Reforms and Growth in MENA Countries: New Empirical Evidence

by

Mustapha Kamel Nabli*
World Bank, Washington, D.C.

and

Marie-Ange Véganzonès-Varoudakis*
Centre National de la Recherche Scientifique (CNRS),
Centre d'Etudes et de Recherches sur le Développement International (CERDI),
Clermont Ferrand, France and World Bank, Washington, D.C.

May 2004

** The views expressed in this paper are those of the authors, not of their institutions*

TABLE OF CONTENTS

List of Tables:

Summary

In this paper we empirically analyze the linkages among economic reforms, human capital, physical infrastructure, and growth for a panel of 44 developing countries over 1970-80 to 1999. For this purpose, we generate aggregated reform indicators using principal component analysis. We show that the growth performance of the MENA region has been disappointing because these economies have lagged behind in terms of economic reforms. However, our analysis also reveals that the growth dividend of some reforms has been small. This is the case when structural reforms are implemented in an unstable macroeconomic environment (which corresponds to the situation of the MENA countries in the 1980s), and when macroeconomic reforms are accompanied by a low level of structural reforms (as observed during the 1990s). Our result illustrates the complementarities between reforms as modeled by Mussa (1987) and Williamson (1994). Actually, after human capital and physical infrastructure, our analysis finds that macroeconomic and external stability are key variables for the reform process and for the growth prospects of the developing world.

1. Introduction

This paper explores the relationship between economic reforms and growth in the MENA economies. Despite apparent reforms starting in the mid-1980s, the growth performance of the region has often been disappointing. Since the large fall in international oil prices in the mid-1980s, most MENA economies have experienced a marked slowdown and/or macroeconomic crisis. In spite of a small recovery of GDP per capita in the 1990s (from -1 percent in the 1980s to 1 percent in the 1990s), the MENA region is, for the second decade, the slowest growing region in the world (see Dasgupta, Keller, and Srinivasan, 2002).

More precisely, in this paper, we try to understand whether the growth performance of the region has been disappointing because MENA economies have lagged behind in terms of reforms, or because the growth dividend of the reforms has been small. We illustrate that both explanations are relevant. On the one hand, economic reforms have been insufficient to boost the growth performance of the countries. This is the case for macroeconomic reforms during the 1980s, and for structural reforms during the entire period. On the other hand, our estimations reveal a low impact of some economic reforms. This is the case when structural reforms are implemented in a volatile macroeconomic environment, and when macroeconomic reforms are implemented without a sufficient level of structural reforms, as in MENA for both decades. Our result illustrates the complementarities between the economic reforms as elaborated by Mussa (1987) and by Williamson (1994).

A first critical step in our exercise has been to measure the economic reform effort of the countries, using indicators that are as close as possible to reform policies and instruments.[1] The originality of our approach, however, has consisted in generating aggregated reform indicators using principal component analysis. This methodology permits the aggregation of basic indicators in a more rigorous way than would a subjective scoring system (see, for example, the rating system elaborated by the *International Country Risk Guide*, ICRG). It also avoids multi-collinearity problems when estimating an equation that includes several disaggregated indicators.

In this sense, our findings bring new empirical evidence to the subject of economic policy and economic growth, since no work, to our knowledge, has previously been undertaken using this methodology in the MENA region. Furthermore, the use of panel data estimation techniques has allowed some comparative analysis among the different regions, as well as among the MENA countries.[2] In addition to economic reforms, the link of human capital and physical infrastructure to economic growth has been discussed in this paper.

[1] The outcome measure — such as the rate of inflation, the external debt, the public deficit, or trade openness (Easterly et al, 1997) — is the most popular way to evaluate economic reforms. In this case, however, the indicators used cannot be considered only as reform inputs, but also as consequences of reforms and other factors. This method nevertheless constitutes an improvement over earlier methods, which distinguished only between the presence or absence of reforms, and therefore failed to capture the gradation in reform intensity across the countries. A better approach would be to directly measure reform inputs. This method could not be used here because of the lack of data.

[2] The comparative advantage of panel data regressions compared to time series estimation techniques can also be seen in:
a - The double dimension (time series - cross section), which improves estimates by adding information;
b - The country dummy variables, which generally ask for an important number of degree of freedom, and which add precision to the results of the estimations.

The paper is organized as follows. The second section presents the principal component analysis of the economic reforms, human capital, and physical infrastructure indicators. Our analysis is based on a panel of 44 developing countries over 1970-80 to 1999.[3] In the third section, we discuss, in a comparative perspective, the progress of reforms in the MENA economies, as well as their development in the areas of human capital and core infrastructure. In the fourth section, we estimate a growth equation that includes our different composite indicators. We verify that economic reforms, human capital, and physical infrastructure have had a positive influence on the growth pattern of our sample of countries. The fifth section quantifies the contribution of reforms, human capital, and physical infrastructure to the economic growth of the MENA region. We illustrate that the lack of reforms has had a negative influence on the growth accomplishment of these economies. The last section concludes.

2. Indicators of Economic Reforms, Human Capital, and Physical Infrastructure

MENA countries differ considerably among themselves, as well as with regard to the rest of the world, in terms of resources endowment and structures of production, and also in terms of economic reforms, physical infrastructure, and human capital. These differences have been assessed using various economic, physical, and social indicators that have been aggregated by means of principal component analysis. This method — applied by Nagaraj, Varoudakis and Véganzonès (2000) — has been used to generate five aggregate indicators.[4]

The first composite indicator, *macroeconomic stability* (*MS*), is based on:

- inflation (*p*) and public deficit as percentage of GDP (*PubDef*), which can be disruptive to investment and growth if they lead to unsustainable macroeconomic imbalances (see Fischer, 1993; De Gregorio, 1992); and

- foreign exchange parallel market's premium (*lBmp,* in logarithm) as a proxy of various distortions in the economy that can also lead to macroeconomic instability.[5]

---

[3] Among these countries, 16 are *African* countries (7 *CFA* and 9 *non-CFA*), 12 are *Latin American* countries, 9 are *Asian* countries, and 7 are *MENA* countries (see *Annex* 1 for the list of countries). These economies have been selected based on their level of income per capita. To preserve the coherence of the sample, we have chosen mostly intermediate-income countries that are comparable with the economies of the MENA region.

[4] Another possibility could have been to use existing composite reform indicators. The *rating system* elaborated by the International Country Risk Guide (*ICRG*) could have presented some interest. Three types of indicators are available from 1984 to 1999:

a- an *economic risk* indicator, composed of 5 basic indicators: GDP per capita, Real GDP growth rate, annual inflation, budget as well as current account balance as a percentage of GDP.

b- a *financial risk* indicator, elaborated from 5 other basic indexes: foreign debt as percentage of GDP, exports of goods and services, current account balance as percentage of exports of goods and services, net international liquidity as months of imports cover, exchange rate stability.

c- a *political risk* indicator, composed of 12 different political indexes.

However because of (a) some disagreement regarding the choice of some basic indicators; (b) the short time period of availability of the series; and (c) the subjectivity attached to the aggregation of the initial indicators, we decided not to use these indexes, but instead to elaborate our own series.

[5] The *Bmp* indicator is traditionally a measure of the distortions on the capital markets, which can hinder the mobilization of resources for investing, especially in tradable goods. This indicator is also used as a proxy for real exchange rate (*RER*) misalignment, and particularly for *RER* overvaluation. In fact, many governments, to ration scarce foreign exchange to the private sector, use exchange controls. The excess of foreign exchange demand arising from the official exchange rate being kept below its market clearing level, leads to an overvaluation of the currency (see Pinto, 1990, for an analysis of the various foreign exchange market's distortions captured by *Bmp)*.

The second composite indicator, *external stability* (*ES*), is represented by:

- external debt as percentage of GNI (*DebExGni*), as well as of exports of goods and services (*DebExX*), which represent the risk to an economy of encountering difficulties in reimbursing its debt and facing a financial crisis; and

- current account in percentage of exports of goods and services (*CurAcX*), which gives another signal of the fragility of the external position of the country.

The third composite indicator, *structural reforms* (*SR*), embodies:

- an indicator of trade policy (*TradeP*), calculated as the ratio of imports plus exports to GDP, from which we have deducted the "natural trade openness" of the economies calculated by Frankel and Romer (1999),[6] as well as the exports of oil and mining products, which introduce a bias in the sample due to natural resource endowment. This indicator is based on the fact that trade reforms can be at the origin of economies of scale and of productivity gains, due to increased competitiveness and increased access to larger markets (Balassa, 1978; Feder, 1982); and

- private credit by deposit money banks and other institutions (in percentage of GDP, *PCrBOG*), as a proxy for the development of the banking system, which can have a positive effect on productivity due to a better selection of investment projects and to higher technological specialization through a diversification of risks (see Levine, 1997, for a synthesis).

The fourth composite indicator, *human capital* (*MH1),* is represented by the logarithm of:

- the infant mortality rate (*lMort*) as a proxy of the health conditions of the population; and
- the number of years of primary schooling of the population (*lH1*).

Both health and education increase the productivity of physical capital and can be at the origin of positive externalities (Lucas, 1988; Psacharopoulos, 1988; Mankiw, Romer, and Weil, 1992).[7]

The fifth composite indicator, *physical infrastructure* (*Phys*), is based on the logarithm of:

- the density of the road network (*lRoads,* in km per km2); and
- the number of telephone lines per 1000 people (*lTel*).

The complementarities among physical infrastructure and physical and human capital lead to higher productivity and increase the incentive to invest (see Barro, 1990 ; Aschauer, 1989 ; Murphy, Shleifer, and Vishny, 1989).

The principal components of these twelve basic indicators[8] were extracted for each group of indicators from an annual panel of 44 countries over 1970-80 to 1999.[9] The five composite indicators were then

[6] The "natural openness" of the economy is calculated by Frankel and Romer (1999) by taking into account the size and the distance of the markets of the countries concerned.

[7] We have also processed a more completed human capital indicator (*H)* that includes, as well, secondary and superior schooling (see *Annex* 2, Table A2.4.a). This indicator does not give better results when estimating the growth equation. We will, however will give some details on the outcomes in secondary and superior education in *Annex 6*.

[8] Fourteen in the case of the more complete human capital indicator (*H,* see *Annex 6)*.

[9] As part of our empirical work, we have tried, without success, to introduce in the principal component analysis the ratio of current account balance to GDP as a component of the macroeconomic stability index, the exchange rate stability as part

constructed as the weighted sum of one or two principal components, depending of the explanatory power of each component. We chose the most significant principal components whose eighenvalues were higher than one. In this case, we explain around 70 percent of the variance of the underlying individual indicators (see Tables A2.1 to A2.5 in *Appendix 2*). The weight attributed to each principal component corresponds to its relative contribution to the variance of the initial indicators (calculated from the cumulative R^2).[10] The contribution of each individual indicator to the composite indicator can then be computed as a linear combination of the weights associated with the one or two principal components and of the loadings of the individual indicators on each principal component *(see Appendix 11)*. The calculations show that all initial indicators contribute as expected to the composite indicators.[11]

3. Reforms in the MENA Countries

In this section, we analyze global performance in the areas of economic reform, human capital, and physical infrastructure in the five regions of our sample (MENA, Latin America, Asia, CFA Africa, and non-CFA Africa). We also analyze the performance of the seven MENA economies (the initial reform indicators are discussed in *anexes 3* through *7*). The MENA countries differed both among themselves and compared to the rest of the world. The main results of our analysis are discussed below.

3.1. Macroeconomic Reforms

With regard to macroeconomic reforms, some progress was made in the 1990s compared to the 1980s, when economies faced great instability. Most MENA countries adopted better macroeconomic policies, some in the late 1980s (*Morocco*, *Tunisia* and *Jordan*) and others in the 1990s, after a decade of regression (*Iran*, *Syria*, *Algeria, Egypt;* see Charts 1.1 and 1.2).[12,13] In the 1990s, some MENA countries *(Morocco*, *Tunisia Jordan,* and *Egypt)* undertook a level of macroeconomic reforms similar to the average of the South and East Asian economies.

---

of the external stability, the cumulated privatization receipts as a factor in the structural reforms, and the real exchange rate misalignment (see Nabli and Véganzonès-Varoudakis, 2002). Other interesting indicators had to be ignored because of the lack of information. This has been the case with the ratio M2 to GDP, the import cover of international reserves, the ratio of short-term to total debt, as well as the net international liquidity as months of import cover, which could have reinforced the external stability index. Similarly, our structural reform index could not benefit from information on mean tariff rates, or highest marginal individual and corporate taxes.

[10] In the case of macroeconomic stability, the first component is weighted by 40/72 and the second by (72-40)/72 (see *Appendix* 2 Table A2.1), where 40 is the explanatory power of the first principal component and (72-40) the explanatory power of the second one. These coefficients are normalized by dividing by 72, which corresponds to the percentage of the variance of the initial indicators explained by the two principal components selected.

[11] For a better reading of the graphs and the composite indicators, we have inverted the sign of the macroeconomic and external stability indexes. They can be interpreted now as the efforts to reform the economy. The same thing has been done for the human capital indicator (see signs of the initial and composite indicators in Tables A2.1 to A2.5, *Appendix* 2)

[12] We have listed the MENA economies in a decreasing order of welfare. The first countries presented in the graphs are the ones which exhibited the higher GDP per capita in the 1970s.

[13] Due to the methodology of calculation of principal component analysis, the level and sign of the aggregate indicators have no particular interpretation. These indicators have to be read as follows:

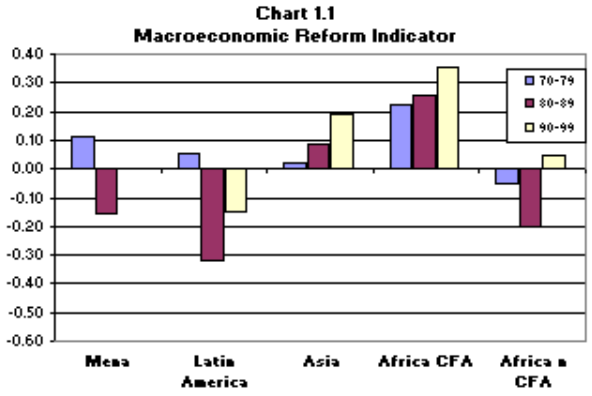
a- A rise in the indicator indicates a progress in reform. Conversely, a deterioration denotes a regression.
b- The intensity of reforms is measured as the difference of the indicator across countries and between periods.

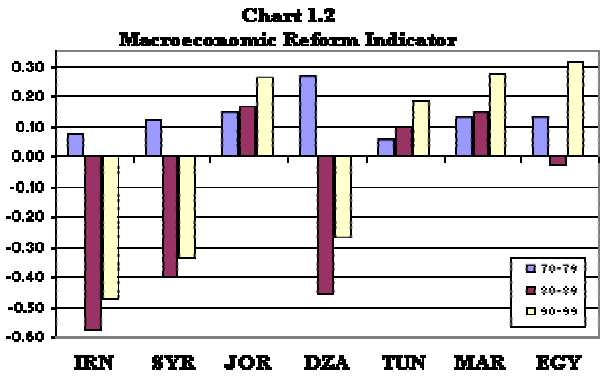
In the last section, we will use the annual growth rate of the composite as well as of the initial indicators to measure their impact on growth.

In the 1990s, inflation was successfully contained (particularly in *Morocco*, *Jordan,* and *Tunisia;* Chart 2.2 in *Annex 3*). The public deficit was reduced in all the countries (Chart 3.2 in *Annex 3*), and the foreign exchange parallel market premium was ended in the majority of the countries (Chart 4.2 in *Annex 3*).

Macroeconomic stability in the MENA region could, however, have been improved more compared to other regions – with the exception of Latin America, where stability was not achieved in the 1990s (see Chart 1.1). In *Tunisia* and *Morocco,* further progress would have reduced the public deficit, which has been higher than the MENA average (3.4 percent and 2.8 percent of GDP, on average, in the 1990s; see Charts 3.1 and 3.2 in *Annex 3*). In *Iran* and *Algeria*, the black market exchange rate (due to capital controls and political instability) and inflation (which reached 20 percent in the 1990s) should have been better controlled (see Charts 2.1, 4.1 and 2.2, 4.2 in *Annex 3*). This is also the case, to a lesser extent, for *Syria's* foreign exchange parallel market premium and for *Egypt's* inflation.

In fact, although macroeconomic policy has globally improved in MENA in the 1990s, efforts still need to be made, particularly in countries such as *Iran*, *Syria,* and *Algeria.*

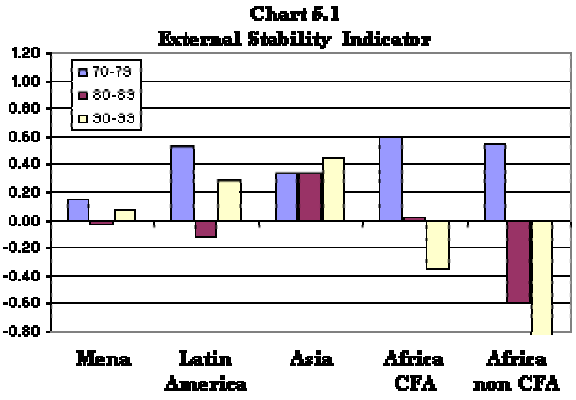


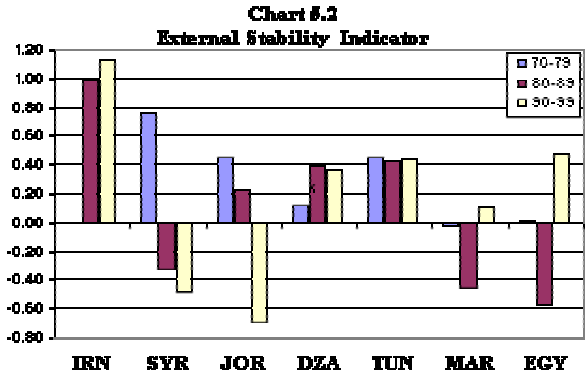


Source: Authors' calculations.

3.2. External Stability

In the area of external stability, the MENA countries in our sample performed rather poorly during the whole period, behind Latin America and Asia (see Chart 5.1).[14] This was largely due to the unsustainable level of foreign debt, which increased dramatically in the 1980s (see Charts 6.1 and 7.1 in *Annex 4*), because of the high public investment ratio of the 1970s and 1980s (see *Annex 8*). The exceptions were *Iran*, and to a lesser extent, *Tunisia* and *Algeria.*[15]





[14] These results are due partly to the exclusion of the *Gulf* economies, in which the average debt ratio has been lower.

[15] *Iran* could not find long-term loans in the international market. *Algeria* and *Tunisia* followed a more cautious policy.

Source: Authors' calculations.

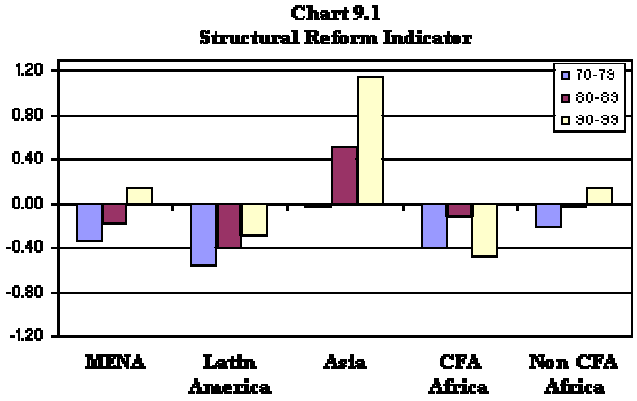
In the 1990s, the MENA countries' external debt accounted for 60 to 70 percent of GNI in *Morocco, Egypt*, *Algeria*, *Tunisia* (around 150 to 200 percent of exports), and more than 130 percent of GNI in *Syria* and *Jordan* (see Charts 6.2 and 7.2).[16] In the 1990s, *Morocco* and *Egypt* were the only two countries to reduce their external debt, following major debt forgiveness after the Gulf War.

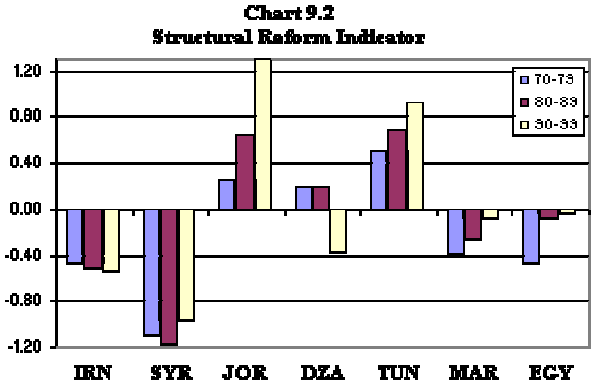
This situation indicates that significant scope for debt reduction exists in the region. Debt reduction is a concern shared by the majority of MENA countries in our sample; however, *Syria*, *Jordan* and, to a lesser extent, *Morocco* need to make a greater effort.

These difficulties in reducing the external debt have been partly compensated by improvements in the current account balance. In fact, MENA countries are among the best performers from all regions in terms of debt reduction (see Chart 8.1 in *Annex 4*). Even if only a few MENA economies exhibited a positive balance in the 1990s – this was the case for *Iran*, *Syria* and *Egypt* – efforts to reduce deficits are noticeable in almost every MENA country (except in *Jordan*).

3.3. Structural Reforms

In terms of structural reforms, the MENA countries seem, at a first glance, to have performed relatively well compared to the rest of the world, and were only surpassed by the Asian economies (see Chart 9.1). This result is largely due to the apparent high financial depth of the MENA economies. The ratio of private credit from the banking system and other institutions has averaged 35 percent during the 1980s and the 1990s. Financial depth has been particularly significant in *Jordan* and *Tunisia* (respectively 70 percent and 60 percent of GDP), but has improved almost everywhere — except in *Egypt*, *Iran* and *Algeria* in the 1990s (Chart 10.2 in *Annex 5*). This achievement has only been better in Asia, where the financial ratio reached, on average, 60 percent in the 1990s (see Chart 10.1 in *Annex 5*). Financial development has, however, been weaker in *Syria*, *Algeria,* and, to a lesser extent, *Iran* and *Egypt* in the 1990s.





Source: Authors' calculations.

Our findings do not mean that the MENA economies have benefited from a strong banking system or a developed financial sector. In fact, other studies highlight the deficiencies of the financial sector as an effective means of boosting the development of the private sector and the growth prospects of the region (Nabli, 2000). In this context, our results might be due to the fact that the proxy used (*PCrBOG)* was unable to capture either the quality of the banking system (which could be better analyzed through other specific indicators),[17] or the development of the financial markets (which have also been deficient in the MENA economies).

[16] The case of *Syria* has to be treated with caution because of the *Russian* debt.

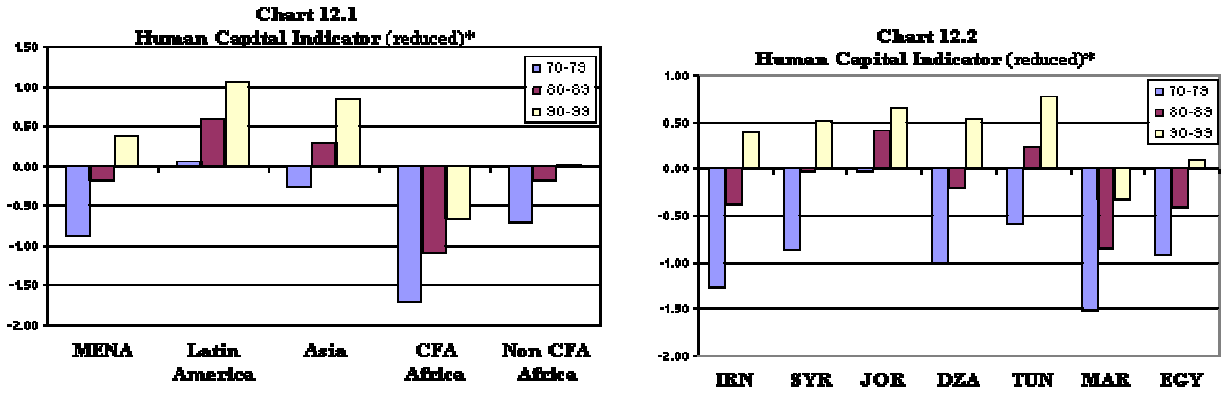
[17] These indicators could, for example, be the nature and the quality of the loans, the ratio of reserves of the banks, or the percentage of loans through private banks. If such indicators were taken into consideration, the picture of the banking

Trade openness has often been particularly low – with a ratio, on average, of about 30 percent of GDP, compared to 45 to 70 percent in Asia[18] – and rather similar to that of Latin America (Chart 11.1 in *Annex 5*). This is the case despite some exports diversification of the *non oil-producing countries* in the 1990s, which explains why trade openness has been rather high in *Jordan* and *Tunisia* (around 60 percent of GDP, Chart 11.2 in *Annex 5*). These countries (with *Morocco*) have been the most diversified of the region (*Table A-1* in *Annex 5*). Trade openness has remained weak in *Iran, Syria,* and *Algeria* (between 10 percent and 20 percent of GDP in the 1990s) due to their difficulties in moving from oil production and State-dominated management of their economies.[19] In these countries, the scope for improvement of trade policy is still very significant.

3.4. Human Capital

During the 1980s and the 1990s, MENA economies significantly improved their level of human capital. Good performances are noticeable throughout the region, and particularly in *Tunisia*, *Algeria*, *Syria,* and *Iran* (see Chart 12.2). If progress was one of the best across regions, however, the level of human capital in the 1990s was still lower than in Asia and Latin America (see Chart 12.1). This means that there are still large potential gains from the development of human capital in the region.

One important area of success has been the reduction of infant mortality. Mortality rates, which reached 30 per 1000 in the 1990s, were cut by two-thirds compared to the 1970s. Levels are now in line with Asia and Latin America. The highest achiever was *Egypt,* where the ratio of infant mortality fell six-fold during the same period. Because of its high initial level, this ratio is, however, still above MENA average. Noticeable efforts in this area were also made by *Iran*, *Algeria*, *Tunisia,* and *Morocco* (see Charts 13.1 and Chart 13.2 in *Annex 6*).



*This indicator includes infant mortality and primary schooling only.
Source: Authors' calculations

In the field of education, results have been mixed. Despite good progress, level of primary schooling has remained lower than in Asia, Latin America, and non-CFA Africa. *Tunisia* is the exception, with almost 5 years of primary schooling in the 1990s. Successful achievements were also realized by *Jordan, Algeria*, *Syria,* and *Iran* (about 4 years of schooling (see Charts 14.1 and 14.2 in *Annex 6.A*). On average, achievements were greater in secondary and superior education, where schooling was more in line with Asia and/or Latin America.

---

system would be different, with, in particular, a not always healthy sector, a very present State, and a slow pace of privatization *(*specifically in *Algeria*, *Egypt*, *Tunisia*, *Iran*, *Syria;* see Nabli, 2000).

[18] Our trade openness indicator excludes the "natural" openness of the economy (see Frankel and Romer, 1999), as well as the exports of oil and mining products.

[19] Trade policy should, however, be analyzed through other indicators, such as average tariffs and non-tariff barriers, which are not available on an yearly basis for a large sample of countries. By using these kinds of indicators from the mid-1980s and for a smaller sample of countries, Dasgupta, Keller and Srinivasan, (2002) have shown that trade policy in MENA countries has historically been among the most restrictive in the world.

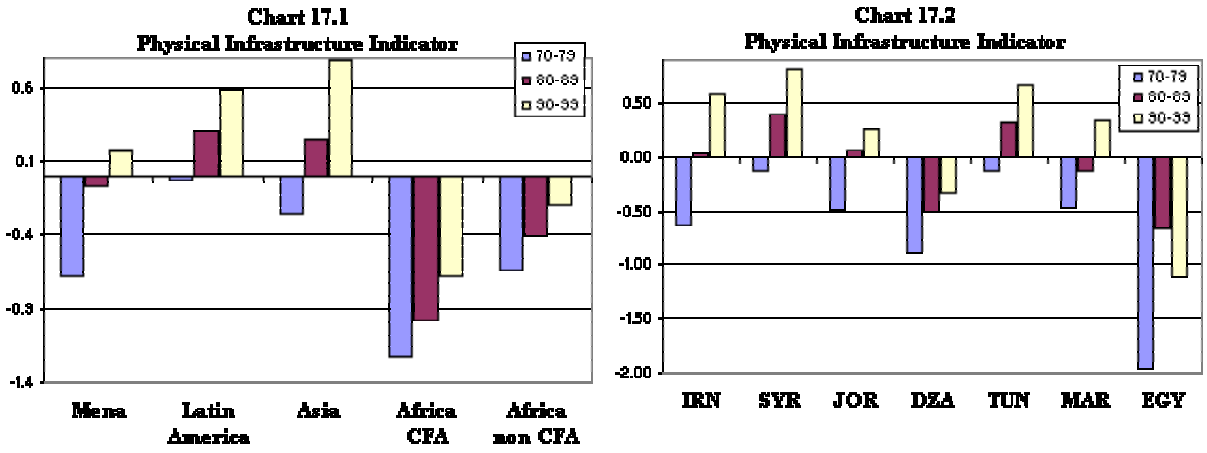
The performance of *Syria*, *Iran, Jordan,* and *Egypt* have been above the MENA average, with 1.5 to 2 years, and 0.6 years of schooling, respectively (but only 0.15 for superior education in the case of *Iran*, see Charts 15.1 and 16.1 in *Annex 6*). In summary, improvements are still needed in the field of education.

3.5. Core Infrastructure

Despite real progress throughout the period, MENA countries remain deficient in infrastructure. Here, again, there are large differences among the countries. For example, *Iran*, *Syria*, *Tunisia* and, to a lesser extent, *Morocco* have shown better achievements than other MENA economies (almost in line with Latin America and Asia, see Charts 17.1 and 17.2).[20]

The road network, in particular, has been very insufficient, with a density as low as in CFA Africa. Although a majority of countries have progressively improved their road infrastructure, the level was still low in *Jordan*, *Algeria,* and *Egypt* in the 1990s. Better progress was made by *Syria*, *Tunisia*, *Morocco,* and *Iran,* where construction equipment was rather equivalent to that in Latin America (but lower than in Asia; see Charts 18.1 and 18.2 in *Annex 7*).

The same observation can be made for the telephone network. Despite real improvements in almost all MENA countries, the level of equipment has remained deficient compared to Latin America and Asia (but far better than in Africa). Only *Iran*, *Syria* and *Jordan* have revealed a pattern similar to that in Latin America (see Charts 19.1 and 19.2 in *Annex 7*). Closing the gap with Asia remains a significant challenge.



Source: Authors' calculations.

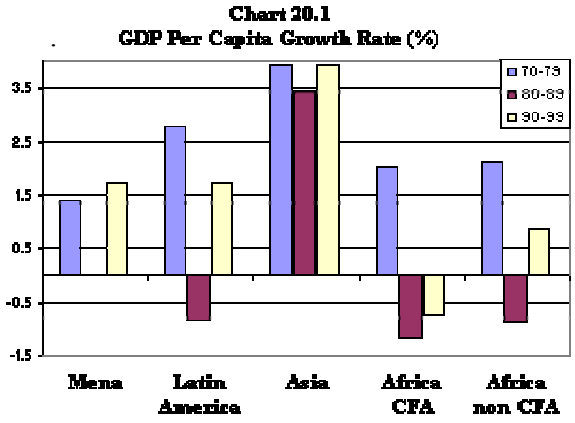
3.6. Growth Performance of the MENA Countries

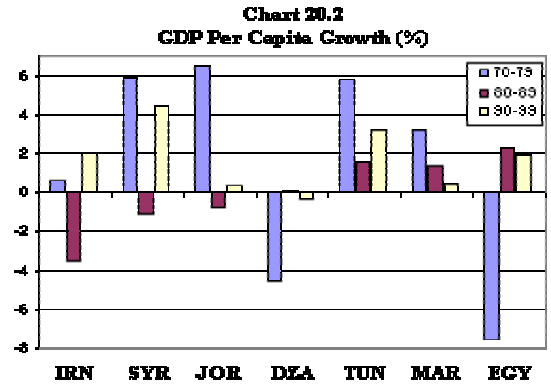
Despite some progress in various areas of reform, MENA countries have revealed a rather disappointing pattern in term of economic growth. Growth performance in almost all MENA countries improved during the 1990s, but GDP growth rates have been largely surpassed in the Asian economies (which reached 4 percent a year, on average, against 1.7 percent for the MENA countries; see Chart 20.1).

Syria and *Tunisia* achieved the best results of the group, with the GDP per capita growth rate reaching respectively 3.5 percent and 4 percent in the 1990s. *Egypt* and *Iran* follow with 2 percent increases. These results can be directly linked to the efforts of these countries in the areas of economic reforms, human capital,

[20] The analysis is, however, restricted by our limited number of indicators; that is to say, the road network on one side, and the number of telephone lines per 1000 population on the other side. Results would also have been different if we had included the *Gulf economies,* as well as other *oil producing* countries in our sample.

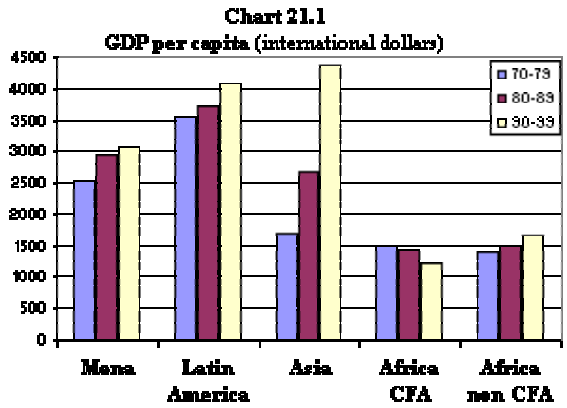
and physical infrastructure. *Tunisia* has performed rather well in all these fields of reform. *Iran* and *Syria* have greatly improved their endowment in human capital and core infrastructure. In addition, *Iran* and *Egypt* have shown a modest debt burden in the 1990s. *Egypt* has also made important progress in human capital development and macroeconomic stabilization.

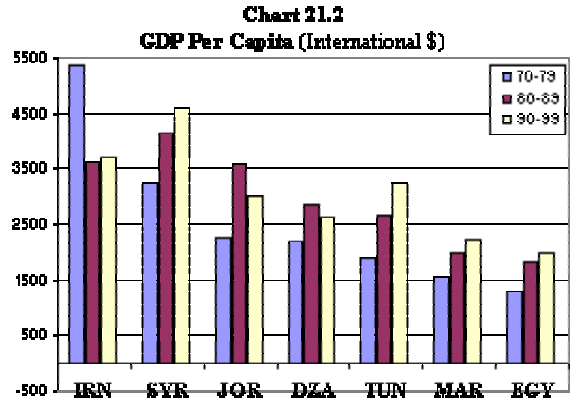




Source: Authors' calculations

Outcomes are, however, poor in the cases of *Jordan, Morocco* (which has shown a clear decreasing trend across the period), and *Algeria* (which has been affected by the fall in oil prices and the political turmoil of the 1980s and 1990s; see Chart 20.2). *Algeria* has been characterized by significant macroeconomic instability, an insufficient trade openness, low financial development, and deficiencies in physical infrastructure. *Jordan* has suffered from a high debt ratio and insufficient endowment in infrastructure. Despite a real effort to reform the economy, *Morocco* has still had to face high foreign debt, low financial development, and insufficient progress in trade openness, human capital development, and to a lesser extent, infrastructure development.





Source: Authors' calculations.

In fact, these low growth performances explain very well why our sample of MENA countries have lagged behind Asia and Latin America in terms of level of GDP per capita (Chart 21.1).

4. Economic Reforms, Human Capital, Physical Infrastructure, and Growth

This section addresses the link between economic reforms and economic growth. For this purpose, we have estimated a conditional convergence equation [*Equation (1)*] inspired by Barro and Sala-I-Martin (1995).

In this equation, the long-run GDP per capita growth rate [$\Delta\ln(y_{i,t})$] depends on the logarithm of the initial level of the GDP per capita [$ln(y_{i,t-1})$] – called the catch-up effect in the growth literature – as well as on other variables. These variables aim at explaining the differences across countries in the long-term level of GDP per capita. In our case, we have added – in addition to the ratio of investment to GDP, which represents the increase in the productive capacities of the economy – the composite economic reform indicators, as well as the physical infrastructure and human capital indicators.[21,22]:

$$\Delta\ln(y_{i,t}) = c + a*\ln(y_{i,t-1}) + b*l.\ln(Inv_{i,t}) + d1*(MS_{i,t}) + d2*(ES_{i,t}) + d3*(SR_{i,t})$$

$$+ e1*(Phys_{i,t}) + e2*(MH1_{i,t}) \quad (1)$$

with: - $y_{i,t-1}$ = GDP per capita of the previous period

- $Inv_{i,t}$ = investment ratio to GDP

- $MS_{i,,t}$ = macroeconomic stability indicator

- $ES_{i,,t}$ = external stability indicator

- $SR_{i,,t}$ = structural reform indicator

- $Phys_{i,,t}$ = physical infrastructures indicator

- $MH1_{i,t}$ = human capital indicator

- c = intercept, a, b, d_1 to d_3, e_1 to e_2, = parameters, t = time index and ε_t = error term.

A variant of this equation has consisted in introducing two multiplicative terms (*MS*SR* and *ES*SR*) to capture the possible complementarities among reforms [*Equation (2)*]. This case has been developed by Mussa (1987) and Williamson (1994), who have elaborated the idea that structural reforms are not efficient if the economy is not stabilized and/or if the external situation of the country is fragile. The multiplicative term also allows for capture of the reverse effect: the efficiency of external and macroeconomic stability increases with the level of structural reforms. This could be relevant to the MENA economies which reforms in some domains have been insufficient.

$$\Delta\ln(y_{i,t}) = c + a*\ln(y_{i,t-1}) + b*l.\ln(Inv_{i,t}) + d1*(MS_{i,t}) + d2*(ES_{i,t}) + d3*(SR_{i,t}) +$$

$$d4*(MS_{i,t*}\,SR_{i,tt}) + d5*(ES_{i,t*}\,SR_{i,t}) + e1*(Phys_{i,t}) + e2*(MH1_{i,t}) \quad (2)$$

[21] It is worth noting that the reduced form used here – which includes the ratio of investment to GDP – is derived from a log-linear approximation around the steady state of a Solow (1967) type growth model. This model has been extended by several authors by incorporating other explanatory variables in order to better explain the residual of the equation (called technical progress – see Mankiw, Romer, and Weil, 1992 – as far as human capital is concerned). In this paper, we have chosen the same approach and have introduced our reform indicators. We should, however, point out that reforms also materialize into growth by increasing the investment ratio. This should be kept in mind when analyzing our estimation results, which, in this context, may have underestimated the impact of reforms on growth.

[22] This method, consisting in directly introducing the initial reform indicators into the regressions, has been tried with less success. Because of the correlation of the disaggregated variables, the significance of some of the variables turned out to depend on the specification of the model. These initial tests have not been reported here because of the large number of combinations.

The existence of these two long-term relationships implies that variables of *Equations (1)* and *(2)* are cointegrated. We therefore determined the order of integration of the series. *Table A5-1* in *Annex 9* provides the results of the Augmented-Dickey-Fuller (ADF) tests of the data for our sample of countries from 1970-80 to 1999. We used the Im, Pesaran, and Shin (1997) methodology, which provides critical values of ADF tests in the case of heterogeneous panel data. The results indicate that series are generally stationary at the 1 percent level (5 percent in the case of human capital). This allowed us to run *Equations (1*) and *(2)* using the standard methods.[23]

Hence, *Equations (1)* and *(2)* describe the long-run relationship between growth and a number of economic reforms, human capital, and physical infrastructure indicators. *Equations (1)* and *(2)* have been estimated on our unbalanced panel of 44 developing countries. The results of the regressions – using the White estimator to correct for the heteroscedasticity bias – are presented in Table 1. To control for the sample heterogeneity, we have introduced country dummy variables. These variables reflect differences in the quality of institutions or the different endowment in natural resources,[24] which can be at the origin of large discrepancies in the "natural propensity" to grow.[25]

Estimated relationships between GDP per capita growth rates and the various independent variables are consistent with the theory. Increases in the investment ratio, in macroeconomic and external stability, in structural reforms, in physical infrastructure, and in human capital lead to higher growth rates.[26]

The impact of most variables on growth is, however, not instantaneous. This is the case with macroeconomic and external stability, as well as structural reforms (respectively one and two lags). This means that structural reforms need some time (two years, according to our estimations) to materialize into growth. As expected, the effects of macroeconomic and external reforms are faster (one year). The same conclusions can be drawn for human capital and physical infrastructure (no lag and two lags respectively).[27]

Another interesting feature can be drawn from the estimation of *Equation (2),* which corroborates the sequencing of reforms developed by Mussa (1987) and Williamson (1994). When introducing the multiplicative term *MS*SR (*macroeconomic multiplied by structural reforms), it turns out to be significant, while the structural reforms indicator alone (*SR*) is no longer significant (see Table 1). This result highlights the complementarity between macroeconomic stability and structural reforms.

On one side, the efficiency of structural reforms depends on success in stabilizing the economy. In an increasingly volatile environment, a high level of structural reforms increases the disruptive effect of macroeconomic instability. This means that structural reforms should take place at least at the same time as macroeconomic reforms, if not before.

---

[23] This is also the case because our sample is sufficiently "big" with *T* (number of time periods) and *N* (number of countries) being large enough (see Im, Pesaran, and Shin, 1997). In this case, despite the presence of the lag variable *y-1*, which is correlated with the constant terms, the distributions of the tests tend to converge.

[24] This applies in particular to the *oil-producing and mining economies* in our sample.

[25] This hypothesis is supported by the data, as shown by the value of the Fischer tests of equality of the intercepts across countries, as well as by the value of the Hausman tests as far as the random hypothesis is concerned (Table 1). Other estimations have consisted in testing the heterogeneity of the estimated relationship across regions, using the Gauss software. In particular, we have tested – without any success – the difference of slope of the economic reforms, human capital, and physical infrastructure indicators.

[26] Macroeconomic stability in *Equation (1),* and human capital in *Equations (1)* and *(2)* are significant at 10 percent level.

[27] In addition of the economic interpretation, the introduction of the lag reform variables has the interest of correcting for the potential bias linked to the endogeneity of the right hand variables. In this case, the reverse causality that might exist is not supposed to interact with and bias the value of the estimated coefficients.

Table 1: Estimation Results of the Long Term Growth Equations (1) and (2)

Dependent Variable $\Delta\ln(y_t)$

Independent Variables	Eq1	Eq2
$\ln(y_{t-1})$	-0.17	-0.17
	(8.62)	*(8.96)*
$\ln(inv_t)$	0.065	0.066
	(5.27)	*(5.38)*
$MS_t^{(1)}$	0.004*	0.028
	(1.76)	*(2.76)*
$ES_t^{(1)}$	0.03	0.027
	(5. 3)	*(3.95)*
$SR_t^{(2)}$	0.015	0.011**
	(2.05)	*(1.56)*
$MS_t^{(1)} * SR_t^{(2)}$		0.027
		(2.65)
$ES_t^{(1)} * SR_t^{(2)}$		0.006**
		(0.69)
$Phys_t^{(2)}$	0.03	0.031
	(2.07)	*(2.07)*
$MH1_t$	0.018 *	0.016 *
	(1.70)	*(1.66)*
Adjusted R^2	0.29	0.30
Fischer test	4.1	4.3
Hausman test	56.2	67.0

Note: Student *t* statistics are within brackets. The number of observations used in the regressions is 589. Data have been compiled from World Development Indicators *(WDI)*, Global Development Finance *(GDF)*, Global Development Network (*GDN),* and Live Data Base *(LDB)* (World Bank).

(**1**): one lag ; (**2**): two lags ; (*****): significant at 10 percent level ; (******): not significant .

Source: Authors' estimations

On the other side, the opposite is partially true. If stabilization programs are more successful when structural reforms are undertaken, and if the growth outcome of the macroeconomic stabilization is linked to the level of structural reforms (through the multiplicative term *MS*SR*), macroeconomic reform materialized into growth even in the absence of structural reforms (through the MS index alone). This stresses the importance of macroeconomic reforms for the growth prospects and the reform process of the countries.

Estimation of *Equation (2)* also reveals in another way the critical role of macroeconomic stability for the growth prospects of the economies. In fact, the coefficient of the macroeconomic reforms index alone in *Equation (2)* is higher and more significant than when estimating *Equation (1)* (see Table 1). In addition, the coefficient of the multiplicative term is of the same magnitude as that of the macroeconomic reforms index alone. This means that both effects are similarly significant. This will be illustrated in the next section, when calculating the contribution of each reform indicator to the economic growth of our sample of countries.

Finally, the robustness of our estimations can be evaluated by the fact that coefficients other than macroeconomic stability and structural reforms are similar in both estimations (see *Equations (1)* and *(2)*). In the rest of this document, we will focus on the results of *Equation (2)*, which gives a more complete picture of the relation between reform and growth.

5. Assessing the Impact of Economic Reform, Human Capital, and Physical Infrastructure on the Long-Run Growth Performance of the MENA Countries

As noted above, the use of aggregate indicators of economic reform, human capital, and physical infrastructure overcomes the difficulties of estimating the impact of a large number of indicators that may have collinear relationships. This method allows, in addition, for subsequent calculations of the contribution of the initial indicators to the growth performance of the countries. The calculation is based on the estimated coefficients of the aggregate indicators in the regression, as well as on the weights of each principal component in the aggregate indicator combined with the loadings of the initial variables in each principal component (see *Annex 10* for more details on the methodology).

5.1. Physical Infrastructure and Human Capital

Table 2 shows our estimates of the long-term coefficients/elasticities of the initial reform indicators (see Tables A11-1 and A11-2 in *Annex 11* for the short-term coefficients/elasticites). A number of conclusions can be drawn from these calculations.

First, improvements in human capital and physical infrastructure present a strong and approximately equal potential impact on growth. In both equations, primary education, along with the road network and the health conditions of the population, show the strongest elasticities. These variables appear to be key factors for the economic growth of our sample of countries. Although studies of the impact of core infrastructure on the growth performance of the economies rarely use physical indicators (such as the road or the telephone network),[28] our results are quite in line with the findings of some authors who have followed the same approach. Comparisons among studies are also difficult because of the differences of indicators and/or of specifications used.[29]

[28] Most of them employ aggregated indicators such as public investment.

[29] As far as the road network is concerned, Pouliquen (2000) – in his study of Indian infrastructure at the village level – found a short-term elasticity of 0.07 for the 1971-1981 period (here 0.03). Nagaraj, Varoudakis and Véganzonès (2000) obtained an elasticity of 0.05 at the Indian States level studied from 1970 to 1994, and Véganzonès (2001) found an elasticity of 0.06 for a panel of 87 countries during 1970-1995. Conversely, Nagaraj, Varoudakis and Véganzonès (2000) have come out with a long-term elasticity of 0.34 and Véganzonès (2001) of 0.16 (here 0.15).

The impact of the development of the telephone network has been evaluated by, among others, Canning (1999) for a large sample of countries during 1965-1990, using cross-countries regressions. Canning has estimated a short-term elasticity of 0.013 (here 0.019) and a long-term elasticity of 0.15 (here 0.10). Véganzonès (2001) has obtained a short-term elasticity of 0.007 and a long-term one of 0.18.

As far as education is concerned, Benhabib and Spiegel (1994) have estimated cross-countries regressions for the 1965-1985 period. They have obtained a short-term elasticity of 0.01 for total education (here 0.025 for primary education) and a long term one of 0.04 (here 0.14). Véganzonès (2001) has found a short term elasticity of 0.01 for primary education and a long term one of 0.19.

Infant mortality is an indicator rarely used in the growth literature, which focuses more on life expectancy. Nagaraj, Varoudakis, and Véganzonès (2000) have estimated a short-term elasticity of - 0.06 (here - 0.02) and a long-term elasticity of - 0.38 (here - 0.12). Véganzonès (2001) has obtained a short-term elasticity of - 0.02 and a long-term one of - 0.37.

Our comparisons are constrained by the indicators and/or specifications chosen. Other close interesting results can be found, for example, in Grace and others (2001), Bougheas, Demetriades and Mamuneas (2000), and Easterly and Levine (1997 and 2000).

Table 2: Economic Policy and Infrastructure Variables
Long-Term Coefficients/Elasticities

Index	Variables	Equation (1)	Equation (2)
MS alone [30]	***P***	-0.004	-0.025
	ln(*Bmp*)	-0.004	-0.029
	PubDef	-0.056	-0.443
ES	***DebExX***	-0.101	-0.089
	DebExGni	-0.003	-0.003
	CurAccX	0.453	0.396
SR[31]	***TradeP***	0.332	*0.230* *
	PCRBOG	0.363	*0.252* *
Phys	**ln(*Roads*)**	0.149	0.145
	ln(*Tel*)	0.106	0.104
MH1	**ln(*Mort*)**	-0.147	-0.123
	ln(*H1*)	0.169	0.142

* not significant.
Source : Authors' calculations.

In light of these results, achievements in human capital have constituted a clear engine of growth for our sample of MENA countries. As shown in Section 3.4, the MENA region has developed the level of education and the health conditions of its population to a large degree. It can be calculated from the long-term elasticities presented in *Table 2,* that improvement in primary schooling contributed an annual average of 0.3 to 0.4 points of GDP per capita growth rate in the 1980s and 1990s. For the amelioration of poor health conditions, the contribution is even higher due to more significant progress than in primary schooling; i.e., 0.8 and 0.5 points for each sub-period.

Globally, improvements in human capital have explained between 0.9 and 1.1 points of growth per capita per year since the beginning of the 1980s. This means that, without progress in human capital, GDP per capita annual growth rate would have been -1.1 percent in the 1980s (instead of 0 percent) and 0.8 percent in the 1990s (instead of 1.7 percent; see Table 3.1). This contribution is even higher in the case of *Iran*, *Syria,* and *Algeria,* due to the initial gap in primary schooling compared to other more advanced MENA countries (1.2 to 1.3 in the 1980s and 0.9 to 1.2 in the 1990s; see Table A12-5 in *Annex 12*).

[30] In *Equation (2)*, macroeconomic reforms impact growth through two channels: one is direct; the other one depends on the level of structural reforms. Elasticities/coefficients could not been calculated in this last case, due to the difficulties linked to the multiplicative term *(MS*SR)*. Nevertheless, the global impact of macroeconomic reforms will be assessed for our different countries/groups of countries through their contribution to growth (see below in this section 5).

[31] The impact of structural reforms in *Equation (2)* depends on the level of macroeconomic reforms. Consequently, due to the multiplicative term, coefficients of the structural reform variables will not appear here. As for macroeconomic stability, their impact will be calculated for the different regions/countries through their contribution to growth.

Table 3: Contribution of Reforms to the Growth Performance of the MENA Countries

3.1 The Impact of Human Capital

MENA Years	%	Primary Education	Health Mortality	Contribution of Human Capital	Growth of GDP per Capita
1980-89	*Annual*	2.8	-6.3		**0**
1990-99	*Growth Rate*	2.3	-4.5		**1.7**
	LT Elasticity	***0.14***	***-0.12***	***Total***	***Without H***
1980-89	*Contribution*	0.4	0.8	***1.1***	***-1.1***
1990-99	*to Growth*	0.3	0.5	***0.9***	***0.8***

Years	MENA	Asia	LA	ACFA	ANCFA
1980-89	**1.1**	**0.7**	**0.8**	**0.7**	**0.6**
1990-99	**0.9**	**0.7**	**0.7**	**0.6**	**0.4**

Source: Authors' calculations.

The contribution of infrastructure to growth also appears to be substantial, despite a relatively low level of equipment in our sample of MENA countries (see Section 3.5). This is due mainly to the rapid increase in the number of telephone lines, which annually has accounted for 0.7 points of the GDP per capita growth rate.[32] Globally, from the beginning of the 1980s, physical infrastructure has annually contributed from 1.0 to 1.4 points of the GDP per capita growth rate (see Table 3.2). This contribution has even been higher in *Iran* and *Syria* (around 1.8 and 1.5 respectively; see Table A12-5 in *Annex 12*).

3.2 Impact of Physical Infrastructure

MENA Years	%	Tel Lines	Roads Network	Contribution of Infrastructure	Growth of GDP per Capita
1980-89	*Annual*	7.2	3.0		**0**
1990-99	*Growth Rate*	7.5	1.8		**1.7**
	LT Elasticity	***0.10***	***0.15***	***Total***	***Without Phy***
1980-89	*Contribution*	0.8	0.6	***1.4***	***-1.4***
1990-99	*to Growth*	0.8	0.3	***1.0***	***0.7***

Years	MENA	Asia	LA	ACFA	ANCFA
1980-89	**1.4**	**1.5**	**0.9**	**0.4**	**0.6**
1990-99	**1.0**	**1.1**	**0.8**	**0.9**	**0.8**

Source: Authors' calculations.

This results implies that – due to the gap between MENA and other more advanced regions (Asia and/or Latin America) – the construction and rehabilitation of infrastructure can be seen (along with primary schooling) as an important potential source of growth for the MENA region.

The importance of human capital and physical infrastructure for the growth experience of the other regions is illustrated in tables 2.1 and 2.2. The rapid progression of the health conditions in MENA accounts for a higher contribution of human capital in that region than in other regions. However, this shows MENA's lag with regard to education and infrastructure compared to the other regions.

[32] The strong impact of the amelioration of the telephone network – which is, however, in line with the finding of other studies – might also be explained by the fact that this indicator, along with the road network, might also capture the impact of other infrastructures.

5.2. Macroeconomic Stability and Structural Reforms

Our calculations stress the significance of macroeconomic stability for the growth prospects of our economies. This result is confirmed by the experience of all the regions in our sample. As noted above, one part of this effect is direct, and the other part depends on the level of structural reforms. Table 3.3 summarizes these two effects, from which several conclusions can be drawn.[33]

During the 1980s, the macroeconomic volatility of MENA was disruptive to growth, due mainly to the sharp increase of the foreign exchange parallel market premium in some MENA countries (*Iran*, *Algeria,* and *Syria*).[34] Inflation and public deficit increased moderately but stayed at a relatively high level (especially in *Iran* and *Syria,* as well as in *Algeria* for inflation). Both the direct and indirect effects contributed negatively and with the same magnitude to growth (-0.6 to -0.7 points per year of GDP per capita growth, for a total of -1.3 points). This means that the negative effect of macroeconomic instability (essentially the black market premium) more than compensated for the positive impact of human capital or physical infrastructure (see Tables 3.1 and 3.2). This negative contribution was even higher in *Iran* and *Syria* (-2.6 and -2.4, respectively)

This finding stresses the importance of macroeconomic stability for the growth accomplishment of our economies, which is also illustrated by the experience of other regions in our sample. Inflation and public deficit in Latin America, and the public deficit and foreign exchange parallel market premiums in non CFA Africa, have contributed to the economic turmoil in these regions (-1.4 to -0.3 points, respectively, of the GDP per capita growth rate; see Table 3.3 and charts 2.1 to 4.1 in *Annex 3*).

In the 1990s, this result was reversed, and stabilization in our sample of MENA economies contributed positively to the region's growth performance.. Progress – which essentially concerned public deficit – could, however, has been more significant. The contribution of improved macroeconomic conditions reached only 0.4 points of GDP for the two effects (0.2 for the direct, 0.2 for the indirect). This can be explained by several factors.

3.3 Impact of Macroeconomic Stability

MENA	**%**	**p**	**bmp**	**PubDef**	**Contribution of**	**Growth of GDP**
Years					**Macroeconomic Stability**	**per Capita**
1980-89	*Annual*	*0.4*	22	*0.03*		**0**
1990-99	*Growth Rate*	*-0.2*	2.6	*-0.6*		**1.7**
	LTCoef/ Elasticity	***-0.025***	***-0.029***	***-0.443***	***MS alone***	***With*** ** ***Without*** *** ***MS***
1980-89	*Contribution*	*-0.01*	*-0.6*	*-0.01*	***-0.7***	***0.7***
1990-99	*to Growth*	*0.01*	*-0.1*	*0.26*	***0.2***	***1.5***

[33] As far as coefficients/elasticities are concerned, our results have also been compared to those of other studies. In the case of inflation, Barro (1996) – who studied a panel of 110 countries for 3 sub-periods between 1965 and 1990 – found a short-term coefficient of - 0.006 (here - 0.005). Guillaumont, Guillaumont-Jeanneney, and Varoudakis (1999) have estimated a short-term coefficient of - 0.006 and a long-term one of - .14 (here - 0.025) for a panel of 44 African countries studied on a 5-year average basis during 1960-1995.

In the case of public deficit, the same authors found a short-term coefficient of - 0.06 (here - 0.08) and a long-term one of - 0.14 (here - 0.43).

For the black market exchange rate premium, Easterly and Levine (1993), as well as Easterly, Kremer, Prichet and Summer (1993), obtained a short-term coefficient of - 0.004 (here - 0.005) for a panel of 115 countries studied during the 1960s, 1970s, and 1980s.

[34] This indicator is considered here as a proxy of various distortions in the economy.

	LTCoef/ Elasticity	-0.024	-0.028	0.427	MS*SR *	With** Without*** MS*SR
1980-89	Contribution	-0.01	-0.6	-0.01	-0.6	0.6
1990-99	to Growth	0.01	-0.1	0.25	0.2	1.5
					Total	With** Without*** MS
1980-89	Contribution	-0.02	-1.2	-0.03	-1.3	1.3
1990-99	to Growth	0.01	-0.15	0.5	0.4	1.3

* Without change in SR ** With MS in the case of a negative impact on growth *** Without MS in the case of a positive impact.

Years	MENA	Asia	LA	ACFA	ANCFA
1980-89	-1.3	0.1	-1.4	0.05	-0.3
1990-99	0.4	0.5	0.8	0.2	1.0

Source: Authors' calculations.

First, as noted in Section 3, the macroeconomic stability of the MENA economies, however successful, could have been further improved. This is the case with the foreign exchange parallel market premium in *Iran, Algeria,* and *Syria;* and, to a lesser extent, with inflation in *Iran*, *Algeria*, *Egypt, Syria;* and with public deficit in *Tunisia* and *Morocco*.

Second, our analysis has shown that structural reforms in MENA have always lagged behind the experiences of the most dynamic region of our sample (Asia), particularly during the high level of reforms of the 1990s. The slow pace of structural reform has been an important factor limiting the benefits of the macroeconomic stabilization. (The same conclusions can be drawn for CFA Africa; Table 3.3). The case of the MENA countries thus illustrates the complementarities between macroeconomic stability and structural reforms.

Third, the rather satisfactory level of inflation in the 1990s (except in *Iran* and *Algeria*) shows that improvements in inflation does not constitute an important source of growth.[35] In Latin America and non CFA Africa, an increase in macroeconomic stability is a greater contributing factor to the growth outcome of the period (respectively 0.8 and 1 point of GDP per capita growth per year, on average; see Table 3.3).

Consequently, the disappointing economic performances of our sample of MENA countries seems to be due, in the first instance, to a lack of reforms of their economies (macroeconomic in the 1980s, structural and to a lesser extent macroeconomic in the 1990s); as well as to the weak effect of macroeconomic reforms when undertaken in a context of few structural reforms. This confirms that both the macroeconomic stability and the structural reforms of the MENA region still have to progress in order to catch up with Asia and contribute to the growth prospects of the region.

3.4- Impact of Structural Reforms
*(Structural Reforms *Macroeconomic Stability: SR*MS*)*

MENA Years	%	TradeP*MS*	PCrBOG*MS*	Contribution of Structural Reforms	Growth of GDP per Capita
1980-89	Annual	-0.1	0.8		0
1990-99	Growth Rate	0.7	0.01		1.7
	LT Coefficients	0.24	0.27	Total	Without SR
1980-89	Contribution	-0.03	0.2	0.2	-0.3
1990-99	to Growth	0.2	0.0	0.2	1.5

[35] Our model does not capture the impact of some reforms through an increase of the investment ratio. This might explain the rather low impact of inflation and, to a lesser extent, of public deficit, both of which are expected to be disruptive to investment.

* Without change in macroeconomic reforms;

Years	MENA	Asia	LA	ACFA	ANCFA
1980-89	0.2	0.9	0.2	0.1	0.2
1990-99	0.2	0.7	0.3	-0.3	0.3

Source: Authors' calculations.

Conversely, the contribution of structural reforms — 0.2 points of GDP per capita growth rate during the two sub-periods, despite a low level of reforms, as well as the macro instability of the 1980s, which has limited the impact of structural reforms on growth (see Table 3.4) — leads us to think that structural reforms are potentially a key factor in the growth prospects of the MENA region. This is confirmed by the strong contribution of structural reforms to the growth performances of the Asian countries (0.7 to 0.9 points, see Table 3.4), as well as by the experience of *Tunisia* and *Jordan* (0.5 to 0.7 points, Table A12-4 in *Annex 12*). The important gap with Asia in this domain constitutes another important potential source of growth for the region.

5.3. External Stability

As far as external stability is concerned, the volatility of the 1980s strongly contributed to the economic turmoil of the period. The increase of the debt ratio related to the exports of goods and services (*DebX*) led, on average, to a deterioration of 1 point of the annual GDP per capita growth rate (see Table 3.5). This deterioration has been even stronger in *Syria* (2.4 points, Table A12-2 in *Annex 12*). Globally, unbalances in the field of external stability cost the MENA countries an average of 1 point per year of GDP per capita growth rate. This means that the growth performance of the region could have reached 1 percent on average per year (instead of 0 percent).

3.5- Impact of External Stability

MENA Years	%	DebX	DebGNP	CurAcc	Contribution of External Stability	Growth of GDP per Capita
1980-89	*Annual*	*9.9*	*3.8*	*-0.3*		0
1990-99	*Growth Rate*	*-1.8*	*1.4*	*2.1*		1.7
	LT Coefficients	***-0.089***	***-0.003***	***0.396***		***With/Without ES***
1980-89	*Contribution*	*-0.9*	*-0.01*	*-0.1*	***-1.0***	***1***
1990-99	*to Growth*	*0.2*	*-0.004*	*0.8*	***1.0***	***0.7***

Years	MENA	Asia	LA	ACFA	ANCFA
1980-89	-1.0	0.2	-1.4	-1.0	-1.9
1990-99	1.0	0.5	0.9	-0.9	-0.2

Source: Authors' calculations.

During the 1990s, the process of debt reduction contributed positively to the growth performance of the region (0.2 point per year of GDP per capita). This low contribution, however, and the gap with other regions (Asia in particular), indicate that this process represents an important potential source of growth.

Special attention needs to be drawn to the current account balance. The strong long-term coefficient potentially makes this variable a key factor that can lead to large variations in the rate of growth of the economies. This was the case in the 1990s, when improvement in the current account position contributed substantially to the growth performance of the region (0.8 point of GDP per capita growth rate). This improvement was even higher in *Egypt* (1.3 points) and *Iran* (1 point). During this period, in fact, MENA showed the best performance among the regions. Table 3.5 also confirms that external stability has constituted a key factor in explaining the growth achievement of all the regions of our sample.

5.4. Summary

Table 3.6 summarizes the global impact of economic reforms, human capital, and physical infrastructure on the growth performance of our sample of countries. The macroeconomic and external instability of the 1980s participated strongly in the low growth of our MENA economies. These factors contributed to lowering the annual GDP growth rate by 2.2 points; i.e., growth could have reached 2.2 percent per year (instead of 0 percent) if no degradation of the macroeconomic and external conditions had occurred. This negative contribution has even been stronger in the case of *Syria* (-5.4 points) and *Iran* (-2.6 points for macroeconomic stability alone).

As far as positive contributions are concerned, human capital, physical infrastructure, and, to a lesser extent, structural reforms contributed during the same period to a 2.7 point annual average of GDP per capita growth rate. This positive influence more than compensated the negative impact of insufficient macroeconomic and external reforms. This positive contribution was even higher in the case of *Tunisia*, *Iran* (3.1 points) and *Syria* (2.8 points).

3.6. Summary

%	Contribution to growth			
Years	MS+ES	H+Phy+SR	Investment	Total
1980-89	-2.2	2.7	-0.3	0.1
1990-99	1.4	2.1	-0.1	3.4

Total contribution to growth	MENA	Asia	LA	ACFA	ANCFA
1980-89	0.1	3.6	-1.0	0.2	-1
1990-99	3.4	3.6	3.5	0.4	2.4
GDP per capita growth rate					
1980-89	0	3.4	-0.8	-1.2	-0.9
1990-99	1.7	3.9	1.7	-0.8	0.9

Source: Authors' calculations

In the 1990s, economic reforms, human capital, and physical infrastructure together explain the improvement in the economic situation in our sample of MENA countries. Human capital and physical infrastructure still contributed the most (1.9 points of GDP per capita growth rate, compared to the observed rate of 1.7 percent), followed by macroeconomic and external stability (1.4 points of GDP per capita growth rate).[36] This finding reflects the efforts of the MENA countries to reform their economies. However, reforms have still lagged behind Asia and Latin America. Indeed, the low contribution of structural reforms, the still high debt ratio, the foreign exchange parallel market premium in some countries, and the low development of infrastructure and primary schooling compared to Asia and Latin America, highlight the urgent need to focus more on these fundamental reforms.

6. Conclusion

Our empirical analysis has clearly revealed the importance of economic reforms, human capital, and physical infrastructure for the growth prospects of the economies. These factors have shown a strong effect on growth, and have contributed greatly to the growth process in our sample of MENA countries.

[36] The relatively high potential growth of the 1990s (3.4 percent compared to 1.7 observed), contrary to the 1980s, shows that some adverse factors to growth have not been taken into consideration in our regressions. These factors could be, for example, political stability or the quality of institutions, which could have deteriorated in some countries such as *Algeria*, *Iran,* or even *Egypt (*see *Table A12.7* in *Annex 12)*.

Success in reducing infant mortality has been highlighted in most MENA economies; and progress in education has been almost of the same magnitude as in Asia and Latin America. Improvements in human capital have contributed to an average annual increase of 0.9 to 1.1 points of the GDP per capita growth rate. However, the level of education in MENA has remained lower than in Asia and Latin America. This gap represents a potential for growth, particularly in the context of economic diversification and integration with the world market (with the European Union, in particular). A more qualified labor force will be needed to accompany the structural reforms of the economies and the growth prospect of the region. This is particularly the case for *Morocco* for primary education; and for *Morocco*, *Algeria,* and *Tunisia* for secondary and tertiary education. Thus education should be an important factor in the reform agendas of the MENA economies.

Even if infrastructure has not been sufficiently developed – the road network in particular is insufficient in *Egypt, Algeria,* and *Jordan* – good progress in the telephone network accounts for the high participation of physical infrastructure in the region's economic accomplishments (the telephone network in *Egypt, Algeria,* and *Morocco,* however, has remained deficient). The contribution of infrastructure development to the GDP per capita growth rate has averaged 1 to 1.4 points per year. However, the availability of infrastructure has still been lower than in Asia and Latin America. This factor, too, should not be neglected if the MENA region wants to increase its productivity gains and be able to compete internationally.

Our analysis has also revealed the importance of macroeconomic reforms for the growth prospects of the economies. On one side, this effect is direct. On the other side, the absence of macroeconomic reforms hinders the positive impact of structural reforms on growth. This makes macroeconomic stability a key variable for the reform process and for the growth prospects of the developing world. Our findings illustrate the complementarities among these and other reforms, as elaborated by Mussa (1987) and Williamson (1994).

Most MENA countries undertook better macroeconomic policies beginning in the 1980s (*Morocco*, *Tunisia, Jordan*), or in the 1990s after a decade of regression (*Iran*, *Syria*, *Algeria, Egypt*). However, the reforms have been insufficient if the region wants to compete with more successful economies, such as the Asian economies. The black market exchange rate premium has remained high in *Algeria, Iran,* and *Syria*. In *Algeria* and *Iran,* inflation should have been better controlled. In *Morocco* and *Tunisia*, the public deficit could have been further reduced. However, any reduction of public spending should not be at the expense of the development of physical infrastructure, health, and education, all of which contribute to growth.

In the 1980s, macroeconomic instability represented a high cost for the growth performance of the region and explained a shortfall of 1.3 points of the GDP per capita growth rate – half directly and half through the failure of structural reforms. This negative indirect impact of insufficient macroeconomic reforms needs to be stressed if the region wants to undertake successful structural reforms and compete with the fast-growing economies.

In the present context of better macroeconomic stability, structural reforms should be deepened in order to strengthen and increase the achievements in the field of macroeconomic reforms. This is also the case because the contribution of structural reforms to the growth performance of the economies has been shown to be high. Efforts should be made toward opening trade – the level of commercial openness being one of the lowest among the regions. This is particularly the case for *Iran, Syria,* and *Algeria*, which have had difficulties diversifying from mainly oil production and the State-dominated management of their economies. Achievements are better in the *non-oil-producing countries* which have successfully diversified their exports (*Jordan*, *Tunisia, Morocco*). Efforts toward developing the financial system have also to be made by *Syria*, *Iran*, *Algeria*, *Morocco,* and *Egypt*.

Finally, in the field of external stability – even though sizeable efforts have been made in renegotiating the external debt – significant scope for debt reduction still exists in the region. This is particularly the case for *Syria*. But efforts can also be made by *Morocco*, *Algeria*, *Jordan,* and *Egypt*. Our estimations show that this is one of the most important factors for the growth accomplishment of the economies, since the increase in the debt burden has, in the past, cost MENA countries nearly 1 % of annual per capital growth.

References

ASCHAUER, D.A. (1989a), "Is Public Expenditure Productive?" *Journal of Monetary Economics*, Vol. 23, pp. 177-200, May.

BALASSA, B. (1978), "Exports and Economic Growth-Further Evidence," *Journal of Development Economics*, Vol. 5.

BARRO, R.J. (1990), "Government Spending in a Simple Model of Endogenous Growth," *Journal of Political Economy*, Vol. 98, No 5, part II, S103-S125, October.

BARRO, R.J. (1996), *Determinants of Economic Growth: A Cross-Country Empirical Study,* Working Paper Series, No 5698. National Bureau of Economic Research, August.

BARRO, R.J. and X. SALA-I-MARTIN (1995), *Economic Growth*. New York: McGraw–Hill.

BENHABIB, J. and M.M. SPIEGEL, (1994), "The Role of Human Capital in Economic Development: Evidence from Aggregate Cross-Country Data," *Journal of Monetary Economics*, Vol.34, No 2, pp. 143-173, October.

BOUGHEAS, H., P.O. DEMETRIADES and T.P. MAMUNEAS (2000), "Infrastructures, Specialization and Economic Growth," *Canadian Journal of Economics*, pp. 506-522, May.

CANNING, D. (1999), "Telecommunications, Infrastructures, Human Capital and Economic Growth," *Discussion Paper,* No 55, Consulting Assistance on Economic Reform II, September.

DASGUPTTA, D., J. KELLER and T.G. SRINIVASAN (2002), "Reforms and Elusive Growth in the Middle East: What Has Happened in the 1990s?" Middle East and North Africa Working Paper Series, No 25, World Bank, Washington D.C., July.

DE GREGORIO, J. (1992), "The Effects of Inflation on Economic Growth: Lessons from Latin America," *European Economic Review*, Vol. 36, No. 2/3, April.

EASTERLY, W. and R. LEVINE (1993), "Is Africa Different? Evidence from Growth Regressions," internal document, World Bank, Washington, D.C., April.

EASTERLY, W. and R. LEVINE (1997), "Africa's Growth Tragedy: Policies and Ethnic Divisions", *Quarterly Journal of Economics*, Vol. 50, No 3, pp. 112-120, November

EASTERLY, W. and R. LEVINE (2000), "It's not factor accumulation: stylized facts and growth models", *IMF Seminar Series*, No. 2000-12, pp. 1-52, March.

EASTERLY, W., N. LOAYZA and P. MONTIEL (1997), *Has Latin Americas's Post-Reform Been Disappointing?* Policy Research Working Paper, No 1708, World Bank, Washington D.C.

EASTERLY, W., M. KREMER, L. PRICHET, and L. SUMMER (1993), "Good Policy or Good Luck: Country Growth Performance and Temporary Shocks," *Journal of Monetary Economics*, Vol. 32, pp. 459-483.

FEDER, G. (1982), "On Exports and Economic Growth," *Journal of Development Economics*, Vol. 12, No 1/2.

FISCHER, S. (1993), *The Role of Macro-economic Factors in Growth*, Working Paper N. 4565, National Bureau of Economic Research.

FRANKEL, J.A. and D. ROMER (1999), "Does Trade Cause Growth," *The American Economic Review*, Vol. 89, No 3.

GRACE, J., C. KENNY, J. LIU, C. QIANG and T. REYNOLDS (2001), "Information and Communication Technologies and Broad-Base Development: A Partial Review of Evidence," World Bank, Washington D.C., February.

GUILLAUMONT, P., S. GUILLAUMONT-JEANNENEY and. A. VAROUDAKIS, (1997), *Economic Policy Reform and Growth Prospects in Emerging African Economies,* Technical Paper, No 145, OECD Development Center, Paris.

IM, K. S., M. H. PESARAN and Y. SHIN, (1997), "Testing for Unit Roots in Heterogeneous Panels," *DAE Working Paper Amalgamated Series*, No 9526, University of Cambridge.

ICRG (1999), *Brief Guide to the Rating System,* International Country Risk Guide, Political Link Service Group, New York.

LEVINE, R. (1997), "Financial Development and Economic Growth: Views and Agenda," *Journal of Economic Literature*, Vol. 35, pp. 688-726.

LEVINE, R. and S. ZERVOS (1993), *Looking at the Facts. What We Know about Policy and Growth from Cross-Country Analysis,* Policy Research Working Paper, No 1115, World Bank, Washington, D.C..

LUCAS, R.E. (1988), "On the Mechanism of Economic Development," *Journal of Monetary Economics*, No 22.

MANKIW, N.G., D. ROMER and D.N. WEIL (1992), "A Contribution to the Empirics of Economic Growth," *Quarterly Journal of Economics*, Vol. 107, No 2, pp. 407-427, May.

MURPHY, K.M., A. SCHLEIFER and R.W. VISHNY (1989), "Industrialization and the Big Push," *Quarterly Journal of Economics*, Vol. 106, No 2, pp. 503-530, May.

MUSSA, M. (1987), " Macroeconomic Policy and Trade Liberalization: Some Guidelines," *Research Observer*, World Bank, Vol. 57, No 6, November.

NABLI, M.K. (2000), "From a Growth Crisis to Prospects for a Strong Growth Recovery in the MENA Region," internal document, MNSED, World Bank, Washington D.C.

NABLI, M.K. and M-A VEGANZONES-VAROUDAKIS, (2002), "Exchange Rate Regime and Competitiveness of Manufacture Exports: The Case of MENA Countries", in *Trade Policy and Economic Integration in the Middle East & North Africa: Economic Boundaries in Flux*, Hassan Hakimian and Jeffrey B. Nugent (eds.), London: Curzon-Routledge.

NAGARAJ, R., A. VAROUDAKIS and M.A. VEGANZONES (2000), "Long-Run Growth Trends and Convergence Across Indian States: The Role of Infrastructures," *Journal of International Development*, Vol.12, No 1, pp. 45-70, January.

PINTO, B. (1990), "Black Market Premium, Exchange Rate Unification and Inflation in Sub-Saharan Africa," *The World Bank Economic Review*, Vol. 3, No 3.

POULIQUEN, L. (2000), "Infrastructure and Poverty," internal document, World Bank, Washington, D.C..

PSACHAROPOULOS, G. (1988), *Economics of Education: Research and Studies*. Elmsford, New York: Pergamon Press.

SOLLOW, R. M. (1956), "A Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics*, Vol. LXX, pp. 65-94.

VEGANZONES-VAROUDAKIS, M.A. (2001), "Infrastructures, investissement et croissance : nouvelles évidences empiriques," *Revue d'Economie du Développement*, No 4, pp 31-46**.**

WILLIAMSON, J. (1994), *The Political Economy of Policy Reforms*, Institute of International Economics, Washington, D.C.

Annex 1

List of countries in the sample

MENA	AFRI CA		ASIA	LATIN AMERICA
	CFA	***Non CFA***		
Algeria *(DZA)*	Burkina Faso *(BFA)*	Botswana (*BWA*)	Bangladesh *(BGD)*	Argentina *(ARG)*
Egypt, Arab Rep. *(EGY)*	Cote d'Ivoire *(CIV)*	Ghana (*GHA*)	Indonesia *(IDN)*	Bolivia *(BOL)*
Iran, Islamic Rep.*(IRN)*	Gabon *(GAB)*	Kenya (*KEN*)	India *(IND)*	Brazil *(BRA)*
Jordan *(JOR)*	Cameroon *(CMR)*	Madagascar (*MDG*)	Korea, Rep.(*KOR)*	Chile *(CHL)*
Morocco *(MAR)*	Gambia, The *(GMB)*	Mauritius (*MUS*)	Sri Lanka *(LKA)*	Colombia *(COL)*
Syrian Arab Republic *(SYR)*	Niger (*NER)*	Malawi (*MWI*)	Malaysia *(MYS)*	Costa Rica *(CRI)*
Tunisia *(TUN)*	Togo *(TGO)*	Nigeria (*NGA*)	Pakistan *(PAK)*	Ecuador *(ECU)*
		South Africa (*ZAF*)	Philippines *(PHL)*	Guatemala *(GTM)*
		Zambia (*ZMB*)	Thailand *(THA)*	Mexico *(MEX)*
				Peru *(PER)*
				Paraguay *(PRY)*
				Uruguay *(URY)*

Annex 2 : Principal Component Analysis

Table A2.1 : Macroeconomic Stability Variables

Component	Eigenvalue	Cumulative R^2
P1	1.19	0.40
P2	0.96	0.72
P3	0.85	1

Loadings	P1	P2	P3
P	0.48	0.86	0.19
lBmp	0.72	-0.16	-0.68
PubDef	-0.67	0.45	-0.60

MS* = 0.40/ 0.72*P1* + (0.72-0.40)/ 0.72****P2***

****

Table *A2.2*: External Stability Variables

Component	Eigenvalue	Cumulative R^2
P1	1.92	0.65
P2	0.81	0.92
P3	0.25	1

Loadings	P1	P2	P3
DebExX	0.92	0.03	0.37
DebExGni	0.76	0.60	-0.26
CurAccX	-0.71	0.67	0.21

ES = P1

****

Table *A2.3*: Structural Reform Variables

Component	Eigenvalue	Cumulative R^2
P1	1.49	0.75
P2	0.51	1

Loadings	P1	P2
TradeP1	0.86	0.50
PCRBOG	0.86	-0.50

SR = P1

****

Table *A2.4.A*: Human Capital Variables
(complete)

Component	Eigenvalue	Cumulative R^2
P1	2.95	0.74
P2	0.50	0.87
P3	0.34	0.95
P4	0.19	1

Loadings	P1	P2	P3	P4
ln(Mort)	0.79	0.59	0.15	0.08
ln(H1)	-0.84	0.34	-0.43	0.04
ln(H2)	-0.91	-0.005	0.26	0.32
ln(H3)	-0.89	0.21	0.27	-0.29

H = P1

Table *A2.4.B.*: Human Capital Variables
(reduced)

Component	Eigenvalue	Cumulative R^2
P1	1.52	0.76
P2	0.48	1

Loadings	P1	P2
ln(Mort)	0.87	0.49
ln(H1)	-0.87	0.49

MH1 = P1

****

Table *A2.5*: Physical Infrastructure Variables

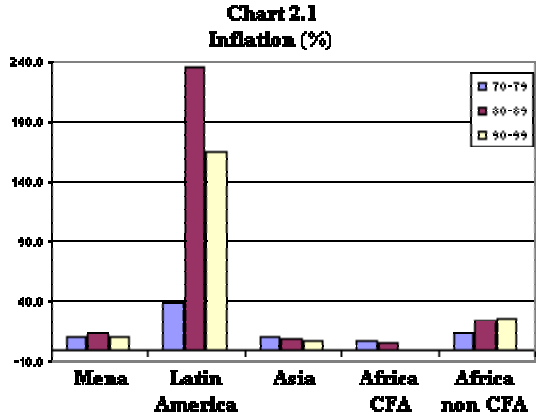
Component	Eigenvalue	Cumulative R^2
P1	1.42	0.71
P2	0.58	1

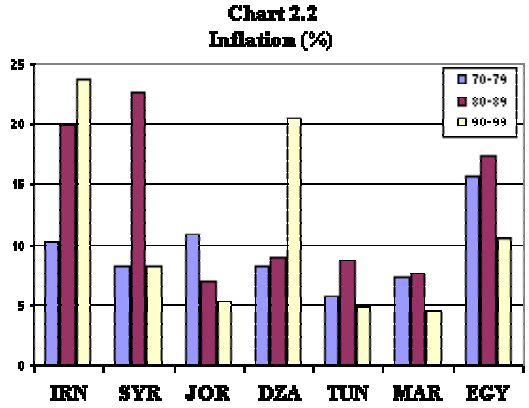
Loadings	P1	P2
ln(Roads)	0.84	0.54
ln(Tel)	0.84	-0.54

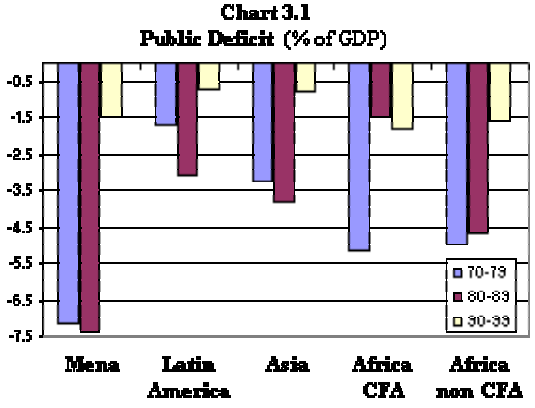
Phys = P1

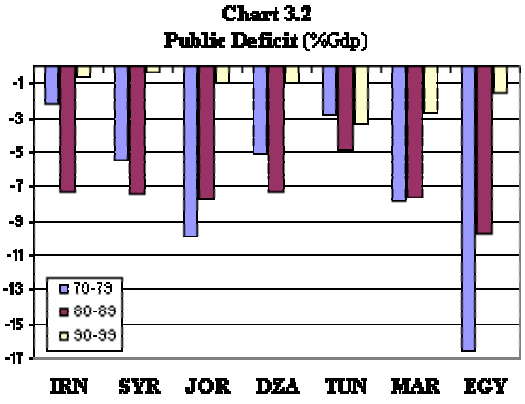
Annex 3: Macroeconomic Stability Indicators

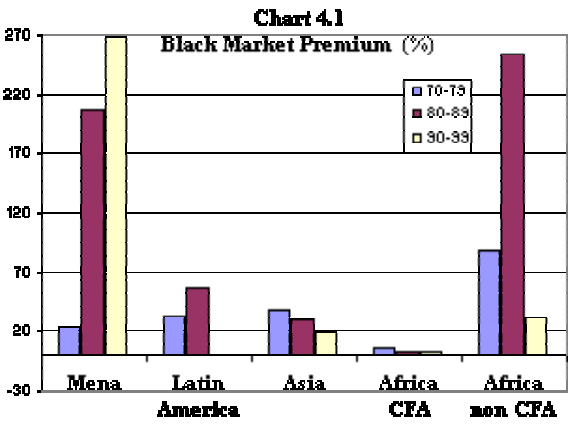
(*Source*: Authors' calculations)

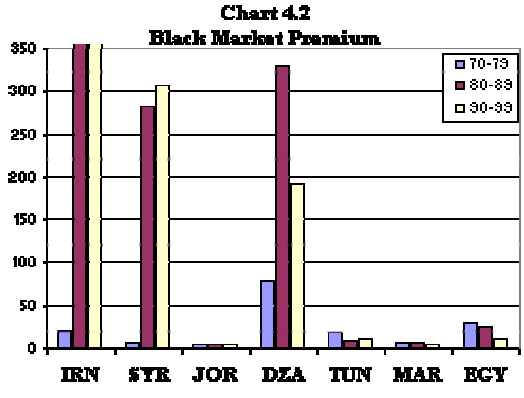






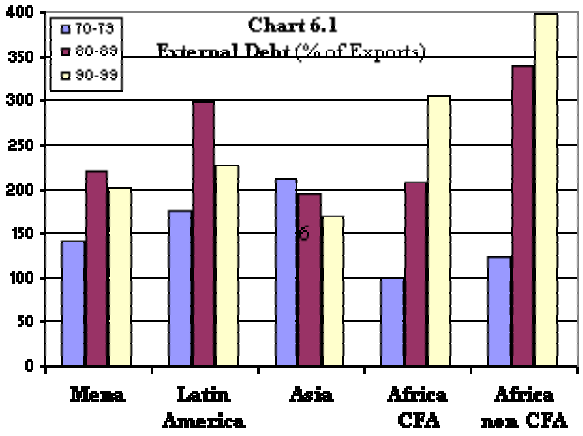


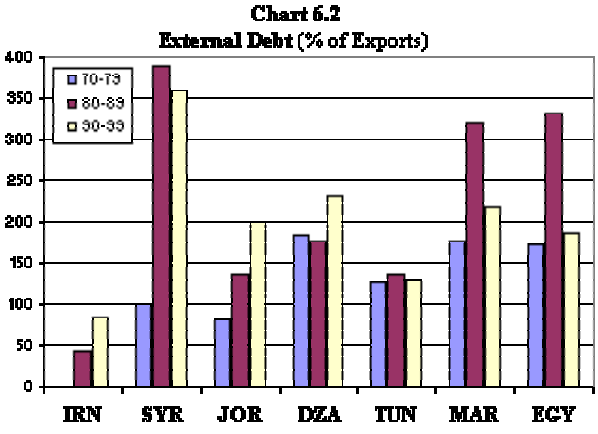


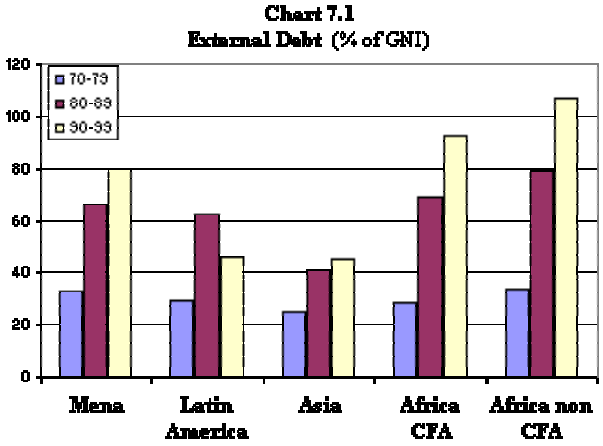


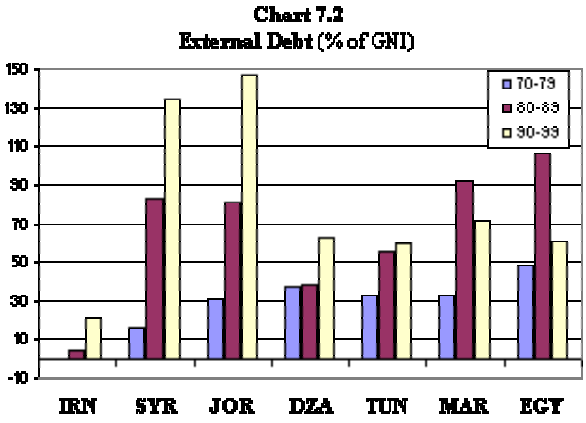
Annex 4: External Stability Indicators

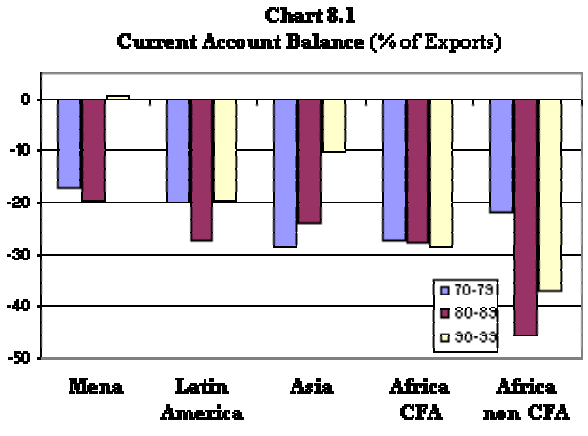
(*Source*: Authors' calculations)

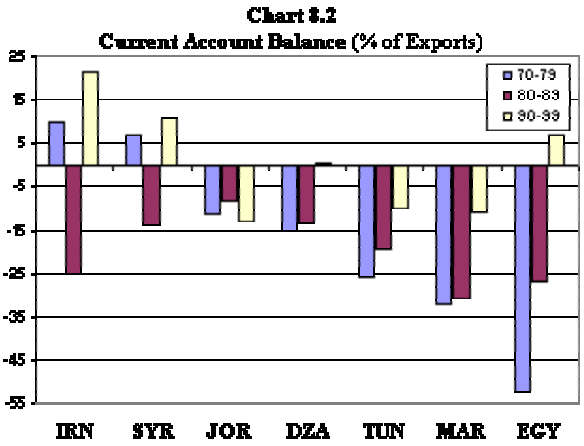






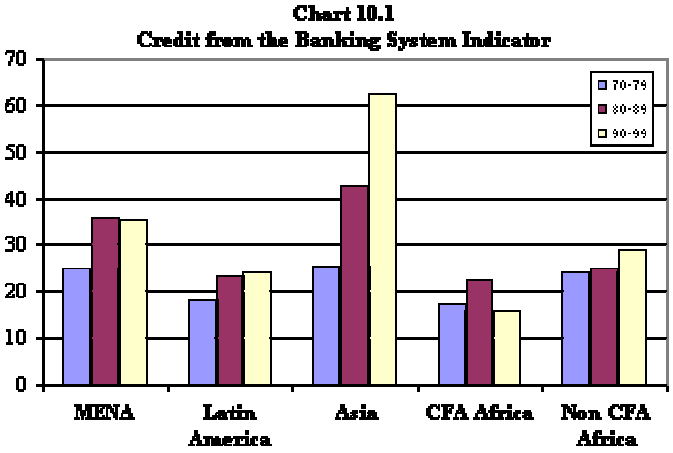


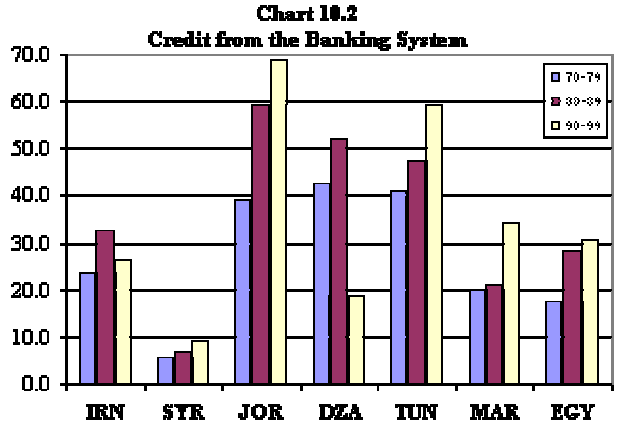


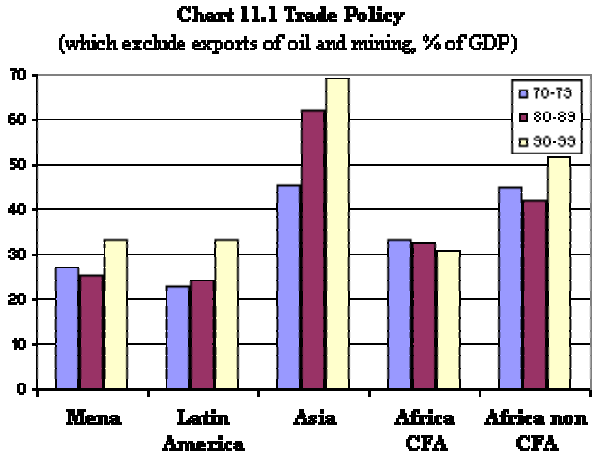


Annex 5: Structural Reform Indicators

(*Source*: Authors' calculations)







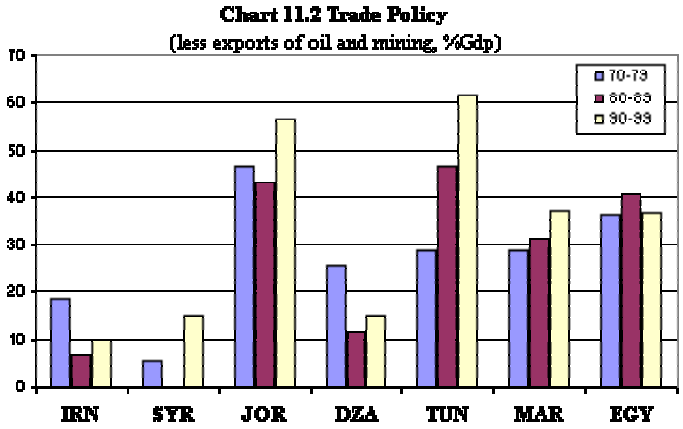


Table A5-1: Average Manufactured Exports of Selected MENA Countries

	Algeria		Egypt		Iran		Jordan		Morocco		Tunisia	
	%X	%GDP	%X	%GDP	%X	%GDP	%X	%GDP	%X	%GDP	%X	%GDP
1970-79	3	0.6	27	3.1	2.9	0.6	26	1.9	16	2.1	24	4.6
1980-89	1.5	0.3	19	1.5	4.0	0.3	43	5.4	39	6.0	49	12
1990-99	3.3	0.8	37	2.4	6.6	1.5	49	9.5	53	7.5	75	21

* For the 1st sub-period, four values were missing for *Iran* (1970, 1971, 1972 and 1973).
** As far as the 3rd sub-period is concerned, two values were missing for *Iran* (1991 and 1992). and one for *Jordan* (1996).
Source: Authors' calculations.

Annex 6: Human Capital Indicators

(*Source*: Authors' calculations)

Chart 13.1

Mortality Rate (per 1000 population)

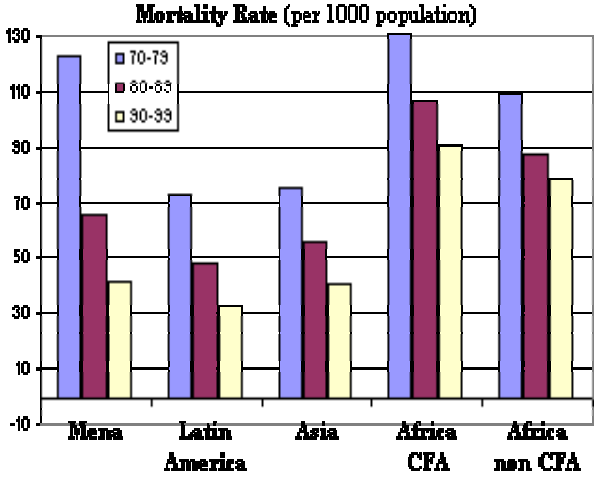


Chart 13.2

Mortality rate (per 1000 people)

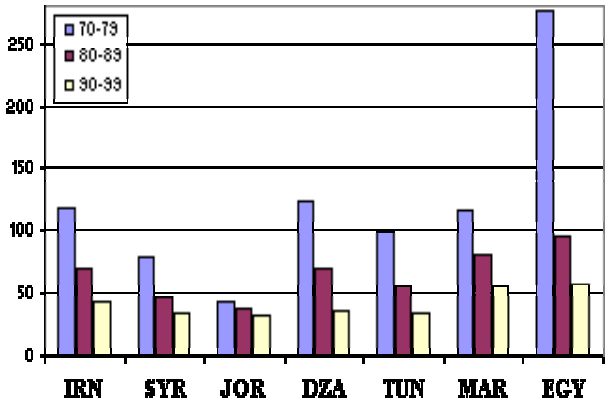


Chart 14.1 Primary Education

(number of year of schooling of the population)

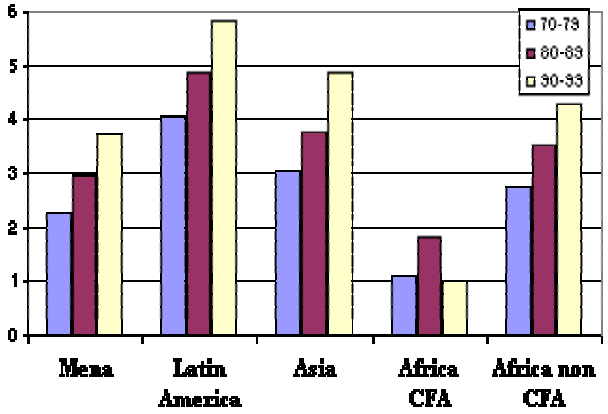


Chart 14.2 Primary Education

(number of years of schooling of the population)

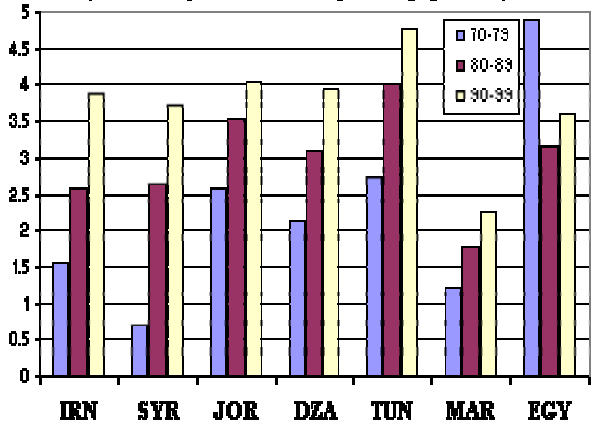


Chart 15.1 Secondary Education
(number of year of schooling of the population)

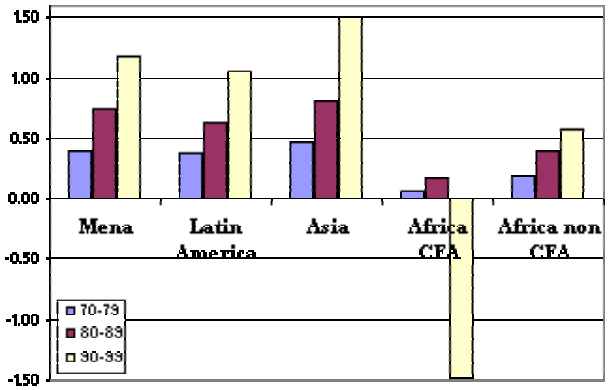


Chart 15.2 Secondary Education
(number of years of schooling of the population)

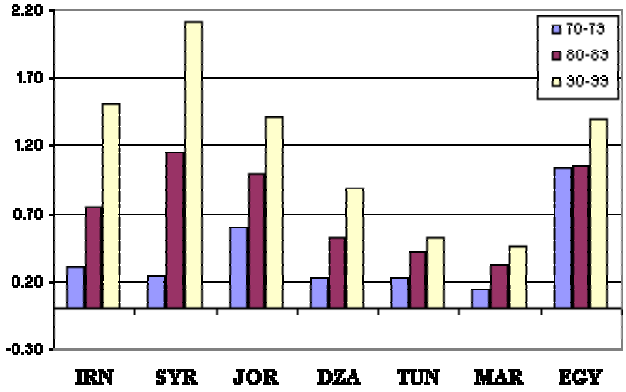


Chart 16.1 Tertiary Education
(number of year of schooling of the population)

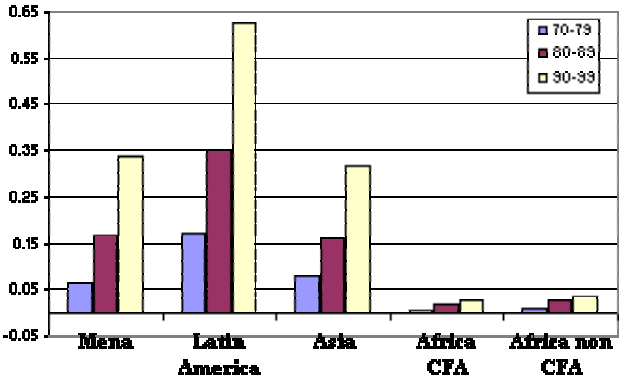
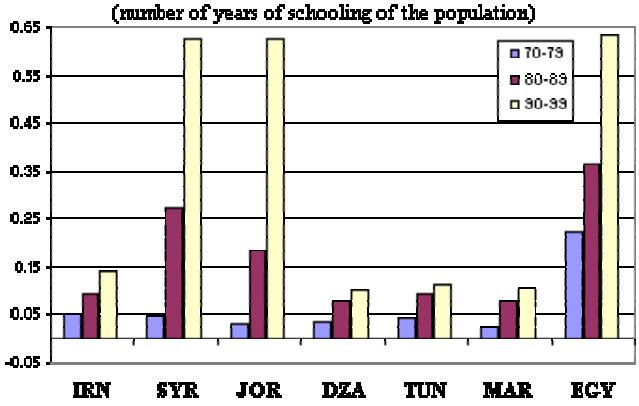


Chart 16.2 Tertiary Education
(number of years of schooling of the population)



Annex 7 : Physical Infrastructure Indicators

(*Source*: Authors' calculations)

Chart 18.1
Roads Network (km/km2)

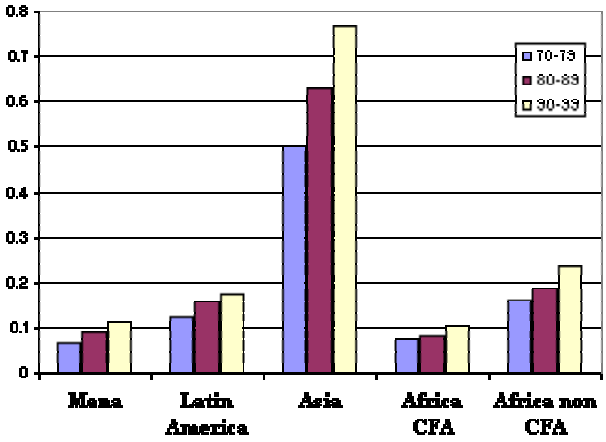


Chart 18.2
Roads Network (km per km2)

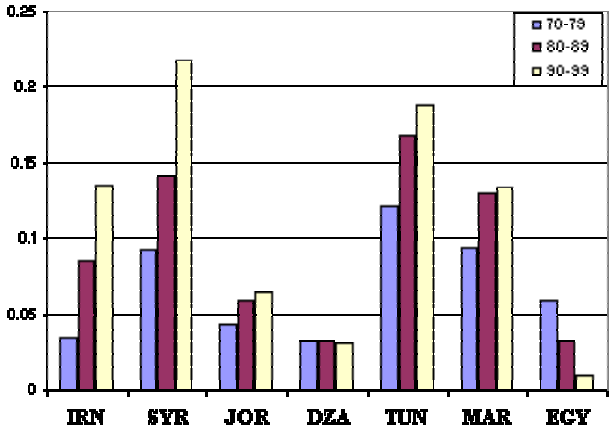


Chart 19.1 Telephone Network
(number of line per 1000 population)

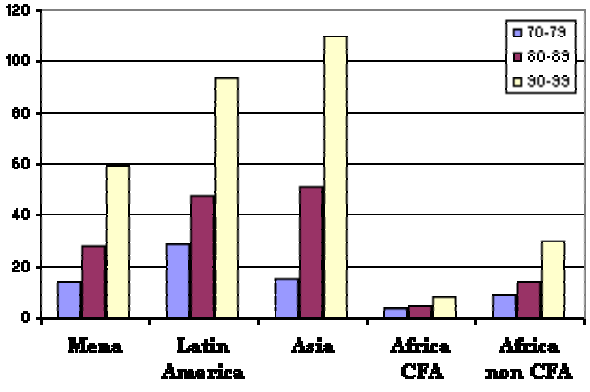
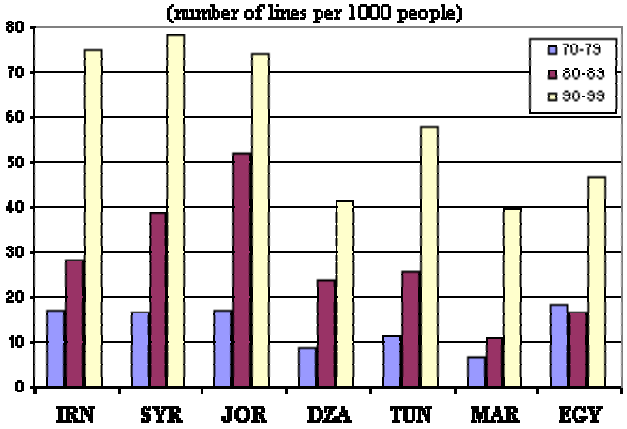


Chart 19.2 Telephone Network
(number of lines per 1000 people)



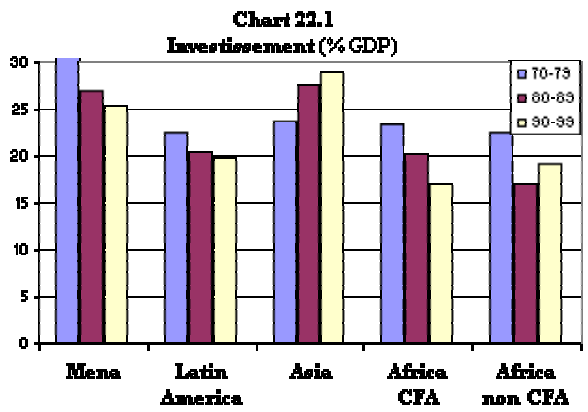
Annex 8 : Investment in the MENA countries

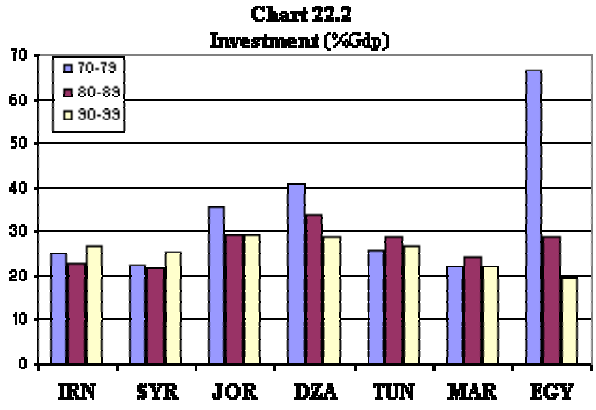
Total investment in the MENA countries of our sample has remained rather dynamic compared to the rest of the world during the whole period. At around 25 percent of GDP, total investment has been stronger than in Latin America and Africa, but inferior from the 1980s than in Asia (Chart 22.1). This result is due mainly to the high public investment ratio, private investment having, conversely, always been rather weak (Dasgupta, Keller and Srinivasan, 2002).

In the 1970s, investment was particularly high in *Egypt* (more than 60 percent of GDP*)* and to a lesser extent, in *Algeria* and *Jordan* (35-40 percent of GDP). This situation can be explained by the abundance of liquidities due to the increase in oil revenues, workers' remittances, and the abundance of foreign capital during this period. During this time, many countries were able to improve their physical infrastructure and human capital.

In the 1980s, because of the marked economic slow down, many MENA economies had to face an over-investment in a context of macroeconomic imbalances and a growing debt burden.[37] Total investment was still high — around 30 percent of GDP — in *Algeria, Jordan*, *Egypt* (Chart 22.2), and public investment was still more dynamic than private investment.

During the 1990s, many MENA countries were able to adjust their public investment ratio with some success. Now total investment ranges from 20 to 30 percent of GDP. This has been done in a context of macroeconomic stabilization and structural reforms. However, private investment remains low compared to the need for productivity gains of the MENA economies.





[37] *Tunisia* and *Morocco* offer a clear example of this situation. Despite a sharp economic slow down during the 1980s, investment increased during the same period.

Annex 9: Augmented Dickey Fuller Test (ADF)

Table A9: **Equations (1) and (2)**

Variable	ADF statistic	$k^{(1)}$	Trend	Critical value$^{(2)}$	ADF test
Ln(y)	*-3.22*	1	yes	-1.82*	I(0)
Ln(Inv)	*-3.12*	1	no	-1.82*	I(0)
MS	*-3.19*	1	no	-1.82*	I(0)
ES	*-3.62*	1	no	-1.82*	I(0)
SR	*-1.86*	1	no	-1.82*	I(0)
MH1	*-1.76*	1	no	-1.73**	I(0)
Phys	*-6.58*	1	no	-1.82*	I(0)

(1) k is the number of lags in the ADF test.
(2) Im, Pesaran and Shin (1997) critical values (respectively * 1% and ** 5% level).
Data have been compiled from World Development Indicators *(WDI)*, Global Development Finance *(GDF)*, Global Development Network (*GDN),* and Live Data Base *(LDB)* (World Bank).
Source: Authors'calculations

Annex 10: Methodology of Calculation of the Coefficient/Elasticities of the Disaggregated Reform Indicators

The impact of each type of indicator can be computed as follows: Let P be the vector (n*1) of the n principal components selected and δ the vector (1*n) of their weights in the aggregate indicator. Furthermore, the n principal components are expressed as a linear combination of initial variables such that $P = AX$, X being the vector (k*1) of k variables, and A represents the matrix (n*k) of loadings assigned to them. The composite indicator is expressed as: $\delta P = \delta A X$. Denoting by γ the estimated coefficient for this indicator, the convergence equation can be written:

$$\ln(y_{i,t}) - \ln(y_{i,t-1}) = \alpha_i - \beta \ln(i_{i,t_{-1}}) + \gamma \delta A X_{i,t} + \eta_t + u_{i,t} \qquad (3)$$

The vector (1*k) (E), expressing the impact on growth of the original variables, can be calculated such that $E = \gamma \delta A$. These coefficients are estimated from *Equations (1)* and *(2),* as well as from the loadings summarized in *Appendix 2A* to *2E*. However, given the standardization procedure for the variables associated with the principal components method, the contribution of variations in level of each indicator to growth is expressed by the previously calculated coefficient (e_i), divided by the standard deviation for each variable (e_i/σ_i). The coefficients/elasticities of the long-run GDP per capita level with respect to different types of indicator is then obtained by dividing the impact coefficients by the convergence coefficient *(β). Table 3* gives the long term coefficients/elasticities for each indicator (see also *Table A-6* and *A-7* in *Annexes 10-A* and *10-B* for intermediate calculations)

Annex 11: Short and Long Term Coefficients/Elasticities *of the Disaggregated Reform Indicators*

Table A11-1. : ***Equation (1)***

Index	Variables	Short Term Coefficients/Elasticities		Long Term Coefficients /Elasticities
		Standardized Variables	Level Variables	
MS	***P***	-0.0026	-0.0007	***-0.004***
	ln(*Bmp)*	-0.0013	-0.0007	***-0.004***
	PubDef	0.0006	0.0094	***0.056***
ES	***DebExX***	-0.027	-0.0172	***-0.101***
	DebExGni	-0.022	-0.0005	***-0.003***
	CurAccX	0.021	0.0770	***0.453***
SR	***TradeP***	0.013	0.0565	***0.332***
	PCRBOG	0.013	0.0618	***0.363***
Phys	**ln(*Roads*)**	0.025	0.0253	***0.149***
	ln(*Tel*)	0.025	0.0181	***0.106***
MH1	**ln(*Mort*)**	-0.0157	-0.0249	***-0.147***
	ln(*H1*)	0.0157	0.0287	***0.169***

Source: Authors' calculations.

Table A11-2 : ***Equation (2)***

Index	Variables	Short Term Coefficients /Elasticities		Long Term Coefficients /Elasticities
		Standardized Variables	Level Variables	
MS	***P***	-0.0176	-0.0044	-0.026
	ln(*Bmp*)	-0.0087	-0.0050	-0.029
	PubDef	0.0039	0.0637	0.375
ES	***DebExX***	-0.024	-0.0154	-0.091
	DebExGni	-0.020	-0.0005	-0.003
	CurAccX	0.018	0.0687	0.404
SR	***TradeP***	0.009	0.0414	0.244
	PCRBOG	0.009	0.0453	0.266
Phys	**ln(*Roads*)**	0.026	0.0262	0.154
	ln(*Tel*)	0.026	0.0187	0.110
MH1	**ln(*Mort*)**	-0.0139	-0.0222	-0.130
	ln(*H1*)	0.0139	0.0255	0.150

Source: Authors' calculations.

Annex 12: Contribution to Growth: Countries' Experience

A12-1-Impact of Macroeconomic Stability

Years	(%)	MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1980-89	*Contribution*	**-1.3**	**0.2**	**-0.01**	**-1.0**	**0.4**	**0.1**	**-2.6**	**-2.4**
1990-99	*to Growth*	**0.4**	**0.4**	**0.7**	**0.8**	**1.3**	**0.6**	**0.3**	**0.6**
1980-89	*GDP per capita*	**0**	**1.6**	**1.4**	**0.1**	**2.2**	**-0.7**	**-3.5**	**-1.1**
1990-99	*Growth Rate*	**1.7**	**3.2**	**0.5**	**-0.3**	**1.9**	**0.4**	**2.0**	**4.4**

A12-1.a- Inflation

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Inflation*	9	6	7	8	16	11	10	8
1980s	*(%)*	13	9	8	9	17	7	20	23
1990s	*Average*	11	5	4	20	13	5	24	8
1980-89	*Annual*	*0.4*	*0.3*	*0.02*	*0.1*	*0.2*	*-0.4*	*0.9*	*1.4*
1990-99	*Change*	*-0.2*	*-0.4*	*-0.3*	*1.1*	*-0.4*	*-0.2*	*0.4*	*-1.4*
Total: p + p*SR									
1980-89	*Contribution*	**-0.02**	**-0.01**	**-0.001**	**-0.004**	**-0.01**	**0.02**	**-0.05**	**-0.07**
1990-99	*to Growth*	**0.01**	**0.02**	**0.02**	**-0.06**	**0.02**	**0.01**	**-0.02**	**0.07**

A12-1.b- Black Market Exchange Rate Premium

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*bmp*	23	19	6	79	30	3.5	20	7
1980s	*(%)*	207	9	6	330	28	4.3	793	282
1990s	*Average*	268	5	4	191	13	4.5	1349	307
1980-89	*Annual*	*22*	*-7.3*	*0.5*	*14*	*-0.7*	*2.0*	*37*	*37*
1990-99	*Growth Rate*	*2.6*	*-4.9*	*-4.0*	*-5.5*	*-7.4*	*0.4*	*5.3*	*0.8*
Total: bmp+bmp*SR									
1980-89	*Contribution*	**-1.2**	**0.4**	**-0.03**	**-0.8**	**0.04**	**-0.1**	**-2.1**	**-2.1**
1990-99	*to Growth*	**-0.1**	**0.3**	**0.2**	**0.3**	**0.4**	**-0.02**	**-0.3**	**-0.05**

A12-1.c- Public Deficit

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Public Deficit*	-7.1	-2.9	-7.8	-5.1	-16.5	-9.9	-2.2	-5.4
1980s	*(% GDP)*	-7.8	-4.9	-7.6	-7.3	-12.5	-7.8	-7.3	-7.4
1990s	*Average*	-1.6	-3.4	-2.8	-0.9	-2.5	-0.9	-0.6	-0.3
1980-89	*Annual*	*0.03*	*0.2*	*-0.02*	*0.2*	*-0.4*	*-0.2*	*0.5*	*0.2*
1990-99	*Change*	*-0.6*	*-0.2*	*-0.5*	*-0.6*	*-1*	*-0.7*	*-0.7*	*-0.7*
Total PubDef + PubDef*SR									
1980-89	*Contribution*	**-0.03**	**-0.2**	**0.02**	**-0.2**	**0.4**	**0.2**	**-0.4**	**-0.2**
1990-99	*to Growth*	**0.5**	**0.1**	**0.4**	**0.6**	**0.9**	**0.6**	**0.6**	**0.6**

Source: Authors' calculations

A12-2- Impact of External Stability

Years	(%)	MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1980-89	*Contribution*	**-1.0**	**0.1**	**-0.8**	**0.1**	**-0.9**	**-0.4**		**-2.4**
1990-99	*to Growth*	**1.0**	**0.3**	**1.2**	**0.1**	**2.5**	**-1.1**	**0.6**	**0.8**
1980-89	*GDP per capita*	**0**	**1.6**	**1.4**	**0.1**	**2.2**	**-0.7**	**-3.5**	**-1.1**
1990-99	*Growth Rate*	**1.7**	**3.2**	**0.5**	**-0.3**	**1.9**	**0.4**	**2.0**	**4.4**

A12-2.a- External Debt

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*External Debt*	121/141?	125	190	185	165	82		100
1980s	*(% Exports)*	219	139	300	178	350	136	42	389
1990s	*Average*	201	129	230	231	220	220	84	365
1980-89	*Annual*	*9.9*	*1.4*	*11*	*-0.7*	*19*	*5.4*		*29*
1990-99	*Change*	*-1.8*	*-1.0*	*-7*	*5.3*	*-13*	*8.4*	*4.2*	*-2.4*
	LT Elasticity	**-0.089**							
1980-89	*Contribution*	**-0.9**	**-0.1**	**-1.0**	**0.1**	**-1.6**	**-0.5**		**-2.6**
1990-99	*to Growth*	**0.2**	**0.1**	**0.6**	**-0.5**	**1.2**	**-0.7**	**-0.4**	**0.2**

A12-2.b- External Debt

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*External Debt*	28	33	33	37	48	30		17
1980s	*(% GNI)*	66	56	92	39	107	81	4	83
1990s	*Average*	80	59	72	63	61	147	21	135
1980-89	*Annual*	*3.8*	*2.3*	*5.9*	*0.1*	*5.9*	*5.0*		*6.6*
1990-99	*Change*	*1.4*	*0.4*	*-2.0*	*2.4*	*-4.6*	*6.6*	*1.6*	*5.2*
	LT Elasticity	**-0.003**							
1980-89	*Contribution*	**-0.01**	**-0.01**	**-0.02**	**-0.0004**	**-0.02**	**-0.02**		**-0.02**
1990-99	*to Growth*	**-0.004**	**0.00**	**0.01**	**-0.01**	**0.01**	**-0.02**	**0.00**	**-0.02**

A12-2.c-Current Account Deficit

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Current Account*	-17	-26	-35	-24	-50	-11	26	-19
1980s	*(% Exports)*	-20	-20	-31	-14	-30	-8	-20	-14
1990s	*Average*	1	-15	-16	0	4	-16	4	4
1980-89	*Annual*	*-0.3*	*0.6*	*0.4*	*1*	*2.0*	*0.3*	*-4.6*	*0.5*
1990-99	*Change*	*2.1*	*0.5*	*1.5*	*1.4*	*3.4*	*-0.8*	*2.4*	*1.8*
	LT Elasticity	**0.396**							
1980-89	*Contribution*	**-0.1**	**0.2**	**0.2**	**0.4**	**0.8**	**0.1**	**-1.8**	**0.2**
1990-99	*to Growth*	**0.8**	**0.2**	**0.6**	**0.6**	**1.3**	**-0.3**	**1.0**	**0.7**

Source: Authors' calculations

A12-4- Impact of Structural Reforms

Years	(%)	MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1980-89	*Contribution*	**0.2**	**0.6**	**0.1**	**-0.1**	**0.4**	**0.5**	**-0.05**	**-0.05**
1990-99	*to Growth*	**0.2**	**0.7**	**0.5**	**-0.8**	**-0.03**	**0.6**	**-0.1**	**0.4**
1980-89	*GDP per capita*	**0**	**1.6**	**1.4**	**0.1**	**2.2**	**-0.7**	**-3.5**	**-1.1**
1990-99	*Growth Rate*	**1.7**	**3.2**	**0.5**	**-0.3**	**1.9**	**0.4**	**2.0**	**4.4**

A12-4.a- Trade Policy

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Trade Openness*	27	29	29	26	36	47	19	6
1980s	*(% GDP)*	26	47	31	11	41	43	7	3
1990s	*Average*	33	62	37	15	37	57	10	15
1980-89	*Annual*	*-0.1*	*1.8*	*0.2*	*-1.4*	*0.4*	*-0.4*	*-1.2*	*-0.3*
1990-99	*Change*	*0.7*	*1.5*	*0.6*	*0.3*	*-0.4*	*1.4*	*0.3*	*1.3*
	LT Elasticity	***0.24***							
1980-89	*Contribution*	**-0.03**	**0.4**	**0.1**	**-0.3**	**0.1**	**-0.1**	**-0.3**	**-0.1**
1990-99	*to Growth*	**0.2**	**0.4**	**0.1**	**0.1**	**-0.1**	**0.3**	**0.1**	**0.3**

A12-4.b- Financial Development

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Private Credit*	27	41	20	43	18	39	24	6
1980s	*(% GDP)*	35	47	21	52	28	59	33	7
1990s	*Average*	35	59	34	19	31	69	26	9
1980-89	*Annual*	*0.8*	*0.6*	*0.1*	*1.0*	*1.1*	*2.0*	*0.9*	*0.1*
1990-99	*Change*	*0.01*	*1.2*	*1.3*	*-3.3*	*0.3*	*1.0*	*-0.6*	*0.3*
	LT Elasticity	***0.27***							
1980-89	*Contribution*	**0.2**	**0.2**	**0.03**	**0.3**	**0.3**	**0.5**	**0.2**	**0.02**
1990-99	*to Growth*	**0.0**	**0.3**	**0.4**	**-0.9**	**0.1**	**0.3**	**-0.2**	**0.1**

Source: Authors' calculations.

A12-5- Impact of Human Capital

Years	(%)	MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1980-89	*Contribution*	**1.1**	**1.2**	**1.0**	**1.2**	**0.7**	**0.6**	**1.3**	**1.3**
1990-99	*to Growth*	**0.9**	**0.9**	**0.8**	**1.2**	**0.8**	**0.4**	**1.2**	**0.9**
1980-89	*GDP per capita*	**0**	**1.6**	**1.4**	**0.1**	**2.2**	**-0.7**	**-3.5**	**-1.1**
1990-99	*Growth Rate*	**1.7**	**3.2**	**0.5**	**-0.3**	**1.9**	**0.4**	**2.0**	**4.4**

A12-5.a- Primary Education

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Primary Education*	2.4	2.7	1.2	2.1	4.9	2.6	1.6	1.7
1980s	*(nbr of years)*	3.0	4.0	1.8	3.1	3.1	3.5	2.6	2.7
1990s	*Average*	3.7	4.8	2.3	3.9	3.6	4.0	3.9	3.7
1980-89	*Annual*	*2.8*	*3.9*	*3.9*	*3.7*	*-4.4*	*3.2*	*4.9*	*4.6*
1990-99	*Growth Rate*	*2.3*	*1.8*	*2.4*	*2.5*	*1.3*	*1.4*	*4.1*	*3.4*
	LT Elasticity	***0.14***							
1980-89	*Contribution*	**0.4**	**0.5**	**0.5**	**0.5**	**-0.6**	**0.4**	**0.7**	**0.6**
1990-99	*to Growth*	**0.3**	**0.2**	**0.3**	**0.3**	**0.2**	**0.2**	**0.6**	**0.5**

A12-5.b- Infant Mortality

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Infant Mortality*	122	99	117	123	277	43	118	79
1980s	*(/1000 population)*	65	56	81	71	95	37	70	47
1990s	*Average*	41	33	56	36	57	32	43	34
1980-89	*Annual*	*-6.3*	*-5.8*	*-3.7*	*-5.6*	*-10.7*	*-1.5*	*-5.2*	*-5.3*
1990-99	*Growth Rate*	*-4.5*	*-5.1*	*-3.8*	*-6.8*	*-5.1*	*-1.6*	*-4.9*	*-3.2*
	LT Elasticity	***-0.12***							
1980-89	*Contribution*	**0.8**	**0.7**	**0.4**	**0.7**	**1.3**	**0.2**	**0.6**	**0.6**
1990-99	*to Growth*	**0.5**	**0.6**	**0.5**	**0.8**	**0.6**	**0.2**	**0.6**	**0.4**

Source: Authors' calculations.

A12-6- Impact of Physical Infrastructures

Years	(%)	MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1980-89	*Contribution*	**1.4**	**1.3**	**1.0**	**1.0**	**1.0**	**1.6**	**1.8**	**1.5**
1990-99	*to Growth*	**1.0**	**1.0**	**1.3**	**0.5**	**-0.9**	**0.5**	**1.7**	**1.4**
1980-89	*GDP per capita*	**0**	**1.6**	**1.4**	**0.1**	**2.2**	**-0.7**	**-3.5**	**-1.1**
1990-99	*Growth Rate*	**1.7**	**3.2**	**0.5**	**-0.3**	**1.9**	**0.4**	**2.0**	**4.4**

A12-6.a- Telephone Lines

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Telephone Lines*	14	11	7	9	9	17	17	16
1980s	*(/1000 population)*	28	26	11	24	17	52	28	39
1990s	*Average*	59	58	40	41	37	74	75	78
1980-89	*Annual*	*7.2*	*8.1*	*4.7*	*10*	*6..8*	*11.2*	*4.9*	*8.5*
1990-99	*Growth Rate*	*7.5*	*8.1*	*13.1*	*5.5*	*8.2*	*3.6*	*9.8*	*7*
	LT Elasticity	***0.10***							
1980-89	*Contribution*	**0.8**	**0.8**	**0.5**	**1.0**	**0.7**	**1.1**	**0.5**	**0.9**
1990-99	*to Growth*	**0.8**	**0.8**	**1.3**	**0.5**	**0.8**	**0.4**	**1.0**	**0.7**

A12-6.b- Road Network

Years		MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
1970s	*Road Network*	0.068	0.121	0.094	0.032	0.025	0.043	0.035	0.092
1980s	*(km/km2)*	0.093	0.168	0.130	0.032	0.032	0.060	0.085	0.141
1990s	*Average*	0.111	0.188	0.133	0.030	0.009	0.065	0.135	0.218
1980-89	*Annual*	*3.0*	*3.3*	*3.2*	*-0.1*	*1.8*	*3.2*	*8.9*	*4.2*
1990-99	*Growth Rate*	*1.8*	*1.1*	*0.2*	*-0.5*	*-11.3*	*0.8*	*4.6*	*4.4*
	LT Elasticity	***0.15***							
1980-89	*Contribution*	**0.6**	**0.5**	**0.5**	**-0.01**	**0.3**	**0.5**	**1.3**	**0.6**
1990-99	*to Growth*	**0.3**	**0.2**	**0.03**	**-0.1**	**-1.7**	**0.1**	**0.7**	**0.7**

Source: Authors' calculations.

A12-7-Contributions to Growth %

Summary

Years	(%)	MENA	Tunisia	Morocco	Algeria	Egypt	Jordan	Iran	Syria
Macroeconomic Stability									
1980-89	*Contribution*	**-1.3**	**0.2**	**-0.01**	**-1**	**0.4**	**0.1**	**-2.6**	**-2.4**
1990-99	*to Growth*	**0.4**	**0.4**	**0.7**	**0.8**	**13**	**0.6**	**0.3**	**0.6**
External Stability									
1980-89	*Contribution*	**-1**	**0.1**	**-0.8**	**0.1**	**-0.9**	**-0.4**		**-2.4**
1990-99	*to Growth*	**1**	**0.3**	**1.2**	**0.1**	**2.5**	**-1.1**	**0.6**	**0.8**
Structural Reforms									
1980-89	*Contribution*	**0.2**	**0.6**	**0.1**	**-0.1**	**0.4**	**0.5**	**-0.05**	**-0.05**
1990-99	*to Growth*	**0.2**	**0.7**	**0.5**	**-0.8**	**-0.03**	**0.6**	**-0.1**	**0.4**
Human Capital									
1980-89	*Contribution*	**1.1**	**1.2**	**1**	**1.2**	**0.7**	**0.6**	**1.3**	**1.3**
1990-99	*to Growth*	**0.9**	**0.9**	**0.8**	**1.2**	**0.8**	**0.4**	**1.2**	**0.9**
Physical Infrastructures									
1980-89	*Contribution*	**1.4**	**1.3**	**1**	**1**	**1.0**	**1.6**	**1.8**	**1.5**
1990-99	*to Growth*	**1**	**1**	**1.3**	**0.5**	**-0.9**	**0.5**	**1.7**	**1.4**
Investment									
1980-89	*Contribution*	***-0.3***	***0.1***	***0.1***	***-0.3***	***-1.5***	***-0.24***	***-0.1***	***-0.03***
1990-99	*to Growth*	***-0.1***	***-0.1***	***-0.1***	***-0.2***	***-0.4***	***0.01***	***0.15***	***0.15***
Total									
1980-89	*Contribution*	**0.1**	**3.5**	**1.4**	**0.9**	**0.1**	**2.2**	**0.4**	**-2.1**
1990-99	*to Growth*	**3.4**	**3.2**	**4.4**	**1.6**	**3.3**	**1.0**	**3.9**	**4.3**
GDP per capita									
1980-89	*Annual*	**0**	**1.6**	**1.4**	**0.1**	**2.2**	**-0.7**	**-3.5**	**-1.1**
1990-99	*Growth Rate*	**1.7**	**3.2**	**0.5**	**-0.3**	**1.9**	**0.4**	**2**	**4.4**

Source: Authors' calculations.

Annex 13: The Short-Term Dynamics of the Growth Equation (2)

Since our variables are cointegrated, the short-term dynamic adjustment of the GDP per capita toward its equilibrium level can be estimated through an error correction model. The estimated equation is as follows:

$$\Delta\ln(y_{i,t}) = - a\,[\ln(y_{i,t-1}) - \ln(y^*_{i,t-1})]$$
$$+ a'\,\Delta\ln(y_{i,t-1})$$
$$+ b_1.\Delta\ln(Inv_{i,t}) + b_2.\Delta(SR_{i,t}) + b_3.\Delta(MS_{i,t}) + b_4.\Delta(ES_{i,t})$$
$$+ b_5.\Delta(MS_{i,t^*}\,SR_{i,t}) + b_6.\Delta(ES_{i,t^*}\,SR_{i,t})$$
$$+ b_7.\Delta(Phys_{i,t}) + b_8.\Delta(MH1_{i,t})$$
$$+ c_1.\Delta\ln(Inv_{i,t-1}) + c_2.\Delta(SR_{i,t-1}) + c_3.\Delta(MS_{i,t-1}) + c_4.\Delta(ES_{i,t-1})$$
$$+ c_5.\Delta(MS_{i,t^*}\,SR_{i,t-1}) + c_6.\Delta(ES_{i,t^*}\,SR_{i,t-1})$$
$$+ c_7.\Delta(Phys_{i,t-1}) + c_8.\Delta(MH1_{i,t-1}) \qquad \text{(A13)}$$

In addition to the error correction term, i.e., the lagged error term of the cointegrating equation [$\ln(y_{i,t-1}) - \ln(y^*_{i,t-1})$], we include the current and the lagged variables of *Equation (2)* in first differences. Table A13 below shows the estimates of the error correction model.

Table A13: Estimates of the Error Correction Model

Dependent variable: $\Delta\ln(y_t)$

Variable	Elasticity	Student
ε_{1t-1^*}	-1.1	(8.51)
$\Delta\ln(y_{i,t-1})$	-0.96	(7.23)
$\Delta\ln(Inv_{i,t})$	-0.14	(3.57)
$\Delta(MS_{i,t})$	0.001	(0.21)
$\Delta(ES_{i,t})$	0.004	(0.79)
$\Delta(SR_{i,t})$	-0.004	(0.41)
$\Delta(MS_{i,t^*}\,SR_{i,t})$	0.002	(0.92)
$\Delta(ES_{i,t^*}\,SR_{i,t})$	0.001	(0.63)
$\Delta(Phys_{i,t})$	0.016	(0.77)
$\Delta(MH1_{i,t})$	-0.02	(1.50)
$\Delta\ln(Inv_{i,t-1})$	0.03	(0.88)
$\Delta(MS_{i,t-1})$	0.0003	(0.08)
$\Delta(ES_{i,t-1})$	-0.001	(0.25)
$\Delta(SR_{i,t-1})$	-0.001	(0.10)
$\Delta(MS_{i,t^*}\,SR_{i,t-1})$	0.002	(0. 87)
$\Delta(ES_{i,t^*}\,SR_{i,t-1})$	0.0005	(0. 56)
$\Delta(Phys_{i,t-1})$	0.13	(0.52)
$\Delta(MH1_{i,t-1})$	0.04	(1.58)
D-W	2.20	1.91

Note: Student *t* statistics are within brackets. The sample includes 149 observations over 1970-80 to1999. **(*)** ε_{1t-1} is the lagged error term of the cointegrating *Equations* (1). Data have been compiled from World Development Indicators *(WDI)*, Global Development Finance *(GDF)*, Global Development Network (*GDN),* and Live Data Base *(LDB)* (World Bank).

Source: Authors' estimations

MENA Working Paper Series

No. 1 **Has Labor Migration Promoted Economic Integration in the Middle East?** June 1992. *Nemat Shafik, The World Bank and Georgetown University.*

No. 2 **The Welfare Effects of Oil Booms in a Prototypical Small Gulf State.** September 1992. *Ahmed Al-Mutuwa, United Arab Emirates University and* John *T. Cuddington, Georgetown University.*

No. 3 **Economic and Social Development in the Middle East and North Africa.** October 1992. *Ishac Diwan and Lyn Squire, The World Bank.*

No. 4 **The Link Between Trade Liberalization and Multi-Factor Productivity: The Case of Morocco.** February 1993. *Mona Haddad, The World Bank.*

No. 5 **Labor Markets in the Middle East and North Africa.** February 1993. *Christopher A. Pissarides, The London School of Economics and Political Science.*

No. 6 **International Competitiveness of the Private Industry and the Constraints to its Development: The Case of Morocco.** June 1993. *Hamid Alavi, The World Bank.*

No. 7 **An Extended RMSM-X Model for Egypt: Quantifications of Market-Oriented Reforms.** September 1993. *Karsten Nimb Pedersen, The World Bank.*

No. 8 **A Report on the Egyptian Tax System.** October 1993. *Mark Gersovitz, Roger H. Gordon and Joel Slemrod, The World Bank.*

No. 9 **Economic Development and Cooperation in the Middle East and North Africa.** November 1993. *Ishac Diwan and Lyn Squire, The World Bank.*

No. 10 **External Finance in the Middle East: Trends and Prospects.** December 1993. *Ishac Diwan, John Underwood and Lyn Squire, The World Bank.*

No. 11 **Tax Incidence on Agriculture in Morocco (1985-1989).** April 1994. *Jean-Paul Azam, CERDI, University of Auvergne, Clermont-Ferrand (France) et CSAE, Oxford (U.K.).*

No. 12 **The Demographic Dimensions of Poverty in Jordan.** August 1994. *Chantal Worzala, The World Bank.*

No. 13 **Fertility and Family Planning in Iran.** November 1994. *Rodolfo A. Bulatao and Gail Richardson, The World Bank.*

No. 14 **Investment Efficiency, Human Capital & Migration A Productivity Analysis of the Jordanian Economy.** May 1995. *Gaston Gelos, Yale University, Department of Economics.*

No. 15 **Tax Effects on Investment in Morocco.** August 1995. *David Sewell, Thomas Tsiopoulos and Jack Mintz, The World Bank.*

No. 16 **Reconstruction in Lebanon: Challenges for Macroeconomic Management.** April 1999. *Daniela Gressani and John Page, The World Bank.*

No. 17 **Towards a Virtuous Circle: A Nutrition Review of the Middle East and North Africa.** August 1999. *Regional HNP Knowledge Management, The World Bank.*

No. 18 **Has Education Had a Growth Payoff in the MENA Region?** December 1999. *Lant Pritchett, The World Bank.*

No. 19 **Rationalizing Public Sector Employment in the MENA Region.** December 2000. *Elizabeth Ruppert Bulmer, The World Bank.*

No. 20 **Achieving Faster Economic Growth in Tunisia**. March 2001. *Auguste T. Kouamé, The World Bank.*

No. 21 **Trade Options for the Palestinian Economy: Some Orders of Magnitude**. March 2001. *Claus Astrup and Sébastien Dessus, The World Bank.*

No. 22 **Human Capital and Growth: The Recovered Role of Educational Systems.** April 2001. *Sébastien Dessus, The World Bank.*

No. 23 **Governance And The Business Environment In West Bank/Gaza** May 2001. *David Sewell, The World Bank.*

No. 24 **The Impact of Future Labor Policy Options on the Palestinian Labor Market** June 2001. *Elizabeth Ruppert Bulmer*, *The World Bank.*

No. 25 **Reform and Elusive Growth in the Middle-East – What Has Happened in the 1990s?** July 2002. *Dipak Dasgupta, Jennifer Keller, T.G. Srinivasan, The World Bank.*

No. 26 **Risks and Macro-Economic Impacts of HIV-AIDS in the Middle East and North Africa: Why waiting to intervene can be costly.** July 2002. *David A. Robalino, Carol Jenkins, Karim El Maroufi, The World Bank.*

No. 27 **Exchange Rate Regime and Competitiveness of Manufactured Exports: The Case of MENA Countries.** August 2002. *Mustapha Kamel Nabli, Marie-Ange Véganzonès-Varoudakis, The World Bank.*

No. 28 **Governance and the Investment Climate in Yemen** September 2002. *Arup Banerji, Caralee McLiesh, The World Bank.*

No. 29 **Exporting Labor or Goods? Long-term Implications for the Palestinian Economy.** October 2002. *Claus Astrup, Sébastien Dessus, The World Bank.*

No. 30 **Poverty and Transfers in Yemen.** December 2002. *Dominique van de Walle, The World Bank.*

No. 31 **Yemen and the Millennium Development Goals.** March 2003. *Qaiser Khan, Susan Chase, The World Bank.*

No. 32 **Making Trade Work for Jobs : International Evidence and Lessons for MENA.** July 2003. *Dipak Dasgupta, Mustapha Kamel Nabli, Christopher Pissarides (LSE), Aristomene Varoudakis, The World Bank.*

No. 33 **Opening up Telecommunications to Competition and MENA Integration in the World Economy**. July 2003. *Carlo Maria Rossotto, Khalid Sekkat, Aristomene Varoudakis, The World Bank.*

No. 34 **Growth, Private Investment and the Cost of Doing Business in Tunisia.** February 2004. *Anós Casero, Paloma, and A. Varoudakis. The World Bank*

No. 35 **Current World Trade Agenda: Issues and Implications for the MENA Region**. April 2004. *Dasgupta, Dipak, Nabli, Mustapha Kamel, Srinivasan, T.G. and A. Varoudakis. The World Bank.*