender gap on trade openness by using the education gap and labor force participation; the findings of this study concluded that whenever trade openness is increasing, it does not reduce the gender gap, which means the female to male labor participation rate goes down, that implies there is a negative impact of trade openness on the gender gap. Assaf (2018) has also explored the impact of trade openness and the gender gap in the Middle East. The results indicated a statistically significant impact of trade openness on women's absolute employment rate for most countries. Similar to this study, much earlier literature has used the gender gap to explore its impact on economic growth; among this literature, we cite; Kabeer and Natali's (2013) study, which examined the dynamic relationship between the gender gap and the economic growth, the findings of this study confirmed that the increase in the gender gap, particularly in education gap and employment gap would affect the economic growth, but much weaker and less consistent evidence for the reverse relationship relating to the impact of economic growth on the gender gap. On the other hand, Hakura et al. (2016) IMF working paper explored the impact and relationship between the gender gap and the economic growth in sub-Saharan; the findings confirmed that income and gender gap are jointly negatively associated with per capita GDP growth. Another paper by Klasen and Silva (2018) argued about the gender gap and economic growth. The findings of this study suggest that the gender gap is a barrier to development and economic growth, especially over the long run. Altarawneh (2020) examined the gender gap in economic activities using cross-country panel data analysis. The findings confirmed an existence of a positive impact of demand-side factors in the gender gap on economic activity, including the GDP growth rate, the gender gap in employment, and trade openness.

3. The Data and the Econometric Model:

3.1 The Data:

The study aims to evaluate the impact of trade openness and economic growth on the gender gap in 21 countries from different regions such as; America, Latin America, Africa, and the Middle East. This cross-country study will use panel data analysis over the period 1990-2020. The process of selecting the countries and regions and the variables of this study were based on the mainstream economic theory and the data availability. The following sources carry out the yearly annual data of this study: The World Bank Development Indicators database (2020), the Trading Economics database, and the Global Economy database.

3.2 The Econometric Model:

To examine the cross-country variation between; trade openness, economic growth, and gender gap, the study will use panel data extracted from the World Bank Indicators 2020 for 21 countries. To investigate the possible impact between the variables, the study will estimate the following model (Arora, 2012)

Yi = F (Xi) **Yi: Y (1…3) Xi: X (1...2)**

Where the endogenous variable is the gender gap (Yi) and measured by the following:
Y1 represents the gender gap in wages (wage gap), measured by the wage and salaried workers (female to male % of employment, modeled ILO estimate).
Y2 represents the gender gap in labor (labor gap), measured by the female-to-male labor force participation rate.
Y3 represents the gender gap in education (education gap), measured by female-to-male school enrollment at the tertiary level.
While the set of explanatory variables (Xi) contains the following variables:
X1 represents the trade openness, measured by the exports and imports as (%) of the GDP growth rate.
X2 represents the economic growth, measured by the GDP growth rate.

4. The Empirical Results:

The required statistical diagnostic tests for panel data were applied to ensure the model's reliability. The panel unit root test Liven test (Levin. A and C.-S. J. Chu., 2002) revealed the following results: For the set of explanatory variables: the economic Growth (X2), which is measured by the GDP growth rate, is stationary at the level, while for trade openness (X1) measured by export and imports as % of GDP growth is stationary at first difference. In terms of the endogenous variable gender gap: the labor gap (Y2), measured by the ratio of female to male labor participation, is stationary at the level, while the education gap (Y3), measured by the percentage of female to male school enrollment at tertiary level is not stationary at level but stationary at first difference. Finally, the wage gap (Y1) measured by the ratio of female to male wages and salaried workers is not stationary at level but stationary at first difference. Based on the results of the unit root test. The study will use three estimation models, GMM, FM-OLS, and EGLS, to evaluate the impact of trade openness and economic growth on the gender gap, and the results will be as follows:

- **The First Model GMM (Y1):** The null hypothesis of no cointegration is rejected based on the Kao Residual Cointegration Test and Augmented Dickey-Fuller Test. So, there is cointegration. Since the variables are cointegrated, and some of them are non-stationary, the best model is the (GMM) dynamic panel data, and the results are as follows:

Table 4. GMM/ Dynamic Panel Data Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRADE_OPENNESS__X1__EXPO	0.034794	0.030164	1.153477	0.2493
ECONOMIC_GROWTH__X2__GDP	-0.244387	0.130018	-1.879634	0.0608
R-squared	0.986600	Mean dependent var		61.20401
Adjusted R-squared	0.982082	S.D. dependent var		28.09065
S.E. of regression	3.760131	Sum squared resid		6206.838
Long-run variance	31.54498			

Based on table (4), the results of using GMM confirmed that trade openness showed a positive but insignificant impact on the gender gap (wage gap). On the other hand, economic growth revealed a negative and significant impact on the gender gap.

- **Results of the Second Model FM-OLS (Y2):** Based on the Kao Residual Cointegration Test and Augmented Dickey-Fuller Test, the null hypothesis of no cointegration is accepted. So, there is no cointegration. Based on the cointegration test and Hausman test, the best model for estimation is Panel Fully Modified Least Squares (FM-OLS), and the results are as follows:

Table 5. Panel Fully Modified Least Squares (FM-OLS).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRADE_OPENNESS__X1__EXPO	0.061735	0.024205	2.550495	0.0110
ECONOMIC_GROWTH__X2__GDP	-0.219748	0.064107	-3.427821	0.0006

R-squared	0.972712	Mean dependent var	51.71394
Adjusted R-squared	0.971722	S.D. dependent var	23.72551
S.E. of regression	3.989664	Sum squared resid	9661.872
Long-run variance	49.88851		

According to table (5), the findings of the FM-OLS model confirmed that trade openness showed a positive and significant impact on the gender gap (labor gap), as expected. At the same time, economic growth showed a negative and significant impact on the gender gap.

- **The Third Model EGLS (Y3):** The null hypothesis of no cointegration is accepted based on the Kao Residual Cointegration Test and Augmented Dickey-Fuller Test. So, there is no cointegration. Based on the cointegration test and Hausman test, the best model for estimation is panel EGLS (Cross-section random effects), while the results as in table (6):

Table 6. Panel EGLS (Cross-Section Random Effects)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.113311	0.024507	45.42852	0.0000
TRADE_OPENNESS__X1__EXPO	-0.000827	0.000395	-2.092996	0.0368
ECONOMIC_GROWTH__X2__GDP	0.000206	0.001075	0.191361	0.8483
	Effects Specification			
			S.D.	Rho
Cross-section random			0.310534	0.8835
The period fixed (dummy variables)				
Idiosyncratic random			0.112756	0.1165
	Weighted Statistics			
R-squared	0.326392	Mean dependent var		1.063422
Adjusted R-squared	0.291513	S.D. dependent var		0.133917
S.E. of regression	0.112720	Sum squared resid		7.852170
F-statistic	9.357741	Durbin-Watson stat		0.431241
Prob(F-statistic)	0.000000			
	Unweighted Statistics			
R-squared	0.030376	Mean dependent var		1.063422
Sum squared resid	66.36148	Durbin-Watson stat		0.051026

Table (6) reveals the results of EGLS; the findings confirmed that trade openness revealed an unexpectedly negative and significant impact on the gender gap (education gap), while the economic growth showed a positive impact, as expected, but insignificant on the gender gap.

5- Conclusions and Recommendations: The purpose of this cross-country study is to evaluate the impact of trade openness and economic growth on the gender gap in four selected regions: America, Latin America, Africa, and the Middle East, including 21 countries, over the period 1990-2020. The study used panel data analysis to evaluate the impact between the variables using the following models; (GMM) dynamic panel data, Panel Fully Modified Least Squares (FM-OLS), and Panel EGLS (Cross-section random effects). In the first model, GMM confirmed that trade openness shows a positive but insignificant impact on the gender gap measured by wage gap (wage and salaried workers, female to male % of employment, modeled ILO estimate). At the same time, economic growth reveals a negative and significant impact on the gender gap. Furthermore, the findings of the second model, FM-OLS, confirmed that trade openness showed a positive and significant impact on the gender gap measured by the labor gap (the ratio of female to male labor force participation rate), and the economic growth showed a negative and significant impact on the gender gap. Our third model EGLS findings confirmed that trade openness revealed an unexpectedly negative and significant impact on the gender gap measured by the education gap (ratio of female to male school enrollment at the tertiary level). And the economic growth showed a positive impact but was insignificant to the gender gap. The recommendations of this study take into account those whole countries and developing countries, in particular, should increase awareness about the impact of the gender gap phenomenon on the economy, and that is by adopting the following steps: making a longer shortlist when recruiting, trying to remove the gender pay gap, use skills-based assessments and having more women monitoring men, especially in the developing countries, that suffers from lack of personal freedom.

Appendix (a)
Trade Openness measured by Export and Import as (%) of GDP 1990-2020

Selected Country / Countries	1990	1995	2000	2005	2010	2015	2020
Algeria	48.38	55.19	62.86	71.28	69.87	59.70	45.23
Argentina	14.99	19.77	22.62	40.55	34.97	22.49	30.50
Brazil	15.16	16.98	22.64	27.09	22.77	26.95	32.35
The central African Republic	42.94	50.48	45.66	35.07	34.43	53.15	49.79
Chile	61.75	54.97	59.32	71.62	69.06	58.97	57.84
Colombia	34.78	35.50	32.67	37.42	34.26	38.36	33.65
Dominican Republic	69.20	73.90	79.30	61.65	56.00	52.17	44.29
Egypt	52.92	50.25	39.02	62.95	47.94	34.85	33.96
Ghana	42.73	57.42	116.05	98.17	75.38	77.28	70.82
Jamaica	99.94	107.65	89.51	90.49	80.92	76.12	89.97
Jordan	149.45	124.59	110.33	146.91	114.22	95.36	65.37
Lebanon	117.91	73.14	50.12	92.76	95.10	71.82	71.72
Mexico	38.52	46.32	52.43	53.94	60.76	71.09	77.98
Morocco	54.63	51.72	59.16	67.91	75.25	77.20	78.62
Nigeria	30.92	39.53	49.00	33.06	43.32	21.33	25.40
Puerto Rico	114.45	99.95	106.17	113.74	104.15	108.86	106.10
Saudi Arabia	71.71	65.04	68.17	81.95	82.55	71.12	50.60
Sudan	11.09	14.77	29.40	47.58	36.98	18.61	9.96
Tunisia	94.16	93.71	82.64	90.25	104.15	91.01	107.86
United States	19.82	22.45	25.10	25.64	28.33	27.76	23.39
West Bank	81.50	91.49	87.64	83.84	68.50	70.78	67.12

Source: World Bank Development Indicators (WBDI) database (2020)

Appendix (b)
Economic growth measured by GDP growth (annual %) 1990-2020

Selected Country / Countries	1990	1995	2000	2005	2010	2015	2020
Algeria	0.80	3.80	3.80	5.90	3.60	3.70	-5.48
Argentina	-2.47	-2.85	-0.79	8.85	10.13	2.73	-9.91
Brazil	-3.10	4.42	4.39	3.20	7.53	-3.55	-4.06
The Central African Republic	-2.15	7.20	-2.49	0.91	4.63	4.34	0.00
Chile	3.33	8.93	5.33	5.74	5.84	2.30	-5.77
Colombia	4.28	5.20	2.92	4.83	4.49	2.96	-6.85
Dominican Republic	-5.45	5.69	4.66	9.43	8.34	6.93	-6.72
Egypt	5.67	4.64	6.37	4.47	5.15	4.37	3.57
Ghana	3.33	4.11	3.70	5.90	7.90	2.12	0.41
Jamaica	4.20	2.35	0.88	0.89	-1.46	0.92	-10.20
Jordan	-0.28	6.20	4.25	8.15	2.31	2.50	-1.55
Lebanon	26.53	6.45	1.34	2.69	7.98	0.21	-20.30
Mexico	5.18	-6.29	4.94	2.31	5.12	3.29	-8.24
Morocco	3.41	-5.41	1.91	3.29	3.82	4.54	-7.12
Nigeria	11.78	-0.07	5.02	6.44	8.01	2.65	-1.79
Puerto Rico	-2.84	4.55	3.27	-1.99	-0.41	-1.05	-3.90
Saudi Arabia	15.19	0.21	5.63	5.57	5.04	4.11	-4.11
Sudan	-5.47	6.00	6.35	7.49	3.47	4.01	-1.56
Tunisia	7.95	2.35	4.71	3.49	3.51	1.17	-8.60
United States	1.89	2.68	4.13	3.51	2.56	3.08	-3.49
West Bank	7.19	7.12	-8.56	11.29	5.78	3.72	-11.46

Source: World Bank Development Indicators (WBDI) database (2020)

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