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Female Labour Force Participation and Economic Growth in the South Mediterranean Countries: Structural Shifts in Causal Linkages

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Abstract
In most of the South Mediterranean countries, female labour force participation rates are far behind in developing or developed countries. Since 2011, the most important demands of civilian uprisings against authoritarian regimes in the region have been towards creating social and economic reforms and employment opportunities. In this paper, we studied the causal relationship between female labour force participation and economic growth in 10 South Mediterranean countries within 1990-2018. We employ Toda-Yamamoto and Fourier Granger causality tests to the model to account for gradual/smooth structural shifts. The findings indicate that accounting for gradual structural shifts matter for the causality between female labour force participation and GDP per capita. The causality analysis without structural changes supports a causality between two variables only in four countries out of 10 while with structural changes seven countries out of 10 Mediterranean countries. This finding is consistent with the fact that Mediterranean countries have experienced structural changes in either female labour force participation or economic growth or both. It contains hope that social and economic development will be promoted, with the removal of regional-specific barriers such as cultural factors and family norms.

1. Introduction

It is an acknowledged fact that the increases observed in female labor force participation (hereafter FLPR) play an important role in eliminating both the growth in per capita income and the deep gap in inequality (Heathcote et. al., 2017). The goal of equality and effectiveness is important for the full integration of women into the economy (Su et al., 2019). The high labor force participation rate is also a measure of women's status in society. However, this situation may change depending on the development level of the country. While discussions of "equal pay for equal work" continue in developed countries, wage labor income other than the households that women earn in developing countries is generally not an important source of family income. In poor countries, women mostly work in family businesses and can't have a say in their earnings. Also, whether women have access to credit and other production factors, inheritance, land ownership or access to other assets are the most important obstacles to development potential (Mammen and Paxson, 2000).

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Except for Israel, the Southern Mediterranean countries lagged far behind in other developed and developing countries. Women's participation in the workforce in the region includes significant differences between economies, regardless of the GDP per capita. This is of course not only associated with economic growth, but is also determined by various legal, cultural, social or other immeasurable factors. It is a widely known phenomenon that social norms restrict women's participation in the global workforce (Alesina et al., 2013; Bertrand et al., 2015; Fernandez, 2013; The World Bank, 2014). The role of women in childcare and housework, their visibility in public and mixed gender settings, their separation into specific jobs and sectors, and the decision-making power of women relative to men are thought to have an impact on women's participation in the workforce.

In this paper, we studied the causal relationship between FLPR and economic growth in the 10 countries of the South Mediterranean countries during the period 1990-2018. We employ the Toda-Yamamoto (hereafter TY) causality approach and Fourier Granger causality tests to the model to account structural shifts, including gradual/smooth shifts. In previous studies, generally OLS, GMM, VAR analyzes draw attention. In this study, it will contribute to filling the gap in the literature in this area by using causality analysis that takes into account the structural breaks.

The rest of the paper is organized as follows. Literature is reviewed in Section 2. Data and methodology are presented and empirical analysis is covered in Section 3. Section 4 concludes.

2. Literature Review

Studies conducted on the relationship between women's labor force participation rate and economic growth reveal that this relationship has a U-shaped relationship in the post-World War period. Women's participation in the labor market is often associated with better access to economic opportunities and the ability to make decisions within the household. The World Bank (The World Bank, 2013) determined that when more women joined the workforce globally- for example, the gender gap in participation in the workforce decreased by 6 percentage points between 1980 and 2009. However, in 2018, this gap was again 27 percent (ILO, 2019). Thus, the findings obtained from the studies reveal that it may lead to the “Kuznets fallacy”. It is possible that the estimations made in this respect will be biased due to the country- specific potential effects. There is a considerable amount of literature that tried to find relationship between women labour force participation and economic growth through U- shaped feminization hypothesis.

Dixon (1982: 561) stated that in the Middle East variation in international statistics is the main problem. There are some differences in calculating FLPR in agricultural sectors. In some cases, non- wages women from family and seasonal workers are not included in labor force. When these are corrected the women participation increases over time. Mostly the women work in agricultural sector and the fertility rate becomes high despite low education level. Youssef (1971: 434) emphasized that social institution arrangements and cultural effects has deep impact on FLPR. Men honor and social stigma and blocking of women involvement in most of the sectors because of contact to male workers prevent women from participating in business life. Latin America and Middle East countries (because of similar level of economic development) and as a second classification industrialized and under- developed countries are compared. Low level of women participation in non- agricultural sectors is mainly due to their will to participate in public life and due to the restrictions of male kind. Chile and Mexico in

Latin America; Egypt, Morocco and Pakistan are selected for deeper analysis. In Middle Eastern women have low participation in occupations related to clerical, administrative and managerial positions because the contact with opposite sex is not acceptable by the society. Most of this kind of jobs are filled with non- Muslim women (Youssef, 1971: 438). According to Goldin's research (1995) the FLPR is generally U- shaped during economic development. The downward part of U- hypothesis is due to strong income effect, low level of education and high level of fertility and a weak substitution effect, and a change in the place of production from home to the plant or agriculture to industry (Goldin, 1995). Their education level and their chance to work in more preferential jobs both increase the power of substitution effect and decrease the strength of income effect (Goldin, 1995: 88). While the substitution effect prevails the income effect, the upward part of the U shaped is taking place; and women's labor force participation increases again.

Mammen and Paxson (2000: 146) studied for 90 countries between 1970 to 1985 years to prove the interrelation between economic growth and FLPR. GDP per capita is used for growth. U-shaped hypothesis is evidenced with a non- parametric regression on log GDP and also parametric regression model is used as well in the fixed effect model. However, since the model is a static one it can contain some difficulties in it. Assaad examined the labor participation of women in Morocco (in 1991 and in 1999) and in Egypt (in 1988 and in 1998). Government sector feminization occurred in 1990 in Egypt due to high recruitment of women. In Morocco in consequence of recruitment of female in non- governmental sector feminization starts to occur in these sectors as well. Morocco depends on manufactured goods and tourism sector on exports while Egypt depends on oil and remittances as main sectors on exports (Assaad, 2004: 15). That's why the feminization is observed in textiles and garments and service sector in Morocco while defeminization occured in Egypt. In order to examine the relationship between FLPR and economic growth, Lincove (2008: 52) discussed 141 developed and developing countries in the period covering 1970-2000. The analysis results for 141 countries demonstrated supports about the existence of the U- shaped feminization hypothesis between the ages of 18-59 women. Fatima and Sultana (2009: 187) examined the relationship between FLPR and economic growth in Pakistan between period 1992-1993, 1996-1997 and 2001-2002. At the end it was hold up that economic growth and labor participation of women increase parallel to each other and there is an existence of a U-shaped hypothesis between the two variables.

Luci (2009: 7), investigated the validity of the U- shaped feminization hypothesis in 184 countries between 1965-2004, by using the generalized moments method (GMM) and OLS. The result of the analysis empirically proves the existence of the U- shaped feminization hypothesis. Gaddis and Klasen (2013: 648) have taken 143 OECD and non-OECD countries with sectoral data within 1980-2005 years. The dynamic difference GMM is used to estimate the model. The authors claimed that there is not any evidence of U- shaped relationship between GDP capita and female labour force participation. Besides this; structural change is correlated with FLPR (Gaddis and Klasen, 2013: 662). On the other hand, the developing countries passed this U- shape hypothesis during their transition to economic developments. Quality control and greater harmonization of international employment statistics should be taken into consideration in order to improve them. Conclusion from the research is the most influencing factors that affect labour participation of women to labour market are cultural norms, sectoral changes,

labour market policies rather than economic development (Gaddis and Klasen, 2013: 676).

Moghadam (2013: 2) argued that the decrease in FLPR is the result of economic sectors dependence on oil revenues, conservative social norms, family laws, patriarchal family structure. Structural and institutional factors have also significant role on participation of women. After the Arab Spring new governments gave an opportunity to women for their participation to business life and educated women were required to participate in the policy. The importance should be given to division of labor by sex in the household in the researches and investigations. In housework some countries in Mena prefers foreign imported servant some prefers domestics servant (Moghadam, 2013: 17). In traditional families the women in the family are responsible for domestic tasks, childcare and elder care. Despite all these the education level increases and fertility rates decreases in the region. Sayre and Hendy (2013), checked the main effects of labor force participation of women in Tunisia, Jordan and Egypt within 1990-2010 and they obtained the most significant three are marital status, age and education. Women are mainly working in public sector. In Tunisia law gives some rights in divorce, in inheritance and in abolition of poligamy laws (Sayre and Hendy, 2013: 8). Women in Jordan work less than women in Egypt and women in Tunisia. In Jordan after marriage most of the women are not working while in Tunisia labour participation rate increases when the education increases.

Verme et al. (2014: 19) studied in Mena Region and stated that the reasons of lower participation of women in Mena region are marriage, household inactivity rates, secondary education, and gross domestic product per capita. The results are robust as per different models. Economic growth has created few jobs, these were not in female-friendly sectors so the demand for female is very weak. As a result of few jobs the men have the superiority to women in the eyes of households and employers. Chapman (2015: 19) investigates the relation between labour participation of women and economic growth with panel data set of 20 countries in the MENA region between 1990-2012 years. The result shows U- shaped

relationship between labour force participation of women and economic growth but the decline in the number of labour participation of women can be explained by the movements towards the bottom of the U- shaped curve. As the total income of the households increases the participation of female in business life decreases. During the next stages when the fertility declines and the education level increases the participation increases as well. Increasing access to childcare facilities and the availability of part-time jobs permit women to participate in business life. At this point substitution effect prevails income effect and raises wages and also GDP per capita. Although the gender gap decreased in the past it did not increase the women participation in labour market. To sum up the decline can't be explained economic aspects but can be explained by social aspects. Verme (2015: 18) focused on MENA countries (1990-2012) and found increase in GDP per capita and FLPR rate with statistics data and economically. In the social side it was proved that fertility rate increases female secondary education. Alaoui (2016) justified that within 1960-2013, in Morocco, Egypt, Tunisia and Algeria education is the most significant factor for growth and to clear off the gender gaps persist in education, health, work, law, culture and political participation. Women's education makes sense in labour market especially of tertiary education (Alaoui, 2016: 975). Considering this the strategy must be to educate

the women who will educate their sons and daughters. Increasing the education level of women increases the family income and improves their health as well. Beside this a good political and social system should be adopted. Despite the difference between Morocco, Algeria, Tunisia and Egypt, the government should also increase the job opportunities for women not only in public sector but also in private sector.

Khaliq et al. (2017: 228) made a research about the relationship between FLPR and economic growth in Pakistan and in 1990 with the time series data. He proved the relationship between FLPR and economic growth in Pakistan is U- shaped and long-term with Error Correction Model (ECM) and Johansen cointegration. The relationship is assessed in four Mena region countries by Assaad et al. (2018: 2) they observed the situation from the demand side of the effects of Algeria, Egypt, Jordan and Tunisia. The results pointed out that the decrease in public sector job opportunities did not result in new job opportunities in the private sector, and female unemployment and women's labor force participation were decreasing (Assaad et al., 2018: 3). Güçlü (2018: 209) investigated the validity of the feminization hypothesis between the years 2004-2014 of Turkey. The results of the panel data analysis for Turkey rejected the validity of the feminization hypothesis. On the contrary, the presence of an inverted U- shaped relationship has been determined. Karlılar and Kıral (2019) investigated the relationship between FLPR and economic growth based on feminization U- shaped hypothesis within the four different group of countries. As a result of the analysis, it was found that the U-shaped feminization hypothesis is valid for high- income countries and upper- middle- income countries. Analysis results for lower- middle- income countries and low-income countries reject the validity of the U- shaped feminization hypothesis and an inverted U- shaped relationship emerges (Karlılar and Kıral, 2019: 943).Tsani et al. (2013) established a general balance model in their study on eleven South Mediterranean countries. Their findings are that the U- shaped hypothesis is supported. Tam (2011) used the OLS and GMM model in his study with 130 countries, but could not obtain evidence supporting the U- shaped hypothesis. Author explains that the U-shaped sample emerged as an intertemporal relationship in relation to this result and that the "Kuznets fallacy" had no consequences. In the study of Lechman and Kaur (2015) with 162 countries regarding the GMM approach, the relationship between economic growth and women's labor force participation (U- shaped hypothesis) is not supported for low- income countries, but for high- income countries.

3. Methodology and Data

3.1. Granger Causality Test and Gradual Structural Shifts

Granger causality test is one of the tests used to statistically determine the direction of the causality of the relationship in case of a delayed relationship between the two variables. The test is based on linear estimates of time series (Dhamala et al., 2008). For the leading causality approach proposed by Granger (1969), the VAR (p) system is defined as in equation (1):

$$y_t = \gamma + \beta_1 y_{t-1} + \cdots + \beta_p y_{t-p} + \mu_t \quad (1)$$

where y_t consists of K endogenous variables that includes all variables in coefficient matrices and γ is a vector of intercept terms, β are coefficient matrices and μ_t are white noise residuals. There are no structural shifts in equation (1) and the constant term is assumed to be constant over time.

Granger has developed a test that tests whether the movements in one variable systematically occur before the actions of another variable (Hacker and Hatemi, 2006). However, its most important deficiency is that the variables are stationary. If the series are not stationary, since the Wald test statistics do not have a standard distribution, the VAR model should be estimated with different series (Gujarati, 1995). This situation may cause long-term information loss in variables. Also, the sensitivity of the test which is very sensitive to the number of lags may produce unreliable results. Within the vector error correction framework developed by Granger (1998), non-stationary series in dynamic Granger causality test should have the same degree of integration and cointegration relationship.

TY (1995) developed a test in which causality can be tested if the variables are integrated in different degrees and without the existence of a cointegration relationship. The TY test is based on an augmented vector autoregressive model. On the other hand, more emphasis has been placed on the importance of structural breaks in causality analysis in recent years.

Ventosa- Santaularia and Vera-Valdés (2008) show that there is no causality in the case of structural shifts in the process of creating a data in a study using the Monte Carlo simulation, even if there is no causal link of the two variables. Enders and Jones (2015) by using Monte Carlo simulations confirm that if structural breaks in the VAR model are neglected, it will lead to specification error. In a VAR model, it is difficult to control structural breaks and to determine the breaks. The most important reason for this is that potential structural breakage in one variable may cause shifts in other variables (Enders and Jones, 2015).

Nazlıoğlu et al. (2016) developed a test that takes into account both sudden and gradual structural breaks in Granger causality analysis. Accordingly, the model in which the constant term is assumed to be fixed over time is relaxed:

$$y_t = \gamma(t) + \beta_1 y_{t-1} + \cdots + \beta_{p+d} y_{t-(p+d)} + \mu_t \quad (2)$$

Here, the constant term γ (t) is time dependent and shows the structural shifts in the dependent variable. Gradual structural shifts, number, and fracture form on an unknown date are defined by the Fourier approach, as in equation (3):

$$\gamma(t) \cong \gamma_0 + \sum_{k=1}^{n} \rho_{1k} \, sin\left(\frac{2\pi kt}{T}\right) + \sum_{k=1}^{n} \rho_{2k} cos\left(\frac{2\pi kt}{T}\right) \quad (3)$$

where n is the number of frequencies, ρ_{1k} and ρ_{2k} shows the amplitude and displacement of the frequency. By substituting equation (3) in equation (2) is obtained equation (4):

$$y_t = \gamma_0 + \sum_{k=1}^{n} \rho_{1k} \, sin\left(\frac{2\pi k}{T}\right) + \sum_{k=1}^{n} \rho_{2k} \, cos\left(\frac{2\pi k}{T}\right) + \beta_1 y_{t-1} + \cdots + \beta_{p+d} y_{t-(p+d)} + \mu_t \quad (4)$$

On the other hand, a large n value is likely to be related to the stochastic parameter variation and may reduce the degree of freedom. This situation may lead to excessive adaptation problem. In the Single Fourier approach frequency mimic various structural breaks in deterministic components, regardless of number and form (Becker et al., 2006). Thus, a single frequency component can be used and γ (t) can be defined as the following equation (5):

$$\gamma(t) \cong \gamma_0 + \gamma_1 sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 cos\left(\frac{2\pi kt}{T}\right) \quad (5)$$

where k denotes the frequency for the approximation. By substituting equation (5) in equation (2), we obtain equation (6):

$$y_t = \gamma_0 + \gamma_1 sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 cos\left(\frac{2\pi kt}{T}\right) + \beta_1 y_{t-1} + \cdots + \beta_{p+d} y_{t-(p+d)} + \mu_t \quad (6)$$

In the TY framework, the null hypothesis of "Granger non- causality" is based upon zero restrictions on first parameters p $(H_0{:}\beta_1 = \cdots = \beta_p = 0)$ of the K^{th} element of y_t. Here, Wald test statistic has an asymptotic χ^2 distribution with p degrees of freedom and depends on the number of frequencies (Durusu- Çiftçi et al., 2020: 5). Therefore, the asymptotic distribution may not follow the χ^2 distribution. As a solution, Nazlıoğlu et. al. (2016) show that the bootstrap distribution of Wald statistics, which includes the terms Fourier, is Becker et al. (2006) proposed by applying the bootstrap approach.

According to Nazlıoğlu et al. (2019), the specification problem in the equation (6) requires the determination of the cumulative Fourier frequency (k) number and the lag length (p). Akaike or Schwarz information criterion is used to determine the optimal lag number. This approach is also used to determine the Fourier frequency number and lag length. Nazlıoğlu et al. (2016, 2019) determine the Fourier frequency number as k max and the lag number as p max. In this case, the optimal number of k and p are chosen, giving the value of the smallest information criterion. In addition, Nazlıoğlu et al. (2019) shows that the TY test is used when studying with a small sample, the single frequency Fourier TY approach is used when working with 50-100 observations, and if there are at least 250 observations, the cumulative frequency Fourier TY is more reliable.

3.2. Data

We examine a sample of 10 South Mediterranean countries for the period 1990-2018. GDP per capita series based on purchasing power parity (PPP) and was obtained from Indicators of the World Bank. The FLPR series were extracted from the International Labour Organization (ILO). The FLPR series are the percentage of female labor force participation as a percentage of the total workforce. The sample limitation to only 10 South Mediterranean countries based on constraints in data availability. We studied Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Tunusia and Turkey, respectively.

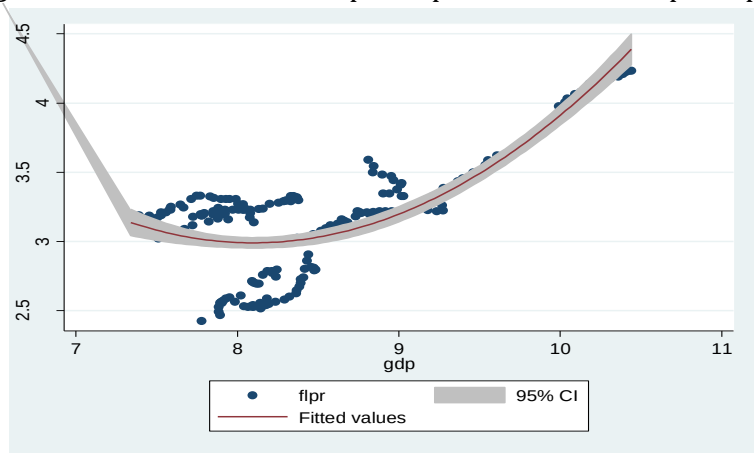
3.3. Empirical Results

Before presenting our empirical results, visual representation of the data is reported in Figure 1. This figure shows the scatter plots of the relation between FLPR and GDP per capita for the South Mediterranean countries. Figure 1 confirms that the 10 South Mediterranean countries follow a U pattern over the period 1990–2018. In countries with high per capita income, FLPR are also high. In countries where GDP per capita ranged from approximately 7.5–8.5, women's participation in the labour market was observed both at relatively high (over 3) and low (below 1) levels. The countries under the curve's turning point are Muslim countries such as Algeria, Jordan and Palestine.

The results of the analyses are reported in Table 1. TY test results show that there is causality only for Morocco, from GDP per capita to FLPR (see panel A of Table 1). The reverse causality is valid for Israel, Lebanon, Palestine and Turkey. Fourier standard Granger causality with single frequency test (Panel B) results support one-way causality from economic growth to FLPR for Morocco, while there is a two-way causality for

Jordan, Palestine and Turkey. For Algeria, Lebanon and Libya, there is a one-way causality relationship from FLPR to economic growth. The results from the bootstrap Fourier TY test with single frequency are reported in Panel C. The results only support one-way causality from economic growth to labor force participation for Egypt and Libya. The reverse causality was found to be valid only for Palestine.

Figure 1: Female labour force participation versus GDP per capita



10 South Mediterranean countries (1990–2018)

Fourier Standard Granger Causality with cumulative frequency test (Panel D) results present the bidirectional causality between FLPR and economic growth in Algeria and Lebanon. Specifically, the empirical results present the unidirectional causality running from economic growth to FLPR in Jordan, Tunusia and Turkey. From FLPR to economic growth, there is causality only for Egypt and Palestine.

The results from the bootstrap Fourier TY test with cumulative frequencies are reported in Panel E. Most of the countries' FLPRs do not have causality on the GDP per capita, except for Algeria, Lebanon and Morocco. On the other hand, the empirical results present unidirectional causality running from economic growth to FLPR in Jordan and Tunusia. Consequently, greater FLPR can boost economic growth by increasing the labour supply (Kinoshita and Gou, 2015).

Table 1: Results of Analyses

Panel A:Toda Yamamoto test	***lngdp ⇏ lnflpr***					***lnflpr ⇏ lngdp***				
	p	**k**	**F-stat**	**Asymptotic p-value**	**Bootstrap p-value**	**p**	**k**	**F-stat**	**Asymptotic p-value**	**Bootstrap p-value**
Algeria	2	0	0.949	0.622	0.604	2	0	0.553	0.759	0.778
Egypt	4	0	7.215	0.125	0.188	4	0	5.685	0.224	0.270
Israel	1	0	0.002	0.966	0.971	1	0	4.063*	0.044	0.056
Jordan	4	0	0.642	0.958	0.949	4	0	4.493	0.343	0.393
Lebanon	2	0	0.255	0.880	0.891	2	0	8.216**	0.016	0.037
Libya	4	0	2.055	0.726	0.719	4	0	0.660	0.956	0.939
Morocco	4	0	10.821*	0.029	0.082	4	0	5.498	0.240	0.279
Palestine	4	0	4.000	0.406	0.478	4	0	39.184***	0.000	0.006
Tunisia	2	0	3.920	0.141	0.172	2	0	1.602	0.449	0.445
Turkey	1	0	0.634	0.426	0.452	1	0	5.565**	0.018	0.032

Panel B: Fourier standart Granger causality with single frequency										
Algeria	1	1	0.034	0.854	0.850	1	1	9.019***	0.003	0.002
Egypt	4	1	9.223	0.056	0.111	4	1	5.291	0.259	0.315
Israel	1	2	1.154	0.283	0.288	1	2	0.501	0.479	0.521
Jordan	4	1	12.310*	0.015	0.059	4	1	17.293**	0.002	0.013
Lebanon	1	2	2.311	0.128	0.147	1	2	26.179***	0.000	0.000
Libya	4	2	3.322	0.505	0.542	4	2	25.800**	0.000	0.032
Morocco	4	1	11.746*	0.019	0.064	4	1	1.128	0.890	0.875
Palestine	4	2	16.354**	0.003	0.051	4	2	19.745**	0.001	0.024
Tunisia	2	1	4.104	0.128	0.145	2	1	3.743	0.154	0.155
Turkey	3	1	14.594***	0.002	0.010	3	1	11.464**	0.009	0.033
Panel C: Fourier Toda–Yamamoto test with single frequency										
Algeria	1	1	0.541	0.462	0.487	1	1	0.198	0.656	0.667
Egypt	1	4	11.647*	0.020	0.071	4	1	4.093	0.394	0.443
Israel	4	1	0.952	0.917	0.919	4	1	8.103	0.088	0.173
Jordan	4	3	6.268	0.180	0.237	4	3	3.670	0.453	0.483
Lebanon	2	2	2.108	0.349	0.367	2	2	0.881	0.644	0.623
Libya	4	1	5.037	0.284	0.476	4	1	0.319	0.989	0.976
Morocco	4	3	10.603*	0.031	0.099	4	3	7.531	0.110	0.178
Palestine	4	1	5.161	0.271	0.369	4	1	16.087*	0.003	0.061
Tunisia	3	1	1.318	0.725	0.715	3	1	6.382	0.094	0.140
Turkey	4	1	1.598	0.809	0.820	4	1	2.513	0.642	0.641
Panel D: Fourier Standard Granger Causality with cumulative frequencies										
Algeria	4	3	12.094*	0.017	0.067	4	3	27.805***	0.000	0.005
Egypt	4	3	5.953	0.203	0.271	4	1	32.271***	0.000	0.006
Israel	4	3	1.979	0.740	0.747	4	3	8.181	0.085	0.162
Jordan	4	3	37.996***	0.000	0.001	4	3	1.926	0.749	0.739
Lebanon	4	3	12.168*	0.016	0.075	4	3	20.236**	0.000	0.019
Libya	4	3	14.014	0.007	0.356	4	3	25.730	0.000	0.260
Morocco	3	3	7.788	0.051	0.106	3	3	7.225	0.065	0.122
Palestine	4	3	12.875	0.012	0.109	4	3	13.794*	0.008	0.100
Tunisia	4	3	19.172**	0.001	0.020	4	3	1.494	0.828	0.828
Turkey	4	3	11.440*	0.022	0.073	4	3	3.516	0.475	0.469
Panel E: Fourier Toda–Yamamoto test with cumulative frequencies										
Algeria	4	3	4.597	0.331	0.442	4	3	23.565**	0.000	0.019
Egypt	4	3	5.765	0.217	0.323	4	3	8.006	0.091	0.197
Israel	4	3	2.496	0.645	0.697	4	3	4.662	0.324	0.397
Jordan	4	3	24.037**	0.000	0.019	4	3	3.215	0.522	0.553
Lebanon	4	3	5.034	0.284	0.365	4	3	14.401*	0.006	0.060
Libya	3	3	13.006	0.005	0.365	3	3	10.778	0.013	0.340
Morocco	4	3	7.031	0.134	0.243	4	3	16.463*	0.002	0.057
Palestine	4	3	11.770	0.019	0.248	4	3	8.887	0.064	0.331
Tunisia	4	3	11.769*	0.019	0.077	4	3	0.395	0.983	0.981
Turkey	4	3	11.036	0.026	0.116	4	3	2.336	0.674	0.692

Notes: $\nRightarrow$ denotes the null hypothesis of Granger non-causality. Maximum k and p are respectively set to 3 and 4. The optimal k and p are determined by Akaike information criterion. Bootstrap p- values are based on 1000 replications. Panel A: Toda Yamamoto test which does not account for structural breaks.***,**,* denote 1,5,10 percent level of statistical significance, respectively.

Analysis results show that for most Southern Mediterranean countries, women's participation in the labor force supports economic growth, but growth does not affect women's labor force participation rates. This result proves that most women spend their time on activities outside the labor market (Goldin, 1995). For example, some women can continue their production activities at home; others may be attending school to develop their human capital. In addition, economic development in low-income countries often results from agricultural employment and transition to industrialized employment. This changes the number and nature

of jobs available for women. Labor force participation may also decrease in some societies due to stigma towards families where women are dealing with these industrialized blue- collar jobs. In short, this result can be interpreted as an indicator that women's work decisions change as GDP rises.

Our findings prove that most of the countries in this region do not follow a U-shape relationship between FLPR and GDP in the economic development process proposed by

Goldin (1995). Also, we have achieved the causal relationship to the growth of the participation of women in the workforce evidence (such as that applicable in TY test Israel, Lebanon, Palestine, and Turkey) proves the existence of potential to increase the economic output of the inclusion of the female workforce.

4. Conclusion

The active involvement of women in economic activities is one of the areas that should focus primarily on combating poverty and inequality. This study examines the causality relationship between FLPR and economic growth in the South Mediterranean countries over the period 1990-2018.

We have estimated TY causality test and new econometric model that accounts for smooth structural changes to test causal relationship between FLPR and economic growth. Our results show that FLPR do contain significant information in explaining economic growth. Granger causality-type tests show significant interaction between FLPR and GDP per capita. Accordingly, mutual causality between variables has been proven for Jordan, Palestine, Algeria and Lebanon. Including women in the labor markets is a key factor in these countries in terms of achieving inclusive economic growth and increasing productivity. Our analysis assumes that some countries in the region characterized by more women's participation in workforce are associated with higher levels of FLPR.

While TY test results showed that the increase in female labor force participation supports economic growth in most countries, further growth does not support any country except Morocco. In addition, Fourier-type TY approach helps in modeling the smooth structural shifts in causality. In the test results no evidence has been obtained to support the interrelation between FLPR and economic growth. The reason for this may be that the Fourier type TY approach did not yield robust results in a small sample. Our results suggest that improving female employment opportunities can promote economic growth. However, in fewer countries, economic growth increases the rate of female labor force participation. This result indicates that the gains of growth for some countries do not promote female employment. Also, despite the benefits of women's labor force participation, significant legal, structural and cultural barriers still remain in some of the Southern Mediterranean countries.

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