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An Analysis of Economic Growth, Productivity and Convergence of Middle East and North African Countries

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Abstract

The objective of this study is to investigate the spatial and temporal variations in economic growth and productivity of the Middle East and North African countries over the period 1970-2014. The study employs standard growth accounting approach to measure and decompose growth of total output into contributions from technological progress and factor accumulation. It also tests the hypothesis of regional convergence in the neo-classical framework. The results of the study suggest that oil-dependent economies have shown significant growth variations that may be associated with movements in oil prices. In most oil-based economies, growth rates of per capita GDP and per worker GDP are quite meagre due to rapid growth in population and labour force (both nationals and immigrants). The results of growth accounting indicate that output growth in the region is due to the accumulation of factor inputs, while TFP does not play a significant role. Both β and σ tests of convergence suggest that there is convergence in per worker GDP (labour productivity) and per capita GDP. The study recommends the adoption of large scale structural reforms to achieve sustained long-run growth in addition to the economic diversification of the individual countries to reduce dependence on single sources of income and employment would diminish the volatility of income and employment.

تحليل النمو الاقتصادي والإنتاجية والتقارب بين دول الشرق الأوسط وشمال إفريقيا

مشتاق مالك

ملخص

تهدف هذه الدراسة الى التحقق من التغيرات المكانية والزمانية في النمو الاقتصادي والإنتاجية في دول منطقة الشرق الأوسط وشمال إفريقيا خلال الفترة 1970-2014. تستخدم الدراسة المنهج المحاسبي لقياس وتفكيك النمو الاقتصادي لقياس مساهمة التقدم التكنولوجي وتراكم العوامل. كما تختبر الدراسة فرضية التقارب الإقليمي في إطار النظرية الكلاسيكية الجديدة. تشير نتائج الدراسة إلى أن الاقتصادات المعتمدة على النفط أظهرت تغيرات كبيرة في النمو متوافقة مع تحركات أسعار النفط. كما أظهرت هذه الدول معدلات نمو ضعيفة لدخل الفرد وللناتج المحلي الإجمالي لكل عامل بسبب النمو السريع في عدد السكان والقوى العاملة (المواطنون والمهاجرون على حد سواء). وتشير نتائج تفكيك النمو في المنطقة عموما أنه يرجع بالأساس إلى تراكم مدخلات عوامل الإنتاج، بينما لا تلعب إنتاجية العوامل دورًا مهمًا. ويشير اختبارا التقارب β و σ إلى وجود تقارب في الناتج المحلي الإجمالي لكل عامل ونصيب الفرد من إجمالي الناتج المحلي. وتوصي الدراسة بتبني إصلاحات هيكلية واسعة النطاق لتحقيق نمو مستدام طويل المدى بالإضافة إلى التنويع الاقتصادي لتقليل الاعتماد على مصدر واحد للدخل والتوظيف.

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1. Introduction

Economic performance of the Middle East and North African region (henceforth, MENA)[(1)] is quite dismal despite having abundant natural resources, especially oil and natural gas. Sustaining stable economic growth is one of the central problems facing most of the MENA countries. Countries in the MENA region are similar in many respects like shared history, language, culture, geography and political regimes. Despite being similar on so many fronts, there are important differences as well. In the economic sphere the region can be divided into two sets of countries: First, those having a large reserve of oil (oil-rich countries) and are net exporters of oil. Second, countries having little or no oil reserve (non-oil countries) and are net importers of oil. Individual countries in the region are substantially different in terms of resource endowments, population, 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 (in most of the cases), is placed in the altogether different sphere in contrast with the second group, where resources to support their respective populations is 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: The first is labour migration from resource-poor nations to resource-rich ones and remittance flows thereby; the second is capital flows (investments, aids and donations); last but not least, is 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 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 a strong negative correlation between the availability of natural resource and economic growth. Excessive dependence on natural resources is estimated to cause Dutch disease[(2)], 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 oil revenue makes them vulnerable with respect to demand and price fluctuations in the world oil market. Extreme dependence on oil in both groups of countries is likely to make their growth unsustainable and volatile. Dependence on oil creates 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). Further, political events in the form of war, revolution and violent conflicts are also detrimental to regional growth.

With this background, the purpose of this study is quite restricted, where we try to focus only on the 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 a convergence of income among MENA countries?

While exploring these issues, we also try to understand the interconnections and interdependencies of oil and non-oil economies.

The remainder of the study is organised as follows. Section 2 will present a brief review of the past studies on the growth performance of the MENA countries. Section 3 will discuss the empirical model of growth accounting approach for measurement of growth in output and the relative contribution of various factor inputs. Again, a brief survey of the convergence hypothesis will be dealt with in section 3. Section 4 describes the variables and data sources employed in the study. Section 5 will discuss the evolution of growth dynamics in MENA, decomposition of output growth into contributions from labour, physical capital, human capital and TFP and empirical testing of the convergence hypothesis is conducted. Lastly, section 6 will provide concluding remarks.

2. Brief Review of Literature

MENA region accounts for approximately 55.6 % and 27.7% share in the global oil and gas reserves, respectively (Arab Monetary Fund, 2016). As such, according to the classical growth theory, natural resource endowments of MENA countries are believed to allow sustained growth over a long period. Nevertheless, past literature has provided mixed results regarding MENA countries' growth performance. The first detailed analysis of the regional growth of MENA was done by Barlow (1982). The study was ambitious in the sense that it first tried to prepare a comparable data set of per capita Gross National Product (GNP) for all of the twenty-three countries over the period of 1950-1972. The study found that oil-exporting countries were growing at a higher rate than non-oil countries. Political factors like war, civil war and decolonization were also playing a significant role and affected growth performance negatively. Countries with rapid population growth were growing at a slower rate. While 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 (Arab Monetary Fund, 2016). Through a study to analyse the long-run growth of sixteen MENA countries over the period of 1980-2000, Hakura (2006) 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 have constrained the growth record of the MENA region as a whole.

Esfahani (2009) endeavoured to investigate the role of social contracts in the MENA region that may throw light on why less interventionism has not been associated with better economic performance in the region. The more interventionist governments with fewer resource rents at their disposal moved earlier to generate revenues through export promotion. This created a growing private sector in favour of reform and engagement in globalization. Countries with larger resources developed more inward-oriented private sectors that were less inclined to support the export promotion and policy dynamism. The study

concluded that policies needed to initiate and enhance growth in each country have many specific components that require extensive local expertise. Through the study on economic growth and investment in the Arab world over the period 1960-2000, Sala-i-Martin & Artadi (2003) relates the 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, the weak business environment and the low quality of human capital have led to systematically unproductive investment decisions and, thus, low economic growth.

While ascertaining the determinants of economic growth, Makdisi et al. (2007) asserted that conventional factors of production played a 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 total factor productivity have a substantial negative effect on growth performance. Abu-Qarn (2007) and Guetat (2006) considered the impact of economic and non-economic factors on the economic growth of the MENA region. Growth accounting exercises showed that total factor productivity has often been found to be negative or detrimental to growth. Corruption and low bureaucratic quality have overwhelmingly mitigated the positive effects of human capital formation. The 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 found a positive and significant relationship between financial development and economic growth in The Organisation of Islamic Countries (OIC). 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 of Hassan et al. (2007), Zirek et al. (2016), and Yu et al. (2016).

3. Methodology

The selection of countries is based on the availability of continuous and comparable data. For economic growth and convergence analysis, we needed data of aggregate output, population and workers. For growth accounting exercise data of inputs (labour, human capital and capital stock) is also needed. We employ standard augmented Solow (1957) model to measure and decompose changes in aggregate output into factor accumulation and TFP. TFP can be defined as a ratio of aggregate output index to aggregate input index. Productivity improvements can be achieved either by an increase in the output given a certain amount of inputs or by a decrease in inputs given a certain amount of output.

3.1 Growth Accounting

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 author 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 these inputs. One of the fundamental predictions of Solow (1957) model is that the long-run growth is sustained by continuous improvement in TFP. Subsequently, literature flourished vastly to empirically estimate the sources of growth in a cross-section of countries. Mankiw, Romer, & Weil (1992) concluded that the augmented Solow model accounts for over 80 percent of cross-country variation in income per capita. However, Young (1995) and many recent studies argued that the growth miracles of Asian Tigers (Hong Kong, Singapore, South Korea, Taiwan) were largely due to a substantial increase in measured factor inputs.

The core arguments in the Solow (1957) model can be approximated by a simple Cobb-Douglas[3] production function with capital and labour in effective units as two critical inputs (Robert E. Hall, 1999), given by

$$Y_t = A_t K_t^{\alpha} (HL)_t^{1-\alpha} \quad \text{..... (1)}$$

where $\boldsymbol{Y_t}$ is output (real GDP), $\boldsymbol{K}$ is the stock of capital, $\boldsymbol{HL}$ is human capital augmented labour force. $\boldsymbol{A_t}$ is called 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. $\boldsymbol{\alpha}$ is a positive exponent representing share of capital in output. The process of estimating Equation (1) is described as follows:

Taking the natural log of Equation (1), we get

$$logY_t = logA_t + \alpha\, logK_t + (1-\alpha)\, log(H_t) + (1-\alpha) log\,(L_t) \text{..... (2)}$$

Equation (2) contains the main variables involved in the analysis of growth performance, decomposition of growth and the convergence process discussed below. We can write Equation (2) as

$$y_t = \mathrm{a}_t + \alpha k_t + (1-\alpha) h_t + (1-\alpha) l_t \quad \text{..... (3)}$$

where small case letters represent the natural log of the corresponding capital letters. The differencing of Equation (3)[4] gives the growth rates of respective variables as follows:

$$(y_t - y_{t-1}) = (\mathrm{a}_t - \mathrm{a}_{t-1}) + \alpha(k_t - k_{t-1}) + (1-\alpha)(h_t - h_{t-1}) + (1-\alpha)(l_t - l_{t-1}) \quad \text{..... (4)}$$

Or it can be written as

$$\Delta y/y = \Delta a/a + [\alpha \times \Delta k/k] + [(1-\alpha) \times \Delta h/h] + [(1-\alpha) \times \Delta l/l] \quad \text{..... (5)}$$

$$[output\ growth = technical\ progress + (capital\ share \times capital\ growth) + (labour\ share \times human\ capital)] + (labour\ share \times labour\ growth)$$

Equation (5) 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 interms 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 second, known as sigma convergence (σ-convergence) looks into the cross-sectional variation in income distribution. In this context, convergence occurs if the dispersion—measured, for example, by the standard deviation or coefficient of variation of output growth 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. The basic mechanism underlying absolute convergence is the principle of diminishing returns to labour and reproducible capital. 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). Theoretically, there may be a difference between the two measures, but with real-world data, whenever we observe σ-convergence, we also observe β-convergence (Sala-i-Martin, 1996).

Systematic formulation of β-convergence is derived from the seminal work of Solow (1957). The model essentially describes a mechanism by which regions or countries reach steady-state equilibrium. Despite the restrictive conditions of the Solow model, two important conclusions can be drawn. First, regions will converge to a common steady state if the growth rate of technology, investment and the labour force is identical across regions. Second, farther the country from its steady-state, the faster would this country grow, which leads to a more general prediction that poorer country will grow faster than richer countries. The movements of factors across countries in search of higher returns would make this to happen. However, according to Sala-i-Martin (1996), “convergence is more likely across regions of the same country rather than between the countries because the structural

differences are likely to be smaller across regions of the same country". The formal estimation of unconditional or absolute β-convergence involves the following equation.

$$\frac{1}{T} ln \left[\frac{y_{it}}{y_{i0}}\right] = \alpha - \left[\frac{(1-e^{-\beta T})}{T}\right] lny_{i0} + \varepsilon_{i0,T} \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

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

$$\frac{1}{T} ln \left[\frac{y_{it}}{y_{i0}}\right] = \alpha + \lambda\, lny_{i0} + \varepsilon_{i0,T} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

A negative value of the coefficient $\boldsymbol{\lambda}$ 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,

$$\sigma_t < \sigma_0 \quad \ldots\ldots \quad t=1, 2, 3\ldots T$$
$$\text{Or} \quad \frac{\sigma_t}{\sigma_0} < 1$$

where σ_t is the standard deviation of $log(y_{it})$ across *i*th country and is given as

$$\sigma = \sqrt{\frac{1}{T}\sum_{t=1}^{T}(y_{it} - \bar{y_t})}$$

where $\bar{y_t}$is the mean value of y_{it} at time *t*.

4. Data and Variables

This study uses annual time series data on real GDP per capita, GDP per worker, the stock of physical capital, and human capital for a sample of 15 MENA countries(5) 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, we used output-side real GDP[(6)] at chained Purchasing Power Parity (in Million 2001 US$). Real GDP per capita is obtained as a ratio of real GDP and population. For the computation of real GDP per worker, we need a measure of the labour force. For this purpose, we used a series on employment variable, which gives the total number of persons engaged in economic activity. As a measure of physical capital stock, we employ the real physical capital series, which is constructed by using *the perpetual inventory method* as follows:

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

where K_t is the capital stock available at time *t*, $K_{t-1}$is the capital stock at time *t*-1, δ is a constant depreciation rate, I_t 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 equipments and other assets (including software, other intellectual property products and cultivated assets). The human capital index is obtained on the basis of 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 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 a 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. Mincerian (1981), the rate of return to education is $\frac{dlnh_{it}}{ds_{it}} = \emptyset'(s_{it})$

As regards the last ingredient required by Equation (3), namely α, the PWT data provide a variable *labsh*, which 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)[7] 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 7). With this approach, the TFP growth is approximated in the Hicks-neutral case by

$$(\mathrm{a}_t - \mathrm{a}_{t-1}) \cong (y_t - y_{t-1}) - (\alpha_{t-1} + \alpha_t)/2(k_t - k_{t-1}) + (1 - [\alpha_{t-1} + \alpha_t]/2)(h_t - h_{t-1}) + (1 - [\alpha_{t-1} + \alpha_t]/2)(l_t - l_{t-1}) \quad (7)$$

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

5. Results and Analysis

5.1 Selected Statistics of MENA Countries

Table 1 provides basic statistics of some selected macroeconomic aggregates of MENA countries. Not all countries in the MENA region have been included in our sample, because of the data limitations. There are some important differences between the countries in the region. While Iran, Turkey and Egypt had a population of over 75 million each in 2014; Bahrain, Kuwait and Qatar had a population below 4 million. Similarly, GDP per capita varied significantly from a low of $4440 for Syria to about $1,51,760 for Qatar. Another salient feature of the MENA region is the rapid population growth of 2.32 percent[8] during the past four decades. This growth rate is highest across all the regions of the world. The expansionary policies for 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). 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 Countries in the MENA Region

	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: Penn World Tables (9.0) and authors own calculations.

5.2 Evolution of Growth

This section examines the economic growth performance of the MENA region. Here we restrict our focus to trace the economic growth of the individual countries over a long time along with two subgroups of oil and non-oil countries. Table 2 displays average growth rates for all MENA countries from 1970-2014 along with two subgroups of oil and non-oil countries. There is a great diversity in growth rates across the region. GDP increased at a rapid rate as shown in column 6 of Table 2.

In fact, 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 1970s mainly due to the remittances, foreign aid, foreign investment, and trade from oil-exporting countries (Al-rawashdeh and Al-nawafleh, 2013)[9]. For the region as a whole, when oil prices plummeted over the 1980s, there was a sharp decline in the GDP growth rates. But there were significant differences among the oil-rich and non-oil countries (see Table 2, column 3). The following decade of the 1990's witnessed a moderate recovery in growth performance because of the rise in oil prices. Oil has been perceived to be used for fuelling 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.

Table(2): Average Annual GDP Growth Rates

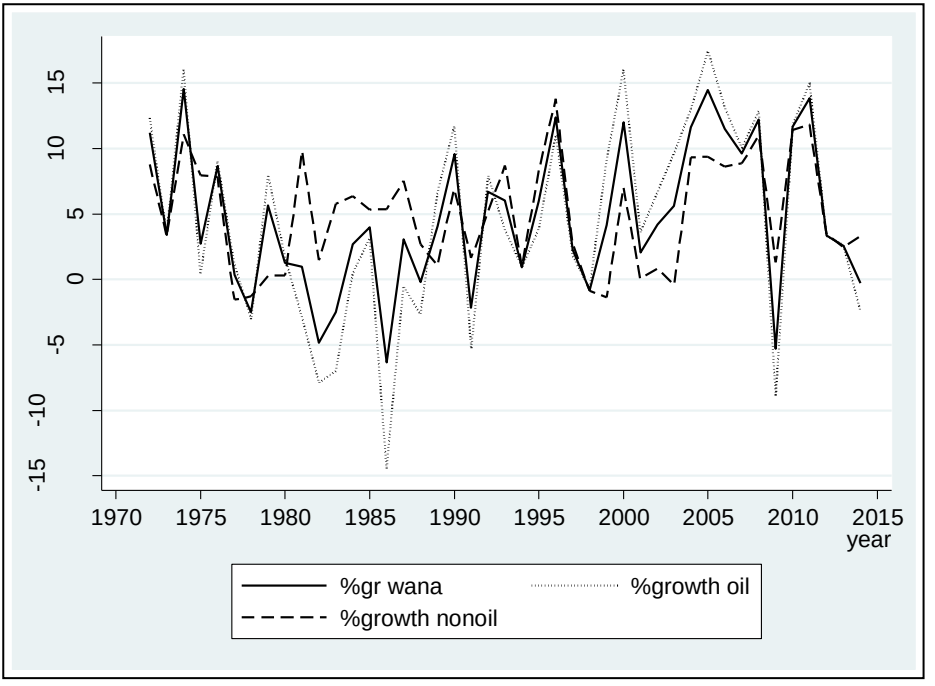
Countries *C(1)*	1971-80 *C(2)*	1981-90 *C(3)*	1991-2000 *C(4)*	2001-2014 *C(5)*	1970-2014 *C(6)*	volatility *C(7)*
			Oil-dependent countries			
Bahrain	8.15	-1.56	7.80	10.53	5.79	2.23
Kuwait	-1.94	-4.07	9.63	10.84	2.65	5.22
Oman	14.84	1.29	5.84	11.93	8.05	1.42
Qatar	5.22	-2.59	10.26	20.69	7.69	1.81
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: Penn World Tables (9.0) and authors own calculations

Notes: 1. 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 during 1970-2014, along with the two sub-groups of oil and non-oil countries. One salient feature of this growth performance is its high volatility(10).

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



As shown in Figure 1 and the last column of Table 2, volatility is larger for oil-rich countries (1.61) than non-oil countries (0.86). Implicitly, it indicates the relationship between oil prices and economic growth. More specifically, economic growth in MENA countries is a result of energy prices. During the 1980s, as energy prices declined, the graph drifts below zero. For non-oil countries, however, it remained fairly stable. This high volatility in growth rates is attributable to several factors that are peculiar to the region. The most prominent among others include lack of diversification which in turn increases vulnerability to external shocks (Malik and Masood, 2020), perennial regional conflict, political instability (Makdisi et al., 2007), low-quality investment projects, low human capital, underdeveloped

financial institutions and large share of government in economic activities (Sala-i-Martin and Artadi, 2003).

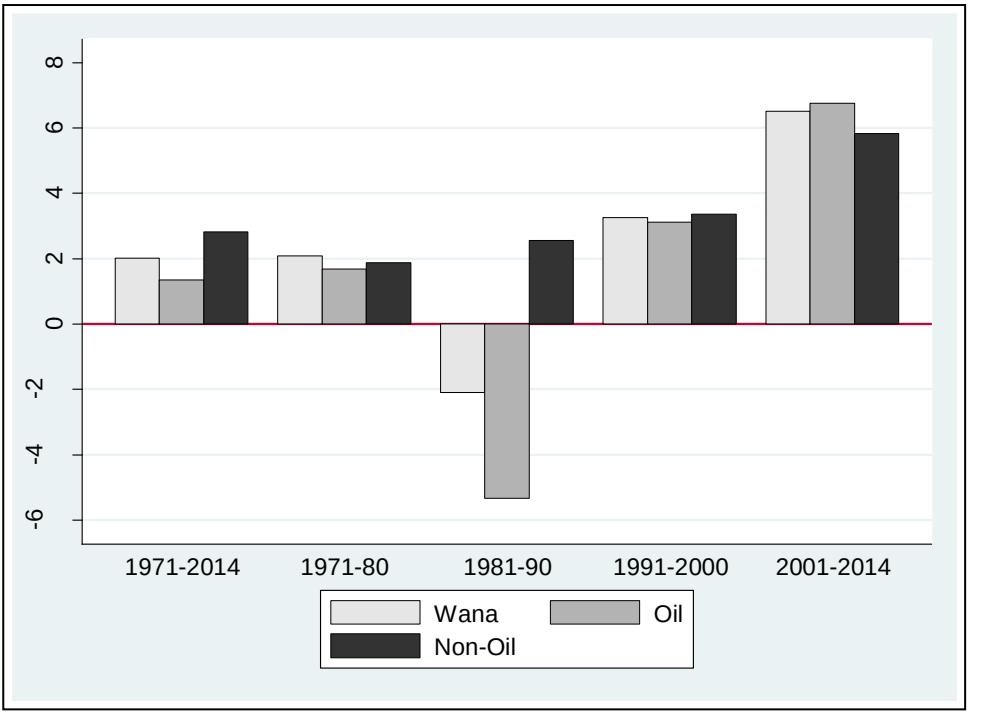
Table 3 and Figure 2 show how per capita GDP growth is evolving in the MENA region. Several stylized features emerge. The annual growth rates are highly volatile for the overall period. The volatility of oil-rich countries (3.88) is higher than the regional (2.36) and non-oil countries (1.40) levels. Using a sample of 92 countries, Ramey and Ramey (1995) found a statistically significant negative relationship between volatility and growth. Large volatility, coupled with low growth rate, which are 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 link is not only statistically but also economically significant. They argued that negative relationship becomes stronger for poor 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, the UAE had a negative average growth rate with the 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 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): Compound Average Annual 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: Penn World Tables (9.0) and authors own calculations.

Figure (2):Annual Growth Rate of Per Capita GDP



Source: authors own calculation

5.3 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. Our past discussion suggests that MENA countries are prone to high volatility in growth pattern, it is, therefore, crucial to identify the various sources of growth, basically to account for this volatility. Most of the countries in the region are dependent on oil revenues to fuel their growth. The fluctuations in the international energy market directly or indirectly affect the growth prospects of the economies. 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 Countries

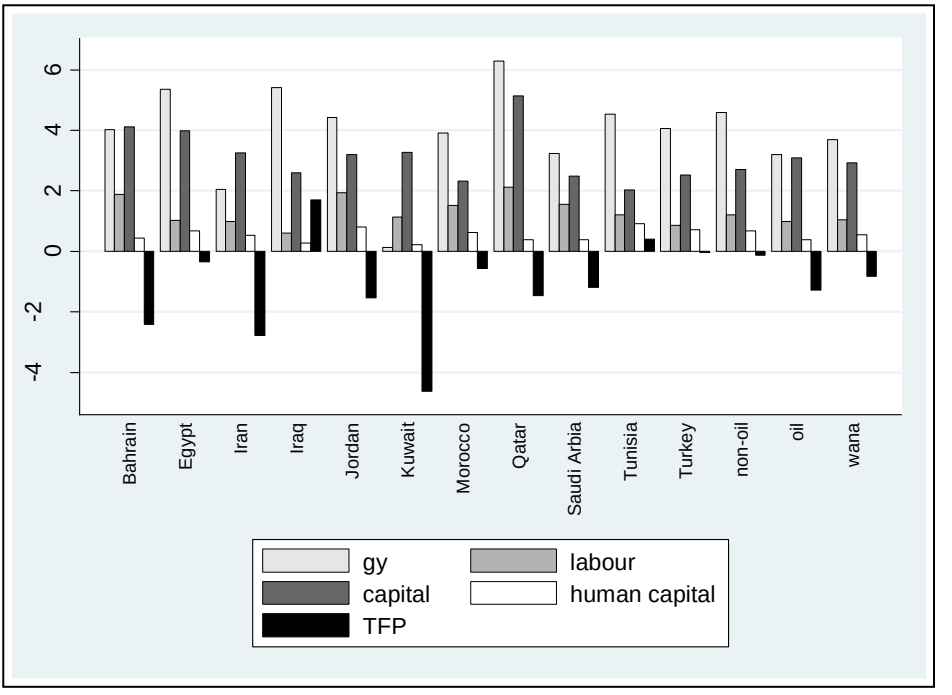
Country	Output growth	Contribution from			
		Labour	Capital	Human capital	TFP
Oil-dependent countries					
Bahrain	4.02	1.89	4.10	0.43	-2.42
Kuwait	0.13	1.14	3.28	0.21	-4.62
Qatar	6.29	2.12	5.14	0.38	-1.46
Saudi Arabia	3.24	1.54	2.49	0.38	-1.19
Iran	2.04	0.98	3.26	0.53	-2.78
Iraq	5.41	0.60	2.60	0.27	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: Penn World Tables (9.0) and authors own calculations.

Table 4 and Figure 3 report growth accounting estimates for selected MENA countries[(11)] for the 1970-2014 period. These results are derived using Equation (5) in section 3.1. In Table 4, the growth rate of real GDP per capita is decomposed into contributions from the growth rates of labour, human capital, physical capital, and TFP. Our first observation is that all countries with the exception of Iraq and Tunisia have negative TFP growth rates. 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. Over time, the MENA region as a whole registered negative TFP growth relative to the benchmark countries (see Table 4, comparators). It indicates lower production efficiency in the region. The negative productivity is the major

factor in the sluggish growth performance of MENA countries. These findings are in line with Makdisi et al. (2007) and Abu-Qarn and Abu-Bader (2007).

Figure (3): 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 for the entire period (1970-2014). Non-oil producing countries have shown improvements in human capital which augmented GDP growth. Our findings point out that labour and capital are the dominant factors of growth followed by human capital. TFP does not seem to play any significant role, rather it is detrimental to the growth performance of MENA countries. An important point to highlight here, however, is that TFP is a residual measure which embodies other factors affecting growth which are 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, the initial income, initial enrolment rate in primary

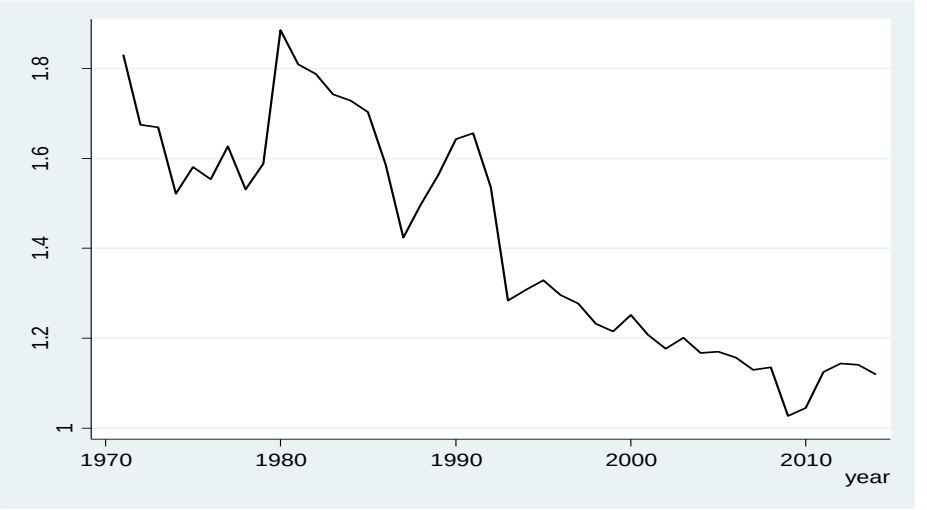
school, index of natural resource abundance. At low values of capital share, the results indicated that institutions and stock of human capital have positive effects on TFP growth. Inflation rate and natural resource abundance had a negative influence on productivity. However, initial income with negative 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.(12)

5.4 Convergence

Table 1 shows that there are large differences in per capita GDP and its growth rates (Table 2) across countries in the MENA region. Therefore it is pertinent to test whether this cross-country difference has decreased or increased over time. Alternatively, we can decide *if* there is convergence or catching-up among various countries in the region. Following section 3, we analyse two types of convergence, namely absolute β-convergence and δ-convergence.

Figure 4 shows the dispersion—measured as the coefficient of variation—of per capita GDP across MENA countries for the period of 1970-2014. The figure portrays a clearly declining trend in cross-country dispersion of income. The dispersion declined from 1.83 in 1970 to 1.52 in 1974. Thereafter, it rises to 1.88 in 1980 and then registered a continuous decline. For the overall period, we found the standard deviation of per capita income to be less than one (0.61); therefore we accept the hypothesis of δ-convergence at five percent level of significance with R^2 of 80 percent (Table 5).

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 5% level of significance

Table 6 and Figure 5 displays the average growth rate of per capita GDP for each country from 1970-2014 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 true in our study. As the countries that were rich in 1970, for example, UAE, Qatar, Kuwait, registered slow (even negative) growth rates over the time period, while initially poor countries, for example, Egypt, Morocco, and Jordan registered rapid growth over time. Table 6 reports the estimation results of absolute β-convergence. The hypothesis of absolute β-convergence hold true for our dataset since β has a negative and significant value of -0.10 and R^2 is 72 percent (Table 6).

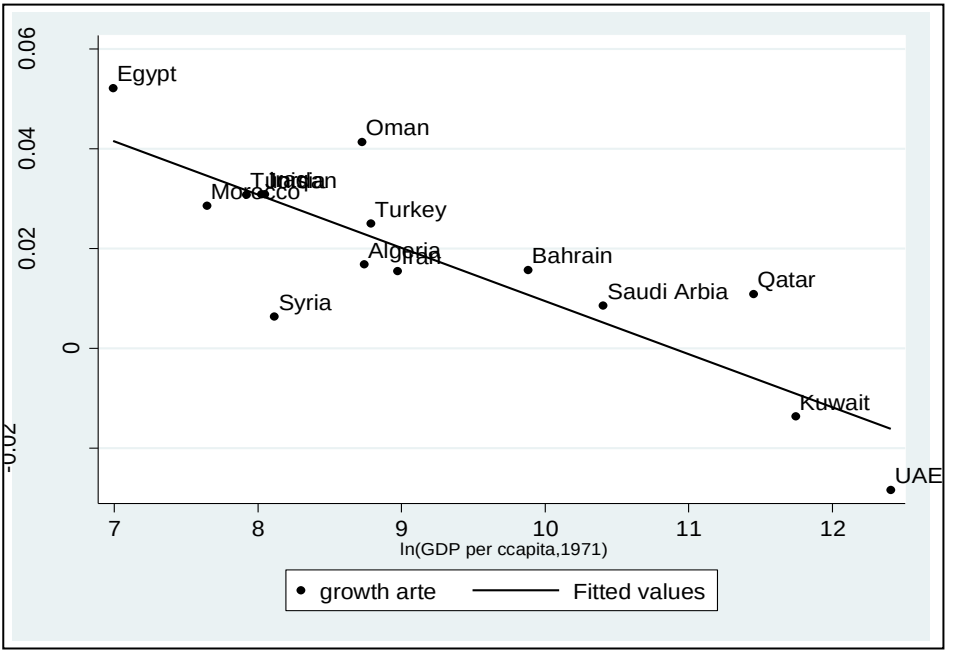
Table (6): Estimation of β-convergence (Dependent variable is Growth rate)

	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 5% level of significance

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 summarised in Table 6.

Figure (5): Convergence of Per Capita GDP across Countries



Source: authors own calculation

The results in Table 5 and Table 6 show that δ-convergence and absolute β-convergence holds true for our sample countries, implying that initially poorer

countries grow more rapidly than rich ones, and dispersion in per capita income decreased over the 1970-2014 sample period.

6. Conclusions

The present study explores the long-run growth of the Middle East and North African region from 1970 to 2014. Specifically, the study focuses on three issues: Temporal and spatial variability of economic growth, convergence of income and role of total factor productivity across the MENA region.

Our findings indicate that oil-dependent economies have shown significant variations 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) in most of the oil-based economies, growth rates of per capita GDP and per worker GDP are quite meagre. The output growth in the region is due to the accumulation of factor inputs, while TFP does not play a significant role (except Iraq and Tunisia). Our findings point out that labour and capital are the dominant factors of growth followed by human capital for all the MENA countries. Both absolute β and σ measures of convergence suggest that there is convergence in per capita GDP. The statistical results of our study have some policy implications including 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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Footnote

(1) MENA (Middle East and North Africa) is also widely known as West Asia and North Africa (WANA) region. For our purpose it includes 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. Israel is excluded since its economic issues are different from others and it is following a different economic model.

(2) Domestic currency appreciates in response to large export of natural resource and revenue inflows making tradable goods less competitive in world markets. Dutch disease is named after this phenomenon occurred in Dutch after discovery of huge natural gas field.

(3) For its simplicity, we adhere to the Cobb-Douglas production function throughout the present study. It provides a relative accurate approximation of an economy's actual production process under the assumption of constant returns to scale and diminishing but positive returns on each input. This functional form has been assumed mostly by empirical growth studies.

(4) The derivative of a log of variable with respect to time is approximately equal to its growth rate.

(5)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.

(6) 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 (Feenstra, Inklaar, & Timmer, 2015).

(7) 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.

(8) Calculations of the population growth rates are not shown in table.

(9) Ilahi & Shendy (2008) analysed 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. While, the growth elasticity of financial flows is about 0.17-0.21, the growth elasticity of remittances is positive and statistically significant with coefficient of 0.07-0.09.

(10) The ratio of standard deviation and absolute mean of growth rates is the commonly used measure of growth rate volatility.

(11) 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.

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

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