How to Boost Private Investment in the MENA Countries:
The Role of Economic Reforms

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Abstract

This paper analyzes the determinants of unsatisfying private investment growth in the Middle East and North Africa (MENA) throughout the 1980s and 1990. In this period, private investment in MENA has on average shown a decreasing or stagnant trend in contrast to the rest of the world. This paper show empirically for a panel of 40 developing economies -- among which five MENA countries -- that in addition to the traditional determinants of investment -- such as the growth anticipations and the real interest rate -- government policies explain MENA's low investment rate. Insufficient structural reforms represented as poor financial development and deficient trade openness has been a crucial factor for the deficit in private capital formation. Economic uncertainties of the region have constituted major deterrent for firms to invest. High external debt burden and economic volatility arise as primary reasons for high uncertainty in the region. These findings provide new empirical evidences on the determinants of private investment in the developing world and in MENA countries in particular.

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1- Introduction

With the liberalization of economies and the acceleration of reforms, private investment increased throughout the world in the 1990s. The Middle East and North Africa (MENA) countries followed this pattern but at a slower pace. While private investment to GDP grew by 7.3 percent in the region, this rate reached 10 percent in Latin America (LAC) and Africa (AFR), and 16 percent in East Asia (EAP), despite the financial crisis) [1].

In this paper, we address the question of the low private investment of the MENA region. For this purpose, we estimate a model of the determinants of private investment for a panel of 40 countries -- among which five MENA economies [2] (see *Appendix 1* for the list of countries). This model determines which factors account for the performances of the MENA region, and identifies the incentives to be provided to boost private investment in the future.

Although the importance of private investment has been widely developed in the literature, little is known -- both theoretically and empirically -- about what induces private firms to invest in developing countries. In fact, developing countries do not always operate in a competitive environment and face constraints that are not accounted for in the neoclassical model. This partly explains why most of the economists do not agree on the subject of the determinants of investment in the developing countries (see Greene and Villanueva, 1991; Blejer and Khan, 1984; Serven, 1998). This phenomenon is also the case for MENA economies, for which the empirical literature is very deficient (see Shafik, 1992, on *Egypt* ; Schmidt and Muller, 1992, on *Morocco* ; Bisat, El-Erian, El-Gamal and Mongelli, 1998, on MENA).

In this context, the objective of this paper is to extend the previous work on the determinants of private investment in the developing world, and in MENA economies in particular. We have first extended the neoclassical accelerator model (Jorgenson, 1963) by taking into account some specific constraints faced by the developing world. These constraints can range from financial repression to absence of well functioning financial markets, foreign exchange shortage, and other distortions associated with foreign exchange, economic instability, deficiencies in infrastructure, lack of skilled labor and deficit in structural reforms (see Shafik, 1992, and Agenor and Montiel, 1998).

The current paper also contributes to the literature by increasing the number of MENA countries studied (five among 40 countries), and the period of time covered (1973-80 to 1999). We employ panel data econometric techniques which allow some comparative analysis between the different regions, and among the MENA countries in particular. Finally, to avoid the problems of multicollinearity caused by the introduction of a large number of potentially collinear explanatory variables, we make use of aggregated reforms indicators processed by the mean of principal component analysis.

This paper is organized as follows. The second section presents the model of private investment tested and the results of the estimations. The third section use this

model to quantify the impact of economic reforms on the private investment of the MENA region. The last section concludes.

2. The Econometric Analysis

2-1. The model tested

The equation of investment considered in this paper extends the neoclassical accelerator model and takes various constraints faced by the investors in developing countries into account. The model is as follows:

$$\ln(\mathrm{Pr}\,iv_{i,t}) = \alpha_0 + \alpha_1 Acc_{i,t} + \alpha_2 r_{i,t} + \alpha_3 MS_{i,t} + \alpha_4 SR_{i,t-2} + \alpha_5 ES_{i,t-1} + \alpha_6 Vol_{i,t}$$
$$+ \alpha_7 Infra_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $\ln(Priv_{i,t})$:   Private investment as percentage of GDP in logarithm
$Acc_{i,t}$:   Accelerator
$r_{i,t}$:   Real interest rate
$MS_{i,t}$ Macroeconomic stability
$SR_{i,t-2}$:   Structural reforms
$ES_{i,,t-1}$:   External stability
$Vol_{i,t}$:   Macroeconomic volatility
$Infra_{i,t}$:   Physical infrastructure
α_0 :   Intercept and α_1 to α_7 : parameters
i: group index, t : time index, and ε : error term

Acc is the variable chosen to accommodate the neoclassical theory of flexible accelerator (Jorgenson, 1963). Anticipations of investors -- as far as the economic environment is concerned -- have been proxied by one lag period of the GDP growth rate ($Growth_{i,t-1}$). The investors envision the future economic environment as the growth rate observed in the past. The reason for taking one lag period of the GDP growth rate is also to avoid simultaneity problems in estimating the investment equation. This variable is expected to have a positive coefficient. Moreover, the neoclassical model of investment takes the user cost of capital into consideration. The current paper incorporates the real interest rate (*r*) to capture this effect. A negative sign of the coefficient is expected ($\alpha_2 < 0$).

SR, MS, and *ER* stand for the indicators of structural reforms, macroeconomic and external stability respectively. These indicators have been constructed by means of principal component analysis. Reform and stability indicators are expected to have a positive impact on private investment (α_3, α_4 and $\alpha_5 > 0$).

Structural reforms constitute an important determinant of the actual and future profitability of private investment. The structural reforms index (SR) incorporates an

indicator of trade policy (TradePGDP) -- calculated as the as the ratio of exports plus imports to GDP, from which we have deducted the exports of oil and mining products, as well as the "natural" openness of the economy generated by Frankel and Romer (1999) -- and the private credit by deposit money banks and other institutions as percentage of GDP (PCrGDP) -- as a proxy for the development of the banking system. The financial development provides more opportunities and incentives for the firms to invest. Developed financial systems mobilize and allocate resources for the firms to undertake investment projects. A developed financial system is also expected to be more efficient due to an increasing technological specialization, which leads to a better selection of projects and a more advanced diversification of risks. This allows the firms to finance more investment projects and increases the productivity of new investments (see Levine, 1997, for a synthesis). Trade reforms constitute another factor that can stimulate private investment. Trade openness increases competitiveness and provides access to enlarged markets (Balassa, 1978; Feder, 1982). Trade openness can be at the origin of economies of scale and of productivity gains. All these factors create favorable conditions for the enterprises to invest.

Macroeconomic stability is an important part of the investment climate of a country. Macroeconomic stability provides a more reliable economic environment, which enables the investors to benefit from the existing profit opportunities (Faini and de Melo, 1992; Larrain and Vergara, 1993; Servén and Solimano, 1993). The macroeconomic stability indicator (MS) is based on inflation (p), public deficit as a percentage of GDP (*PubDef*) and foreign exchange parallel market's premium (*lBmp,* in logarithm). High inflation rates -- in addition to raising the cost of long-term financing -- are expected to adversely affect private investment by increasing the risk associated with long-term investment projects. Similarly, black market premium and budget deficit can lead to unsustainable macroeconomic imbalances and sudden economic policy reversals, which are likely to affect the profitability of long-term investment.

Similar to macroeconomic stability, external stability constitutes an integral part of the investment decision for the enterprises, due to providing a more predictable economic environment. The external stability indicator (*ES*) takes into account the external debt as a percentage of GDP (*DebGDP*), as well as of exports of goods and services (*DebEx*), and the current account balance as a percentage of GDP (*CurGDP*). The ratios of external debt represent the risk for an economy to encounter difficulties in reimbursing its foreign debt and to face a financial crisis. The presence of a large external debt can also adversely affect investment by reducing the funds available to invest, given that the return from new investments must be used to repay the existing debt (Cohen, 1994). The current account ratio indicates the fragility of the external position of the country (Fitzgerald, 1994).

The economic volatility is another factor that can be disruptive to private investment. Volatility may lead the investors to seek profit opportunities in short-term portfolio investments rather than investing in long term productive projects -- especially when the investment contains more irreversible features (Pindyck, 1991). The macroeconomic volatility indicator (*Vol*) is based here on the volatility of GDP growth. It

is defined as the five-year moving standard deviation of this variable (*StdGDP5*). Increased volatility is expected to decrease private investment ($\alpha_6 < 0$).

Physical infrastructure can be seen as a complementary factor of private investment. Physical infrastructure stimulates private capital formation by raising the profitability of investment (Barro, 1990). The physical infrastructure indicator (*Infra*) incorporates the logarithm of the density of the road network (*lRoads,* in km per km2) and the number of telephone lines per 1,000 people (*lTel*). The expected sign of the coefficient is positive ($\alpha_7 > 0$).

Data on private investment are issued from the *Global Development Network Database* of the World Bank. Inflation and interest rates come from the *International Financial Statistics* of IMF [3]. Data on all other disaggregate variables are from *World Development Indicators* of the World Bank. Aggregate indicators of infrastructure, structural reforms, external and macroeconomic stability are from Nabli and Véganzonès-Varoudakis (2004).

2-2. Estimation Results

The first step of our estimation analyses the degree of integration of the variables of *Equation (1)*. This test determines the existence of a long-term relationship between private investment and its determinants. Given that the correlation between dependent and independent variables suffer from the issue that these variables follow a common trend, the relationship estimated in this case would be biased.

To account for this potential bias, table 2 in *Appendix 2* provides the results of the Augmented-Dickey-Fuller (ADF) tests of the data of our sample. We have used the Im, Pesaran, and Shin (2003) methodology, which provides critical values of ADF tests in the case of heterogeneous panel data [4]. The results indicate that the series are generally stationary at the 1 percent level. The exception is structural reforms, which are stationary at the 10 percent level. These results allow running *Equation (1)* by using the standard estimation methods [5].

Equation (1) then describes the long-run relationship between private investment and a number of economic variables. *Equation (1)* has been estimated on an unbalanced panel of 40 developing countries from 1973-80 to 1999. 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 endowments of natural resources, which can be at the origin of large discrepancies in the "natural propensity" to invest [6]. 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. The regressions fit the data quite well, accounting for 62 to 65 percent of the variations of the investment ratio across countries and overtime.

In the estimations, almost all explanatory variables exhibit a significant impact on private investment, with the exception of macroeconomic stability and of infrastructures whose results are not reported here (Table 1). The accelerator variable *(Acc)* has the expected positive sign, which implies that anticipations of economic growth induce more investment. Similarly, interest rate (*r*) appears to exert a negative effect on a firm's investment projects, which is consistent with the user cost of capital theory.

Table 1: Estimation Results of the Long-term Private Investment Equations
Dependent Variable ln(*PRIV*)

Independent Variables	Coef.	t-stat.
$Acc_{i,t}$	0.02	-4.4
$r_{i,t}$	-0.06	-2.7
$SR_{i,t-2}$	0.12	-5
$ES_{i,t-1}$	0.08	-2.8
$StdGDP5_{i,t}$	-0.02	-1.8
Hausman Test	CHISQ(5) :9.7	
No. of Countries	41	
No. of Obs.	717	
Adj. R-squared	0.65	
F-stat. in Fixed Effects Estimation	F(45,671): 72.5	

Sources: the data have been compiled from the *World Development Indicators* and the *Global Development Network* Database (World Bank*)*, and the IMF *International Financial Statistics.* Aggregated indicators (*SR* and *ES*) are issued of Nabli and Véganzonès-Varoudakis 2004). All coefficients are significant at 5 percent level. Numbers in parentheses are heteroskedasticity-consistent t-statistics

More interestingly, structural reforms (*SR*) and external stability (*ES*) enhance the private investment decisions. This confirms that firms in developing countries face other constraints than in more developed ones. Higher degree of trade openness and higher financial deepening increase private capital formation. Quantitatively -- holding other variables fixed -- one standard deviation improvement in structural reforms stimulates private investment by 0.29 percent (.12 X .025). External stability (*ES*) constitutes also an important determinant of private investment. The impact of one standard deviation is 0.24 percent (.08 X .031) on the private investment ratio. An interesting result is that the effects of both variables (*SR* and *ES*) are not instantaneous, respectively in two-year and one-year lags. This result indicates that investment decisions require reforms to be consolidated and economic environment to be more stable before materializing into real projects.

Our estimation also reveals the negative impact of macroeconomic volatility -- calculated as a five-year moving standard deviation of GDP growth, *StdGDP5* -- on private investment decisions. This result is consistent with the findings of Aizenman and Marion (1999) [7]. This may present new empirical evidence to support the view that the

impact of volatility on economic performance is not trivial. This finding -- together with the role of structural reforms (*SR*) and of external stability (*ES*) -- confirms that a stable and sound investment climate is crucial for stimulating private investment.

Our estimation failed, however, to highlight the role of macroeconomic stability and of infrastructure on the firms' decision to invest. This conclusion is always the case regardless of the measures tried (composite or disaggregated indicators). This does not mean, however, that these factors do not constitute real determinants of private investment. Actually, other studies have shown the importance of both factors on private capital formation (see Fischer, 1993, and Greene and Villanueva, 1991, for macroeconomic stability and Blejer and Khan 1984, for infrastructure). Furthermore, the lack of strong evidence in favor of macroeconomic stability can be due to the significance of the volatility indicator, when calculated as the standard deviation of inflation, which may incorporate some elements of macroeconomic stability.

3. Contribution of Economic Reforms to the Private Investment of the MENA Countries

As mentioned earlier, using aggregate indicators overcomes the difficulties of estimating the impact of a large number of indicators that may have collinear relationships. This method also allows for subsequent calculations of the contribution of the initial indicators to the investment performance of the countries. In this section, we use our estimated equation to calculate the coefficients of the disaggregated variables (see Table 2) [8].A number of conclusions can be drawn from these calculations.

First, the structural reform emerges to be an important explanatory variable of private capital formation. Financial system's development shows a strong impact on the firms' decisions to invest (coefficient 0.41). This means that making the funds available to the private sector to invest is a priority. Trade openness also comes to be a key variable in stimulating private investment (coefficient 0.23).

External stability represents another sector of reform, which is conducive to private investment. Progress in the current account balance shows an impact as high as financial development (coefficient 0.43). External debt to GDP, also, discourages private capital formation (coefficient -0.16).

Table 2: Structural Reforms and External Stability
Estimated Coefficients (Benchmark Equation)

Index	Variables	Short Term coefficients	
		Standardized Variables	Level Variables

ES	*DebGDP*	-0.067	-0.16
	DebExX	-0.066	-0.04
	CurGDP	0.047	0.43
SR	*TradePGDP*	0.095	0.23
	PCrGDP	0.095	0.41

Source: Authors' calculation.

All together, real progress in structural reforms and external stability in MENA would help private investment to catch up with other more advanced regions, East Asia in particular. In fact, the MENA countries have been characterized with low trade openness, modest level of financial development, high external debt, slow growth, and high volatility in the last two decades (see Nabli and Véganzonès-Varoudakis 2004). On the contrary, the East Asia and Pacific region has witnessed remarkable progress in structural reforms and external stability, together with high rate of growth, low volatility of the economy, and outstanding performances in terms of private investment.

Table 3. Private Investment to GDP in the 1990s

	Actual	Increase with improvement in					Sub-Total	Potential (a)	Fixed Effects	Potential (b)
		Str. Reforms	Ext. Stability	Growth	Int. Rate	Vol.				
	(% GDP)	(%)	(%)	(%)	(%)	(%)	(%)	(% GDP)	(%)	(% GDP)
Egypt	**11.1**	25	1.1	2.8	1.2	-3.3	*28*	**14.3**	*48*	**21.1**
Iran	**18.1**	31	-3.2	2.3		0.7	*30*	**23.5**		
Jordan	**25.9**	9	11.9	5.0	2.1	3.7	*26*	**32.7**	*13*	**36.8**
Morocco	**11.7**	25	3.9	6.2	1.8	4.3	*35*	**15.8**	*28*	**20.2**
Tunisia	**13.7**	14	2.6	2.4	0.9	-1.3	*19*	**16.2**	*28*	**20.8**
MENA	**16.1**	21	3.3	3.7	1.5	2.3	*31.8*	**21.2**	*29*	**26.4**

Note: (a) is the sum of columns 1 to 6 ; (b) adds the impact of the fixed effects.

Following this analysis, we have quantified how much the lack of reform, external instability, and volatility in the region have contributed to discourage firms to invest. To this end, we have taken the East Asian countries as reference and calculated the level of private investment that MENA could have reached if the region had undertaken the same level of reform and had faced the same economic conditions -- external stability, volatility, and economic growth -- as the East Asian countries. Our calculations focus on the 1990s. The results are presented in Table 3.

The structural reforms, because of their strong impact on private investment, and their clear deficit in most MENA countries, appear to be a key factor as far as firms' decisions to invest are concerned. Our calculation shows that the firms would have invested 21 percent more during the 1990s, if MENA region had the same trade openness and financial development than East Asia. This increase would even have been higher in *Iran* (31 percent) because of the low financial depth and trade diversification, and in *Egypt* and *Morocco* (25 percent), due to the weak financial development. These results highlight the substantial contribution of the deficit in structural reforms for the low private capital accumulation of the 1990s.

As far as external stability is concerned, the high debt burden of MENA economies has also contributed, however less, to the slow private capital formation in the region. A more stable external environment, like in East Asia, would have stimulated investment decisions in average by 3.3 percent in the 1990s. In *Jordan*, the critical external situation has caused a deficit in investment by 12 percent. *Iran* is the only country with a lower external debt ratio than East Asia (see negative sign of the contribution in Table 3) [9].

Volatility of the activity has also been another concern for the region. A more stable economic environment would have definitely encouraged firms to realize more investment projects, which could have been increased by 2.3 percent on average for the region and even more in *Jordan* and *Iran* (3.7 and 4.3 percent, respectively).

A reason of the low private investment in MENA can also be seen in the slow economic growth compared to East Asia. This situation has constituted a negative signal for the enterprises to invest and decreased private investment by 3.7 percent during the 1990s. *Morocco* and *Jordan* have been affected more by the weak economic performances in the 1990s. Despite a relatively low impact, this result constitutes another argument in favor of reforms, which can also boost investment through their impact on growth. Finally, interest rates are higher than in other regions -- East Asia in particular. However, this higher interest rates have played a marginal role in the low capital formation in MENA countries.

In total, the private investment decisions would have increased by 31.8 percent and the investment ratio would have reached 21.2 percent of GDP -- instead of 16.1 percent, (see Table 3), if MENA had the same economic conditions as East Asia in the 1990s. Especially, *Egypt* and *Jordan* are of concern because of their deficiencies in reforming their economies.

In the MENA region, however, investment ratio remains on average inferior as compared to East Asia. This low ratio is due to the fact that reform and stabilization efforts pay less in the MENA region. Fixed effects are, on average, smaller in the MENA countries than in East Asia [10] (see Table 3). Hence MENA countries appear to be characterized by unexplained factors, which are not always favorable to private investment. These factors have contributed on average to deter firms' decisions to invest by 29 percent in the 1990s. This percentage has even been higher in *Egypt* (37 percent). If MENA countries had the same fixed effects as East Asia, private investment would have reached 26 percent of GDP in the 1990s.

4. Conclusion

In this paper, it has been shown that economic reforms, in addition to economic environment, greatly affect private entrepreneurs' decision to invest. In this regard, our results are in line with the conclusions of Greene and Villanueva (1991), Blejer and Khan (1984), and Serven (1998).

In MENA, the lack of economic reforms and the deficiencies of the economic environment explain well the deficit in private investment. This has been particularly the case for structural reforms, which were lacking in the 1980s and 1990s. In fact, private investment would have been increased by 29 percent in the 1990s, if the MENA region had benefited from the same level of trade policy and financial development as in East Asia. This percentage would have even been higher in *Morocco* (around 35 percent) due to a weak financial development and in *Iran* (around 30 percent) because of the low financial depth and trade diversification.

Same conclusions can be drawn for external stability and volatility. An improvement of the debt burden and a more stable economic activity, similar to East Asia, would have stimulated private firms' investment by respectively 3.3 percent and 2.3 percent in the 1990s.

Our findings confirm that the lack of economic reforms remains a problem for a majority of MENA countries, which have failed to raise the rate of growth of their economy (Nabli and Véganzonès-Varoudakis, 2004), as well as the productivity and the competitiveness of their enterprises (Dasgupta et al., 2002). This conclusion is even more critical in the context of high growth of the labor participation which asks for a substantial capital formation in order to better confront with unemployment in the MENA region (World Bank, 2004).

Notes

[1] These calculations are based on a sample of 81 developing countries between 1970 and 1999.

[2] The MENA countries studied have been determined by the availability of data.

[3] The "ideal" interest rate should be the real lending rate. Unfortunately, its availability is quite limited in terms of both time and group dimensions. To avoid selection bias and expand our coverage, we decided to use the nominal bank discount rate deflated by inflation to construct the real interest rate series. The real interest rate is calculated as $\ln(1+i)/1+\pi)*100$.

[4] When testing for unit roots, we assume that the disturbances in the underlying ADF regressions are serially correlated following an AR(1) process. The proper test inspected, hence, is standardized t-bar statistic, which adjusts the average t-statistic across countries by their individual means and variances.

[5] 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, tests' distribution tends to converge.

[6] This applies in particular to the oil and mining producing economies of our sample of countries.

[7] In Aizenman and Marion (1999), volatility measures are based on the standard deviations of government consumption as a share of GDP, of nominal monetary growth, and of real exchange rate.

[8] 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 loading of the initial variables in each principal component (see Nabli and Véganzonès-Varoudakis, 2004).

[9] This is due to the fact that -- because of its political circumstances -- *Iran* could not receive long term loans in the international financial markets.

[10] Note that the fixed effects are country specific. They are the intercepts of the regression.

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Appendix 1

List of countries of the sample

Africa	Latin America	South East Asia	South Asia	MENA
Cote d'Ivoire	Bolivia	China	Bangladesh	Egypt
Cameroon	Brazil	Indonesia	India	Iran
Gabon	Chile	Korea, Rep.	Sri Lanka	Jordan
Ghana	Colombia	Malaysia	Pakistan	Morocco
Gambia, The	Costa Rica	Philippines		Tunisia
Kenya	Ecuador	Thailand		
Madagascar	Guatemala			
Mauritius	Peru			
Malawi	Paraguay			
Niger	Uruguay			
Nigeria	Venezuela			
Senegal				
Togo				
South Africa				
Zambia				

Appendix 2

Augmented Dickey Fuller Test (ADF)

Table 2: Augmented Dickey-Fuller (ADF) Unit Root Tests

Variables	t-bar stat.	critical value	ADF test
ln(Priv)	-2.52	-1.74*	I(0)
Acc	-4.97	-1.73*	I(0)
Gap5	-5.20	-1.73*	I(0)
GapHP	-5.90	-1.73*	I(0)
r	-2.56	-1.82*	I(0)
SR	-0.77	-1.69***	I(0)
ES	-1.84	-1.82*	I(0)
StdInf5	-1.27	-1.64***	I(0)
Residuals of Estimation:			
Benchmark	-2.52	-1.97*	I(0)
Specification 2	-2.28	-1.97*	I(0)
Specification 3	-2.26	-1.97*	I(0)
Specification 4	-2.55	-1.97*	I(0)
Specification 5	-2.51	-1.97*	I(0)
Specification 6	-2.30	-2.14*	I(0)

Note: Data are compiled from *World Development Indicators*, *Global Development Network*, and *IMF International Financial Statistics*. All unit root tests are augmented by 1 period lag. Critical values are from Im, Pessaran, and Shin (2003), with *, **, and *** indicating 1 percent, 5 percent, and 10 percent significance levels, respectively.

Source: Authors' estimations