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Long Run Economic Growth in Lebanon, Syria, Jordan, and Egypt

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Introduction

The growth rate of the economy is the rate at which the gross domestic product (GDP) is increasing. On average, most economies grow by a few percentage points per year over long periods. For instance, U.S. real GDP grew at an average rate of 3.4 percent per year from 1960 to 2002. However, this growth has certainly not been smooth.

What causes GDP to grow over time? The first reason GDP changes is that the available amount of resources in the economy changes. The principal resources are capital and labor. The labor force, consisting of people either working or looking for work, grows over time and thus provides one source of increased production. The capital stock, including buildings and machines, likewise rises over time, providing another source of increased output. Increases in the availability of factors of production the labor and capital used in the production of goods and services- thus account for part of the increase in GDP.

The second reason GDP Changes is that efficiency of factors of production may change. Efficiency improvements are called *productivity increases*. Over time, the same factors of production can produce more output. Productivity increases result from changes in knowledge, as people learn through experience to perform familiar tasks better[1].

The Solow growth model presents a theoretical framework for understanding the sources of economic growth, and the consequences for long-run growth of changes in the economic environment and in economic policy.

This paper aims at studying economic growth in Lebanon and in some other major Arab countries.

We divided our study into three chapters preceded by an introduction and followed by a conclusion.

In the first chapter, we began by forming a theoretical framework emphasizing growth accounting, sources of economic growth, growth accounting and the productivity

[1] Dornbush, Fisher, Startz, Macroeconomics, Ninth Edition, McGrow-Hill, p: 12

slowdown, the Solow model, the fundamental determinants of long-run living standards, and the New Growth Theory.

The second chapter presented a country data profile of the countries treated by our study.

The third chapter was allocated to the application of the model through knowing the contribution of factor productivity in economic growth in each country, and through calculating the expected available capital stock at steady state.

Chapter One

Growth Accounting and Growth Dynamics

In order to study the economic growth in Lebanon and some other major Arab countries, we will first begin this chapter by studying the theoretical frame concerning growth accounting, sources of economic growth, growth accounting and the productivity slowdown, the Solow model, the fundamental determinants of long-run living standards, and the New Growth Theory.

We have enormously higher incomes than did our grand parents. People in industrialized nations are far wealthier than people living in less developed countries. In fact, Americans and many Europeans had higher incomes a century ago than people in poor countries do today. What accounts for these vast differences? What will determine our standards of living in the future? Growth accounting and growth theory answers these questions. Growth accounting explains what part of growth in total output is due to growth in different factors of production (capital, labor, etc.). growth theory helps us understand how economic decisions determine the accumulation of factors of production.

The growth rate of the economy is the rate at which the gross domestic product (GDP) is increasing. On average, most economies grow by a few percentage points per year over long periods. For instance, U.S. real GDP grew at an average rate of 3.4 percent per year from 1960 to 2002. However, this growth has certainly not been smooth.

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from changes in knowledge, as people learn through experience to perform familiar tasks better[2].

A- Growth Accounting:

In this section, we use the production function to study two sources of growth. Output grows through increases in inputs and through increases in productivity due to improved technology and a more able work force. The production function provides a quantitative link between inputs and outputs. As a simplification, we first assume that labor (L) and capital (K) are the only important inputs. Equation (1) shows that output (Y) depends on inputs and the level of technology (A). (we say that A represents the level of technology because the higher A is, the more output is produced for a given level of inputs. Some times A is called "productivity" a more neutral term than "technology.") Equation (1) relates the level of output to the level of inputs and the level of technology. The production function in equation (1) can be transformed into a very specific relationship between input growth and output growth

$$Y = AF(K,L) \quad \text{.....(1)}$$

We start with a production function that tells us what output Y_t will be at some particular time t as a function of the economy's stock of capital K_t, its labor force L_t, and the economy's total factor productivity A_t. The Cobb-Douglas form of the production function is:

$$Y_t = A_t \times (K_t)^{\alpha} (L_t)^{1-\alpha} \quad \text{..... (2)}$$

Where $(1-\alpha)$ and α are weights equal to labor's share of income and capital's share of income. Equation (2) summarizes the contributions of inputs growth and improved technology to the growth of outputs. Labor and capital contribute an amount equal to their growth rates multiplied by the share of that input n income. The rate of improvement of technology, called *technical progress*, or the *growth of total factor productivity*, is the other term in the equation. If output changes, it can only be because the economy's capital stock, its labor force, or its level of total factor productivity changes.

1- Changes in Capital

[2] Dornbush, Fisher, Startz, Macroeconomics, Ninth Edition, McGrow-Hill, p: 12

Consider, first, the effect on output of a change in the capital stock from its current value K_t to a value $K_t + \Delta K$—an increase in the capital stock by a proportional amount $\Delta K/K_t$. In this production function, K_t is raised to a power, α, so we can apply our rule-of-thumb for the proportional growth rate of a quantity raised to a power to discover that the proportional increase in output from this change in the capital stock is:

$$\Delta Y/Y_t = \alpha(\Delta K/K_t) \quad \text{.....(3)}$$

Thus if the diminishing-returns-to-scale parameter α were equal to 0.5, and if the proportional change in the capital stock were 3%, then the proportional change in output would be:

$$\Delta Y/Y_t = 0.5 \times 3\% = 1.5\%$$

1- Changes in Labor

Now consider, second, the effect on output of a change in the labor force from its current value L_t to a value $L_t + \Delta L$. —an increase in the capital stock by a proportional amount $\Delta L/L_t$. In this production function L_t is raised to a power, $1-\alpha$, so we can apply our rule-of thumb for the proportional growth rate of a quantity raised to a power, to discover that the proportional increase in output from this change in the labor force is:

$$\Delta Y/Y_t = (1-\alpha)\,\Delta L/L_t \quad \text{.....(4)}$$

Thus if the diminishing-returns-to-scale parameter α were equal to 0.5, and if the proportional change in the labor force were 1%, then the proportional change in output would be:

$$\Delta Y/Y_t = (1-0.5) \times 1\% = 0.5\%$$

1- Changes in Total Factor Productivity

Last consider, third, the effect on output a change in total factor productivity. A proportional increase in total factor productivity produces the same proportional increase in output:

$$\Delta Y/Y_t = \Delta A/A_t \quad \text{.....(5)}$$

Thus if the proportional change in total factor productivity were 2%, then the proportional change in output would be:

$$\Delta Y/Y_t = 2\%$$

Therefore, if we consider a real-world situation in which all three—the capital stock, the labor force, and total factor productivity are changing—then the proportional growth rate of output is:

$$\Delta Y/Y_t = \alpha \Delta K/K_t + (1-\alpha)\, \Delta L/L_t + \Delta A/A_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

with the first term $\alpha(\Delta K/K)$ giving the contribution of capital to the growth of output, the second term $(1-\alpha)(\Delta L/L)$ giving the contribution of labor to the growth of output, and the third term $(\Delta A/A)$ giving the contribution of total factor productivity to the growth of output.

Thus, this equation is the key. If we know the proportional growth rates of output, the capital stock, and the labor force, and if we know the diminishing-returns-to-scale parameter α in the production function, then we can use this growth-accounting equation to calculate the (not directly observed) rate of growth of total factor productivity A, and to decompose the growth of total output Y into:

(i) The contribution from the increasing capital stock K.

(ii) The contribution from the increasing labor force L.

(iii) The contribution from higher total factor productivity A[3].

Growth accounting measures the relative contributions of the three sources of economic growth, and It involves the following 4 steps:

First, obtain measures of growth rates of output, $\Delta Y/Y$, capital $\Delta K/K$ and labor $\Delta L/L$, for the economy over any period of time.

Second, estimate values for elasticties α and $(1-\alpha)$ from historical data. For USA, $\alpha = 0.3$, and $(1-\alpha) = 0.7$.

Third, calculate the contribution of capital to economic growth as $(1-\alpha)\Delta K/K$ and the contribution of labor to economic growth as $(\alpha)\Delta N/N$.

[3] Daniel Hamberg, Models Of Economic growth, Harper & Row, p: 43

Fourth, to find out the contribution of improvement in total factor productivity, A, use:

$\Delta A/A = \Delta Y/Y - (1-\alpha)\Delta K/K - (\alpha)\Delta N/N$

• Example: suppose in the U.S., output grows by 40%, capital stock grows by 20% and labor grows by 30% over a certain period of time. Then, $\Delta Y/Y = 40\%$, $\Delta K/K = 20\%$ and $\Delta N/N = 30\%$. We use $\alpha = 0.3$, and $1-\alpha = 0.7$. We get, contribution of capital growth to output growth = $(1-\alpha)\Delta K/K = 0.3 \times 20\% = 6\%$ and the contribution of labor growth to output growth = $(\alpha)\Delta N/N = 0.7 \times 30\% = 21\%$

Lastly, calculate the contribution of productivity growth to output growth as, $\Delta A/A = \Delta Y/Y - (1-\alpha)\Delta K/K - (\alpha)\Delta N/N = 40\% - 6\% - 21\% = 13\%$.

One way to view this growth-accounting equation, is that it allows one to break down growth into components that can be attributed to the observable factors of the growth of the capital stock and of the labor force, and to a *residual* factor—often, in fact, called the *Solow residual*—that is the portion of growth left unaccounted for by increases in the standard factors of production.

Changes in the Solow residual or (the same thing) total factor productivity can come about for many reasons. Economists often refer to total factor productivity as "technology," but if it is technology, it is technology in the widest possible sense. Not just new ways of constructing buildings, newly invented machines, and new sources of power affect total factor productivity, but changes in work organization, in the efficiency of government regulation, in the degree of monopoly in the economy, in the literacy and skills of the workforce, and in many other factors affect total factor productivity as well.

Moreover, total factor productivity also inherits errors in measurement. An overstatement of inflation because of a failure to take account of better quality in goods will reduce the measured growth rate of output without reducing the measured growth rates of the inputs of labor and capital, and so will lead measured total factor productivity to understate the truth.

An alternative—and preferable—way of writing the growth-accounting framework puts the rate of growth of output per worker—the growth rate of output minus the growth rate of labor input—on the left-hand side, and notes that the key variables on

the right hand side are then the growth rate of capital-per-worker and of total factor productivity:

$$\Delta Y/Y_t - \Delta L/L_t = \alpha(\Delta K/K_t - \Delta L/L_t) + \Delta A/A_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

This expression decomposes the growth of labor productivity into two terms: the first term $\alpha(\Delta K/K - \Delta L/L)$ gives the contribution of *capital deepening* to increased labor productivity, and the third term $(\Delta A/A)$ gives the contribution of total factor productivity to the growth of labor productivity. Since we are usually at least as interested in the growth of standards of living and output per worker as in the growth rate of total GDP, this form of the growth-accounting framework is often more useful[4].

2-Growth Accounting and the Productivity Slowdown[5]:

Possible Reasons for this Productivity Growth Slowdown:

(1) Measurement: Slowdown is the result of measurement problems. We need to capture changes in quality i.e. even if firms are producing the same number of products, they may be of better quality. Which increases the level of productivity of the same level of quantitative output.

(2) Legal and Human Environment: Lately, higher standards for cleaner environment and worker safety and health have been set. As more inputs are devoted to these uses, output and productivity will be lower. In addition, rising dishonesty, crime and corruption have reduced the measure.

(3) Technological Depletion: The major technological advances of the past have been fully utilized and new commercially significant technological advances have not arrived fast enough. A reason why this has happened could be that the high rate of innovation during World War II was actually abnormally high and we have reverted to a more normal rate of innovation.

[4] www.cepa.newschool.edu/het/essays/growth/neoclass/solowgr.htm#intro
[5] www.troi.cc.rochester.edu/~srya/eco209/chapter6pdf

(4) The Oil Price Explanation: Slowdown resulted from a large increase in energy prices since 1973. However, for many industries, energy costs are a relatively small part of the costs. One answer is that, the rise in oil prices made many energy intensive machines and factories unprofitable to operate and so nation's capital stock fell by more than is reported. However, in that case, the price of used capital goods should have dropped sharply but they did not. Also, for energy intensive industries, their productivity growth should have gone up once oil prices fell in the 1980s but it didn't.

3- Growth Dynamics the Solow Model[6]:

In the 1950s, Robert Solow built a model that kept diminishing returns to capital and labor, but which added a third factor—technical knowledge—that continued to prod economic productivity and growth (1957). Solow's model pictured technology as a continuous, ever-expanding set of knowledge that simply became evident over time—not something that was specifically created by economic forces. This simplification allowed economists to continue to model the economy using decreasing returns, but only at the cost of excluding technology from the economic model itself. Because technology was assumed to be determined by forces outside the economy, Solow's model is often referred to as an "exogenous" model of growth.

The model Solow devised—ultimately recognized in the 1987 Nobel Prize for economics— became a mainstay of the economic analysis of growth. A number of economists used the basic framework to make elaborate calculations of the relative contributions of expanding (and improving) labor supplies, and increased capital investment to driving growth. These efforts at "growth accounting" showed that most of the growth of the economy was due to increases in capital and labor, and, consistent with the Solow model, assumed that what couldn't be explained by these factors was "the residual" attributable to improvements in technology.

The world described by the Solow model provided not only the basis for economic theorizing, but also strongly shaped the policy recommendations of economists, what was taught in colleges and universities about economic development, and what kinds of policies many governments followed. Neoclassical theory has brought us a number of important ideas that we apply to the world of economic policy. Taken as a whole,

[6] www.troi.cc.rochester.edu/~srya/eco209/chapter6pdf

neoclassical assumptions lead us to conclude that markets are generally very competitive, and don't tend toward monopolies, that left un-impeded, market processes usually result in optimum levels of production and allocation. They also imply that we have relatively limited opportunities for government to promote economic ends, other than encouraging market competition, providing adequate schooling and encouraging savings and investment.

Here, we explain the growth rate of the economy's capital stock and study factors that affect the growth of the capital stock.

3,1- The Solow Model:

Assume for any year t, L_t = number of workers available. We also Assume that the population and the workforce both grow at the fixed rate n. At the beginning of each year t, the economy has available capital stock K_t. Then, using K_t and L_t, output produced is Y_t in year t. We also assume that the economy is closed and there are no government purchases.

Denote C_t as consumption in year t and I_t as gross (total) investment in year t. Then, we have:

$$C_t + I_t = Y_t \quad \text{.....(8)}$$

We will use per worker notation: i.e. $y_t = Y_t/L_t$ = output per worker in period t. Moreover, $c_t = C_t/L_t$ = consumption per worker in year t. And $k_t = K_t/L_t$ = capital per worker in year t (also called the capital-labor ratio).

Per worker production function is given by

$$y_t = f(k_t) \quad \text{.....(9)}$$

in each year t, amount k_t of capital per worker produces y_t amount of output per worker. Notice that there is no 'A' or productivity factor. For now, we assume that there is no productivity growth.

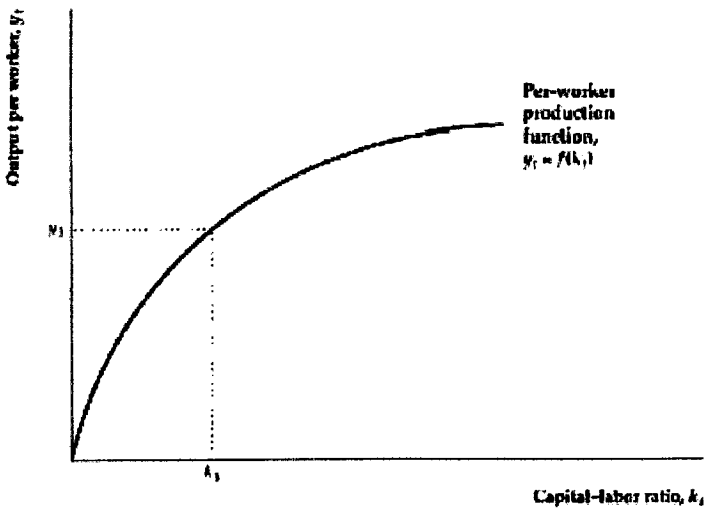


Chart1: Per Worker production function

It is upward sloping because more capital per worker leads to more output per worker. And It is bowed in shape reflecting diminishing marginal productivity of capital.

3,2- Steady States:

In the absence of productivity growth, the economy reaches a steady state in the long-run. A steady state is a situation in which the economy's output per worker, consumption per worker, capital per worker are constant, i.e. in a steady state, y_t, c_t, and k_t do not change over time.

At steady state, from the definition of y_t, c_t, and k_t and because, L_t grows at the rate n, the aggregate variables, Y_t, C_t, and K_t all grow at the rate n. To see how the economy attains the steady state, we look at investment in steady state first. Gross investment has 2 components:

(1) Replacing worn-out or depreciated capital.

(2) Expanding the size of the capital stock:

If d is the depreciation rate, then, total amount of depreciated capital in year t is dK_t. And a Change in capital stock is $K_{t+1} - K_t$. Now, if capital stock increases at the rate n, then, $K_{t+1} = (1+ n) K_t$. This implies,

$$\mathbf{K_{t+1} - K_t = (1+ n) K_t - K_t = nK_t} \quad \mathbf{.....(9)}$$

Moreover, gross investment $I_t = nK_t + dK_t = (n + d) K_t$. And in steady state, $C_t + I_t = Y_t$ or, $C_t + (n + d) K_t = Y_t$. In per worker terms, we obtain, $c_t + (n + d) k_t = y_t$. So:

$$\mathbf{c_t = f(k_t) - (n + d) k_t} \quad \mathbf{.....(10)}$$

At steady state, c_t, k_t are constant over time; so drop time subscripts. So,

$$c = f(k) - (n + d)\, k \quad \text{.....(11)}$$

An increase in k has 2 opposing effects on steady state consumption c:

(1) It leads to an increase in output per worker, f (k).

(2) It leads to an increase in investment, (n + d) k.

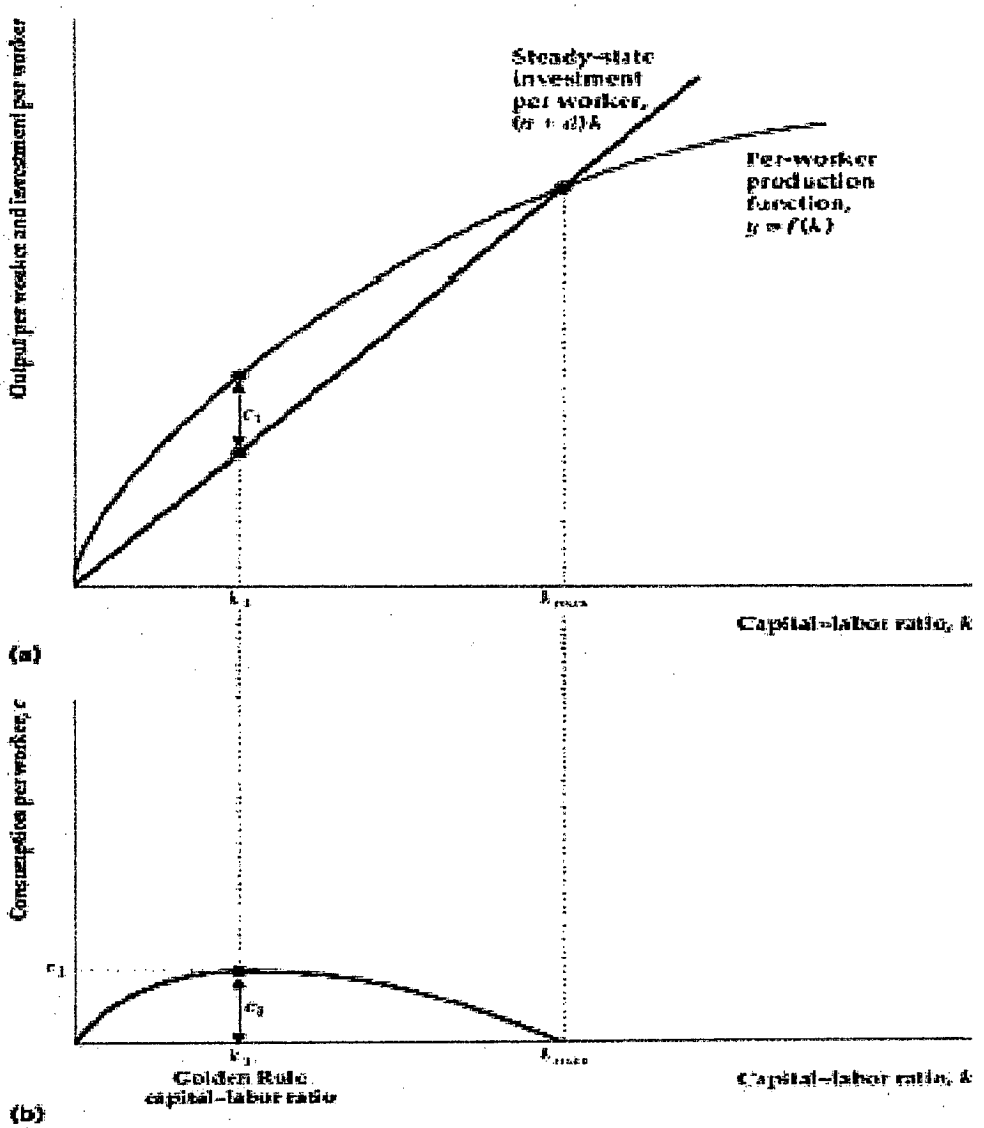


Chart 2: Steady state investment per worker

For every k, the steady state consumption c equals the height of the curve f(k) minus the height of the straight line, (n + d)k.

The level of k that maximizes consumption per worker in the steady state, (here, k_1), is called the ***Golden Rule capital-labor ratio.***

Starting from low or medium values of k, ($k < k_1$), an increase in steady state capital-labor ratio leads to increase in steady state consumption per worker.

Starting from high values of k, ($k > k_1$), increase in steady state capital-labor ratio k leads to lower steady state consumption per worker.

k_{max} is the level of k where, f (k) = (n + d) k, or, c = 0.

Empirically, it has been observed that increases in capital per worker have led to higher steady state consumption per worker ; so, assume that k lies to the left of the Golden Rule capital-labor ratio.

Next, look at Savings. Suppose, saving in the economy is proportional to current income, i.e., $S_t = s\ Y_t$; where, s is the saving rate.

In every year t, National saving S_t = Investment I_t. Therefore, in steady state, we will have,

$$\mathbf{s\ Y_t = (n + d)\ K_t} \text{.....(12)}$$

In per worker terms, dividing by L_t throughout, we get, $s\ y_t = (n + d)\ k_t$ i.e. in steady state,

$$\mathbf{s\ f(k) = (n + d)\ k} \text{.....(13)}$$

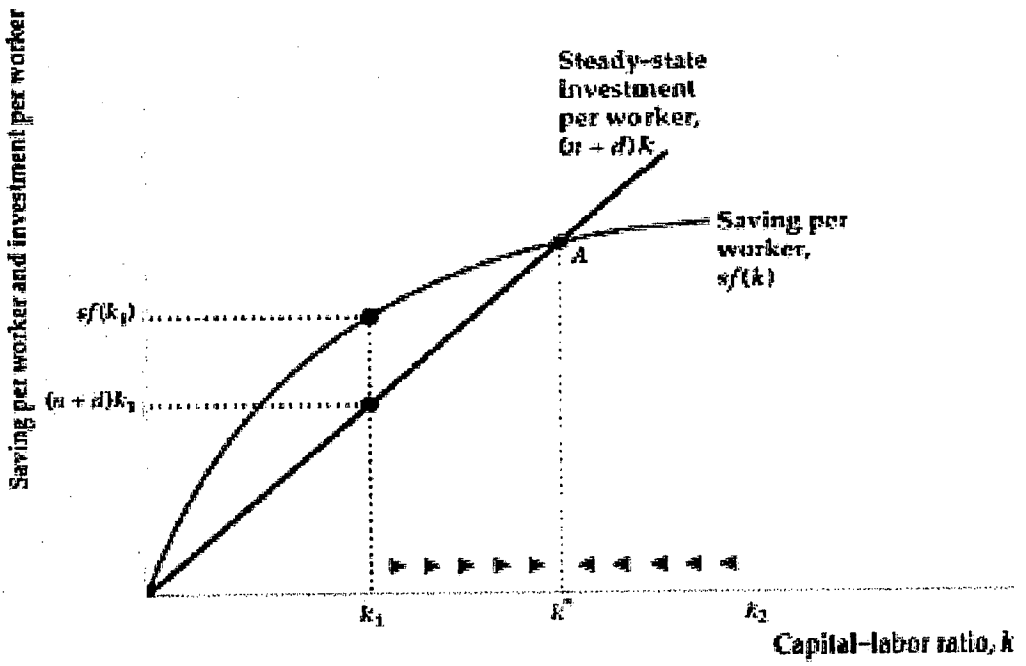


Chart 3: Saving per worker and investment per worker at steady state

Note that s f(k) has the same shape as f(k) because s is just a fixed fraction multiplying f(k).

Steady state is attained at k^*, where, s f(k) = (n + d) k. k^* is the only steady state value of k in the economy.

Steady state value of output per worker is $y^*=f(k^*)$, and the steady state consumption per worker is

$$c^* = f(k^*) - (n + d)\, k^* \quad \text{.....(14)}$$

At steady state, c, k, y all stay constant. So, once, k^* is reached, the economy will stay here forever.

If the economy is at $k < k^*$, say, at k_1, then saving per worker is higher than the amount of investment needed to keep capital per worker constant. Then, this extra saving is used to create new capital and this will lead to an increase in k till k^* is reached.

Similarly, at $k > k^*$, the amount of saving per worker done is less than the investment needed to keep the capital per worker constant. As a result, k will decline until k^* is reached.

4- Fundamental Determinants of Long Run Living Standards[7]:

If we measure long run well being of an economy by the steady state level of consumption per worker. Three fundamental factors affect the steady state level of k and so, the steady state level of c are:

(1) Savings rate: Suppose the savings rate increases from s_1 to s_2. This increases the savings per worker s f(k) for every level of k , i.e. it shifts the s f(k) curve upwards.

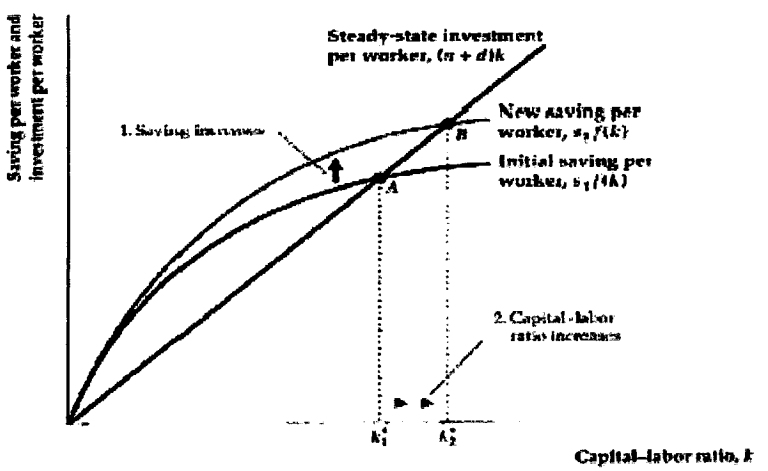


Chart 4: Transition due to increased savings

[7] www.troi.cc.rochester.edu/~srya/eco209/chapter6pdf

• New steady state I is at k_2^*. At the initial steady state k, savings per worker is greater than investment needed to keep k constant and so, k increases till the new steady state is reached.

• At new steady state, output per worker and consumption per worker are higher.

• Should policy goal be to make savings rate as high as possible to improve long run living standards. – The answer is not so clear. Higher savings rate now will lead to higher consumption per worker in the long run but at the initial stage will imply lower current consumption. Hence, there is a trade-off between current and future consumption.

(2) Population Growth: Suppose the rate of population growth rises from n_1 to n_2. Then, the rate of growth of labor force also increases to n_2, which means that to maintain the same steady state k, the amount of investment per worker needed; (n+d) k must increase. Therefore, the steady state investment line pivots up and to the left.

• The new steady state is at k_2^*, which is lower than the initial steady state.

• The new steady state consumption per worker and the output per worker are lower. Therefore, living standards are lower.

• Policies to control the population growth will improve living standards. However, if n decreases, then the growth rate of the aggregate variables, C_t, Y_t and K_t will decrease. Some countries may care about the growth in aggregate output, e.g. for military reasons.

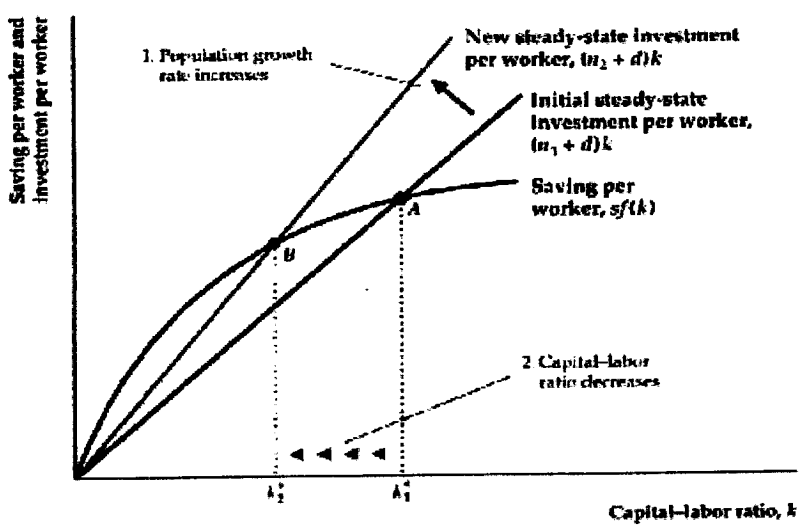


Chart 5: Moving to a new steady state

(3) Productivity Growth: An improvement in productivity corresponds to an upward shift in the per-worker production function, because at every value of k, each worker produces more output. So, the per-worker production function shifts from $f_1(k)$ to $f_2(k)$.

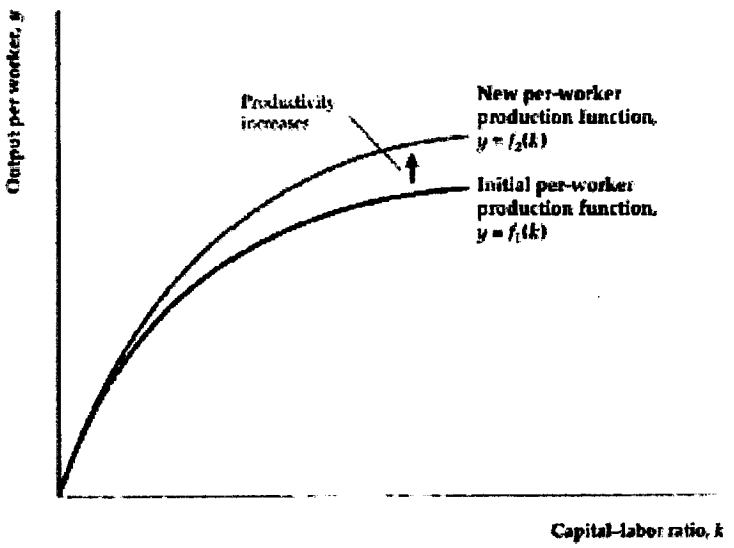


Chart 6: productivity increases

- As savings per worker is a constant fraction of output per worker, the s f (k) curve also shifts upwards in a similar fashion.
- New steady state is at k_2^*, which is higher than the initial steady state.
- Also, steady state output per worker and steady state consumption per worker will increase. This increase is in two ways:
  (1) By increasing f (k) for every k, amount produced by any k increases.
  (2) By increasing the long run steady state k.
- Increases in s, decrease in n, or improvement in productivity all move the economy to higher standards of living. In reality, there are limits to an increase in s or decrease in n. So, in the long run, according to the Solow Model, only continuous increases in productivity may lead to transition to higher k and living standards.

B- NEW GROWTH THEORY:

New Growth Theory emphasizes that economic growth results from the increasing returns associated with new knowledge. Knowledge has different properties than other economic goods (being non-rival and partly excludable). The ability to grow the economy by increasing knowledge rather than labor or capital creates opportunities for nearly boundless growth. Markets fail to produce enough knowledge because innovators cannot capture all of the gains associated with creating new knowledge. And because knowledge can be infinitely reused at zero marginal cost, firms who use knowledge in production can earn quasi-monopoly profits. All forms of knowledge, from big science to better ways to sew a shirt exhibit these properties and contribute to growth. Economies with widespread increasing returns are unlikely to develop along a unique equilibrium path. Development may be a process of creative destruction, with a succession of monopolistically competitive technologies and firms. Markets alone may not converge on a single most efficient solution and technological and regional development will tend to exhibit path dependence[8].

The new growth theory shows how creativity reduces scarcity to satisfy requirements. It means that creativity will replace scarcity as a new paradigm in economics.

Mankind is better defined by its mind power than by its physical strength. Then, mind power must come in first before the physical labor in the hierarchy of production factors. In economics, creativity is the expression of mind power: It is the capacity to produce new ideas such as inventions and innovations. An invention is a discovery while an innovation is the application of the invention to produce new goods and services.

The theory claims that:

1- Creativity is today the most important factor of production because it integrates ideas in labor and capital. As a result, ideas increase the amount of goods produced through labor and capital.

[8] www.impresaconsulting.com/cortright_ngt.pdf

2- Creativity is today the main resource because it creates an artificial resource base.

3- Creativity tends to abundance because it benefits of the law of increasing returns.

As creativity is a by-product of free thought, the limits of growth can only come from a backward step of freedom[9].

1- Creativity Improves Labor and Capital

Creativity is today the most important factor of production because it integrates ideas in labor and capital. As a result, ideas increase the quantity of goods produced through labor and capital.

1-1 Creativity and labor

Without any additional labor or capital, the ideas added to labor increase the production. Ideas are integrated to labor and as a result, they produce a rise in production. Without ideas, physical labor is just good to produce the energy it consumes!

1-2 Creativity and capital

Ideas integrated in the tools enable to multiply the production; ideas take a growing share into the capital structure. As a result, a modern machine, which includes a large amount of creativity, produces thousands times the dead labor it integrates. This means that thanks to creativity, the law of diminishing returns cannot apply any more to the modern capital[10].

2- Creativity Extends Resources

Creativity rearranges the resources and creates an artificial new resource base. As a result, resources become unlimited. In classic economy, resources are limited. The existing resource includes available and unavailable resources. The consumption

[9] www.bized.ac.uk/virtual/economy/policy/advisors/general.htm
[10] www.freeworldacademy.com/index.htm

decreases the existing resources and as they are non renewable, we can expect a limit of growth.

2-1 Creativity rearranges resources:

Even if the existing resources are limited, creativity enables us to get more from it by rearranging the resources. We must consider that people do not want land, wood, coal or oil. They want food and energy. To produce energy, you are not obliged to use wood. Thanks to technical progress, you can always use another resource larger than the precedent to satisfy the same requirement. It means that you rearrange your resources. For example, in olden times people used wood for energy. It was a limited resource whatever the technical progress in chopping wood. When people jumped from wood to coal, the existing resource to get energy increased on a far extend. It was only possible thanks to a great step in scientific progress.

2-2 Creativity creates an artificial resource base:

Beside the limited natural resources, creativity can create an artificial resource base. This new resource is unlimited. Right now, chemists know how to mix selected atoms elements at different temperatures in order to get artificial stuff. For example, supra conductor comes from research in this field. Given the fact that the periodic table contains about one hundred different types of atoms, Paul Romer has calculated that it authorizes about 330 billions combinations between elements! It just means that the technology enables us to construct an unlimited artificial resource base made up with combination of elements. The same can be said about vegetal and animal kingdom. Genetic enables us to clone creatures and to produce food without land by using some chemical liquid. As for energy, its amount is just limited by the duration of the sun!

In summary, the relevant resources rely in mankind mind power rather than in some physical things[11]

[11] www.freeworldacademy.com/index.htm

3- Creativity Tends to Abundance

Time is coming to introduce some very new and fascinating concepts that we can summarize as follow:

- Creativity reduces scarcity of final goods.

- Among final goods, creativity increases spiritual goods versus material goods.

- On turn, spiritual goods increase creativity.

3-1 Creativity reduces scarcity of final goods.

Creativity has yet reduced scarcity for primary goods in the most developed countries. Primary goods correspond mainly to food and raw materials: For example, technical progress such as combine harvesters to replace sickles has caused a significant increase in production of food. Although Eating and drinking represent the greatest utility for our survival, these physiological requirements are quickly saturated. Nobody puts 100 kg of sugar in their coffee. Nor is it possible to drink a barrel of wine with every meal! As a result, the relative price of goods coming from the primary sector (farming and so on) decreases rapidly. In Middle Age, a laborer's daily wages represented just enough to buy 1 kg of bread. Today, buying bread represents scarcely 2% of the daily wages of a non-qualified worker.

Clothing and lodging (secondary sector) are more difficult to satisfy and their relative value does not decrease as in the primary sector. The requirements such as education (tertiary sector) are quite unlimited and their relative value increases.

3-2 Creativity increases spiritual goods.

Many empirical observations has discovered a new evolution based on a distinction between spiritual goods and material goods.
-Material goods satisfy physiological or basic requirements: Eating, drinking, housing, moving and so on.

-Spiritual goods satisfy Reason, Ethics, or Esthetics: It can be a book, a fine painting, a music festival, and any increase in knowledge and Ethics.

This distinction does not correspond to the primary, secondary and tertiary goods that we have just examined above: For example, a Japanese bunch of flowers belongs to the primary good (horticulture) but is nevertheless a spiritual good because it satisfies mainly Esthetics and meditation. On the contrary, an X movie although it belongs to the tertiary goods is nevertheless a material good because it only satisfies basic instincts.

Considering these definitions, a relationship had been observed between the level of education and the proportion of spiritual goods into the final goods: Educated people consume more spiritual goods than uneducated who consume mainly material goods.

For example, let's suppose two categories of people having the same given high income: People with low education will consume furniture's, appliances, yacht, luxurious cars, noisy music. With the same income, high-educated people will save much more and consume antiques, books, library, museums, classical music, and cultural adventures and so on. As education is growing in all countries, it means that the quantity of spiritual goods would increase greater and greater.

3-3 Creativity benefits of increasing returns.

Creativity increases goods and extends resources. On turn, final goods increase creativity: More you use creativity, more you extend it. Clearly, it means that creativity benefits of the law of increasing returns!

According to the classic theory, the law of diminishing returns is the following " when increasing amounts of one factor of production are employed in production along with a fixed amount of some other production factors, after some point the resulting increase in output of product becomes smaller and smaller"

Very often, the classic theory uses agricultural example to illustrate the law: when you apply increasing amount of fertilizer to a constant area with unchanged labor, yields begin to increase and then fall quickly[12].

[12] www.freeworldacademy.com/index.htm

In summary, nothing can prevent creativity to perform abundance except a backward step of freedom. What is more we must emphasize on the role of education: A slow pace in education would delay abundance. It is a supplementary argument in favour of the global learning system. According to the new growth theory, **objective limits** do not exist, and **psychological limits** are not linked to economics. The only threat comes from **political limits**.

* The objective limits

Some economists say that growth is limited in space (undeveloped countries) and could halt in the future because limited resources and negatives externalities.

- Undeveloped countries:

The growth does not widen out to the entire world, because the undeveloped countries do not benefit from freedom and creativity.

The economic growth of the west was preceded by the surge of individual freedom and creativity. Of course, representative government and universal suffrage have often been implemented in the 20th century but the freedom of consciousness appeared by the end of the 18th and was the cause of technical progress and growth.

Unfortunately, in many areas of the present world, authoritarian governments and dictatorships are impeding the surge of freedom. What is more, most of these governments have followed the advices of Marxist scholars and have consequently adopted an economic model based on protectionism and autarky.

As a result, these countries remain poor and fall in the Malthusian trap. They have failed to implement the basic policies: human rights, democratic governance, large education, property rights and free market. This means that Undevelopment is mainly a political problem.

-Increase of negative externalities:

Some assert that the increase in negative externalities such as pollution, congestion in town, noise and so on, could constitute a serious limit to the economic growth.

In fact, creativity reduces these negative externalities: For example, air pollution has dramatically decreases in USA, Europe and Japan. Once again, it's wrong to say that the riches more pollute than the poor's.

What is more, the Pince Curve shows that as education rises, people consume more spiritual goods. This evolution authorizes a sustainable growth: Material goods use

resources and bring negative externalities such as pollution. On the contrary, spiritual goods which are mainly made up of ideas, need a few resources and have only positive externalities.

The long run growth is better guaranteed with educated persons than with low educated people.

Finally we can conclude that the objective limits do not exist.

* Psychological limits:

It is largely said that affluent society does not bring happiness: Depressions and teen suicides increase.

In fact, this situation is due to a deficient education. Real education does not improve as fast as the technical progress.

Educated people have a good awareness of the law of diminishing benefits: For example, the first $100,000 make you happy, the second $ 100,000 has not the same taste and the third does not matter. Educated people know that money and goods can partly avoid misery but do not bring happiness or a sense to life.

Therefore, when they have satisfied their physiological requirements such as food, warm, home, they are not eager to accumulate material goods any more and they look for spiritual goods such as increase in knowledge and spirituality. As a result, you do not observe many depressions or suicides among the scientists and the professors of University!

On the contrary, for many uneducated people, money and material goods play the same role as the fetishism in the primitive society. As ideas are more and more integrated into the final goods, they appear like magic goods.

For example, take a primitive tool such as an harpoon: It's mainly dead work. As a result, when you buy it, you will need to be trained maybe during one year before to be able to catch a fish! On the contrary, a TV set integrates mainly ideas. Although it is a far complicated machine, any person can use it immediately and very easily. He has just to push a button!

Then, people worship goods and consumerism like a new religion. When they realize that the accumulation of material goods is a non sense, they fall into depression. Uneducated people such as top model, actor movie, sportsmen, winner of lottery are exposed to this phenomenon.

This situation does not mean that the affluent society brings psychological misery. Economic growth has no responsibilities. Once again, advances in education are the right answers to solve this problem: It enables to shift the consumption from material goods to spiritual goods.

* Political limits:

The political topics represent a real threat for the future of growth because of the rising hostility against inequalities and the increased role of State.

-Hostility against inequalities:

Growth needs savings and as the amount of saving is related to the income, a fast growth always implies widen inequalities in the income distribution

For example, Let' suppose that we have $450 to distribute between 3 persons and that each of them must consume $100 for his basic living and $25 for an extra spending. If the sum is equally shared between the 3 persons, each receive $150 and the total saving will amount $75.

Now let's suppose that one people A receives $250 and the other, B and C, only 100 for each of them. When we apply the precedent rule, B and C do not save anything, but A saves 250$ - 125$ = 125$. Now let' suppose that the investment yield reaches 10%: with 125 you get 250 in ten years. With 75 you need 12 years to get 250.

It shows that the inequality of revenues enables us to move faster toward abundance.

-However, this technical argument is not sufficient because the rising hostility against inequalities appears to be mainly a political topic related with poverty. Then, we must focus on the following facts and arguments:

-Inequalities are not inequalities in consumption but mainly in savings. There are not emotive inequalities but functional economical mechanisms. In our example, A consumes slightly more than the others (125 $ instead of 100). It is clear that even if he wanted to, he couldn't consume 250 $. Nobody puts 100 kg of sugar in their coffee simply because they are richer than everybody else. On the other hand, B and C have satisfied their basic requirements.

-Poverty which exist in our developed countries is relative poverty: The houses of poor people today contain household equipment that even the Rockefellers or Carnegies of the 19th century did not have.

-It's also selective poverty: In the USA, fragmented or one-parent families had a poverty rate of 37 %. This type of poverty is not due to the breakdown of an economy's production, but simply to the way in which people manage their private lives.

-It's not an inherited poverty due to heritage: Among the richest 100 Americans in 1996, only 24 % had inherited their wealth from their parents. 76 % were "self made men".

Creativity reduces scarcity and prepares abundance. The main challenge relies on the political limits of growth. A backward step of freedom and creativity would have dramatic consequences.

The defense of liberty is the most important topic regarding the new growth theory.

Learning and education must be improved to maintain a sustainable growth and to reach abundance[13].

[13] David R. Henderson, The fortune Encyclopedia of Economics, Warner Books.

Chapter Two

Country profile

The following chapter is concerned in forming a country data profile of each country we are going to study. The countries are Lebanon, Syria, Jordan, and Egypt. Growth is a challenging problem for most of the Middle East countries. Moreover, as the latest report by the World Bank suggested: Improved Public Governance in Middle East Could Boost Economic Growth by One Percentage Point a Year. Public governance—the ways in which governments interact with citizens or civil society groups to promote social and economic welfare—is typically weaker in countries in the Middle East and North Africa (MENA) region than in others at similar income levels. Second in a series of reports focusing on development in MENA, argues that good governance rests on the twin values of inclusiveness and accountability. The reports[14] reveals that the failure of MENA countries to ensure these has weakened their economic growth and human development. And, as men and women in MENA are living today at a time of rising expectations and growing economic challenges, the gap between societies' achievements and people's aspirations puts development in MENA at risk. We can take a glance at Middle East economy in the following table[15]:

[14] http://www.gesource.ac.uk/home.html
[15] http:// www. Mideastweb.com

Table 1: Countries Profile

Country	GDP Adjusted $Millions	Per Capita GDP [Adjusted $]	Real GDP Growth [Adjusted %]	Per Capita GDP [Raw $][1]	Petroleum Reserves [Billions BBL]	Imports $Billions	Exports $Billions	Debt $Billions
Algeria	171,000	5,500	5	1,625	9.2	9.2	19.6	25
Bahrain	10,1000	15,900	5	9,776	0.2	4.2	5.8	2.7
Egypt	247,000	3,600	5	1,427	3.7	17	7.3	31
Iran	413,000	6,300	3	3,802	93	15	25	7.5
Iraq	57,000	2,500	15	3,455	112	13.8	31.8	139
Israel	110,200	18,900	5.9	16,000	0	31.5	35.1	38
Jordan	17,300	3,500	2	1400	0	4	2	8
Kuwait	29,300	15,000	6	14,082	94	7.6	23.2	6.9
Lebanon	18,200	5,000	1	3200	0	6.2	0.7	9.6
Libya	45,400	8,900	6.5	5,811	29.5	7.6	13.9	4.1
Morocco	105,000	3,500	0.8	1239	0	12.2	7.6	18.4
Oman	19,600	7,700	4.6	6,777	5.1	4.5	11.1	4.5
Palestine	3,100[3]	1,500	-7.5	1660	0	2.5	.7	108
Qatar	15,100	20,300	4	20,673	3.7[2]	3.8	9.8	13.1
Saudi Arabia	232,000	10,500	4	7,004	262	30.1	81.2	26.3
Sudan	35,700	1,000	7	367	0.3	1.2	1.7	24.9
Syria	50,900	3,100	3.5	4546	2.5	3.5	4.8	22
Tunisia	62,800	6,500	5	1,800	0.31	8.4	6.1	13
Turkey	444,000	6,800	6	2,869	0.26	55.7	26.9	109
UAE	54,000	22,800	4	17,008	98	34	46	12.6
Yemen	14,400	820	6	381	4	2.7	4.2	4.

Moreover, our focus will be only on the following countries: Lebanon, Syria, Jordan, and Egypt.

Lebanon:

The 1975-91 civil war seriously damaged Lebanon's economic infrastructure, cut national output by half, and all but ended Lebanon's position as a Middle Eastern entrepot and banking hub. Peace enabled the central government to restore control in Beirut, begin collecting taxes, and regain access to key port and government facilities. Economic recovery was helped by a financially sound banking system and resilient

small- and medium-scale manufacturers. Family remittances, banking services, manufactured and farm exports, and international aid provided the main sources of foreign exchange. Lebanon's economy made impressive gains since the launch in 1993 of Horizon 2000, the government's $20 billion reconstruction program. Real GDP grew 8% in 1994, 7% in 1995, 4% in 1996 and in 1997, but slowed to 1.2% in 1998, -1.6% in 1999, -0.6% in 2000, 0.8% in 2001, 1.5% in 2002, and 3% in 2003. During the 1990s, annual inflation fell to almost 0% from more than 100%. Lebanon has rebuilt much of its war-torn physical and financial infrastructure. The government nonetheless faces serious challenges in the economic arena. It has funded reconstruction by borrowing heavily - mostly from domestic banks. In order to reduce the ballooning national debt, the re-installed HARIRI government began an economic austerity program to rein in government expenditures, increase revenue collection, and privatize state enterprises. The HARIRI government met with international donors at the Paris II conference in November 2002 to seek bilateral assistance restructuring its domestic debt at lower rates of interest. While privatization of state-owned enterprises had not occurred by the end of 2003, massive receipts from donor nations stabilized government finances in 2002-04[16].

Since the end of 1992, the Government's economic strategy aimed at transforming the Lebanese economy from a war economy to a normal post war economy, capable of adjusting to economic realities of the 1990s and the beginning of the 21st century, while simultaneously improving the standards and quality of life for the Lebanese people. The linchpin of this strategy has been the creation of a conducive environment for private sector investment with a view to generate significant employment opportunities and hence increase the level of income to the Lebanese people, increase production and productivity, and consequently enhance the competitiveness of the Lebanese economy in the context of massive international economic and social developments.

In its attempt to achieve these objectives, the Government initially focused on regaining and maintaining public confidence in the economic future of Lebanon through introducing and maintaining macroeconomic stability, markedly reducing inflation and containing the fiscal deficit. In parallel to these measures, the

[16] http://www.gesource.ac.uk/home.html

Government mobilized sufficient internal and external resources to embark on a major reconstruction and rehabilitation program, thereby establishing the necessary preconditions for reclaiming an economic role for Lebanon within a changing regional and global economy. And the following table introduces a data profile for Lebanon.

Table 2: Lebanon Data profile.

Lebanon Data profile[17]			
	1999	**2002**	**2003**
Population, total	4.3 million	4.4 million	4.5 million
Population growth (annual %)	1.4	1.3	1.3
labor force	1.5 million	1.52 million	1.54 million
Surface area (Sq. km)	10400		
GNI (current US $)	16.7 billion	17.3 billion	18.2 billion
GNI per capita	3910.0	3900.0	4040.0
GDP (current US $)	16.5 billion	18.3 billion	19.0 billion
GDP Growth (annual %)	1.0	2.2	2.7
GDP implicit price deflator (annual % growth)	0.2	1.8	1.3
Value added in agriculture (% of GDP)	11.9	11.7	12.2
Value added in industry (% of GDP)	22.0	21.0	20.0
Value added in services (% of GDP)	66.1	67.3	67.7
Exports of goods and services (% of GDP)	11.6	13.1	13.4
Imports of goods and services (% of GDP)	37.5	38.7	39.0
Gross capital formation (% of GDP)	21.6	17.0	16.7
Trade in goods as a share of GDP (%)	41.6	43.3	**NA**
Foreign direct investment, net inflows in reporting country (current US$)	250.0 million	257.3 million	**NA**
Present value of debt (current US$)	**NA**	18.1 billion	**NA**
Total debt service (% of exports of goods and services)	27.4	51.0	**NA**
Short-term debt outstanding (current US$)	2.2 billion	2.5 billion	**NA**

[17] www.worldbank.com

Syria:

Syria's economy lately has been growing more slowly than its 2.4% annual population growth rate. Recent legislation allows private banks to operate in Syria, although a private banking sector will take years and further government cooperation to develop. Factors, including the war between the US-led coalition and Iraq, probably drove real annual GDP growth levels back below 1% in 2003 following growth of 3.5% in 2001 and 4.5% in 2002. A long-run economic constraint is the pressure on water supplies caused by rapid population growth, industrial expansion, and increased water pollution. Syria's GDP growth rate for 2004 is 0.9%[18].

Economic Data (2003 Estimates):

GDP: $20.5 billion (at current prices).

Real growth rate: 3.3%.

Per capita GDP: $1,165.

Natural resources: Crude oil and natural gas, Phosphates, Asphalt, Rock salt, Marble, Gypsum, Iron ore, Chrome and Manganese ores

Agriculture: ***Products***: Cotton, Wheat, Barley, Sugar beets, Fruits and Vegetables.

Arable land: 32%.

Industry: *Types*--Mining, Manufacturing (textiles, food processing), Construction, Petroleum.

Trade: *Exports*--$5.143 billion: Petroleum, Textiles, Phosphates, Antiquities, Fruits and Vegetables, Cotton. *Major markets*--EU, Arab countries, U.S., New Independent States, Eastern Europe. *Imports*--$4.845 billion: Foodstuffs, Metal and Metal Products, Machinery, Textiles, Petroleum. *Major suppliers*--Germany, Turkey, Italy, France, U.S., Japan[19]

Table 3: Syria Data Profile.

Syria Data Profile[20]			
	1999	**2002**	**2003**
Population, total	15.8 million	17.0 million	17.4 million
Population growth (annual %)	2.5	2.4	2.3
Labor force	4.8 million	4.92 million	5.03 million

[18] http://www.appliedlanguage.com/country_guides/syria_country_introduction.shtml
[19] http://www.state.gov/
[20] http://www.worldbank.com

Surface area (Sq. km)	185.2 thousand		
GNI (current US $)	14.6 billion	18.5 billion	20.2 billion
GNI per capita	920.0	1,090.0	1,160.0
GDP (current US $)	15.9 billion	19.9 billion	21.5 billion
GDP Growth (annual %)	-0.9	3.2	2.5
GDP implicit price deflator (annual % growth)	4.6	1.5	5.2
Value added in agriculture (% of GDP)	24.0	23.5	23.5
Value added in industry (% of GDP)	30.4	29.3	28.5
Value added in services (% of GDP)	45.6	47.1	48.0
Exports of goods and services (% of GDP)	34.4	38.3	7.4
Imports of goods and services (% of GDP)	32.8	29.5	7.2
Gross capital formation (% of GDP)	19.9	22.6	23.6
Trade in goods as a share of GDP (%)	46.0	51.8	**NA**
Foreign direct investment, net inflows in reporting country (current US$)	263.0 million	225.3 million	**NA**
Present value of debt (current US$)	**NA**	21.2 billion	**NA**
Total debt service (% of exports of goods and services)	6.4	3.0	**NA**
Short-term debt outstanding (current US$)	6.2	5.7	**NA**

Jordan:

The Jordanian economy had a spectacular run during the first half of the 1990s. Growth in real GDP at constant basic prices averaged more than 5.2 per cent between 1993 and 1995. Job creation was exceptionally strong, and the unemployment rate dipped briefly below 13 per cent at the end of 1993.

As the Kingdom moved into the second half of the 1990s, however, economic growth diminished, and it has weakened steadily ever since, except for a short period of arrested expansion in 2000 and the first three quarters of 2001.

Since then, there are increasing signs that the world economy is heading towards a synchronised recession. The slowdown in the US economy and the worldwide tech recession, which became evident in the second half of 2000, were exacerbated by the September 11 terrorist attacks on the US, giving rise to further deflationary pressures around the globe. Concurrently, Jordan's economic growth slowed to a trickle during the 4th quarter of 2001. The estimates available (primarily GDP data) suggest that

growth has decelerated significantly. According to preliminary Department of Statistics estimates, real economic growth at constant basic prices has slowed down significantly[21].

Jordan's economy has resumed strong growth, recovering from the dislocations caused by the war in Iraq in 2003. Real gross domestic product (GDP) grew at 2.8% in 2003, but is projected to recover to 4.6% in 2004 and 5.2% by 2005. Much of the recent growth stems from expansion in the country's manufacturing sector. This has been driven in part by the U.S.-Jordan Free Trade Area agreement, which was ratified by the U.S. Senate in September 2001.

Economic Data (2003 Estimates):

GDP (2003 nominal): $9.95 billion.

Annual growth rate (2003): 3.3%; (first half 2004): 7.2%.

Per capita GDP (2003): $1,817.

Natural resources: Phosphate, Potash.

Agriculture: *Products*--fruits, vegetables, wheat, olive oil, barley, olives. *Land*--10% arable; 5% cultivated.

Industry (24.8% of GDP): *Types*--phosphate mining, manufacturing, electricity and water; cement and petroleum production, and construction.

Trade (2003): *Exports*--$2.36 billion: phosphates, potash, textiles and garments, fertilizers, pharmaceutical products, agricultural products. *Major markets*--U.S., Iraq, India, Saudi Arabia, U.A.E., Israel. Re-exports: $0.72 billion. *Imports*--$5.74 billion: crude petroleum and derivatives, vehicles, machinery and equipment, cereals, fabrics and textiles. *Major suppliers*—Saudi Arabia, China, Germany, U.S., Iraq, EU. [22]

Table 4: Jordan Data Profile

Jordan Data Profile[23]			
	1999	2002	2003
Population, total	4.7 million	5.2 million	5.3 million
Population growth (annual %)	3.1	2.7	2.6
Labor force	1.15 million	1.18 million	1.21 million
Surface area (Sq. km)	89,210.0		

[21] http://www.jordanembassyus.org/April042002.htm
[22] http://www.state.gov/
[23] http://www.worldbank.com

GNI (current US $)	7.7 billion	9.1 billion	9.8 billion
GNI per capita	1,620.0	1,760.0	1,850.0
GDP (current US $)	8.1 billion	9.4 billion	9.9 billion
GDP Growth (annual %)	3.1	5.0	3.2
GDP implicit price deflator (annual % growth)	-0.2	1.2	1.9
Value added in agriculture (% of GDP)	2.4	2.2	2.2
Value added in industry (% of GDP)	25.8	25.9	26.0
Value added in services (% of GDP)	71.9	71.9	71.8
Exports of goods and services (% of GDP)	43.4	45.6	44.5
Imports of goods and services (% of GDP)	61.3	65.9	70.1
Gross capital formation (% of GDP)	21.6	22.8	22.7
Trade in goods as a share of GDP (%)	68.2	82.8	NA
Foreign direct investment, net inflows in reporting country (current US$)	158.0 million	55.9 million	NA
Present value of debt (current US$)		7.4 billion	NA
Total debt service (% of exports of goods and services)	10.0	8.7	NA
Short-term debt outstanding (current US$)	870.9 million	535.9 million	NA

Egypt:

Table 5: Egypt Data Profile.

Egypt Data Profile			
	1999	2002	2003
Population, total	62.8 million	66.4 million	67.6 million
Population growth (annual %)	1.9	1.8	1.8
Labor force	19 million	19.38 million	19.7 million
Surface area (Sq. km)	1.0 million		
GNI (current US $)	86.3 billion	97.8 billion	93.9 billion
GNI per capita	1,370.0	1,470.0	1,390.0
GDP (current US $)	89.1 billion	89.9 billion	82.4 billion
GDP Growth (annual %)	6.3	3.2	3.2
GDP implicit price deflator (annual % growth)	2.2	3.8	3.8

Value added in agriculture (% of GDP)	17.3	16.8	16.1
Value added in industry (% of GDP)	30.9	33.0	34.0
Value added in services (% of GDP)	51.7	50.2	49.8
Exports of goods and services (% of GDP)	15.3	16.2	21.7
Imports of goods and services (% of GDP)	23.7	22.7	23.6
Gross capital formation (% of GDP)	20.5	16.9	17.1
Trade in goods as a share of GDP (%)	22.0	18.8	
Foreign direct investment, net inflows in reporting country (current US$)	1.1 billion	646.9 million	**NA**
Present value of debt (current US$)	**NA**	26.7 billion	**NA**
Total debt service (% of exports of goods and services)	10.7	10.3	**NA**
Short-term debt outstanding (current US$)	4.3 billion	3.5 billion	**NA**

Egypt made significant economic progress in the 1990s with major reforms that strengthened macroeconomic discipline, reined in inflation, and privatized many state-owned enterprises. Real economic growth averaged more than 4.6% over the decade and per capita Gross Domestic Product (GDP) has climbed above $1,500. Formidable challenges remain, however. Recurrent liquidity problems began in 1998 and, while successive devaluations totalling more than 25% have redressed some foreign exchange imbalances, hard currency shortages have persisted, especially after September 11th. Partly as a result, economic growth has slowed, the private sector faces increasing uncertainties, and the earlier growth of foreign direct investment has stalled. Privatization has slowed-with a still-sizable public enterprise sector-and despite general economic improvements.

Chapter Three

Applying the Solow Model

This chapter is allocated to the application of the model through knowing the contribution of factor productivity in economic growth in each country, and through the calculation of the expected available capital stock at steady state.

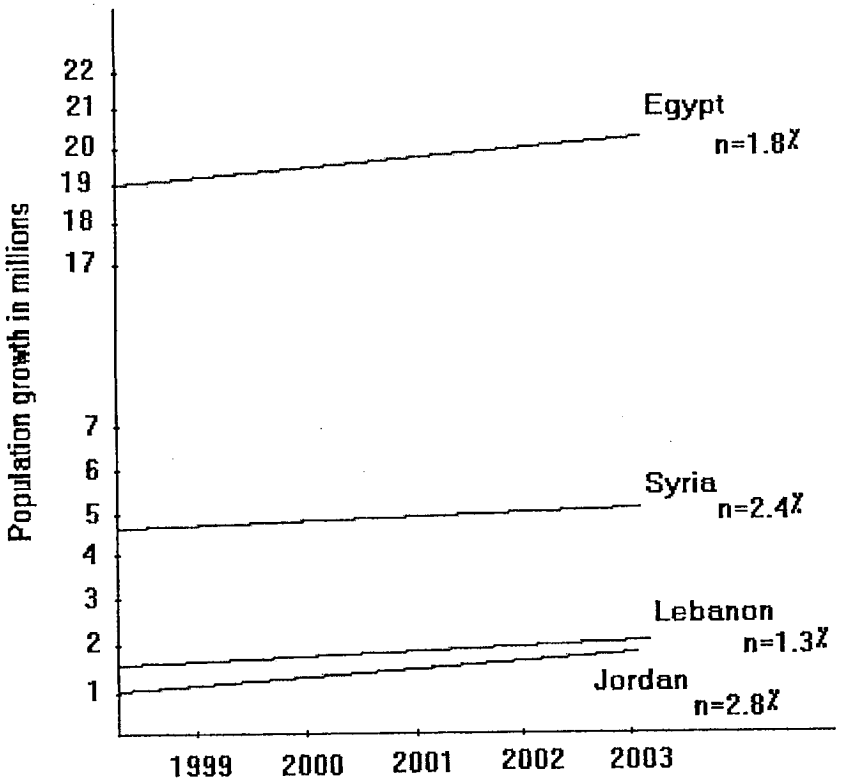
For any year t, L_t is the number of workers available, or the number of the work force. In the table below we will list the number of the work force in the four different countries under study over a rang of years assuming that work force and population both grow at a fixed rate n:

Table 6: Population growth rate

Country	Population growth rate n	1999	2002	2003
Lebanon	1.3%	1.5 million	1.56 million	1.58 million
Syria	2.4%	4.8 million	5.15 million	5.27 million
Jordan	2.8%	1.15 million	1.25 million	1.28 million
Egypt	1.8%	19 million	20 million	20.4 million

Moreover, the following graph represents the population growth in the four different countries over a period of five years:

Chart 7: population growth rate



Available capital stock in year t, K_t. we shall draw an estimation of the available capital stock in a certain year as a percentage of GDP and that by focusing on two factors. First, the dollar value of the imports of each country and the structure of those imports. Second, the amount of government expenditure in the budget on capital stock.

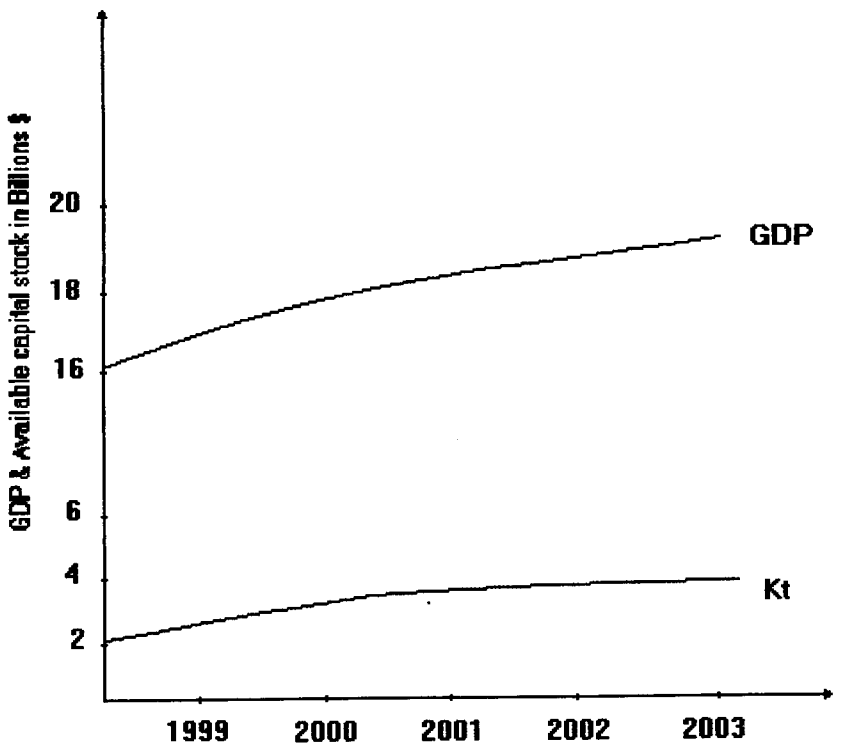
Lebanon:

Imports: the value of imports in 1999 was about $ 5.8 billion. And the structure of those imports is as follows: Foodstuffs 15%, electrical products 20%, vehicles 17%, minerals 10%, chemicals 7%, textiles 10%, fuels 21%.

Budget expenditure was $ 5.9 billion in 1999[24].

By looking at those figures, we can estimate available capital stock to be about 12% of GDP. The following is a graphical representation of the available capital stock in Lebanon:

Chart 8:GDP and Available capital stock



Lebanon

[24] http: www.yahooeducation.com

Syria:

Imports: the value of imports in 1999 was about $ 3.2 billion. And the structure of those imports is as follows: machinery and equipment 23%, foodstuffs/animals 20%, metal and metal products 15%, textiles 10%, chemicals 10%.

GDP composition by sector

Agriculture:29%

Industry:22%

Services:49%

Budget expenditure was $ 4.2 billion in 1999[25].

By looking at those figures, we can estimate available capital stock to be about 10.5% of GDP.

Jordan:

Imports: the value of imports in 1999 was about $ 3.3 billion. Moreover, the structure of those imports is as follows: crude oil 16%, machinery 20%, transport equipment 15%, food 12%, live animals 6%, and manufactured goods 14%.

GDP composition by sector:

Agriculture:3%

Industry:25%

Services:72%

Budget expenditure was $ 3 billion in 1999[26].

By looking at those figures, we can estimate available capital stock to be about 13% of GDP.

Egypt:

Imports: the value of imports in 1999 was about $ 15 billion. Moreover, the structure of those imports is as follows: machinery and equipment 26%, foodstuffs 14%, chemicals 12%, wood products 10%, fuels 18%.

GDP composition by sector:

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[25] http: www.yahooeducation.com

[26] http: www.yahooeducation.com

Agriculture:17%

Industry:32%

Services:51%

Budget expenditure was $ 21.4 billion in 1999.

By looking at those figures, we can estimate available capital stock to be about 16% of GDP.

Table 7: Available capital stock:

Country	1999	2002	2003
Lebanon	2 billion	2.1 billion	2.18 billion
Syria	1.67 billion	2.1 billion	2.26 billion
Jordan	1.05 billion	1.22 billion	1.29 billion
Egypt	14.25 billion	14.38 billion	13.18 billion

Since the countries we are studying has a 25 to 30 percentage of there population below poverty line, and since GDP per capita is relatively low in those countries we think that it is fair to assume that the income earned is mostly consumed. And consumption has the largest share of income C = 95% where saving S =5%. We shall assume also that what is saved is totally invested.

We will use per worker notation, $y_t = Y_t/L_t$, output of worker in period t.
$c_t = C_t/L_t$, consumption of worker in period t. $k_t = K_t/L_t$,investment of worker in period t It . we will calculate Ct as 95 % of income or GDP

Lebanon	1999	2002	2003
y_t	11000	11090	11520
c_t	10450	10535	10943
k_t	1333	1346	1380
I_t	650	555	577

Syria	1999	2002	2003
y_t	3312	3864	4274
c_t	3147	3670	3875

k_t	348	427	450
I_t	165	194	399

Jordan	1999	2002	2003
y_t	7013	7966	8182
c_t	6690	7567	7772
k_t	913	976	1007
I_t	323	399	410

Egypt	1999	2002	2003
y_t	4690	4638	4182
c_t	4455	4406	3972
k_t	750	719	646
I_t	235	232	210

Contribution of factor productivity in economic growth:

We will use the production function to study two sources of growth. Output growth through increases in inputs and through increases in productivity due to improved technology and a more able work force.

Using equation (6) developed in chapter two:

$$\Delta Y/Y_t = \alpha \Delta K/K_t + (1-\alpha)\, \Delta L/L_t + \Delta A/A_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

First, we should obtain the measures of growth rates of output, $\Delta Y/Y$, capital $\Delta K/K$ and labor $\Delta L/L$, for the economy over a period of time. Let this period be between years 2002 and 2003, and the first country to deal with be Lebanon. From tables shown in chapter three we can see that $\Delta Y/Y = 3.3\%$, $\Delta L/L = 1.3\%$, and estimating the increase of capital stock $\Delta K/K = 3.3\%$ since we had previously assumed in our

calculations of available capital stock that it is calculated as a percentage of GDP than it should grow by the same percentage growth as GDP.

Second, we estimate values for elasticities α and $(1-\alpha)$. For USA and some advanced countries the estimation is $\alpha = 0.3$, and $(1-\alpha) = 0.7$. While for developing countries we could estimate $\alpha = 0.4$, and $(1-\alpha) = 0.6$. Since any increase in capital stock in these countries will have a greater effect than advanced countries and eventually will lead to a significant increase in output.

Third, we calculate the contribution of capital to economic growth as $(1-\alpha)\Delta K/K = 0.6 \times 3.3\% = 1.98\%$, and the contribution of labor to economic growth as $(\alpha)\Delta N/N = 0.4 \times 1.3\% = 0.52\%$.

Fourth, to find out the contribution of improvement in total factor productivity, A, use:

$$\Delta A/A = \Delta Y/Y - (1-\alpha)\Delta K/K - (\alpha)\Delta N/N$$

$$\Delta A/A = 3.3\% - 1.98\% - 0.52\%$$

$$\Delta A/A = 0.8\%.$$

Syria:

$\Delta Y/Y = 3.2\%$, $\Delta L/L = 2.2\%$, and $\Delta K/K = 3.2\%$.

The contribution of capital to economic growth as $(1-\alpha)\Delta K/K = 0.6 \times 3.2\% = 1.92\%$, and the contribution of labor to economic growth as $(\alpha)\Delta N/N = 0.4 \times 2.2\% = 0.88\%$.

The contribution of improvement in total factor productivity, A, using:

$$\Delta A/A = \Delta Y/Y - (1-\alpha)\Delta K/K - (\alpha)\Delta N/N$$

$$\Delta A/A = 3.2\% - 1.92\% - 0.88\%$$

$$\Delta A/A = 0.4\%.$$

Jordan:

$\Delta Y/Y = 6.3\%$, $\Delta L/L = 2.54\%$, and $\Delta K/K = 6.3\%$.

The contribution of capital to economic growth as $(1-\alpha)\Delta K/K = 0.6 \times 6.3\% = 3.78\%$, and the contribution of labor to economic growth as $(\alpha)\Delta N/N = 0.4 \times 2.5\% = 1\%$.

The contribution of improvement in total factor productivity, A, using:

$$\Delta A/A = \Delta Y/Y - (1-\alpha)\Delta K/K - (\alpha)\Delta N/N$$

$\Delta A/A = 6.3\% - 3.78\% - 1\%$

$\Delta A/A = 1.52\%$.

Egypt:

$\Delta Y/Y = 3.2\%$, $\Delta L/L = 1.65\%$, and $\Delta K/K = 3.2\%$.

The contribution of capital to economic growth as $(1-\alpha)\Delta K/K = 0.6 \times 3.2\% = 1.92\%$, and the contribution of labor to economic growth as $(\alpha)\Delta N/N = 0.4 \times 1.65\% = 0.66\%$.

The contribution of improvement in total factor productivity, A, using:

$$\Delta A/A = \Delta Y/Y - (1-\alpha)\Delta K/K - (\alpha)\Delta N/N$$

$\Delta A/A = 3.2\% - 1.92\% - 0.66\%$

$\Delta A/A = 0.62\%$.

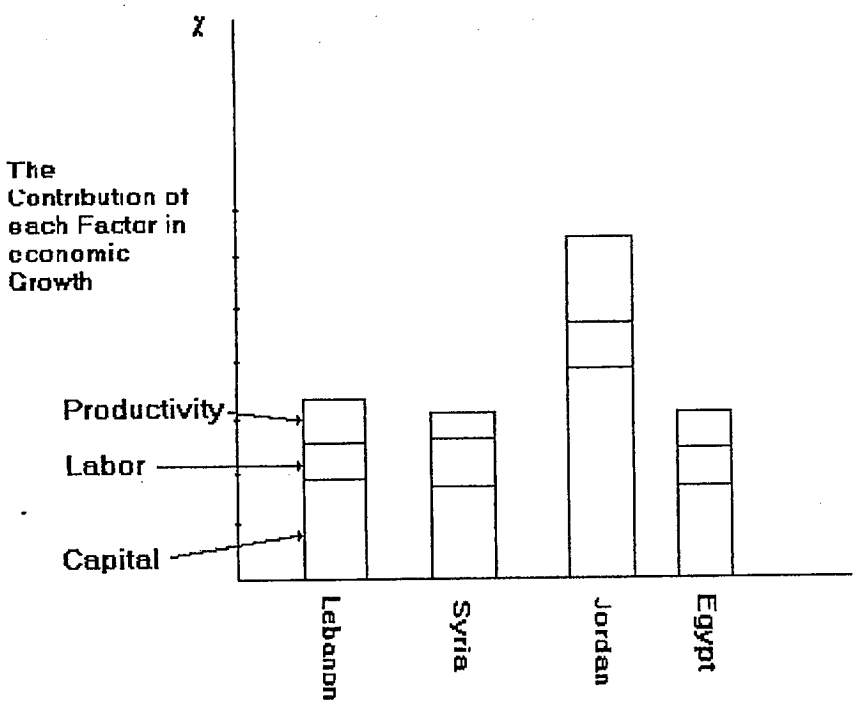

Chart 8: Contribution of each factor in economic growth

Reaching Steady State:

We have already assumed that saving represent, a small share of income in the countries we are studying and we approximated the saving rate to be about 5% of income.

$S_t = sY_t$ where s is the saving rate, in every year t national savings S_t = investment I_t. Therefore, in steady state we have $s\ Y_t = (n+d)\ K_t$.

For Lebanon we assume that the current work force growth rate will be constant at 1.3% and depreciation to be 7% than we have: $0.05\ Y_t = (0.013 + 0.07)\ K_t \Rightarrow 0.05\ Y_t = (0.083)\ K_t \Rightarrow K_t = 0.05 / 0.083\ Y_t$

$\Rightarrow K_t = 0.602\ Y_t$ or $K_t = 60.24\%\ Y_t$ while we have available capital stock to be around 12% of GDP.

For Syria we assume that the current work force growth rate will be constant at 2.4% and depreciation to be 7% than we have: $0.05\ Y_t = (0.024 + 0.07)\ K_t \Rightarrow 0.05\ Y_t = (0.094)\ K_t \Rightarrow K_t = 0.05 / 0.094\ Y_t$

$\Rightarrow K_t = 0.531\ Y_t$ or $K_t = 53.19\%\ Y_t$ while we have available capital stock to be around 10.5% of GDP.

For Jordan we assume that the current work force growth rate will be constant at 2.8% and depreciation to be 7% than we have: $0.05\ Y_t = (0.028 + 0.07)\ K_t \Rightarrow 0.05\ Y_t = (0.098)\ K_t \Rightarrow K_t = 0.05 / 0.098\ Y_t$

$\Rightarrow K_t = 0.51\ Y_t$ or $K_t = 51\%\ Y_t$ while we have available capital stock to be around 13% of GDP.

For Egypt we assume that the current work force growth rate will be constant at 1.8% and depreciation to be 7% than we have: $0.05\ Y_t = (0.018 + 0.07)\ K_t \Rightarrow 0.05\ Y_t = (0.088)\ K_t \Rightarrow K_t = 0.05 / 0.088\ Y_t$

$\Rightarrow K_t = 0.568\ Y_t$ or $K_t = 56.8\%\ Y_t$ while we have available capital stock to be around 16% of GDP.

Conclusion

The private sector is central in promoting growth and expanding wealth opportunities in any country. It is generally believed to encourage investment, improve productivity, create jobs, and increase the standard of living. However, the countries we are studying will not be able to reach these objectives unless proper internal domestic reforms are implemented in the financial, regulatory, and legal environment. These include protection of property rights, access to credit, and efficient judicial, taxation, and customs systems. Entrepreneurial motivations and the development of the private sector are often influenced by factors such as the regulatory costs of business and regulations that enhance or constrain investment, productivity, and growth.

In the countries, we are studying improvements in the standard of living and economic growth will only be attained with fiscal and political reforms. Since lengthy bureaucratic procedures, unclear regulations, and corruption, pose major obstacles to economic growth development and integration into global markets. These controlled economies directly affect foreign and domestic investments. Where Starting a Business, Hiring and Firing Workers, Enforcing Contracts, Getting Credit, and Closing a Business are all factors that affect investment, moreover no serious actions are undertaken to improve those factors.

In applying the model, we computed the contribution of total factor productivity improvement in the growth and that turned to be as follows:

Lebanon 0.8 points, which represents 24.2% of total annual growth, and 0.4 points for Syria and this represents 12.5 % of total annual growth. As for Jordan the contribution of total factor productivity is 1.65 points representing 24.1% of total annual growth and in Egypt 19.5 % of annual growth was contributed to improvement in total factor productivity or improvements in efficiency.

	Lebanon	Syria	Jordan	Egypt
Contribution of total factor productivity in total annual growth	24.2%	12.5%	24.1%	19.5%

Those numbers obtained are convincing taking into consideration the education level, the population growth level, and the infrastructure in each country. But those figures

alone cannot tell much, therefore we calculated what the available capital stock level should be to reach steady state and what it is today, and we get the following:

	Lebanon	Syria	Jordan	Egypt
Available capital stock level today	12%	10.5%	13%	16%
Available capital stock level at steady state	60.2%	53.1%	51%	56.8%

Those numbers show that investment in capital stock should rise enormously but in order to achieve this the environment for the private sector should be prepared.

Economic reforms in Egypt have faltered due to the post September 11 downturn in tourism, high Suez Canal tolls, and low level of exports. Little progress has been achieved in privatizing or reforming the significantly large public sector. Social concerns have taken precedence as the largest Arab country, with a population of 65 million, suffers from growing unemployment and the need to maintain subsidies on food, energy, and other commodities for the large percentage of the poor. Development of the natural gas export market may help the growth of the economy. The containment of the radical Islamic movements is a major cause of uncertainty, which hinders both domestic and foreign investment. While investment laws have been revised to promote foreign investment, between 1998 and 2001, FDI actually fell by 50 percent, from approximately US$1bn to US$500m due to bureaucratic constraints. Although decreasing, state-owned banking sector still holds the majority of the market share. These banks are characterized by "low capitalization, a high percentage of poorly performing loans, massive overstaffing and stifling bureaucracy" The Egyptian legal code is complex and often characterized by lengthy delays. Nevertheless, the legal system protects private property. Regulations and regulatory agencies are influenced by private interests and government corruption, which cause delays in clearing goods through customs, arbitrary decision-making, and high market inefficiencies.

With scarce economic resources, Jordan's constitutional monarchy has generally been dependent on foreign loans and foreign aid. Legislative and regulatory reforms under

King Abdullah II allowed Jordan to accede to the WTO, leading to privatization and economic growth. Although the country faces a heavy debt burden, high unemployment, and the end of Iraqi-subsidized oil, Jordan can bring back tourism and foreign investment by working towards a more peaceful and open Middle East. In 2001, its tariff rate was 13.5 percent. However the inefficient customs pose a bigger hindrance to imports where they are subject to arbitrary regulations and frequent delays.

The top income and corporate tax rates in Jordan are 25 and 35 percent respectively. In 2001, the government consumed 23 percent of GDP. While the government promotes foreign investment, investors face numerous obstacles and restrictions such as the minimum capital requirement of $70,000 and a maximum of 49 percent ownership. The 2000 new banking law protects the interests of investors and works against corruption. U.S. Department of States estimates that 30 percent of Jordan's loans are nonperforming. Subsidies still remain for oil, while most price controls have been removed. The judiciary branch is designed to be independent; however the strong executive branch can easily influence the judges in its favor. Similarly the government is attempting to bring reforms to foster a more competitive environment, yet the bureaucratic and burdensome regulatory system characterized by red tape and arbitrary application of customs, tax, labor, and other laws is a strong obstacle to attract investment.

Old guard generals, intelligence chiefs, and politicians prevent Syria from undertaking liberalizing reforms to restructure the lagging economy. Deeply rooted corruption, cumbersome legal, regulatory, and bureaucratic institutions hinder foreign and private investment. These structures have a direct effect on trading policies due to the country's tedious customs procedures. Similarly, the weakness in law enforcement is facilitated by cumbersome and inefficient regulations. For example, the protection of property rights is uncertain. At the same time, the government-influenced judiciary system enforces commercial laws arbitrarily, frequently favoring private interests. The top income and corporate tax rates are 15 and 45 percent, respectively, but War Effort Surtaxes increase the rate substantially.

Key industries, such as oil productions, telecommunications, and water distribution, compose the public sector. Through the sectors, the government influences prices using price controls and subsidies. Similarly, the government-controlled banking

sector only lends to the public sector, resulting in poorly serviced loans and insufficiently funded private enterprises. Due to its inefficiency, the public sector has become a substantial fiscal burden on the economy. As a result, foreign investment remains limited. In response, the government adopted a reform in 2000 to allow full foreign ownership of a company and its land in order to reverse the trend. These reforms have been ineffective in lifting the standard of living of the general population.

With the need to rebuild its physical and political infrastructure after the end of the civil war in 1990, Lebanon faces a heavy public debt burden constituting 160 percent of GDP. The 16- year civil war has devastated the country and left unemployment at 25 percent. Although, the government is committed to improve its debt burden through tax reforms and debt management, privatization has been stalled by negotiations and political disagreement. Nevertheless, Lebanon has the most liberal banking in MENA, with no restriction on foreign investment and transparency. Much of the country, however, is occupied by neighboring Syria, limiting its sovereignty and influencing major government decisions. Aside from Lebanon's 12 percent tariff rate, import controls pose a significant barrier to trade. The top income and corporate tax rates are 20 and 15 percent respectively. State owned-enterprises contributed to 17 percent of the government revenues in 2001, while at the same time its consumption constituted 18 percent of GDP. Although government red tape and corruption can be a hindrance to investment, Lebanon does not discriminate between national and foreign investments in most sectors. The government controls prices directly or through its state-owned enterprises in a broad range of sectors. It also has significant control over the judiciary system, resulting in a high- risk environment for foreign investors. This is mostly due to the lack of transparency, corruption, red tape, and unexpected changes in economic policies and regulations. This type of business environment fosters illegal trade and a strong informal market in a wide spectrum of goods.

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