**The Macroeconomics of Labor Market Outcomes in
MENA over the 1990s: How Growth Has Failed
To Keep Pace with a Burgeoning Labor Market**

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Abstract

Providing good employment opportunities is perhaps the greatest challenge facing the MENA region. Unemployment rates in the region are among the highest in the world and the magnitude of the problem is overwhelming. This paper analyzes the major developments in the MENA region during the 1990s and examines the reasons growth has failed and investment has not materialized despite initiating programs of macroeconomic stabilization and structural reform throughout the region. The paper also provides policy recommendations for stimulating job-creating growth.

ملخص

يعد توفير فرص عمل كافية وجيدة للمواطنين من أهم التحديات التي تواجه دول الشرق الأوسط وشمال إفريقيا في الوقت الحالي. وقد بات حجم هذه المشكلة يؤرق صانعي السياسات في المنطقة نظرا لأن معدلات البطالة السائدة في تلك الدول تعد من بين أعلى المعدلات في العالم. تقوم هذه الدراسة بتحليل التطورات الاقتصادية في منطقة الشرق الأوسط وشمال إفريقيا خلال عقد التسعينيات مع البحث في أسباب عدم تحقيق معدلات النمو والاستثمار المنشودة بالرغم من أن هذه الدول قد بدأت في تنفيذ برامج للتثبيت الاقتصادي والإصلاح الهيكلي. وتخلص الدراسة إلى مجموعة من التوصيات الهادفة إلى تحفيز النمو كثيف العمالة والذي يضمن توليد أكبر عدد ممكن من فرص العمل.

I. Introduction

Perhaps the greatest single issue facing the economies of the Middle East and North Africa[1] (MENA) is the challenge of employing its people with good jobs. While the region is heterogeneous in terms of developments in the labor market, the majority of the region has been characterized by high levels of unemployment, and in some cases by declining real wages. The problem of job creation for the MENA region is staggering. Some 47 million jobs need to be created over the next ten years just to keep pace with new entrants to the job market.[2] Close to 6.5 million additional jobs would be needed to reduce the regional unemployment rate[3] by half. The implication is that the current employed workforce would have to expand by close to 60 percent over the next ten years (see Annex Table 1). Such an accomplishment was not even achieved by the high performing East Asian economies[4] during the height of their employment growth periods.

Unemployment rates in the MENA region are among the highest in the world, averaging 20 percent of the labor force for economies outside the oil-producing economies of the Gulf. Unemployment among the young[5] is even more prevalent; more than twice the national average. Such severe unemployment, particularly among these first-time job seekers, has potentially large implications for society. In recent months, the role that social inclusion (and economic inclusion) plays in preventing social conflict has gained immense interest.

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[1] The countries of the MENA region included in this analysis (depending upon data availability) are: Morocco, Algeria, Libya, Tunisia, Egypt, Jordan, Lebanon, Syria, Iran, Iraq, Yemen, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, the West Bank and Gaza, and the United Arab Emirates.

[2] These numbers are based on assumptions on labor force growth rates from the International Labor Organization (ILO). The labor force growth rates are partially based on assumptions about changes to labor force participation rates which differ from country to country. Without a detailed analysis of these underlying assumptions, the ILO's labor force projections have been accepted at face value, but the assumptions are clearly important in determining the extent of the labor market challenge over the next decade. The demand for jobs may be even higher under more realistic assumptions given the social transformations and possible significant increase in labor force participation by women in view of the gains in education.

[3] While comparability issues (in terms of defining the labor force and the unemployed) prevent a true calculation of the regional unemployment rate, a rough approximation of 18.7 percent has been estimated, based on the latest available unemployment rate estimates from country and other sources. In Annex Table 1, the implication of reducing the regional unemployment rate to 9.3 percent (the number of new jobs which need to be created) is shown.

[4] Hong Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Taiwan, China, and Thailand.

[5] Under age 25.

Unemployment also implies a substantial loss of human capital to the economy. Over the last decades, the MENA region has made considerable progress in increasing access to basic education. The educational attainment of the adult population in MENA has increased by more than 180 percent over the last three decades, higher than any other region of the world. But at a time when human capital achievements should be having their greatest pay-off in terms of economic growth, a considerable portion of these resources are left idle.

Much of the story behind the MENA region's "lost decade of growth" and the consequences on the labor market is understood. Declining oil prices had a major impact on the region, both for the oil-exporting nations and for much of the region, through the impact on remittances and external financial flows. Additionally, the region was marked by macroeconomic instability and structural inefficiencies which prevented the emergence of a strong private sector. At least half of MENA economies suffered from some degree of macroeconomic instability from 1985-1995. Public sector ownership was extensive, yet, while large investments were taking place with the oil windfalls, there were few policies in place to make these investments competitive. Trade regimes were protective. Regulation limited the entry of the private sector into most sectors. Financial sectors were geared to serving public enterprises, and institutions were not in place to facilitate a vibrant private sector. As a result, when oil prices collapsed, the engine for growth in the economies of MENA stalled and there was limited ability to absorb the burgeoning labor force.

What is of greater concern in MENA is that despite macroeconomic stabilization and at least some structural reform undertaken throughout most of the region, economic recovery has remained elusive. GDP per capita growth in the region averaged only 1.5 percent annually during the 1990s, higher than during the 1980s (less than 0.1 percent annually), but hardly the rebound desired following a decade of stagnation. Outside the Gulf economies, growth has been somewhat healthier though less than robust, averaging 1.8 percent per year. After almost two decades of poor or lackluster economic performance, the MENA region now faces unemployment rates that are higher than in every other region of the world (with the exception, perhaps, of Sub-Saharan Africa).[6] Improving labor market opportunities has become among the highest priorities for policy makers in the region.

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[6] Reliable unemployment rate figures for Sub-Saharan Africa are only available for a handful of economies. For many countries in which such figures are not available, however, the suspected degree of unemployment is high.

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This paper analyzes the major labor market trends that developed in the MENA region during the 1990s. It also examines the failure of growth to materialize following widespread structural reform throughout the region. By decomposing growth over the 1990s, between factor accumulation and productivity growth, findings indicate that productivity growth has improved for the majority of countries in the region during the 1990s, with an average increase of total factor productivity (TFP) growth by 1.3 percent annually during the 1980s. Despite these positive productivity improvements in MENA, economic growth has remained anemic with average growth GDP per laborer during the 1990s virtually unchanged from the 1980s. This is greatly due to the collapse in investment that occurred in virtually every economy in the region.

This paper also explores reasons why private sector investment has not materialized as dynamically as hoped, despite widespread macroeconomic and structural policy reforms instituted throughout the region in the early 1990s. Despite achievements during the 1990s in terms of macroeconomic stabilization and policy reform, MENA's structural reform progress has been incomplete. Financial sectors remain weak. Trade liberalization remains incomplete, with continuing high protection levels. Public ownership remains high. Additionally, the regulatory framework and supportive institutions for private sector investment have not materialized.

Policy recommendations for improving labor market outcomes are outlined in the final section of this paper. Pushing forward with more complex and politically challenging "second generation" reforms may be mandatory if the region is to ensure the higher and sustainable economic growth needed to guarantee better labor market prospects in the region.

II. Disappointing Labor Market Outcomes in MENA

The lack of employment opportunities in the region

According to official statistics, MENA's unemployment rates are the highest in the world, although anecdotal evidence would suggest even more widespread unemployment in Sub-Saharan Africa. Excluding the Gulf Cooperation Council (GCC) economies, the average national unemployment rate in MENA is almost 20 percent of the labor force.[7] The

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[7] Within the GCC, the proportion is much lower (9 percent), but still moderately high in both Oman and Bahrain.

unemployment problem is most severe in Iraq, with an estimated 50 percent of the work force unemployed. In West Bank and Gaza, estimates of unemployment in 2001 were close to 40 percent, but the recent events of 2002 have without question resulted in even higher levels of unemployment. In a number of other countries in the region, such as Iran, Algeria, Libya, and Yemen, as much as one-third of the potential work force is unemployed.

Figure 1: Unemployment, 2001 *

Unemployment rate, latest available year
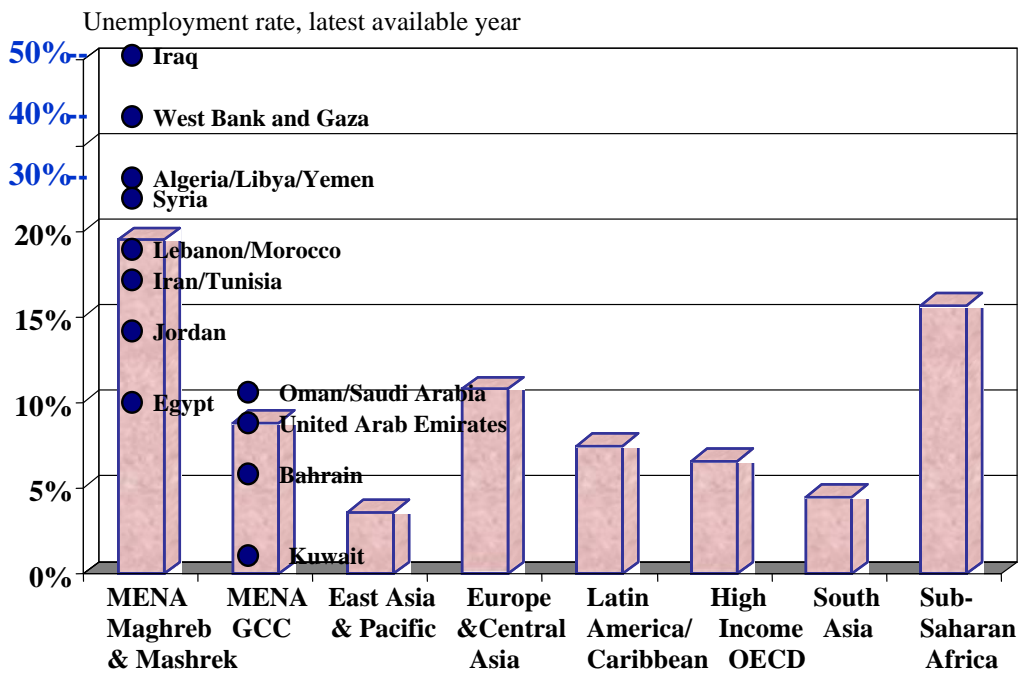
* Or most recent year available.
Note: Regional unemployment rates weighted by labor force.
Sources: See Annex Table 1 for detailed description of sources.

A caveat in comparing unemployment rates across economies must be offered. Because of differences in the way employment and labor force are defined across countries (or even between different sources within a country); a comparison of unemployment rates is difficult. For example, those who are unemployed but are between the ages of 15-17 or age 60 and above, are not included in Tunisia's official unemployment figures. At the same time, the Tunisians count the set of inactive people (mostly housewives) as unemployed, although these people would not be counted as unemployed in most other countries.[8] Even with comparable definitions for unemployment, there is also the possibility of underestimation of unemployment rates in economies where labor market opportunities are poor. Labor force

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[8] See Rama, 1998.

participation is often greatly affected by market opportunities, with individuals tending to withdraw from the labor market when opportunities for employment are poor. As a result, labor force estimates are often downwardly biased in precisely the economies where labor market opportunities are the poorest.

Unemployment most likely worsened throughout the 1990s, contributing to the high unemployment rates currently observed. Table 1 compares labor force growth to employment growth over the 1990s. Due to discouraged workers leaving the labor force, it is not always possible to interpret the phenomenon of employment growth outpacing labor force growth as necessarily a reduction in "unemployment." However, when labor force growth exceeds employment growth, it is indicative of worsening unemployment. As shown in Table 1, the rate of growth of the labor force exceeded the rate of growth of employment in Algeria, Iran, Jordan, Morocco, and Yemen, which together account for approximately 50 percent of the entire region's labor force and where current unemployment rates now average 21 percent. In Tunisia and Egypt, where the rate of unemployment was already moderately high, the rate of growth of employment remained about on par with the rate of growth of the labor force. For the Gulf countries with available employment information, only in Bahrain, Kuwait, and Oman did employment growth outpace labor force growth.

Table 1: Labor Force Growth versus Employment Growth Over the 1990s

Country	Labor force growth (%)	Employment growth (%)	Time period	Unemployment (%, latest year available)	Labor force as % of total MENA labor force[*]
Algeria	4.0	3.2	1989-1997	28.7	10.7
Iran	2.7	1.9	1992-2000	16.2	20.1
Morocco	2.6	2.2	1990-1999	17.8	11.6
Yemen	3.8	3.3	1994-1998	30.0	5.7
Jordan	3.7	3.5	1996-2000	13.7	1.5
Egypt	2.7	2.7	1988-1998	9.4	24.4
Tunisia	2.9	3.0	1989-1997	15.9	3.9
Bahrain	3.2	4.3	1987-1994	5.0	0.3
Kuwait	6.4	7.9	1994-1997	1.3	0.8
Oman	3.6	5.1	1991-1997	10.0	0.7

* Including Lebanon, Libya, Iraq, and the GCC economies for which employment data is unavailable.
Source: Country sources.

Worker productivity – which over the long-term forms the basis for increases in real wages – has generally increased throughout MENA but remains low by international standards. During the 1990s, the growth of GDP per worker was lower in the MENA region

than in any other region of the world, averaging only 0.8 percent per year. Productivity actually declined over the 1990s in Algeria, Kuwait, and Oman.

Table 2: Employment, Worker Productivity and Growth in MENA During the 1990s (%)

Country	GDP growth	Employment growth	Productivity growth	Elasticity	Employment period
Algeria	0.9	3.2	-2.2	3.6	1989-1997
Egypt	4.4	2.7	1.6	0.6	1988-1998
Iran	3.1	1.9	1.1	0.6	1992-2000
Morocco	3.3	2.7	1.1	0.8	1993-1999
Tunisia	5.0	3.0	1.9	0.6	1989-1997
Bahrain	5.9	4.3	1.5	0.7	1987-1994
Kuwait	7.5	8.3	-0.7	1.1	1992-1997
Oman	4.6	5.1	-0.4	1.1	1991-1997
MENA	**3.4**	**2.6**	**0.8**	**1.1**	

Sources: Employment information from country sources. GDP growth figures from WDI.

III. Understanding Poor Labor Market Outcomes in MENA

In almost any comparison, MENA's labor market outcomes have been disappointing. Why aren't enough jobs being created? Why are resources sitting idle? Why are laborers who do find jobs, unable to watch their wages grow?

The simplest answer to these questions is that economic growth has been insufficient compared to the region's labor force growth. Labor force growth in MENA is exceptional, the result of both rapid population growth and increasing rates of labor market participation (particularly for females). With an average growth rate of 3 percent annually, MENA's labor force is growing at a higher rate than any other region of the world.

At the same time, this labor force growth has barely been matched by economic growth. High labor force growth, of course, need not be an automatic recipe for poor labor outcomes. It could very easily contribute to high GDP growth, as was the case in East Asia during their high growth years. In MENA, however, high labor force growth rates have been accompanied by only marginal growth of real output. In Table 3, labor force growth rates and real GDP growth rates between East Asia in the 1970s are compared with labor force growth rates and real GDP growth rates of the MENA economies in the 1990s. There is little difference between the two regions' labor force growth – both were exceptionally high (3.0 percent in MENA, versus 3.1 percent in East Asia).

Table 3: Labor Force Growth and Real GDP Growth: MENA 1990s versus East Asia in the 1970s (%)

MENA 1990s	Average yearly labor force growth	Average yearly GDP growth	Average yearly growth of output per laborer
Algeria	3.8	1.9	-1.9
Egypt	2.9	4.4	1.5
Iran	2.3	4.1	1.8
Jordan	5.7	5.1	-0.6
Lebanon	3.0	7.1	4.0
Morocco	2.5	2.1	-0.4
Syria	4.3	5.3	1.0
Tunisia	2.9	4.8	1.8
Yemen	4.5	3.3	-1.1
Bahrain	3.3	4.1	0.9
Oman	3.4	4.5	1.1
Saudi Arabia	2.5	2.1	-0.3
UAE	4.7	2.0	-2.6
MENA	3.0	3.6	0.6
GCC	2.9	2.3	-0.5
Maghreb	3.0	2.4	-0.6
Others	3.0	4.4	1.3
East Asia 1970s	3.1	7.6	4.4
Philippines	3.0	5.9	2.8
Hong Kong	4.2	9.3	4.9
Indonesia	2.7	7.9	5.1
Korea	3.2	7.6	4.3
Malaysia	3.6	7.8	4.1
Singapore	4.4	9.0	4.4
Thailand	3.5	6.9	3.3

Note: Period of analysis for MENA region 1990-1999, with exception of Kuwait (1993-1999). Period of analysis for E. Asia 1970-1980. GDP growth figures in Table 2 are based on different periods of analysis and on the availability of employment growth data (generally, much less readily available). As a result, GDP growth rates indicated in Table 3 differ – at times significantly – from those in Table 2.

Source: World Development Indicators, country sources.

The real difference between the regions is that East Asia's labor force growth was accompanied by enormous increases in real output, something not witnessed in the MENA economies. Real GDP growth in East Asia averaged 7.6 percent annually from 1970-1980, which is more than double its labor force growth rate for the same period. Alternatively, MENA economic growth during the 1990s only averaged about 3.6 percent per year – only marginally higher than the growth rate of its labor force, implying virtual stagnation in productivity per potential laborer for the region as a whole.

To better understand the importance of the growth of output per laborer in improving labor market outcomes, the following simple accounting framework is outlined. Creating

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employment for those who want to work is equivalent to increasing the ratio of employed persons to the total labor force (c). Increasing productivity (the basis for wage growth, at least over the long-term) is equivalent to increasing output per employed person (b). The sum of these two objectives results in growth in output per laborer (a). The higher real output per laborer growth, the greater the scope for the economy to reduce unemployment and/or increase productivity (and wages). In short, output per laborer growth provides a snapshot of the labor market outcomes that will arise.[9] Strong growth means that there is room for both

$$\text{Growth} \; \frac{\textbf{Output}}{\textbf{Labor Force}} \;=\; \text{Growth} \; \frac{\textbf{Output}}{\textbf{Employment}} \;+\; \text{Growth} \; \frac{\textbf{Employment}}{\textbf{Labor Force}}$$

$$\text{(a)} \qquad = \qquad \text{(b)} \qquad + \qquad \text{(c)}$$

unemployment reductions and wage increases. In MENA, output per laborer growth has been only 0.6 percent annually on an average basis. As a result, almost any reductions in unemployment have had to come at the expense of wages. There has been limited scope for simultaneously lowering unemployment and realizing real wage increases.

In MENA, output per laborer has grown at an average annual rate of only 0.6 percent, with actual deterioration in output per laborer in Algeria, Jordan, Morocco, Yemen, Saudi Arabia, and the United Arab Emirates. Only four countries, Egypt, Iran, Lebanon, and Tunisia managed output growth per laborer above 1.5 percent per year, though the strong growth in output experienced in Lebanon was primarily the result of massive reconstruction efforts that took place following the 15-year civil war.

Does high growth guarantee good labor market outcomes? No. It is possible that employment problems will still persist with high economic growth if that growth is primarily capital-intensive rather than employment-intensive. Looking at the MENA economies, past growth does not seem to have been employment-unfriendly.

On the contrary, for the countries in which both employment growth and economic growth estimations are available (Table 2), there is not a single country in which the employment elasticity of growth is below 0.6 percent. In comparison, during the height of

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[9] Of course, over the short-term, wages may not move in tandem with worker productivity increases. Additionally, employment growth may rise without real output growth. But over the long run, sustainable increases in employment and wages depend upon increases in real output per laborer.

employment creation in the high-performing East Asian economies, the employment elasticity of growth rarely exceeded 0.6 percent. In fact, the elasticity of employment with respect to growth for the MENA region has averaged above 1 percent, implying that any percentage change in economic output was accompanied by a higher percentage change in total employment (clearly unsustainable in the long run). The intense manner in which growth has led to employment or, more accurately, in which employment has strongly expanded despite low levels of growth, is a reflection of the nature of employment creation in the region, where public sector employment has been used as a refuge for large portions of the labor force. While this type of employment creation is unlikely to be sustainable over the longer term (and employment will inevitably have to emerge from the private sector), there is still little evidence that the MENA region's growth has a poor employment generating capacity.

It is clear that employment cannot emerge without growth. High employment growth cannot coexist over a sustainable period with low levels of economic growth. Paramount to improving the region's labor market outcomes is the improvement of the region's growth prospects.

In the end, policy makers should have two basic goals for labor market outcomes: (1) that those who want to work can find work, and (2) that wages increase. In MENA, lack of growth of output per laborer has prevented both goals from transpiring simultaneously in the majority of countries. If one goal has been achieved, such as a reduction in unemployment, it has come at the expense of the other – real wage loss.

The story of employment outcomes in MENA is clear from an arithmetic standpoint; output growth has been insufficient. With output growth just keeping pace with growth in the labor force, it is impossible to simultaneously achieve the objectives of growth in wages and reduction in unemployment. Within MENA, that tradeoff is apparent – as a whole, the region has experienced either slight or no reductions in unemployment rates over the last decade and output per worker declined as well. If the region wants to achieve both higher employment growth and higher wages, much higher output growth will be required. It is well established and backed by a wealth of empirical evidence that rapid output growth brings with it rapid

growth in employment. Periods of buoyant GDP expansion are almost invariably associated with rising job numbers while, conversely, slow-downs bring growing unemployment.[10]

IV. What Explains MENA's Poor Growth Performance?

Over the last decade, MENA countries took a number of steps to overcome the macroeconomic imbalances and structural impediments that prevailed throughout the 1980s. Starting in the late 1980s, several countries in the region – Morocco and Tunisia, and soon after, Jordan and Egypt, embarked on extensive programs of macroeconomic stabilization and policy reform. By the 1990s, nearly all of the non-GCC countries in the region followed suit, as did several of the Gulf economies. While there has been considerable variance among economies in terms of both the speed and depth of these reforms, the overall change in policy throughout the region would seem to be a significant step toward creating an environment in which the private sector could emerge and become an engine for higher and sustainable growth. Despite this, strong growth failed to emerge.

In order to understand why, an examination was done on the region's economic growth in a growth accounting framework, in which economic growth occurs as the result of factor accumulation (either physical or human) and increases in TFP (see Annex 2 for methodology and description of the data).

TFP growth is something of a mixed bag. It is the residual of what cannot be explained by investments, if we assume those investments (both physical and human) earn a reasonable rate of return. TFP growth is often thought of as "technical progress," but in fact, as the residual of a growth accounting estimation; it not only embodies the differences across countries relating to their progress in the adoption of better technology, but also reflects a host of non-technological differences. These differences include changes in the utilization of both capital and labor, changes in schooling quality, and changes in the overall efficiency with which factors are allocated in the production process. In an effort to better understand what has prevented the region from achieving the rates of growth needed to improve its labor market outcomes, it is important to explore how MENA's overall growth has improved or deteriorated since it began its structural reform process.

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[10] Boltho and Glyn, 1995.

In the MENA region, accumulation and productivity have often gone in opposite directions, as during the period of massive public sector investments. Examining growth alone will mask these very different effects, and the somewhat anemic growth that has characterized the region since reform may be more a reflection of significantly lower investments than of continuing poor productivity performance.

In Table 4, estimates of TFP growth during 1960-1999 are presented by region and decade. TFP growth has been calculated as the simple residual between output growth and the growth of factor inputs (capital and labor), assuming those factors earn a reasonable rate of return.[11] As expected, the MENA region exhibited a pattern of high TFP growth in the 1960s, declining dramatically over the 1970s and continuing throughout the 1980s.[12] Understanding these developments, however, requires a more detailed look at growth, accumulation, and productivity.

In the 1960s, MENA's economic growth performance was the highest in the world, averaging 6.7 percent per year (4.6 percent annually per laborer). Beginning in the 1960s, the region began a two-decade period of massive public investment in infrastructure, health, and education, which in this early period of development translated into high growth. In addition to high levels of accumulation spurring growth, TFP growth during the 1960s was also high, with large-scale public investments in critical infrastructure generating a significant growth response.

This is not to say that all of the investments undertaken during the 1960s were exceptionally productive. Along with investments in large infrastructure projects, the region also invested heavily in protected state industries. In the 1960s, even the region's overall strategy of industrial and agricultural protectionism, supported by trade barriers and encouraged by publicly subsidized energy, water, and agrochemicals, was initially successful, as it allowed the region to utilize underused capacities and provide the early boost of industrialization.

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[11] In this case, the elasticity of output with respect to capital is exogenously assumed to be 0.4, which is based on both international evidence, as well as own estimations.

[12] See Bosworth, Collins and Chen (1995) for similar findings.

**Table 4: GDP per Capita Growth and Growth of Accumulation and Productivity by Region:
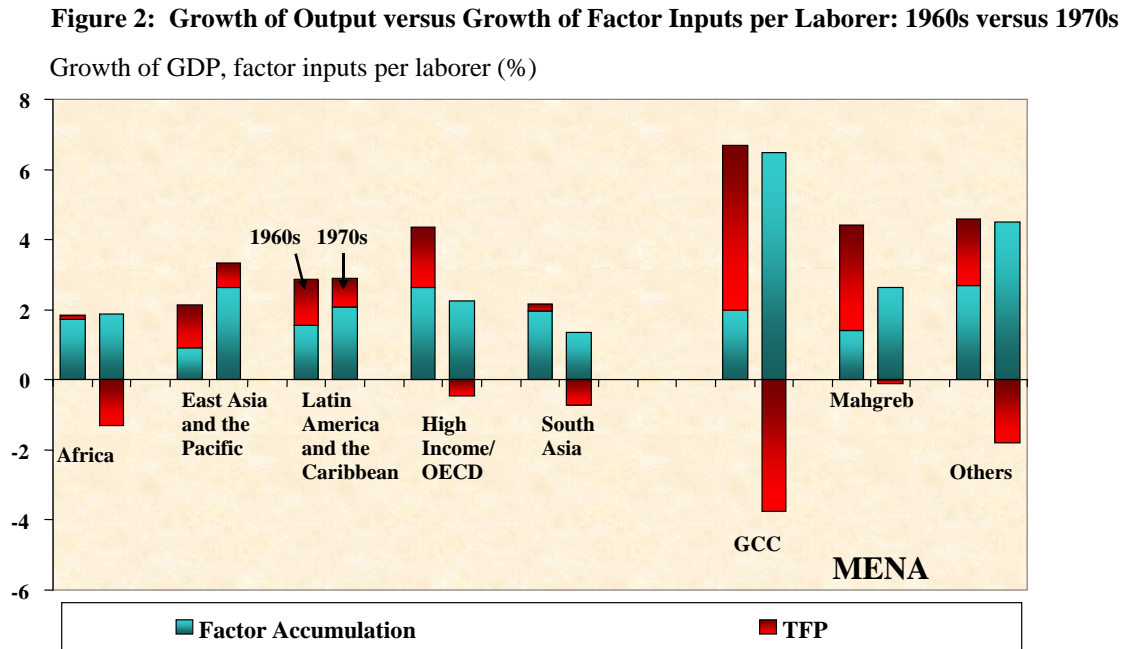1960-1990 (%)**

Region	Decade	Growth of GDP per laborer	Growth of physical capital per laborer	Growth of human capital per laborer	TFP growth
Sub-Saharan Africa	1960s	1.8	3.8	0.4	0.1
	1970s	0.6	4.2	0.3	-1.3
	1980s	-0.9	-0.1	0.7	-1.3
	1990s	0.3	0.0	0.5	0.0
East Asia & Pacific	1960s	2.1	1.1	0.8	1.2
	1970s	3.3	5.3	0.9	0.7
	1980s	5.6	6.7	1.0	2.3
	1990s	7.5	7.8	0.6	4.0
Latin America/Caribb.	1960s	2.9	3.1	0.6	1.3
	1970s	2.9	4.3	0.6	0.8
	1980s	-1.7	0.2	0.9	-2.4
	1990s	0.6	0.6	0.8	-0.1
High Income/OECD	1960s	4.4	5.8	0.5	1.7
	1970s	1.8	3.6	1.4	-0.4
	1980s	1.8	2.3	0.3	0.7
	1990s	1.3	2.2	0.5	0.1
South Asia	1960s	2.2	4.0	0.6	0.2
	1970s	0.6	1.9	1.0	-0.7
	1980s	3.6	2.7	0.9	2.0
	1990s	2.9	2.1	0.8	1.6
MENA	1960s	4.6	4.9	0.5	2.4
	1970s	2.6	7.9	1.5	-1.4
	1980s	0.4	2.1	1.4	-1.3
	1990s	0.7	-0.3	1.2	0.0
World	1960s	2.7	3.2	0.6	1.1
	1970s	2.2	4.1	1.0	0.0
	1980s	3.2	3.8	0.8	1.2
	1990s	4.0	4.1	0.7	2.0

Note: Regional averages are constructed as the weighted average of country estimates of GDP per laborer growth, factor accumulation per laborer, and TFP growth, weighted by mid-period labor force.
Source: See Annex 2 for data sources and methodology.

Looking at growth figures alone, in the 1970s, MENA was still in the middle of a growth "heyday," with GDP growth averaging 5.7 percent annually. But the underlying conditions spurring growth represented a serious and negative departure from the previous decade of high growth and productivity. To begin, the 1970s were marked by an increase in the rate of physical capital accumulation per laborer of more than 60 percent, and the rate of

human capital accumulation per laborer nearly doubled. Over the 1970s, the MENA region realized the highest rates of growth of *both* physical capital per laborer and human capital per laborer.

Figure 2: Growth of Output versus Growth of Factor Inputs per Laborer: 1960s versus 1970s

Growth of GDP, factor inputs per laborer (%)

Source: World Bank staff estimates from TFP database (see Annex 2 for description).

Despite this immense increase in accumulation, on a per laborer basis growth actually declined on average by close to 2 percentage points per year. Thus, the 1970s represented two large and yet conflicting growth dynamics for the region; investments were being undertaken in record levels (all things equal, increasing the region's growth potential), while at the same time, these investments were having increasingly poor growth payoffs.

MENA's investments in needed infrastructure during the 1960s generated a significant payoff in terms of a growth response. By the 1970s, the public sector's sphere of comparative advantage in investment began to shrink and the limits of the MENA region's strategy of protection of both public and private industries began to be realized.

The pattern of higher levels of accumulation partnered with declining productivity characterized many of the economies within the region. Egypt almost doubled its rate of physical capital accumulation and more than doubled its rate of human capital accumulation, but TFP growth declined by about one-quarter. Morocco and Algeria also doubled their rate of accumulation, but TFP growth went from high and positive (4.6 percent in Morocco, 1.4

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percent in Algeria), to negative rates. In the Gulf, Saudi Arabia's four-fold increase in physical capital accumulation (and 15 percent increase in human capital accumulation) was accompanied by a decline in per laborer GDP of about 34 percent.

Figure 3: Growth of Output versus Growth of Factor Inputs per Laborer: 1960s versus 1970s: Middle East and North Africa Region
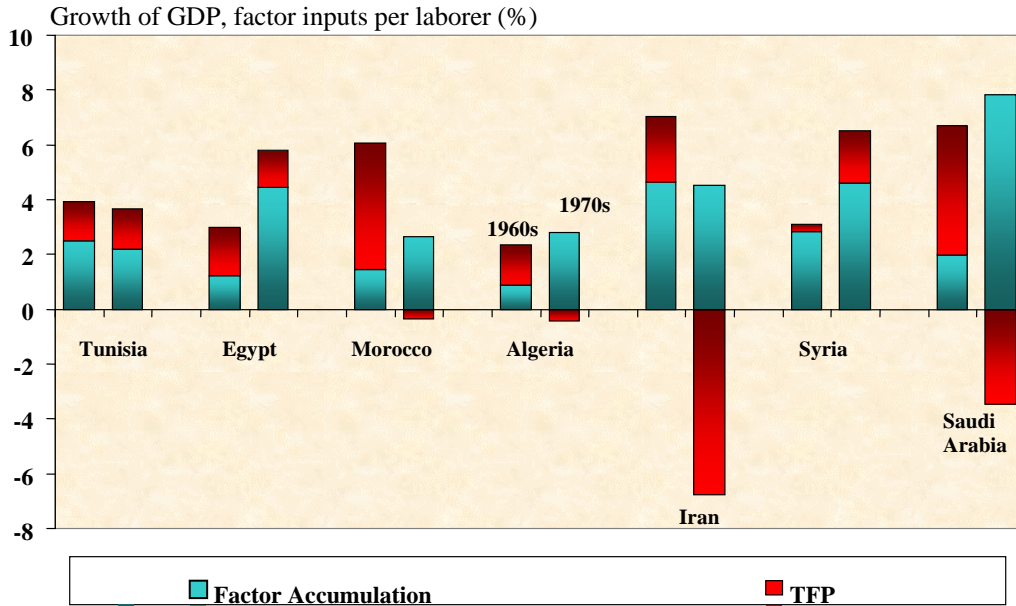
Note: The total bar height represents GDP per laborer growth only when both factor accumulation and TFP growth are positive. If TFP growth is negative (but factor accumulation positive), for example, the bar height represents only factor accumulation.

Source: World Bank staff estimates from TFP database (see Annex 2 for description).

In the 1980s, as international oil prices slumped in the wake of global overproduction, these economic gains became unsustainable and the region's countries witnessed slow or even negative per laborer growth rates. Eroding macroeconomic balances and growing debt burdens caused investments to decline dramatically, despite both heavy external assistance (which permitted spending for several more years) and a strong social contract (which hindered the government's ability to retract from commitments). The rate of growth of the physical capital stock per laborer declined by almost three-quarters from the prior decade.

This decline was almost without exception, with every country in the region but Kuwait experiencing a dramatic decline in accumulation between the 1970s and 1980s, and almost every economy experiencing a similar decline in TFP. Only Iran and Oman saw actual improvements in TFP between the 1970s and 1980s.

Figure 4: Growth of Output versus Growth of Factor Inputs per Laborer: 1970s versus 1980s: Middle East and North Africa Region
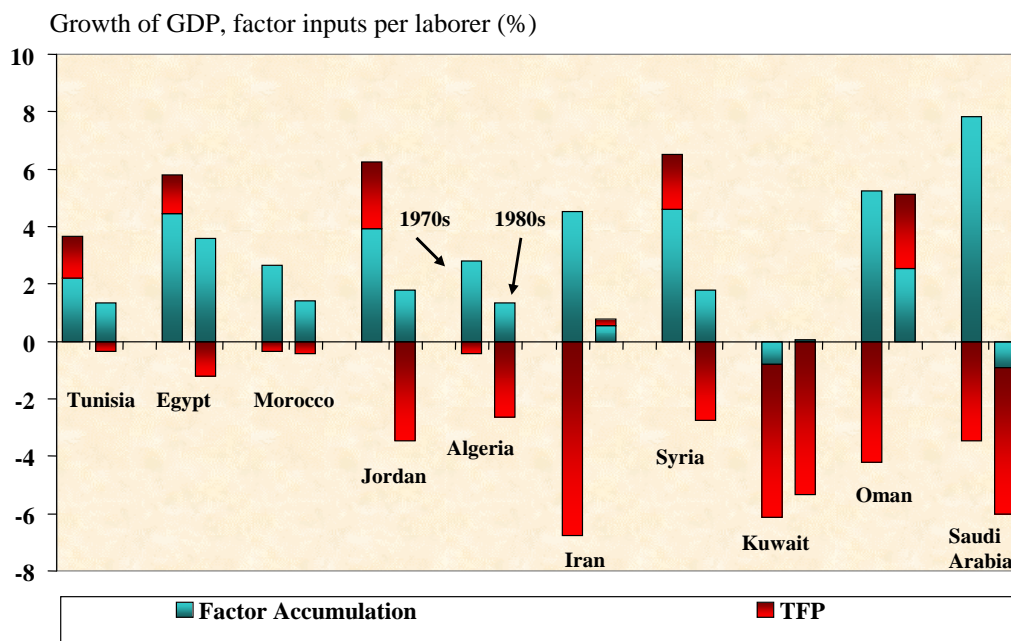
Growth of GDP, factor inputs per laborer (%)

Negative productivity growth was most prevalent in the oil-producing economies of the region – both within the GCC economies, as well as Algeria. Because the ensuing TFP estimates are a reflection of factor efficiency, the degree to which capital is underutilized will be heavily reflected in the TFP growth measurements. This feature is of particular importance to these economies, because as oil prices collapsed in the 1980s, there was a significant effort by oil-producers to increase oil prices by holding down production. Nevertheless, even in the non-oil producing economies, there were widespread declines in productivity for almost every country. With massive declines in accumulation and corresponding declines in TFP for most countries, the MENA region experienced a collapse of economic growth per laborer.

By the late 1980s, the "lost decade of growth" prompted a handful of countries in the region – Morocco and Tunisia, and soon after, Jordan, to embark on programs of macroeconomic stabilization and policy reform. By the 1990s, nearly all of the non-GCC countries in the region followed suit, as did several of the Gulf economies. The reason, of course, was to create an environment in which the private sector could emerge and become an engine for higher and sustainable economic growth, which is crucial for employment creation.

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How did the region fare in the 1990s? To understand the developments of the decade, growth decomposition is used once again. Table 5 outlines the MENA region's changes to accumulation, productivity, and growth over the decade. For clarity, the table does not present GDP and TFP growth over the 1990s, but rather the change in average GDP, factor, and TFP growth between the 1980s and 1990s (thus, if an economy moved from an average GDP per laborer growth of 2 percent per year in the 1980s, to 5 percent per year over the 1990s, the change in GDP growth per laborer over the decade is 3 percent).

The countries are presented in order of the change to their average TFP growth per laborer between the 1980s and 1990s. At the top of the list of improved productivity growth is Syria, which in the 1990s benefited from increased oil production and agricultural performance, an aid windfall during the Gulf war (which allowed it to undertake key growth-enhancing infrastructure investments, such as the purchase of power stations and a telephone network), as well as some limited liberalization reforms. Three of the four countries[13] termed the "early reformers" (specifically, Jordan, Tunisia, and Egypt) also experienced improvements in their average TFP growth during the 1980s and 1990s.

Table 5: Change in MENA's Growth and TFP Growth Between 1980s and 1990s (%)

Country	Change in average GDP growth per laborer	Change in physical capital accumulation per laborer	Change in human capital accumulation per laborer	Change in TFP growth
Syria	2.54	-3.06	-0.80	4.24
Jordan	1.07	-6.27	-0.71	4.00
Saudi Arabia	5.69	5.20	-0.27	3.77
Kuwait	9.11	7.64	6.47	2.17
Egypt	-0.99	-5.65	-0.66	1.67
Tunisia	0.84	-1.45	0.09	1.37
Iran	0.88	-0.57	0.23	0.97
Algeria	-0.92	-3.80	-0.46	0.88
Morocco	-1.23	-1.35	0.12	-0.77
Oman	-4.10	-3.33	0.52	-3.08

Source: See Annex 2 for data sources and methodology.

Overall, TFP growth in the region actually improved in all but two economies, Morocco and Oman. At the same time, however, due to large declines in accumulation within most of MENA (particularly accumulation of physical capital), the improvements in factor allocation and efficiency have not translated into significant increases in GDP growth.

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[13] Jordan, Morocco, Tunisia, and Egypt all embarked on structural reform programs from the mid-1980s to early 1990s.

The message that emerges regarding the region's failure to improve its labor market outcomes is that ***improving the region's labor market outcomes must come from substantial increases in investment***. Employment creation in the region can only be improved by enhancing the employment creation capacity of growth (the employment elasticity) or from higher economic growth itself.

Let's consider the first notion that improving labor market outcomes could be achieved by increasing the employment intensity of growth. Employment elasticities reflect the percent change in employment that are associated with some percent change in real output. International evidence would suggest that the long-run elasticity of output with respect to employment falls somewhere between 0.4 and 0.8. In countries that are highly capital-intensive, the employment elasticity is likely to be closer to 0.4, while in labor-intensive production structures, it is likely to be closer to 0.8. In this instance, an employment elasticity of 0.7 is assumed, which is relatively healthy by international standards and is unlikely to be improved. Table 6 estimates the level of output growth necessary to create sufficient jobs to fully absorb the growing labor force, given relatively high rates of employment creation.[14] Compare that GDP growth rate with the observed growth rate over the 1990s and the difference reflects the gap between needed growth and observed growth.

In three cases (Egypt, Iran, and Tunisia), the rates of growth that were observed were sufficient, under optimistic employment generation assumptions, to create the levels of employment needed to meet the growth of the labor force without any increases in productivity or capital accumulation. For most of the other countries in the region, however, the increases in output growth needed to reach growth levels consistent with the desired rates of employment growth are substantial: in Jordan, output would have needed to grow by 3 percentage points per year; in Algeria, by almost 4 percentage points per year; and in Kuwait, by more than 5 percentage points per year. In Saudi Arabia, economic growth would have needed to grow by more than 2 percentage points per year to be consistent with the desired employment creation levels.

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[14] Of course, the process is circular: just as employment creates output growth, output growth in some sense "creates" employment, in that in order to sustain that level of output growth; it requires continuing increases in employment. Thus, rather than thinking of growth generating employment, we can think of certain levels of output growth consistent with a given level of sustainable employment creation.

Even with employment-intensive growth, the level of economic growth itself has prevented the employment creation rates needed to absorb the growing labor force. The remaining potential for improving employment creation in the region, then, is higher economic growth.

Table 6: GDP Growth Consistent with Desired Employment Creation Rates 1990-1999 (%)

Country	Needed employment growth (=labor force growth)	GDP growth consistent with employment growth	Observed GDP growth	Gap in GDP growth
Algeria	3.8	5.5	1.5	4.0
Egypt	2.9	4.2	4.3	
Iran	2.3	3.3	4.0	
Jordan	5.8	8.3	5.2	3.1
Kuwait	5.1	7.3	2.1	5.3
Morocco	2.5	3.5	2.2	1.3
Oman	3.7	5.3	4.7	0.6
Saudi Arabia	3.1	4.4	2.1	2.3
Syria	4.3	6.1	5.9	0.2
Tunisia	2.9	4.1	4.8	

Source: Country sources (labor force data), World Bank data.

Throughout the 1990s, a substantial improvement in the region's productivity growth occurred. While there is always potential for even greater productivity improvements, there are also limits to what can be achieved. With economic growth so substantially below what would be needed to be consistent with full labor absorption, the considerable improvement in economic growth rates must primarily come from substantial increases in investment.

During the 1990s, however, almost every economy in MENA experienced an actual decline in the amount of physical capital per laborer, and the region went from increasing its physical capital per laborer by 2.1 percent per year in the 1980s, to experiencing actual declines in physical capital per laborer of 0.3 percent per year in the 1990s (Table 4). MENA's physical capital accumulation during this period was the lowest worldwide.

V. Interpreting the Decline in Investment

It is difficult to definitively interpret the substantial declines in accumulation throughout the 1990s without reliable investment data broken down between the public and private sectors. Public sector investments have almost certainly dropped off. So, in the midst of an overall

factor accumulation deterioration, it is possible that private sector factor accumulation is actually improving, but not sufficiently to counteract the large declines in public investment.

However, it is also possible that while productivity and factor allocation efficiency has improved significantly over the 1990s, it has failed to generate a comparable private sector investment response. Understanding the lack of increased private investment is complex. Much of the private sector investment that occurred in the region during the 1980s was domestic demand-driven. The private sector developed under the patronage of governments. It flourished, not by being dynamic in a competitive environment, but often by supplying protected domestic markets and generally "living off the state." Thus, the investments by the private sector during the 1980s were largely focused on serving the domestic market rather than on export expansion. For example, the share of construction in value-added during the 1980s was 7.1 percent relative to a world average of 5.6 percent. This suggests that a larger-than-average share of the region's investment constituted new buildings rather than re-tooling or investments in new or high-tech sectors (see Table 7). During the 1990s, there was a decline in share of construction in value-added, which could signal a change in the types of investment the private sector is undertaking. Even though there were declines in private sector investments during the 1990s, it could be the case that the investments were more externally demand-driven and, hence, over the long-term, more sustainable.

Table 7: Share of Construction in Value-Added 1980s and 1990s (%)

Country	1980s	1990s	Change
Algeria	13.7	10.5	-3.2
Egypt	5.0	5.0	0.0
Iran	6.9	3.8	-3.1
Jordan	7.6	5.1	-2.5
Kuwait	3.5	3.3	-0.2
Morocco	5.9	4.7	-1.2
Oman	5.2	3.2	-2.0
Saudi Arabia	11.7	8.9	-2.9
Syria	5.9	4.1	-1.8
Tunisia	5.2	4.5	-0.8
Regional Average[*]	7.1	5.3	-1.8
World Average[*]	5.6	5.7	0.1

* Unweighted average.

Source: World Bank data.

There is a possibility that private sector investment, in addition to dropping off in the domestic demand markets, has not significantly improved in the tradable goods sectors

either. Why would the reform process, which has clearly produced an impact on the region's productivity, fail to generate a private sector investment response in the external-oriented sectors? While the comprehensive macroeconomic and structural reform programs espoused by many of the MENA economies created an exuberant boost in their economic outlooks, most of the region has failed to complete the reform process. Reforms have generally been limited to "stroke of the pen" reforms, easily executed but, in the absence of additional, more serious and challenging reforms, they have a limited effect.

VI. Policy Implications

Understanding why private investment has failed to respond to improved productivity and reforms in the region is essential for realizing the rates of investment necessary for high and sustained economic growth. In order to significantly increase the growth of private investment in the region, the private investment climate must be improved. While this paper cannot definitely establish the chief factors that have inhibited an enabling private investment climate, several likely possibilities are offered.

To begin with, the region has substantial work to do in terms of creating an enabling macroeconomic environment through exchange rate management. The preoccupation with macroeconomic stability during the 1990s often relied on maintaining nominally fixed and stable exchange rates in virtually all countries of the region (Algeria, Tunisia, and Yemen and more recently Iran, are notable exceptions), which meant that one important tool to make exports more profitable was surrendered. This is the opposite of the policies that the successful exporting countries such as the "East Asian Tigers" have pursued over the last three decades. We know from experience that growing exports of manufactured and non-traditional goods also creates dynamism in the domestic economy with very significant spill-over effects. Now, the issue is to find ways to "exit" the pegs in an orderly manner to push economic growth.

Second, there is the size of the public sector. Governments may account for as much as 40-60 percent of gross domestic output and of employment in the region. This includes continuing high expenditures on military and social services which account for the large size of the public sector. The big role of the state, a sector that essentially has low productivity and limited inherent potential for productivity gain, is a drag on growth in most economies in

the region. In many countries, efforts to reduce the public sector have begun through rationalization of public employment. Endeavors have also been made to improve its performance through better incentives and institutions, and by the privatization of goods and services that could be produced more efficiently in the private sector. By and large, these efforts remain slow and half-hearted to date.

Third, the private sector is stifled from development due to the systems of governance that pervade the region. Chief among the governance problems is the issue of regulatory capture, where groups of influential businesses (whether public or private) are able to essentially capture the state regulations and utilize them for profit at the expense of the rest of the private sector. High on the list of regulatory capture are infrastructure and telecommunications, but the list extends to taxes, licensing, and manipulating the loopholes within the system. The unfair advantages extended to a group of elite firms prevent other private business from entering and competing. Addressing the myriad of governance issues pervading the region should be at the top of the agenda if the private sector is to ultimately thrive in MENA.

Then, there is the issue of trade reform. Trade policy in the region remains one of the most restrictive in the world with low level and speed of integration into the world economy. Tariff rates remain high and the extent of non-tariff barriers is large. The importance of export orientation in growth is well established in empirical literature. High and sustainable growth simply does not occur without a substantial outward orientation. A number of policy moves across the region are expected to lead to greater trade openness, stimulating integration, and hopefully, growth, most notably the EU association agreements signed by Tunisia, Morocco, Jordan, Algeria, Egypt, and Lebanon.

Among the most important but lagging reforms is that of the banking sector, particularly the slow progress on privatizing state banks in countries such as Algeria, Egypt, Tunisia, Iran, and Syria. In a number of countries the banking sectors are relatively healthy, but this is not the case in most countries and financial sector development remains a principal constraint for the development and growth of the private sector.

Finally, the region needs a virtual overhaul of its system of property rights, better legal systems, and improved contract enforcement mechanisms.

Unless the private sector begins to see itself as an independent source of growth and productivity in the economy, and society begins to underpin this change economically and politically, it is unlikely that any of the past economic reforms in themselves will be adequate. The public sector's role in improving labor market outcomes in the region is important, but unlike the 1960s and 1970s, better labor market outcomes cannot be guaranteed through public employment. The government's role has distinctly changed. Now the public sector must find ways to improve the investment climate and promote economic growth, which remain the most important ways to ensure better labor market outcomes in the future.

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Annex 1

Table 1: Calculating the Needed Job Growth Between 2002-2012 to Absorb New Labor Force Entrants and Reduce the Regional Unemployment Rate by 50 Percent

Country	Unemployment rate (latest year available)	Year	Labor force 2002	Unemployed (actual)	Labor force 2012	Unemployed (with 50% reduction in regional unemployment rate)	Labor force participation rate, 2002 (Labor force over total population)	Labor force participation rate, 2012
Algeria	28.7	1997	11,472,694	3,292,663	16,729,709		34.9	41.6
Egypt	9.4	1998	27,444,152	2,579,750	36,106,612		39.0	43.5
Iran	16.2	2000	25,778,539	4,176,123	39,874,080		32.1	38.6
Iraq	50.0	1999	6,873,680	3,436,840	9,769,273		28.2	30.4
Libya	30.0	1994	1,954,684	586,405	2,762,705		28.8	29.8
Yemen	30.0	1996	6,165,097	1,849,529	9,006,543		31.8	33.1
Syria	25.0	1999	5,560,916	1,390,229	8,210,567		32.9	38.2
Lebanon	18.0	1997	1,215,942	218,870	1,586,104		36.0	41.3
Morocco	17.8	1996	12,162,105	2,164,855	15,528,683		40.8	45.1
Tunisia	15.9	1997	4,097,709	651,536	5,294,497		40.4	45.0
Jordan	13.7	2001	2,035,570	278,873	2,997,171		30.3	33.4
Bahrain	5.0	2000	291,440	14,572	362,472		45.8	49.1
Oman	10.0	1995	783,990	78,399	1,191,751		26.7	27.7
Kuwait	1.3	1997	854,535	10,743	1,218,463		41.8	49.0
Saudi Arabia	10.0	1998	7,610,381	761,038	10,595,557		33.1	34.2
United Arab Emirates	6.7	2000	1,241,670	83,068	1,424,631		49.2	48.1
MENA region	**18.7**		**115,543,102**	**21,573,492**	**162,658,817**	**15,185,323**	**(9.3%)**	

New laborers, 2002-2012	**47,115,715**
+ Reduction in unemployed, 2002-2012	**6,388,169**
Total jobs needed	**53,503,884**
As percent of current employed	**57%**

Note: Differences among countries in terms of defining the labor force or the unemployed prevent a true calculation of the regional unemployment rate. The regional unemployment rate of 18.7 percent provided above is a simple weighted average (weighted by the labor force) of the most recently available country-level unemployment rates. Reducing the MENA regional unemployment rate by 50 percent, in practice, would be heavily determined by reducing unemployment in the most labor-populous countries (Egypt, Iran, Morocco, Algeria), exerting a greater weight on the regional rate of unemployment. The labor force growth rates are, in part, based upon the ILO's assumptions about changes to labor force participation rates, which differ from country to country. Without a detailed analysis of these underlying assumptions, the ILO's labor force projections have been accepted at face value, but the assumptions are clearly important in determining the extent of the labor market challenge over the next decade.

Source: Unemployment rates from country sources. Labor force, population figures from ILO.

Annex 2: Measuring Growth, Accumulation, and TFP Growth

To examine how the MENA region's growth has changed since it began its comprehensive structural reform process, simple calculations were made of the change in both the region's rate of accumulation, as well as the region's total factor productivity (TFP) growth.

TFP growth is something of a mixed bag. It is the residual of what cannot be explained by investments if we assume those investments (both physical and human) earn a reasonable rate of return. TFP growth is often thought of as "technical progress," but in fact, as the residual of a growth accounting estimation, it not only embodies the differences across countries in their progress in the adoption of better technology, but also reflects a host of non-technological differences, including changes in the utilization of both capital and labor, changes in schooling quality, and changes in the overall efficiency with which factors are allocated in the production process. Because of the many other factors that can potentially affect the growth residual, a great deal empirical work has focused on reducing those elements of the residual (TFP) which do not reflect actual shifts in technological opportunities in the economy. For example, adjustments for the business cycle have been introduced, to account for the short-term fluctuations in capacity utilization (Griliches, 1992; Lefort and Solimano, 1994; Fajnzylber and Lederman, 1999). An alternative procedure employed by Griliches and Lichtenberg (1984) has been to estimate growth over five-year periods, and to only allow the TFP series to increase or stay constant (resetting any values to the previously observed peak level) to maintain the assumption that "true" productivity can only improve and that measured reductions in TFP can only reflect short-term fluctuations.

This paper has adopted a more casual measurement approach. It explores how MENA's overall growth has improved or deteriorated since it began its structural reform process. In the end, growth will be determined by both accumulation of physical and human capital, as well as the overall manner in which those factors are put to production. For the MENA region, elements such as improved capacity utilization of capital and human capital by the region are precisely what may be heavily affected by structural reform; therefore, it is important to have this effect reflected in the estimates. At the same time, as discussed in the subsequent section, calculations have been controlled for global shocks.

Under many circumstances, the environment created to encourage investment would also correspond to an environment in which those investments could be productive. But in the MENA region, accumulation and productivity have often gone in opposite directions, such as during the period of massive public sector investments which yielded rates of return well below international rates. Examining growth alone will mask these very different effects, and the somewhat anemic growth that has characterized the region since reform may be more a reflection of significantly lower public investments than of continuing poor productivity performance. From the standpoint of evaluating the impact of the region's structural reform, it is precisely TFP growth that is expected to be most influenced by changes in national policies that enhance the efficiency of capital and labor.

Data and Methodology

TFP growth estimates were calculated utilizing panel data of capital stock accumulation, human capital stock accumulation, and GDP growth from 1960-1999. Estimates of the physical capital stock for a sample of 83 economies from 1960-1990 come from Nehru and Dhareshwar (1993),[15] which was created by a perpetual inventory method from investment rates from 1950 forward, with initial assumptions about the capital/output ratio, and assuming a common fixed annual geometric depreciation rate of 0.04. These capital stock data were extended to 1999 using the growth rates of constant price local currency investment from the World Bank's World Development Indicators database,[16] and applying similar assumptions to the depreciation rate. Capital stock estimates for another 12 economies, including 4 economies in the MENA region of particular interest, were created according to a similar methodology, using investment rates from 1960 forward. Since GDP growth is estimated using a panel regression approach over ten-year periods, the sample was restricted to those economies in which the capital stock could be estimated for the full 1960-1999 period, both to maintain a balanced panel and reduce the importance of the assumption about the initial stock in the period of analysis of particular importance – the 1990s.

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[15] Nehru, Vikram Ashok Dhareshwar (1993), "A New Database on Physical Capital Stock: Sources, Methodology and Results," *Revista de Analisis Economico*, vol. *8*, no. *1: 37-59.*

[16] In the case of MENA economies, where there were inconsistencies, the World Bank MENA regional database investment series was preferred.

Real GDP in constant local currency was also estimated from World Bank data. The human-capital-augmented labor stock was estimated, using labor force estimates as reported by the ILO, from the World Bank database, and estimates of the educational attainment of the adult population from Barro and Lee.[17] The functional form of human-capital-augmented labor has been assumed as:

$$H = L \, e^{\,(r \, * \, S)}$$

where L is the labor force, S is the average years of schooling of the adult population, and r is the rate of return to schooling. According to international evidence, a reasonable approximation of that rate of return is 10 percent, which we have assumed for the purposes of our analysis.

TFP growth was calculated over ten-year periods from 1960-1999, rather than on an annual basis, in order to minimize the error that is inherent in current capital stock measurements. National accounts would attribute any investment expenditures made over the year, even the last day of the year, to that year's capital stock. However, it is unlikely that investment expenditure would contribute to economic growth immediately, but rather would only create the potential to contribute to growth into the future. To reduce this lag-effect that physical capital exhibits, TFP growth was calculated based on ten-year averages. A slight variation was allowed in the years counted for Kuwait, in order to minimize the very large impact of the Gulf war. For Kuwait, the years 1989-1992 have been removed from the analysis. This small change to the data set was made not to mine the data in any fashion, but only to better serve the purpose of evaluating the country's growth, accumulation, and productivity.

Production was assumed to follow a Cobb-Douglas specification with constant returns to scale between physical and human-capital-augmented labor:

$$Y_t = A \, (t) * K_t^{\alpha} * H_t^{(1-\alpha)}$$

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[17] "International Data on Educational Attainment: Updates and Implications," *CID Working paper*, no. 42, Center for International Development at Harvard University, April 2000.

where Y is output, A is an index of TFP, and K and H are the stocks of physical and human-augmented labor, respectively. Dividing both sides by the work force, taking logs, and first-differencing, growth of output per laborer can be related as follows:

$$\ln (y_i / y_{i-1,}) = \alpha \ln (k_t / k_{t-1}) + (1-\alpha) \ln (h_t / h_{t-1}) + \ln (A_t / A_{t-1})$$

To determine the coefficients on capital and human-capital-augmented labor, α and $(1-\alpha)$, the average annual rate of GDP per labor growth over the decade was regressed on average growth of physical capital per laborer and human-capital per laborer with a least squares trend over the entire period of availability (1960-1999).

From the estimation, the elasticity of output of physical capital was found to be 0.49, somewhat higher than the average estimated coefficient from previous research, but within the range of accepted parameters. This may be due to the inclusion of several more developing countries than in the original Nehru-Dhareshwar physical capital stock data set, made possible using World Bank data. At the same time, the purpose is not to break new ground in measuring TFP, but to evaluate the region's performance in factor allocation and efficiency. Thus, TFP was calculated using three distinct calculations of factor shares: $\alpha_k = 0.3$, $\alpha_k = 0.4$, and $\alpha_k = 0.5$, in order to check the sensitivity of the region's growth performance to the assumptions made on the output elasticities. The resulting sets of TFP growth estimations for the full sample of countries are presented in Annex 1. Within the text of this paper, TFP calculations are based on elasticity of capital assumption of 0.4 across countries.

Annex Table 2: TFP Estimates Under Alternate Assumptions on α_k

Region	Country	Decade	TFP growth, alpha k=0.5	TFP growth, alpha k=0.4	TFP growth, alpha k=0.3
East Asia & Pacific	China	1960s	1.44	1.38	1.32
East Asia & Pacific	China	1970s	0.37	0.77	1.17
East Asia & Pacific	China	1980s	2.41	3.01	3.60
East Asia & Pacific	China	1990s	4.55	5.34	6.14
East Asia & Pacific	Fiji	1960s	-2.42	-1.69	-0.96
East Asia & Pacific	Fiji	1970s	-1.39	-0.97	-0.55
East Asia & Pacific	Fiji	1980s	-1.47	-1.49	-1.52
East Asia & Pacific	Fiji	1990s	0.21	0.01	-0.20
East Asia & Pacific	Indonesia	1960s	0.46	0.46	0.46
East Asia & Pacific	Indonesia	1970s	-0.19	0.56	1.31
East Asia & Pacific	Indonesia	1980s	-1.13	-0.46	0.21
East Asia & Pacific	Indonesia	1990s	-2.11	-1.61	-1.11
East Asia & Pacific	Korea	1960s	0.25	1.09	1.92
East Asia & Pacific	Korea	1970s	-1.76	-0.96	-0.16
East Asia & Pacific	Korea	1980s	1.57	2.21	2.84
East Asia & Pacific	Korea	1990s	-0.43	0.18	0.79
East Asia & Pacific	Malaysia	1960s	-0.36	0.21	0.78
East Asia & Pacific	Malaysia	1970s	-0.05	0.56	1.17
East Asia & Pacific	Malaysia	1980s	-0.45	0.02	0.48
East Asia & Pacific	Malaysia	1990s	-0.19	0.44	1.07
East Asia & Pacific	Myanmar	1960s	-0.10	0.01	0.13
East Asia & Pacific	Myanmar	1970s	1.69	1.78	1.86
East Asia & Pacific	Myanmar	1980s	-2.09	-1.94	-1.79
East Asia & Pacific	Myanmar	1990s	0.73	1.37	2.01
East Asia & Pacific	Papau New Guinea	1960s	-1.98	-0.59	0.80
East Asia & Pacific	Papau New Guinea	1970s	-1.90	-1.53	-1.16
East Asia & Pacific	Papau New Guinea	1980s	-1.53	-1.52	-1.50
East Asia & Pacific	Papau New Guinea	1990s	2.27	2.22	2.17
East Asia & Pacific	Philippines	1960s	-0.18	0.15	0.48
East Asia & Pacific	Philippines	1970s	-0.28	-0.03	0.22
East Asia & Pacific	Philippines	1980s	-2.39	-2.26	-2.14
East Asia & Pacific	Philippines	1990s	-0.76	-0.81	-0.86
East Asia & Pacific	Singapore	1960s	-1.50	-0.22	1.05
East Asia & Pacific	Singapore	1970s	-0.92	0.04	1.00
East Asia & Pacific	Singapore	1980s	0.31	0.88	1.46
East Asia & Pacific	Singapore	1990s	1.34	1.79	2.23
East Asia & Pacific	Thailand	1960s	0.49	1.53	2.58
East Asia & Pacific	Thailand	1970s	-0.11	0.47	1.05
East Asia & Pacific	Thailand	1980s	1.90	2.30	2.69
East Asia & Pacific	Thailand	1990s	-0.89	-0.33	0.22
Europe & Central Asia	Cyprus	1960s	4.04	4.45	4.86
Europe & Central Asia	Cyprus	1970s	0.62	0.87	1.12
Europe & Central Asia	Cyprus	1980s	1.71	1.87	2.03
Europe & Central Asia	Cyprus	1990s	1.40	1.53	1.67
Europe & Central Asia	Hungary	1960s	-0.91	0.01	0.92
Europe & Central Asia	Hungary	1970s	-0.09	0.82	1.74
Europe & Central Asia	Hungary	1980s	-0.13	0.31	0.74
Europe & Central Asia	Hungary	1990s	-1.03	-0.81	-0.60
Europe & Central Asia	Turkey	1960s	1.64	2.01	2.39

Table 2 continued

Region	Country	Decade	TFP growth, alpha k=0.5	TFP growth, alpha k=0.4	TFP growth, alpha k=0.3
Europe & Central Asia	Turkey	1970s	-0.01	0.53	1.08
Europe & Central Asia	Turkey	1980s	1.29	1.41	1.53
Europe & Central Asia	Turkey	1990s	-0.86	-0.84	-0.82
High Income / OECD	Australia	1960s	0.81	1.10	1.39
High Income / OECD	Australia	1970s	-0.16	0.05	0.27
High Income / OECD	Australia	1980s	-0.04	0.07	0.17
High Income / OECD	Australia	1990s	1.12	1.27	1.41
High Income / OECD	Austria	1960s	1.36	2.20	3.03
High Income / OECD	Austria	1970s	0.27	0.77	1.27
High Income / OECD	Austria	1980s	0.28	0.49	0.71
High Income / OECD	Austria	1990s	-0.25	-0.05	0.14
High Income / OECD	Belgium	1960s	1.69	2.04	2.40
High Income / OECD	Belgium	1970s	1.03	1.40	1.77
High Income / OECD	Belgium	1980s	0.49	0.61	0.73
High Income / OECD	Belgium	1990s	-0.10	0.06	0.22
High Income / OECD	Canada	1960s	1.69	1.85	2.01
High Income / OECD	Canada	1970s	-0.26	-0.24	-0.23
High Income / OECD	Canada	1980s	-0.68	-0.47	-0.26
High Income / OECD	Canada	1990s	-0.33	-0.14	0.06
High Income / OECD	Denmark	1960s	0.07	0.74	1.40
High Income / OECD	Denmark	1970s	-0.76	-0.47	-0.18
High Income / OECD	Denmark	1980s	0.44	0.51	0.59
High Income / OECD	Denmark	1990s	1.15	1.32	1.49
High Income / OECD	Finland	1960s	1.28	1.66	2.05
High Income / OECD	Finland	1970s	0.33	0.57	0.81
High Income / OECD	Finland	1980s	0.07	0.12	0.16
High Income / OECD	Finland	1990s	0.94	0.95	0.97
High Income / OECD	France	1960s	1.11	1.75	2.40
High Income / OECD	France	1970s	-0.43	-0.09	0.26
High Income / OECD	France	1980s	0.45	0.69	0.93
High Income / OECD	France	1990s	-0.35	-0.31	-0.26
High Income / OECD	Greece	1960s	2.34	3.27	4.20
High Income / OECD	Greece	1970s	-0.01	0.41	0.82
High Income / OECD	Greece	1980s	-0.83	-0.79	-0.75
High Income / OECD	Greece	1990s	-0.09	0.07	0.24
High Income / OECD	Iceland	1960s	0.33	0.56	0.79
High Income / OECD	Iceland	1970s	1.67	1.86	2.06
High Income / OECD	Iceland	1980s	-0.82	-0.73	-0.65
High Income / OECD	Iceland	1990s	0.52	0.57	0.61
High Income / OECD	Ireland	1960s	1.16	1.69	2.21
High Income / OECD	Ireland	1970s	0.70	1.13	1.56
High Income / OECD	Ireland	1980s	0.91	1.08	1.25
High Income / OECD	Ireland	1990s	3.53	3.61	3.69
High Income / OECD	Israel	1960s	2.81	3.05	3.30
High Income / OECD	Israel	1970s	0.26	0.49	0.73
High Income / OECD	Israel	1980s	0.59	0.65	0.72
High Income / OECD	Israel	1990s	0.25	0.36	0.46
High Income / OECD	Italy	1960s	1.84	2.42	3.00
High Income / OECD	Italy	1970s	1.05	1.38	1.71

Table 2 continued

Region	Country	Decade	TFP growth, alpha k=0.5	TFP growth, alpha k=0.4	TFP growth, alpha k=0.3
High Income / OECD	Italy	1980s	0.21	0.35	0.50
High Income / OECD	Italy	1990s	-0.32	-0.24	-0.16
High Income / OECD	Japan	1960s	2.33	3.64	4.95
High Income / OECD	Japan	1970s	-1.09	-0.33	0.42
High Income / OECD	Japan	1980s	0.63	1.02	1.40
High Income / OECD	Japan	1990s	-1.52	-1.19	-0.87
High Income / OECD	Netherlands	1960s	-0.26	0.00	0.26
High Income / OECD	Netherlands	1970s	-0.19	0.01	0.21
High Income / OECD	Netherlands	1980s	-0.55	-0.59	-0.62
High Income / OECD	Netherlands	1990s	0.97	1.06	1.15
High Income / OECD	New Zealand	1960s	0.34	0.53	0.72
High Income / OECD	New Zealand	1970s	-1.44	-1.45	-1.46
High Income / OECD	New Zealand	1980s	-0.63	-0.54	-0.45
High Income / OECD	New Zealand	1990s	-0.07	0.07	0.21
High Income / OECD	Norway	1960s	0.81	0.96	1.12
High Income / OECD	Norway	1970s	0.82	1.01	1.20
High Income / OECD	Norway	1980s	-1.52	-1.66	-1.79
High Income / OECD	Norway	1990s	2.11	2.12	2.14
High Income / OECD	Portugal	1960s	1.98	2.66	3.34
High Income / OECD	Portugal	1970s	-0.20	0.01	0.22
High Income / OECD	Portugal	1980s	0.10	0.31	0.52
High Income / OECD	Portugal	1990s	-0.30	-0.04	0.21
High Income / OECD	Spain	1960s	1.80	2.52	3.24
High Income / OECD	Spain	1970s	-0.79	-0.37	0.05
High Income / OECD	Spain	1980s	0.35	0.51	0.67
High Income / OECD	Spain	1990s	-0.34	-0.18	-0.02
High Income / OECD	Sweden	1960s	1.13	1.57	2.02
High Income / OECD	Sweden	1970s	-1.27	-1.21	-1.15
High Income / OECD	Sweden	1980s	0.30	0.47	0.65
High Income / OECD	Sweden	1990s	-0.52	-0.64	-0.75
High Income / OECD	Switzerland	1960s	-0.15	0.28	0.71
High Income / OECD	Switzerland	1970s	-1.87	-1.72	-1.56
High Income / OECD	Switzerland	1980s	-0.26	-0.06	0.15
High Income / OECD	Switzerland	1990s	-1.24	-1.11	-0.98
High Income / OECD	United Kingdom	1960s	-0.05	0.45	0.96
High Income / OECD	United Kingdom	1970s	-0.41	-0.17	0.07
High Income / OECD	United Kingdom	1980s	0.62	0.78	0.94
High Income / OECD	United Kingdom	1990s	0.12	0.29	0.47
High Income / OECD	United States	1960s	0.68	0.74	0.81
High Income / OECD	United States	1970s	-1.17	-1.33	-1.49
High Income / OECD	United States	1980s	0.90	1.05	1.21
High Income / OECD	United States	1990s	0.60	0.74	0.89
Latin America & Caribbean	Argentina	1960s	0.57	0.83	1.08
Latin America & Caribbean	Argentina	1970s	-0.79	-0.53	-0.28
Latin America & Caribbean	Argentina	1980s	-2.42	-2.66	-2.90
Latin America & Caribbean	Argentina	1990s	3.25	3.07	2.88
Latin America & Caribbean	Barbados	1960s	-1.96	-1.16	-0.35
Latin America & Caribbean	Barbados	1970s	-0.06	0.72	1.49
Latin America & Caribbean	Barbados	1980s	-1.46	-1.46	-1.45

Table 2 continued

Region	Country	Decade	TFP growth, alpha k=0.5	TFP growth, alpha k=0.4	TFP growth, alpha k=0.3
Latin America & Caribbean	Barbados	1990s	-0.19	-0.26	-0.33
Latin America & Caribbean	Bolivia	1960s	1.45	1.82	2.20
Latin America & Caribbean	Bolivia	1970s	-0.10	0.25	0.59
Latin America & Caribbean	Bolivia	1980s	-1.05	-1.43	-1.80
Latin America & Caribbean	Bolivia	1990s	1.79	1.58	1.38
Latin America & Caribbean	Brazil	1960s	1.19	1.46	1.74
Latin America & Caribbean	Brazil	1970s	2.01	2.63	3.25
Latin America & Caribbean	Brazil	1980s	-2.35	-2.39	-2.43
Latin America & Caribbean	Brazil	1990s	-0.14	-0.18	-0.23
Latin America & Caribbean	Chile	1960s	1.18	1.40	1.62
Latin America & Caribbean	Chile	1970s	-0.06	-0.20	-0.35
Latin America & Caribbean	Chile	1980s	-0.09	-0.16	-0.23
Latin America & Caribbean	Chile	1990s	1.61	2.04	2.46
Latin America & Caribbean	Colombia	1960s	2.08	2.26	2.44
Latin America & Caribbean	Colombia	1970s	0.61	0.63	0.65
Latin America & Caribbean	Colombia	1980s	-0.87	-0.86	-0.85
Latin America & Caribbean	Colombia	1990s	-1.34	-1.22	-1.10
Latin America & Caribbean	Costa Rica	1960s	0.60	0.89	1.17
Latin America & Caribbean	Costa Rica	1970s	-1.39	-1.06	-0.74
Latin America & Caribbean	Costa Rica	1980s	-1.42	-1.44	-1.47
Latin America & Caribbean	Costa Rica	1990s	1.15	1.37	1.59
Latin America & Caribbean	Dominican Republic	1960s	0.45	0.53	0.61
Latin America & Caribbean	Dominican Republic	1970s	-0.49	0.20	0.89
Latin America & Caribbean	Dominican Republic	1980s	-2.79	-2.64	-2.49
Latin America & Caribbean	Dominican Republic	1990s	1.91	2.02	2.12
Latin America & Caribbean	Ecuador	1960s	0.59	0.78	0.97
Latin America & Caribbean	Ecuador	1970s	2.86	3.05	3.23
Latin America & Caribbean	Ecuador	1980s	-1.11	-1.13	-1.16
Latin America & Caribbean	Ecuador	1990s	-1.50	-1.60	-1.69
Latin America & Caribbean	El Salvador	1960s	0.11	0.32	0.53
Latin America & Caribbean	El Salvador	1970s	-1.94	-1.55	-1.16
Latin America & Caribbean	El Salvador	1980s	-2.33	-2.49	-2.64
Latin America & Caribbean	El Salvador	1990s	0.54	0.50	0.46
Latin America & Caribbean	Guatemala	1960s	1.18	1.40	1.62
Latin America & Caribbean	Guatemala	1970s	0.63	0.89	1.15
Latin America & Caribbean	Guatemala	1980s	-1.53	-1.62	-1.71
Latin America & Caribbean	Guatemala	1990s	0.49	0.46	0.43
Latin America & Caribbean	Guyana	1960s	0.79	0.92	1.05
Latin America & Caribbean	Guyana	1970s	-1.36	-1.39	-1.43
Latin America & Caribbean	Guyana	1980s	-4.14	-4.45	-4.77
Latin America & Caribbean	Guyana	1990s	2.68	2.78	2.88
Latin America & Caribbean	Haiti	1960s	-1.21	-1.20	-1.19
Latin America & Caribbean	Haiti	1970s	-0.35	0.29	0.92
Latin America & Caribbean	Haiti	1980s	-4.31	-4.10	-3.90
Latin America & Caribbean	Haiti	1990s	-1.60	-1.88	-2.16
Latin America & Caribbean	Honduras	1960s	0.39	0.62	0.86
Latin America & Caribbean	Honduras	1970s	0.48	0.69	0.90
Latin America & Caribbean	Honduras	1980s	-1.83	-2.02	-2.21
Latin America & Caribbean	Honduras	1990s	-1.20	-1.23	-1.26

Table 2 continued

Region	Country	Decade	TFP growth, alpha k=0.5	TFP growth, alpha k=0.4	TFP growth, alpha k=0.3
Latin America & Caribbean	Jamaica	1960s	1.25	1.62	1.99
Latin America & Caribbean	Jamaica	1970s	-3.91	-4.07	-4.22
Latin America & Caribbean	Jamaica	1980s	0.43	0.17	-0.08
Latin America & Caribbean	Jamaica	1990s	-3.08	-2.82	-2.56
Latin America & Caribbean	Mexico	1960s	1.02	1.42	1.82
Latin America & Caribbean	Mexico	1970s	-0.21	0.11	0.44
Latin America & Caribbean	Mexico	1980s	-3.02	-3.14	-3.26
Latin America & Caribbean	Mexico	1990s	-0.53	-0.48	-0.42
Latin America & Caribbean	Nicaragua	1960s	0.70	1.11	1.52
Latin America & Caribbean	Nicaragua	1970s	-4.12	-4.03	-3.93
Latin America & Caribbean	Nicaragua	1980s	-4.52	-4.66	-4.79
Latin America & Caribbean	Nicaragua	1990s	-0.34	-0.62	-0.90
Latin America & Caribbean	Panama	1960s	1.36	2.01	2.67
Latin America & Caribbean	Panama	1970s	-0.95	-0.60	-0.25
Latin America & Caribbean	Panama	1980s	-3.17	-3.38	-3.60
Latin America & Caribbean	Panama	1990s	1.23	1.28	1.33
Latin America & Caribbean	Paraguay	1960s	0.30	0.50	0.69
Latin America & Caribbean	Paraguay	1970s	0.88	1.56	2.23
Latin America & Caribbean	Paraguay	1980s	-2.69	-2.39	-2.08
Latin America & Caribbean	Paraguay	1990s	-1.60	-1.48	-1.35
Latin America & Caribbean	Peru	1960s	1.10	1.22	1.34
Latin America & Caribbean	Peru	1970s	-0.90	-0.95	-1.00
Latin America & Caribbean	Peru	1980s	-3.50	-3.56	-3.63
Latin America & Caribbean	Peru	1990s	0.33	0.22	0.11
Latin America & Caribbean	Trinidad & Tobago	1960s	0.76	1.02	1.27
Latin America & Caribbean	Trinidad & Tobago	1970s	-0.51	-0.14	0.24
Latin America & Caribbean	Trinidad & Tobago	1980s	-6.00	-5.74	-5.49
Latin America & Caribbean	Trinidad & Tobago	1990s	-1.40	-1.08	-0.76
Latin America & Caribbean	Uruguay	1960s	-0.15	-0.22	-0.29
Latin America & Caribbean	Uruguay	1970s	-0.89	-0.72	-0.56
Latin America & Caribbean	Uruguay	1980s	-0.10	-0.32	-0.54
Latin America & Caribbean	Uruguay	1990s	1.38	1.47	1.55
Latin America & Caribbean	Venezuela	1960s	2.02	1.95	1.88
Latin America & Caribbean	Venezuela	1970s	-4.04	-4.12	-4.20
Latin America & Caribbean	Venezuela	1980s	-1.57	-1.69	-1.81
Latin America & Caribbean	Venezuela	1990s	-2.37	-2.55	-2.72
Middle East & North Africa	Algeria	1960s	1.37	1.44	1.52
Middle East & North Africa	Algeria	1970s	-0.84	-0.42	0.00
Middle East & North Africa	Algeria	1980s	-2.60	-2.66	-2.71
Middle East & North Africa	Algeria	1990s	-1.39	-1.78	-2.17
Middle East & North Africa	Egypt	1960s	1.47	1.78	2.08
Middle East & North Africa	Egypt	1970s	0.81	1.34	1.86
Middle East & North Africa	Egypt	1980s	-1.64	-1.23	-0.81
Middle East & North Africa	Egypt	1990s	0.53	0.45	0.36
Middle East & North Africa	Iran	1960s	1.43	2.39	3.35
Middle East & North Africa	Iran	1970s	-7.59	-6.76	-5.93
Middle East & North Africa	Iran	1980s	0.40	0.25	0.10
Middle East & North Africa	Iran	1990s	1.45	1.22	0.99
Middle East & North Africa	Jordan	1970s	1.57	2.30	3.02

Table 2 continued

Region	Country	Decade	TFP growth, alpha k=0.5	TFP growth, alpha k=0.4	TFP growth, alpha k=0.3
Middle East & North Africa	Jordan	1980s	-3.48	-3.45	-3.42
Middle East & North Africa	Jordan	1990s	1.08	0.55	0.02
Middle East & North Africa	Kuwait	1970s	-4.80	-5.35	-5.90
Middle East & North Africa	Kuwait	1980s	-4.91	-5.34	-5.78
Middle East & North Africa	Kuwait	1990s	-2.85	-3.17	-3.49
Middle East & North Africa	Morocco	1960s	4.38	4.59	4.80
Middle East & North Africa	Morocco	1970s	-0.82	-0.36	0.09
Middle East & North Africa	Morocco	1980s	-0.59	-0.44	-0.29
Middle East & North Africa	Morocco	1990s	-1.20	-1.20	-1.20
Middle East & North Africa	Oman	1970s	-5.19	-4.21	-3.23
Middle East & North Africa	Oman	1980s	2.33	2.60	2.87
Middle East & North Africa	Oman	1990s	-0.37	-0.48	-0.60
Middle East & North Africa	Saudi Arabia	1960s	4.44	4.69	4.95
Middle East & North Africa	Saudi Arabia	1970s	-5.13	-3.45	-1.77
Middle East & North Africa	Saudi Arabia	1980s	-4.54	-5.11	-5.67
Middle East & North Africa	Saudi Arabia	1990s	-1.32	-1.33	-1.35
Middle East & North Africa	Syria	1960s	-0.25	0.26	0.77
Middle East & North Africa	Syria	1970s	1.15	1.92	2.69
Middle East & North Africa	Syria	1980s	-2.85	-2.76	-2.68
Middle East & North Africa	Syria	1990s	1.62	1.48	1.33
Middle East & North Africa	Tunisia	1960s	1.03	1.43	1.84
Middle East & North Africa	Tunisia	1970s	1.27	1.45	1.64
Middle East & North Africa	Tunisia	1980s	-0.44	-0.36	-0.27
Middle East & North Africa	Tunisia	1990s	1.09	1.02	0.95
South Asia	Bangladesh	1960s	0.67	0.87	1.07
South Asia	Bangladesh	1970s	-0.93	-1.09	-1.24
South Asia	Bangladesh	1980s	1.80	1.85	1.91
South Asia	Bangladesh	1990s	1.09	1.12	1.14
South Asia	India	1960s	-0.20	0.11	0.43
South Asia	India	1970s	-0.89	-0.77	-0.65
South Asia	India	1980s	1.93	2.14	2.35
South Asia	India	1990s	1.59	1.73	1.88
South Asia	Pakistan	1960s	-1.14	-0.11	0.93
South Asia	Pakistan	1970s	0.07	0.20	0.32
South Asia	Pakistan	1980s	1.10	1.16	1.22
South Asia	Pakistan	1990s	0.40	0.56	0.72
South Asia	Sri Lanka	1960s	1.28	1.36	1.45
South Asia	Sri Lanka	1970s	-0.66	-0.26	0.15
South Asia	Sri Lanka	1980s	-0.74	-0.32	0.10
South Asia	Sri Lanka	1990s	0.97	1.21	1.44
Sub-Saharan Africa	Bostwana	1960s	0.60	1.80	3.01
Sub-Saharan Africa	Bostwana	1970s	3.20	4.59	5.98
Sub-Saharan Africa	Bostwana	1980s	2.22	2.61	3.00
Sub-Saharan Africa	Bostwana	1990s	-0.63	-0.35	-0.06
Sub-Saharan Africa	Cameroon	1960s	-1.35	-1.06	-0.76
Sub-Saharan Africa	Cameroon	1970s	2.20	2.81	3.42
Sub-Saharan Africa	Cameroon	1980s	-3.38	-2.88	-2.38
Sub-Saharan Africa	Cameroon	1990s	-0.42	-0.80	-1.17
Sub-Saharan Africa	Cote D'Ivoire	1960s	2.45	3.06	3.66

Table 2 continued

Region	Country	Decade	TFP growth, alpha k=0.5	TFP growth, alpha k=0.4	TFP growth, alpha k=0.3
Sub-Saharan Africa	Cote D'Ivoire	1970s	-1.43	-0.85	-0.26
Sub-Saharan Africa	Cote D'Ivoire	1980s	-2.28	-2.52	-2.76
Sub-Saharan Africa	Cote D'Ivoire	1990s	-0.07	-0.31	-0.54
Sub-Saharan Africa	Ethiopia	1960s	-1.05	-0.38	0.29
Sub-Saharan Africa	Ethiopia	1970s	0.05	0.12	0.19
Sub-Saharan Africa	Ethiopia	1980s	-3.48	-3.12	-2.76
Sub-Saharan Africa	Ethiopia	1990s	-0.33	0.01	0.34
Sub-Saharan Africa	Ghana	1960s	-2.75	-2.52	-2.29
Sub-Saharan Africa	Ghana	1970s	-1.97	-2.00	-2.03
Sub-Saharan Africa	Ghana	1980s	-0.09	-0.29	-0.49
Sub-Saharan Africa	Ghana	1990s	1.15	1.17	1.19
Sub-Saharan Africa	Kenya	1960s	1.61	1.50	1.39
Sub-Saharan Africa	Kenya	1970s	3.21	3.22	3.22
Sub-Saharan Africa	Kenya	1980s	1.31	1.10	0.88
Sub-Saharan Africa	Kenya	1990s	-0.76	-0.98	-1.21
Sub-Saharan Africa	Lesotho	1960s	0.59	1.16	1.73
Sub-Saharan Africa	Lesotho	1970s	-1.55	-0.26	1.03
Sub-Saharan Africa	Lesotho	1980s	-1.24	-0.53	0.18
Sub-Saharan Africa	Lesotho	1990s	-1.58	-1.05	-0.52
Sub-Saharan Africa	Malawi	1960s	-1.55	-0.73	0.08
Sub-Saharan Africa	Malawi	1970s	-0.61	0.02	0.65
Sub-Saharan Africa	Malawi	1980s	0.23	0.07	-0.09
Sub-Saharan Africa	Malawi	1990s	2.04	1.77	1.49
Sub-Saharan Africa	Mali	1960s	0.15	0.36	0.56
Sub-Saharan Africa	Mali	1970s	1.82	1.89	1.95
Sub-Saharan Africa	Mali	1980s	-0.69	-0.57	-0.45
Sub-Saharan Africa	Mali	1990s	0.99	1.04	1.10
Sub-Saharan Africa	Mauritious	1960s	0.51	0.27	0.03
Sub-Saharan Africa	Mauritious	1970s	1.12	1.10	1.09
Sub-Saharan Africa	Mauritious	1980s	3.73	3.79	3.84
Sub-Saharan Africa	Mauritious	1990s	1.32	1.61	1.89
Sub-Saharan Africa	Mozambique	1960s	0.74	1.16	1.59
Sub-Saharan Africa	Mozambique	1970s	-3.90	-3.82	-3.73
Sub-Saharan Africa	Mozambique	1980s	-1.28	-1.35	-1.43
Sub-Saharan Africa	Mozambique	1990s	2.96	3.09	3.22
Sub-Saharan Africa	Niger	1960s	-2.08	-1.71	-1.34
Sub-Saharan Africa	Niger	1970s	-3.19	-2.88	-2.58
Sub-Saharan Africa	Niger	1980s	-2.21	-2.43	-2.66
Sub-Saharan Africa	Niger	1990s	0.98	0.56	0.14
Sub-Saharan Africa	Nigeria	1960s	-1.78	-1.39	-1.00
Sub-Saharan Africa	Nigeria	1970s	-3.52	-2.54	-1.57
Sub-Saharan Africa	Nigeria	1980s	-1.69	-1.95	-2.20
Sub-Saharan Africa	Nigeria	1990s	-0.93	-1.01	-1.09
Sub-Saharan Africa	Rwanda	1960s	-1.02	-1.03	-1.04
Sub-Saharan Africa	Rwanda	1970s	-0.16	0.13	0.42
Sub-Saharan Africa	Rwanda	1980s	-4.98	-4.47	-3.95
Sub-Saharan Africa	Rwanda	1990s	-1.54	-1.87	-2.20
Sub-Saharan Africa	Senegal	1960s	0.40	0.41	0.42
Sub-Saharan Africa	Senegal	1970s	-1.25	-1.21	-1.16

Table 2 continued

Region	Country	Decade	TFP growth, alpha k=0.5	TFP growth, alpha k=0.4	TFP growth, alpha k=0.3
Sub-Saharan Africa	Senegal	1980s	0.75	0.68	0.61
Sub-Saharan Africa	Senegal	1990s	0.42	0.37	0.32
Sub-Saharan Africa	South Africa	1960s	1.16	1.47	1.79
Sub-Saharan Africa	South Africa	1970s	-0.49	-0.01	0.47
Sub-Saharan Africa	South Africa	1980s	-2.30	-2.43	-2.56
Sub-Saharan Africa	South Africa	1990s	-0.96	-1.10	-1.24
Sub-Saharan Africa	Tanzania	1960s	2.80	2.98	3.16
Sub-Saharan Africa	Tanzania	1970s	-0.67	-0.36	-0.06
Sub-Saharan Africa	Tanzania	1980s	0.03	-0.06	-0.15
Sub-Saharan Africa	Tanzania	1990s	0.53	0.44	0.35
Sub-Saharan Africa	Togo	1960s	-0.70	0.43	1.56
Sub-Saharan Africa	Togo	1970s	-3.03	-2.36	-1.68
Sub-Saharan Africa	Togo	1980s	-2.08	-2.09	-2.09
Sub-Saharan Africa	Togo	1990s	-0.19	-0.48	-0.78
Sub-Saharan Africa	Uganda	1960s	-0.22	0.03	0.28
Sub-Saharan Africa	Uganda	1970s	-10.07	-10.19	-10.32
Sub-Saharan Africa	Uganda	1980s	2.60	2.23	1.86
Sub-Saharan Africa	Uganda	1990s	3.92	3.90	3.88
Sub-Saharan Africa	Zambia	1960s	0.27	0.36	0.44
Sub-Saharan Africa	Zambia	1970s	-1.25	-1.37	-1.50
Sub-Saharan Africa	Zambia	1980s	0.23	-0.27	-0.77
Sub-Saharan Africa	Zambia	1990s	-0.73	-1.39	-2.06
Sub-Saharan Africa	Zimbabwe	1960s	3.42	3.35	3.28
Sub-Saharan Africa	Zimbabwe	1970s	-1.09	-0.91	-0.74
Sub-Saharan Africa	Zimbabwe	1980s	-0.53	-0.95	-1.36
Sub-Saharan Africa	Zimbabwe	1990s	-0.04	-0.04	-0.03
World Average		1960s	0.65	1.05	1.45
World Average		1970s	-0.72	-0.37	-0.01
World Average		1980s	-0.86	-0.80	-0.74
World Average		1990s	0.22	0.26	0.31