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Economic Growth, Productivity, and Convergence of Middle East and North Africa Countries

Mushtaq Ahmad Malik[1] and Tariq Masood[2]

ABSTRACT

The objective of this study is to investigate the variability in economic growth and productivity of the Middle East and North Africa countries for the period 1970-2014. We employed growth accounting approach to measure and decompose growth in total output into contributions from growth in factor accumulation and total factor productivity. The study also tests the hypotheses of regional convergence using the neoclassical framework. The results indicate significant variability in growth performance of oil dependent countries that can be associated with movements in oil process, at least in the short run. In most oil dependent economies, growth rates of per capita GDP are quite meagre. However, non-oil countries showed higher and consistent growth performance over the sample period. The results of growth accounting equation indicate that output growth in the region is due to the accumulation of factor inputs, while total factor productivity has a negligible or negative role. Both σ and β-convergence tests provide support for existence of convergence in per capita GDP across the countries. The study favours the adoption of large scale structural reforms to achieve sustained long run growth. At the same time, economic diversification of the individual countries to reduce dependence on single sources of income and employment would diminish the volatility of income and employment.

ملخص

تروم هذه الدراسة التحقيق في التغيرات المكانية والزمانية في النمو الاقتصادي والإنتاجية في دول الشرق الأوسط وشمال إفريقيا خلال الفترة الممتدة ما بين 1970 و 2014. وقد استخدمنا نهج حساب معدل النمو الموحد لقياس وتفكيك نمو إجمالي الناتج إلى مساهمات من التقدم التكنولوجي وتراكم عوامل الإنتاج. وتتناول الدراسة أيضا فرضية التقارب الإقليمي في الإطار الكلاسيكي الجديد. وتشير نتائجنا إلى أن الاقتصادات المعتمدة على النفط أظهرت تغيرات كبيرة في النمو قد تترافق مع تحركات على مستوى أسعار النفط. ففي معظم الاقتصادات القائمة على النفط، تعد معدلات النمو من الناتج

[1]*Corresponding author*. Department of West Asia and North African Studies, Aligarh Muslim University, Aligarh, India. Email:malikmushtaq10@gmail.com.
[2]Department of West Asia and North African Studies, Aligarh Muslim University, Aligarh, India. Email:tariqmasood8@gamil.com.

المحلي الإجمالي لكل فرد والناتج المحلي الإجمالي لكل عامل هزيلة للغاية بسبب النمو السريع في عدد السكان والقوى العاملة (المواطنين والمهاجرين على حد سواء).وتشير نتائج حساب معدل النمو إلى أن نمو الناتج في المنطقة يرجع إلى تراكم مدخلات عوامل الإنتاج، بينما لا يلعب إجمالي إنتاجية عوامل الإنتاج (TFP) دورا هاما. كما يشير كل من اختباري التقارب β وσ إلى وجود تقارب في الناتج المحلي الإجمالي لكل عامل (إنتاجية العمالة) ونصيب الفرد من الناتج المحلي الإجمالي. وتؤيد الدراسة اعتماد إصلاحات هيكلية واسعة النطاق لتحقيق نمو مستدام طويل المدى. وفي الوقت نفسه، فإن التنويع الاقتصادي للبلدان على الصعيد الفردي من أجل تقليل الاعتماد على مصادر واحدة للدخل والعمالة من شأنه أن يقلل من التقلبات على مستويي الدخل والعمالة.

ABSTRAITE

L'objectif de cette étude est d'étudier les variations spatiales et temporelles de la croissance économique et de la productivité des pays du Moyen-Orient et d'Afrique du Nord sur la période entre 1970 et 2014. Nous avons utilisé l'approche standard de la comptabilité de croissance pour mesurer et décomposer la croissance de la production totale en contributions du progrès technologique et de l'accumulation de facteurs. L'étude teste également l'hypothèse d'une convergence régionale dans le cadre néo-classique. Nos résultats suggèrent que les économies dépendantes du pétrole ont montré des variations de croissance significatives qui peuvent être associées aux mouvements des prix du pétrole. Dans la plupart des économies basées sur le pétrole, les taux de croissance du PIB par habitant et du PIB par travailleur sont assez faibles en raison de la croissance rapide de la population et de la main-d'œuvre (tant les nationaux que les immigrants). Les résultats de la comptabilité de la croissance indiquent que la croissance de la production dans la région est due à l'accumulation des facteurs de production, alors que la PTF ne joue pas un rôle significatif. Tant le site β σ que les tests de convergence suggèrent qu'il existe une convergence du PIB par travailleur (productivité du travail) et du PIB par habitant. L'étude préconise l'adoption de réformes structurelles à grande échelle pour parvenir à une croissance soutenue à long terme. En même temps, la diversification économique des différents pays afin de réduire la dépendance à l'égard de sources uniques de revenus et d'emploi diminuerait la volatilité des revenus et de l'emploi.

Keywords: Economic growth, Growth accounting, Productivity, Convergence, MENA

JEL Classification: O, O4, O47

1. Introduction

Economic performance of the Middle East and North Africa (MENA)[1] region is quite dismal despite having abundant natural resources, especially oil and natural gas. Achieving stable economic growth is one of the central problems facing most of the MENA countries. Countries in the MENA region are similar on so many fronts like shared history, language, culture, geography, and political regimes. Despite being similar, there are important differences as well. Based on resource endowments, the region is often divided into two sets of countries. First, those having large reserves of oil (oil-rich countries) and are net exporters of oil. Second, countries having little or no oil reserves (non-oil countries) and are net importers of oil. Further, individual countries are substantially different in terms of population size, economic size, living standards, public-private sector balance, trade, and financial connections with other parts of the world. To any naïve observer, it may seem that the economic problems of these two groups of nations are quite different, and there is no need for the joint study of these two groups. The first group, with large rent inflows from oil exports and little population to support, is placed in an altogether different position relative to the second group, where resources to support their respective populations are quite limited. There are at least three channels through which these two groups are interconnected and need to be studied in conjunction with each other. First, there is continuous labour migration from resource-poor nations to resource-rich nations and thereby remittance flows from resource-rich to poor nations. Second, capital flows (investments, aids, and donations) from resource-rich nations to resource-poor nations. Third, continuous political events like wars, conflicts, and revolutions having regional repercussions.

The literature largely adopted the 'resource curse' theory to explain the dismal performance of many resource-based economies. The basic argument of the resource curse theory is that the economies that are heavily dependent on natural wealth are less likely to do well both on the economic and political fronts. The theory is well supported by empirical studies most notably carried out by Sachs & Warner (1995) which suggest

[1]MENA is also widely known as West Asia and North Africa (WANA) region. For our purpose it includes the following 19 countries until stated otherwise: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, Iran, Iraq, Algeria, Turkey, Tunisia, Egypt, Jordan, Morocco, Syria, Lebanon, Palestine, Libya, and Yemen.

a strong negative correlation between the availability of natural resources and economic growth. Excessive dependence on natural resources is expected to cause Dutch disease, weak human capital, lack of incentive towards work, volatility in revenues, political authoritarianism, corruption, and violence and conflict. It constraints economic diversification as well. In the MENA region, all of these problems are apparent. Further, dependence on resources makes the region vulnerable to demand and price fluctuations in the world oil market, which in turn instills uncertainty and volatility in growth performance. Dependence on oil created a state-led development model for most of the countries in the region. However, re-orientation of policies towards higher efficiency and growth led by the private sector has remained elusive across the region (Yousef, 2004).

With this background, the purpose of this study is quite restricted, where we try to focus only on the long-term economic performance of the MENA countries with three specific questions:

1. Is the long-term economic performance as measured by the growth of gross domestic product (GDP) satisfactory
2. Does total factor productivity (TFP) play a significant role in sustaining growth
3. Is there any convergence of income among MENA countries?

The remainder of the paper is organized as follows. Section 2 presents a brief review of the literature. The empirical model of growth accounting approach and economic convergence is presented in Section 3. Section 4 describes the variables and data sources. Section 5 discusses long-term growth performance, decomposition of output growth, and convergence across the MENA region. Lastly, Section 6 will provide concluding remarks.

2. Literature Review

MENA region accounts for approximately 55.6 and 27.7 percent share in the global oil and gas reserves, respectively (Arab Monetary Fund, 2016). Thus, according to the classical growth theory, natural resource endowments would allow sustained growth over time across the region. Nevertheless, past literature has provided mixed results regarding the region's growth performance. When ascertaining the determinants of

economic growth, Barlow (1982) pointed out that the oil industry has directly or indirectly contributed positively to both groups of economies. However, this windfall of oil wealth was not translated into improving the living standards of the masses and achieving sustained growth rates. Accordingly, the region observed high levels of unemployment, low quality of education, and less skilled workforce. The factors like rapid population growth, war, civil war, and decolonization were also playing a significant role and affected growth performance in a negative way.

Through a study on economic growth and investment of the Arab world over the 1960-2000 sample period, Sala-i-Martin and Artadi (2003) relate poor performance of both oil and non-oil producers to investment. The decline in the investment rate during the last two decades in the region is probably a consequence, not a cause of this slowdown. The decline in the overall growth rate has led to a substantial fall in investment rates over the years. The study concluded that the low quality of investment projects is the key determinant of slow growth. The excessive reliance on public investment, the low quality of financial institutions, weak business environment, and the low quality of human capital has led to systematically unproductive investment decisions, and thus, low economic growth.

Hakura (2006) through a study to analyze the long run growth of 16 MENA countries over the period 1980-2000, also verified the weak growth performance of both oil-resource rich and poor countries. Large scale intervention of the government sector in economic activities of Gulf Corporation Council (GCC) countries, poor institutional quality and political instability has constrained the growth performance of the MENA region as a whole.

When ascertaining the determinants of economic growth, Makdisi et al. (2007) asserted that conventional factors of production played minimal role in the economic growth of MENA countries. Especially, capital accumulation and international trade are found to be less beneficial to economic growth. Moreover, external shocks in the form of volatile oil prices, modest levels of human capital formation and negligible or negative role of TFP have a substantial negative effect on growth performance.

Guetat (2006) and Abu-Qarn and Abu-Bader (2007) considered the impact of economic and non-economic factors on the economic growth of the MENA region. Growth accounting exercises showed that TFP has often been negative or detrimental to growth. Corruption and low bureaucratic quality have overwhelmingly mitigated the positive effects of human capital formation. Past empirical literature has shown that financial development is one of the most significant factors of economic growth. In this context, Hassan et al. (2001 a, b) endeavoured to explore the nexus between financial development and economic growth in low, middle and high-income countries using vector autoregressive (VAR) framework. These studies concluded a positive and significant relationship between financial development and economic growth in Organization of Islamic Conference (OIC) countries. Moreover, short term multivariate analysis suggests one-way causality running from growth to financial development. The positive and significant relationship between financial development and economic growth in the Arab world has been further verified by the studies like Hassan et al. (2007), Zirek et al. (2016), and Yu et al. (2016).

Esfahani (2009) endeavoured to investigate the role of social contracts in the MENA region and argued that the more interventionist governments with fewer resource rents at their disposal moved earlier to generate revenues through export promotion. It created a growing private sector in favor of reform and engagement in globalization. On the other hand, countries with larger resources developed more inward-oriented private sectors that were less inclined to support the export promotion and policy dynamism.

To conclude, the above cited studies have produced mixed results regarding the economic performance of the WANA region despite having abundant natural resources. Growth accounting exercises have shown that TFP has often remained negative or detrimental to GDP growth over the time. Whereas, factor accumulation is the driving force of the countries in the region.

3. Data and Methodology

3.1. Growth Accounting Decomposition

The basic idea of growth accounting is to divide output growth into input growth and factor productivity. Assuming neoclassical growth theory with two factors of production (labour and capital), Solow (1957) conducted pioneering long-term growth and productivity analysis. The study argued that a major part of the output growth was not explained by labour and capital. The unexplained part, commonly known as TFP, was attributed to improvement in the efficiency of production process.

The core arguments in the Solow (1957) model can be approximated by a simple Cobb-Douglas production function with capital and effective-labour as two critical inputs, given by

$$Y_{it} = AK_{it}^{\alpha}(HL)_{it}^{1-\alpha}, \; i \text{ is country index and } t \text{ is time index} \quad (1)$$

where Y_{it} is real GDP, K_{it} is the stock of physical capital, HL_{it} is human capital augmented labour force. A represents TFP. TFP is often considered to be a measure of efficiency over time, meaning how much a decision-making unit (country) has progressed in efficiency between two consecutive periods. α represents the share of capital in output. After simplification, the growth accounting equation can be derived from Equation (1) as:

$$(y_t - y_{t-1}) = (\mathrm{a}_t - \mathrm{a}_{t-1}) + \alpha(k_t - k_{t-1}) + (1-\alpha)(h_t - h_{t-1}) + (1-\alpha)(l_t - l_{t-1}) \quad (2)$$

Or it can be written as

$$\Delta y/y = \Delta a/a + [\alpha \times \Delta k/k] + [(1-\alpha) \times \Delta h/h] + [(1-\alpha) \times \Delta l/l] \quad (3)$$

where small case letters represent the natural log of the corresponding capital letters. Equation (3) decomposes output growth into technical progress (or improved productivity) and input growth. Technical progress indicates an increase in output as a result of improvements in methods of production (efficiency), while holding inputs as constant.

3.2. Convergence

To test the convergence hypothesis empirical literature largely relied on two different concepts. The first, known as absolute or unconditional β-convergence, occurs if a poor country tends to grow faster than rich ones in terms of per capita income, and thereby all countries converge to the common steady-state (Barro & Sala-i-Martin, 1992). Accordingly, we expect a negative relationship between per capita income and its growth rate. The basic mechanism underlying absolute β-convergence is the principle of diminishing returns to labour and reproducible capital. The second, known as σ-convergence examines the cross-sectional variation in income distribution over time. In this context, convergence occurs if the dispersion—measured, for example, by the standard deviation or coefficient of variation of output (or its growth rate) across a group of countries or regions—declines over time (Sala-i-Martin, 1996). If at time *t*, the dispersion in regional income distribution is smaller than an initial period, we can say that σ-convergence does occur. Under certain conditions, β-convergence (poor countries tending to grow faster than rich ones) tends to generate σ-convergence (reduced dispersion of per capita income or product). The formal estimation of unconditional or absolute β-convergence involves the following equation.

$$\frac{1}{T} ln \left[\frac{y_{it}}{y_{i0}}\right] = \alpha - \left[\frac{(1-e^{-\beta T})}{T}\right] lny_{i0} + \varepsilon_{i0,T} \quad (4)$$

where $\boldsymbol{y_{it}}$ is the output of *i*-th country at time *t* and $\boldsymbol{y_{i0}}$ is the output of the same country at initial year. *T* is the time span. The dependent variable of the equation represents the average growth rate over the sample period and the independent variable is the initial level of output. $\varepsilon_{i0,T}$ denotes idiosyncratic term. For a given *T*, Equation (5) can be reformulated as

$$\frac{1}{T} ln \left[\frac{y_{it}}{y_{i0}}\right] = \alpha + \lambda\, lny_{i0} + \varepsilon_{i0,T} \quad (5)$$

A negative value of $\boldsymbol{\lambda}$ indicates that the poorer regions are growing faster than richer ones that will lead to convergence. Value of β can be interpreted as the speed of convergence towards steady-state and is given as $\beta = -\ln(T\lambda + 1)/T$. Positive $\boldsymbol{\lambda}$ coefficient indicates divergence. The concept of σ-convergence asserts that dispersion, measured by the standard deviation of real per capita income across countries shrinks over

time. That is, $\sigma_t < \sigma_0$, for *t*=1, 2, 3...*T* and σ_t is the standard deviation of per capita output across the countries and is given as $\sigma^2 = \frac{1}{T}\sum_{t=1}^{T}(y_{it} - \bar{y})$, where $\bar{y}$ is the mean value of y_{it} at time *t*.

3.3. Data and Variables

This study uses annual time series data on real GDP per capita, GDP per worker, stock of physical capital, and human capital for a sample of 15 MENA countries[1] from 1970-2014. The relevant data is drawn from Penn World Tables version 9.0 (Feenstra et al., 2015). To conduct a comparative analysis of growth performance, output-side real GDP[2] at chained Purchasing Power Parity (in Million 2011 US$) is used. Real GDP per capita is obtained as a ratio of real GDP and population. For the measure of the labour force, we used data series on employment variable, which gives the total number of persons engaged in economic activity. As a measure of physical capital stock, the real physical capital series is employed, which is constructed by using the perpetual inventory method as follows:

$$K_{it} = I_{it} + (1 - \delta)K_{i,t-1}$$

where K_{it} is the capital stock available at time *t*, $K_{i,t-1}$is the capital stock at time *t*-1, δ is a constant depreciation rate, I_{it} is the investment at time *t*. Capital stock series in Penn World Table has been adjusted for differences in asset composition between countries and over time. More specifically, capital stock is the accumulation of depreciation-adjusted-investments in four types of assets: structures (including residential and non-residential); machinery (including computers, communication equipment, and other machinery); transportation equipment and other assets (including software, other intellectual property products, and cultivated assets). The human capital index is obtained based on average years of schooling for the population aged 15 and above, and an assumed rate of return for primary, secondary, and tertiary education as provided

[1]Algeria, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, Iran, Iraq, Turkey, Tunisia, Egypt, Jordan, Morocco and Syria. The other remaining countries of the region are not included in the analysis due to lack of relevant data.

[2] Output-side real GDP allows comparison of productive capacity across countries and overtime. And it is estimated by using prices for final goods, exports, and imports that are constant across countries**.**

by Psacharopoulos (1994) survey of wage equations. The annual data series on average years of schooling was interpolated from the quinquennial data series provided by Barro & Lee (2013). Using these inputs, the human capital index can be constructed as follows:

$$h_{it}=e^{\emptyset(s_{it})}$$

where s_{it} represent the average number of schooling years of workers in the labour force in country i and $\emptyset(s_{it})$ is a piecewise linear function, with zero intercept and a slope of 0.13 through the 4th year of education, 0.10 for the next 4 years, and 0.07 for education beyond the 8th year

As regards the value of α [see Equation (3)], PWT data provide a variable that is an estimate of labour's share, or 1 – α. The share of capital input, α, is taken to be the one minus labour share. Empirically α is estimated to be constant, but our study is more general in that the shares are allowed to vary over time. Thornqvist (1936)[1] dealt with TFP decomposition by measuring the growth rate of a variable between two points in time, $t-1$ and t, by logarithmic differences and by using as weights the arithmetic average of the factor shares at time $t-1$ and t (Equation 6). With this approach, the TFP growth is approximated in the Hicks-neutral case by

$$(\mathrm{a}_t-\mathrm{a}_{t-1}) \cong (y_t-y_{t-1})-(\alpha_{t-1}+\alpha_t)/2(k_t-k_{t-1})+(1-[\alpha_{t-1}+\alpha_t]/2)(h_t-h_{t-1})+(1-[\alpha_{t-1}+\alpha_t]/2)(l_t-l_{t-1}) \quad (6)$$

where $(\alpha_{t-1}+\alpha_t)/2$ is the average share of capita for period $t-1$ and t. TFP, as given in Equation (6) by $(\mathrm{a}_t-\mathrm{a}_{t-1})$ is a Solow-residual—capturing those changes in output growth which are not accounted for changes in measured inputs.

4. Empirical Results

4.1. Selected Statistics of MENA Countries

Table 1 presents basic statistics of some selected macroeconomic aggregates for the MENA countries. Not all countries in the MENA region have been included in our sample, because of the data limitations.

[1] Thornqvist index is a weighted sum of the growth rates of total output, where weights are equal to the arithmetic mean of the input-shares. It is a more general index over the constant base-year weighted indexes. Thornqvist index allows weights to vary.

There are some important differences between the countries across the region. GDP levels increased rapidly across the region between 1970 to 2014 sample period. However, per capita GDP has not accelerated at the pace. This result implies that GDP has not kept pace with the population growth. In some of the oil rich countries, for example, per capita GDP in 2014 was lower relative to 1970s level. Moreover, cross-country comparison reveals that GDP per capita varied significantly from a low of $4440 for Syria to about $1,51,760 for Qatar during 2014. Another salient feature of the MENA region is the rapid population growth of 2.32 percent during the past four decades. This growth rate is highest across all the regions of the world. The expansionary policies of attracting the expatriate workforce to support various economic activities have resulted in a population growth rate of 6.30% and 7.57% in Qatar and UAE, respectively (Arab Monetary Fund, 2016). In addition, cross-country comparison reveals that during 2014, Iran, Turkey, and Egypt had a population of over 75 million each, while Bahrain, Kuwait, and Qatar had a population of less than 4 million. There are certainly other important differences between the countries which will be highlighted in the sections to follow.

Table 1: Basic Macroeconomic Aggregates for Selected MENA Countries

	Real GDP (Billion)		**Population (Million)**		**Real GDP per capita (Thousands)**	
Countries	**1970**	**2014**	**1970**	**2014**	**1970**	**2014**
Oil dependent countries						
Bahrain	4.32	53.29	0.22	1.36	19.55	39.13
Kuwait	102.03	260.11	0.81	3.75	126.30	69.31
Oman	4.61	161.08	0.75	4.24	6.15	38.03
Qatar	11.20	329.64	0.12	2.17	93.95	151.76
Saudi Arabia	201.24	1487.96	6.10	30.89	33.01	48.18
UAE	67.19	636.90	0.28	9.09	244.19	70.10
Iran	230.38	1218.37	29.28	78.14	7.87	15.59
Iraq	32.04	430.02	10.26	35.27	3.12	12.19
Algeria	93.34	509.31	14.96	38.93	6.24	13.08
Non-oil dependent countries						
Turkey	233.09	1525.26	35.61	77.52	6.55	19.67
Tunisia	14.21	118.66	5.17	11.13	2.75	10.66
Egypt	38.64	968.57	35.56	89.58	1.09	10.81
Jordan	5.31	88.01	1.74	7.42	3.05	11.87
Morocco	34.21	249.68	16.39	33.92	2.09	7.36
Syria	22.06	83.36	6.60	18.77	3.34	4.44
MENA	1093.87	8120.23	163.84	442.19	6.68	18.36
Oil	746.35	5086.69	62.77	203.85	11.89	24.95
Non-oil	347.51	3033.54	101.07	238.34	3.44	12.73

Source: Authors own calculations using Penn World Tables (9.0).

Note: Figures for MENA, Oil and Non-oil is constructed by aggregating data across individual countries of the region, oil dependent countries, and non-oil dependent countries, respectively.

4.2. Evolution of Growth

Here we restrict our focus to trace the economic growth of the MENA region over a long time. Table 2 displays average growth rates of GDP between 1970 to 2014 for the MENA region, along with two subgroups of oil and non-oil countries. There is a great diversity of growth rates across the region. GDP increased at a rapid rate over the sample period, as shown in column 6 of Table 2. Three of the oil rich countries, namely Oman, UAE, and Iraq achieved double-digit growth rates during 1970-80. Although Kuwait and Iran have substantial oil resources, they registered negative growth rates during the same period. Furthermore, non-oil exporting countries, except Syria, performed relatively well during the 1970s mainly due to the remittances, foreign aid, foreign investment, and trade flows from oil exporting countries (Al-rawashdeh & Al-nawafleh, 2013)[7]. When oil prices plummeted during 1980s, there was a sharp decline in the GDP growth rates across the region as a whole. For example, oil rich countries registered negative growth in GDP, while non-oil countries registered positive and higher growth in GDP during 1980s. In addition, there were significant differences among the oil rich and non-oil countries (see column 3 of Table 2). The following decade of the 1990s witnessed a moderate recovery in growth performance because of the rise in oil prices. Oil is perceived to be used for fueling growth in the MENA region. Our analysis has partially confirmed this empirical observation—look at the last two decades of high growth following a rise in oil prices.

[7] Ilahi & Shendy (2008) analyzed 35 years panel data and estimated that the growth rates of real GDP, private consumption, private investment in the non-oil MENA economies are significantly explained by financial and remittances outflows from the GCC countries. The growth elasticity of financial flows is about 0.17 to 0.21, while the growth elasticity of remittances is about 0.07 to 0.09.

Table 2: Average GDP Growth Rates

Country	1971-80	1981-90	1991-2000	2001-2014	1970-2014	volatility
Oil-dependent countries						
Bahrain	8.15	-1.56	7.80	10.53	5.79	2.23
Kuwait	-1.94	-4.07	9.63	10.84	2.65	5.22
Oman	14.84	1.29	5.84	11.93	8.05	1.42
Qatar	5.22	-2.59	10.26	20.69	7.69	1.81
Saudi Arabia	8.02	-3.55	1.95	11.81	3.48	2.41
UAE	15.41	-2.94	4.37	7.00	4.56	2.28
Iran	-5.16	2.16	9.71	5.96	5.36	2.71
Iraq	11.08	1.48	11.86	15.36	4.05	2.43
Algeria	9.27	-1.82	2.02	5.87	2.90	1.63
Non-oil dependent countries						
Turkey	4.28	4.96	3.68	6.77	3.91	1.24
Tunisia	7.20	4.69	6.25	3.55	5.05	0.82
Egypt	4.86	5.51	10.93	9.44	8.32	0.81
Jordan	7.43	4.22	4.36	14.18	6.19	1.35
Morocco	5.71	7.52	2.26	6.27	4.52	1.11
Syria	-2.35	-2.52	6.32	7.98	3.79	3.74
MENA	4.97	0.80	5.23	8.53	4.39	1.20
Oil	5.27	-1.90	5.21	9.17	4.11	1.61
Non-Oil	4.30	5.09	5.23	7.53	4.90	0.86

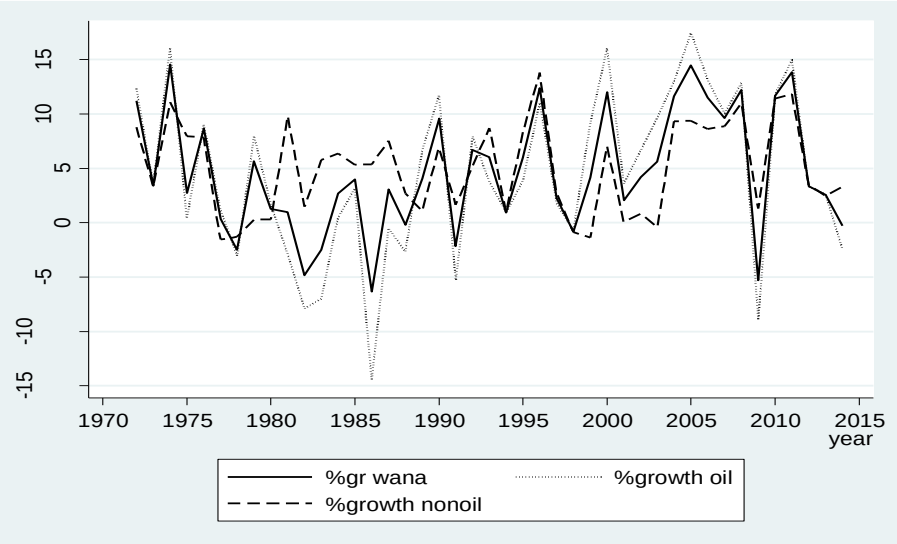
Source: Authors own calculations using Penn World Tables (9.0).

Notes: Growth rates are calculated using the OLS regression $lnY_t = \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \beta_1 D_1 t + \beta_2 D_2 t + \beta_3 D_3 t + \beta_4 D_4 t + u_t.$, where D_i, i =1,2,3,4 is a dummy for each decade.

Figure 1 shows the pattern of GDP growth rates for the MENA region as a whole, along with the two sub-groups of oil and non-oil countries during the 1970-2014 sample period. One salient feature of this growth performance is its high volatility[8].

[8] The ratio of standard deviation and absolute mean of growth rates is the commonly used measure of growth rate volatility.

Figure 1: Annual growth rate of GDP (1970-2014)



Source: Authors own calculations.

As shown in Figure 1 and the last column of Table 2, volatility is larger for oil rich countries (1.61) than the region's (1.20) and non-oil countries (0.86) levels. This volatility in growth rates across the MENA region, in general, and oil-rich countries, in particular, is ascribed to fluctuations in global oil market. More specifically, it is argued that the economic growth across the MENA countries depends on energy prices. During the 1980s, when energy prices declined, the graph drifts below zero. For non-oil countries, however, it remained fairly stable. Moreover, volatility in growth rates is attributable to several other factors that are peculiar to the region. The most prominent include, among others, lack of diversification which in turn increases vulnerability to external shocks (Malik and Masood, 2020); perennial regional conflict, political instability (Makdisi et al., 2007); and low-quality investment projects, low human capital, underdeveloped financial institutions, and a large share of the government in economic activities (Sala-i-Martin & Artadi, 2003).

Table 3 and Figure 2 shows how per capita GDP growth is evolving in the MENA region. Several stylized features emerge. The annual growth rates are highly volatile for the overall period. The volatility of oil rich

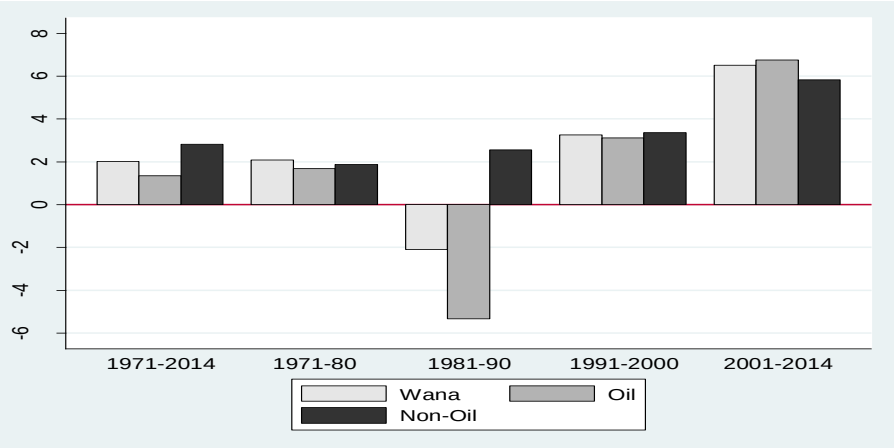
countries (3.88) is higher than the region's (2.36) and non-oil countries (1.40) levels. Using a sample of 92 countries, Ramey and Ramey (1995) found negative and significant relationship between volatility and output growth. Large volatility, coupled with low growth rate, which is very clear in the case of oil-exporting countries, serves as an indication of the phenomena of "natural resource curse." Hnatkovska and Loayza (2003) assert that this negative association between volatility and growth rate is not only statistically but also economically significant. They argued that negative relationship becomes stronger for countries with underdeveloped institutions, low financial development, and countries that are unable to conduct countercyclical fiscal policies. For two consecutive decades, some oil-exporting countries (Kuwait, Saudi Arabia, Qatar, and Iran) registered negative growth rates and very high volatility. For over four consecutive decades, UAE had a negative average growth rate with volatility of 6.10. After controlling for simultaneous and reverse causality bias in the volatility and growth relationship, Hnatkovska and Loayza (2004) estimated that one percent increase in volatility decreases growth by 1.3 percentage points, which represent a significant drag on output growth. Furthermore, from 1970-2014 the average growth rate of resources poor countries such as Egypt, Tunisia, Morocco, Jordan, and Turkey, remained relatively superior and even surpassed the major oil exporters where their average growth did not exceed 2 percent (see Figure 2). Table 3 shows that the growth rate of oil producers was negative during the early 1980s—period of a steep decline in oil prices—while that of the non-oil producers was positive, but the region as a whole registered negative growth rate. It shows that, despite substantial heterogeneity between individual countries, the region as a whole is showing a common trend of growth performance which is very disappointing.

Table 3: Average Growth of GDP per capita

Country	1971-80	1981-90	1991-2000	2001-2014	1971-2014	volatility
Oil-dependent countries						
Bahrain	2.22	-4.62	4.68	4.24	1.58	5.32
Kuwait	-7.62	-8.00	10.06	5.19	-0.08	25.86
Oman	9.40	-2.99	4.04	7.04	4.37	2.58
Qatar	-1.52	-9.42	7.85	7.76	1.31	6.86
Saudi Arabia	2.33	-8.13	-0.65	8.94	-0.28	7.69
UAE	-0.54	-8.24	-0.84	-2.51	-2.79	6.10
Iran	-8.03	-1.64	8.01	4.71	2.95	5.20
Iraq	7.59	-0.92	8.50	12.16	1.18	3.62
Algeria	6.21	-4.64	0.23	4.19	0.67	3.49
Non-oil dependent countries						
Turkey	1.88	2.84	2.07	5.27	2.10	2.06
Tunisia	4.77	2.06	4.59	2.52	3.16	1.19
Egypt	2.58	2.73	8.88	7.37	6.01	1.12
Jordan	4.36	0.33	1.04	10.25	2.62	2.61
Morocco	3.36	5.23	0.79	5.07	2.78	1.68
Syria	-5.60	-5.66	3.46	6.51	0.98	8.87
MENA	2.09	-2.09	3.26	6.51	2.01	2.36
Oil	1.69	-5.34	3.12	6.76	1.35	3.88
Non-Oil	1.88	2.56	3.36	5.83	2.82	1.40

Source: Authors own calculations using Penn World Tables (9.0).

Figure 1: Annual Growth Rate of Per Capita GDP



Source: Authors own calculation

4.3. Growth Accounting

In this section, growth accounting exercise is conducted to shed some light on the contribution of different factors of production to economic growth. Understanding the sources of growth and their relative contribution is, therefore, critical for designing policies for sustaining growth. Our focus here is on the structural determinants of long-run growth as predicted by standard augmented Solow (1957) model.

Table 4: Growth Accounting for Selected MENA Countries

Country	Output growth	Contribution from			
		Labour	Capital	Human capital	TFP
Oildependent countries					
Bahrain	4.02	1.89	4.10	0.43	-2.42
Kuwait	0.13	1.14	3.28	0.21	-4.62
Qatar	6.29	2.12	5.14	0.38	-1.46
Saudi Arabia	3.24	1.54	2.49	0.38	-1.19
Iran	2.04	0.98	3.26	0.53	-2.78
Iraq	5.41	0.60	2.60	0.27	1.69
Non-oil dependent countries					
Turkey	4.06	0.86	2.53	0.70	-0.04
Tunisia	4.54	1.20	2.02	0.91	0.39
Egypt	5.35	1.01	3.99	0.67	-0.34
Jordan	4.42	1.94	3.19	0.80	-1.53
Morocco	3.92	1.52	2.32	0.62	-0.58
MENA	3.68	1.04	2.93	0.54	-0.83
Oil	3.19	0.99	3.08	0.37	-1.29
Non-oil	4.60	1.21	2.70	0.68	-0.14
Comparators					
India	5.37	1.50	2.13	0.78	0.96
China	6.57	1.22	3.42	0.79	1.14
Brazil	3.76	1.35	2.08	0.72	-0.39
Singapore	6.82	1.59	4.32	0.75	0.14
Japan	2.48	0.27	2.51	0.35	-0.65

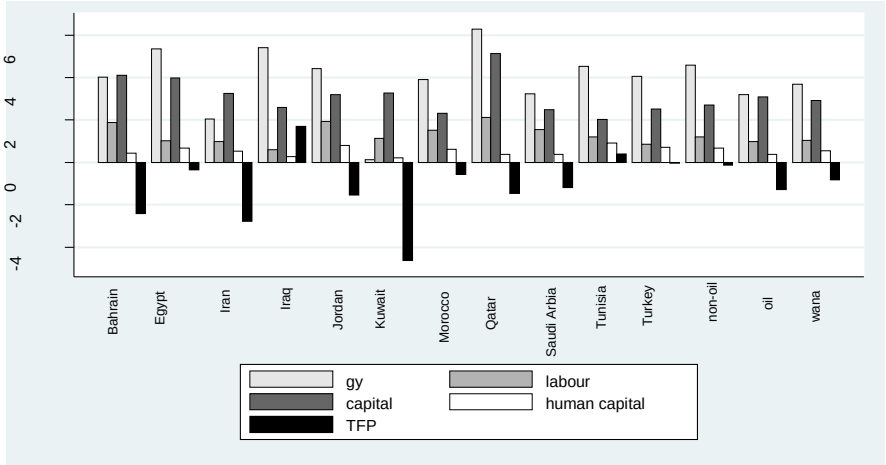
Source: Authors own calculations using Penn World Tables (9.0).

Table 4 and Figure 3 reports growth accounting estimates for selected MENA countries[9] for the 1970-2014 period. These results are derived from Equation (6) in Section 3.3. The growth rate of real GDP per capita

[9] Necessary data for growth accounting on remaining countries under consideration namely Oman, UAE, Algeria and Syria was not available and has been left out of analysis in growth accounting decomposition.

is decomposed into contributions from the growth rates of labour, human capital, physical capital, and TFP. Our first observation is that labour and capital are the dominant factors of output growth followed by human capital.

Figure 2: GDP Growth Rate Decomposition (1970-2014)



Source: Authors own calculation

Table 4 shows that the contribution of human capital to the GDP growth is meagre across the countries as a whole over the 1970-2014 sample period. However, relative to oil rich countries, non-oil producing countries have observed higher growth in human capital which augmented aggregate GDP growth. TFP does not seem to play any significant role, rather it is detrimental to the growth performance of MENA countries. All countries have observed negative TFP growth rates, with the exception of Iraq and Tunisia. In the case of Iraq, TFP contributes about 31 percent in per capita GDP growth, while in the case Tunisia, TFP contributes about 8.5 percent, respectively. Over time, the MENA region as a whole registered negative TFP growth relative to the benchmark countries (see Table 4, comparators). It indicates that the region has failed to improve the efficiency of the production processes over time. The negative productivity is the major factor in the sluggish growth performance of the MENA countries. These findings are in line with Makdisi et al. (2007) and Abu-Qarn and Abu-Bader (2007).

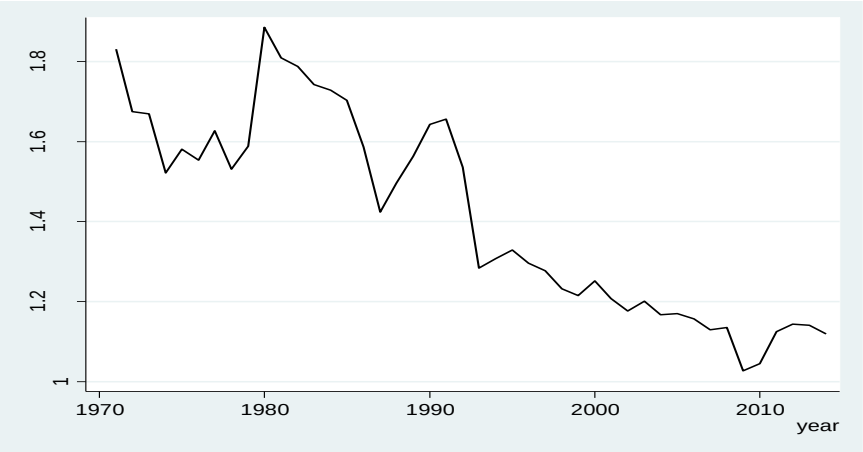
An important point to highlight here, however, is that TFP is a residual measure which embodies other factors affecting growth not included in labour, physical capital and human capital. Makdisi et al. (2007) regressed TFP growth on a series of relevant variables to assess their relative contribution. The main repressors' were the quality of institutions, inflation rate, initial income, initial enrolment rate in primary school, and index of natural resource abundance. At low values of capital share, the results indicated that institutions and stock of human capital have positive effects on TFP growth. Inflation rate and natural resource abundance had a negative influence on productivity. However, initial income with negative sign points catching–up effect on productivity. With a higher value of the capital share, only initial income and human capital remained statistically significant. All these empirical findings emphasize the adoption of policies that will lead to an improvement in productivity growth.[10]

4.4. Convergence

Following section 3, we analyze two types of convergence, namely σ-convergence and absolute β-convergence. Figure 4 shows the dispersion—measured by the coefficient of variation—of per capita GDP across MENA countries between 1970 to 2014 sample period. The figure portrays a declining trend in cross-country dispersion of per capita GDP. It clearly shows that the income gap between countries of the MENA region declines and the hypothesis of σ-convergence is accepted. In addition, for the overall period, it is found that the coefficient of variability (of per capita income) series on time is found to be negative and statistical significant at 1% significance level (Table 5).

[10] See Bisat, El-Erian, & Helbling (1997) has highlighted various policy measures for achieving high and sustained growth in Arab countries.

Figure 4: Dispersion of Income across MENA Countries, 1970-2014



Source: Authors own calculation

Table 5: Estimation of the **σ**-convergence

	Coefficients	***t-Statistic***	***P-value***
Intercept	36.15	13.31*	0.00
time	-0.018	-12.79*	0.00
R-Square			0.795

Source: Authors own calculation.
* indicates 1% level of significance

Table 6 and Figure 5 displays the average growth rate of per capita GDP from 1970-2014 for each country against the log of per capita GDP in 1970. The cross-country variation in growth rates is very clear in Figure 5. A visual inspection of the table reveals that the hypothesis of absolute β-convergence holds in our study. As the countries that were rich in 1970, for example, UAE, Qatar, and Kuwait, registered slow (even negative) growth rates over the subsequent time period, while initially poor countries, for example, Egypt, Morocco, and Jordan registered rapid growth. Table 6 reports the estimation results of absolute β-convergence. The hypothesis of absolute β-convergence is accepted for our dataset because the coefficient on initial income level is negative and significant at 1% level of significance.

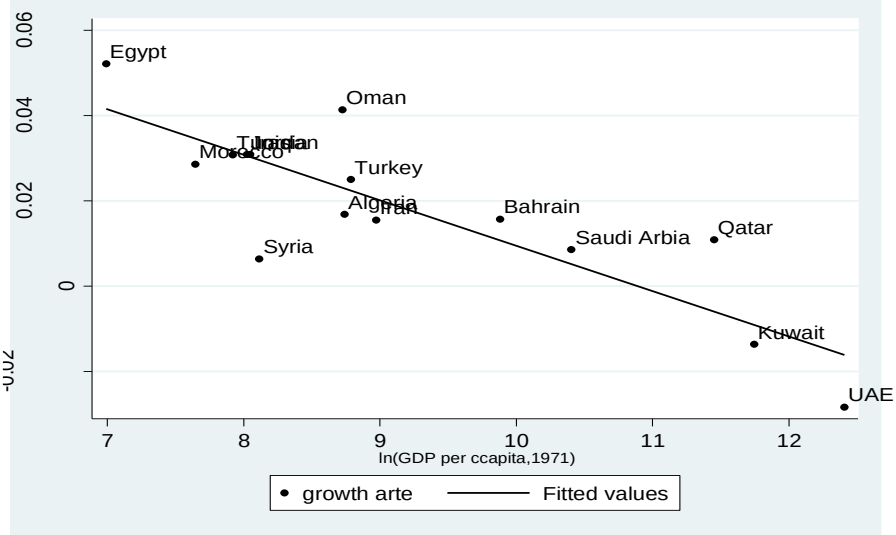
Table 6: Estimation of β-convergence (Dependent variable is Growth rate)

	Coefficients	t-Statistic	P-value
Intercept	0.116121	6.893712*	0.00
ln(GDP pc,1970)	-0.01066	-5.90211*	0.00
R-Square			0.728

Source: Authors own calculation.
* indicates 1% level of significance

Furthermore, Figure 5 shows that the relationship between growth rate and initial level of per capita GDP is negative that reinforces the results of growth regression summarized in Table 6.

Figure 3: Convergence of Per Capita GDP across Countries



Source: Authors own calculation

The results presented in Table 5 and Table 6 show that σ-convergence and absolute β-convergence holds for our sample countries. The goodness-of-fit measures reported un Table 5 and 6 are satisfactory with R-square of 79 and 72 percent, respectively. These findings indicate that initially poorer countries grew more rapidly than rich ones, and dispersion in per capita income across the MENA region decreased over the 1970-2014 sample period.

5. Conclusion

The present study explored the long run growth trend of the MENA countries from 1970 to 2014. Specifically, the study focused on three issue—variability in economic growth; role of total factor productivity; and convergence of income across the MENA countries over time. The findings indicate that oil dependent economies have registered significant variability in growth which can be linked with the fluctuations of oil prices. Due to the rapid growth of population and labour force (both nationals and immigrants), growth rates of per capita GDP are quite meagre in most of the oil-based economies. The output growth in the region is due to the accumulation of factor inputs, while TFP does not play a significant role in output growth, with the exception of Iraq and Tunisia. Our findings point out that labour and capital are the dominant factors of output growth followed by human capital across the MENA countries. Both σ and absolute β- convergence tests provide overwhelming support for convergence in per capita GDP across the countries. The statistical results of the study have some policy implications. In light of the above findings, there is an urgent need for policymakers and governments of the respective countries in the region to undertake structural reforms (meaningful human capital development, research and development, financial sector development, economic openness, and strong private sector) aiming at sustaining long run growth rate. Particularly, TFP growth needs to be improved by raising the efficiency of input factors and undertaking technological improvements. Economic diversification of respective countries to reduce dependence on single sources of income and employment would help to mitigate the undesirable effects of external shocks.

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