

International Trade and Women Employment: The Case of Jordan

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Abstract

Objectives: This study aims to assess the impact of international trade measurements, trade liberalization, and other related variables on the Female Labor Force Participation (FLFP) and Female Employment (FE) in the agricultural, industrial, and services sectors in Jordan from 1990 to 2019.

Methods: The study adopts four models and uses the Fully Modified Ordinary Least Square (FMOLS) approach to estimate the effects of International Trade (Trade), Gross Domestic Product per Capita (GDPC), Live Births (LB), Female Enrollment in Secondary School (EFSS), Female Unemployment (FUN), and Jordan's Accession to the WTO on the FLFP and FE in the three sectors.

Results: The empirical results indicate that international trade measurements, Jordan's WTO accession, EFSS, and FUN have a significantly negative impact on FLFP, except for GDPC which reveals a positive impact on FLFP, while LB proves to be insignificant. Different results were obtained in terms of Female Employment (FE) in the three economic sectors. The trade measurements hurt FE in the agricultural and services sectors, and a positive impact on the industrial sector.

Conclusions: One of the most intriguing findings of this study is that Female Employment (FE) in Jordan has experienced adverse impacts due to increased trade openness. Consequently, the government must pursue policies promoting trade openness without adversely affecting FE. This can be achieved by enhancing Female Labor Force Participation (FLFP) through education and training initiatives. Simultaneously, there is a need to consider revising labor laws and regulations. These revisions should unequivocally prohibit gender-based wage discrimination.

Keywords: Trade Liberalization, Female Employment, WTO accession, Labor, Jordan, FMOLS.

التجارة الدولية وعمالة المرأة: حالة الأردن

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ملخص

الأهداف: هدف هذا البحث إلى استقصاء تأثير مؤشرات التجارة الدولية، وتحرير التجارة، والمتغيرات الأخرى ذات الصلة على مشاركة الإناث في القوى العاملة (FLFP)، وعمالة الإناث (FE) في قطاعات الزراعة؛ والصناعة؛ والخدمات في الأردن للفترة 1990-2019. المنهجية: استخدمت الدراسة أربعة نماذج قياسية معتمدة على منهج المربعات الصغرى العادية المعدلة بالكامل (FMOLS)، وذلك لتقدير تأثير كل من التجارة الدولية (Trade)، والناتج المحلي الإجمالي للفرد (GDPC)، والمواليد الأحياء (LB)، والتحاق الإناث في المدرسة الثانوية (EFSS)، وبطالة الإناث (FUN)، بالإضافة إلى انضمام الأردن إلى منظمة التجارة العالمية على مشاركة الإناث في القوى العاملة وعلى عمالة الإناث في القطاعات الاقتصادية الثلاثة.

النتائج - أشارت النتائج التجريبية إلى أن التجارة الدولية، وانضمام الأردن إلى منظمة التجارة العالمية، و EFSS، و FUN لها تأثير سلبي كبير على FLFP، يعكس تأثير GDPC الذي جاء إيجابياً. وفيما يتعلق بعمالة الإناث في الثلاثة القطاعات الاقتصادية، فقد تم الحصول على نتائج مختلفة، إذ كان أثر التجارة الدولية سلبياً في قطاعي الزراعة والخدمات، وإيجابياً في القطاع الصناعي. الخلاصة: من أهم النتائج التي توصلت إليها الدراسة هي أن مشاركة المرأة في سوق العمل قد تأثرت سلباً بالانفتاح التجاري. لذلك، على الحكومة المضي قدماً في سياسة الانفتاح التجاري وفي ذات الوقت تعزيز مشاركة المرأة في سوق العمل، ورفع نسبة تلك المشاركة من خلال تبني مبادرات تعليمية وتدريبية تؤهل المرأة لسوق العمل. إضافة إلى مراجعة تشريعات العمل في الأردن من أجل التخلص من فجوة الأجور المبنية على التمييز بين الجنسين.

الكلمات الدالة: تحرير التجارة، الانفتاح التجاري، منظمة التجارة العالمية، عمالة الإناث، الأردن، FMOLS.



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1. INTRODUCTION

Jordan, like many developing countries, initiated economic reform and trade liberalization programs several decades ago. Increased trade, coupled with greater female labor force participation, stimulates economic growth and reduces poverty. As we are aware, international trade affects the labor market in various dimensions. Jordan's labor market has faced significant distortions, evidenced by a high unemployment rate reaching approximately 24.8%, with a refined economic participation rate of 33.7% (53.4% for males and 13.9% for females) for the second quarter of 2021 ⁽¹⁾.

Jordan is experiencing a low rate of women's employment participation. Theoretically, trade liberalization promotes cheaper products, increases employment opportunities, and expands markets. Heckscher and Ohlin (1933) and Stolper and Samuelson (1941) explain how trade can be beneficial through comparative advantage. On the other hand, according to the new trade theory (Krugman, 1979, 1980), trade can negatively impact the labor market in developing economies when they have a weak competitive advantage in the international market compared to developed countries. Additionally, trade policy plays a crucial role in enhancing labor participation and addressing gender inequality gaps. Women are typically more affected by trade liberalization, as they are less able than men to capitalize on new opportunities due to limited access to resources and markets. As known theoretically, any changes in trade policy, along with trade liberalization, have a profound impact on employment. The main question that this paper aims to address is whether international trade affects female labor force participation in Jordan and, if so, how?

The paper employed various measures to represent the international trade liberalization variable, along with six other explanatory variables suggested by economic theory and the literature review that may also affect female labor force participation. These variables include GDP per capita, female unemployment rate, live births, female enrollment in secondary school, and Jordan's accession to the WTO. Additionally, four models were adopted to investigate the impacts of all selected variables on the female labor force participation rate (FLFP). The first model focuses on Jordan's economy as a whole, while the other three models examine the impact of the same factors on female employment in specific sectors: the agricultural sector, industrial sector, and services sector.

The study utilizes both quantitative and qualitative techniques to analyze the impact of macroeconomic variables, particularly international trade measurements, on female labor force participation in Jordan across various economic sectors. The remainder of this research is structured as follows: the next section provides a literature review and discusses previous studies. Section 3 introduces the data and methodology. Section 4 presents the empirical results and discussion, and finally, section 5 offers conclusions and recommendations.

2. LITERATURE REVIEW AND PREVIOUS STUDIES

2.1 Literature review

In developing countries, female labor force participation (FLFP) rates, on average, have modestly increased over the past two decades, although there is significant heterogeneity across regions and countries. FLFP rates are the lowest in the MENA (Middle East & North Africa) and South Asia regions. In most developing countries, female participation rates increase due to rising female education and skills, declining fertility rates, and sustained economic growth. However, gender norms and traditions are slow to adjust, and increasing opportunity costs in foregone incomes may raise FLFP rates (Klasen, 2019).

The impact of trade liberalization on labor markets could be gender-specific due to two main reasons. The first is

⁽¹⁾ Department of Statistics (DOS) Jordan: <http://dosweb.dos.gov.jo>

associated with the supply side; females' decisions on whether to enter or exit the labor market depend on household income. If trade liberalization increases household incomes, females may decide to exit the labor market, especially in relatively poor countries (Wang et al., 2019; Klasen et al., 2021). The second reason is associated with the demand side; international trade induces competition, which could reduce discriminatory behavior by increasing the relative demand for female employees (Becker, 1957; Black and Brainerd, 2004; Hirata and Soares, 2016). Firms also increase their investments in technology in response to foreign competition (Bloom et al., 2016) and market expansion (Bustos, 2011). Therefore, the position of female workers in labor markets, in terms of women's employment intensity and relative wages, is greatly improved. The technology upgrading based on automated systems reduces dependence on strength-intensive skills, which are mostly the males' comparative advantage (Juhn et al., 2014). Furthermore, trade liberalization could either reduce female workers' intensity (Sauré and Zoabi, 2014) or increase it in exporting sectors (Gaddis and Pieters, 2017) depending on whether female and male workers are substitutable or complementary (Wang et al., 2019).

Seguino (2000) argued that exports and investments are positively linked to a wide gender wage gap. Women's low wages are seen to reduce product costs, enhance productivity levels, and consequently stimulate more female employment. In the same context, trade openness has a cost reduction effect resulting from high global competition, leading to the feminization of the labor force (Cagatay and Ozler, 1995).

On the other hand, the Heckscher-Ohlin theory of international trade states that countries specialize in exporting goods using intensive production factors with which they are relatively abundantly endowed. Specifically, trade liberalization stimulates the higher growth of unskilled labor-intensive industries in countries abundantly endowed with unskilled workers. This, in turn, leads to high female employment intensity, given that the average female worker has lower educational attainment and skills than the average male worker. In contrast, the rapid inflows of new foreign technologies via trade openness and foreign direct investment increase the demand for male workers, as the skills level of the average male worker is generally higher than that of an average female worker (Banerjee and Veeramani, 2015).

Cagatay's theory (2005) posits that trade liberalization could lead to more discrimination in employment and decision-making opportunities. That is, females may be more influenced by the adverse effects of trade liberalization than males, due to differences in education, wage inequalities, and training opportunities. Therefore, trade liberalization could be either harmful or beneficial for females, depending on the opportunities offered to them as well as the socio-cultural environments (Fontana et al., 1998). In fact, Women Watch (2011) emphasized that trade liberalization policies must be reformulated to enable providing employment opportunities for all, reduce the gender gap, and empower women. It also encourages the timely provision of training and development opportunities for female workers in small-scale businesses to help them survive and cope with global competition.

2.2 Empirical evidence on trade and women's employment

Empirical evidence suggests that trade liberalization has a differential impact on female employment intensity. For instance, Aguayo-Tellez et al. (2010) utilized data from nine rounds of Mexican household income and expenditure surveys, employing OLS regressions. They discovered that females' relative employment and wages improved in Mexico during the 1990s, a period marked by significant trade liberalization under the North American Free Trade Agreement (NAFTA). Consequently, they concluded that trade liberalization contributes to greater employment opportunities for women.

Hyder and Behrman (2011) investigated the impact of international trade on the male-female difference in labor force participation rates in Pakistan, utilizing three regression models and labor force survey data spanning the period 1951-

2008. They concluded that the increase in international trade significantly narrowed the gender gap in labor force participation rates, attributed in part to a shift in production from agriculture to industrial and services sectors.

In a similar context, Wamboye and Seguinto (2012) tested the impact of economic and trade structure on gendered employment in Sub-Saharan Africa, using an unbalanced panel data for 38 countries over the period 1991-2010 and two estimation methods: fixed effects and two-stage least squares. The gendered employment was measured by the female minus male employment-to-population ratio for those 15 years old and above, as well as the female employment-to-population ratio. The estimations showed mixed results, indicating that trade liberalization has a gendered employment impact with a direction depending on the structure of the economy and varying across sectors. The authors concluded that improving trade structure and economic infrastructure could increase women's access to employment opportunities created by trade openness.

Gaddis and Pieters (2012) found a positive effect of Brazil's 1987-1994 trade liberalization on the female labor force, recognizing that tariff reductions were associated with an increase in female labor force participation. Similarly, Sajid and Ullah (2014) analyzed the impact of trade openness on gender employment equality for eight developing countries (Egypt, Pakistan, Turkey, Iran, Bangladesh, Indonesia, Malaysia, and Nigeria) during the period 1980-2012, using panel data, multiple regressions, and a Random Effect model. The study found that trade openness has a significant positive effect on gender employment equality at a 1% significance level in all equations. Nevertheless, Sauré and Zoabi (2014) examined the effects of NAFTA (trade liberalization regulations) on the United States labor market, revealing that male workers migrated from male-intensive to female-intensive sectors, leading to a reduction in the female labor participation rate and widening the gender gap.

Bloom et al. (2016) explored the impact of Chinese import competition on Information Technology (IT), Research & Development (R&D), and Total Factor Productivity (TFP) in Europe, using a panel of half a million firms across twelve European countries over the period 1996-2007. They found that the increase in such competition has significantly led to improvements in R&D, IT, and TFP within firms; however, it has resulted in a decline in both overall employment and survival rates.

Alazzawi (2016) investigated the impact of trade liberalization on the gender wage gap and women's employment in the Egyptian manufacturing sector, using two nationally representative labor market sample surveys. The results revealed that the gender wage gap has increased dramatically due to increasing trade liberalization. The study also found a significant negative impact of such trade on women's employment, after controlling for public-private and occupational distinctions.

Al-Wadi (2017) explored the impact of trade liberalization on women's employment in Middle East countries, using simple linear regressions and data for five countries during the period 2000-2014. The model was estimated separately for each country as well as for the whole sample. The study found a significant negative impact of trade liberalization on self-employed women in Middle East countries (whole sample), in addition to Jordan and Turkey. Meanwhile, the impact was significantly positive for Egypt. The results also revealed a significant positive effect of trade liberalization on paid employment jobs for women in Middle East countries (whole sample), as well as Jordan, Bahrain, and Turkey, whereas the effect was significantly negative for Egypt.

Gaddis and Pieters (2017) examined the gender labor market effects of trade liberalization measured by tariff reductions, using difference-in-difference estimation and data for industries in Brazil. They found that the increase in trade liberalization has reduced both male and female employment and labor force participation rates, but the negative effect of such trade on males has been greater, leading to narrowing the gender gap in the labor force.

In the same context, Jamielaa (2018) investigated the impact of trade openness on female-male earnings differentials in Indonesia, using survey data and applying OLS and Quantile Regression estimation methods. The study found that the gender wage gap is narrower in low quantile wage distributions than in high ones. Moreover, such a gap is also narrower in high and middle-income provinces than in low-income ones.

Shamlawi and Saqfalhait (2018) investigated factors affecting women's labor force participation rate in Jordan, using (FMOLS), during the period 1990-2015. They found a positive effect of Gross National Product per capita and the female percentage in higher education on the participation rate of women in the labor force, but a negative effect of the fertility rate and the female percentage in the population on the participation rate of women in the labor force.

Li et al. (2019) found in their study the existence of a threshold value for the effect of trade openness on the female labor force participation rate by using annual panel data for nine Asian countries from 1990 to 2016. The outcomes of the panel threshold regression reveal the existence of an optimal point in the correlation between trade openness and the Female Labor Force Participation Rate (FLFPR). Below this point, an increase in trade openness leads to an improvement in FLFPR, while beyond this threshold, a negative relationship emerges between trade openness and FLFPR.

In a study of how trade openness affects female labor, Li et al. (2020) found a nonlinear threshold effect between trade openness and female labor force participation in Asian countries for the period of 1990 to 2016, as the female labor force participation rate first increases with the increase of trade openness then decreases.

Kyander (2020) analyzed the impact of trade liberalization on female labor force participation in the Indian manufacturing sector, using survey data and applying OLS and Two-Stage Least Squares estimation methods. The study concluded that trade liberalization is positively related to higher women employment in the manufacturing sector.

Altarawneh (2020) investigated the U-shaped hypothesis between economic development and the female labor force participation rate (FLFPR) in Jordan and used other explanatory variables to capture the behavior of FLFPR, employing the Dynamic Ordinary Least Squares (DOLS) approach, for the period of 1990-2017. The study found a U-shaped relationship between economic development and FLFPR and a positive impact of female education and urbanization on FLFPR, and a negative impact of GDP per capita on FLFPR.

In the most recent works, Ghosh (2022) investigated the effect of trade diversification on gender inequality in the Indian labor force participation, using a simultaneous equation model and annual data over the period 1991-2019. The results confirmed that trade diversification has a significant negative impact on female labor force participation (FLFP), while the impact of trade diversification squared is positive on FLFP (a non-linear relationship exists), indicating that rapid trade diversification can improve FLFP. Gupta (2021) also investigated the impact of the 1991 trade liberalization episode in India on women's employment share, using establishment data from the annual survey of industries. The study found that the reduction of output tariffs, import competition, and trade reforms have a significant negative impact on women's employment share.

However, Giovannetti et al. (2021) analyzed the impact of trade liberalization on the gender employment gap in Ethiopia, using micro-level data from the 1994 population census and three existing waves of Ethiopian Surveys for 1999, 2005, and 2013. They found that districts more exposed to trade liberalization significantly suffered from a reduction in their female employment levels, leading to a widening gender employment gap.

3 DATA AND METHODOLOGY

3.1 Theoretical framework

It has been recognized in the literature that international trade might influence female labor force participation (FLFP).

In general, the demand for labor employment is a derived demand, as stated by the labor theory, since employees are hired for producing goods and services in different economic sectors. The labor demand curve is a downward-sloping function of real wages, as suggested by the substitution and scale effects. International trade is one of the factors that affect the employment rate generally, and it turns out that it also has a specific effect on the female employment rate.

The neoclassical trade theory, Heckscher–Ohlin–Samuelson (HOS) model, explains how international trade and liberalization raise wage inequality in developing countries due to an increase in the relative price of the skill-intensive product and lower the wage inequality as the unskilled-labor-intensive product's relative price increases.

There are essential differences in labor endowments between the sexes, as Saure and Zoabi (2009) emphasized. In their paper, their classification of female labor's comparative advantage in brain-intensive sectors, while male labor's comparative advantage in the physically intensive sector, makes males compete in the expanding sector and crowd out females as trade enlarges. Similarly, these theories believe that the differences in initial factors endowments and comparative advantages among countries induce the effects of trade openness on female labor market outcomes.

Jordan is one of the developing countries that experienced a low female employment rate and underwent economic reform towards greater trade openness and liberalization. In the 1990s, Jordan initiated a significant economic reform program and made a progressive shift in trade policy. While accepting and implementing the non-discriminatory principle of the WTO, Jordan has continued to support its trade policy with various forms of bilateral agreements. Since 1995, Jordan has signed more than 24 bilateral trade agreements with Arab and non-Arab countries, which are allowed under the WTO.

The government began its reforms by adopting measures such as lifting subsidies, abolishing price regulation of non-essential products, liberalizing monetary and trade policies, launching a privatization program for major state-owned enterprises, and approving fiscal reforms to encourage both domestic and foreign investment (Spetan, 2015). The reform program included trade liberalization and international market integration into the global market, following fiscal expansionary policies that were largely financed by external borrowing and the depletion of reserves. The balance of payments and budget deficits crisis, coupled with high inflation, compelled the government to seek financial support from the International Monetary Fund (IMF) and World Bank (WB) (Harrigan et al., 2006).

In return for the IMF and WB's loans, Jordan's government implemented a range of economic reforms, and the country transitioned from a mercantilist trade policy with very high tariffs and quantitative restrictions to liberalizing trade systems by reducing tariffs, rationalizing tariffs, and removing non-tariff barriers to trade (Washington Institute, 1996).

Jordan's accession to the WTO in 2000 indicated its commitment to global incorporation. Under the agreement with the WTO, Jordan significantly reduced its simple average tariff from 23.8 percent in 2000 to 11.2 percent in 2008. These reforms, along with Jordan's participation in several regional agreements, have facilitated the expansion of trade in Jordan. This tariff structure has led to the development of low value-added, low skill-intensive manufactures that depend on foreign labor, at the expense of the development of higher value-added, higher-skill-intensive jobs for Jordanians (Pitigala, 2009).



Fig. 1 Trade Openness in Jordan for the period (1990-2019)

Source: By the authors, based on World Bank data

Figure 1 shows the average value for Trade Openness (TO) for Jordan during the period 1990-2019, which was 118.31 percent, with a minimum of 85.68 percent in 2019 and a maximum of 149.45 percent in 1990. For comparison purposes, the average (TO) for 2019 based on 167 countries was 91.78 percent (World Bank, 2021).

Figure 2 below shows the average Female Labor Force Participation rate (FLFP) for Jordan during the same period. Despite high levels of education among women, Jordan has one of the lowest labor force participation rates worldwide, attributed to the gap between educational skills and market needs, a primary factor in the educational paradigm (United Nations, 2020). Jordan's Female labor force participation rate in 2019 was estimated at 14.59 compared to 18.46 in Egypt, 52 percent in the United Arab Emirates, and 22.1 in Saudi Arabia. The global average was 47.1 in 2019 (World Bank, 2021).

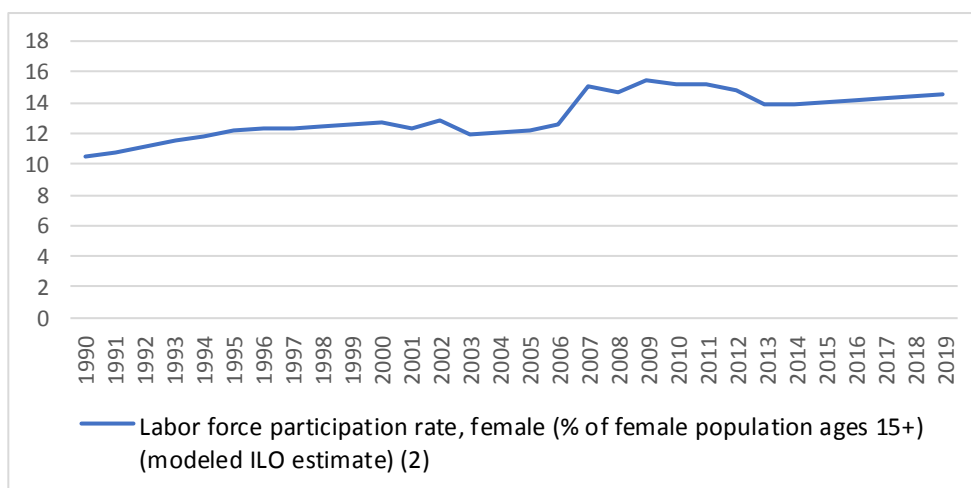


Fig. 2 Female Labor force participation rate (% of female population ages 15+) in Jordan for the period (1990 - 2019)

Source: By the authors, based on World Bank data

To investigate how trade liberalization influenced female employment four models have been adopted and, in each model, several trade volume measures have been used that are prevalent in the literature.

The basic FLFP model with traditional and trade-related determinants takes the following form:

$$Y_t = \beta_0 + \beta_1 x_t + \varepsilon_t \quad (1)$$

Where (Y) is the dependent variable in time t, (X) is the independent variables, β_s are the coefficients and the ε_t is the error term.

3.2 Choice of variables and datasets

This study utilized annual data covering the period 1990-2019. It is important to note that our selection of all variables was guided by the existing literature, previous studies, the availability of consistent data for Jordan, and statistical diagnostic tests.

Data were obtained from the World Bank's (WB) online database and the Department of Statistics of Jordan. The definitions and sources of the variables are elucidated in Tables (1. A) and (1. B).

Table (1. A) Dependent variables definition

Variables (Symbol)	Definition
Female Labor Force Participation Rate (FLFP)	The Proportion of The Population female Ages 15 And Older That Is Economically Active: All People Who Supply Labor for the production of goods and services during a Specified Period.
Female Employment in Agriculture Sector (FEAG)	Defined as female of working age she was engaged in any activity of activities in agriculture sector to produce goods or provide services for pay or profit.
Female Employment in industry Sector (FEIN)	Defined as female of working age she was engaged in any activity of activities in industry sectors to produce goods or provide services for pay or profit.
Female Employment in Services Sector (FESE)	Defined as female of working age she was engaged in any activity of activities in services sectors to produce goods or provide services for pay or profit.

Table (1. B) Independent variables definition

Variables (Symbol)	Definition
Live Births (LB)	Sum of all live births in the year.
GDP Per Capita (GDPC)	Gross domestic product divided by midyear population. (Constant price).
Enrollment Female in Secondary School (EFSS)	The ratio of total enrollment female, regardless of age, to the population of the age group that officially corresponds to the level of education shown.
Female Unemployment Rate (FUN)	The female labor force that is without work but available for and seeking employment.
Trade openness (TO)	The sum of exports and imports of goods and services measured as a share of gross domestic product.
Export Intensity (EX)	represent the value of all goods and other market services provided to the rest of the world.
Import Intensity (IM)	represent the value of all goods and other market services received from the rest of the world.
Import Penetration* (IMP)	The proportion of the value of imported goods to overall domestic demand. The import penetration rate indicates how much imports are used to meet domestic demand. It is calculated as imports divided by GDP plus imports minus exports, $[M / (GDP + M - X)]$.
Dummy Variable (WTO)	It is a binary variable that takes the value of 1 for the period of WTO accession 2000-2019 and zero otherwise.

Note 1: Sources the tables (1.A, 1.B) Prepared by the authors based on the World Bank, World Development Indicators, Updated Date (11/23/2021).

Note2*: The calculation by the researcher is based on the data of exports, imports and GDP published in the World Bank.

3.3 Estimation methodology

Our main models are represented by Equations 2, 3, 4, and 5, which depict the essential Female Labor Force Participation (FLFP) model with expected and trade-related determinants. In these equations, FLFP and Female Employment (FE) for each economic sector (Agricultural, Industrial, and Services sectors) serve as the dependent variables; β s are the parameters to be estimated, and ε_t represents the model's residual. The main independent variables of interest include international trade, which is represented by four different measures (trade openness, export intensity, import intensity, and import penetration), and trade liberalization, represented by the WTO variable. The WTO variable is a binary variable that takes the value of 1 for the period of WTO accession (2000-2019) and zero otherwise. Other relevant independent variables include live births as a proxy for the female labor force's health, female education represented by female enrollment in secondary school, and GDP per capita to capture the level of economic development.

$$FLFP_t = \beta_0 + \beta_1 Trade_t + \beta_2 LB_t + \beta_3 GDPC_t + \beta_4 EFSS_t + \beta_5 FUN_t + \beta_6 WTO_t + \varepsilon_t \quad (2)$$

$$FEAG_t = \beta_{a0} + \beta_{a1} Trade_t + \beta_{a2} LB_t + \beta_{a3} GDPC_t + \beta_{a4} EFSS_t + \beta_{a5} FUN_t + \beta_{a6} WTO_t + \varepsilon_{at} \quad (3)$$

$$FEIN_t = \beta_{n0} + \beta_{n1} Trade_t + \beta_{n2} LB_t + \beta_{n3} GDPC_t + \beta_{n4} EFSS_t + \beta_{n5} FUN_t + \beta_{n6} WTO_t + \varepsilon_{nt} \quad (4)$$

$$FESE_t = \beta_{s0} + \beta_{s1} Trade_t + \beta_{s2} LB_t + \beta_{s3} GDPC_t + \beta_{s4} EFSS_t + \beta_{s5} FUN_t + \beta_{s6} WTO_t + \varepsilon_{st} \quad (5)$$

Commencing our investigation into the effects of international trade and liberalization on female labor force participation in Jordan involves testing the stationarity of the model variables and exploring the integration relationship. We applied the widely used Augmented Dickey-Fuller (ADF) test with the intercept, trend, and intercept, and none, to examine the presence of a unit root in each variable.

Next, we examined the long-run relationship among the variables using the Fully Modified Least Squares (FMOLS) model. To do so, we employed cointegrating estimators, namely, the Johansen test (1991, 1995). The FMOLS model is robust to both non-stationarity and endogenous regressors, providing consistent and efficient estimators even in data with a small sample size. The FMOLS method, suggested by Phillips and Hansen (1990), aims to deliver optimal estimates of cointegration regression. The primary idea behind using the FMOLS model is to account for serial correlation and test for the endogeneity in the regressors resulting from the presence of the cointegrating relationship.

4 EMPIRICAL RESULTS AND DISCUSSION.

4.1: Unit root test

The study employed the ADF test to ascertain the stationarity of all the variables. The results have been stated in Table 2.

Table 2-unit root test: Augmented Dickey-Fuller test statistic

Variables	Level (the <i>P</i> -value)			First difference (the <i>P</i> -value)			Degree of stationarity
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None	
FLFP	0.3929	0.4880	0.9204	0.0001	0.0004	0.0000	I (1)
FEAG	0.7517	0.3931	0.1084	0.0459	0.1627	0.0082	I (1)
FEIN	0.2587	0.5989	0.5041	0.0389	0.0455	0.0029	I (1)
FESE	0.8760	0.7191	0.9361	0.0233	0.0711	0.0034	I (1)
LB	0.7300	0.1994	0.9497	0.0005	0.0026	0.0001	I (1)
GDPC	0.2604	0.8993	0.8846	0.0411	0.0567	0.0058	I (1)

Variables	Level (the <i>P</i> -value)			First difference (the <i>P</i> -value)			Degree of stationarity
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None	
EFSS	0.9654	0.7157	0.4027	0.0252	0.0329	0.0020	I (1)
FUN	0.3425	0.7652	0.3324	0.0003	0.0014	0.0000	I (1)
TO	0.5901	0.7411	0.1264	0.0017	0.0098	0.0001	I (1)
EX	0.4322	0.5737	0.1239	0.0002	0.0013	0.0000	I (1)
IM	0.5696	0.6033	0.1687	0.0015	0.0082	0.0001	I (1)
IMP	0.6624	0.7738	0.1156	0.0015	0.0083	0.0001	I (1)

The results indicate that all the variables are non-stationary at their levels. However, upon taking the first difference, all variables become stationary. The tests were conducted with various possibilities for the common null hypothesis of a unit root (non-stationarity), including intercept, none, and intercept with a trend. The next step involves performing a co-integration test to determine whether long-term relationships exist among the variables.

4.2 Co-integration Test

As all the selected variables are stationary at the first difference (I(1)), we can assume the existence of a long-run relationship between variables. To examine this assumption, the Johansen co-integration test was conducted. The estimated results of the Johansen analysis are reported in Tables (1-13) in the Supplemental online material. The null hypothesis of no co-integration has not been accepted, indicating the presence of a long-run relationship among the selected variables for all adopted models.

4.3 Multicollinearity Test

The study applies the Multicollinearity test to examine the correlation among the explanatory variables. The correlation matrix and the variance inflation factor (VIF) were conducted. The VIF test shows no multicollinearity problem within this test (Susanti et al., 2020). Both tests indicate no high correlation between variables, with VIF values greater than 1 and less than 10 for all variables except for GDPC. The mean value for all models is not greater than 5.7, suggesting no multicollinearity issue in this testing analysis. Regarding the variable GDPC* and other variables with moderate multicollinearity, there may not be a need to resolve the multicollinearity problem, especially since these predictor variables are control and dummy variables. Their correlation does not hinder our ability to obtain a good fit, nor does it tend to affect inferences about mean responses or predictions of new observations (Kutner et al., p. 283, 2005). The results of multicollinearity tests are reported in Tables 3 and 4.

* We tried to remove the LB and GDPC one at a time, the signs and the significance didn't change, so we can conclude that the multicollinearity is not an issue in our model.

Table 3 Correlation Matrix

	LB	GDPC	EFSS	FUN	WTO	TO	EX	IM	IMP
LB	1.000	0.779	-0.488	-0.492	0.742	-0.540	-0.619	-0.473	-0.569
GDPC	0.779	1.000	-0.016	-0.455	0.834	-0.067	-0.184	0.004	-0.098
EFSS	-0.488	-0.016	1.000	0.058	-0.165	0.618	0.640	0.581	0.633
FUN	-0.492	-0.455	0.058	1.00	-0.632	0.478	0.507	0.442	0.476
WTO	0.742	0.834	-0.165	-0.632	1.000	-0.293	-0.424	-0.203	-0.323
TO	-0.540	-0.067	0.618	0.478	-0.293	1.000	0.960	0.985	0.997
EX	-0.619	-0.184	0.640	0.507	-0.424	0.960	1.000	0.900	0.972
IM	-0.473	0.004	0.581	0.442	-0.203	0.985	0.900	1.000	0.974
IMP	-0.569	-0.098	0.633	0.476	-0.323	0.997	0.972	0.974	1.000

Table 4 Variance Inflation Factors (VIF)

Variable	VIF (Trade: EX)	VIF (Trade: IM)	VIF (Trade: IPM)	VIF (Trade: TO)
LB	9.292243	9.573999	9.950073	9.811042
GDPC	10.26918	10.31595	10.68411	10.64316
EFSS	2.777551	2.675353	2.723339	2.712470
FUN	2.231535	2.389625	2.308382	2.380809
Trade	3.917313	3.210726	3.816993	3.695488
WTO	5.331924	4.941384	5.060574	5.010160
The Mean	5.63	5.5	5.7	5.7

4.4 Presentation of Regression Results

To comprehensively explore the relationship between Female Labor Force Participation (FLFP) in Jordan and Female Employment (FE) rates for each economic sector, various scenarios (1 to 4) were employed, utilizing the Fully Modified Least Squares (FMOLS) method. Table 5 presents the results of Model 1 with different scenarios, employing different measurements for international trade to gain a comprehensive understanding of the trade-FLFP relationship.

According to the results in Table 5, international trade, represented by four trade openness indices (export intensity, import intensity, import penetration, and trade openness index), exhibits a significant and negative impact on FLFP. This implies that as trade openness increases, FLFP decreases. These findings align with the results of Alazzawi (2016) and Alwadi (2017). The use of the live births index (LB) as a proxy for women's health or family size does not show a significant impact on FLFP in all models. Economic growth (GDPC) consistently has a significantly positive impact on FLFP across all models, in line with economic theory suggesting that as the economy grows, the labor force participation rate increases.

Examining the FMOLS results reported in Table 5, it is observed that EFSS, FUN, and the dummy variable (WTO) all

have a significantly negative impact on FLFP. While the effect of EFSS on FLFP was expected to be positive (Li et al., 2020), the result contradicts this expectation. This discrepancy may be justified by considering that enrollment in secondary school might postpone female entry into the labor force, as suggested by Solati and Loxley (2015). Literature suggests that FLFP rates are influenced by unemployment, and in this study, FUN's effect is ambiguous, indicating that the unemployment rate affects the probability of females finding work (Tsani et al., 2012). Thus, women may struggle to secure jobs when the unemployment rate is high.

Interestingly, Jordan's accession to the WTO has a significantly negative impact on FLFP, signifying a decline in FLFP after 2000 by 1.61 percent, 1.33 percent, 1.48 percent, and 1.44 percent for scenarios 1, 2, 3, and 4, respectively.

Table 5 model 1- Effect of International Trade on the Female Labor force Participation Rate. (FMOLS-Results)

Independent Variables	(1)	(2)	(3)	(4)
Trade	-0.071928 [0.008790] (0.0000)	-0.047891 [0.004042] (0.0000)	-0.081523 [0.007763] (0.0000)	-0.032151 [0.002946] (0.0000)
LB	9.31E-07 [2.53E-06] (0.7160)	-1.30E-06 [2.32E-06] (0.5809)	-1.59E-06 [2.43E-06] (0.5194)	-1.71E-06 [2.41E-06] (0.4852)
GDPC	0.004319 [0.000240] (0.0000)	0.004630 [0.000216] (0.0000)	0.004561 [0.000226] (0.0000)	0.004630 [0.000226] (0.0000)
EFSS	-0.020674 [0.006779] (0.0059)	-0.021331 [0.005806] (0.0013)	-0.018988 [0.006118] (0.0052)	-0.018563 [0.006100] (0.0060)
FUN	-0.052032 [0.012487] (0.0004)	-0.032192 [0.011642] (0.0013)	-0.044251 [0.011782] (0.0011)	-0.037034 [0.011993] (0.0054)
WTO	-1.606301 [0.131396] (0.0000)	-1.339561 [0.113868] (0.0000)	-1.480456 [0.118364] (0.0000)	-1.448562 [0.117812] (0.0000)
Constant	8.106999 [0.635125] (0.0000)	7.025312 [0.576634] (0.0000)	8.690184 [0.588075] (0.0000)	7.431602 [0.592559] (0.0000)
Obs	29	29	29	29
R ²	0.853037	0.871651	0.865707	0.869345

Note (1): Within the parentheses [], is the Std. Error, while inside the parentheses (), is the Probability.

Note (2): In scenario (1) trade is the Export Intensity (EX) (X/GDP). In scenario (2) trade is the Import Intensity (IM) (M/GDP). In scenario (3) trade is the Import Penetration (IMP) (M/GDP+M-X). In scenario (4) is the trade openness (TO) index (X+M/GDP).

- Regarding the impact of trade on female employment in each sector, the results are summarized in Table 6, revealing the following observations:
- In the agricultural sector, international trade, measured by indices such as export intensity, import intensity, and trade openness, has a significantly negative impact on Female Employment (FE). Additionally, GDPC, LB, and WTO accession exhibit a significantly negative effect on FE. EFSS has a significant impact on FE, while FUN does not have a significant impact.
- Results for the industrial sector present interesting outcomes. Table 6 indicates that international trade, GDPC, and FUN have a significant and positive impact on FE in Jordan's industrial sector, whereas LB and WTO accession show an insignificant impact on FE.
- In Jordan's services sector, international trade, GDPC, EFSS, and FUN have a significantly negative impact on FE. On the other hand, LB and WTO accession have a significantly positive impact on FE, as reported in Table 6.

Table 6 The Effect of International Trade on the Female Employment in Economic Sectors.

Model 2-the Effect of International Trade on the Female Employment in Agricultural Sector (FEAG)									
	Trade	LB	GDPC	EFSS	FUN	WTO	Constant	Obs	R²
(1)	-0.022662 [0.004332] (0.0000)	-6.90E-06 [1.25E-06] (0.0000)	-0.002004 [0.000118] (0.0000)	0.062539 [0.003341] (0.0000)	0.004813 [0.006154] (0.4425)	-0.533588 [0.064754] (0.0000)	5.296592 [0.312999] (0.0000)	29	0.951895
(2)	-0.009723 [0.002108] (0.0001)	-6.23E-06 [1.21E-06] (0.0000)	-0.002047 [0.000112] (0.0000)	0.059769 [0.003027] (0.0000)	0.005851 [0.006070] (0.3455)	-0.457520 [0.059371] (0.0000)	5.106206 [0.300659] (0.0000)	29	0.952874
(3)	-0.007537 [0.001518] (0.0001)	-6.62E-06 [1.24E-06] (0.0000)	-0.002009 [0.000117] (0.0000)	0.061394 [0.003144] (0.0000)	0.005401 [0.006181] (0.3917)	-0.485087 [0.060723] (0.0000)	5.149028 [0.305418] (0.0000)	29	0.953387
Model 3-the Effect of International Trade on the Female Employment in Industrial Sector (FEIN)									
	Trade	LB	GDPC	EFSS	FUN	WTO	Constant	Obs	R²
(1)	0.102475 [0.008553] (0.0000)	-7.56E-06 [2.46E-06] (0.0055)	0.003078 [0.000233] (0.0000)	0.005212 [0.006596] (0.4379)	0.054378 [0.012151] (0.0002)	0.027428 [0.127859] (0.8321)	0.473757 [0.618031] (0.4515)	29	0.834107
(2)	0.059590 [0.004195] (0.0000)	-3.65E-06 [2.41E-06] (0.1442)	0.002790 [0.000224] (0.0000)	0.016352 [0.006026] (0.0127)	0.040911 [0.012083] (0.0027)	-0.349674 [0.118174] (0.0073)	0.882503 [0.598441] (0.1545)	29	0.861625
(3)	0.042667 [0.003165] (0.0000)	-3.20E-06 [2.59E-06] (0.2299)	0.002688 [0.000243] (0.0000)	0.008234 [0.006555] (0.2222)	0.040162 [0.012887] (0.0050)	-0.175684 [0.126595] (0.1791)	0.884204 [0.636735] (0.1788)	29	0.861766
Model 4-the Effect of International Trade on the Female Employment in Services Sector (FESE)									
	Trade	LB	GDPC	EFSS	FUN	WTO	Constant	Obs	R²
(1)	-0.078311 [0.004454] (0.0000)	1.46E-05 [1.28E-06] (0.0000)	-0.001105 [0.000121] (0.0000)	-0.068663 [0.003435] (0.0000)	-0.059625 [0.006327] (0.0000)	0.522514 [0.066574] (0.0000)	94.29749 [0.321797] (0.0000)	29	0.940786
(2)	-0.048875 [0.002679] (0.0000)	9.95E-06 [1.54E-06] (0.0000)	-0.000735 [0.000143] (0.0000)	-0.077138 [0.003848] (0.0000)	-0.046953 [0.007717] (0.0000)	0.790334 [0.075473] (0.0000)	94.00268 [0.382197] (0.0000)	29	0.957352
(3)	-0.035091 [0.001907] (0.0000)	9.57E-06 [1.56E-06] (0.0000)	-0.000647 [0.000146] (0.0002)	-0.070498 [0.003948] (0.0000)	-0.045498 [0.007762] (0.0000)	0.647178 [0.076252] (0.0000)	93.98892 [0.383525] (0.0000)	29	0.956602

Note (1): Within the parentheses [], is the Std. Error, while inside the parentheses (), is the Probability.

Note (2): In all models, (1) trade: is the Export Intensity (EX) (X/ GDP). In all models, (2) trade: is the Import Intensity (IM) (M/ GDP). In all models, (3) trade: is the trade openness (TO) index (X+M/GDP).

4.5 Discussion

Since both the Johansen cointegration and FMOLS tests have been analytically assessed, it is evident that there is a statistically significant impact of international trade, trade liberalization, live births (LB), GDP per capita (GDPC), female enrollment in secondary school (EFSS), and female unemployment rate (FUN) on Female Labor Force Participation (FLFP) in the overall economy and on Female Employment (FE) in each economic sector.

The expansion of international trade in Jordan has an adverse impact on FLFP and FE in the agricultural and services sectors, while it has a boosting effect on FE in the industrial sector. In developing countries, where low-skilled workers are abundant, it is expected that they will specialize in industries that use low-skilled workers intensively. Given that women are typically paid lower wages than men, they are likely to constitute a large share of the workforce in industries with low-skilled labor-intensive operations. Therefore, with the expansion of these industries due to increased trade, FE can be expected to increase in the industrial sector (Kyander, 2020).

It is noteworthy that using different measurements to represent international trade did not alter the results across all models. The coefficients on export intensity (EX), import intensity (IM), import penetration (IMP), and trade openness (TO) are consistently negative and statistically significant, indicating that an increase in imports as a share of domestic consumption, export intensity, and overall trade is associated with lower FLFP in model one and lower FE in models 2 and 4.

Jordan's accession to the World Trade Organization (WTO), representing trade liberalization, was examined to see if it would support the outcomes of trade openness. The results show that FLFP and FE in the agricultural sector decreased as trade became more liberalized, reinforcing the results of trade openness. It is apparent that WTO accession did not create job opportunities for women in Jordan, as it has a statistically significant and negative impact on FLFP and FE in the agricultural sector. These findings contradict the expected arguments that international trade and WTO accession may lead to an increase in women's employment. In model four, in the services sector, WTO accession has a positive and statistically significant impact on FE, while it is insignificant in the industrial sector when using export intensity and trade openness as measurements for international trade. However, it turns significant with the import intensity measurement, displaying a negative coefficient.

The study has also found that an increase in GDP per capita has a significantly positive impact on Female Labor Force Participation (FLFP) in Jordan's economy and on Female Employment (FE) in the industrial sector. However, it has a negative impact on FE in the agricultural and services sectors. This implies that FLFP and FE increase with economic growth acceleration in Jordan's economy as a whole and in the industrial sector, but decrease with it in the agricultural and services sector.

As mentioned earlier, Jordan's female labor force participation rate is one of the lowest rates not only in the region but in the entire world. This low rate has been driven by a historically low female labor force participation rate, which was less than 15 percent in 2019, ranking among the lowest levels worldwide. This helps to understand the inverse effects of increased trade and WTO accessions on FLFP, as Jordan's labor market in general and the female labor market specifically suffer from structural distortions resulting from policy biases and some economic, social, and political factors.

Jordan's economy faces a large informal economic sector leading to extensive informal employment. Nevertheless, there is a significant gap in women's formal employment, making it one of the worst in the world. Women are still underrepresented in many areas of society due to traditional standards and social norms that limit the empowerment and political participation of Jordanian women (OECD, 2018). Moreover, the employment structure in Jordan unfavorably affects women's economic activity, with most women working in education and health in the public sector, which may be

considered a non-tradable sector (World Bank, 2014). Additionally, women in Jordan face legislative discrimination; for instance, the utilization of economic assets such as land and access to loans remains biased towards men (OECD, 2018).

The increase in Female Enrollment in Secondary School (EFSS) and the Female Unemployment Rate (FUN) is associated with a decrease in FLFP in the whole economy and FE in the services sector. Conversely, the FE in the agricultural sector decreases as the EFSS decreases. Moreover, the increase in FUN increases FE in the agricultural and industrial sectors. Although Jordan has one of the highest education rates for females in the region, unfortunately, it has not translated into economic participation. Lower live births are associated with higher female unemployment in the agricultural and industrial sectors, while in the services sector, FE increases as live births increase.

5 CONCLUSIONS AND RECOMMENDATIONS

Although trade openness and globalization play a substantial role in economic growth, positively impacting a country's development, including women, the effects of the liberalization of international trade on gender are ambiguous. In Jordan, women in the labor market are often negatively affected by international trade liberalization. Jordan, like many developing countries, sees women undertaking numerous economic roles such as workers, producers, entrepreneurs, traders, home managers, taxpayers, and users of public services. However, they face gender-related challenges, including limited access to productive resources, skills development and training, information and business networks, and constraints in trade facilitation logistics and transport (Hagen, 2014). An inclusive approach is needed to bridge the gender gap in the economy, particularly addressing the gender pay gap. This could involve establishing nurseries, improving public transportation, and eliminating any discriminatory features in accessing justice and finance.

Creating a workplace environment that encourages female participation requires revising labor laws and regulations. These revisions should explicitly prohibit gender-based wage discrimination to eliminate the existing gender pay gap. Simultaneously, long-term public initiatives aimed at altering societal perceptions of gender roles should be pursued. Strict enforcement of policies related to affordable childcare facilities and ensuring safe working conditions is also crucial.

It is noteworthy that the correlation between per capita Gross Domestic Product (GDP) and Female Labor Force Participation (FLFP) is not as strong as one might expect. In certain sectors, such as agriculture and services, a rise in per capita GDP is associated with a decrease in female employment, highlighting the inadequacy of economic development alone in improving female workforce participation. Jordan faces the significant challenge of having the lowest female labor force participation rate globally, presenting a considerable hurdle for policymakers.

To address this multifaceted issue, a comprehensive review of educational policies is crucial. Enhancing educational opportunities, particularly in technical and vocational skills, stands out as a strategic approach to improving female employment prospects and strengthening labor force participation.

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