

THE IMPACT OF CORRUPTION ON ECONOMIC GROWTH IN MENA REGION

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Abstract

This paper examines the impact of corruption on investments and economic growth of countries from the MENA region over the period 1990-2017. The extent of corruption and the practice of democratic life are often cited as the main factors that affect the volume of public and private investments. For this work, we use a dynamic panel data model. According to the results, we show empirically that political institutions have a positive effect on investment and growth moreover corruption has a negative effect on economic growth through its effect on investment.

Keywords: Political institutions; corruption; public and private investment; simultaneous equations; panel data

JEL Classification: O43, C33, H54, R42, D73

1. Introduction

Despite a broad consensus within the scientific community about the negative effects of corruption on economic growth, some economists still defend the argument that the effects of corruption on growth are contextual and related to factors such as the frame legal, quality of governance and the type of political regime. They conclude that, in some highly regulated countries but lacking effective institutions and systems of governance, corruption can offset the institutional weaknesses and the effects of a heavy bureaucracy and "stimulate" the economy.

This argument fails when we consider the longer-term impact of corruption on economic growth, equality and the quality of governance and the institutional environment of a country. Most data indicates that corruption is likely to have a long term negative effect on economic growth through its effects on investment, taxation, public expenditure and human development. Corruption also risks undermining the legal framework of a country and the efficiency of public institutions, insofar as the search for immediate individual profits distorts public decision making. Corruption affects not only the economic development through its effects on efficiency and economic growth; it affects also equitable income redistribution, widening income inequality, undermines the effectiveness of social programs and results, ultimately, in the lower levels of human development. This can, in turn, erode development sustainable, economic growth and equality of the citizens.

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2. Literature review

If corruption represents a democratic imperfection, the phenomenon in developing countries refers to heavier and more alarming findings (Transparency International Report, 1996). The military, customs, police, justice, tax administrations and labor inspection are frequently corrupt. Moreover, corruption is present in the specific programs developing such international assistance, support for land reform, and the fight against poverty. Myrdal (1968) evoked the "folklore corruption" in recognition of his massive and unavoidable presence and, more recently, Rose Ackerman (1997a) described a "corruption trap" to express the fact that corruption feeds on itself. Whatever their political regimes, developing countries have fragile corruption than developed countries simply because failures of the state and the market are higher and they lay violent distortions (Stern, 1989, p. 615-622). Essentially, economic studies of corruption make the assumption that transactions are commercial, while most political scientists rather describe institutionalized social exchanges (see Padioleau, 1982 and Médard, 1995 the differences between "corruption-barter" and "social corruption-trade"). The new institutionalism or new institutional economics is a set of currents of thought which contributed to the renewal of the economic analysis of institutions in the 70s. It's about a set which includes heterogeneous works that have in common to question the role of institutions in economic coordination. This is specifically for the set of rules and standards that govern and regulate the behavior of individuals and businesses (Williamson, 2000). From this point of view, there is no unanimity as to the mode of supervision and regulation of behavior and especially in setting rules. Gabrié and Jacquie (1994) have highlighted the weaknesses of the theoretical foundations of the new institutional economics. Similarly, there is a relevant statement of the limits of this theory in the work of Maucourant (2003).

Beyond all these oppositions of ideas and currents of thought, the theory of institutions provides tools and avenues for economic analysis to better understand the evolution of many aggregates and explain their interrelationships. In this dynamic, we teach economic literature on the limits of public investment, private initiatives and credibility of institutions?

Scientific contributions relating to the nature and specificity of investment are many. Pereira and Flores de Frutos (1999) emphasize the complementarity between the public and private sectors that significantly contribute to the improvement of the indicators of economic performance of the United States of America. The rules and public expenditure disbursement procedures are subject to strict control and regular monitoring by competent structures (Pereira, 2001). Private sector actors are moving in a defined register and their economic activities are governed by the texts of all known and respected by all. While corruption exists and affects the quality of public investment, but globally, the US authorities have reason to be satisfied (Pereira, 2000). This assertion is defended by Podrecca and Carmeci (2001) that led reflections on the positive impact of public investment and private economic growth. Productive investments are characterized by positive externalities on the evolution of economic growth and unemployment. For many economists, corruption and weak democratic life are among the main reasons for the failure or the overestimation of investments (Feng, 2003; Knack, 2003; Johnston,

2005). Studies of Burguet and Che (2004) show that the corruption has damaging effects on free competition and the quality of products provided by a company selected following a tender for example. The issue of interrelations can exist between foreign direct investment and corruption was addressed by Habib and Zurawicki (2002) and by Larrain and Tavares (2004). These authors show that corruption has a negative impact on cooperation, whatever the direction of investments: whether the donor or the recipient country. They all stress that corruption is the basis of inefficient investments. In a study highlighting the negative effects of corruption, Fedeli and Forte (2003) explain that in the absence of corruption, the performance of a centralized system and a decentralized system are identical in co-financing of private projects. However, leading the reflection from a monopolistic competition analysis to Chamberlain by the introduction of corruption in the model, the centralized plan has the largest dysfunction as it meets favorable conditions for widespread corruption. At the macroeconomic level, the scientific literature shows generally that corruption has a direct negative impact on growth and development. Corruption has also an indirect effect on efficiency economic of a country, its impact on several factors that drive economic growth, such as investment, taxation and the level of public expenditure, distribution and their effectiveness. Economists have long identified a number of channels through which corruption correlate negatively to economic growth (see in particular Mauro, 1995; Tanzi, 1997; Gupta, 2000; Gyimah Brempong 2001): Corruption distorts the incentives of economists and market forces, leading to a misallocation of resources. Corruption is like an inefficient tax on business, increasing costs reducing production and profitability investments. Corruption may also reduce productivity investment by weakening the quality of resources. For example, interfering in the quality and quantity of health services education, corruption decreases capital human of a country. Macroeconomic studies, using national data to explore the variations between countries for economic indicators and governance indicators, conclude systematically that corruption reduces growth and economic development. The comparative data thus indicate that the corruption is systematically correlated with particularly low levels of the main economic indicators - growth rates, GDP per capita, human development - and to a high rate of economic inequality (Rothstein & Holmberg, 2011). Similarly, a systematic review of data available on the impact of corruption on economic growth in 2011 confirms that corruption has a direct negative effect on Growth in low-income countries (Ugur & Dasgupta, 2011). This analysis of corruption has also indirect effects through investment, human capital and finance. The negative effects of corruption are likely to be more significant in countries with high per capita income and a strong institutional structure.

3. Causes of corruption in developing countries

The interpenetration between the economic and political orders fosters relationships incestuous. The mixed economy facilitates legal and illegal trade in resources between these two spheres. Microeconomic researches on the causes of corruption traditionally rely on the information economy flows. The political and social universe of developing countries has prompted, more recently, researchers to emphasize the weakness of governance and economic delays for the origin of corruption.

3.1. Weak governance and degraded property rights

Three factors explain how bad governance is at the root of the expansion of corruption.

1 / Weak powers-cons: Property rights are often the cause of corruption (Jagannathan, 1986). According to the political legitimization systems based on the charisma and the rationality of goals are more permeable to corruption than systems based on skills and performance. In authoritarian regimes, systems of control and power-cons are precarious because there is no tradition of separation of powers nor the expertise or culture use of freedom of the press or of mobilizing and speaking (Report on World Development 1997). The weakness of independent mediators and modes of representation increases the discretion of political intermediaries, and the cost of the information in time and money can become prohibitive (Alam, 1995).

2 / The construction of difficulties: We have observed that political systems, even when they are democratizing, still rely on patronage and patrimonialism or corporatism (imperfect political market). The collected bribes, when awarding large contracts, serve both for the personal enrichment of the elite and the redistribution of clientelistic networks that enable political authorities remain in power by buying political support. A high degree of ethnic and religious split highlights the importance of network informal redistribution and their connections through alliances.

3 / Inadequate right: The formal rules of functioning of society should be constantly evolving to adapt to rapid changes. More formal rules are vague, rigid or inappropriate, more informal arrangements conduct the actions and choices of economic agents. Furthermore, many formal rules are put in place to allow predation (finicky regulations or procedures perceived as illegitimate by citizens). The development of informal rules takes place in opacity and without control procedure of their global effects. A labor law of the level of economic development or an excessive tax burden on new business promotes informal and corrupt arrangements necessary for its operation (Tanzi, 1983; De Soto, 1994; Mello et al. 1995). Arbitrary behavior and weak legitimacy of many states - which do not protect the economic agents do not organize negotiation between these actors - give way to alternative systems of protection or resourcefulness which are based on micro-legitimacies such as family, clan, ethnic group, region, the criminal organization, guerrilla warfare ... These systems are exclusionary for those whom do not adhere to local protection networks.

The feeling of inequitable initial distribution of private and public ownership (or a closed access accentuating the marginalization) or allocation of new rights to foster the emergence of elite raises the question of standards justice. If the legal distribution of favors to certain fractions of the elite do not indirectly benefit the entire population, through creation of mechanisms or redistribution of income, the risk is great to see the development of lack loyalty actors for the standards Public power (Cartier-Bresson, 1995b).

3.2. Economic Delay, scarcity of public goods and poverty

The role given to the State in developing countries remedial strategies and the weakness of its means determine a breeding ground for corruption. Five situations encourage corruption.

1 / The exploitation of strong natural resource endowments can be a source of annuities since they are sold at a price well above their cost. The payment of bribery is common when selling concessions. Many observers explained that the discovery of oil and the explosion of corruption went hand in hand with Mexico and Nigeria (Diamond, 1993).

2 / Developmentalist policies are based on a multitude of transfers' annuities that fostered corruption (cf. Vornetti in this development in Worlds number). The weakness of the class of productive entrepreneurs then explains the relationship between primitive accumulation of capital, the allocation of public resources for these entrepreneurs and corruption (Khan, 1996). The trade restrictions by quotas give value of import licenses to importers competing for the buy, while taxes protect producers operating in the country and block foreign companies (Krueger, 1974). Industrial policies based on subsidies, tax rebates or input price control even create rents for the sector private. Major infrastructure works give rise to procurement contracts very high value and it is in this context that international corruption has flourished (Transparency International Report, 1996, 1997).

3 / The scarcity of public goods in developing countries creates creating queues. More these are important and the property is essential (housing, a phone line commercial, a place in the hospital, a scholarship, water for irrigation), more economic agents will be willing to pay a premium for privileged access. In the presence of free prices (on an official or parallel market) and administered prices (interest rates, exchange rates, currency allocation, commodities subsidized housing), goods that sell to administered prices below the free market price are rare and the competition between economic agents favors corruption (Roemer and Jones, 1989). Corruption reintroduced competition and discrimination by consumer prices. The price of subsidized food items including a bribe may remain lower than it would in a free market, and in this case the liberalization strategies have little chance of getting a popular support if they do not integrate social objective (Bardhan, 1997).

4 / If the reforms to reduce the weight of the public sector and policies regulations should in the long run reduce the opportunities of corruption issues developmentism, the transition to the new standards favors new illegal arrangements. Privatisation (Rose-Ackerman, 1996) and the banks creation permissions are two examples of the new corruption. Furthermore, establishment in the future of competition policy through the development regulatory agencies may allow, in the context of poor governance, the emergence of a new large-scale corruption in the logic of the economy capture (Laffont, Tirole, 1993).

5 / Low salaries in the public sector largely explains the trivialization of petty corruption (Klitgaard, 1989; Besley and McLaren, 1993; and Flatters McLeod, 1995; Mookherjee, Png, 1995). The higher level of civil service wage lower than in the private sector, the greater the temptation of illegal catching up (called rate temptation in the Development Report in the World, 1997) will be powerful (Gambia, Private sector wages are three to six times higher than in the public sector). The opportunities for corruption then become the main motivation for joining the public function. Given the fiscal crisis and adjustment policies, governments often preferred to let inflation reduce the level of wages, rather than decreasing the number of officials. In Latin America, real wages in the public sector fell from 30 to 40% since the early 80s, three times more than those in the

private sector (Naim, 1995). In Africa, in 1983, the real wages of senior officials represented only 5% those of 1975 in Uganda, 11% in Ghana, 30% in Nigeria, 45% in Zambia (Klitgaard, 1997). The power of information asymmetries or totally discretionary powers arbitrary in a context of poor governance, the massive presence of poverty and social violence will explain the importance of the consequences of corruption in developing countries. Causes and consequences are indeed intertwined since many sources of corruption are due to the adaptation of economic actors to the consequences of corruption earlier. Recent econometric studies attempt to address the new institutional concerns about the credibility of the adjustment policies. Besides the theories of endogenous growth stressing the importance of human capital and public capital to explain the good performance of certain countries, many studies have tried to find out what influence of political regimes and stability on the growth or the influence of the size of the government on economic expansion. This is in line these macroscopic methodological work on good governance that empirical comparative analyzes on corruption emerged. The reliability of the sources of data is the first problem with these analyzes. Indeed, data on corruption are fragile because the transactions are by definition secret. It is impossible from the judicial data because definitions of corruption and especially the strength of the enforcement vary widely from country to another. Econometric research has then used subjective data provided by Study agencies on risks posed by various developing countries for investments and loans. The various index rank, noting from 0 (totally corrupt) to 10 (totally clean), for sixty developed and developing countries. These data represent an estimate of the share of the business community. Biases are twofold: i) countries with good economic performance and high levels of corruption that are rated those with the same level of corruption but low growth; ii) internal corruption faced by citizens or local firms is not perceived.

3.3. The causes of corruption: interventionism and a weak judicial system

Ades and Di Tella (1995) examine the role of market structure on the level of corruption for 52 countries. Authors retain four variables to explain the origin of corruption: i) the probability of being politically sanctioned (loss of power), ii) the level of development (measured by GDP per capita) iii) the level of education (such as the capacity indicator to produce and use information). Finally, iv) the level of economic competition evaluated by three sets of data. They conclude that an increase of 4 400 \$ per capita income would improve the classification of the country in the two-point corruption index (ex. 6/10 instead of 4/10). Furthermore, an increase of one standard deviation of competition faced by firms in the country would improve the classification of the latter by 0.5 points (eg. 4.5 / 10 instead of 4/10). So they are the same as economic development and under similar conditions of political competition, corruption is higher in countries with markets dominated by a few firms or if domestic firms are protected from international competition. The authors then wrote "that a third of the difference of corruption between Italy and Austria is explained by the reduced exposure of Italy in international competition."

In another article, to capture the effects of repression on the level of corruption, Ades and Di Tella (1997b) try to understand the interaction between the degree of

openness of the economy and independence of the judiciary. The authors find that corruption is higher in countries that closed in countries open to international trade. It is also higher in countries where the legal system is undeveloped or poorly independent. But, the most important from their point of view is that the openness of an economy is particularly effective in the fight against corruption in countries where legal institutions are weak. In countries where the independence of the judiciary is above average, an increase of one standard deviation of competition reduces corruption by 0.4 points, while in countries below the average, the same operation would improve by 2.3 points (eg a score of 6.3 / 10 instead of 4/10).

Ades and Di Tella (1997a) analyze the same logic the effects of the degree of intensity of industrial policy (tax breaks or subsidies) on corruption. The negative effects of corruption (lower investments, Mauro see below) must be subtracted from the positive effects of industrial policy. By integrating data on preferential practices to support national champions on the purchase of property by public authorities, they found that an improvement of a standard deviation of an index on preferential policies would sharply reduce corruption the country concerned. The authors conclude that "Almost half of the efforts of industrial policy and to persons engaged in Research & Development is lost by the distortions involved in the corruption." Similarly, the Report on World Development (1997), by regressing Variables on a corruption index, emphasizes four factors associated with low Corruption: i) Lack of distortions due to economic policies; ii) A system predictable legal; iii) recruitment of civil servants on merit; iv) A small difference between salaries in the private and public sectors. This questioning of the state is tempered by Kimberly work (1997) for 83 countries show that there is a positive correlation between corruption and low level of central government spending. In the 16 countries most corrupt, the average percentage of central government expenditure to GDP is 21%, a ratio below the sample average (32%).

3.4. The consequences of corruption: low investment and growth

Keefer and Knack parallel to (1995) quantifies the impact on investment of more or less respect for property rights, the quality of administration and intensity of corruption, Mauro (1995) highlights a negative correlation between corruption and the rate of investment and between corruption and growth rates for 67 countries during the period 1960-1985. The author found that if a country like Egypt improved its administrative efficiency and reduce its corruption to bring it to the level of that of Argentina (which corresponds to a standard deviation of the index, that is to say a 6/10 instead of 4/10), the rate investment would increase by 3% and its growth rate of 0.5%. According to Mauro, the result is not different if we regress the small or grand corruption (investment improvement respectively 2.6% and 3.4%), there is no support to the explanation of the beneficial effects of petty corruption as a factor of acceleration of administrative procedures. Mauro (1996) writes that "an improvement of one standard deviation of the index allows a 4.2% increase in the investment rate and 0.6% of GNP per capita". The author shows that parallel corruption promotes public spending leading to transactions corrupt. Typically arms expenditure to the detriment of education spending. In a recent contribution, Wei (1997) jointly studied the effects of a tax increase or corruption on investment by multinational

companies from fourteen countries towards forty five host countries. According to the author, increasing the tax rate on companies making direct investments has a significant negative effect on the amount of these investments. He continues "an increase in corruption from a zero level as that of Singapore (rated 10/10) at a high level as that of Mexico (rated 3.25 / 10) is equivalent to an increase in the rate of 21% tax "and therefore greatly reduces the direct investment flows. Brunetti (1995), constructed from data on 28 countries, shows that this is more the uncertainty related to the instability of administrative rules (which corruption is only one element among others) that negatively affects investments as corruption itself. Thus, countries with endemic but predictable corruption (Thailand and Indonesia) do not undergo reduction in investment or growth. The Report on World Development (1997) brought this logic a clue about the stability of corrupt transactions in 69 countries (the predictability of the additional amount to be paid and the benefits resulting from this installment). For the same level of corruption, countries with a more predictable system of corruption have a higher level of investment. By crossing the two parameters (level of corruption and predictability) have obtained four situations each corresponding to an investment rate including: i) Strong unpredictable corruption (12.3%); ii) Strong predictable corruption (19.5%); iii) Low unpredictable corruption (21.3%); iv) 'Low predictable corruption (28.5%). The debate from the econometric work on corruption has finally started, but it is not sure it can be more conclusive than the one on the relationships between democratization and growth. While comparative econometric analyzes have some interest, they also have many limitations, the authors are cautious indeed aware. The direction of causality is obviously the first problem because of «statistical associations» does not give the direction of effects and the more so that models underlying growth are not explicit. Thus, in the new empirical analysis, the fundamental relationship between growth and investment remains problematic, and doubts persist about the relationship between the economic policies conducted and growth. It is difficult to know if these are the characteristics of underdevelopment that foster corruption (the wealth of a country and its growth would explain the weakness of the corruption and its perception) or whether it is corruption that keeps the underdevelopment (less corruption would allow better performance). To avoid these problems Kaufmann (1997) began more modest econometric studies by region (ex. Ukraine) based on responses to detailed questionnaires. Furthermore, regarding the causes of corruption, econometric analyzes seize the moment after the old corrupt interventionist state. They do not explain the new forms of corruption that can thrive with democratization and transition to market economy regulated by the law. Finally, the work does not include as explanatory variables of the diversity of causes of corruption of data on income distribution structures and on the consequences of corruption.

4. The Methodological Framework

4.1 The basic model

To appreciate the impact of corruption on investment, several authors have proposed various theoretical and empirical models that rival relevance. For information, one can refer to the recent contributions of Mauro (2004), which analyzes the relationship between corruption and economic growth. Through a microeconomic approach, it shows that the lack of incentives is a resistance factor enables the corruption that is itself the cause of low

growth. Similarly, Correani (2005) argues that it is difficult to overcome corruption in an environment characterized by great poverty which encourages opportunistic behavior. Like the authors of the above, very few studies that highlight the direct link between the level of corruption and public investment in the empirical literature.

Our analysis for the following model:

$$pubinv = \alpha_0 + \alpha_1 cpi + \beta X + \varepsilon \quad (1)$$

Where *pubinv* means the share of public investment in GDP and *cpi* is the Corruption Perceptions Index provided by Transparency International. As noted above, it is a composite indicator based on surveys of individuals and organizations. He is between 1 and 10. This indicator is important, so that a high score indicates high corruption perception thus facilitating interpretation. Thus, we define the variable *corr* = 10 - *cpi*. “X” a vector of control variables. As we said, to capture the effect of corruption, we have used the Corruption Perceptions Index (CPI). It is an indicator that has been the subject of much criticism in the economic literature. So Williams and Siddique (2008), believe that the limits of the CPI lies in the variability of the questionnaire and the sample countries. They then questioned the credibility of an indicator which varies in time and space? Beyond these shortcomings, Lambsdorff (2004) argues that over time, we can consider that the observed changes in the methodology do not affect the robustness of this indicator. We share this idea because CPI is now used in almost all scientific work fit corruption in their analysis (Swaleheen, 2009 and 2007). α and β represent parameters and ε represents the stochastic perturbation. The matrix X consists of explanatory variables such as economic growth rate (GDP), the degree of openness (trade) calculated by the sum of imports and exports relative to GDP, the share of private investment in GDP (*priinv*) and external debt to GDP (*exd*). Macroeconomic data, which cover the period 1990 to 2017, are from the World Development Indicators Database (WDI) of the World Bank.

The structural form of the model is then:

$$pubinv_t = \alpha_0 + \alpha_1 corr_t + \alpha_2 GDP_t + \alpha_3 trade_t + \alpha_4 priinv_t + \alpha_5 exd_t + \varepsilon_t \quad (2)$$

This equation highlights the impact of corruption on the volume of public investment and we are particularly sensitive to the sign and value of the coefficient of private investment. Equation (3) that allows to link corruption and private investment presents itself as follows:

$$priinv_t = \beta_0 + \beta_1 corr_t + \beta_2 GDP_t + \beta_3 trade_t + \beta_4 pubinv_t + \beta_5 mmo_t + \beta_6 bco_t + \delta_t \quad (3)$$

Where “mmo” and “tb” represent respectively the money (M_2) and the trade balance. The variable *mmo* represents paper money, bank deposits and negotiable debt, all of which may be used immediately as payment. The other variables are defined as above. It may be noted here that among the explanatory variables of the model, there is no delayed value of private investment, as is the case in several studies such as Mo (2001) and Dusek (2005). These economists have shown that there is a very strong correlation

between the volume of private investments in the year (t) and year (t-1). Similarly, there is evidence that it is entirely appropriate to consider only the investments of the current year which have statistically significant effects on economic growth. The main reason for this option is that there are only twelve observations for each variable and it costs in terms of degrees of freedom. The other variable the model are observable over a long period. The objective of this study was to analyze the impact of corruption on the public and private investment and beyond to determine their effects on the level of economic growth, it appears appropriate to specify a model of simultaneous equations. Besides the two above equations, we take a third equation in which economic growth is explained by public investment, private investment and the rate of inflation (ri). The latter variable is calculated based on the consumer price index.

The third equation is as follows:

$$GDP_t = \nu_0 + \nu_1 pubinv_t + \nu_2 priinv_t + \nu_3 ri_t + \theta_t \quad (4)$$

Finally, the simultaneous equations model (SEM) we choose to verify the research hypothesis is as follows:

$$\begin{aligned} pubinv_t &= \alpha_0 + \alpha_1 corr_t + \alpha_2 GDP_t + \alpha_3 trade_t + \alpha_4 priinv_t + \alpha_5 exd_t + \varepsilon_t \\ priinv_t &= \beta_0 + \beta_1 corr_t + \beta_2 GDP_t + \beta_3 trade_t + \beta_4 mmo_t + \beta_5 tb_t + \gamma_t \quad (5) \\ GDP_t &= \nu_0 + \nu_1 pubinv_t + \nu_2 priinv_t + \nu_3 ri_t + \theta_t \end{aligned}$$

4.2 The statistical properties of the variables and the estimator of SEM

The table below provides a summary of the analysis of the descriptive statistics of the model variables (5). With the exception of variables (GDP) and (ri), all other variables are expressed as a percentage of GDP.

Table 1: Descriptive statistics of variables

Variables	Symbol	Average	Maximum	Minimum	Standard-Deviation
Public investment	<i>Pubinv</i>	6,0	11,9	3,0	3,8
Private investment	<i>Priinv</i>	6,3	14,1	5,1	4,6
Growth	<i>Gdp</i>	4,4	8,4	2,3	8,4
Trade openness	<i>Tradeu</i>	45,6	74,7	27,9	4,4
External debt	<i>Exd</i>	72,3	93,6	69,6	4,5
Corruption	<i>Corrr</i>	8,5	6,2	4,9	0,8
Money (M2)	<i>Mmo</i>	13,8	34,4	24,7	2,2
Trade balance	<i>Tb</i>	19,1	31,6	8,9	5,6
Rate inflation	<i>Ri</i>	6,3	24,8	1,7	6,6

Source: Author's estimate based on WDI data and TI.

Overall, it can be noted that the standard deviations are low; which means that the variances are minimal between the variable values. It is therefore not necessary to perform a logarithmic transformation thereof as is often the case for normalizing the series. Regarding the statistical properties of the variables, issues related to the autocorrelation and heteroscedasticity arising in the model of equation (5) were resolved by the respective implementing Baltagi and Li (2001) tests. We verified that the variables are stationary in first differences within the meaning of Im, Pesaran and Shin (2003). The small number of observations does not allow us to consider a long-term analysis through a cointegration test. Like any estimate a simultaneous equations model, it is important to solve the problems of identification. The econometric literature states that identified model is estimable or just identified by the double least squares (DLS) or triples least squares (TLS). However, a model sub-identified (more parameters than equations) remains difficult to estimate (Greene, 2005). A necessary condition for identifiability for a structural equation is that the number of absent exogenous variables thereof is equal to (or greater than) the number of endogenous model variables minus one. In the case of our study, the calculations indicate that the model is identified because the number of endogenous variables is less than the number of excluded exogenous variables:

$$G_1 - 1 < K - K_1 \quad (6)$$

G_1 is the number of endogenous variables, K the number of equations and K_1 is the number of exogenous variables. We can therefore use the (DLS) to the estimator estimates. This estimation method, which is present in two steps, first we estimate the reduced form of the model by ordinary least squares (OLS). Then, we replace predicted values of the coefficients in the initial structural shape to obtain the estimated values of the model (5). The results of the estimates are set forth in the next section.

5. Empirical results

The empirical results of our study are presented in Table No.2. This table shows the results of the estimation of the model with simultaneous equations. The results inspired several comments. Only the main findings and lessons learned are discussed in this section. When considering the results of the first equation of SEM (Simultaneous Equations Model), we can note that all the model coefficients are significant at the 5% level. Corruption contributes to a public investment. This is consistent with the findings of Everhart (2010) and Burguet and Che (2004).

Table 2: Estimation results of the SEM

Estimation with OLS						
	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
pubinv : dependent variable						
Corr	2,64	0,4 ₄	6,5 ₅	0,013	-1,64	-1,56
GDP	4,05	0,3 ₂	4,7 ₈	0,011	0,37	0,83
Trade	2,77	0,2 ₃	5,1 ₆	0,039	0,08	0,92
Priinv	-2,11	0,5 ₈	-0,42	0,056	-0,12	0,14
Exd	-7,54	0,1 ₁	-2,41	0,009	0,27	1,27
_cons						
invpri : dependent variable						
Corr	3,43	0,6 ₀	2,5 ₇	0,054	1,20	2,56
GDP	3,51	1,6 ₉	6,0 ₄	0,074	2,47	4,35
Trade	1,883	0,3 ₂	1,5 ₈	0,093	1,72	3,95
Pubinv	-4,06	0,2 ₈	-2,34	0,032	3,54	5,46
Mmo	4,53	0,1 ₄	6,0 ₉	0,013	-6,45	-2,76
Tb	-0,45	0,7 ₄	-2,52	0,853	3,42	6,22
_cons	-2,94	2,5 ₅	-6,62	0,045	-8,45	-2,34
GDP : dependent variable						
Pubinv	0,23	0,2 ₁	-6,13	0,003	-1,45	-1,23
Priinv	0,17	0,1 ₆	3,6 ₈	0,012	0,76	0,78
Ri	-5,27	0,5 ₈	2,1	0,024	0,13	0,45
_cons	12,12	0,1 ₁	-0,76	0,345	-0,43	0,23

Source: Author's estimate based on WDI data and TI.

It is then possible to support a climate of widespread corruption pushes agents to overestimate the volume of investments in anticipation of their profit margin, provided that all funds are not spent on construction of the infrastructure for example. Considering the results of the third equation, the positive sign and the low value of the public investment ratio shows that these investments have a low value on the level of economic growth. This result confirms the idea that corruption has perverted the evolution of GDP. Mauro (2004) and Mo (2001) arrive at the same results in their studies. The situation is the same when considering the effect of corruption on private investment and on economic growth. Corruption affects positively and significantly the investments of private operators who are not carriers of economic growth. The fierce fight against corruption will then continue to clean up the management and allocation of public

finances. It is also noted that, whatever the variable considered explained or explanatory, the coefficient linking public and private investment has a negative sign. This could partly explain the eviction that the private sector is the result of a state intervention. Corruption exerts a negative impact on the economic growth of the sample countries subject of our study. This finding is the same result of Levine (1993) who has studied the effect of financial development on the economic growth. The main result is that financial development leads to produce a positive impact on growth and on the global productivity factors. Finally, corruption is correlated negatively to economic growth of countries of MENA region essentially through its effect on investment.

6. Interpretations and discussion

This study aimed to determine the effect of corruption on public and private investment in countries of MENA region, to examine their different impacts on economic growth. It also had the ambition to analyze the effect of the economic and political crisis on the evolution of these aggregates. The main results of this study are to highlight three points. The first is that corruption has led to increased public investment which has not, itself, had positive and significant effects on the economic growth of countries studied. This confirms the argument that corruption is an evil that must absolutely fight. So this is the place to invite governments to establish a national authority which would be endowed with exceptional powers of sanction. The second point is that economic and political crisis has profoundly destabilized and undermined the financial system of MENA region and highlighted the corruption phenomenon. The recent remarkable development in the informal and semi-formal sectors with the promotion of micro-finance institutions allowed thousands of citizens to better cope with poverty. However, the negative effects of corruption and socio-political instability have affected the management of the resource mobilization structures and diminished private investments of households. The third point is that public investment has an eviction effect on private investment. Yet, it is acknowledged, in the economic literature and in practice, that the private sector has an important role on economic growth. In light of these conclusions, governments should establish strong and credible institutions to better fight corruption. This could be achieved by developing a plan outreach director of all political and economic actors to harm of corruption in these countries. This plan could be revised and improved every decade depending on the evolution of the Corruption Perceptions Index.

7. Conclusion

Economic analysis shed light on the causes of corruption using concepts of asymmetric information, discretion, and monopoly and annuity research. However, the logic of agency models poorly explains the presence of honest economic agents. Similarly, analyzes rent seeking are suitable only illuminate the failures of public policies and not success stories. Various models have also exposed the ambivalence of the consequences of corruption, and so question the reformers on the priorities of the fight against corruption. In addition, the early economists discussions on political systems of developing countries to better understand the diversity of the configurations of corruption from the market power of ideas or social networks. It seems precisely that the first results

of econometric analyzes still suffer from not integrate sufficiently the influence of the variety of political regimes on corruption. Yet it is, with different types of structures economic markets and the degree of poverty, the origin of the variety of configurations of corruption. The future economic research should then make an effort in a more historical leadership and institutional to explain the variety of socio-political transactions that grow in developing countries and explain specifically how the most corrupt Asian countries have nevertheless developed rules law and sound macroeconomic management. They should likewise continue to integrate normative equity concerns to better grasp the relationships maintained by economic rationality, political and social (and not always to the disadvantage of the latter two) in periods of transitions. It is already in the sense that the concern of international institutions, for corruption, has increased thanks to the new role given to the "good governance". This inflection approach offers hope for administrative necessary reforms from a broader spectrum than the withdrawal of the State advocated previously, strengthening research on social sustainability of reforms. However, strategies to improve governance may not offer the least developed countries from the time when the solution strengthening state action capacity is a cost that may be inconsistent with the adjustment policies. The question of the effectiveness and equity of development strategies then remains full for least developed countries.

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