Measuring Returns to Education and Human Capital in the Southern Mediterranean

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Abstract

Measuring human capital has been a significant challenge for economists because the main variable of interest is intangible and not directly observable. In the Middle Eastern and Northern African region the task is further complicated by the general scarcity of comparable and reliable data. This study overcomes these challenges by relying on a unique international survey that covers most of the region and by deriving a market-based measure that uses returns to education and various labour market factors as guidance. The results show that private returns to schooling are relatively low in most southern Mediterranean countries (SMC). Israel and Turkey are clear outliers, surpassing even the EU-MED averages. In Algeria and Jordan, the returns are almost flat, implying that earnings do not respond significantly to education levels. Despite high attainment levels, Greece, Spain and Portugal also perform badly; only marginally surpassing some of the bottom-ranked SMC, providing evidence of problems in absorption capacity. The baseline scenarios for 2030 show substantial sensitivity to current estimates on returns to education. In particular, improving attainment levels can produce measurable gains in the future only when the returns to education are already high. Such is the case for Egypt, Morocco and Turkey, which substantially improve their human capital stocks under the baseline scenarios, surpassing several EU-MED countries with little or no room for improvement.

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1. Introduction

Measuring human capital has been a significant challenge for economists. For the most part, this is because the main variable of interest is intangible and not directly observable. The elusive nature of human capital is revealed in the various attempts by researchers to define the concept. For example, according to Schultz (1961) human capital can be described as the sum of skills and knowledge that are attained through education and experience. More recent definitions, however, incorporate innate attributes and abilities, i.e. Lang and Kropp (1986) and others. On the other hand, OECD (2001) considers a wider definition that includes the creation of personal, social and economic well-being. For the southern Mediterranean countries (SMC),[1] the task is further complicated by the general scarcity of data. The available data on education and work-related information is far from harmonious, making comparisons difficult. Most unfortunately, most of the micro-data sets on labour market characteristics are not publicly available.

In this study, human capital is defined as the aggregate stock of productivity among the working-age population. By its construction, the measure is closely related to the private returns to education, or the additional income an individual can earn by remaining an extra year in school. Such a broad description necessitates measurement methods that can capture the factors that may contribute to human capital development.

Earlier studies have relied on much simpler measures of human capital, in many cases based on average education levels, such as years of schooling, educational attainment or adult literacy rates.[2] There are several reasons why such approaches may fail to lead to an adequate assessment of human capital. First, there is no single appropriate method of measuring education to the extent that it relates to human capital development. What is taught in school may not correspond to the needs of the productive sectors; an increase in average years of schooling may thus only lead to more graduates with irrelevant training. Second, the quality of education is also likely to matter. If the quality of education is low, increased attainment is unlikely to translate into increased human capital. In fact, increasing educational attainment may come at the expense of schooling quality if the schools' resources are inadequate.[3]

This study uses a specific methodology to overcome these difficulties. The aim is to build comparable indicators of human capital development within the southern Mediterranean to explain both the current conditions and to provide prospects for development by 2030. In a nutshell, the measure aims to aggregate average productivities by using earnings that workers would earn in the market as guidance. Provided that incomes are competitively determined and that base salaries reflect a standard (i.e.

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[1] For the purposes of this study, the southern Mediterranean countries are defined as Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine Authority, Syria, Tunisia, and Turkey.

[2] See Wössmann (2003) for a review of literature using a variety of measures.

[3] Several studies have attempted to account for differences in quality of education to account for growth-enhancing effects of education, including Barro (1991) and Barro and Lee (1996). Also, Lee and Barro (2001) show that various input factors, such as parental background, class size, and teachers' salary are closely related to schooling quality, as measured by internationally comparable test scores, repetition rates and drop-out rates.

comparable) level of productivity across countries, a weighted sum of the wage levels across different education and experience levels can be used as indicators of human capital.

The estimation also relies on a dataset based on the World Values Survey (WVS) and European Values Study (EVS), covering a cross-section of six southern Mediterranean and six EU-MED countries.[4] The data is unique in that it provides individual-level information for each country, with roughly 500 to 1,500 observations, depending on the country and year. The surveys used in the study were conducted between 1999 and 2002.[5]

In order to provide an estimate of the current stock of human capital in the Mediterranean, the study first estimates private returns to education. These estimations are central to the measures developed as the surveys identify incomes only within an interval. Moreover, since the sampling of each survey may not be the best approximation for the population, the study relies on aggregate data on educational attainment and employment conditions based on official statistics.

To fulfil its second aim of providing prospective scenarios for the year 2030, the study considers how the factors used to build the measures may change over the next two decades. These assumptions include trend-growth assumptions and likely developments in returns to education, educational attainment, labour market and economic conditions. The resulting new values are then used to construct a prospective view of the human capital conditions in the sampled countries.

The results of the study show that the derived human capital measures differ quite substantially from other measures often used in the literature as indicators. For example, a high level of educational attainment does not translate into high human capital stocks in many countries, i.e. Greece or Spain. Employment conditions are also of little consequence, possibly since they appear to be relatively homogenous. Instead, human capital levels are high in countries where returns to education and/or experience are high.

Viewed through the lens of these findings, many southern Mediterranean countries score relatively well. For example, human capital stocks are very high in both Israel and Turkey. Even Morocco, where average attainment levels are extremely low compares well with some of the better-educated EU-MED countries. In turn, Algeria, Jordan and Egypt have a relatively low stock of human capital, evidenced by low returns to education. When the prospects for 2030 are considered, several SMC c improve their relative ranking. In particular, the human capital stocks improve substantially in Morocco, Turkey, and Egypt due to improving attainment levels.

A general note of caution is in order here. The indicator for human capital developed in this study relies heavily on the degree of competitiveness in labour markets as a precondition. If the assumption of competitive labour markets is unfounded, returns to education may fail to be collinear with the underlying productivity enhancements, which could put the indicator into question. This is likely to give rise to an appearance of low human capital development. If, for example, the base salaries (i.e. the earnings of those with low education or experience) are set above the market clearing amounts, as is the case in Greece and Portugal, then the returns realised may be dampened by the impact of base salaries. For these reasons, the results should be interpreted with caution.

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[4] The SMC included in the study are Algeria, Egypt, Israel, Jordan, Morocco, and Turkey The EU-MED countries included in the study are seven EU member states with shores on the Mediterranean (except Slovenia), comprising France, Greece, Italy, Malta, Portugal, and Spain. Cyprus was not included due problems in identifying Turkish and Greek-origin populations.

[5] The World Values Surveys explore people's values and beliefs, covering a large number of social and political issues, including democracy, discrimination, gender equality, religion and attitudes toward the environment, work, family, politics, and culture. The surveys are based on the European Values Study (EVS), which was first carried out in 1981 and has been conducted in five waves ever since, covering a total of more than 100 countries. Data for the two surveys are freely available at: (http://www.worldvaluessurvey.org/) and (http://www.europeanvaluesstudy.eu/).

2. Literature review

Several studies provide estimates for private returns to schooling in the Mediterranean region. Pritchett (1999; 2006) emphasises that the steady expansion of the attainment rates in the Middle East and the North Africa (MENA) region has not paid off in the form of increased productivity. Moreover, education does not appear to have had a positive impact on the growth of per capita output, with the accumulation of physical capital driving most of the results. In fact, for non-oil exporting countries, such as Egypt, Morocco, Tunisia, and Turkey, the relationship appears to be negative, with increased educational attainment reducing growth rates. Similarly, Makdisi et al. (2007) find that initial enrolment ratios (for 1960) account for a substantial part of the output gap between the MENA and other regions, including East Asia and Latin America.

One of the only cross-country studies for the region, Salehi-Isfahani et al. (2009) investigates private returns from schooling for urban males in the form of earnings using labour force and household surveys from Egypt, Iran and Turkey.[6] The authors find that returns to education are the greatest in Turkey, where an additional year of schooling leads to roughly a 12% return on wages (according to 2003 figures). Aside from labour market conditions, the authors contend that the high returns may also be due to an inherent selectivity bias in Turkey – also present in Iran – where tough national selection procedures may be effectively leading to an over-representation of students with relatively high cognitive abilities in higher levels of education.

A broader cross-country comparison conducted by Psacharopoulos and Patrinos (2004) reveals that the returns are exceptionally low in some of the developing southern Mediterranean countries, such as Egypt and Tunisia.[7] The results are paradoxical due to the presence of a strong negative relationship between private returns and the level of development. In other words, the private returns to education in Egypt and Tunisia tend to be substantially lower than other countries with similar income levels. This is not the case in Morocco, another SMC country, where private returns are among the highest.

The results imply that the improvements in educational attainment have failed to transform the labour markets and enter into the aggregate production process. Several structural shortcomings that are typically present in the region have been put forward to explain these results. First, despite high levels of attainment, the educational systems suffer from low quality due to inadequate funding, large class sizes, and inappropriate teacher education, (World Bank, 2008). Second, informality is prevalent in most countries in the region, which could undermine the returns from education, both private and social, if skilled workers have a greater tendency to be informally employed, (Angel-Urdinola & Tanabe, 2012). Rent-seeking behaviour may also absorb productive capacities developed through education, often as a direct consequence of the predominance of public sector employment opportunities, (Assaad, 1997; Huitfeldt & Kabbani, 2007; Pissarides & Véganzonès-Varoudakis, 2007). Lastly, a mismatch between the demand for and the supply of skills could be driving down the private returns to schooling, which would run counter to the present trends in many developing countries, especially in the aftermath of trade liberalisation (Revenga, 1997; Pavcnik, 2003; Fajnzylber & Fernandes, 2004; Almeida, 2012).

3. Aggregate attainment and relative earnings

Educational attainment levels vary substantially across the Mediterranean countries. In particular, the share of those with diplomas is extremely high in all SMC except Israel (Figure 3.1). In particular, in Syria and Morocco, more than half of all adults (aged 15 years and above) have no primary,

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[6] Salehi-Isfahani et al. (2009) focus on a subset of the entire sample in order to increase comparability in view of the wide divergences in female and rural labour participation rates between the sampled countries.

[7] Of the SMC, only five were included in the sample of studies revised by Psacharopoulos and Patrinos (2004), including Egypt, Israel, Morocco, Tunisia, and Turkey. It is important to underline that some of the comparisons rely on outdated data, including many of the pre-1990s studies covered by Psacharopoulos (1994).

secondary, or tertiary qualifications. In Algeria, Egypt, Libya, and Tunisia, the comparable ratios are closer to one-third of all adults. As for most of the EU-MED countries, the share of adult population with no qualification is less than 10%. However, exceptions do exist, such as in Cyprus and Portugal.

The differences in terms of schooling between the southern Mediterranean and EU-MED countries are also confirmed by figures on average years of schooling for the region (Figure 3.2). With the exception of Morocco and Syria, most SMC have achieved an average of seven years' schooling, which implies that the average population attainment corresponds to an elementary (ISCED 1, grades 1 to 6) degree only. However, the average years of schooling for SMC adults are clearly much lower than the EU-MED adults, with the exception of Israel and Portugal.

For higher levels of education, a substantial proportion of all adults have only a primary school qualification in Malta, Portugal, and Turkey. Tertiary education is more popular in most of the EU-MED countries, including most notably Greece, Spain and Cyprus. Israel also enjoys a more educated population compared to its peers, even in the EU-MED. Among the SMC, only Libya has a high level of tertiary attainment, mirroring the persistent increase in the number of higher education institutions and enrolment since the 1980s.[8]

Figure 3.1 Educational attainment of adult population (ages 15+), 2010 estimates
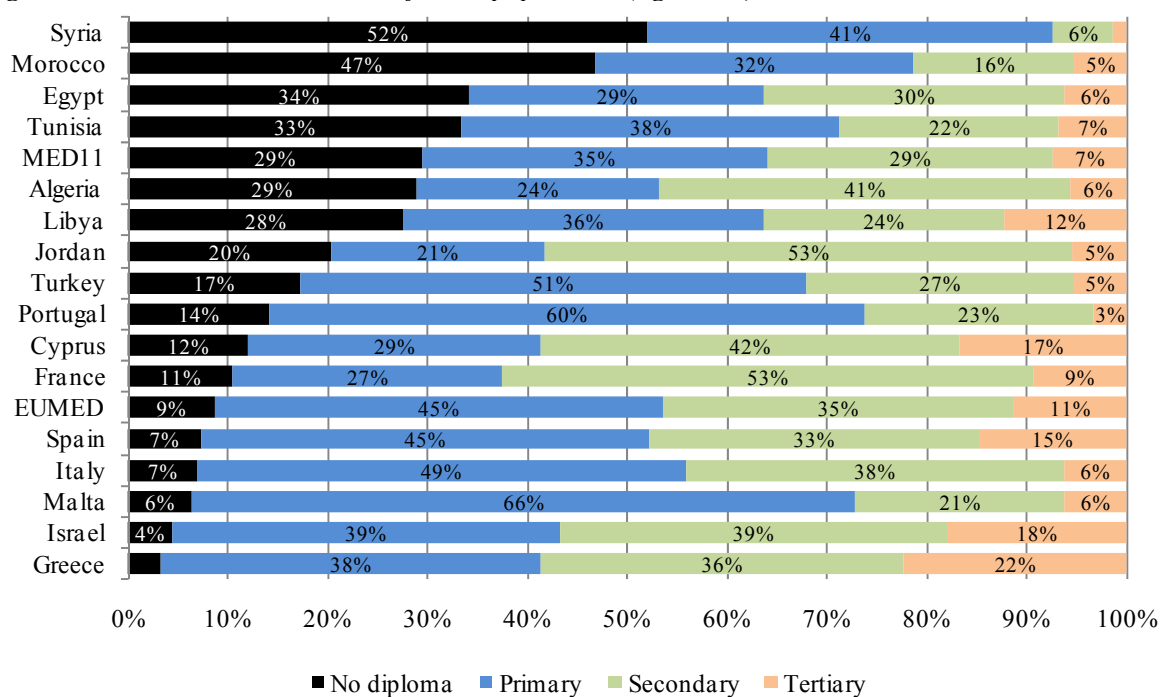
Source: Barro and Lee (2010).

Notes: Figures represent the highest level of study completed with diploma and accounting for potential drop-outs, in many cases corresponding to educational levels under International Standard Classification of Education (ISCED) 1-2 (Primary), ISCED 3-4 (Secondary), and ISCED 5-6 (Tertiary).

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[8] By 2004, the total enrolment in Libyan universities was nearly 270,000, or approximately 7% of the total adult population. For more, see N. Clark (2004), "Education in Libya", *World Economic News and Reviews*, Vol. 17, No. 4 (http://www.wes.org/eWENR/04July/Practical.htm).

Figure 3.2 Average years of schooling for adult population (ages 15+), 2010

Country	Years
Israel	11.3
Greece	10.7
France	10.5
Spain	10.4
Malta	10.2
Cyprus	10.1
EU-MED	9.9
Italy	9.5
Jordan	9.2
Algeria	8.3
Portugal	8.0
Libya	7.9
MED-11	7.6
Tunisia	7.3
Egypt	7.1
Turkey	7.0
Syria	5.3
Morocco	5.0
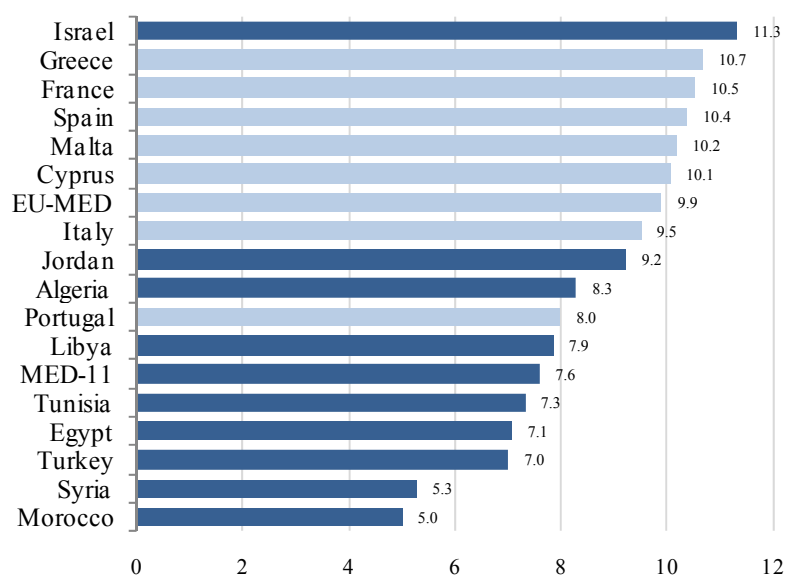
Source: Barro and Lee (2010).

A more detailed look at the Barro and Lee (2010) datasets shows that for Syria, the main explanation for the low attainment levels is the law on compulsory education. Indeed, a substantial proportion of Syrian adults with no primary school certificate appear to have only elementary certificates, i.e. grades 1 to 6, which was the level of compulsory education until recently. This is also reflected by the low average years of schooling among Syrian adults, where Syria ranks – along with Morocco – at the bottom of the list of Mediterranean countries. With the extension of compulsory education in both countries and to cover lower secondary education in the early 2000s, attainment levels are expected to rise significantly.[9]

In Algeria, the high drop-out rates and incomplete enforcement of mandatory schooling laws are likely to be the main reasons for low attainment levels since laws requiring mandatory schooling that cover all primary education (i.e. until grade 9, including lower secondary education) have been in place since 1976.

Meanwhile, the low attainment levels in Morocco (and to a large extent in Egypt and Syria) can only be explained by poor enforceability of compulsory schooling laws. Most strikingly, the data shows that a substantial proportion of Moroccan adults with no primary certificate of education have had no schooling at all.[10] According to Morocco's national statistics, in 2010, more than one-third (35%) of all adults have no qualifications (elementary or even below); nearly 10% had only a pre-school (*préscolaire*) or a Koranic education (*M'Sid*) qualification, which is classified below an elementary (ISCED 1) degree. The population averages point to remarkable improvements for the younger generations, with the share of young adults (ages 15 to 24) with no education, or only a preschool/Koranic education having dropped to 13% and 1%, respectively.

One of the reasons that individuals may choose to remain in school is the potential wage gains that they may enjoy in the future. Although non-pecuniary incentives such as prestige and social class may

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[9] With the adoption of Law No. 32 of 7 April 2002, Syria's free and compulsory basic education covers elementary and lower secondary education starting from the school year 2002/3.

[10] A more detailed and precise analysis of the factors contributing to inadequate education levels is made difficult by potential inconsistencies in the determination of levels of education and years of mandatory education.

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also be at play, earnings differentials between the educated and less educated are likely to be the key driver for a higher level of education.

Figure 3.3 shows that the gains for the SMC appear to be much steeper than in other EU-MED countries. For example, in Tunisia, the earnings of those with a university degree are four times the earnings of those with less than a secondary school diploma. In Morocco, university graduates have more than three times the earnings of those with an upper secondary education. For Tunisia, Morocco, Turkey, and Egypt, the earnings of those with an upper secondary degree are at least 50% more than those with less education. Interestingly, the returns are much lower in other Mediterranean countries, including the EU-MED countries and Israel.

Although illustrative, the use of the aggregate relative wages as a general indicator for returns to education is inappropriate for a variety reasons. Perhaps more importantly, the figures do not take account of experience, which can undermine or exaggerate the observed aggregate earning differentials. For example, in many countries the share of educated people is lower for older individuals, simply because educational attainment levels have been increasing. This could mean that the less educated cohorts appear to earn more, simply because they contain a greater share of more experienced individuals. Well-educated young graduates often have trouble finding employment, which is a particularly common phenomenon in Mediterranean countries. When educated young people face obstacles in seeking work, the more educated adults with jobs would also be more experienced, which could overstate their relative earnings.

Figure 3.3 Relative wages by education level, 2006/7

Earnings below upper secondary = 100
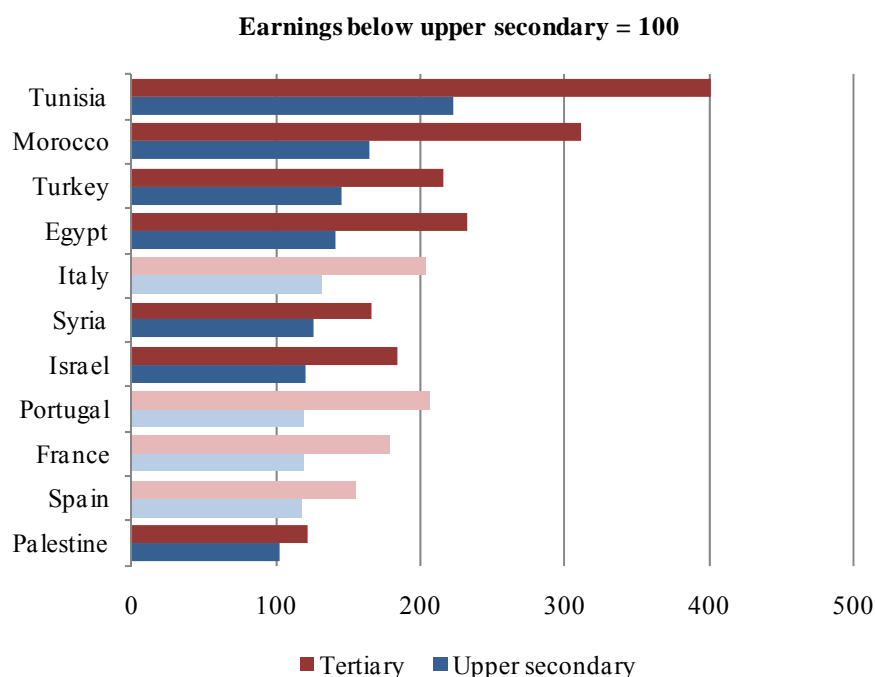
Note: Earnings of those with lower secondary or lower qualifications are set to 100.

Sources: OECD (2010); own data collection from MEDPRO partners.

Other individual factors, such as gender and civil status (i.e. married, single, divorced, widowed, etc.), may also play a role in the determination of earnings. For example, if the job pool includes less educated men, for example, the relative earnings could be inflated, provided that men earn, holding all else constant, more than women. Similarly, married couples may receive more subsidies from the state, which could appear as earnings benefits if – as is usually the case – the income transfers cannot be adequately controlled.

For these reasons, using the average relative returns as estimates of individual returns from schooling are likely to be biased and should only be used as a second-best when individual-level data are unavailable. The next section turns to the description of the estimation of returns from schooling in this study. The section will also detail how the returns from education will be used to build an indicator of human capital.

4. Methodology

4.1 Measuring human capital

As noted above, many traditional measures of the stock of human capital that rely on average years of schooling and educational attainment levels fail to consider underlying factors that contribute to the productivities of individuals with different educational attainments. For example, if the educational quality is low, due to a large class size, high pupil-to-teacher ratios, inadequate resources, or low test scores, then the contribution of education to aggregate productivity could be meagre. There is indeed clear evidence that education quality varies substantially in the Mediterranean region, especially among the SMC, as evidenced from the dispersion in international test scores.

Based on Mulligan and Sala-i-Martin (1997; 2000), the measure of human capital used in this study is related to the wage that an individual would earn in the market place, as a multiple of the base salary in that country. More specifically, the measure of human capital is equivalent to the weighted sum of earnings of individuals with differing education and experience levels divided by the average earnings of those with no education or experience, i.e. those with the lowest levels of productivity.

The rationale for the described measure is as follows. Provided that they serve to improve workers' productivity, markets should reward the more educated and more experienced with higher wages. In countries where educational quality is low, these returns should likewise be lower. If the labour markets are competitive, earnings will be a linear function of the aggregate marginal product of labour and individual productivity. Under these conditions, the sum of relative wages as a share of a base salary would essentially give a weighted sum of productivities, which is exactly what the human capital measure serves to measure.

To derive the measure of human capital more formally, suppose that aggregate output in country i, Y_i, is a function of physical (K) and human capital (H) devoted to productive purposes:

$$Y_i = F(K_i, H_i). \tag{1}$$

The human capital measure can further be written as a summation of the individual contributions of workers with different education levels, s, and experience level, x, such that

$$H_i = \sum_s \sum_x \theta_i(s,x) \cdot N_i(s,x),$$

where θ gives the productivity, or the efficiency parameter, and N is the number of employed workers at each education (s) and experience (x) level. Unlike Mulligan and Sala-i-Martin (1997), employment rates are allowed to differ across experience and education levels, effectively accounting for distinctions in labour force participation and unemployment across different groups.

Dividing the aggregate human capital stock by the total stock of workers, i.e. $\sum N_i$, the target measure of human capital per-capita is obtained,

$$h_i = \sum_s \sum_x \theta_i(s,x) \cdot n_i(s,x), \tag{2}$$

where n is the share of employed workers at each education and experience level. When labour markets are competitive, a worker's earnings, w, are equivalent to the marginal product of labour input. As a consequence,

$$w_i(s,x) = F_H \cdot \theta_i(s,x) \tag{3}$$

where F_H is the marginal product of labour.[11]

In order to arrive at our simple measure of human capital, it is assumed that workers at the bottom of the education and experience scales, i.e. those with $s = x = 0$, have identical levels of productivity across all countries, defined as $\theta_0 > 0$. Those with higher levels of education and experience, in turn, may have differing productivities, depending on the education system, labour market conditions, as well as other country-specific and individual characteristics.

With these assumptions and after normalising for $\theta_0 = 1$ without loss of generality, the marginal product of labour in each country can be written as:

$$F_H = w_i(0,0). \tag{4}$$

Eliminating marginal products in equation (3) using equation (4), equation (2) can finally be re-written as:

$$h_i = \frac{1}{w_i(0,0)} \cdot \left(\sum_s \sum_x w_i(s,x) \cdot n_i(s,x) \right). \tag{5}$$

Equation (5) will serve as the country-specific indicator to be estimated. In what follows, the estimation of the earnings for each education and experience level, $w(s,x)$, will rely on econometric specifications using a cross-section of household surveys. Since the survey samples are unlikely to be accurate proxies for the population shares, the employment rates, $n(s,x)$, will in turn be obtained from aggregate data on educational attainment and employment rates, accounting for varying unemployment and labour participation rates across different age and education groups, to the extent of data availability.[12]

Due to national differences in the descriptions of different attainment levels, the human capital measures use approximate years of schooling corresponding to each attainment levels, i.e. 3 years for those with inadequate education, 9 years for those with primary education (including lower secondary schooling), 12 years for those with secondary education, and 16 years for those with tertiary education. In turn, four experience levels are considered. These are 0 to 5 years, 5 to 15 years, 15 to 25 years, and more than 25 years of experience.

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[11] The assumption of perfect labour markets can be relaxed without any impact on the validity of the human capital measure provided that the imperfection has a uniform impact on wage setting. This would be the case, I, for example, equation (3) can be written as $w_i(s,x) = \gamma_i \cdot F_H \cdot \theta_i(s,x)$, where $0 \leq \gamma_i \leq 1$ represents the country-specific factor of market imperfection. Although such an assumption could cover many cases where wages are set below their marginal products, such as a general monopsony in labour markets or cross-sector unionised bargaining process, it will not be appropriate for potentially asymmetrical imperfections, such as the presence of (binding) minimum wages and sector-specific bargaining.

[12] It is important to note that the human capital measure used in the study is based on the productivity of individuals as reflected by their incomes and not necessarily the population as a whole, who may or may not be employed. This would mean that our human capital measure may point to high levels of productivity even in markets with under-employment. As an extreme case, suppose that in an economy only a minority of highly able persons are employed while the majority (well-educated or not) are either unemployed or out of the labour force. In this case, the human capital measure would point to a high level of human capital without considering the education levels of the rest of the population. An alternative measure on the *potential* level of human capital can also be developed, taking account of the wages that individuals with similar educational attributes would earn but weighing each by the population shares and not the employment rates. However, an analysis of such a measure (not included here) shows that the results are not very sensitive to such a distinction.

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4.2 Micro-level data

The study relies on a large micro-level dataset extracted from the fourth wave of the World Values Survey (WVS) and European Values Survey (EVS), which were conducted between the years 1999 and 2002.[13] For the sampled countries, the surveys were conducted in 2000/1. Due to inadequate coverage, only 12 countries in the Mediterranean are included in the database. Among the southern Mediterranean countries,[14] six are covered, including Algeria, Egypt, Israel, Jordan, Morocco, and Turkey. In addition, all the EU-MED countries[15] except Cyprus are included in the dataset.[16]

Aside from some individual characteristics, including the subject's gender, age (used for schooling calculations), whether he or she is the chief income earner in the household and the civil status (married or not), two sets of variables on earnings and education levels were used for the purpose of empirical exercise.

The first set of variables relates to annual (or in some cases monthly) household earnings, accounting for all wages, salaries, pensions, and other supplemental income. However, instead of reporting the actual incomes, under the WVS and EVS, subjects are asked to identify their household incomes within a scale of 10 income groups, readily provided to the respondents during the interview. The scales of incomes were country-specific and recorded as a separate variable, which were used as the basis for the econometric specifications.[17] Finally, the scaled incomes were translated into hourly earnings in international dollars using i) the Purchasing Power Parity (PPP) adjusted currency conversion rates, available from the Penn World Tables; and ii) average working hours (or official working hours whenever data unavailable) and number of days spent as holidays, using the Working Time database of the International Labour Organization (ILO). Figure 4.1 provides the hourly earnings for households in the 12 countries covered in our sample for the fourth waves of the WVS and EVS.

The second set of variables covers level of schooling. The database provides two relevant variables: age out of school and highest level of education attained. The first variable, age out of school, was translated into years of schooling by subtracting the official starting age for elementary education (6 in most countries; 5 in Israel and Malta for the years studied). The same variable was also used to obtain a proxy for (post-school) experience, set to current age minus age out of school.[18] The coding for the second variable relating to schooling, i.e. educational attainment, showed substantial inconsistencies, mainly due to differences in compulsory schooling and the treatment of technical and vocational treatment within the sample. For example, an individual with only an elementary school degree may be interpreted to have a very low attainment in France; the same subject may be considered as having successfully completed compulsory education in Algeria. Nevertheless, the country-specific educational attainment data was used to confirm the reliability of the data on years of schooling and drop any inconsistencies.[19]

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[13] The incomes data were incomplete for most countries of interest for the fifth wave of the survey. In particular, subjects were asked to rank their incomes on a subjective scale, rather than a pre-defined and clearly stated income ranking, as was the case in our database.

[14] For the purposes of this study and the MEDPRO project in general, SMC are defined as Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine Authority, Syria, Tunisia, and Turkey.

[15] EU-MED countries sampled in the study are seven EU member states with a shore on the Mediterranean (except Slovenia), comprising Cyprus, France, Greece, Italy, Malta, Portugal and Spain.

[16] Although Cyprus is covered under the EVS, there are potential problems in the treatment incomes figures for the Greek and Turkish areas.

[17] The scales reported in the databases were double-checked for consistency using the actual questionnaires (whenever available).

[18] A more appropriate measure would be the years employed; however, the survey does not contain any data on years employed or unemployment spells.

[19] To do this, educational attainment data were transformed into approximate years of schooling. More specifically, individuals with 0 to 4 years of schooling are typically deemed to have inadequate education (no

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The descriptive statistics for the micro-data set are provided in Table 4.1. Interestingly, the average years of schooling show very little variance across the two coasts of the Mediterranean. In the EU-MED and SMC, adults have an average of 12.5 and 12.0 years of education, respectively. However, this is largely due to Algeria and Israel, in which the sample means for schooling are above 13 years.[20]

Figure 4.1 Probability density distributions of household hourly incomes
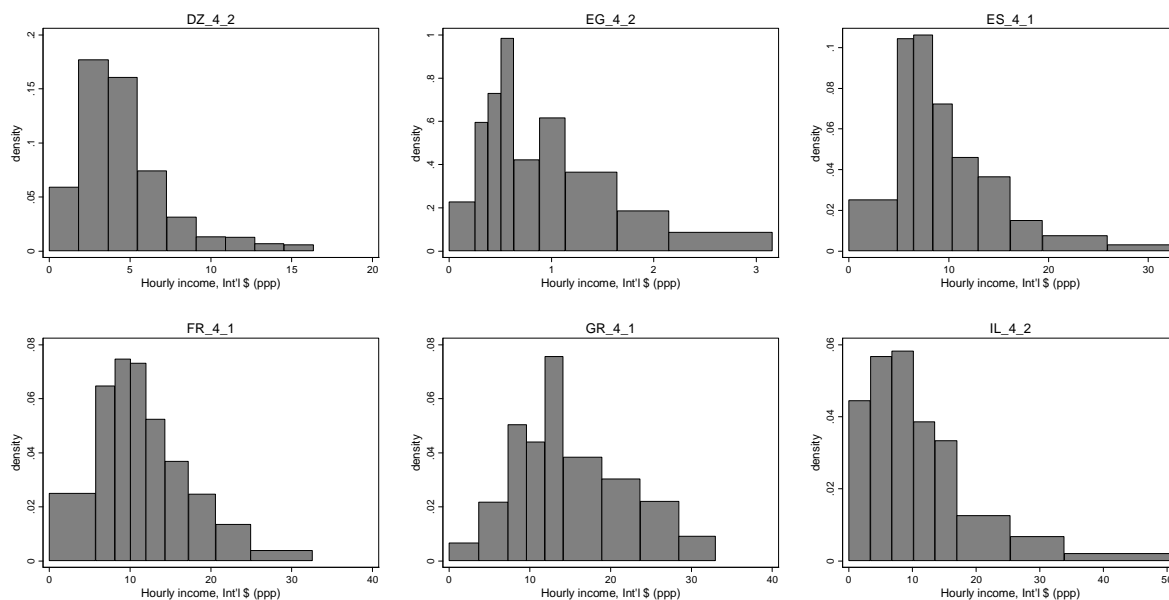
diploma); similarly, those with a total schooling of 5 to 8 years, 9 to 11 years, 12 to 14 years or more than 15 years of education are deemed to have elementary, lower secondary, upper-secondary, and tertiary education, respectively. Cases where the years of schooling were outside the typical lower and upper thresholds for the preceding and subsequent educational level classes were dropped. For example, the procedure would eliminate an individual with 7 years of schooling who claims to have upper secondary or even a tertiary attainment; the same individual would not be eliminated, however, if the reported attainment was less than lower secondary.

[20] While the samples show very little differences between the EU-MED and SMC in terms of average attainment levels, an international comparison using the Barro and Lee (2010) database reveals a completely different picture. In particular, the average years of schooling for adults (aged 15 and above) are much lower across the SMC, notably in Algeria (an average of 8.3 years), Egypt (7.1 years), Morocco (5.0 years), and Turkey (7.0 years). These comparisons clearly show that our micro-sample is substantially biased towards more educated individuals among the SMC and thus cannot be used as a basis for aggregate statistics.
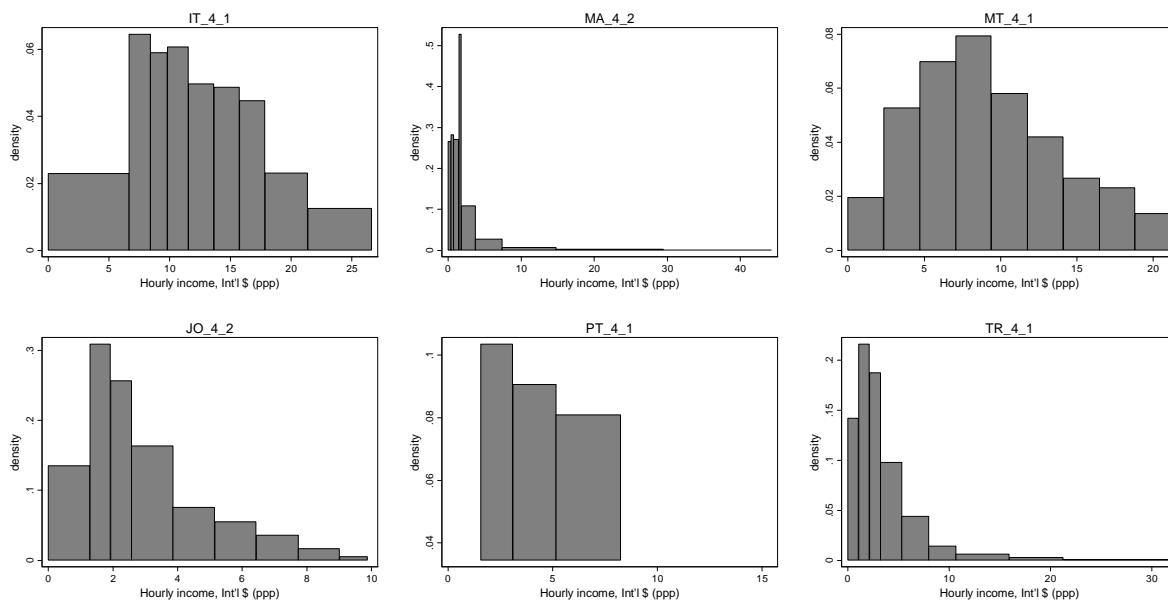
Notes: Household income figures were reported as belonging to one of the 10 (4 in Portugal) pre-specified income intervals. The survey data were converted from monthly or annual income in local currency units to hourly income in international dollars using ILO data on average (or official) working hours, average days of official holidays and Purchasing Power Parity (PPP) adjusted currency conversion rates from the Penn World Tables.

Sources: WVS and EVS, Wave 4, 1999-2004 and own calculations.

Table 4.1 Descriptive statistics for survey data, adults of ages 20-59

	Obs.	**Mean**	**Std. dev.**	**Max.**	**Min.**
EU-MED					
Household income, lower bound ($, ppp)	4,200	11.64	6.93	33.00	0.00
Years of schooling	5,537	12.50	4.52	25.00	0.00
Years of experience	5,147	20.66	12.72	52.00	0.00
Rural area (1= less than 50,000 inhab.)	5,538	0.65	0.48	1.00	0.00
Gender (0=male)	5,537	0.53	0.50	1.00	0.00
Civil status (1=married)	5,471	0.56	0.50	1.00	0.00
SMC					
Household income, lower bound ($, ppp)	4,916	3.89	5.76	50.81	0.00
Years of schooling	5,617	12.02	4.59	25.00	0.00
Years of experience	5,376	18.48	12.09	61.00	0.00
Rural area (1=< 50,000 inhabitants)	5,627	0.52	0.50	1.00	0.00
Gender (0=male)	5,627	0.50	0.50	1.00	0.00
Civil status (1=married)	5,611	0.64	0.48	1.00	0.00

Table 4.2 Data coverage, adults of ages 20-59

		Source	Year	Obs.	Income reported*
EU-MED					
ES	Spain	EVS	1999	755	66.6%
FR	France	EVS	1999	1,151	81.3%
GR	Greece	EVS	1999	962	84.5%
IT	Italy	EVS	1999	1,360	76.0%
MT	Malta	EVS	1999	724	73.2%
PT	Portugal	EVS	1999	586	65.7%
SMC					
DZ	Algeria	WVS	2002	907	81.1%
EG	Egypt	WVS	2000	1,516	90.4%
IL	Israel	WVS	2000	928	80.6%
JO	Jordan	WVS	2001	909	93.4%
MA	Morocco	WVS	2001	466	70.0%
TR	Turkey	EVS	2001	901	98.4%

Note: * Share of respondents reporting their household income.

Details on the country-specific coverage of the dataset are given in Table 4.2. The figures show that the coverage is somewhat unbalanced and not necessarily weighted by the population shares in the overall sample. For example, Turkey, which has the second largest population in the region, does not have a corresponding share of respondents in the pooled sample. Nevertheless, most households report their income levels across the sample, especially among the southern Mediterranean countries.

4.3 Econometric specification for estimating returns from schooling

The aim of the econometric exercise in the study is to estimate the earnings functions of each individual, using the following Mincerian model:

$$y_i^* = \alpha + \beta_1 \cdot s_i + \beta_2 \cdot s_i^2 + \beta_3 \cdot x_i + \beta_4 \cdot x_i^2 + \delta \cdot Z + \varepsilon_i, \tag{6}$$

where $y^* = ln\ w^*$ is the actual log-earnings, s and x are years of schooling and experience, Z is a vector of control variables and ε is the error term, assumed to be normally distributed. In this specification, the intercept in equation (6), α, provides an estimate of the base incomes for those with no schooling or experience.

Two control variables are included in the general assessment of returns to education in the two regions, EU-MED and the SMC. The first control variable is a dummy for rural location, indicating that the respondent lives in an area with a population of less than 50,000 inhabitants. The second control variable indicates whether the subject is married or not, in an attempt to control for divergence in household earnings. These control variables are not included in the country-specific estimates to build the human capital measures, in order to avoid introducing a bias for the base incomes.[21]

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[21] If, instead, the two control variables were included in the estimation of human capital levels, they would imply that the returns to education and experience would correspond to the general population while the base salary, depicted by the intercept estimate, would correspond to unmarried individuals living in urban areas. Since the human capital measures are effectively weighted averages of the said coefficients, the results would be biased.

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Under these specifications, while actual earnings are unobserved, each subject j reports the interval within which his or her household income falls, so that the observed dependent value y is defined as follows:[22]

$$
y_{ij} = \begin{cases} 0 & \text{if} & 0 \leq w_{ij}^* < a_{1i} \\ 1 & \text{if} & a_{1i} \leq w_{ij}^* < a_{2i} \\ \vdots & \\ 10 & \text{if} & a_{9i} \leq w_{ij}^* < \infty \end{cases} \tag{7}
$$

Since the earnings data is interval-censored, the ordinary least squares (OLS) of y over relevant explanatory variables would lead to biased estimates, similar to the case of omitted variables, (Maddala, 1983). The literature has provided several solutions to the problem of interval dependent variables. One simple solution is assigning to each observation the midpoints of the left- and right-hand censoring limits for each group and making a distributional assumption to resolve the top-coding problem.[23] Although such an *ad hoc* procedure for transforming incomes is relatively easy to implement, it is not likely to lead to estimates that converge to the actual parameters and would not be asymptotically consistent.[24]

A more appropriate approach is to make an assumption regarding the distribution of the income variable and to estimate the censored variables using maximum likelihood procedures. In our case, the income is assumed to have a log-normal distribution. The estimation procedures used here approximate to the ones proposed by Amemiya (1973), taking account of interval-censoring and providing estimates of returns to education for each country separately.

In order to reduce potential biases in estimating returns to education, two additional assumptions are made. First, only <u>employed adults</u> between the ages of 20 and 59 are considered. For younger individuals, ongoing education and time spent at school may bias the estimates. For adults aged 59 and over, divergent life expectancies on both sides of the Mediterranean may complicate the estimations. Second, only <u>males</u> are considered in the estimation exercise. Although omitting female responses results in a reduced sample (by roughly 50% in all cases), men are more likely to be the chief wage earners in most of the countries under study, which helps us to limit the potential biases from using household income rather than individual income levels.[25] Moreover, women's labour participation may be guided by other factors, such as differing cultural roles, not sufficiently controlled by the simple model presented above, which could undermine the validity of the methodology. Third, the schooling data were checked for consistency and any inconsistent observations. In particular, years of schooling that were substantially different from the implied education attainment levels were dropped from the estimations, leading to a 1% to 3% reduction in the sample size for each country. Lastly, the 5-percentile outliers were removed based on income data for each educational attainment group.

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[22] Note that under the previous specification, the income scales, *a*, may differ from one country to another.

[23] A similar approach was used by Krueger and Lindahl (2001) to resolve the interval data for income in the WVS dataset. In particular, the authors have resolved the top-coding problem by fitting a Pareto distribution to family incomes beyond the median income and calculating the mean for the censored distribution for the top income category. For all other cases, the authors assign mid-points of each income interval.

[24] In particular, assigning mid-points to censored intervals would lead to consistent results only when incomes are uniformly distributed or when the number of intervals is sufficiently large, both of which are unrealistic assumptions for our purposes.

[25] Although returns to schooling estimates may suffer from the fact that household incomes are represented, the human capital measure in equation (5) is essentially a ratio of two incomes, which should limit the impact of household incomes. Other variables that could have been used to build a more approximate proxy were either largely missing or hard to interpret. For example, the surveys asked the respondents to state whether they were chief income earners in their households. However, no guidance was provided on what this meant exactly. Moreover, in Israel, the question was not posed.

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4.4 Estimating employment rates

As noted above, the construction of the human capital measure relies on aggregate data on employment rates by level of education and age. For the EU-MED countries, Eurostat provides tables on employment rates, distinguishing between age and educational attainment. Since a comparable source does not exist for the SMC in our sample, national sources were solicited to create a database on labour participation, unemployment and employment rates across the countries in the sample.

For countries for which the employment information was incomplete, linear estimations were made using the national figures on employment rates and the education attainment indicators of Barro and Lee (2010) to fill out the table of employment rates across the different age and education levels.

More concisely, the estimation of employment rates followed these steps:

- First, the available information on employed population (or active population) was gathered in a table. In many cases, this amounted to group totals, i.e. across age groups without distinguishing education levels or across different education levels for all age groups.

- Then, if employment rates (i.e. share of employed divided by the population for the relevant group) were not available, a corresponding table was constructed with the use of Barro and Lee's (2010) educational attainment database.

- Third, the empty elements of the table were estimated by extrapolating the available information. The estimation assumes that the employment rate for any given group is determined as a linear combination of the employment rates for each corresponding group total.[26] The best fit for the linear formulae was determined by an OLS regression with the available information, i.e. group totals.

5. Results

5.1 Returns to schooling

In order to assess the returns to education on both sides of the Mediterranean, a series of estimations were made for the pooled samples of EU-MED and the SMC. Although not used in the construction of the human capital measure, these regressions nevertheless give a sense of the results, highlighting the distinctions between the European and southern Mediterranean countries. Since Israel and Turkey, which are in the SMC sample, are clearly distinct from their peers, a third set of regressions is also run by pooling the data for Algeria, Egypt, Jordan, and Morocco.

The results for the pooled regressions depicted in Table 5.1 provide evidence of clear differences in the returns to schooling and the incomes of households across the Mediterranean. The linear element for the returns to schooling show that an additional year of schooling results in approximately an 11% increase in the incomes in the EU-MED. For the six SMC included in the study, the returns are even greater, around 13 to 14% per year of schooling. In both cases, the returns diminish with increasing schooling, as indicated by the negative square-terms. A most notable contribution of this study is that, unlike Psacharopoulos and Patrinos (2004), however, the developing SMC economies face much lower returns to education than the EU-MED countries. In particular, while the returns to schooling are comparable between the EU-MED and SMC, a clear distinction emerges once Turkey and Israel are removed from the latter sample.

Experience has a substantial positive impact on incomes in the EU-MED countries, once again diminishing over time but nevertheless remaining present for the entire life span of most adults. However, the impact of experience appears to be partly absorbed when civil status is controlled for.

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[26] For example, the employment rate for individuals aged 15-24 and with a primary education qualification are determined by a linear combination of employment rates for (a) all individuals aged 15-24 and (b) those with a primary qualification.

This is most likely due to some interaction between the two variables as married couples tend to be older (and thus more experienced).

For the southern Mediterranean countries in general, experience has no income; however, when Turkey and Israel are left out of the sample, inexperience appears to lower incomes. With more and more experience, the square-term kicks in and offsets and eventually leads to higher incomes. Once again, the impact of experience appears to be absorbed by the marriage dummy, most likely due to similar reasons as above. However, the positively signed square-terms are present, implying a J-shaped relationship between income and experience, which is mostly likely evidence of the persistently depressed incomes for young graduates with low levels of experience in the region.

Those living in rural areas have a severe disadvantage across the Mediterranean. However, in SMC, the earnings differentials are striking. In particular, rural households across these countries have anywhere between 40 to 80% lower incomes than those living in urban areas (i.e. with a population above 50,000). The disparities are even more striking when Turkey and Israel are included in the sample of SMC. Further tests (not included here) show that rural residents are severely disadvantaged in Turkey. Meanwhile, the differences are much smaller in the EU-MED, albeit still significant.

As noted in the methodology, the second set of estimations considers the base equation and identifies country-specific incomes for different education and experience levels. These estimates are then used to build the human capital measures, as outlined above. Also, only the simple econometric model is used to ensure that the coefficient estimates and the intercepts correspond to the same group of individuals.

Table 5.1 Private returns to schooling in the Mediterranean, pooled interval regressions

	EU-MED			MED-11			MED-11 w/o TR or IL		
	I	II	III	IV	V	VI	VII	VIII	IX
Years of schooling	0.110***	0.107***	0.110***	0.137***	0.130***	0.126***	0.024	0.046*	0.051**
	(0.016)	(0.016)	(0.016)	(0.022)	(0.020)	(0.020)	(0.024)	(0.024)	(0.023)
Years of schooling squared	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experience	0.012***	0.012***	0.002	0.002	-0.004	0.014**	-0.020***	-0.019***	0.002
	(0.004)	(0.004)	(0.004)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.008)
Experience squared	-0.001*	-0.001*	-0.000	0.001***	0.001***	0.000	0.001***	0.001***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rural area dummy		-0.074***	-0.085***		-0.955***	-0.912***		-0.541***	-0.520***
		(0.026)	(0.026)		(0.042)	(0.042)		(0.051)	(0.051)
Married dummy			0.152***			-0.305***			-0.319***
			(0.031)			(0.055)			(0.068)
Constant	1.298***	1.379***	1.405***	-0.638***	0.154	0.109	0.286	0.520***	0.397**
	(0.119)	(0.121)	(0.120)	(0.164)	(0.151)	(0.149)	(0.180)	(0.175)	(0.172)
Observations	1,909	1,909	1,895	2,338	2,338	2,330	1,593	1,593	1,588
Log likelihood	-4016.00	-4012.00	-3970.00	-5378.00	-5149.00	-5113.00	-3633.00	-3580.00	-3554.00
Chi sq.	322.90	330.40	348.80	223.00	741.50	781.30	67.11	181.70	202.60
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: The dependent variables for the regressions are the left- and right-censored log income intervals. Robust standard errors are reported in parentheses. The significance levels are as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The data captures the conditions in years 2000/1. Income levels are converted to international dollars (adjusted by the purchasing power parity derived from GDP deflators in the relevant years) to make the results comparable.

Table 5.2 Private returns to schooling in EU-MED, pooled interval regressions

	I	II	III	IV	V	VI
	France	**Greece**	**Italy**	**Malta**	**Portugal**	**Spain**
Years of schooling	0.110**	0.040	0.157***	0.257***	0.075	0.075**
	(0.044)	(0.056)	(0.031)	(0.086)	(0.050)	(0.032)
Years of schooling sq.	-0.001	0.000	-0.004***	-0.007**	-0.000	-0.001
	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)
Experience	0.037***	0.021**	0.003	-0.032***	0.028**	0.015
	(0.009)	(0.009)	(0.008)	(0.012)	(0.013)	(0.011)
Experience sq.	-0.0005***	-0.0004*	0.000	0.0015*	-0.001**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.824***	1.848***	1.237***	0.837	1.207***	1.414***
	(0.318)	(0.429)	(0.230)	(0.602)	(0.355)	(0.244)
Observations	423	288	479	259	152	219
Log likelihood	-940.30	-646.50	-1102.00	-560.90	-194.10	-488.40
Chi sq.	100.70	45.39	75.42	60.02	47.29	33.51
p-value	0.00	0.00	0.00	0.00	0.00	0.00

Note: The dependent variables for the regressions are the left- and right-censored log income intervals. Robust standard errors are reported in parentheses. The significance levels are as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The data captures the conditions in years 2000/1. Income levels are converted to international dollars (adjusted by the purchasing power parity derived from GDP deflators in the relevant years) to make the results comparable.

Table 5.3 Private returns to schooling in MED-11, pooled interval regressions

	I	II	III	IV	V	VI
	Algeria	**Egypt**	**Israel**	**Jordan**	**Morocco**	**Turkey**
Years of schooling	0.022	0.097***	0.121*	0.067**	0.028	0.197***
	(0.032)	(0.024)	(0.068)	(0.029)	(0.083)	(0.037)
Years of schooling sq.	0.000	-0.002*	-0.001	-0.001	0.003	-0.005***
	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)
Experience	-0.011	-0.002	0.009	-0.006	0.069**	-0.003
	(0.010)	(0.009)	(0.018)	(0.009)	(0.031)	(0.013)
Experience sq.	0.000	0.0004*	0.000	0.000	-0.002**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Constant	1.170***	-1.122***	0.599	0.340	-0.504	-0.332
	(0.263)	(0.187)	(0.488)	(0.229)	(0.617)	(0.275)
Observations	333	718	318	380	162	427
Log likelihood	-575.50	-1537.00	-633.20	-713.80	-326.50	-736.80
Chi sq.	13.41	79.57	65.64	26.92	44.54	152.60
p-value	0.01	0.00	0.00	0.00	0.00	0.00

Note: The dependent variables for the regressions are the left- and right-censored log income intervals. Robust standard errors are reported in parentheses. The significance levels are as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The data captures the conditions in years 2000/1. Income levels are converted to international dollars (adjusted by the purchasing power parity derived from GDP deflators in the relevant years) to make the results comparable.

The results of the country-specific estimations are given below. As can be seen from these results, the returns to schooling appear to be more homogenous among the EU-MED countries (Table 5.2). Returns are extremely high in Italy and Malta in early years education but the square-term dampens the positive gains from continued schooling. In France, Greece, Portugal and Spain, an additional year of schooling increases incomes between 6.2 to 8.0% in almost all years of schooling, which implies relatively constant returns. In addition, apart from Malta, experience pays off substantially, increasing incomes by 1.6 to 3.5% in early years. The constant terms are significant in all of the European countries. Interestingly, the base incomes are extremely high in Greece and Spain.

Turning to the SMC, the returns to schooling are less uniform, (Table 5.3). Most strikingly, in Algeria, the returns are almost flat, even for different experience levels. The constant term, in turn, is significant and relatively high, at least when compared to the other SMC. Substantial sample variation leads to less significant returns to schooling in Morocco even though the implied returns are not zero, suggesting a 3% return to an additional year of schooling. Perhaps not so surprisingly, Turkey and Israel have the greatest returns to schooling. In Turkey, an additional year of education leads to an 18.5% increase in income, even though the dampening effect of the square terms for years of schooling is also strong.[27]

Whenever they are significant, the square terms are also negative, pointing to lower returns at higher levels of education. This is particularly the case in Italy, Malta, Egypt, and Turkey, all with limited predominance of tertiary education. In turn, in countries where obtaining a tertiary degree is more commonplace, such as France, Greece, Israel and Spain, the square terms are insignificant.

Experience has a substantial impact on incomes in several countries. With the exception of Malta, an additional year of experience leads to approximately 2 to 4% income rise in the EU-MED. In particular, in France and Portugal those with 10 years of experience earn around 25 to 30% more than their peers with an identical schooling level. Among the SMC, experience only has a significant impact in Morocco, with nearly 7% for the first year and rising to more than 30% in five years. In Egypt, experience pays off exponentially but the effect is very limited, with the wage differential between a young graduate with no experience and another with 10 years of experience, holding all else constant, is only 2% in additional income. In other SMC, the impact is more ambiguous.

5.2 Human capital measures

The estimates from above can now be put together to build the human capital measures. For the purpose of this exercise, the assumed employment shares are detailed in the appendix.

According to the results shown in Figure 5.1, Israel and France have the highest stock of human capital, suggesting that the productivity of an average worker is approximately 4.5 to 5 times the productivity of a worker with no experience or skills. If the productivity of those earning the base salaries is comparable across countries, then both countries come top of the list of the human capital comparison in the Mediterranean. Malta's labour market also has a very high stock of human capital. Following Malta is Turkey, which has one of the highest (linear) returns terms within the sample. As for other SMC, Morocco remains roughly in the middle of the list while Egypt, Jordan and Algeria are at the bottom of the list.

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[27] The finding that private returns to education are relatively high is in line with Tansel (2008) and the comparative results on higher education of Psacharopoulos (2009).

Figure 5.1 Human capital measures, 1999-2001 surveys, multiples of base income

IL	4.84
FR	4.54
MT	4.15
TR	4.03
IT	3.89
PT	2.78
MA	2.60
ES	2.48
GR	2.02
EG	2.01
JO	1.69
DZ	1.12
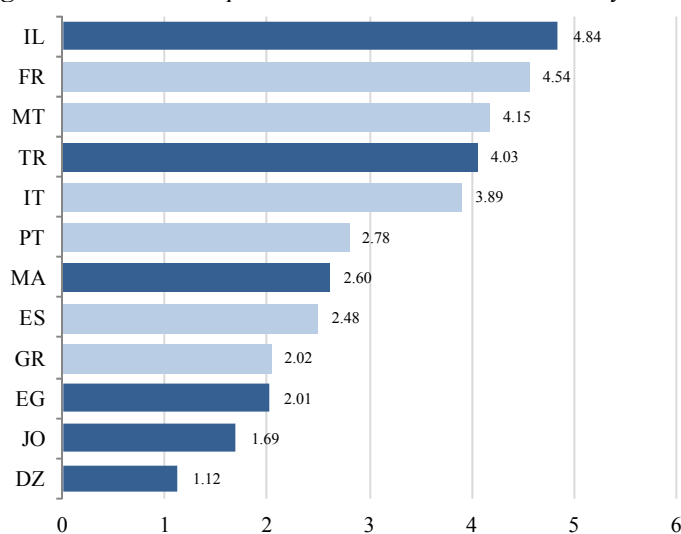
Note: Base income is equivalent to the incomes of those with no education or experience, assumed to correspond to a uniform productivity across the entire sample and as indicated by the intercept estimates for each country.

The results reflect, to a large extent, the findings for returns to education. Education pays off substantially in Israel, Malta, and Turkey, with an additional year of schooling bringing in anywhere between 10 to 20% of additional income (see Table 5.2 and Table 5.3 above). As for Italy, the linear returns are dampened by the square term, which lowers the country's overall ranking. Egypt's labour market also provides steep returns to schooling; however, the average level of schooling remains extremely low in the country's employed workforce. Morocco's mid-level ranking is by and large thanks to returns to experience (and not education), which strongly improves incomes and thus productivity levels.

Interestingly enough, several EU-MED countries are also placed at the bottom of the list. For Greece, paradoxically one of the most educated populations in our sample, the results are largely due to low returns to schooling. Moreover, Greece's base salary is relatively high, suggesting that non-competitive factors (such as binding minimum wages or collective bargaining) may be at play. Although education pays off in Spain, the returns are not that high when compared with the regional figures. Moreover, experience plays almost no role, which is an important factor behind France's top positioning. Lastly, and perhaps most importantly, unemployment rates are very high, especially among the educated, in Greece and Spain, which also lower the human capital scores.

It is important to highlight that the results should be interpreted with care. For one thing, human capital measures developed in this study provide an estimate of the average incomes, as multiples of a base income corresponding to no schooling or experience. All income levels are estimated using the procedures identified in the methodology section. Assuming that the base incomes can be treated as uniform productivity benchmark across the sample, the figures give a comparable view of the average productivity in the work force. However, it should be noted that these figures may change if the potential earnings of those outside the employed workforce, especially those that are unemployed can also be factored. Due to unavailability of data on the wage opportunities of those with no jobs, such a procedure is not followed here. Thus, the conclusions must be treated with caution.

Another potential weakness is the possibility that the perfect competition assumption in equation (3) may be inappropriate in some cases. This is most likely the case in Algeria and Greece, where the base salaries appear to be too high. Although the human capital estimates will not be influenced by these choices, their comparability may be at question if the base incomes are less related to productivities (or the marginal product of labour).

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6.   Prospects for 2030

This section develops the baseline scenarios for the year 2030 with the aim of assumptions on i) educational attainment; ii) employment rates; and iii) returns to schooling. The following provides an overview of the assumptions made.

-    The dataset of Barro and Lee (2010) detailing the highest level of diploma received for 5-year groups for the years 1950-2010 was used to identify long-term and short-term trends in attainment.[28]

-    Employment rates are adjusted with the aid of national statistics for labour force participation rates and unemployment rates across different groups in order to identify trends. Since data availability is a serious impediment, the assumptions are relatively broad.

-    Returns to education are modified by paying special attention to countries with less developed and less market-oriented labour markets. For example, the returns are expected to improve substantially in Algeria, Morocco, and Jordan which remain relatively under-developed. In other countries, in emerging economies, the returns will become more moderate.

To a large extent, the results are more sensitive to the returns to education and the population shares for different education categories. With the exception of high unemployment rates among inexperienced youth and the low participation rates in most SMC, employment rates show relative consistency across different age and education categories. To follow is a detailed description of the assumptions made in building the scenarios.

6.1   Prospects of returns to education

The literature on the determinants of returns to education is relatively limited. Yang (2005) use Chinese household data for two years, 1988 and 1995, to show that the economic transition improved not only the returns to education but also returns to experience and communist party membership. According to the study's findings, the returns to schooling (in years) in the standard Mincerian low-wage equation increased from approximately 3-3.5% to 5-6%. At the same time, the returns to an added year of experience increased from around 4% to more than 7%, contributing to a growth in inequality.

A similar study for the Czech Republic by Munich et al. (2005) also confirms that the returns to education increased dramatically during the country's transition from a centrally-planned economy to a market economy between the years 1989 and 1996. Within this period, the increased returns to an additional year of schooling increased from around 2.5% to more than 5.5%. The effect was particularly strong for the high school university graduates, for which the returns from a higher degree more than doubled.

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[28] Barro and Lee (2010) use a specific methodology for filling in missing observations. These methods were closely followed here to generate the forecasts using backward extrapolation.

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Figure 6.1 Relationship between returns to schooling and years of schooling
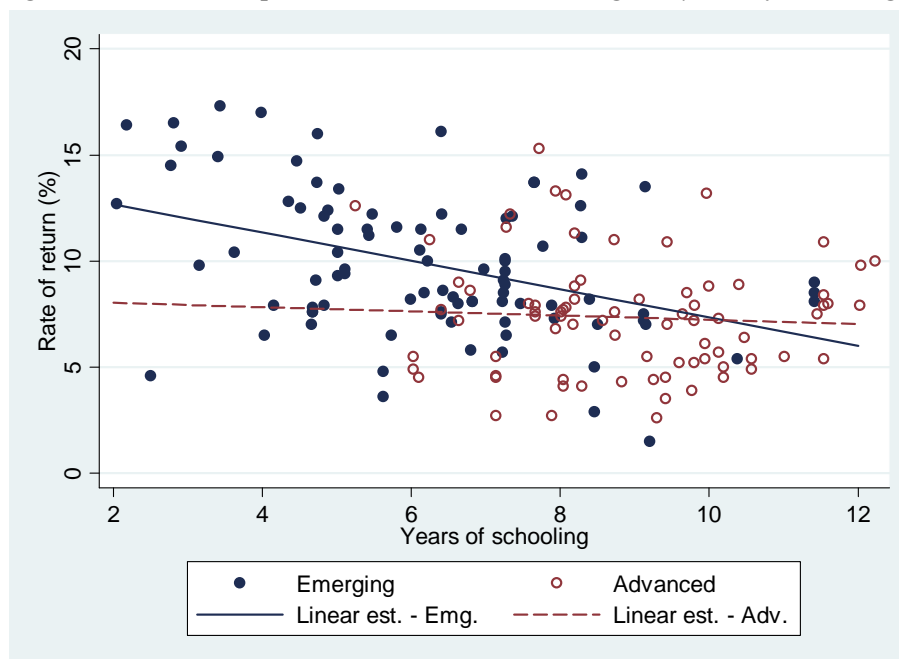
Sources: Psacharopoulos and Patrinos (2004) and Barro and Lee (2010)

Notes: Figure plots the linear terms for returns to schooling for 98 countries, with multiple entries for most countries over the period of 1960 to 2000. The returns data is from Psacharopoulos and Patrinos (2004), matched with years of schooling estimates of Barro and Lee (2010). The linear estimations result in the following equations y = 14.01 – 0.67*schooling (R² = 0.17) for emerging economies and y = 8.21 – 0.10*schooling (R² < 0.01) for advanced economies.

In contrast to these studies, Tansel and Bircan (2011) show that the returns to education have declined in Turkey between the years 1994 and 2002, partly due to the increasing attainment levels and implementation of the new compulsory education laws of 1997. Psacharopoulos and Patrinos (2004) also find a similar result, showing that average returns to schooling have a declining tendency while schooling levels are on the rise for a large sample of developed and developing countries.

More specifically, the relationship between the years of schooling and the returns to schooling obtained from the data set of Psacharopoulos and Patrinos (2004) show that the gains decline for all countries on average, but especially for the emerging economies by an estimated absolute drop of 0.6% per year of schooling gains over time, (Figure 6.1). For the advanced economies, which include some of the EU-MED countries in our sample, the relationship is not as clear, pointing at a weak 0.1% per year of schooling gains. Since the dataset includes mostly emerging economies, the change in returns for less developed countries and those with already low returns are likely to be low.

Several reasons may explain why increasing attainment may overlap with declining returns to education. First, as more individuals become educated, the signalling role of a higher level of diploma is reduced. For example, when more and more individuals are able to attain university degrees, job market candidates will have to use individual factors other than education (i.e. experience, volunteer work, etc.) to show that they are worthy of a job. Second, structural rigidities may inhibit the absorption capacity of the labour market for the more educated. If the rapid expansion in the supply of diplomas is not matched with an expansion in the demand for skills (due to inadequate technical change), employees may find it easier to bargain down the wages due to the increased abundance of highly skilled unemployed job-seekers.[29]

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[29] See World Bank (2005) for evidence of declining returns to skills in Egypt but not in Morocco.

The square terms are likely to become flatter, indicating a smaller squared-term (in absolute terms) once tertiary education becomes more available and in greater demand, potentially as part of an economy-wide transition to a knowledge economy. Although the evidence for non-linear returns to education is limited, Salehi-Isfahani et al. (2009) show that these terms have remained relatively constant over time. The constant terms, in turn, tend to move with the changes in linear terms.

Following these benchmarks, the following assumptions were made to construct the 2030 scenario:

- The linear returns to schooling in the SMC with below average returns, i.e. Algeria, Morocco, and Jordan, will increase by 2%.

- For Egypt and Turkey, the square terms are expected to drop by 0.2% as tertiary education gains importance in the job market. The same adjustment is not applied for Morocco and Jordan, where the returns from higher education are already relatively flat or even increasing (i.e. positive square-term for schooling).

- After controlling for economic development (as above), the (linear) returns to schooling drop by 0.6% for each additional year of schooling in all SMC, except Israel. For EU-MED countries (except Greece where returns are already low) and Israel, the linear returns drop by 0.1% per year of schooling.

- Constant terms are revised at the same rate as the linear returns.

6.2 Prospects of educational attainment

Acting as the determinant for returns to schooling, educational attainment levels are assumed to follow their long-term path. The methodology for making the projections closely follows Barro and Lee (2010), generating educational attainment scenarios using backward extrapolation.

The following provides a detailed account of how the estimations were generated. First, it is assumed that an individual's educational attainment remains unchanged from age 30 to 64 and that mortality is uniform across all individuals with vary education attainment. This means that for all ages 30 to 64, the forecasts can be based on attainment of the younger age group from the previous period. In other words, to forecast attainment levels of ages 30 to 34 in 2015, the attainment levels of ages 25 to 29 in 2010 were used. Effectively, this is equivalent to assuming that survival rates are identical across different educated groups.

Second, for age groups 20 to 24 and 25 to 29, the extrapolation methods are not appropriate due to ongoing schooling. For these age groups, the attainment rates from one 5-year interval to another were revised by assuming a constant time-trend. However, since the estimates for different schooling levels need to add up to one, the estimates were built by fitting a Dirichlet-multinomial distribution function.

In all cases, the population estimates for the general populations (by age groups) were obtained by the UN's World Population Prospects for the years 2015, 2020, 2025, and 2030. In later rounds, input from MEDPRO's Work Package 3 may also be used to build the estimates.

The resulting estimates are depicted in Table 6.1.[30] As noted above, the returns to education are assumed to depend on average years of schooling. The following table provides the average years of schooling based on the average years of schooling at each attainment level (i.e. 3 years for inadequate, 9 years for primary, 12 years for secondary and 16 years for tertiary). The table is used as an input (partially) to determine the returns from education over time.

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[30] See also the more detailed diagrams in the appendix for each 5-year period and each country.

Table 6.1 Average years of schooling based on scenario

	2000	2030
Algeria	6.35	11.03
Egypt	5.20	9.57
France	10.66	12.87
Greece	10.89	13.84
Israel	11.95	12.49
Italy	9.94	12.06
Jordan	7.69	12.00
Malta	8.32	10.23
Morocco	3.94	8.11
Portugal	8.26	10.71
Spain	9.86	12.54
Turkey	7.35	10.25

Sources: Barro and Lee (2010) and own calculations.

6.3 Prospects of employment rates

In some Mediterranean countries, there may be clear impediments placed on women in society and, in particular, the role of education in increasing their market opportunities. A close examination of the WVS surveys reveal that respondents in the SMC, including Egypt, Jordan, Morocco, and Algeria, tend to agree that university education is more important for boys than girls, (Figure 6.2). A narrow view of women's role in society is likely to hamper educational attainment and active participation in future years, clearly restricting human capital development.

Figure 6.2 "University education <u>more</u> important for boys than girls?", std. scores
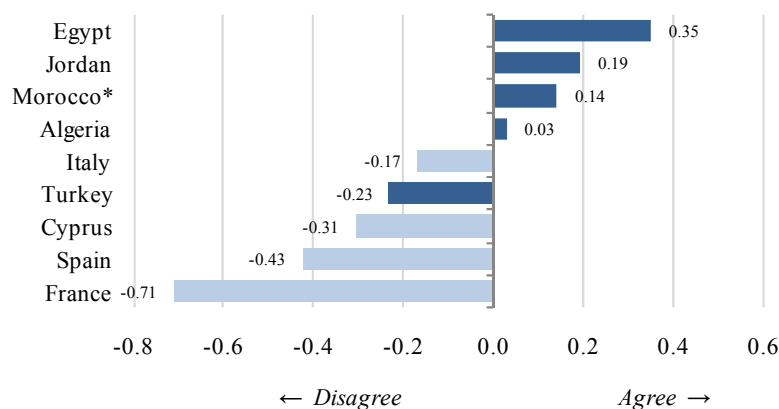
*Source:* World Values Surveys, Wave 5, for years 2005-2007

Notes: *For Morocco, the figures are for 1999-2004. Figures depict standardised scores obtained from the surveys, calculated as standard deviations from the sample mean.

A related problem is the limited labour force participation, especially among women, who tend to be relatively under-employed. Indeed, Figure 6.3 shows that the participation rates are on the decline in a number of SMC, excluding Algeria and Israel. In Algeria, the development is attributable to an increase in female labour participation rates. Indeed, according to 2008 statistics, Algerian women are the most active among their counterparts among the SMC (except in Israel) with a participation rate of 37%, as opposed to a regional averages of 20 to 25%. The growing job market activity of women is

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also behind the rising participation rates among most of the EU-MED countries, such as Italy, Portugal, and Spain, as well as Israel. In the opposite direction, labour force participation rates have declined substantially in Turkey, at an average of 0.5% per year between the years 2000 and 2008.[31] A similar but more moderate decline is also present in Egypt and Morocco. In all three, the rates decline once again due to diminishing labour participation rates among women.

Figure 6.3 Annual growth in labour force participation rates, 2000-2008
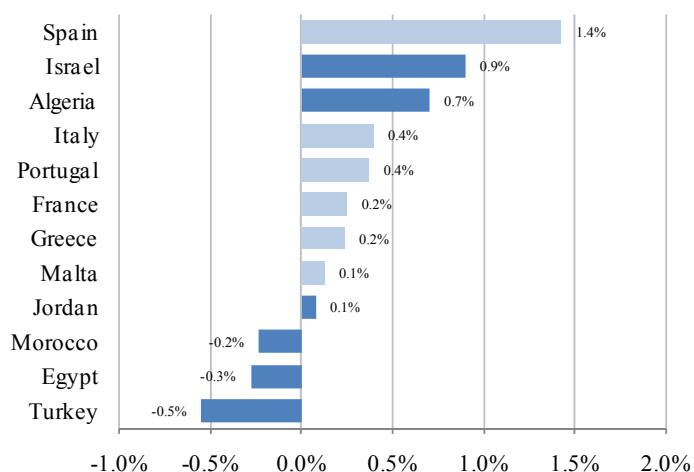
Source: World Bank, World Development Indicators.

The literature tends to support these observations. Azmat et al. (2006) find that, for a panel of OECD countries, unemployment rates among women are much higher in the Mediterranean countries. Hajj and Panizza (2002) find that educational attainment is strongly associated with labour force participation among females. However, for married women, once the education level of the husband is controlled for, the education level of the wife has a much smaller effect, suggesting that intra-household decisions may dominate the income effect associated with higher wages that come with higher educational attainment. Also, after controlling for the endogeneity of fertility and economic activity decisions, the authors find no significant relationship between childbearing and labour force participation among young Lebanese women.

High youth unemployment rates, thought to be one of the major factors behind the recent civil unrest and the Arab Spring in the region, can also contribute to lower human capital levels. This would be the case since the unemployment rates are especially high for well-educated young people. Such rigidities highlight underlying problems in the labour market and the broader economy. Unemployment also matters for determining aggregate productivity. In particular, difficulties faced by more educated individuals contribute negatively to the aggregate human capital measures and productivity levels. At the aggregate level, the unemployment rates of those with a tertiary and secondary education are lower than the national averages. Indeed, Figure 6.4 shows that – with the notable exception of Israel – those with a tertiary education represent less than one-quarter of the total unemployment in all of the Mediterranean countries. Those with a secondary education also seem to be less present among the unemployed, except in France and Greece.

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[31] Indeed, Turkey is the only country in the Mediterranean where the female participation rates have declined since the early 1980s.

*Figure 6.4 Share of unemployment by education level, 2008 (% of total)*
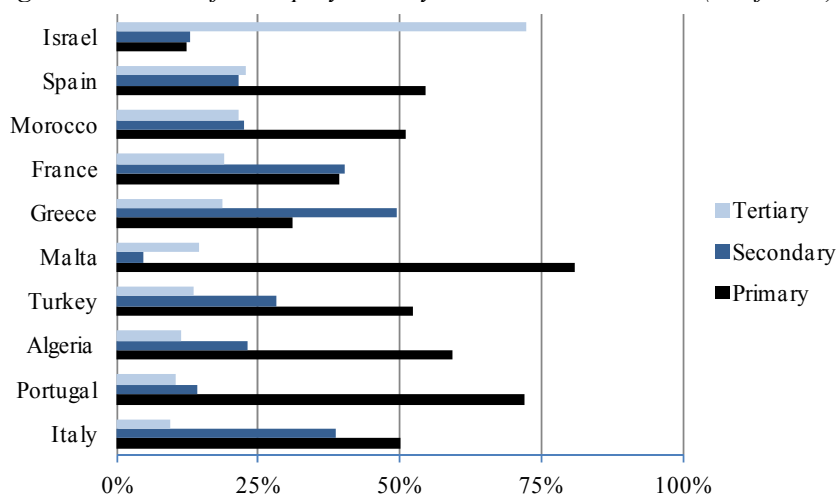
Source: World Bank, World Development Indicators.

Note: * 2004 figures for Algeria.

Despite the aggregate view that education appears to lower unemployment, when age groups are considered a completely different picture emerges. Although detailed data is lacking for some of SMC, the available information shows that university graduates are more likely to be unemployed than others in Greece, Turkey, Morocco, Portugal, and Cyprus, (Figure 6.5). The figures improve slightly when older (and possibly more experienced) individuals are considered, however university graduates nevertheless face higher or equivalent unemployment likelihood in most of the countries depicted in the diagram until their early 30s, i.e. corresponding to 5 to 10 years of experience for most typical graduates.

Figure 6.5 Youth unemployment rates, ages 20-24, 2009/10
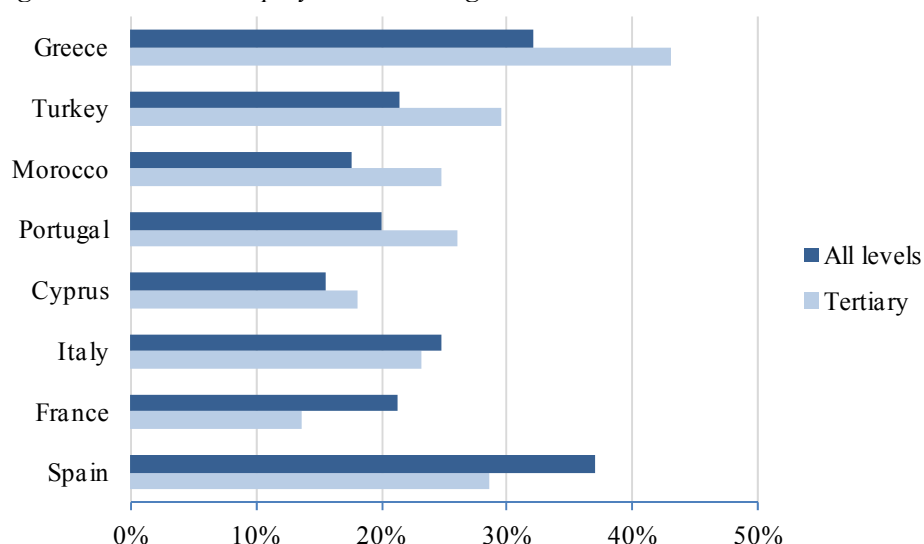
Sources: Eurostat; national statistics offices of Turkey and Morocco.

With historical data on youth unemployment severely lacking for the southern Mediterranean, it is hard to know how conditions have changed over time. The data from EU-MED countries show that young graduates are particularly at risk when market conditions are difficult. Indeed, youth unemployment has become more severe over the last decade or so, especially in Cyprus, Greece and Portugal, with rates rising from 3%, 29% and 4% in 2000 to 18%, 43% and 26% 2010, respectively.

Aside from the current financial crisis, however, the figures appear to be compounded by an ongoing degradation of job opportunities for young graduates.

For the construction of the 2030 employment rate estimates, the following assumptions were made.

- Employment rates in Morocco, Egypt and Turkey will drop (in absolute terms) by 5% by 2030. Although the recent evolution of labour participation rates point to much stronger losses (ranging between 10 to 15%) over time, continued efforts aimed at enhancing women's labour market contribution and reducing informality are likely to lead to more modest losses over the next 20 years.

- In Algeria, the recent rise in labour force participation rates will gradually slow down as labour participation rates hit a cultural ceiling of around 40% (up from the current rate of 36%). This will result in a modest rise of employment rates by %5 by 2030.

- Employment rates in Jordan will rise by 2% as the country continues on its current path to increase labour participation.

- Israeli employment rates will increase by 10% due to increasing calls for labour market reform to integrate a larger part of the population into the active economy.

- In all EU-MED countries, employment rates will increase by 7%, which are in line with the current averages.

- The employment rates for young university graduates (i.e. with experience of 5 years at the most) will diverge from the aggregate tendencies in all EU-MED countries, remaining constant. This is by and large due to constant unemployment among university graduates, in continuation with current conditions.
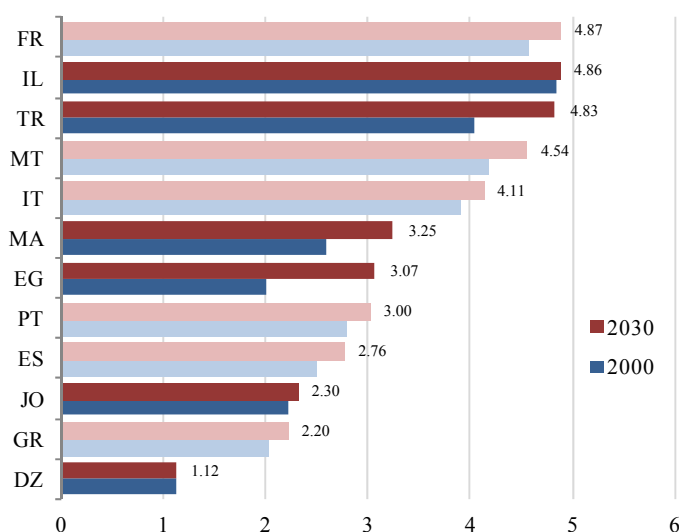
6.4 Scenario for human capital attainment

These assumptions used to modify the employment rates, educational attainment and private returns to schooling are summarised.

The resulting human capital scores are displayed in Figure 6.6. The results show that most countries improve their productivity, despite lower returns to schooling in almost all cases. Several countries make notable gains. Most notably, both Morocco and Egypt enhance their positioning and aggregate productivity. In Morocco, relatively modest gains in schooling translate into smaller reduction in returns; moreover, the returns add-on of 2% is expected to increase the average returns slightly. In Egypt, despite lower returns, the square-term is expected to disappear, increasing returns from higher education. These developments mean that both countries can reap the benefits of increasingly better educated workforces. Turkey also gains substantially, partly due to a reduced square-term on education, putting it on comparable terms with Israel, thanks mostly to the extremely high linear returns and increasing returns for higher levels of education.

Other countries perform equally poorly in 2000 and 2030. The conditions in Algeria barely improve, despite the 2% jump in linear returns to schooling. Meanwhile, in Jordan, the returns remain low and experience does not pay off, which results in lower income differentials.

Figure 6.6 Human capital measures, 2030, multiples of base income

Horizontal bar chart showing human capital measures for 2030 and 2000 by country:
FR: 4.87
IL: 4.86
TR: 4.83
MT: 4.54
IT: 4.11
MA: 3.25
EG: 3.07
PT: 3.00
ES: 2.76
JO: 2.30
GR: 2.20
DZ: 1.12

Legend: 2030, 2000

Notes: Base income is equivalent to the incomes of those with no education or experience. By assumption, the base incomes correspond to a uniform productivity across the entire sample.

Turning to EU-MED countries, all countries face a small but perceptible reduction in linear returns due to limited improvements in educational attainment. For example, Greece achieves nearly 25% tertiary attainment by 2030 (see appendix); however, this improvement does not improve the country's relative ranking much since the returns to education remain low and unemployment rates for the more educated remains high. In Spain and Portugal, the returns to education and experience are below the regional averages, which contribute to lower ranking.

7.   Conclusions

The study assessed human capital attainment levels in the Mediterranean using a unique micro dataset, which covers a substantial proportion of the region. Despite its potential weaknesses, most notably its reliance on perfect competition assumptions, the methodology provides a uniform method to make regional comparisons, using incomes levels as the basis for measuring aggregate productivities.

The core of the study provides insights into private returns to schooling. The results show that labour markets in the EU-MED countries reward schooling (and experience) more than the southern Mediterranean countries, with the exception of Israel and Turkey. In particular, the returns to education are very low in Algeria, with almost flat returns. In Morocco, experience matters much more than education. Apart from these results, the regional analyses show that rural-urban inequality is prevalent in the SMC.

Turning to the human capital measure, the results show that the labour-market based measure leads to some surprising results. Several SMC, most notably Turkey, Israel and Morocco, rank higher than EU-MED countries. In particular, the returns to education in Greece, Spain and Portugal are relatively low. There is some evidence that the job market conditions may also be contributing to these findings, especially in Greece and Spain, where unemployment among the young university and secondary school graduates is much higher than the national averages – implying that these individuals are unable to contribute to aggregate productivity.

The study extends its findings to 2030 with the aim of producing a benchmark scenario, using current tendencies as a measure. Assuming that returns to education will drop with increasing attainment levels (a general finding in the literature), the results suggest that some of the distinctions between the EU-MED and SMC will remain. France, Malta, and Italy will continue to have greater than average

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productivity; Israel and Turkey will be the only SMC at the top of the list. Meanwhile, the persistently lower returns to education in Greece, Spain and Portugal will serve to keep those countries at the bottom of the list. Among the SMC, Egypt shows the largest jump, mostly thanks to increasing returns to higher education.

The study's main findings are as follows:

- Differences in returns to education account for most of the differences in aggregate productivities. To the extent that they reflect competitive market conditions, incomes cannot be directly targeted by policy mechanisms. However, governments may target industries that value human capital more in an attempt to increase returns to education.

- Experience matters less than education in most, but not all, countries. For example, high returns to experience is one of the key reasons that Morocco does relatively well in our measures. This finding clearly shows that labour markets do find ways to compensate for potential weaknesses in the education system.

- Educational attainment has only a weak and indirect impact on human capital development. For example, both Greece and Spain, which are among the most educated countries in the Mediterranean, are at the bottom of country-by-country comparisons. Moreover, evidence suggests that increasing attainment often comes at the expense of lower returns to schooling.

- Having said that, alternative scenarios where returns to education respond less (negatively) to educational attainment (as was the case for Israel in 1970s and 1980s) could be envisaged, potentially enhancing the role of educational attainment. For this reason, improving attainment as a general policy aim is unlikely to succeed; the governments need to match attainment goals with increasing demand for a more educated workforce through industrial and enterprise policies.

- Employment rates matter even less since they appear to be relatively homogenous across different ages and to a large extent education groups, especially in the more advanced countries. Nevertheless, for some of the southern Mediterranean countries, female participation rates may improve the human capital attainments over time.

Appendix: Model Assumptions

Employment rates

The following table gives the share of the employed population across difference age and schooling groups. The table is built on national statistics and Barro and Lee (2010). The number of years distinguishing each schooling and experience level corresponds to the value used to obtain the income estimates. When the data provided in one of the sources failed to overlap with the elements of the table, approximations were made to fit the data into the relevant age and schooling groups.

Table 0.1 Employed population shares, 2000/1 (% of total employed population, ages 20-59)

SCHOOLING →	Inadeq. (3 yrs,)				Primary (9 yrs.)			
EXPERIENCE →	0-4 yr.	5-14	15-24	25-45	0-4	5-14	15-24	25-45
Algeria	0.0%	8.0%	9.5%	8.8%	0.0%	10.3%	8.0%	4.9%
Egypt	0.0%	1.0%	1.7%	3.2%	0.0%	11.4%	8.6%	7.4%
Spain	0.0%	0.7%	1.0%	3.1%	0.0%	11.3%	12.7%	19.7%
France	0.0%	1.0%	2.2%	6.9%	0.0%	3.6%	6.8%	15.2%
Greece	0.0%	0.1%	0.1%	0.9%	0.0%	7.4%	9.6%	20.9%
Israel	0.0%	0.3%	0.3%	1.0%	0.0%	8.0%	7.5%	10.9%
Italy	0.0%	0.0%	0.0%	1.2%	0.0%	8.0%	14.5%	21.4%
Jordan	0.0%	0.0%	0.0%	0.3%	0.0%	6.6%	5.7%	7.5%
Morocco	0.0%	0.0%	1.0%	2.0%	0.0%	14.3%	8.3%	5.2%
Malta	0.0%	0.1%	0.0%	1.5%	0.0%	15.2%	14.2%	31.9%
Portugal	0.0%	0.0%	0.0%	3.8%	0.0%	17.1%	19.7%	28.0%
Turkey	0.0%	1.0%	1.2%	2.1%	0.0%	19.2%	19.9%	14.6%

SCHOOLING →	Secondary. (12 yrs,)				Tertiary (16 yrs.)			
EXPERIENCE →	0-4 yr.	5-14	15-24	25-45	0-4	5-14	15-24	25-45
Algeria	9.4%	12.1%	6.7%	3.0%	0.9%	0.9%	0.5%	0.0%
Egypt	6.0%	6.1%	4.5%	3.0%	0.3%	0.3%	1.2%	0.6%
Spain	3.8%	13.3%	9.8%	5.4%	2.4%	6.6%	4.6%	2.2%
France	6.3%	17.5%	17.9%	11.1%	1.4%	3.7%	3.0%	1.6%
Greece	5.7%	15.1%	11.6%	5.4%	2.7%	8.2%	6.5%	2.6%
Israel	7.6%	14.3%	11.2%	9.8%	5.7%	9.4%	9.1%	3.4%
Italy	4.2%	17.8%	14.7%	7.4%	0.9%	3.4%	3.0%	1.5%
Jordan	10.0%	33.2%	11.4%	2.0%	1.5%	5.1%	2.0%	1.1%
Morocco	3.2%	3.4%	2.3%	1.5%	1.1%	1.1%	0.9%	0.2%
Malta	5.3%	7.4%	5.2%	3.9%	1.7%	2.5%	2.5%	2.0%
Portugal	3.2%	9.9%	6.3%	3.5%	0.7%	1.4%	1.2%	0.8%
Turkey	5.5%	9.6%	5.5%	1.1%	1.9%	3.9%	2.6%	0.5%

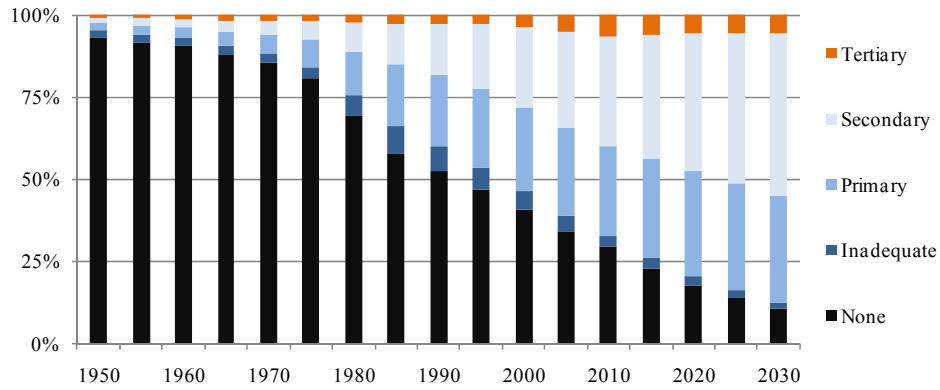*Source:* National statistics; Eurostat; Barro and Lee (2010).

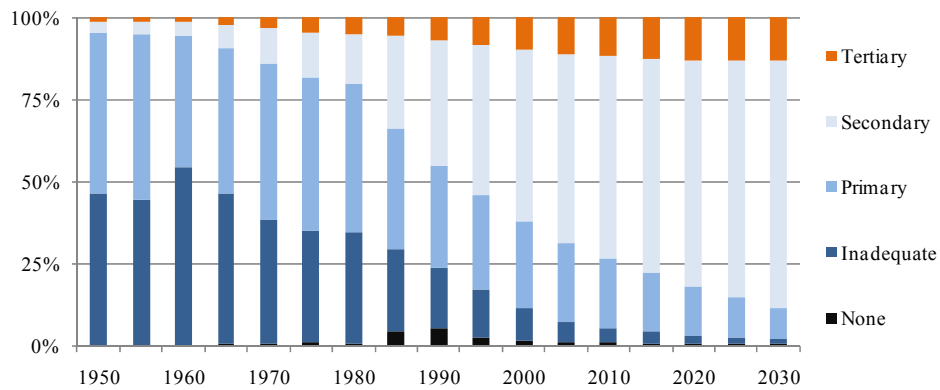## Education attainment levels, 1950-2030
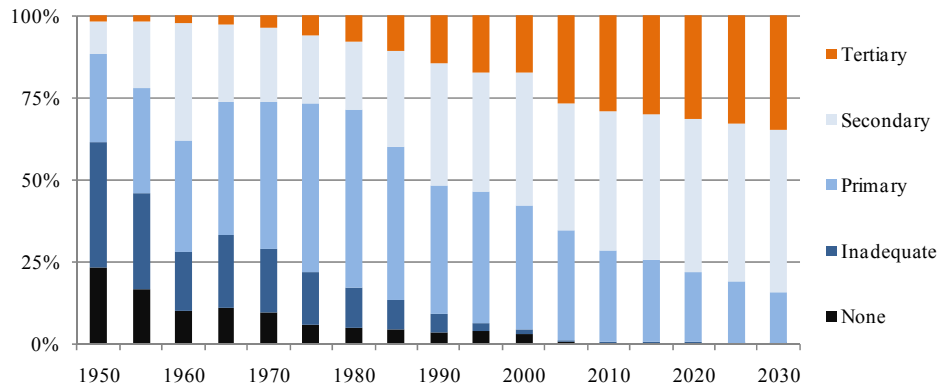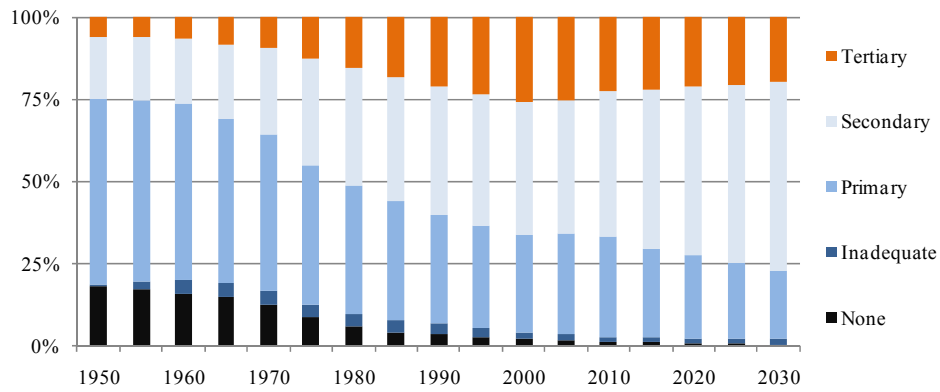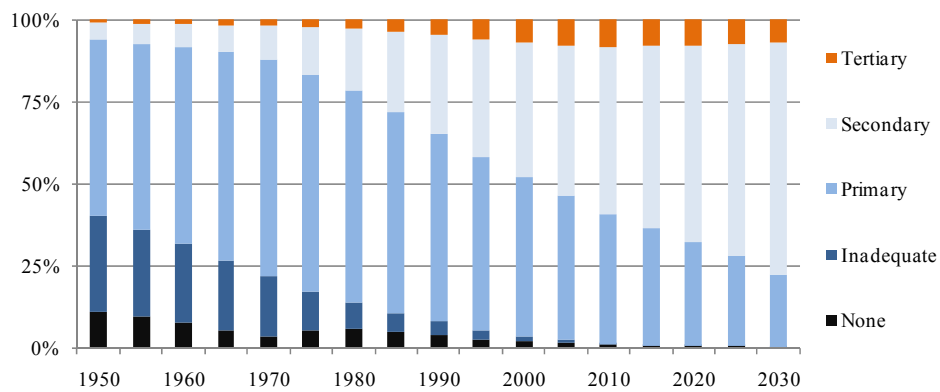
Algeria
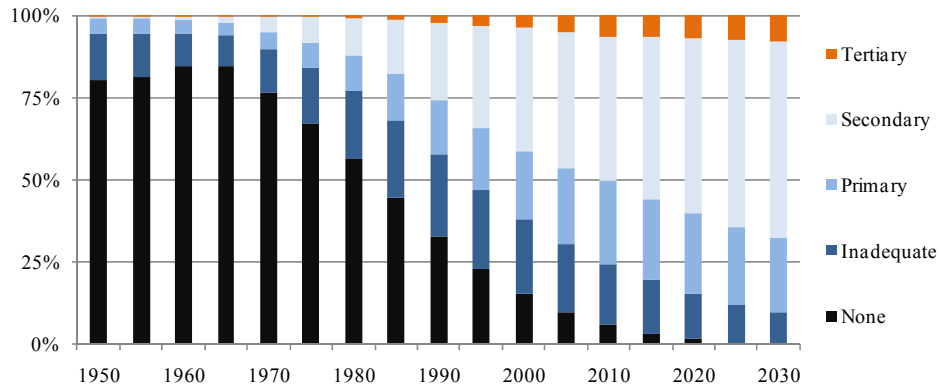
Egypt

France

Greece

Israel

Italy

Jordan
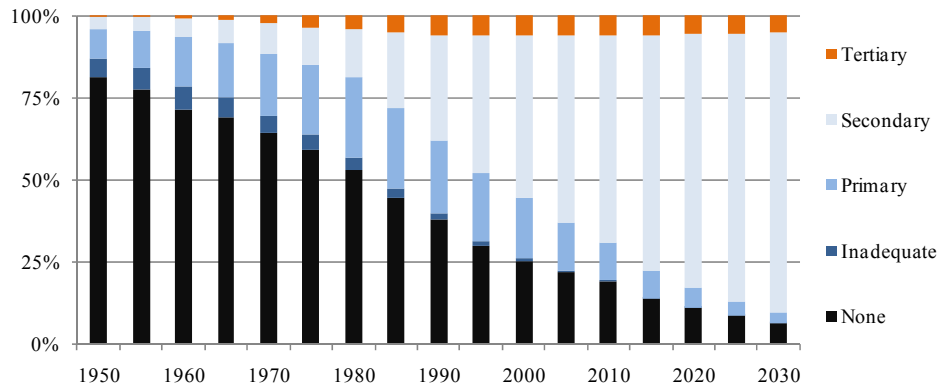
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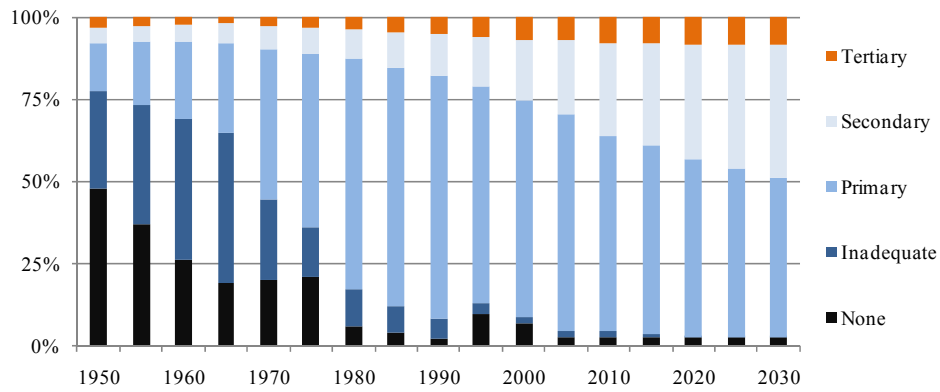
Morocco
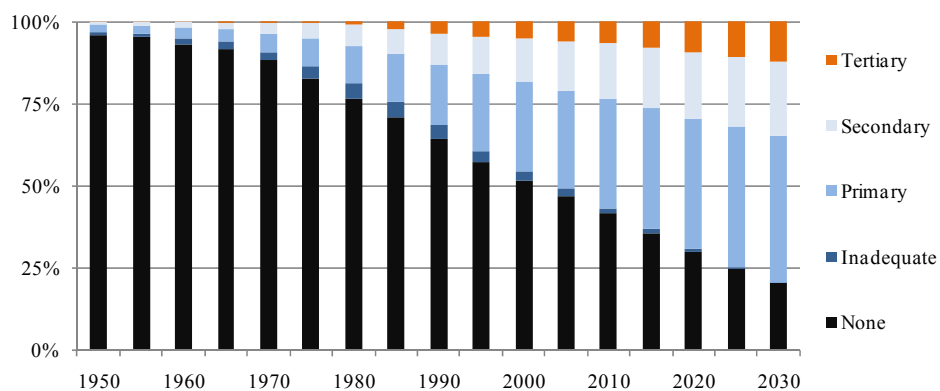
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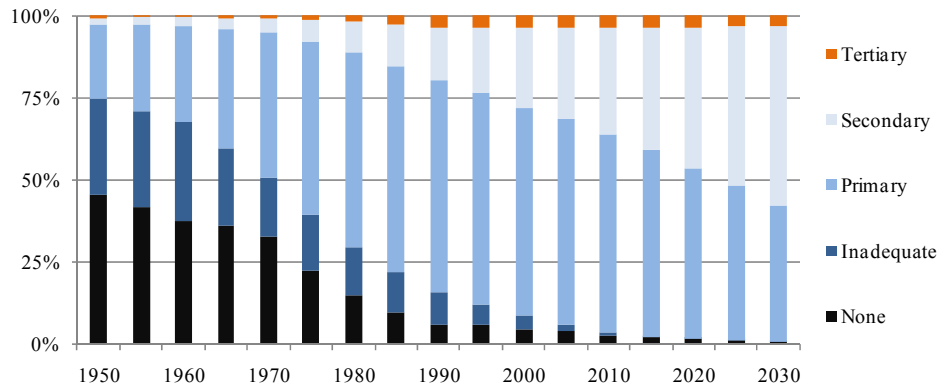
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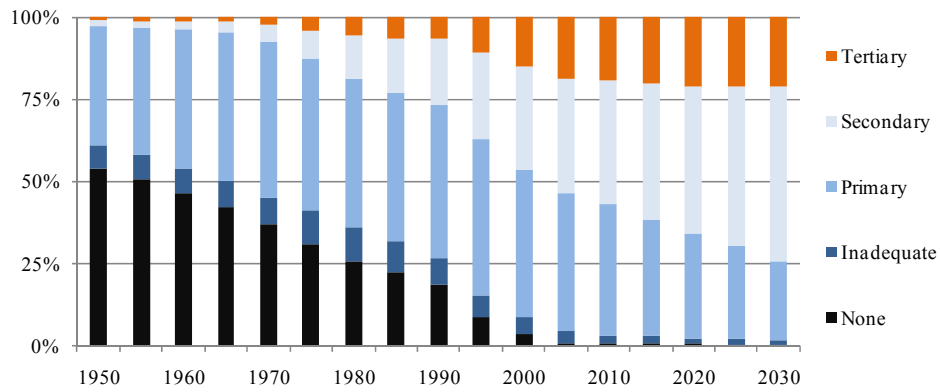
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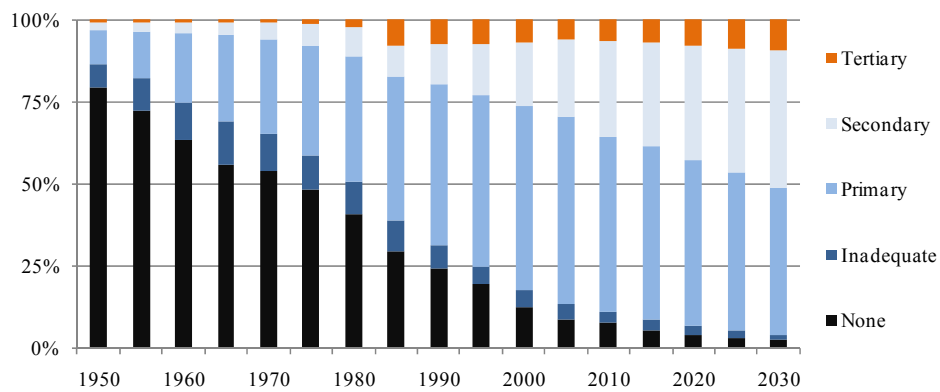
Human capital estimates for 2000 and 2030, multiples of base income

	2000	2030
Algeria	1.12	1.16
Jordan	1.69	3.07
Greece	2.02	2.67
Egypt	2.01	4.87
Spain	2.48	2.12
Portugal	2.78	4.86
Morocco	2.60	4.11
Italy	3.89	1.70
Malta	4.15	4.00
Turkey	4.03	4.54
Israel	4.84	3.00
France	4.54	4.83

Notes: Base income is equivalent to the incomes of those with no education or experience. By assumption, the base incomes correspond to a uniform productivity across the entire sample.

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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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