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Female Labour Force Participation and Economic Development in Southern Mediterranean Countries: What scenarios for 2030?

Stella Tsani, Leonidas Paroussos, Costas Fragiadakis, Ioannis Charalambidis and Pantelis Capros

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Abstract

This paper investigates the relationship between female labour force participation rates and economic growth in southern Mediterranean countries. A two-step methodology involving econometric estimations and the use of a general equilibrium model was used for this purpose.

The econometric estimations suggest that there is a U-shaped relationship between economic growth and female labour force participation rates and they indicate the presence of region-specific barriers impeding women's entry into the labour force in southern Mediterranean countries.

The econometric results were fed into a general equilibrium model, the GEM-E3-MEDPRO, which was used to simulate two alternative assumptions on developments in female labour participation rates in the region up to 2030. The first of these simulated changes in female labour force participation rates arising from income level trends projected for the period 2015–2030 in southern Mediterranean countries. The second assumed the lowering of region-specific barriers which deter female labour force participation.

The results of these simulations suggest that lower female labour force participation rates may lead to marginally lower economic growth in the region, while the removal of region-specific barriers to female labour force participation may encourage economic growth. This has important policy implications, suggesting that policies intended to remove such barriers could help to promote the growth of the region's economies.

JEL Classification: J01, C68

Keywords: Female labour force participation rate, general equilibrium, southern Mediterranean countries

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Female Labour Force Participation and Economic Development in Southern Mediterranean Countries: What scenarios for 2030?

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1. Introduction

This paper assesses the impact of changes in female labour force participation on the economic development of a group of southern Mediterranean countries.[1]

The assessment was carried out using a combination of econometric and general equilibrium modelling. In the first stage of this process, an econometric model was used to assess the relationship between economic growth and female labour force participation rates. This drew on pooled time-series cross-section data for a set of 160 countries, including the southern Mediterranean countries, for the period 1960–2008. The aim of the exercise was to

i. test the hypothesis that there is a U-shaped relationship between female labour force participation rates and economic development;

ii. test the presence of region-specific effects which may impede women's entry into the labour force; and

iii. obtain the coefficients to be used in the second stage of the analysis (the general equilibrium modelling).

A computable general equilibrium model, the GEM-E3- MEDPRO model, was used to simulate two alternative scenarios for the development of female labour force participation rates in the southern Mediterranean countries. The first of these simulated the effects of lower participation rates resulting from income trends forecast for the region in the period 2015–2030. The quantification of the relationship between income and female labour force participation rates was based on the econometric estimations obtained during the first stage of the analysis.

Using the same econometric estimations, the second scenario simulated the effects of removing region-specific barriers to female labour force participation in the southern Mediterranean countries. The econometric results had suggested the presence of region-specific characteristics (such as social, family and cultural norms) which might impede female entry into the labour force. The estimated coefficients suggested that the absence of such barriers could increase female labour force participation rates by 5%. This second scenario tested this.

The paper complements the debate on female labour force participation in several ways. The econometric estimations complement both the evidence on the determinants of female labour force participation rates and the debate on the U-shaped relationship between these rates and economic growth. Moreover, in its use of a computable general equilibrium model, the paper complements the methodologies already being used to assess the impact on economies of changes in female labour force participation rates.

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[1] By “southern Mediterranean countries” is meant Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey.

By shedding more light on the evidence from the southern Mediterranean, this paper makes a valuable contribution to the debate on female labour force participation rates and economic growth more generally. It also seeks to advance discussions in the region itself on the development of policies which can to promote female inclusion in its economic life and growth.

The sections of the paper after this introduction are organised as follows:

- Section 2 reviews the current situation and the literature on female labour force participation rates in the southern Mediterranean countries.
- Section 3 summarises the methods and the data used in the econometric specification and the estimation results.
- Section 4 summarises and discusses the results of the different simulations.
- The concluding section examines the implications of the paper's findings for policy development.

2. Female labour force participation rates in southern Mediterranean countries

Most southern Mediterranean countries are undergoing a profound transformation. There are demonstrators on the streets calling for social and economic reforms and measures to boost employment. The region's social and economic prospects are uncertain.

Nevertheless, the future may bring with it an opportunity to enhance the economic, social and political inclusion of women. Significant progress has been made in closing gender gaps in education and health outcomes in recent years. This progress has, however, not yet translated into higher female participation in economic life:

- Female labour force participation rates in the region remain significantly low in comparison with those in other developing and developed countries.
- Young entrants into the labour force, particularly young women, face extremely high levels of unemployment. In many countries in the region, female unemployment rates are as high as 50% (World Bank, World Development Report 2012).
- High unemployment rates discourage women from entering the labour force and restrict the economic opportunities that are available to them.
- Jobs in the informal sector may mask women's underemployment while offering few benefits and limited job security. They may also underutilise the skills of educated women who have been unsuccessful in securing formal-sector work.

Several reasons have been suggested for the lower female labour participation rates in southern Mediterranean countries. Some commentators argue, for example, that low female employment has its origins in religious values and norms. Yet while these values may have affected the region's social and legal conventions, it is simplistic to say that they are directly responsible for gender discrepancies in economic inclusion. In fact, the data available point to a great diversity of outcomes for women in the region (Rauch and Kostyshak, 2009; World Bank's World Development Companion Report, 2012). This implies that there are other factors common to southern Mediterranean countries which may offer a better explanation for low female labour participation rates.

Authors have also debated the role of oil in determining female labour participation rates in the region's oil-rich economies (Moghadam, 2004a; Ross, 2008). Oil-rich countries tend to have non-diversified male-dominated private sectors; there are fewer employment opportunities for women, and most of those that do exist are in the public sector. Oil-rich economies tend to create fewer jobs which could potentially be filled by women.

An increasing volume of work points towards religious and cultural factors and their manifestation in different regulations, social and family norms as important influences on women’s rights and

opportunities. Several authors have argued that cultural factors may be more important in explaining gender outcomes in the region (Youssef, 1978; Clark, 1991; Moghadam 2004a and 2004b). Many argue that the continuing dominance of the patriarchal family unit acts as a significant constraint on women's mobility and employment (Kandiyoti, 1988; Moghadam, 1993).

The patriarchal family is defined as a kinship-based unit in which members have clearly defined gender roles derived from age and sex. Men are the ones engaged in economic activities (Karshenas and Moghadam, 2001; Semyonow, 1980) and women are economically dependent on them. In urban areas, it is generally the smaller, nuclear family, rather than the wider extended family, that is regarded as the patriarchal family, but the traditional division of labour into male breadwinners and female homemakers remains. This patriarchal structure is also "protected" by various legal codes, social policies, and family laws, creating constraints on women's employment.

Furthermore, Karshenas and Moghadam (2001) support the view that female labour participation rates in the southern Mediterranean region are directly influenced by the levels of pay offered as these economies modernise. The preservation of the patriarchal family structures has been attributed to the fact that these are relatively high-wage economies. Households can afford to keep female family members at home and out of paid employment - part of the reason for the relatively lower female labour participation rates.[2]

3. Econometric assessment: methods, data and estimation results

The first step in this work was to develop an appropriate econometric model of the determinants of female labour force participation rates. This was needed to quantify the region-specific barriers to female labour force participation and also the relationship between economic growth and the rates of participation. The resulting estimated coefficients were used to quantify the changes in female labour participation rates that were simulated by the the GEM-E3-MEDPRO general equilibrium model.

The economic literature provides a rich discussion on the determinants of female labour force participation and on the relationship between female labour force participation rates and economic development. Whether or not women participate in the labour force seems to be decided jointly by individuals and their households. Individual education levels and influences on overall economic and labour market conditions, such as the level of urbanisation and unemployment, seem to work to their disadvantage in this decision-making process.

There is considerable empirical evidence to suggest that the relationship of female labour force participation rates to the process of economic development is U-shaped. See, for example, the work of Boserup (1970), Durand (1975), Kottis (1990), Schultz (1991) and Tam (2011).

Evidence for the U-shaped relationship is based on historical experience of developed countries and on multi-country studies. Goldin (1995) finds that, in the case of the United States, female labour force participation fell during the initial stages of economic growth and began to rise later as this growth continued (hence the U-shaped pattern). Hill (1983), Mincer (1985), Pampel and Tanaka (1986) and Psacharopoulos and Tzannatos (1989) argue that high-income and low-income countries have the highest female labour force participation rates, while middle-income countries have the lowest.

Boserup (1970; 1990) and Goldin (1995) argue that when income is low, women often work in family farms and in small home-based businesses. As the economy develops, the place of production shifts from the home to factory and non-family enterprises, making it more difficult for women to combine their childbearing role and production activities and also making it more costly for them to work. Boserup (1970) argues that men's privileged access to education and new technologies displaces

[2] Karshenas and Moghadam (2001) argue that oil-based economies may be partly responsible for the low female labour participation rates. In these countries, high dependency on oil revenues and windfalls in natural resources has sustained economic growth, while also, in tandem with the prevailing social conventions, limiting the opportunities for women to participate in the labour force. (Oil industries are capital intensive and the jobs generated favour male, rather than female, employment.)

women from the labour force during the early stage of economic development. As development continues, women gain access to education and technologies and their participation in the labour force participation rate increases (the U-shape).

Other factors may include a reduction in the relative price of home-produced goods and a decline in the demand for women's labour in agriculture. Social custom or employer preference may hinder women's employment in manufacturing. In the growing industrial and service sectors, women may not be able to compete with men because of their lower educational attainments. They are also held back by tradition, culture and household responsibilities. However, as women's education improves and their wages relative to the price of goods rise, so does their participation in the labour force increase (as in the rising part of the U-shaped curve).

Goldin (1995) and Tam (2011) consider the income effects (change in labour supply as household income changes) and substitution effects (income remains constant, but changing wages lead to a change in the labour supply) that contribute to the U-shaped pattern. The declining part of the U-shaped curve suggests that a strong income effect dominates. In the rising part, the substitution effect of higher wages (away from home to market activities) dominates the small income effect (Mincer, 1962; Killingsworth and Heckman, 1986; Goldin, 1995).

According to the theory of time allocation (Becker, 1965 and 1991; Heckman, 1978; Killingsworth, 1983), a decision by a woman to join the labour force is the result of a collective decision-making process in her household. The household maximises a combined utility function subject to the constraints it faces in determining the times allocated to home work, paid work and leisure for the individuals. Thus, the time allocated to paid work will depend on a number of personal (education) and household (income) characteristics as well as on overall economic and labour market characteristics (economic growth, unemployment rates, urbanisation, social norms).

Education can have an effect on an individual's decision to participate in the labour market and also in deciding how much time to spend on the labour market (Tansel, 2001). In theory, the effect of education on female labour force participation is ambiguous. It depends on the relative strength of two forces: the substitution effect and the income effect. First, education increases the potential earnings and therefore the cost of not working (positive effect). Second, as a result of higher earnings, the income target is achieved sooner. The higher income can then be used to consume more leisure and reduce the need to work (negative effect).[3] The net effect of education depends on which force prevails.

On the question of socio-economic and labour market conditions, the literature suggests that female labour force participation rates are affected by unemployment, urbanisation and economic growth. The effects of unemployment on female labour force participation are ambiguous and depend on the relative strengths of the "discouraged-worker effect" and the "added-worker effect" (Tansel, 2001). Unemployment affects the probability that women entering the labour market will find a job. The higher the unemployment rate, the less likely it is that a woman will find a job. The economic and psychological costs associated with looking for work will be higher when the unemployment rate is high. For these reasons, women may be discouraged from looking for a job and may drop out of the labour force. The "discouraged-worker" hypothesis implies, therefore, that unemployment has a negative effect on female labour force participation.

[3] Empirical studies in a number of countries suggest that the substitution effect is stronger than the income effect and, therefore, that there are more educated females in the labour force. Evidence in the work of Tansel (1994; 1996) and Psacharopoulos and Tzannatos (1991) across a number of different countries shows that education has a positive effect on female labour force participation. Smith and Ward (1985) and Kottis (1990) find that the relationship between education and the female labour participation rate is negative. Nevertheless several researchers argue that the effect of education on female labour force participation depends on the stage of development of the country concerned. As such, the inclusion of education as a determinant of the female labour force participation rate is criticised on the grounds of multicollinearity and endogeneity bias.

According to the "added-worker" hypothesis, when unemployment increases and men lose their jobs, wives may enter the labour force in order to compensate for the loss of family income. The "added-worker" hypothesis implies that local unemployment has a positive effect on female labour force participation. However, the paucity of jobs for women means that the "added-worker" effect is likely to be small. In practice, this means that the "discouraged-worker" effect will probably prevail over the "added-worker effect", ensuring that unemployment has a negative effect on female labour force participation.

The degree of urbanisation is suggested as a determinant of the female labour force participation rate, affecting the number of jobs available and their accessibility (King, 1978). Urban areas may offer more paid employment opportunities than rural areas. Thus the higher the proportion of the population living in urban areas, the higher will be female labour force participation.[4] Economic growth as an overall measure of the general economic conditions may determine the female labour force participation rate because higher economic growth means greater availability of jobs and thus higher female labour force participation. Conversely, contraction of the economy reduces the work opportunities and female labour force participation.

The arguments developed in the literature on the determinants and the characteristics of female labour force participation were adopted in the econometric specification. The model employed was:

$$FLPR_{i,t} = b_0 + b_1 GDP_{i,t} + b_2 LGDP_{i,t}^2 + \sum_{n=1}^{k-1} b_n X_{n,i,t} + b_k MED11_{i,t} + e_{i,t} \quad (1)$$

where $FLPR_{i,t}$ is female labour force participation rate, $LGDP_{i.t}$ is the log of the real GDP per capita, $LGDP_{i,t}^2$ its square, $X_{n,i,t}$ is a set of n variables controlling for education, fertility, urbanisation, religious norms and unemployment rates. $MED11_{i,t}$ is a dummy control variable for the southern Mediterranean countries. $e_{i,t}$ is an error term capturing all other omitted factors, measurement errors and possible misspecifications.

The econometric approach used pooled time-series cross-section data for a set of 160 countries for the period 1960-2008. $FLPR_{i,t}$ is defined as the number of female labour participants aged between 15 and 64 and divided by the total female population of the same age group. Labour force participation is defined as employed (paid and unpaid family workers) plus unemployed (actively seeking work).

Data on $FLPR_{i,t}$ were taken from International Labour Organization (ILO) figures.[5] The ILO figures came from available national censuses and were adjusted so that agricultural and unpaid family workers, definitions of unemployment, members of the armed forces and reference periods were treated consistently for all nations. Data on real GDP, unemployment, urbanisation, fertility rates and school enrolment were taken from the World Bank's World Development Indicators database (2011 edition).

[4] Nevertheless this determinant is vulnerable to criticism because women in rural areas may participate in the labour force in large numbers as unpaid family workers on farms. This could mean that the overall participation of women in the labour force is low in a region where there is a large rural population. It could also lead to levels of female labour force participation in urban areas being underestimated.

[5] See: www.ilo.org

Table 1. Estimation results: Method Pooled OLS. Dependent variable: Female labour participation rate[6]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
lgdpcap	-39.92***	-13.52**	-42.67***	-86.60***	-41.68***	-84.39***	-73.24***	-48.30***	-31.99**	-77.97***	-35.81***	-33.890***
	(4.876)	(6.363)	(5.173)	(9.292)	(8.566)	(9.576)	(4.476)	(4.666)	(4.636)	(9.323)	(9.348)	(9.361)
lgdpcap^2	6.602***	2.891***	6.879***	12.32***	5.166***	12.01***	9.843***	7.398***	5.324***	10.16***	4.336***	4.117***
	(0.696)	(0.883)	(0.717)	(1.246)	(1.148)	(1.288)	(0.624)	(0.663)	(0.663)	(1.221)	(1.234)	(1.234)
unempl		-0.161***								-0.131*	-0.0625	-0.0386
		(0.059)								(0.070)	(0.093)	(0.094)
urban			0.0302							0.0402*	-0.104***	-0.0964***
			(0.019)							(0.024)	(0.030)	(0.030)
primary_net				0.312***						0.133**		
				(0.043)						(0.051)		
secondary_net					0.329***						0.395***	0.368***
					(0.028)						(0.044)	(0.046)
tertiary_net						0.304***						
						(0.044)						
fertility							-5.262***			-4.647***	1.221	0.922
							(0.208)			(0.463)	(0.803)	(0.815)
muslim80								-0.152***		-0.116***	-0.102***	-0.085***
								(0.009)		(0.013)	(0.015)	(0.017)
med11									-15.35***			-5.111*
									(1.068)			(2.678)
Constant	87.22***	45.07***	91.60***	152.7***	93.73***	149.2***	179.5***	108.8***	76.77**	180.3***	84.69***	82.64***
	(8.351)	(11.16)	(8.793)	(14.61)	(15.17)	(15.02)	(8.191)	(8.080)	(7.917)	(15.91)	(18.12)	(18.07)
Observations	1,687	1,081	1,687	712	336	634	1,500	1,591	1,687	522	307	307
Adjusted R-sq	0.139	0.174	0.140	0.195	0.343	0.190	0.382	0.257	0.234	0.426	0.460	0.476

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

[6] For sources and definitions of variables, see table A1 in the appendix.

Table 1 summarises the estimation results under alternative specifications.

The estimation results remained robust when alternative control variables were used, thus confirming the arguments developed in the literature to date on the determinants and characteristics of female labour force participation rates.

The econometric estimations confirmed the U-shaped hypothesis on the relationship between the female labour force participation rate and economic growth. Women's childbearing role and social conventions were found to have negative implications for female labour force participation, while education (as measured by enrolment for primary, secondary and tertiary education) was found to have a positive influence. The control variable for urban population was inconclusive.[7]

When controlling for region-specific characteristics that may not be adequately captured by the model (Table 1, column 12), the estimation results confirmed that the southern Mediterranean countries recorded relatively lower female labour force participation rates when compared with the other developed and developing countries included in the dataset.

The estimated coefficients for the relationship between income and female labour force participation and for the southern Mediterranean countries (a dummy variable) were used in the second stage of modelling, a computable general equilibrium model simulating the alternative assumptions on female labour force participation rates in those countries. The coefficients estimated in the dummy variable were assumed to capture cultural and social norms specific to the region, not captured by other covariates, which may be found in family structures and legal codes and restrict the rate of female participation in the labour force.

4. GEM-E3-MEDPRO simulation results

The GEM-E3-MEDPRO model[8] was used to simulate the alternative scenarios. This is a computable general equilibrium multi-country model, treating each country separately and linking them through endogenous trade in goods and services. It covers several different industrial sectors and economic agents, allowing consistent evaluation of policies' distributional effects. It is dynamic recursive over time, involving dynamics of capital accumulation and technological progress, stock and flow relationships and retrospective expectations. It covers the major aspects of public finance including all substantial taxes, social policy subsidies, public expenditure and deficit financing.

The GEM-E3-MEDPRO model can be applied worldwide. (The version used for this paper covers 19 countries/regions and 23 economic activities.[9]) It covers the period from 2010 to 2030 in five-year

[7]To ensure robustness of the estimation results, the model summarised in equation 1 was tested further on a balanced dataset. The dataset was balanced in the sense that only the countries/years for which data for all the explanatory variables were available were included. This was done in an attempt to rule out the possibility that the differentials among the alternative results might be due to the different samples used. The estimation results confirmed the initial findings on the U-shaped hypothesis as well as those on the impact of the control variables. The robustness of the model was checked further by carrying out alternative estimations with past values for the control variables. The estimation results confirmed the findings. The model was difficult to estimate using a time-series analysis due to the poor quality and availability of the data.

[8] The GEM-E3-MEDPRO model is a version of the GEM-E3 model which was created in the 1990s by a consortium involving the National Technical University of Athens-E3MLab, the Catholic University of Leuven (Centre for Economic Studies), the University of Mannheim and the Centre for European Economic Research (ZEW) as the core modelling team. The orginal model has been extended several times by E3MLab and other partners and there are now versions suitable for analysing growth, market reforms (such as the EU's internal market) and structural policies. It has been used extensively in a series of studies undertaken for the European Commission and in several research projects.

See: http://www.e3mlab.ntua.gr/index.php?option=com_content&view=category&id=36%3Agem-e3&ltemid=71&layout=default&lang=en, http://ipts.jrc.ec.europa.eu/activities/energy-and-transport/gem-e3/

[9] The sector-specific and regional disaggregation of the model are presented in the appendix in tables A2 and A3 respectively

steps and is calibrated on the GTAP v.8 database[10] (which has 2007 as its base year). In the case of those southern Mediterranean countries which have no data available on the GTAP, the authors developed a detailed database including social accounting, consumption, trade and investment matrices.

In general equilibrium models, it is the deviations from the reference scenario which are the key to evaluating structural changes. The reference scenario relates to the development of an economic outlook for each region and sector of the GEM-E3-MEDPRO model and requires assumptions to be made for the main drivers of growth, population growth and expectations of exogenous growth.

The reference scenario developed by Paroussos et al. (2012)[11] was used. It was based on assumptions of economic growth provided by Coutinho (2011) and on demographic projections for the southern Mediterranean countries provided by Groenewold et al. (2011). In their assumptions on the labour force, Paroussos et al (2012) do not distinguish between male and female workers. The present paper extends the scenario to do this, making appropriate assumptions on the female and male shares of the labour force and on female participation rates.

Active population data for the base year came from ILO figures[12] and active population growth rates from Groenewold et al. (2011).[13] The figures for the male and female shares of the active population came from the ILO database. ILO provides projections for the period up to 2020; it was assumed that trends recorded over the period 2007-2020 would continue from 2020 to 2030. Labour participation rates were taken from Paroussos et al. (2012). Data on the proportion of the labour force accounted for by women were taken from the World Bank databank (2011 edition). It was assumed that this proportion would stay close to current levels and not change significantly up to 2030 (Table 2).

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[10] See: Global Trade Analysis Project, https://www.gtap.agecon.purdue.edu/

[11] Paroussos et al. (2012) use the GEM-E3-MEDPRO model to develop the reference scenario. This scenario is compatible with the qualitative scenario QI developed by Ayadi and Sessa (2011) which assumes that the Euro-Mediterranean state of affairs continues without any substantial change up to 2030. Current trends in the southern Mediterranean countries are assumed to continue over the period up to 2030. In the reference scenario, Turkey is projected to remain the largest economy in the southern Mediterranean region in terms of GDP, and it is followed by Israel and Egypt. Economic growth in the southern Mediterranean is sustained by the growth in the region's population and the availability of relatively cheap labour and hydrocarbon resources in some of the countries (Algeria, Libya).

[12] See: www.ilo.org

[13] The demographic scenarios developed by Groenewold et al (2011) are compatible with the qualitative analysis of Ayadi and Sessa (2011). Groenewold et al. (2011) developed four alternative demographic scenarios (S1-S4) for each of the southern Mediterranean countries up to the year 2050. The population projections of scenario S1 were used for the reference scenario.

S1 anticipates a demographic future in which past trends are extrapolated. These demographic projections assume that the EU and the southern Mediterranean countries fail to upgrade their partial and *ad hoc* style of cooperation into a coherent framework of action and collaboration on key political, security, economic, socio-cultural and environmental issues. In this scenario, the net migration rates observed over the period from 2005-2010 for individual countries are assumed to remain constant for the whole projection period, with the exception of the period from 2010-2015 for which it is assumed that the political turmoil and insecurity in some countries seen in 2011 will lead to increased emigration from those countries. This scenario assumes that the EU continues to impose severe restrictions on legal immigration and that refugee stocks will not alter significantly. It is also assumed that the presence of refugees (such as Iraqi refugees in Jordan) will put pressure on available national resources (health, housing) and the ecosystem, and that this may, directly or indirectly, affect the health of the host population. The presence of large refugee stocks may affect labour (im)migration flows as refugees will try to compete in the local labour market, with or without working permits, in a bid to ensure their survival. The observed decline of fertility rates in most countries is assumed to continue and eventually remain at constant levels, i.e. at replacement level. This means that women, on average, give birth to 2.1 children during their reproductive life. Improvements, and levelling-off of changes, in life expectancy are expected to continue in the southern Mediterranean countries. It is assumed that the current differences in countries' respective life expectancy rates will remain unchanged.

Combining these data, projections and assumptions made it possible to calculate the female labour force participation rates for the reference scenario.

Table 2. Reference scenario female labour force, as a % of total labour force

	2030
Algeria	15.83
Egypt	23.73
Israel	46.60
Jordan	17.47
Lebanon	25.20
Libya	27.84
Morocco	27.42
Syria	16.06
Tunisia	26.65
Turkey	25.91
Palestine	17.88

Source: Authors' estimations.

Two alternative cases were simulated and compared to the reference scenario. In both of these, the econometric estimations were used to calculate the estimates for the size of the female labour force that were fed into the model.

The first alternative assumed that the growth in per capita income levels resulting from the population projections provided by Groenewold et al. (2011) and the growth projections expected for the southern Mediterranean countries by Coutinho (2011) would lead to lower female labour participation rates. This was based on the assumption that, from 2015 to 2030, women might not be able to compete with men for jobs in the industrial and service sectors as employer preferences or cultural and social norms might prevent them from entering the labour market. It was assumed further that income effects would be strong and dominate: in other words, changes in household income would have an impact on the supply of female labour. The econometric estimations on the relationship between income levels and female labour participation rates were used to quantify these assumptions and calculate the changes in female labour force participation rates.

In the second alternative, the GEM-E3-MEDPRO model was used to assess the effects of higher female labour participation rates. Here it was assumed that region-specific barriers to women's entry into the labour force would cease to exist. The model simulated a state of social and economic development in the southern Mediterranean countries that brought with it a reduction in, or removal of, the influence of cultural factors and family norms on female participation in the labour force - such factors being characterised, for example, as legal codes or social conventions.

The quantification of this scenario was based on the econometric estimations for the dummy control variable for the southern Mediterranean countries. The econometric results suggested that the removal of region-specific barriers could lead to female labour force participation rates increasing by 5%. This second scenario assumed the same rate of increase in the southern Mediterranean countries over the period from 2015 to 2030.[14]

[14] For Israel it is assumed that female labour force participation rate increases by 1% above the reference scenario

Table 3. Change in female labour force and total labour force when lower female labour force participation rates are assumed

	Female labour force change from reference, in %, cumulatively from 2015 to 2030	**Total labour force, change from reference, in million, cumulatively from 2015 to 2030**	**Total labour force, change from reference, in %, cumulatively from 2015 to 2030**
Algeria	-2.76	-0.89	-0.44
Egypt	-1.60	-2.04	-0.38
Israel	-1.30	-0.37	-0.61
Jordan	-3.01	-0.18	-0.53
Lebanon	-1.51	-0.10	-0.38
Libya	-1.33	-0.16	-0.37
Morocco	-1.61	-0.92	-0.44
Syria	-1.80	-0.35	-0.29
Tunisia	-2.33	-0.43	-0.62
Turkey	-1.91	-2.41	-0.49
Palestine	-0.84	-0.04	-0.15

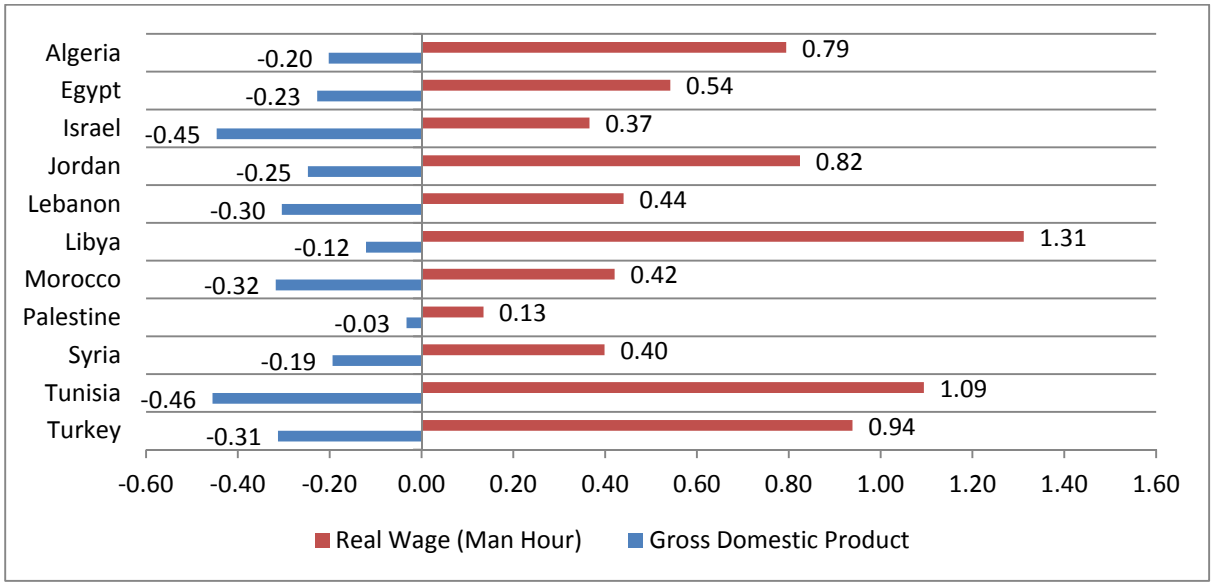
Source: Authors' estimations.

In the first case, female labour force participation rates were assumed to be lower than in the reference scenario. Thus a smaller labour force pool applied to this scenario. In the second case, female labour force participation rates were higher for all southern Mediterranean countries compared with the reference scenario. The estimated changes in female labour force participation rates were applied to the participation rates adopted in the reference scenario so as to derive the new estimates to be input into the alternative model.

These figures were added to the figures assumed for the male labour force in the reference scenario. No assumptions were made on the male labour force in the alternative scenarios. The male labour force in the alternative scenarios equals that in the reference scenario. Hence the only change when the alternative scenarios were run came from different assumptions on the female labour force in each of the southern Mediterranean countries. The changes in the total labour force correspond to the number of women entering or opting out of it. Table 3 assumes lower female participation rates in the period from 2015 to 2030 and summarises the changes in the female labour force and total labour force that occur then. Table 4 summarises the changes when higher female labour force participation rates of 5% above reference are assumed.

Figure 1 and Figure 2 summarise the impact of lower female labour force participation rates on GDP, wages and trade in the individual southern Mediterranean countries. The effects of lower female labour participation rates are small. This is largely because female labour participation is relatively low in most of the southern Mediterranean countries; small changes in female participation rates mean small changes in the total labour force and so would not have a significant impact on macroeconomic variables. In Israel, the effects are greater because the labour force is divided equally between women and men and thus changes in women's participation would have a larger impact.

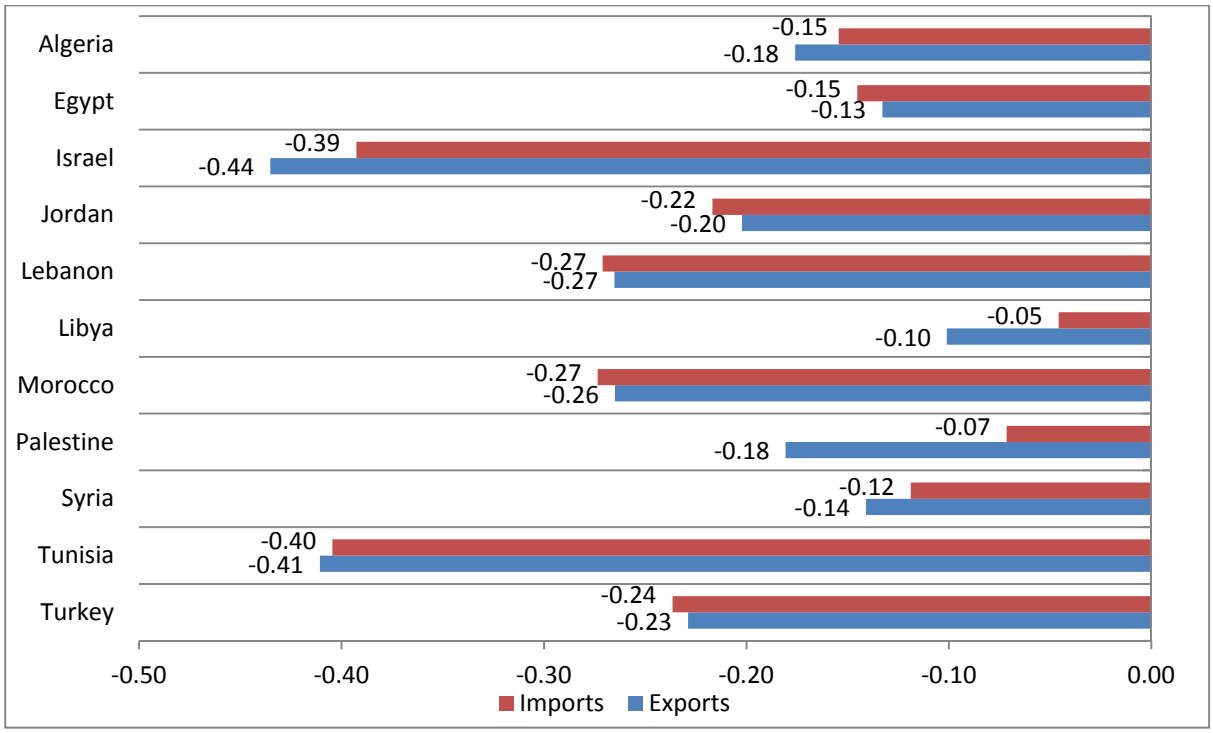
Figure 1. Impact on wages and GDP of lower female labour force participation rates, change from reference scenario, in %, cumulatively from 2015 to 2030



Source: GEM-E3-MEDPRO.

Lower female participation in the labour force decreases labour supply and wages increase as a result. Higher wages mean higher production costs. Exports from the southern Mediterranean countries become less competitive; domestic production contracts and imports of intermediate goods reduce as a result. A deteriorating trade balance and lower consumption and investments all reduce GDP. The effects on GDP are more pronounced in countries like Tunisia and Morocco where labour-intensive sectors, like textiles and the public sector, are important. The GDP of the southern Mediterranean region was found to contract by 0.3% cumulatively over the period from 2015 to 2030, and be 123bn US $ (in 2007 values) lower than the reference scenario.

Figure 2. Impact on trade of lower female labour force participation rates, change from reference scenario, in %, cumulatively from 2015 to 2030



Source: GEM-E3-MEDPRO.

In the second alternative, increased female labour force participation increases labour supply and the cost of labour and wages fall as a result. This drives production costs down and makes exports from the southern Mediterranean countries more competitive in international markets. The reduced prices resulting from lower labour costs increase private consumption. Higher consumption and investments lead to growth in GDP.

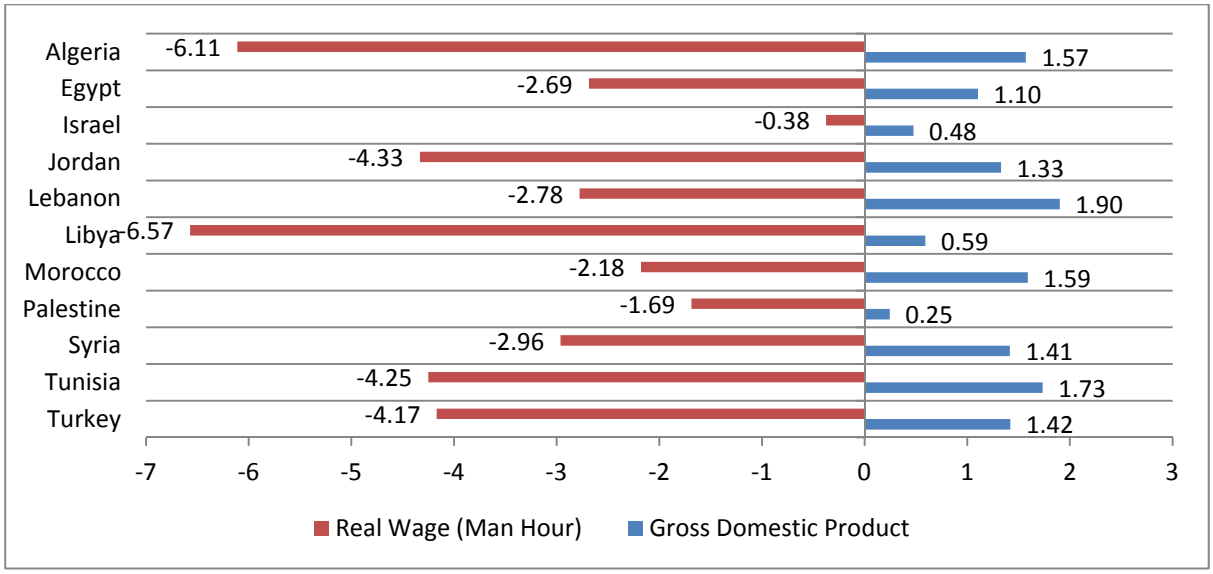
As with the first alternative, the effects of increased female labour force participation are more pronounced in countries where labour-intensive sectors dominate domestic production. From 2015 to 2030, Lebanon, Tunisia and Morocco record the largest cumulative change in GDP when compared with the reference scenario. In Tunisia, the change is one of 20bn US $ (2007 values); in Morocco and Lebanon, it is 35bn and 12bn US$ (2007 values) respectively. Oil-producing countries (Algeria and Libya) record a relatively higher drop in real wages, but the impact of this on economic growth is limited as these economies are dominated by capital-intensive sectors.

Table 4. Change in female labour force and total labour force when higher female labour force participation rates are assumed

	Female labour force change from reference, in %, cumulatively from 2015 to 2030	**Total labour force, change from reference, in million, cumulatively from 2015 to 2030**	**Total labour force, change from reference, in %, cumulatively from 2015 to 2030**
Algeria	22.69	7.34	3.59
Egypt	8.09	10.34	1.92
Israel	1.39	0.40	0.65
Jordan	16.58	0.98	2.90
Lebanon	9.74	0.66	2.45
Libya	7.14	0.86	1.99
Morocco	8.40	4.78	2.30
Syria	13.67	2.66	2.20
Tunisia	9.33	1.72	2.49
Turkey	8.95	11.31	2.32
Palestine	9.73	0.41	1.74

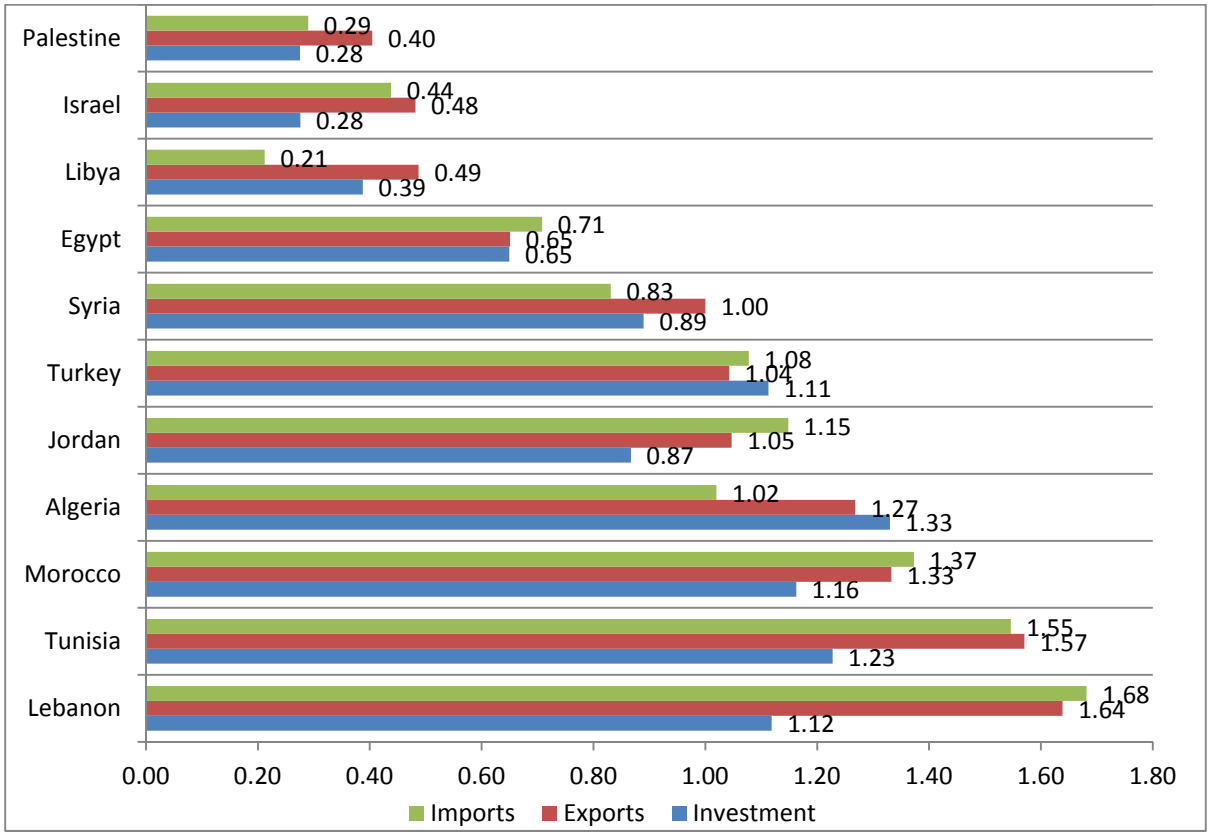
Source: Authors' estimations.

Figure 3. Impact on wages and GDP of higher female labour participation rates, change from reference scenario, in %, cumulatively from 2015 to 2030



Source: GEM-E3-MEDPRO.

Figure 4. Impact on trade and investments of higher female labour participation rates, change from reference scenario, in %, cumulatively from 2015 to 2030



Source: GEM-E3-MEDPRO.

The effects on GDP of increased female labour force participation are considerable for the southern Mediterranean region. An increase of 5% in female labour force participation rates leads to a cumulative decrease in real wages of 3.5% for the whole region over the period from 2015 to 2030. This leads to a cumulative 1.3% increase in GDP above the reference scenario over the same period; in monetary terms, this equates to an increase of 525 bn US $ (2007 values).

5. Concluding remarks and policy implications

This paper has studied the relationship between female labour force participation and economic growth in southern Mediterranean countries. It has done so using a two-step methodology: an econometric exercise and general equilibrium modelling. The econometric results confirmed the view that there is a U-shaped relationship between economic growth and the female labour force participation rate. The results further suggested that womens' decisions to participate in the labour force might be affected by other personal, economic and labour market conditions.

In the case of the southern Mediterranean countries, the estimation results suggested that female labour force participation may decrease if economic growth in the region is modest and may increase if it is sufficiently high. Qualitative characteristics specific to the southern Mediterranean countries may help to explain the low levels of female participation in the region.

The econometric results were fed into the GEM-E3-MEDPRO model, a general equilibrium model used to simulate two alternative assumptions on female labour participation rates in the region. The first case simulated the fall in female labour participation rates caused by changing income levels in southern Mediterranean countries and estimated from the population and GDP growth assumptions used in the reference scenario. The second alternative assumed the lowering of region-specific barriers which deter female labour force participation. The simulation results suggested that lower female labour participation rates may have marginal effects on the macroeconomic outcomes in the region.

In contrast, if barriers to women joining the labour force are removed and their participation increases, the economic benefit may be significant. Growth in female labour force participation may lead to a cumulative increase in GDP of 1.3% over reference values in the period from 2015 to 2030. In monetary terms, this equates to an increase $525 billion (at 2007 values).

The importance of the findings lies in their policy implications. They suggest that policies aiming at the removal of region-specific barriers to female labour force participation may lead to economic growth in the region. The female labour force remains an untapped resource of the southern Mediterranean countries. Efforts should be made there to promote further female labour force participation as the entire region will benefit from the growth that this generates. Such efforts could include the adoption of policies designed to remove or lower barriers to women's entry into the labour force - barriers such as the way in which social and cultural norms are reflected in legal codes.

The focus should be on policies and cooperation strategies which will promote the modernisation of cultural norms and legal codes. These could include, for example, legislative reform, changes to the education curriculum, encouraging more female attendance at school, cultural exchange and cooperation programmes with developed countries. Deeper cultural integration with the EU could help this process. The EU could support reforms in the southern Mediterranean region by sharing its experience with policies promoting female labour participation.

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Appendix

Table A.1 Variables: Sources and definitions

Variable	Definition	Source
flpr	Female labour participation rate,defined as the number of female labour participants of age 15–64 divided by the total female population of the same age group	International Labour Organisation, LABOURSTA Labour Statistics Database
lgdpcap	Log of GDP per capita. Authors' estiamtions based on GDP data (constant 2000 US$) and total population figures	World Bank, World Development Indicators Database
unempl	Unemployment, total (as percentage of total labour force)	World Bank, World Development Indicators Database
urban	Urban population (as percentage of total)	World Bank, World Development Indicators Database
primary_net	School enrolment, primary, female (as percentage of net)	World Bank, World Development Indicators Database
secondary_net	School enrolment, secondary, female (as percentage of net)	World Bank, World Development Indicators Database
tertiary_net	School enrolment, tertiary, female (as percentage of net)	World Bank, World Development Indicators Database
fertility	Fertility rate, total (births per woman)	World Bank, World Development Indicators Database
muslim80	Muslims, as percentage of total population in 1980	La Porta et al. (1999)
med11	Dummy variable taking the value of 1 if the country belongs to the southern Mediterranean countries group, 0 otherwise	Authors' compilation

Table A.2 GEM-E3-MEDPRO sectoral aggregation

No	Sector	No	Sector
1	Agriculture	**13**	Transport equipment
2	Animal products	**14**	Consumer goods industries-Food
3	Coal	**15**	Consumer goods industries-Rest
4	Crude oil	**16**	Textiles and clothing
5	Oil refining	**17**	Construction
6	Natural gas extraction	**18**	Transport
7	Gas distribution	**19**	Communication
8	Transmission and distribution of electricity	**20**	Business-Financial services
9	Water	**21**	Public services
10	Chemical products	**22**	Recreational and other services
11	Other energy intensive	**23**	Dwellings
12	Electric goods-Other equipment goods		

Table A.3 GEM-E3-MEDPRO regional aggregation

No	Country/Region		Country/Region
1	Algeria	**11**	Turkey
2	Egypt	**12**	EU15 countries[15]
3	Israel	**13**	New EU member states[16]
4	Jordan	**14**	South EU member states[17]
5	Lebanon	**15**	Emerging Asian economies[18]
6	Libya	**16**	Rest of OECD countries[19]
7	Morocco	**17**	Rest of emerging economies[20]
8	Palestine	**18**	Rest of Middle East [21] (the Gulf region)
9	Syria	**19**	Rest of the world
10	Tunisia		

[15] Austria, Belgium, Denmark, Finland, Germany, Ireland, Luxembourg, Netherlands, Sweden and United Kingdom

[16] Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, Bulgaria, Romania

[17] Cyprus, France, Greece, Italy, Malta, Portugal and Spain

[18] China, Hong Kong, Taiwan, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam and India

[19] Australia, New Zealand, Rest of Oceania, Japan, Korea Republic, Canada, United States of America, rest of North America, Switzerland, Norway and Rest of EFTA

[20] Mexico, Argentina, Brazil, Chile, Venezuela, Albania, Belarus, Croatia, Russian Federation, Ukraine, Rest of Eastern Europe, Rest of Europe, Kazakhstan, Kyrgyzstan, rest of former Soviet Union, Azerbaijan and Georgia

[21] Armenia, Bahrain, Iran Islamic Republic, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, Yemen and Iraq

About MEDPRO

MEDPRO – Mediterranean Prospects – is a consortium of 17 highly reputed institutions from throughout the Mediterranean funded under the EU's 7th Framework Programme and coordinated by the Centre for European Policy Studies based in Brussels. At its core, MEDPRO explores the key challenges facing the countries in the Southern Mediterranean region in the coming decades. Towards this end, MEDPRO will undertake a prospective analysis, building on scenarios for regional integration and cooperation with the EU up to 2030 and on various impact assessments. A multi-disciplinary approach is taken to the research, which is organised into seven fields of study: geopolitics and governance; demography, health and ageing; management of environment and natural resources; energy and climate change mitigation; economic integration, trade, investment and sectoral analyses; financial services and capital markets; human capital, social protection, inequality and migration. By carrying out this work, MEDPRO aims to deliver a sound scientific underpinning for future policy decisions at both domestic and EU levels.

Title	MEDPRO – Prospective Analysis for the Mediterranean Region
Description	MEDPRO explores the challenges facing the countries in the South Mediterranean region in the coming decades. The project will undertake a comprehensive foresight analysis to provide a sound scientific underpinning for future policy decisions at both domestic and EU levels.
Mediterranean countries covered	Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey
Coordinator	Dr. Rym Ayadi, Centre for European Policy Studies (CEPS), rym.ayadi@ceps.eu
Consortium	Centre for European Policy Studies, **CEPS**, Belgium; Center for Social and Economic Research, **CASE**, Poland; Cyprus Center for European and International Affairs, **CCEIA**, Cyprus; Fondazione Eni Enrico Mattei, **FEEM**, Italy; Forum Euro-Méditerranéen des Instituts de Sciences Economiques, **FEMISE**, France; Faculty of Economics and Political Sciences, **FEPS**, Egypt; Istituto Affari Internazionali, **IAI**, Italy; Institute of Communication and Computer Systems, **ICCS/NTUA**, Greece; Institut Europeu de la Mediterrania, **IEMed**, Spain; Institut Marocain des Relations Internationales, **IMRI**, Morocco; Istituto di Studi per l'Integrazione dei Sistemi, **ISIS**, Italy; Institut Tunisien de la Compétitivité et des Etudes Quantitatives, **ITCEQ**, Tunisia; Mediterranean Agronomic Institute of Bari, **MAIB**, Italy; Palestine Economic Policy Research Institute, **MAS**, Palestine; Netherlands Interdisciplinary Demographic Institute, **NIDI**, Netherlands; Universidad Politecnica de Madrid, **UPM**, Spain; Centre for European Economic Research, **ZEW**, Germany
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