

Source of Economic Growth in MENA Region: An Empirical Study

OUALI Nadjia

Department of economics

Economics and Development Laboratory, University of Bejaia- Algeria

nadjia.ouali@univ-bejaia.dz

SOUMAN Mohand Ouidir

Department of economics

Economics and Development Laboratory, University of Bejaia- Algeria

idir.souman@univ-bejaia.dz

BENAHMED Kafia

Department of economics

Economics and Development Laboratory, University of Bejaia- Algeria

kafia.benahmed@univ-bejaia.dz

ABSTRACT

This paper aims to study the sources of growth in the MENA region between 1970-2023. We focus on understanding the factors that determine growth in the region. To this end, we use the growth accounting approach where we construct a series of physical capital stocks using the perpetual inventory method (PIM) and estimate the share of capital, labor, and TFP in GDP. To do this, statistical and empirical analyses are carried out using a set of econometric estimates. The results show the predominance of the contribution of capital accumulation over that of labor and TFP to growth performance over the period 1990-2023. The MENA region as a whole experienced the lowest contribution of TFP to economic growth compared to the rest of the regions.

Keywords: Growth, MENA, growth accounting, Capital, TFP

JEL Classification : O55, O53, O47, D24

Introduction

The impressive record of economic growth in the economies of Japan and East Asia has provided fertile ground for analyzing the sources of economic growth. Many researchers have hypothesized that rapid and sustained growth is the result of technology transmission, i.e., the transfer of technology through foreign direct investment and international trade. However, other studies, notably Collins & Bosworth (1996), Young (1995) and Krugman (1996) have sparked new interest in growth accounting by highlighting the role that factor accumulation has played in East Asia's rapid growth. In this sense, the accumulation of physical and human capital are seen as essential elements in the process of economic growth.

MENA countries experience high volatility in economic activity, so it is crucial to identify their sources of growth and productivity. Most MENA economies depend on their natural resources (mainly oil) and primary goods. Fluctuations in international trade affect the economic performance of MENA economies. Policies based on an understanding of the main determinants of economic growth are, therefore, essential to mitigate the impact of exogenous shocks. Output in the MENA region has followed an upward trend, with real GDP increasing by 570.98% between 1970 and 2023. In other words, GDP in the MENA region has grown at an average annual rate of 3.58%, slightly higher than the global growth rate of 3.05%.

In this paper, we study the evolution of the structure of growth in the MENA region between 1970 and 2023. Thus, by applying the perpetual inventory method (PIM), we estimate regional and national measures of the share of capital in national income. Then, we use the growth accounting method to identify the proximate determinants of economic growth in MENA countries.

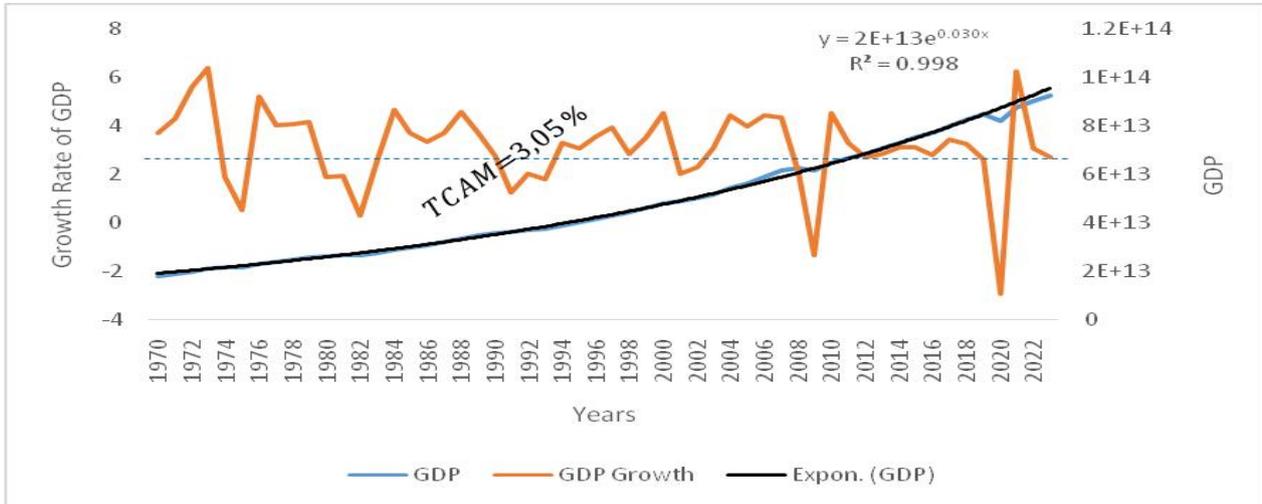
1 Growth in the MENA region: Evolution and trend

Economic growth is the increase in the level of output of a given economy. This level of production can be stimulated by an increase in the factors of production: capital, labor, or technological progress. In the literature on economic growth and convergence, a fundamental debate revolves around a specific question: Why is it that in some countries or regions, rapid growth occurs while others fail to converge toward higher growth rates? In light of this main concern, the evolution of growth should also be studied for the countries of the Middle East and North Africa (MENA).

From 1970 to 2023, world production is on an upward trend. World GDP, in real terms, is growing at an exponential rate, with $R^2 = 0.99$ (Chart 1). Between 1970 and 2023, the growth rate is estimated at 409.89%, i.e., world output increases at an average annual growth rate of 3.05%. In 2020, after the COVID crisis, the world economy recorded a negative

growth rate estimated at -2.93%, which is considered to be the lowest growth rate in the last fifty years. The highest growth rate was recorded in 1973, at 6.4% (Chart 1).

Graph 1. Evolution of real GDP and real GDP growth in the world (1970-2023)

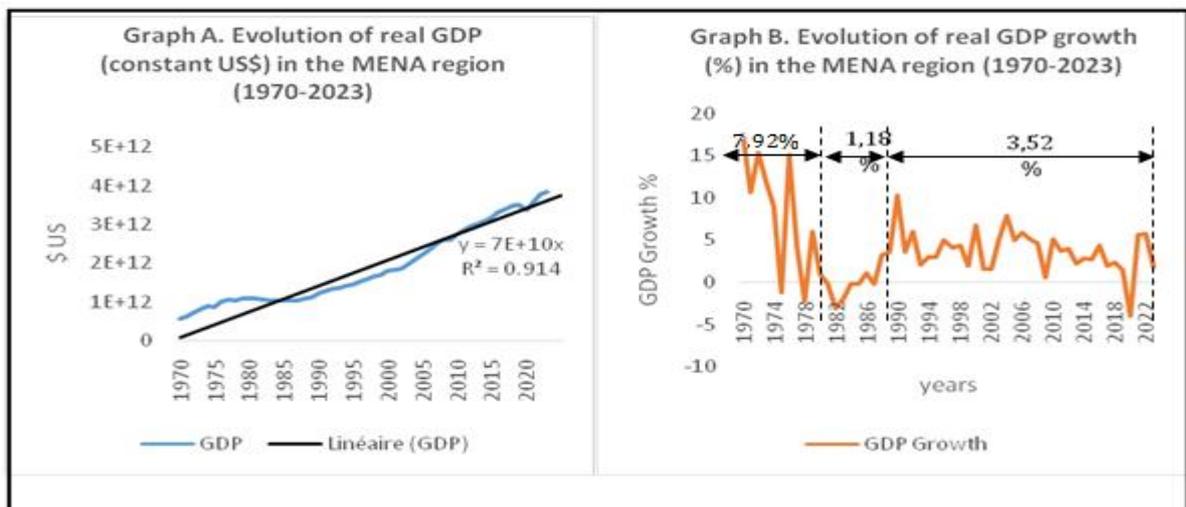


Source: Authors' calculations based on World Bank data.

Throughout the period 1970-2023, output in the MENA region followed an upward trend, with real GDP increasing by 570.98% between 1970-2013 (Graph 2). In other words, GDP in the MENA region grew at an average annual rate of 3.58%, slightly higher than global growth. As Chart 3 shows, after a period of relatively high growth in the 1970s (7.92%), growth slowed in the 1980s to 1.18% below the estimated world average of 3.14%, a gap of 1.96 percentage points. Between 1990 and 2018, growth in the MENA region was estimated at 3.34%, higher than the world's growth by 0.44 percentage points.

The relative improvement in growth in the MENA region in the 1970s is explained by a favorable external environment following the rise in oil prices. This situation was reversed in the 1980s, with a sharp fall in savings, investment, and domestic growth. In this context, oil was seen as the most important source of growth in the MENA region. On the other hand, this growth pattern is considered to be inextricably linked to several characteristics of most countries in the region, notably their high dependence on oil, their weak economic base, high population growth, low rates of return on investment in physical and human capital, low level of integration into the global economy and underdeveloped market institutions (Makdisi, & al, 2006).

Graph 2. Volume and growth of real GDP in the MENA region (1970-2023)



Source: Authors' calculations based on World Bank data.

The low overall growth in the MENA region during the 1980s and 1990s mainly reflects the poor performance of the oil-exporting countries, which recorded a negative growth rate of -4.68% compared with 1.50% in the 1971-1980 period. Overall, the periods analyzed show that in terms of per capita GDP growth, the non-oil countries outperformed the oil countries, always recording higher growth rates than the oil countries (Table 1).

However, the impact of the global recession in the early 1980s was more pronounced for MENA countries, whose growth was not only lower than the world average but also weaker than that of sub-Saharan Africa, which performed poorly. Compared with other regions of the world, the growth rates of MENA countries have been remarkably volatile and well below the performance of South and East Asian countries or the countries of the European Union (Table 1).

Table 1. GDP/capita growth by region

	1970-2023	1971-1980	1981-1990	1991-2000	2001-2010	2011-2023
MENA	1,48	3,81	-2,00	1,64	2,01	0,85
Totale MENA-Oil	-0,57	1,50	-4,68	1,27	-0,09	-0,80
Totale MENA not-Oil	3,09	5,45	2,40	4,09	2,03	1,87
North of America	1,74	2,17	2,28	2,16	0,85	1,53
south Asia	3,22	0,78	3,08	3,06	4,53	4,29
Latine America& Caribbean	1,44	3,61	-0,56	1,56	1,83	0,74
Sub-Saharan Africa	0,43	0,93	-1,48	-0,56	2,57	0,28
East Asia & Pacific	3,59	2,99	3,79	3,11	4,49	3,78
European Union	1,86	2,81	2,09	1,92	1,10	1,25
OCDE	1,74	2,36	2,30	1,93	0,93	1,32
World	1,63	1,91	1,34	1,47	1,71	1,70

Source: Authors' calculations based on World Bank data.

Another striking feature of the recent growth performance of MENA countries is its high volatility. The data show that over the period 1970-2023, the average annual growth rate of GDP per capita in MENA countries has been characterized by high variability compared with other regions and the world average. The average variability of growth, measured by the standard deviation of the growth rate of real GDP per capita for the MENA region, is almost four times that of the world and twice that of the underperforming sub-Saharan Africa region. From the second half of the 1980s onwards, although the variability of growth rates declined somewhat for the MENA region as a whole, it remained higher than the world average (Table 1).

Table 2. Growth in GDP per capita (1970-2023)

	TCAM	moyenne	Ecart-type
MENA	1,14	1,48	0,24
Totale MENA-Oil	-0,72	-0,57	0,10
Totale MENA not-Oil	2,98	3,09	0,08
North of america	1,73	1,74	0,00
south Asia	3,12	3,22	0,07
Latine America& Caribbean	1,34	1,44	0,07
Sub-Saharan Africa	0,31	0,43	0,08
East Asia & Pacific	3,56	3,59	0,03
European Union	1,75	1,86	0,08
OCDE	1,70	1,74	0,03
World	1,59	1,63	0,03

Source: Authors' calculations based on World Bank data.

This high degree of variability in the MENA region's growth performance can be explained by several factors, including the lack of economic diversification, which increases vulnerability to external shocks. This is particularly true for oil-exporting countries, which are frequently subject to the vagaries of the international oil market, and for countries that are heavily dependent on agriculture and whose performance is frequently affected by unfavorable climatic conditions.

Political instability and persistent regional conflicts may further explain the highly variable growth performance of a number of countries in the region.

2 Decomposing the growth rate in an international perspective

We have used the growth accounting approach to compare the MENA region's growth performance internationally. This approach allows us to see whether factor accumulation or TFP (Total Factor Productivity) is at the root of the growth gap between the MENA region and other regions of the world and between MENA countries.

Economic growth may originally be the result of the growth of inputs such as labor and capital or of the technical efficiency of inputs, in other words, total factor productivity¹. The debate about the share of inputs compared with that of TFP is still going on. Analysis of the sources of growth dates back to the late 1950s, when Tinbergen (1968), Abramovitz (1986) and above all, Solow (1956) began to decompose output growth into a weighted average of the growth rate of labor and capital and a residual that became known as total factor productivity (TFP) growth. Although the Solow residual is nothing more than the unexplained part of economic growth, economists have increasingly come to regard the residual as a measure of technological change. In the 1960s and 1970s, new contributions² led to the use of more general production functions and more precise measurements of inputs and outputs (Denison, 1962; Jorgenson & Griliches, 1967; Denison & al, 1972).

Robert Solow's neoclassical growth model emphasizes technological change as the main determinant of long-term growth. However, assuming everyone has access to the same technology, the model also attributes an important role to the accumulation of physical and human capital for countries in a transition or catch-up phase. In contrast, endogenous growth theories often include a role for physical and human capital in determining growth, arguing that differences in technology contribute to variations in the speed of convergence.

Empirical studies come to surprisingly different conclusions about the role of capital accumulation versus TFP. Mankiw, & al (1992) argue that the share of physical and human capital associated with population growth accounts for up to 80% of the international variation in per capita income. Young (1995) argues that the Asian miracle is the result of a rapid and temporary accumulation of factors. In contrast, Klenow & Clare (1997) argue that TFP is the key to economic growth and that factor accumulation plays a less important role. Susan & Barry (2003) studied the contribution of tangible capital, human capital, and TFP to economic growth, showing that in developing countries, the accumulation of tangible capital is the main factor in growth, while in industrialized countries, the growth of TFP contributes as much as capital accumulation to economic growth. Easterly & Levine (2001) reject the importance of capital accumulation in the variation of the growth rate.

3 Evolution of the share of capital in GDP

From an international perspective, the question that needs to be asked is: Why are the empirical results so divergent? The differences largely reflect three fundamental measurement problems³. The share of capital in total output could be imposed a priori, calculated from national income accounts, or estimated. Each of these approaches has its caveats. Imposing a uniform value, generally between 0.3 and 0.7, is unrealistic because this value varies widely across a wide range of countries. Calculating this value from national accounts, on the other hand, is too demanding in terms of data, especially in light of the availability of internationally comparable data on capital stock and labor that would easily allow direct estimation of the capital share. In order to make comparisons, we have chosen the estimation approach.

¹ In practice, TFP represents a combination of the other factors that enter into the production equation. It also represents efficiency gains and technological developments. In this sense, TFP captures the part of measured growth that cannot be explained by the factors of production (labour and capital). It is defined as a measure of our ignorance of the growth process (Abramovitz, 1986).

² Denison (1962) made an important contribution by taking into account changes in both the quantity and quality of labour and capital inputs. In the case of labour, for example, Denison took into account not only changes in the size of the labour force, but also improvements in the methodology of basic growth accounting, which led to estimates of TFP for the US that were much lower than those found by Solow.

³ Firstly, some researchers rely on the share of investment in GDP to represent changes in the capital stock, while others construct a direct measure of the capital stock. Second, some evaluate investment in terms of domestic prices, while others use a measure of international prices. Finally, some measure the contribution of capital by the change in the capital-output ratio, rather than by the change in the capital-labour ratio.

4 Measuring physical capital stocks

To construct the series of physical capital stocks for MENA countries, we used the PIM (Continuous Inventory Method).

Assuming that the level of capital services is proportional to the level of capital stock. A general PIM with a geometric decomposition model can be expressed as:

$$K_t = (1 - \delta)K_0 + \sum_{i=1}^{t-1} I_{t-1} (1 - \delta)^i \quad \dots (1)$$

Equation (1) tells us that the capital stock in year t is equal to the net initial capital stock K_0 (after depreciation at an annual rate (δ)) plus the sum of net investments I . Thus, to construct a series of capital stocks⁴, we can use a variation of equation (1) to describe the evolution of the capital stock as follows:

$$K_t = I_t + (1 - \delta)K_{t-1} \quad \dots (2)$$

Since the capital stock series is constructed from the accumulation of investments, it is essential to have a reliable estimate of the initial capital stock⁵. In the literature, there are several ways of generating an estimate of the initial capital stock. The first method assumes a zero initial capital stock. Such an assumption is bound to bias the growth rate of the capital stock upwards in subsequent years. The main disadvantage of this assumption is that it is simply an arbitrary estimate (Abu-Qarn & Abu Bader, 2007). A second method is to start from zero initial stock and use PIM to generate the capital stock series, then calculate the average capital-output ratio, which is assumed to be fixed over time (including time zero). Under this assumption, we can construct a new estimate of the initial capital stock. This procedure is repeated until the capital-output ratio converges. The method that is widely used by researchers, and which is also used in our work, is based on the work of Harberger (1978). By rearranging equation (2), we obtain equation (3):

$$K_{t-1} = \frac{I_t}{(1 + \delta)} \dots (3)$$

For g , researchers frequently use the average annual growth rate of real GDP. Many researchers have adopted this measure for estimating the initial capital stock, as it captures long-term effects and avoids short-term fluctuations (Abu-Qarn & Abu-Bader, 2007). Technically, data on depreciation rates are obtained by surveys at the industry level or by applying depreciation rates from guidelines to tax scales. Unfortunately, data is scarce for most countries, including MENA countries. In this sense, a depreciation rate of 4% is generally assumed for the overall capital stock. Obviously, these rates change over time and space.

Table 3. Average annual growth in physical capital stock (%)

Pays	Croissance annuelle					TCAM	Ecart-type	
	Période							
	1971-1980	1981-1990	1991-2000	2001-2010	2011-2023			
MENA	8,64	-0,62	4,35	5,96	2,60	4,13	3,54	0,42
North of America	13,39	2,31	4,20	-0,05	3,21	4,56	3,90	0,47
South Asia	5,99	8,04	5,29	8,99	5,27	6,67	6,37	0,21
Latine America & Caribbean			3,84	3,91	1,64	2,45	2,16	0,21
East Asia & Pacific	4,85	5,92	2,91	6,32	5,33	5,08	4,93	0,10
Sub-Saharan Africa		4,77	1,73	6,24	3,30	3,86	3,52	0,24
OCDE	6,45	3,00	2,20	0,30	2,58	2,90	2,71	0,13
European Union	2,50	2,05	1,65	0,53	1,99	1,75	1,64	0,08
World	6,57	3,00	2,51	2,88	3,66	3,72	3,56	0,11

Source: Calculations by the authors

In Table 3, we present the average annual growth rates of the capital stock series for some sub-periods from 1971 to 2023. We can see some interesting trends. For example, the MENA region has experienced relatively high upward trends in capital stocks since the 1970s.

Table 3 also presents long-term trends, illustrated by averages of the annual growth rate of the capital stock over the entire 1971-2023 period, as well as by decade. MENA capital stock growth rates are not stable over the different study periods. The MENA region records average growth rates that are slightly higher than the world average for the periods 1971-1980

⁴ In this sense, we need an estimate of the initial capital stock K_0 , an estimate of the rate of depreciation of capital stocks (δ) , and a series of past investments I_{t-1} .

⁵ It is recommended that this figure be obtained directly from a benchmark study. However, if such a study is not available, as is the case for MENA countries, a rough estimate is used.

and 1991-2010. According to our analysis, the average annual growth rate of the capital stock is 3.54%, with a standard deviation of 0.42 percentage points of the average growth between 1971-2023.

5 Estimating the share of capital

The share of inputs in total output is very crucial in the debate on the convergence of growth rates and productivity dynamics. In this sense, it is very useful to estimate these shares accurately. Several methods have been used to estimate the shares of capital and labor. The first method consists of using national accounts for the remuneration of labor and capital in national income⁶. The second method assumes a capital share of 30% to 40% as an *a priori*⁷ measure. The third method is based on the estimation of a log-linear Cobb Douglas production function:

$$K\alpha Y = K + K\ln K + K\ln L + K\alpha K = K\alpha A = K\alpha TFP$$

To carry out the accounting exercise, we used a two-factor Cobb-Douglas production⁸ function in the form of a production function per worker. The capital shares required to measure the relative contribution of factor accumulation and productivity were estimated using the following regression equation:

$$\Delta \ln \left(\frac{Y}{K} \right) = \alpha \Delta \ln (K) + \beta \Delta \ln (L)$$

Where α is the slope of the regression, it represents the share of capital in production, Y represents real production, measured by real GDP, K is the capital stock and L is labor power. The data are obtained from the World Bank database. The parameter α is the elasticity of production with respect to capital. On the other hand, the elasticity of production with respect to labor is given by the parameter β , of which⁹. The output elasticity measures the responsiveness of output to a change in the levels of labor or capital used in production, these elasticities are given by:

$$\alpha = \frac{\partial Y/Y}{\partial K/K}$$

$$\beta = \frac{\partial Y/Y}{\partial L/L}$$

Table 4 provides the estimated values of the capital and labor shares. Several remarks can be highlighted after reading Table 4. First, our estimates of the world average capital share turned out to be higher than the commonly accepted values of 0.3 or 0.4. This is in line with the results of estimates provided, for example, by Senhadji (1999) and Nehru & Dhareshwar (1993), who found capital shares above 0.5. Bisat & al (1997) found that the capital share in many MENA countries is well above 0.5 and 0.7 for some oil producing countries.

Table 4. Share of capital

	α	$A = TFP$	A	B	R^2
MENA	3,1 [3,54]	22,19	0,61 [7,78]	1,02 [17,16]	0,69
Monde	-6,24 [7,68]	0,0019	0,65 [10,26]	0,73 [5,60]	0,99
Afrique Subsaharienne	-4,15 [12,89]	0,015	0,6 [15,27]	0,73 [13,11]	0,99
Amérique de Nord	-17,45 [18,93]	2,64E-08	0,15 [4,02]	2,26 [21,25]	0,99
Amérique Latine et Caraïbes	1,97	7,17	0,34	0,87	0,99

⁶ This approach is rarely used due to data availability.

⁷ Studies based on parametric estimates have shown that the share of capital in developing countries often exceeds 40%.

⁸ Studies on the production function date back to the work of Knut Wicksell (economist) in 1906. The Cobb-Douglas production function was then developed by mathematician Charles W. Cobb and economist Paul H. Douglas in 1928. The Cobb-Douglas production function is widely used in economic studies. It describes economic output as a function of two factors, capital and labour. The Cobb-Douglas production function is used to model substitution between capital, labour services and technical change.

⁹i) $\alpha + \beta = 1$: Function with constant scaling efficiency;

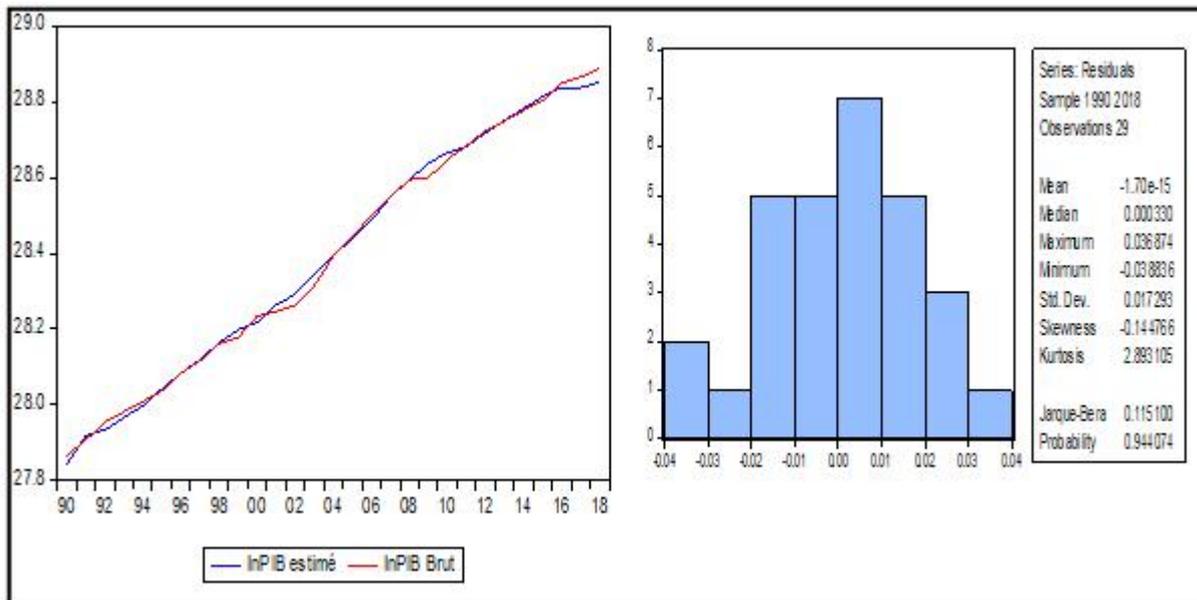
- ii) $\alpha + \beta > 1$: Function with increasing returns to scale ;
- iii) $\alpha + \beta < 1$: Function with diminishing returns to scale.

	[4,90]		[8,14]	[14,29]	
Asie de l'Est et Pacifique	-11,59	9,26E-06	0,76	0,84	0,99
	[4,99]		[20,20]	[5,16]	
Asie de Sud	5,52	249,63	0,89	-0,17	0,98
	[0,83]		[6,50]	[0,34]	
UE	-28,88	2,87E-13	0,44	2,35	0,97
	[10,08]		[5,90]	[9,68]	
OCDE	-12,24	4,83E-06	0,42	1,46	0,99
	[18,61]		[8,45]	[15,42]	

Source: Estimated by the authors.

Secondly, the countries of East Asia and South Asia hold the highest capital shares, 76% and 89%, respectively. Third, the countries of North America and Latin America have the lowest capital shares. These results impact the calculation of TFP. Instead of imposing a uniform value for the capital share across the sample of countries, we have made the less restrictive assumption of region-specific values based on the estimation results.

Figure 1: Gross GDP, estimated GDP and distribution of residuals



Source: Estimated by the authors.

In the case of the MENA region, the estimated Cobb-Douglas equation production function shows that the level of production technology is 22.19. The elasticity of capital α is 0.61. This value shows that a 1% increase in capital leads to a 0.61% increase in GDP. The elasticity of labor β is also 1.02. This value shows that a 1% increase in labor leads to a 1.02% increase in GDP.

The sum of the elasticities of the factors of production is as follows: $\alpha + \beta = 0,61 + 1,02 = 1,63 > 1$. This shows that the percentage increase in GDP is greater than that of the increase in capital and the number of employees, i.e. it shows an increasing return to scale. The errors between the observed values of real GDP and the values estimated by the Cobb-Douglas production function are normally distributed (Figure 1), the probability corresponding to the Jarque-Bera statistic is $0.94 > 0.05$. In this case, we accept the hypothesis H_0 that the errors follow a normal distribution.

6 The source of growth: decomposing the GDP growth rate

After estimating the shares of capital and labor in GDP, we will analyze the sources of economic growth in the MENA countries and focus on the question of where growth in the MENA region comes from. Does it come from the accumulation of capital, labor, or technological progress? To provide an answer, our approach is based on the so-called growth accounting method initiated by Solow. This method consists of estimating the shares of capital and labor and

estimating the level of total factor productivity using the Cobb-Douglas production function. In other words, it measures the contribution of production to technical efficiency (Perkins & Rawski, 2008).

The Cobb-Douglas function used previously can be converted to a form that measures the contribution of each factor to total output growth (Perkins & Rawski, 2008).

$$K_K = (K_K * K_K) + (K_K * K_K) + K_{TFP}$$

Where K_K denotes the growth rate of real GDP, K_K et K_K represent the growth rates of capital and labor respectively. K_K et K_K indicate the share in total output of returns to capital and wages respectively. The term K_{TFP} represents the rate of change of technical progress. This equation shows us how the rate of output is split between growth in inputs and growth in technical change. In our TFP calculations, we will first use estimated K_K et K_K , and then assume values of 0.5; 0.6 and 0.7 for K_K and 0.5; 0.4 and 0.3 for K_K .

Table 5 provides estimates of the relative contribution of capital, labor and TFP to economic growth for the MENA countries included in our study sample, compared with other regions.

Table 5. The decomposition of the growth rate

	Croissance du PIB	Travail	Capital	PTF
MENA	3,74	2,85 (76,43%)	2,28 (61,00%)	-1,40 (-37,43%)
Monde	2,84	1,02 (36,03%)	1,78 (62,61%)	0,04 (1,36%)
Afrique Subsaharienne	3,64	1,99 (54,73%)	1,73 (47,55%)	-0,08 (-2,28%)
Amérique de Nord	2,50	2,15 (86,02%)	0,38 (15,09%)	-0,03 (-1,11%)
Amérique Latine et Caraïbes	2,74	1,86 (67,82%)	0,95 (34,60%)	-0,07 (-2,42%)
Asie de l'Est et Pacifique	4,17	0,85 (20,37%)	3,38 (81,17%)	-0,06 (-1,54%)
Asie de Sud	6,06	-0,31 (-5,09%)	5,72 (94,52%)	0,64 (10,57%)
UE	1,72	0,97 (56,60%)	0,56 (32,79%)	0,18 (10,62%)
OCDE	2,10	1,38 (65,77%)	2,47 (117,64%)	-1,75 (-83,42%)

Source: Calculations by the authors

Overall, the results show the predominance of the contribution of capital over that of labor and TFP in growth performance over the period 1990-2023. The MENA region as a whole experienced the lowest contribution of TFP to economic growth compared to the rest of the regions with (-1.4) or (-37.43%) of GDP growth. For the other MENA countries in the sample, only certain non-oil economies, such as Lebanon, Egypt, and Morocco, managed to have a positive TFP share. We note that other MENA countries in the sample that had a negative TFP share were oil-exporting countries such as Algeria and Iran. Although the use of oil GDP in the calculation of TFP may be problematic due to its magnitude (Bisat & al., 1997), the lack of available data on employment and capital stock in the oil sector prevented us from calculating TFP after excluding oil.

Conclusion

In this work, we have tried to determine the key factors of economic growth for the MENA region for the period (1970-2023). Our objective was to find out whether the productive structures of the region under consideration provide us with any answers to enrich the academic debate between capital and productivity. We thus sought to find out whether growth in the MENA region compared with other regions is mainly due to the accumulation of capital or technological improvements.

To examine all these questions, we resorted to the growth accounting exercise, which requires a reliable series of capital stock and a good approximation of labor input. Several steps were followed to construct physical capital stocks. First, we examined the evolution of economic growth in trend and average terms, noting the volatility of growth rates. We then collected a long series of gross fixed capital formation and tried several approaches to estimating the initial capital

In the end, for the overall capital stock, we assumed a relative depreciation rate of 4%. Obviously, this rate changes over time and space.

Overall, our estimates with the various methods used show us how the rate of output is split between growth in inputs and growth in technical change. In our TFP calculations, we first used estimated α_K and β_L , and then assumed values of 0,5 ; 0,6 et 0,7 and α_K et 0,5 ; 0,4 et 0,3 for β_L .

The results indicate the predominance of capital's contribution to growth performance over the period 1990-2023. In other words, the analysis of the sources of growth shows that for the MENA region, the role of TFP in determining economic growth is small, even insignificant, and often detrimental. A large part of growth is due to the accumulation of physical capital and the availability of labor. The contribution of TFP is negative and detrimental to economic performance.

We therefore conclude that we take part in the debate between TFP and capital accumulation (K). Based on the experiences of the selected MENA countries, the accumulation of factors of production (capital and labor) remains the main source of economic growth. This finding is consistent with several studies that show a much higher share of physical capital in countries rich in natural resources, such as many MENA countries.

7 Références

- 1) Abramovitz, M. (1986). Catching Up, Forging Ahead and Falling Behind. *The Journal of Economic History*, 46(2), 385-406.
- 2) Abu-Qarn, A. S., & Abu-Bader, S. (2007). Sources of growth revisited: Evidence from selected MENA countries. *World Development*, 5(35), 752-771.
- 3) Bisat, A., El Erian, M., & Helbling, T. (1997). Growth, investment, and savings in the Arab Economies. *IMF Working Paper WP/97/85, IMF, Washington, DC*.
- 4) Collins, S. M., & Bosworth, B. P. (1996). Economic growth in East Asia: accumulation versus assimilation. *Brookings Papers on Economic Activity*, 2, 135-191.
- 5) Denison, E. F. (1962). Sources of Growth in the United States and Alternatives before US. *New York: Committee for Economic development*.
- 6) Denison, E. F., Jorgenson, D., & Griliches, Z. (1972). The measurement of productivity. *Survey of Current Business*, 52, 3-111.
- 7) Easterly, W., & Levine, R. (2001). It's not factor accumulation: stylized facts and growth models. *World Bank Economic Review*, 15(2), 177-219.
- 8) Harberger, A. C. (1978). Perspectives on capital and technology in less developed countries. Dans M. J. Artis, & R. A. Nobay, *Contemporary economic analysis*. London: Croom Helm.
- 9) Jorgenson, D., & Griliches, Z. (1967). The explanation of productivity change. *Review of Economic Studies*, 34, 249-280.
- 10) Klenow, P. J., & Clare, A. R. (1997). The Neoclassical Revival in Growth Economics: Has it Gone Too Far? *NBER: Macroeconomics Annual, MIT Press*.
- 11) Krugman, P. (1996). The myth of Asia's miracle. *Foreign Affairs*, 73, 62-78.
- 12) Makdisi, S., Fattah, Z., & Limam, I. (2006). Determinants of growth in the MENA countries. Dans J. B. Nugent, & M. Hashem Pesaran, *Explaining growth in the Middle East (Contributions to Economic Analysis (Vol. 278, pp. 32-60)*. Bingley: Emerald Grou.
- 13) Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics*, 107(2), 407-437.
- 14) Nehru, V., & Dharaeswar, A. (1993). A new database on physical capital stock: sources, methodologies and results. *Revista de Analisis Economico*, 8, 37-59.
- 15) Perkins, D., & Rawski, T. G. (2008). Forecasting China's Growth to 2025. Dans L. Brandt, & T. G. Rawski, *China's Great Economic Transformation*. New York: Cambridge University Press.
- 16) Senhadji, A. (1999). Sources of economic growth—an extensive growth accounting exercise. *IMF Working Paper. (99/77)*.
- 17) Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics*, 50(1), 65-94.
- 18) Susan, M. C., & Barry, B. (2003). The empirics of growth : An Update. *Brookings Papers on Economic activity*, 2, 113-179.
- 19) Tinbergen, J. (1968). The Optimal International Division of Labour. *Acta Oeconomica Academiae Scientiarum Hungaricae*, 3, 257-282.
- 20) Young, A. (1995). The tyranny of numbers: confronting the statistical realities of the East Asian growth experience. *Quarterly Journal of Economics*, 110, 641-680.