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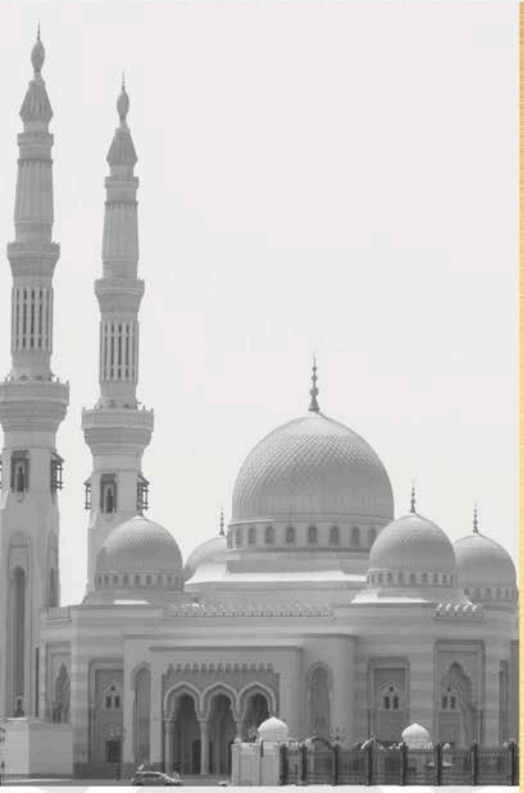

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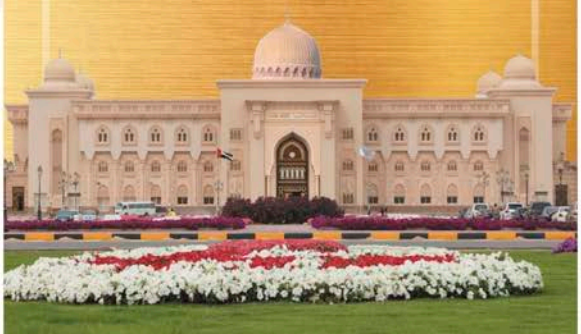

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تأثير مشاركة المرأة في القوى العاملة على النمو الاقتصادي في فلسطين: نهج نموذج الانحدار الذاتي للفجوات الزمنية الموزعة (ARDL)

THE INFLUENCE OF FEMALE LABOUR FORCE PARTICIPATION ON ECONOMIC GROWTH IN PALESTINE: AN ARDL APPROACH[1]

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الملخص

تبحث هذه الورقة تأثير مشاركة المرأة في القوى العاملة على النمو الاقتصادي في فلسطين، المقاس من خلال اللوغاريتم الطبيعي للناتج المحلي الإجمالي. على الرغم من الجهود المستمرة لتعزيز المساواة بين الجنسين، لا تزال مشاركة المرأة في القوى العاملة في فلسطين منخفضة بشكل ملحوظ، مما يمثل فرصة مهدرة للنمو والتطوير الاقتصادي. تستخدم هذه الدراسة نموذج الانحدار الذاتي للفجوات الزمنية الموزعة (ARDL) ونموذج التصحيح غير المقيد للخطأ (UECM) لتحليل البيانات من عام 2000 إلى عام 2022، التي تم

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الحصول عليها من البنك الدولي. تشمل الأهداف الرئيسية تقييم التأثيرات قصيرة وطويلة الأجل لمشاركة المرأة في القوى العاملة على النمو الاقتصادي، وتقييم سرعة التكيف مع التغيرات في مشاركة المرأة في القوى العاملة. يحدد نموذج ARDL تأثيرات إيجابية كبيرة لنسبة مشاركة المرأة في القوى العاملة على الناتج المحلي الإجمالي في الأجلين القصير والطويل. يشير اختبار الحدود إلى وجود علاقة توازنية طويلة الأجل بين نسبة مشاركة المرأة في القوى العاملة والناتج المحلي الإجمالي، وتؤكد نتائج نموذج التصحيح غير المقيد للخطأ هذه النتائج، مشيرة إلى سرعة تعديل كبيرة نحو التوازن طويل الأجل. تشير النتائج إلى أن زيادة مشاركة المرأة في القوى العاملة يمكن أن تعزز النمو الاقتصادي بشكل كبير في فلسطين، مما يؤدي إلى فوائد اقتصادية طويلة الأجل. تبرز هذه النتائج أهمية السياسات المستهدفة لتقليل العوائق أمام توظيف النساء وتعزيز المساواة الإسلامية (العدالة) وعدم التمييز في سوق العمل. يمكن أن تشمل هذه السياسات تحسين الوصول إلى التدريب المهني، وتطبيق أطر قانونية داعمة، ومعالجة المساواة الجوهرية والتحويلية لتمكين الأنشطة الاقتصادية للمرأة. تساهم هذه الورقة في الأدبيات الحالية من خلال تقديم أدلة تجريبية قوية على الدور الحاسم لمشاركة المرأة في القوى العاملة في دفع النمو الاقتصادي في فلسطين. تدعم نتائج الدراسة صياغة سياسات تعزز من مشاركة المرأة في القوى العاملة، مما يؤدي إلى فوائد اقتصادية طويلة الأجل ومستقبل مشرق لاقتصاد فلسطين. ينبغي أن تركز الأبحاث المستقبلية على استكشاف تأثير التدخلات المحددة ودراسات مقارنة عبر سياقات اقتصادية اجتماعية مماثلة لتعميق الفهم لهذه الديناميكيات.

Abstract

This paper investigates the impact of female labor force participation (FLFP) on economic growth in Palestine, measured through the natural logarithm of gross domestic product (GDP). Despite ongoing efforts to promote gender equality, FLFP in Palestine remains markedly low, representing a missed opportunity for economic growth and

development. This study utilizes an autoregressive distributed lag (ARDL) model and an unrestricted error correction model (UECM) to analyze data from 2000 to 2022, sourced from the World Bank. The primary objectives include assessing the short-run and long-run effects of FLFP on economic growth and evaluating the speed of adjustment to changes in the participation of the female labor force. The ARDL model identifies significant positive impacts of the FLFP rate on GDP in the short and long term. The bounds test indicates a long-run equilibrium relationship between the FLFP rate and the GDP, and the UECM results corroborate these findings, highlighting a significant speed of adjustment towards the long-run equilibrium. The results suggest that increasing FLFP can substantially boost economic growth in Palestine, leading to significant long-term economic benefits. These findings underscore the importance of targeted policies to reduce barriers to female employment and promote Islamic equality (*musawah*) and nondiscrimination in the labor market. Such policies could include improving access to vocational training, implementing supportive legal frameworks, and addressing substantive and transformative equality to empower women's economic activities. This paper contributes to the existing literature by providing robust empirical evidence of the critical role of FLFP in driving economic growth in Palestine. The study's findings support formulating policies that enhance FLFP, leading to significant long-term economic benefits and a hopeful future for Palestine's economy. Future research should explore the impact of specific interventions and comparative studies across similar socio-economic contexts to deepen understanding of these dynamics.

الكلمات الدالة: مشاركة المرأة في سوق العمل، تمكين المرأة، العدالة الإسلامية، التنمية الاقتصادية، فلسطين، تحليل السلاسل الزمنية.

Keywords: Women’s Labor Market Participation, Women's Empowerment, Islamic Justice, Economic Development, Palestine, Time Series Analysis.

1.0 Introduction

Female labor force participation (FLFP) is a crucial factor in achieving global economic progress, as it contributes significantly to gross domestic product (GDP) growth through increased workforce involvement (Choudhry & Elhorst, 2018). Gender equality in the labor market has been identified as an essential factor in realizing comprehensive social benefits for all participants (Besamusca, Tijdens, Keune, & Steinmetz, 2015). Despite these proven benefits, the past few decades have seen significant disparities in FLFP rates across different countries and regions (Idowu & Owoeye, 2019; World Bank, 2019; Klasen, 2017; Assaad, 2014). Understanding the underlying reasons for these geographical variations is essential for the global economy.

FLFP in Palestine is pivotal in enhancing the economy and achieving prosperity. Considering women as key partners in building a strong society and a prosperous economy reflects the belief in their economic and social capabilities. From a religious standpoint, Islam views women as equal partners in work and production, underscoring the importance of their economic empowerment to achieve justice and gender equality. The Quran says: “For men, there is a reward for what they have earned (and likewise) for women, there is a reward for what they have earned” (04:32). Historically, women's economic participation has been a marker of social progress and a driver of economic development.

Economic indicators reveal that Palestine’s GDP growth has been modest, averaging around 2-3% annually, with significant fluctuations due to political instability and economic challenges (World Bank, 2024). While showing gradual improvement, the GDP per capita remains insufficient to address the high population growth rate and the increasing demand for employment (World Bank, 2024). Studies suggest that increasing FLFP could significantly boost GDP growth by expanding the labor pool, enhancing productivity, and fostering economic resilience (Salleh & Mansor, 2022; Kabeer & Natali, 2013; Klasen & Lamanna, 2009). For instance, research has shown that higher female participation in the labor market can lead to more diverse and innovative work environments, which are crucial for economic competitiveness (Garcia, et al., 2022).

Despite numerous initiatives aimed at promoting gender equality in Palestine, FLFP remains significantly low compared to male participation. According to the World Bank (2024), the FLFP rate in Palestine has been hovering around 16-18% over the past decade, while the male labor force participation rate is substantially higher, consistently around 70-72%. This stark disparity not only highlights gender inequality in the labor market but also represents a missed opportunity for economic growth and development.

The low participation of women in the labor force is further compounded by high female unemployment rates, which exceed 40%, compared to approximately 25% for males (World Bank, 2024). This situation is indicative of systemic barriers that women face, including limited access to quality education and vocational training, socio-cultural norms that restrict women's economic activities, and inadequate legal frameworks that fail to protect women's employment rights (Economic and Social Commission for Western Asia (ESCWA), 2023).

The main objective of this study is to analyze the influence of FLFP on economic growth in Palestine by assessing the relationship between them in the short and long term. The study also aims to measure how economic growth adapts to changes in women's participation in the labor market and determine the speed of this adaptation.

The study employs advanced econometric models, including the Autoregressive Distributed Lag (ARDL) model and the Unrestricted Error Correction Model (UECM), to analyze the relationship between FLFP and economic growth. These models are chosen for their ability to capture both short-run dynamics and long-term equilibrium relationships (Pesaran et al., 2001). The study intends to provide evidence-based insights into the potential economic benefits of increased female labor participation. The findings will inform policy interventions promoting Islamic equality (*musawah*) and economic development, ultimately contributing to sustainable economic growth and improved societal well-being.

This paper is organized as follows: The next section reviews relevant theoretical frameworks and empirical studies, identifying gaps and the study's contributions. The third section describes the

methodology, focusing on data sources, the ARDL model, and validation techniques. Section four presents the results, including descriptive analysis and model estimations. The last section summarizes key findings and discusses policy implications, limitations, and suggestions for future research.

2.0 Literature Review

The relationship between female labor force participation (FLFP) and economic growth has garnered significant attention in economic literature. This section reviews the theoretical foundations and empirical evidence concerning this relationship, with a particular focus on the unique socio-economic context of Palestine. Understanding how FLFP influences economic growth is crucial for formulating effective policies promoting Islamic equality (*musawah*) and economic development. The section is structured first to provide a theoretical framework, integrating key theories explaining labor force participation and economic growth dynamics. Following this, the empirical review synthesizes findings from various studies that explore the impact of FLFP on economic growth across different regions and periods. Special attention is given to the Palestinian context, highlighting the social, economic, and regional factors influencing female labor force participation. The section concludes by identifying gaps in the existing literature and outlining the contributions this study aims to make.

2.1 Theoretical Framework

This section outlines the theoretical framework for examining the impact of FLFP on economic growth in Palestine, both in the short and long run. The framework integrates key theories and models that explain the dynamics between FLFP and economic growth, providing a robust basis for the study and aligning with the study's objectives and scope.

Human Capital Theory

Human Capital Theory posits that investments in education and training enhance the productivity of individuals, which in turn drives economic growth (Becker, 1993). This theory emphasizes the role of

education and skill development in increasing FLFP. Educated women are more likely to participate in the labor force and contribute significantly to economic productivity. In Palestine, where educational attainment among women has improved, this theory is crucial for understanding how these educational investments can translate into higher GDP growth through increased labor force participation.

Endogenous Growth Theory

Endogenous Growth Theory emphasizes the role of human capital, technology, innovation, and knowledge in driving long-term economic growth from within the economy (Romer, 1986). This theory links human capital development, including female education and labor participation, to sustainable economic growth. It highlights the internal mechanisms, such as improvements in productivity and innovation, that contribute to economic development. This theory is pertinent for Palestine as it underscores how enhancing FLFP can lead to sustainable GDP growth by fostering an environment conducive to innovation and technological advancement.

Feminization U Hypothesis

The feminization U hypothesis proposes a U-shaped relationship between economic development and FLFP, where participation decreases initially with development but increases at higher stages (Goldin, 1994). This hypothesis is particularly relevant for examining Palestine's economic development stages and their effects on FLFP and subsequent economic growth. It suggests that FLFP may initially decline as Palestine progresses economically due to cultural and social barriers. However, it will eventually increase as the economy reaches higher development stages and societal norms evolve.

By integrating these theories, the study provides a comprehensive framework to examine the impact of FLFP on GDP growth in Palestine. Human Capital Theory and Endogenous Growth Theory are particularly relevant for analyzing short-term and long-term effects, highlighting the importance of education and internal growth mechanisms. The Feminization U Hypothesis adds depth by considering the developmental stages and cultural contexts unique to Palestine.

This framework guides the empirical analysis, helping to explore:

1. Short-Run Effects: How immediate increases in FLFP, driven by education and skill development, contribute to short-term GDP growth.
2. Long-Term Equilibrium Relationships: How sustained increases in FLFP lead to enduring economic benefits, identifying long-term equilibrium relationships between FLFP and economic growth.
3. Adjustment Speed: Econometric models like ARDL and UECM evaluate how quickly economic growth adjusts to changes in FLFP, supported by the principles of Human Capital Theory and Endogenous Growth Theory.

The theoretical frameworks above comprehensively explain how FLFP can influence economic growth. By integrating these theories, we establish a robust basis for the empirical investigation of FLFP's impact on economic growth. The following section delves into the empirical evidence from various studies, highlighting key findings and contextualizing them within the framework established.

2.2 Empirical Review

Evidence on Female Labor Force Participation and Economic Growth

A substantial body of empirical literature examines the relationship between FLFP and economic growth across different regions and time periods. This section synthesizes key findings from recent studies, highlighting this relationship's nuanced and multifaceted nature.

Positive Effects of Female Labor Force Participation on Economic Growth

Numerous studies have documented the positive impact of increased FLFP on economic growth. The following examples illustrate the diversity and consistency of these findings across various regions.

Sulaiman et al. (2024) found that female labor participation significantly contributes to long-term economic growth, longevity, education, and investments in Southeast Asia. Similarly, Akhtar et al. (2023) identified a robust positive association between FLFP and

economic growth in Malaysia, underscoring the importance of trade openness and gender parity in fostering economic development.

Urama et al. (2022) highlighted the positive relationship between FLFP and economic growth in sub-Saharan Africa, advocating for policies encouraging women's participation in the labor force. This aligns with the findings of Omran and Bilan (2022) in Egypt, where FLFP and gross fixed capital formation growth rates positively influenced long-term economic growth. Baerlocher et al. (2021) examined the concept of a "gender bonus." They found a significant positive effect of FLFP on economic growth, suggesting that increased female labor participation enhances average living standards.

The U-Shaped Hypothesis

Several studies have explored the U-shaped hypothesis, which posits that FLFP initially declines with economic development but increases at higher stages of growth. This subsection reviews the empirical support for this hypothesis and examines its applicability across different contexts.

Tsani et al. (2013, 2015) and Fatima and Sultana (2009) provided evidence supporting this hypothesis in South Mediterranean countries and Pakistan, respectively. Their research suggests that region-specific barriers and the stages of economic development significantly influence FLFP patterns.

Choudhry and Elhorst (2018) confirmed a U-shaped relationship between FLFP and economic development across 40 countries, emphasizing the importance of demographic transitions and sectoral employment shifts. However, not all studies corroborate the U-shaped relationship. Sundari (2019) found no empirical support for the U-shaped hypothesis in Tamil Nadu, India. Instead, the research revealed an inverted U-shape, with FLFP declining during periods of high economic growth due to a strong negative income effect and limited job opportunities for women. Similarly, Gaddis and Klasen (2014) questioned the robustness of the U-shaped hypothesis, suggesting that cross-country differences and data inconsistencies weaken the empirical support for this trend.

Mixed and Context-Dependent Findings

Other studies present mixed or context-dependent findings, reflecting the complexity of the relationship between FLFP and economic growth. The following examples highlight the varied impacts of FLFP across different countries and contexts.

Göcen (2021) identified bidirectional causality between FLFP and economic development in Middle Eastern countries, with varying impacts across different nations. For instance, in Turkey and Jordan, FLFP negatively influenced economic growth, while in Egypt, Kuwait, and Oman, economic development spurred female labor participation.

In Korea, Suh (2017) observed a U-shaped curve over time but noted that income inequality had a more significant impact on women's employment than economic growth alone. Similarly, Luci (2009) and Choudhry and Elhorst (2018) found evidence of the U-shaped hypothesis but emphasized the role of demographic transitions and structural changes in shaping FLFP. Altuzarra et al. (2019) found a U-shaped relationship in the European Union, with distinct patterns emerging between older and newer member states. Their study underscores the complexity of FLFP dynamics within different economic contexts.

Education, Sectoral Shifts, and Policy Interventions

Education and sectoral shifts influence FLFP and economic growth. This subsection explores the impact of these factors and the effectiveness of policy interventions to enhance FLFP.

Lechman and Kaur (2015) confirmed a global U-shaped relationship, noting significant cross-country variability. They stressed the importance of educational attainment and structural economic changes in promoting FLFP. Tasseven (2017) also highlighted the positive effects of education and GDP on FLFP in G8 countries while emphasizing the discouraging impact of unemployment.

In India, Lahoti and Swaminathan (2016) argued that the composition of economic growth, rather than its magnitude, influences women's labor participation. They found that movements across sectors, rather than within sectors, primarily drive changes in FLFP. Similarly, Debnath and Das (2022) highlighted the negative

association between fertility rates and FLFP in India, emphasizing the importance of inclusive growth policies.

Sajid et al. (2024) extended the examination of the U-shaped hypothesis in Pakistan, using advanced econometric techniques to reveal an inverse U-shape, suggesting that FLFP may decline in the future without targeted interventions to improve women's job opportunities and technical skills. Pampel and Tanaka (1986) and Mujahid and Zafar (2012) provided early evidence of the complex relationship between economic structures and FLFP, highlighting the role of demographic and social factors in shaping labor market outcomes for women.

Sector-Specific and Regional Insights

Sector-specific and regional studies provide deeper insights into FLFP and economic growth dynamics. This subsection examines how different sectors and regions experience and respond to changes in FLFP.

Zhang (2010) and Fathi (2017) offered sector-specific insights, with Zhang examining the role of structural changes in China and Fathi discussing the challenges faced by female entrepreneurs in the Middle East and North Africa. These studies underscore the importance of considering sectoral dynamics and regional barriers in understanding FLFP patterns. Tsani et al. (2013) used general equilibrium modeling to simulate the effects of removing region-specific barriers to FLFP in the South Mediterranean, demonstrating substantial potential gains in economic growth.

2.3 Female Labor Force Participation in Palestine

Various social and economic factors significantly influence FLFP in Palestine. The following sections explore these influences in greater detail, integrating insights from multiple studies to present a comprehensive picture of the dynamics at play.

Social and Economic Influences

Bargawi, Alami, and Ziada (2022) discuss the crisis of social reproduction, where economic and political challenges have driven women, particularly married women, to engage in both formal and

informal labor markets. This involvement necessitates renegotiating domestic and caregiving responsibilities without adequate state or private sector support for care services. Jabali (2018) underscores the persistent barriers to FLFP, including social norms, legal constraints, and political instability. Despite policy efforts to increase women's labor participation, these deep-seated challenges hinder progress. The study calls for raising societal awareness and creating more job opportunities for women.

Education, Labor Demand, and Wage Inequality

Educational attainment among Palestinian women has improved significantly, yet their labor market participation has not kept pace, especially for young, educated women. Fallah et al. (2021) find that labor demand specifically for educated women, rather than overall labor demand, is crucial for their labor force participation. This highlights the need for targeted efforts to boost demand for educated women's labor. Daoud and Shanti (2016) and Tansel and Daoud (2016) provide a comparative analysis of wage differentials and returns to education between genders in Palestine. They find that while returns to education are relatively low, they are higher for women in the public sector compared to the private sector, explaining the tendency of educated women to seek public sector employment. Ayyash and Sek (2019) examine the gender wage gap across occupational groups in Palestine, revealing significant wage differentials attributable to gender. Their study emphasizes the necessity of policies to address occupational discrimination and wage inequality to improve women's economic participation.

Regional Variations and Conflict Dynamics

Hallaq and Daas (2024) investigate regional differences in FLFP across East Jerusalem, the West Bank, and the Gaza Strip. They note an increase in FLFP in Gaza since 2008, contrasted with a decline in East Jerusalem, driven by differing social norms and economic conditions. Petesch (2017) highlights the impact of conflict on gender roles, showing how women often gain economic agency while men may feel disempowered. However, these changes do not always result in lasting shifts in gender norms, as observed in the Gaza Strip.

2.4 Gaps in the Literature

Despite extensive research on FLFP and economic growth, several critical gaps remain. Addressing these gaps is essential to understanding the dynamics between FLFP and economic development, particularly in unique contexts like Palestine.

Current studies often rely on cross-sectional data, limiting the ability to analyze dynamic changes over time. There is a pressing need for longitudinal studies and panel data to provide deeper insights into how FLFP evolves in response to economic, social, and policy changes (Fallah et al., 2021). Additionally, macro-level data would help understand individual and household factors influencing women's labor market decisions (Salleh & Mansor, 2022; Daoud & Shanti, 2016).

While considerable research exists on FLFP in various regions, specific contexts, such as conflict-affected areas like Palestine, remain underexplored (Bargawi et al., 2022). Detailed studies focusing on Palestinian territories' unique socio-political and economic challenges can provide more tailored insights and policy recommendations (Hallaq & Daas, 2024).

There is a notable gap in the literature regarding direct empirical evidence on the impact of FLFP on economic development, specifically in Palestine. While several studies explore related factors and contextual influences, there is a need for comprehensive research that directly measures how FLFP contributes to economic growth in the Palestinian context (Bargawi, Alami, & Ziada, 2022; Fallah et al., 2021).

2.5 Contribution of the Study

This study aims to address several of the aforementioned gaps in the literature by focusing on the specific context of Palestine. The contributions of this study are outlined as follows:

1. *Context-Specific Insights and Longitudinal Analysis*
   By focusing on Palestine, this study provides detailed insights into the unique socio-economic and political conditions that influence FLFP in the region. This localized focus allows for tailored policy recommendations directly relevant to the Palestinian context. Additionally, by employing data from the past two decades, the

study captures long-term trends and recent developments in FLFP and economic growth. It enables a comprehensive analysis of how these trends have evolved and their impact on economic performance over time.

2. *Direct Examination of Female Labor Force Participation's Impact on Economic Development*
   A significant contribution of this study is its direct examination of how FLFP impacts economic growth in Palestine. By filling this gap, the research provides empirical evidence on the specific contributions of FLFP to the region's economic development, which was previously underexplored.
3. *Advanced Econometric Modeling*
   The study examines both short-run and long-term effects of FLFP on economic growth using advanced econometric models such as the Autoregressive Distributed Lag (ARDL) model and the Unrestricted Error Correction Model (UECM). These models are well-suited to capturing the dynamics and equilibrium relationships between FLFP and economic growth, providing robust and reliable results (Pesaran et al., 2001).
4. *Policy Recommendations*
   Based on empirical findings, the study aims to offer evidence-based policy recommendations to enhance FLFP and leverage its potential for boosting economic growth in Palestine. These recommendations will inform policymakers about effective strategies to promote Islamic equality (*musawah*) and economic development, translating research findings into practical interventions.

By addressing these gaps and providing comprehensive, context-specific insights, this study aims to significantly contribute to the existing body of literature on FLFP and economic growth, particularly within Palestine's unique context. This research enhances academic understanding and aims to influence policy development to foster economic growth through increased participation by the female labor force. The next section will detail the research methodology employed to achieve the study's objectives.

3.0 Methodology

This section outlines the methodology employed to examine the impact of female labor force participation (FLFP) on economic growth in Palestine. The section begins with the research design, followed by detailed descriptions of the data sources, econometric models, estimation methods, and variable measurements. Additionally, the section discusses model validation procedures, and the software tools used for the analysis. The methodology is designed to achieve the study's objectives, assessing both short-run and long-run effects of FLFP on GDP growth.

3.1 Data Description

The primary dataset used in this study is sourced from the World Bank, encompassing data on the West Bank and Gaza Strip. This dataset includes annual data on the FLFP rate and the natural logarithm of GDP (LNGDP) from 2000 to 2022. The key variables in this study are:

- Female labor force participation (FLFP) rate, representing the percentage of women aged 15 and above who are actively participating in the labor market.
- LNGDP: Natural logarithm of gross domestic product at constant prices, used to stabilize variance and normalize the data distribution (Gujarati & Porter, 2009).

The analysis covers the period from 2000 to 2022, focusing on the West Bank and Gaza Strip. This period captures significant socio-economic changes and policy shifts that have influenced FLFP and economic performance in Palestine.

The primary limitation of the dataset is its reliance on national estimates from the World Bank, which may not capture all factors influencing FLFP and GDP in Palestine. Due to the limited availability of data, the model excludes control variables to avoid the risk of overfitting, where the model becomes overly tailored to the available data and may not generalize well to other periods or contexts (James et al., 2013).

3.2 Estimation Methods

This study employs the Autoregressive Distributed Lag (ARDL) model to analyze the relationship between FLFP and GDP. The ARDL

model is particularly suitable for small sample sizes and can distinguish between short-term and long-term effects (Pesaran et al., 2001). The general form of the ARDL (p, q) model used in this study is specified as follows:

$$LNGDP_t = \alpha + \sum_{i=1}^{p} \beta_i LNGDP_{t-i} + \sum_{j=0}^{q} \gamma_j FLFP_{t-j} + \varepsilon_t$$

Where $LNGDP_t$, the dependent variable, is the natural logarithm of constant GDP, $FLFP_t$, the independent variable, is the national estimate of the female labor force participation rate of the female population ages above 15 years old, α is the constant term, β_i and γ_j are coefficients, p and q are the lag orders, and ε_t is the error term.

The decision to use a bivariate ARDL model in this study is supported by the original formulation of the ARDL bounds testing approach by Pesaran and Shin (1997), where the method was successfully applied to both simple bivariate relationships and more complex models with control variables. While the model performed well in both contexts, there is no evidence suggesting that the inclusion of additional control variables necessarily improves performance in all cases. Given the specific focus of this study and the limited availability of data, a bivariate approach is justified as it allows for a clear and direct analysis of the relationship between the two key variables, while avoiding potential issues of overfitting with a small sample size.

The causal relationship between FLFP and GDP is identified using the bounds-testing approach for cointegration within the ARDL framework (Pesaran et al., 2001). This method tests for a long-run equilibrium relationship between the variables. The Unrestricted Error Correction Model (UECM) captures short-run dynamics and long-run equilibrium relationships, specified as follows:

$$\Delta LNGDP_t = \alpha + \sum_{i=1}^{p-1} \beta_i \Delta LNGDP_{t-i} + \sum_{j=0}^{q-1} \gamma_j FLFP_{t-j} + \lambda(LNGDP_{t-i} - \theta_0 - \theta_1 FLFP_{t-1}) + \epsilon_t$$

Where Δ denotes the first difference, λ is the speed of adjustment parameter, and $(LNGDP_{t-i} - \theta_0 - \theta_1 FLFP_{t-1})$ represents the error correction term. The ARDL model is estimated using the 'auto_ardl' function in the R package 'ARDL' (Natsiopoulos & Tzeremes, 2023), which selects the optimal lag length based on the Akaike Information Criterion (AIC).

3.3 Model Validation

To ensure the robustness of the ARDL model, various diagnostic tests are conducted:

- Serial Correlation: The Breusch-Godfrey test is conducted to detect serial correlation in the residuals, which can lead to inefficient estimates and biased standard errors (Wooldridge, 2013).
- Heteroskedasticity: The Breusch-Pagan test is used to detect heteroskedasticity, where the variance of the residuals is not constant. Heteroskedasticity can affect the efficiency of estimators and the validity of statistical tests (Greene, 2012).
- Normality of Residuals: The Jarque-Bera test is applied to check the normality of residuals. Normally distributed residuals are a key assumption for valid inference in regression analysis (Jarque & Bera, 1987).

The next section will present the empirical findings and discuss their implications for policy and practice.

4.0 Results

This section presents the results of the analysis examining the impact of female labor force participation (FLFP) on economic growth in Palestine, measured by the natural logarithm of gross demonic product. The analysis includes descriptive statistics, stationarity tests, the Autoregressive Distributed Lag (ARDL) model estimation, and the Unrestricted Error Correction Model (UECM). Diagnostic tests are also conducted to validate the model's robustness. The findings align with the study's objectives to assess both the short-run and long-run effects of FLFP on economic growth and to evaluate the speed of adjustment to changes in FLFP.

4.1 Descriptive Analysis

This section provides an overview of the key variables used in the study, namely the FLFP rate and the natural logarithm of GDP (LNGDP). Descriptive statistics offer insights into the central tendency, dispersion, and distribution of these variables.

Table 1: Descriptive Statistics of Key Variables

Variable	Mean	SD	Median	Min	Max	Range	Skew	Kurtosis	SE
FLFP	14.9	2.48	15.4	9.94	18.6	8.64	-0.44	-0.88	0.52
LNGDP	23.1	0.33	23.2	22.45	23.5	1.03	-0.5	-1.21	0.07

Source: Author's calculation based on the dataset.

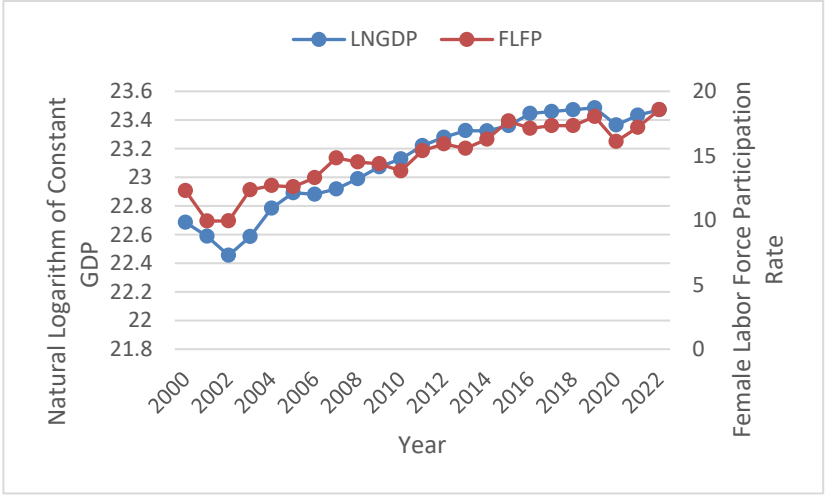
The descriptive statistics in Table 1 show that FLFP has a mean value of approximately 14.93 with a standard deviation of 2.48, indicating moderate variability. The median FLFP rate is 15.39, slightly higher than the mean, suggesting slight left skewness (-0.44). The FLFP distribution is somewhat flat (kurtosis = -0.88). The minimum and maximum values of FLFP are 9.94 and 18.58, respectively.

For LNGDP, the mean value is 23.11, with a standard deviation of 0.33, indicating low variability. The median LNGDP is 23.22, very close to the mean, indicating symmetry in the distribution. The slight left skewness (-0.5) and the flat distribution (kurtosis = -1.21) further characterize the LNGDP data. The range of LNGDP values is 1.03, showing a narrow spread over the period.

Figure 1 illustrates the trend of two key variables over time: the natural logarithm of constant GDP (LNGDP) and the FLFP rate from 2000 to 2022. The trends in LNGDP and FLFP indicate a positive relationship between economic growth and FLFP over time. The periods of economic growth (as indicated by rising LNGDP) generally coincide with increases in FLFP, suggesting that as the economy grows, more women are participating in the labor force. This could be due to improved economic conditions providing more opportunities and the implementation of policies aimed at encouraging female employment. The LNGDP, represented by the blue line, shows a general upward trend over the period, indicating consistent economic growth in Palestine. The GDP growth trajectory experienced some fluctuations, particularly noticeable around the early 2000s and during

the late 2010s. These fluctuations could be attributed to various economic, political, and social factors impacting the region.

Figure 1: Trend of Key Variables Over Time



Source: Own illustration based on experimental data.

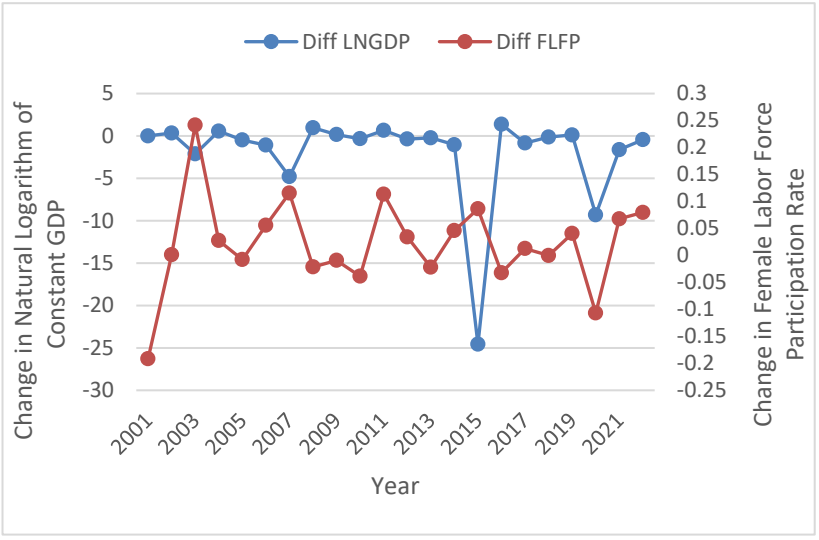
The decline in LNGDP around 2001-2002 can be linked to the second intifada, significant political instability, and economic challenges during this period. Post-2003, there is a steady rise in LNGDP, reflecting recovery and growth phases, with some minor dips, indicating periods of economic stress or policy changes. Another noticeable dip occurred around 2019-2020, which could be related to global economic impacts, such as the COVID-19 pandemic and its effects on the local economy.

The FLFP, represented by the orange line, also shows an overall increasing trend, although it has more pronounced fluctuations compared to LNGDP. The FLFP rate starts relatively low but begins to rise from 2003 onwards. The initial low participation rates could be due to traditional socio-economic barriers and limited opportunities for women in the labor market. There is a notable increase in FLFP from 2005 onwards, with a steady rise up to around 2013, indicating improvements in female labor participation, possibly due to targeted policies, educational advancements, and socio-cultural shifts. A

significant dip in FLFP is observed around 2019, which aligns with economic challenges faced during the same period affecting overall labor market participation.

Figure 2 illustrates the changes in the natural logarithm of constant GDP and the changes in the FLFP rate from 2001 to 2022. This differenced data helps identify the annual growth rates and volatility in both variables. The differenced data for LNGDP and FLFP highlight the annual growth rates and reveal the volatility in economic growth and FLFP. The simultaneous positive and negative spikes in both variables suggest that economic contractions and expansions directly affect FLFP rates.

Figure 2: Differenced of Key Variables Over Time



Source: Own illustration based on experimental data.

The changes in LNGDP, represented by the blue line, exhibit fluctuations around the zero line, indicating periods of both economic growth and contraction. A noticeable dip in 2001 suggests a significant contraction in GDP, which is followed by a recovery in 2002. This period aligns with economic disruptions that could have been influenced by political instability and external factors. During this period, the changes in LNGDP generally hover around zero, indicating

relative stability with occasional positive and negative spikes. The positive changes reflect years of economic growth, while the negative spikes indicate years of economic challenges. A significant negative spike in 2016 suggests a major economic contraction, followed by a recovery in the subsequent years. Another dip around 2019-2020 can be associated with the global economic impacts of the COVID-19 pandemic. The changes in LNGDP show positive growth, indicating economic recovery post-pandemic.

The changes in FLFP, represented by the orange line, also show considerable fluctuations, reflecting variations in female labor market participation over the years. A significant positive change in 2002 indicates a sharp increase in FLFP, followed by a dip in the subsequent years. This volatility could be due to changes in socio-economic conditions or policy implementations during this period. This period shows a general decline in the rate of change, indicating slower growth or reduction in FLFP. The reasons could range from socio-cultural barriers to economic constraints affecting women's employment opportunities. The changes are relatively more stable, with minor fluctuations around the zero line. However, there are still noticeable negative changes, particularly in 2016 and 2019, aligning with economic contractions in the same periods. The positive changes in the recent years indicate a recovery and an increase in FLFP, possibly driven by economic recovery and supportive policies.

4.2 Stationarity Tests

To ascertain the suitability of the data for ARDL modeling, Augmented Dickey-Fuller (ADF) tests were conducted to assess stationarity of the data series for both the natural logarithm of GDP (LNGDP) and the FLFP.

Table 2: Unit Root Test

	Level		**First Difference**	
	ADF Statistic	**p-value**	**ADF Statistic**	**p-value**
LNGDP	-0.41943	0.9785	−5.2742	0.01
FLFP	−1.68930	0.6907	-4.5173	0.01

Source: Author’s calculation based on the dataset.

Table 2 shows that both LNGDP and FLFP are non-stationary at levels but become stationary upon first differencing, indicated by significant p-values at the 1% level. This confirms the appropriateness of using differenced series in subsequent analyses.

4.3 ARDL Model Estimation

The optimal lag length for the ARDL model was determined using the 'auto_ardl' function. This function selects the best lag length based on the Akaike Information Criterion (AIC), a widely used measure for model selection that balances model fit and complexity. The function evaluated multiple combinations of lag orders for LNGDP and FLFP, ultimately identifying the model with the lowest AIC value as the optimal choice.

The best lag order identified was two for LNGDP and zero for FLFP. This suggests that the current value of LNGDP is influenced by its own values, which are lagged by one and two periods, while the current value of FLFP directly impacts LNGDP without any lagged effects. The top lag order selections based on AIC values are presented in Table 2.

Table 3: Lag Order Selection

Lag Order (LNGDP)	**Lag Order (FLFP)**	**AIC**	**Lag Order LNGDP**	**Lag Order FLFP**	**BIC**
2	0	−62.32354	2	0	-57.10092
3	3	−61.18922	1	0	-56.56672
1	0	−60.93089	1	1	-54.90423
2	1	−60.70437	2	1	-54.43723
1	1	−60.35944	3	3	-52.22763
3	2	−60.15920	3	2	-52.19334
2	2	−59.45302	2	2	-52.14136
4	4	−56.90602	4	4	-46.51719

Source: Author's calculation based on the dataset.

By selecting the optimal lag length, we ensure that the ARDL model captures the dynamics of LNGDP and FLFP effectively, accounting for both short-term fluctuations and long-term trends.

The ARDL model was estimated using the optimal lag order identified in the previous step, which was 2 for LNGDP and 0 for FLFP. The model estimation results are summarized in Table 4. The intercept term is estimated at 9.15723, which is highly significant with a p-value of 8.21e-05. The coefficient for LNGDP lagged by one period (L(LNGDP, 1)) is 0.92687, indicating a strong positive relationship with the current value of LNGDP, and this coefficient is also highly significant (p-value = 1.01e-05). In contrast, the coefficient for LNGDP lagged by two periods (L(LNGDP, 2)) is -0.35866, suggesting a negative relationship with the current value of LNGDP, significant at the 5% level (p-value = 0.017212). The coefficient for FLFP is 0.05585, indicating a positive impact on LNGDP, and is highly significant (p-value = 0.000265). The high significance of these coefficients underscores that both the lagged values of LNGDP and the current value of FLFP significantly impact LNGDP.

Table 4: ARDL Model Estimation Results

	Estimate	**Std. Error**	**t value**	**Pr(>|t|)**	
(Intercept)	9.15723	1.78215	5.138	8.21E-05	***
LNGDP (lag 1)	0.92687	0.15005	6.177	1.01E-05	***
LNGDP (lag 2)	-0.35866	0.13588	-2.639	0.017212	*
FLFP	0.05585	0.01219	4.582	0.000265	***

Source: Author's calculation based on the dataset.

The results of the ARDL model provide evidence of a significant relationship between FLFP and economic growth in Palestine. The positive and significant coefficient for FLFP suggests that an increase in FLFP positively impacts GDP in the short run.

A Bounds F-test was conducted to examine the presence of cointegration between the variables. The bounds test results indicate a significant potential for cointegration between LNGDP and FLFP. The F-statistic for the bounds F-test (Wald) is 13.112, with a p-value of 0.0005114, suggesting strong evidence against the null hypothesis of no cointegration. This implies a long-term equilibrium relationship between LNGDP and FLFP. The significant p-value confirms that the

variables move together in the long run, indicating a stable and persistent relationship between FLFP and economic growth in Palestine. This finding supports the hypothesis that changes in FLFP have lasting effects on LNGDP, emphasizing the importance of female labor participation in influencing economic performance.

4.4 UECM Estimation

4.4.1 Short-Run Dynamics

Given the indication of a long-run relationship from the Bounds F-test, a UECM was estimated to capture both the short-run dynamics and the long-run equilibrium relationship (Pesaran, Shin, & Smith, 2001). The UECM results provide valuable insights into the short-run dynamics and long-run equilibrium relationship between the natural logarithm of GDP (LNGDP) and FLFP in Palestine (see Table 5).

Table 5: UECM Estimation Results

	Estimate	**Std. Error**	**t value**	**Pr(>|t|)**	
(Intercept)	9.15723	1.78215	5.138	8.21E-05	***
Error correction term	-0.43179	0.08447	-5.112	8.68E-05	***
FLFP	0.05585	0.01219	4.582	0.000265	***
ΔLNGDP (lag 1)	0.35866	0.13588	2.639	0.017212	*

Source: Author's calculation based on the dataset.

The intercept term is estimated at 9.15723, with a highly significant p-value of 8.21e-05. This coefficient represents the baseline level of LNGDP when other variables are held constant. The coefficient for the error correction term is -0.43179, which is negative and highly significant (p-value = 8.68e-05). This negative coefficient reflects the speed of adjustment towards the long-run equilibrium, indicating that approximately 43.18% of the deviation from the long-run equilibrium is corrected each period. The coefficient for FLFP is 0.05585, which is positive and highly significant (p-value = 0.000265). This suggests that increases in FLFP significantly impact LNGDP, reinforcing the importance of FLFP in driving economic growth. The

coefficient for the differenced first lag of LNGDP is 0.35866, which is significant at the 5% level (p-value = 0.017212). This coefficient captures the short-term adjustments in LNGDP due to its past values, indicating a positive short-term impact.

The UECM results highlight the significance of both short-term dynamics and long-term equilibrium in the relationship between LNGDP and FLFP. The negative coefficient for the lagged LNGDP term (-0.43179) confirms a substantial speed of adjustment towards the long-run equilibrium. The significant positive coefficient for FLFP (0.05585) underscores the vital role of FLFP in promoting economic growth in Palestine. Additionally, the significant short-term dynamics captured by the differenced lag of LNGDP (0.35866) indicate that past values of GDP have a notable influence on current GDP levels.

Overall, the UECM results align with the study's objectives by providing robust evidence of both short-run and long-run impacts of FLFP on economic growth and the speed at which the economy adjusts to changes in FLFP. These findings support policies to enhance FLFP to drive sustainable economic growth in Palestine.

4.4.2 Long-Run Equilibrium

The calculation of long-run multipliers for both the ARDL and UECM models shows that the results are identical, confirming the consistency between the two modeling approaches (see Table 6). The long-run multiplier for the intercept is 21.2075685, with an extremely low standard error of 0.17337353 and a highly significant t-value of 122.32299 (p-value = 1.768234e-26). This value represents the baseline level of LNGDP when FLFP is held constant in the long run. The long-run multiplier for FLFP is 0.1293442, with a standard error of 0.01111475 and a highly significant t-value of 11.63717 (p-value = 1.607143e-09). This coefficient indicates that a one-unit increase in FLFP leads to a 0.1293442 unit increase in LNGDP in the long run.

Table 6: Long-Run Multipliers

Variable	**Multiplier**	**Standard Error**	**t-value**	**p-value**
Intercept	21.208	0.173	122.322	<0.001***
FLFP	0.129	0.011	11.637	<0.001***

Source: Author's calculation based on the dataset.

The long-run relationship results highlight the significant and positive impact of FLFP (FLFP) on the natural logarithm of GDP (LNGDP) in Palestine. The estimated long-run multiplier for FLFP (0.1293442) implies that increasing the participation of women in the labor force has a substantial and sustained positive effect on economic growth. This finding underscores the importance of promoting Islamic equality (*musawah*) in the labor market as a means to achieve higher economic growth.

These results align with the study's objectives by providing robust evidence of the long-term equilibrium relationship between FLFP and economic growth. The consistency between the ARDL and UECM models further reinforces the reliability of these findings. This evidence supports the need for policies aimed at enhancing FLFP, which can lead to significant long-term economic benefits for Palestine.

4.5 Model Validation

Several diagnostic tests were conducted to validate the robustness of the UECM (see Table 7). The p-value of the Breusch-Godfrey test is 0.6913, which is much higher than the common significance levels (0.01, 0.05, or 0.10), indicating that there is no evidence to reject the null hypothesis of no serial correlation. This suggests that the residuals of the UECM model do not exhibit serial correlation, implying that the model is well-specified in capturing the temporal dependencies in the data.

The p-value of the Breusch-Pagan test for heteroskedasticity is 0.4256, which is higher than the common significance levels. This indicates that there is no evidence to reject the null hypothesis of homoskedasticity. The variance of the residuals is constant and does not depend on the level of the independent variables, suggesting that heteroskedasticity is not a concern in this model.

Lastly, the p-value of the Jarque-Bera Test for normality is 0.5851, which is much higher than the common significance levels. This indicates that there is no evidence to reject the null hypothesis that the residuals are normally distributed. This suggests that the residuals of the UECM model follow a normal distribution, which is a desirable property for the validity of inferential statistics.

Table 7: Diagnostic Test Results

Test	Statistic	p-value	Conclusion
Breusch-Godfrey (Serial Correlation)	0.15773	0.6913	No serial correlation
Breusch-Pagan (Heteroskedasticity)	2.7875	0.4256	No heteroskedasticity
Jarque-Bera (Normality)	1.0721	0.5851	Residuals are normally distributed

Source: Author's calculation based on the dataset.

The diagnostic tests prove that the UECM model satisfies key assumptions necessary for reliable statistical inference. There is no indication of serial correlation, heteroskedasticity, or non-normality of residuals, suggesting that the model is well-specified, and the estimated coefficients are reliable. These diagnostic results bolster confidence in the validity of the model's findings regarding the relationship between FLFP and economic growth in Palestine, both in the short and long run.

5.0 Conclusion

This study aimed to examine the impact of female labor force participation (FLFP) on economic growth in Palestine, measured by the natural logarithm of gross domestic product (GDP). The primary objectives were to assess the short-run effects of FLFP on economic growth, identify a long-term equilibrium relationship, examine the long-run effects, and evaluate the speed of adjustment to changes in FLFP. The autoregressive distributed lag (ARDL) model estimation indicated significant coefficients for both the lagged GDP values and the current FLFP, underscoring their substantial impact on GDP. The bounds test results showed a long-term equilibrium relationship between GDP and FLFP. The unrestricted error correction model (UECM) estimation further highlighted the short-run dynamics and long-term equilibrium. The error correction term indicated a significant speed of adjustment towards the long-run equilibrium, reinforcing the importance of FLFP in influencing economic growth. Diagnostic tests validated the robustness of the UECM, confirming the absence of serial correlation, heteroskedasticity, and non-normality of residuals. The findings of this study have significant

implications for policymaking in Palestine. The positive relationship between FLFP and economic growth suggests that policies aimed at increasing FLFP can substantially impact the economy. This includes initiatives to reduce barriers to female employment and promote Islamic equality (*musawah*) and nondiscrimination in the labor market. Such policies could include improving access to vocational training, implementing supportive legal frameworks, and addressing substantive and transformative equality to empower women's economic activities.

While this study provides valuable insights into the relationship between FLFP and economic growth in Palestine, it has some limitations. The dataset relies on national estimates from the World Bank, which may not capture all factors influencing FLFP and GDP in Palestine. Additionally, this study acknowledges a limitation due to the absence of control variables in the ARDL model, which could otherwise enhance the accuracy and reliability of the estimated relationships. Future research could benefit from using more comprehensive datasets that include additional variables and cover longer periods. Incorporating qualitative data could also provide deeper insights into the socio-cultural and institutional factors affecting FLFP. Including more granular data, such as sector-specific FLFP rates and regional economic performance, could enhance the robustness of the analysis.Additionally, future research should explore the impact of specific policies and interventions on FLFP and economic growth. Comparative studies between Palestine and other regions with similar socio-economic conditions could provide a broader understanding of the factors influencing FLFP and economic performance. Research on the impact of technological advancements and digital inclusion on FLFP could also offer valuable insights, particularly in a rapidly changing global economy.

In conclusion, increasing FLFP is not just a matter of *musawah* but an economic imperative for Palestine. The empirical evidence from this study aligns with global findings, underscoring that economies that better integrate women into the workforce tend to experience higher growth rates and improved economic stability (Economic and Social Commission for Western Asia (ESCWA), 2023). By addressing the barriers to female employment and fostering an inclusive labor market, Palestine can harness the full potential of its human capital and achieve long-term economic prosperity.

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