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12 June 2015

Online at <https://mpra.ub.uni-muenchen.de/65004/>
MPRA Paper No. 65004, posted 13 Jun 2015 06:50 UTC

Control of corruption, Action of public power, Human capital and Economic development: Application two sectors of education and health in the MENA region

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Abstract:

The objective of this article is to study the direct and indirect effects of corruption control via the action of public power on economic development (economic growth, education, health, etc.). This work also seeks to show spending on areas of education and health to improve the skills and human capital levels of education. Finally, we try to test the complementarity between the role of the action of public power and control of corruption (anti-corruption) in a context of economic development while using the models of simultaneous equations for our area of MENA study, during a definite period (1984-2012).

Keywords: Economic growth, control of corruption, action of public power, Human capital and Models of simultaneous equations.

JEL Classification: C13, J24, K 0, F24 and C33

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Résumé :

L'objectif de cet article est d'étudier les effets directs et indirects du contrôle de la corruption via l'action du pouvoir public sur le développement économique (croissance économique, éducation, santé, etc.). Ce travail cherche aussi de montrer les dépenses allouées aux secteurs de l'éducation et de la santé pour améliorer les compétences et les niveaux de scolarisation du capital humain. Finalement, nous tentons de tester la complémentarité entre le rôle important de l'action du pouvoir public et le contrôle de la corruption (anti-corruption) dans un contexte du développement économique tout en utilisant les modèles à des équations simultanés pour notre région d'étude MENA, durant une période bien déterminée (1984-2012).

Mots clés : Croissance économique, Contrôle de la corruption, Action du pouvoir public, capital humain, et Modèles à des équations simultanés.

Classification JEL : C13, J24, K0, F24 et C33.

1. Introduction

The abundance of empirical work provides a clear idea about international differences in annual per capita GDP accounted for by differences between the ways of governance and also between institutional quality. Developing countries could improve their economic performance while appyant on the quality of their institutions, they-fixing rules on economic matters that are necessary for economic growth during the period of operation. So, good institutional quality complies with the law, resolve conflicts, protect property rights and maintain order. It guarantees a very efficient management of public goods, an efficient bureaucracy, significant public investments in education, health and infrastructure. Thus, « *the problems of governance, transparency and accountability, public strongly handicapped the economic, social and human, by building barriers to investment and reducing the country's ability to optimize the use of its resources and to further improve the living conditions of citizens* ». (Karim Ben Kahla, 2013)

As part of this work, we choose another more channel that also reflects a very clear path illuminating public corruption in some areas. Indeed, the general idea of this path is the following: "Governance is the institutional image of a country where corruption exists or not in the world into consideration." Furthermore, economic governance encompasses the central decisions of economic activities provided in a nation or country in a framework with the rest of the world. It inevitably has significant consequences on growth and institutional quality.

We close our econometric study how the public power (government efficiency and the fight against corruption) promotes the development (in sectors of education and health). *That Is the control of corruption promotes the development of basic sectors such as health care and education?*

In this context and according Ablo and Ritva (1998), corruption can reduce the impact of public spending on education and health on social performance (literacy or illiteracy rates, mortality rates or life expectancy) and weakens the quality of services provided. Reducing this scourge would significantly improve in terms of child mortality and primary enrollment rates by Gupta et al. (2001). In addition, « *corruption affects the share of expenditure in GDP allocated to different sectors of the economy negatively for health and education spending* ». (Mauro, 1998)

Tiongson and Gupta (2003), in this area, treated the negative impact of corruption on human development while showing that corruption was detrimental to the health status and educational level of the population, but also it generated a loss of efficiency of health and education spending. This work will focus on the empirical side and will review the results, interpretations and discussions by comparison of the main empirical studies and previous studies while comparing the results for the MENA region. To do this, we will specify the models used and we will conduct the main tests of key assumptions for our estimate of simultaneous equations models. We will have to press a few education and health indicators. For the first great line (education), we use the ratio of educational expenses and those of research and development (% of GDP) to know the percentage of this expenditure in the total consumption of the country and also to know well the illiteracy rate (ignorance) in some world regions. Regarding the latter sector (health) will set the study of corruption in the health sector while focusing on purely health indicators such as rates of public health expenditure (% of GDP) and the child mortality rate as we will have an idea on Are the capacity of health spending can reduce the mortality rate in these countries.

In addition, the relative question of public spending and corruption is already treated by Gupta and Tiongson (2002) treated it generated a loss of efficiency of health and education spending. But, *querying control there will be corruption effective in the fight against corruption? Is it-that the sustainability of public spending in basic social sectors (education and health) by political decisions (action of public power) remains adequate to the development of countries?*

The majority of the worlds third countries or developing countries and to sustainable and lasting development, we choose to explain the growth rate, control of corruption and human capital, as variables of both endogenous and exogenous. These indicators are explained by other structural and institutional indicators. The answer to the central question involves the following additional questions:

-To fight against corruption (corruption beyond control), public spending on education and research -they are able to innovation in research and reduce ignorance in our sample (MENA and OECD)?

- The government effectiveness in the fight against corruption remains the only element necessary for public health spending should be accompanied by a low mortality rate and an improvement in the quality of services for the same areas of study and during a definite period (1984-2012)?

2. Revue de la littérature

2.1. Education and health institutional determinants of corruption: action of public power

The many works of the first offer several possible prospects of deepening the analysis of the implications of the institutional context on the level of public funding. Thus, the relationship between public spending and economic growth has been studied in many empirical studies.

The contributions of Tanzi and Schuknecht in 2003 showed that "*public finances do not carry long-term growth. This can be explained partly by the existence of crowding out of private investment by public investment, and secondly by poor mobilization and inefficient allocation of public revenue.*"

Indeed, some recent work Schuknecht Afonso, Ebert and Thone (2005) showed that "*if public spending is good, then the products services following expenditures are efficient and can generate economic growth.*" The notion of public spending and its performance in the economies has been analyzed by several authors (Easterly and Levine, 2003) as a way of governance, which have sought to construct an empirical measure of the performance of public spending in the field of provision of services education, health and legal regulations.

In this context, "*governance is supposed to have a positive impact on the level of income.*" (Hall and Jones (1999), Acemoglu, Johnson, and Robinson (2001), Easterly and Levine (2003) and Rodrik, Subramanian, and Trebbi (2002)). It also has a positive impact on the growth rate of the economy. (Knack and Keefer (1995), Acemoglu, Johnson, and Robinson (2001), Gwartney, Holcombe and Lawson (2004) and Weede (2006)). So in this case we speak of good governance.

Gaudin (2002) states that "*governance refers more to the change in the relationship between politics and economics,*" while for Hamel and Jouve (2006), governance refers more to the questioning of the governability of companies traditional democratic western directed by one central decision-making authority. There are some other authors as Meiseil and Ould Aoudia, (2007) show that "*governance has no impact on growth, but only on the level of income, or even a negative impact.*" So this is bad governance.

The divergence of ideas in a governance context, we drive to talk about another institutional support since good governance offers a good institutional quality and contrast. Many like Kaufmann et al. (2005) developed an interesting approach to measure the quality of political institutions (governance).

Kaufmann, D. and M. Mastruzzi (2005) define governance "*as the traditions and institutions that enable the exercise of authority in a country. It includes how governments are established, monitored and replaced; the ability of the government to formulate and implement sound policies; and the respect of citizens and the condition of the institutions that govern economic and social interactions among them. The indicators measure six broad areas of governance: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and finally the control of corruption*".

According to these authors North (1990, 1995), Kaufmann, Kraay and Mastruzzi (2004), Clague, Keeferet and Olson (1995), Alesina and Perotti (1996), effective institutions can contribute to improved economic performance and success of reforms. Some other neoliberal authors like Acemoglu, Johnson and Robinson (2004), Rodrik, Subramanian and Trebbi (2002) argue that "*the quality of institutions is vital not only for the revival of growth, but mostly for development. It is the only factor determining the level of development*". It appears that good governance, as there are in OECD countries, is based mainly on control of corruption within the government to show the effectiveness of public power.

However, the most debilitating institutional factors in the quality of governance vary by region. It appears that, for the MENA region, the quality of the judicial system and bureaucratic quality are the most debilitating factors in the quality of governance in the region.

Gupta, Davoodi and Tiongson (2000) showed that "*the effect of corruption on the provision of public education after the regression of various indicators of academic progress (failure rate in primary school, rates of illiterate, can be accepted as evidence of quality public education services on a constant and the corruption index*".

2.2. Effectiveness of the action of the public power

It reflects "*the perception of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of the formulation and implementation of policies and the credibility of the commitment these government policies*". (Kaufmann et al. 2003)

It is a measure of the competence of the public bureaucracy and quality of public services. This variable is mainly explained by the following:

- The quality of public policy.
- The quality of government staff.
- The twists can affect the quality of government staff.
- The ability of the government to develop new programs.
- The probability that when a government agent violated the rules, another agent can go to another agent (or above) and obtain correction of the irregular act.
- The extent of the length of time spent by economic agents with bureaucrats; either bureaucratic delays.
- The quality of services provided by the state.
- Predictability of changes in the rules and laws.
- The transparency of decentralization.
- The competence of the staff in the public sector in relation to staff skills belonging u private sector.
- The waste in government spending.
- The level of exposure of the public services to political interference.

Finally, this trend mesuer "*Government Effectiveness*" is insufficient to give the exact institutional indicator.

3. Choice of variables and Estimation Methodology

3.1. The action of the public power and the triangle "Growth, Control of Corruption and Human Capital": A Simultaneous Equations Model

Our goal is to study the direct and indirect effects of control of corruption through the action of public power on economic development (economic growth, education, health, etc.). and also to show the importance of spending on areas of education and health to improve the skills and human capital levels of education. We will adopt the estimate by the simultaneous equation models that meet, mathematically speaking, the following three equations:

$$\textit{*The Growth Equation: } Y_{i,t} = \alpha_0 + \alpha_1 G_{i,t} + \alpha_2 K_{i,t} + \sum_{i=3}^4 \alpha_i X_{i,t} + \varepsilon_{i,t}$$

$$\textit{*The Control of Corruption Equation: } Z_{i,t} = \beta_0 + \beta_1 Y_{i,t} + \beta_2 K_{i,t} + \sum_{i=3}^3 \beta_i G_{i,t} + \mu_{i,t}$$

$$\textit{*The Humain Capital: } K_{i,t} = \delta_0 + \delta_1 Y_{i,t} + \delta_2 G_{i,t} + \sum_{i=3}^4 \delta_i R_{i,t} + \omega_{i,t}$$

In order not to complicate things and simplified, these equations become like this:

$$GDP_{i,t} = \alpha_0 + \alpha_1 GE_{i,t} + \alpha_2 HK_{i,t} + \alpha_3 CV''_{i,t} + \alpha_4 TRAD_{i,t} + \varepsilon_{i,t} \quad (A')$$

$$CC_{i,t} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 HK_{i,t} + \beta_3 GE_{i,t} + \mu_{i,t} \quad (B')$$

$$HK_{i,t} = \delta_0 + \delta_1 GDP_{i,t} + \delta_2 GE_{i,t} + \delta_3 Ed_{i,t} + \delta_4 St_{i,t} + \omega_{i,t} \quad (C')$$

($i = 1 \dots 17; N = 493; t = 1 \dots 29$)

Avec ;

$$Y_{i,t} = GDP_{i,t}$$

$$Z_{i,t} = CC_{i,t}$$

$$K_{i,t} = HK_{i,t}$$

$X_{i,t} = CV_{i,t}$ et $TRAD_{i,t}$, with $CV_{i,t}$ is the vecteur $Pop_{i,t}$, $In_{i,t}$, $GC_{i,t}$ et $FDI_{i,t}$

$$G_{i,t} = GE_{i,t}$$

$$R_{i,t} = ED_{i,t} \text{ et } HE_{i,t}$$

$\varepsilon_{i,t}$, $\mu_{i,t}$ et $\omega_{i,t}$ are respectively the random variables of the equations A, B et C.

** Development of equations (A), (B') and (C') for the MENA region*

First, we start with the first equation of the model; This is the equation of economic growth which will be explained by the human indicator and the control of corruption indicator via the action of public power 'was justified by the public intervention in economic activities. For MENA, we adopt macroeconomic indicators and existing values in the World Bank website. Then equation (A') is written as follows:

$$GDP_{i,t} = \alpha_0 + \alpha_1 GE_{i,t} + \alpha_2 HK_{i,t} + \alpha_3 CV''_{i,t} + \alpha_4 TRAD_{i,t} + \varepsilon_{i,t}$$

Avec ; CV'' is an indicator that includes the variables as (*Inv.*), (*FDI*), (*POP*) et (*GC*)

The equation becomes while taking into account the ratings assigned to the MENA region as the human flag (**HK**) and the opening indicator (**TRAD**).

$$GDP_{i,t} = \alpha_0 + \alpha_1 GE_{i,t} + \alpha_2 HK_{i,t} + \alpha_3 FDI_{i,t} + \alpha_4 Inv + \alpha_5 Pop + \alpha_6 GC + \alpha_7 TRAD_{i,t} + \varepsilon_{i,t}$$

Then we will develop the second corruption check equation (**B'**) that explains this better noted indicator (**CC**) with the indicator of economic growth (**GDP**) and the indicator (**HK**) and we added a variable of effectiveness of government (**GE**).

$$CC_{i,t} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 HK_{i,t} + \beta_3 GE_{i,t} + \mu_{i,t}$$

The third human capital equation (**C'**) will be developed to explain the human flag (**HK**) by the indicator of economic growth and corruption control flag (**CC**) while taking into account the variables of education (**ED**) and health (**HE**). For education be explained by three variables such as public spending as a percentage of **GDP** to education (**PSE**) and research and development (**RD**) and ignorance rates (**IR**), while health is explained by two indicators namely public spending as a percentage of GDP in health (**PSH**) and mortality rates (**MR**).

$$HK_{i,t} = \delta_0 + \delta_1 GDP_{i,t} + \delta_2 GE_{i,t} + \delta_3 ED_{i,t} + \delta_4 HE_{i,t} + \omega_{i,t}$$

This equation (**C'**) becomes as follows:

$$HK_{i,t} = \delta_0 + \delta_1 GDP_{i,t} + \delta_2 GE_{i,t} + \delta_3 PSE_{i,t} + \delta_4 RD_{i,t} + \delta_5 IR_{i,t} + \delta_6 MR_{i,t} + \delta_7 PSH_{i,t} + \omega_{i,t}$$

3.2. Preliminary tests

The tests mandatory assumptions for estimating simultaneous equations models, a series of conventional econometric tests will be directed to the composition of equations and variables of the estimated model. First, there is stationarity tests, collinear. Thereafter, we turn to the presentation of the main findings, interpretations and debates compared to previous studies.

** Stationary tests*

We know in advance that to check the stationary panel data, we can have recourse to the first generation of stationary tests. These Types of tests involving 1ère génération panel data are the tests Levin and Lin (1992); Pesaran (1997); and K. Hadri (2000). That said, it should be noted that for the tests of the first generation, they are only applicable on cylindered panels, that is to say without missing data that is the case of our variables. Thus using the test Pesaran (1997), we find that all variables are stationary in levels.

** Study collinearity between independent variables*

Before tackling the empirical analysis underlying our goal, it should be noted that the use of simultaneous equations models is exposed to two possible problems, those of endogenous³ explanatory variables and collinearity between variables independent.

- The first difficulty can lead to biased estimates. To solve this problem, it must pass through instrumental variables. So, practically, it is not easy to find instruments, it is not easy to have data on these instruments. We assume, in this work, that the bias due to this problem is zero.
- The second problem arises when there is a strong correlation between the explanatory variables. A strong correlation leads to poor estimates of the coefficients for the determinant of the matrix (\mathbf{XX}') is almost zero; with (\mathbf{X}) : the matrix of explanatory variables. To solve this problem, it is necessary that the invertible matrix.

³ A variable is said to explain or endogenous in an econometric equation, when it is not independent of error terms, which may cause a bias in the estimates of the coefficients

3.3. Multicollinearity problem and model selection

* Principle

The explanatory variables are highly correlated with the dependent variable. They must be weakly correlated.

* Effects of multicollinearity:

Among the existing consequences in this context, it is the increase of the estimated variance of certain coefficients and also the instability of estimators of the coefficients of least squares. So in case of perfect multicollinearity the matrix ($\mathbf{X}'\mathbf{X}$) is singular, the estimated coefficients is impossible.

* Test Klein:

It is not a statistical test in terms of a hypothesis test, but simply a multicollinearity presumptive criterion. There appearance multicollinearity if the coefficient of determination of the full model (\mathbf{R}^2) is lower than the correlation coefficients ($\mathbf{r}^2 \mathbf{x}_i, \mathbf{x}_j$) and we need to compare the R correlation coefficients (\mathbf{R}_{X_i, x_j}) that appear in the coefficient matrix correlation.

* Test Farrar and Glauber

Insofar as the empirical value of χ^2 is greater than the value read from the table, there is assumption of multicollinearity.

* Correct multicollinearity:

When specifying the model, we eliminate the explanatory series could be correlated and represent the same phenomena and increase the sample size if the added observations differ from the first. To correct the regression channel: this is a purely numerical response of transforming $\mathbf{X}'\mathbf{X}$ in $(\mathbf{X}'\mathbf{X} + \alpha\mathbf{I})$ where α is an arbitrarily chosen constant. We increase and the first diagonal and "digital" effects of multicollinearity are reduced.

* Other methods

The first method is the stepwise regression procedure identical to the previous, except that after the incorporation of a new explanatory variable, the Student t of each of the previously selected variables are examined and variables with t Student is below the threshold are eliminated.

3.4. Identification problem of the model equations

The model identification requirements are determined by equation equation. Three situations may arise.

- The sub-model is identified, if a model equation is sub-identifiable (that is to say that there are fewer equations than to identify parameters in the structural form). In such a situation, the system is impossible to solve.
- When all the equations are "just" identifiable, the model would be "just" found.
- The model is over-identified if the model equations are either "fair" or on-identifiable identifiable. When the model is under-identified, it is impossible to estimate its parameters and modeling must be re-specified. The model identification requirements are the subject of a sometimes complex development.

In the following, we will limit our analysis to the study of simple rules that are, in practice, applied first. The most applied identification requirements are the conditions of order and rank conditions. However, to make these identifications, it is essential to check whether there are any restrictions to be considered in this study or not. There is a restriction on a coefficient of the structural shape, each time a parameter is constrained to be equal to a determined value. There are two types of restrictions that can be identified, namely the exclusion restrictions and linear restrictions.

** Exclusion Restrictions*

This restriction is to assign a zero coefficient for each endogenous or exogenous variable that does not appear in a structural equation. In our model, the variable "GE" is in the first equation and, respectively, at the second and third equation. Likewise, the variables "POP", "IN", "TRAD", "GC" and "FDI" are at the first equation and do not appear at the second or the third equation. There are variables which occur at the second and the third equation and is not available at the first. This amounts to affect all these variables zero coefficients in equations in which they are not included.

** Linear Restrictions*

Some specifications require that the model variables are assigned an identical coefficient. This type of restriction is not present in our model. Once the restrictions on the coefficients performed, it is essential to carry out the identification of the system of equations. There are two conditions identifications: order conditions (necessary conditions) and rank conditions (sufficient conditions).

** The necessary conditions: Order Conditions*

After selecting the variables to include in the model a step prior to the treatment step of simultaneous equation models is to perform model identification tests to select the most appropriate estimation method. In our case, we find for the model to study, all equations are over-identified. Indeed, we have three endogenous variables in the model (whether $W = 3$) "GDP", "CC" and "HK" and exogenous variables eleven "TRAD", "IN", "FDI", "GC", "POP", "GE", "PSE", "RD", "PSH", "MR" and "IR" (whether, $K = 11$)

The first equation has seven exclusion restrictions and no restriction constraint⁴.

By applying the requirements for identification, the variables in the equation of poverty give: $W = 1$, $K = 6$ and $r = 0$ with W is the number of endogenous variables in an equation and K is the number of exogenous variables in an equation. Is therefore: $W - W' + K - K' = 3 - 1 + 11 - 6 = 7 > W - 1 = 3 - 1 = 2$, the first equation is identified-on⁵.

The second equation has seven exclusion restrictions but no constraint restrictions. We consequently $W = 3$, $K = 11$, $W = 1$, $K = 3$ and $r = 0$, which gives us: $W - W' + K - K' = 3 - 1 + 11 - 3 = 10 > W - 1 = 2$, the equation is over-identified. The third equation has six exclusion restrictions but no constraint restrictions. We therefore $W = 3$, $K = 11$, $W = 1$, $K = 8$ and $r = 0$, Which implies $W - W' + K - K' = 3 - 1 + 11 - 8 = 4 > W - 1 = 2$, the third equation is on-identified. Since in our model all equations are over-identified, the model will be on-identified.

⁴ When the model contains linear restrictions, we must add the numbers in the second part of equality that is to say we need to compare $W - 1$ and $W - W' + K - K' + r$.

⁵ For more details on order conditions see the work of Bourbonnais (2002).

* Sufficient conditions: rank conditions

If the order of conditions are satisfied, it is also important to check the rank conditions (sufficient conditions). However, in practice, they reveal is difficult or sometimes impossible, to implement. This is what drives us to limit our analysis to the level of verification of qualified order conditions necessary conditions.

* Method SUR (Seemingly Unrelated Regression)

In our case, the presented model is over-identified. The adopted method was the econometric method **SUR** (*Seemingly Unrelated Regression*). This method is suitable for treating this kind of model.

However, our model is characterized by the presence of an endogeneity problem of order two, by its definition, which is why the estimate by the least squares method would triple longer recommended.

The estimation method is based on the principle of applying the ordinary least squares method in three stages. A technique to solve endogeneity problems is to introduce the origin of these problems variables as instrumental variables. However, the version used in this study is that of *STATA 11*. Using the method **2 SLS**, treatment with Stata software allows us to complete resolution of the results to criticize.

4. The variables used in the estimation

Table N°1: Summary measures of the variables used in this estimate.

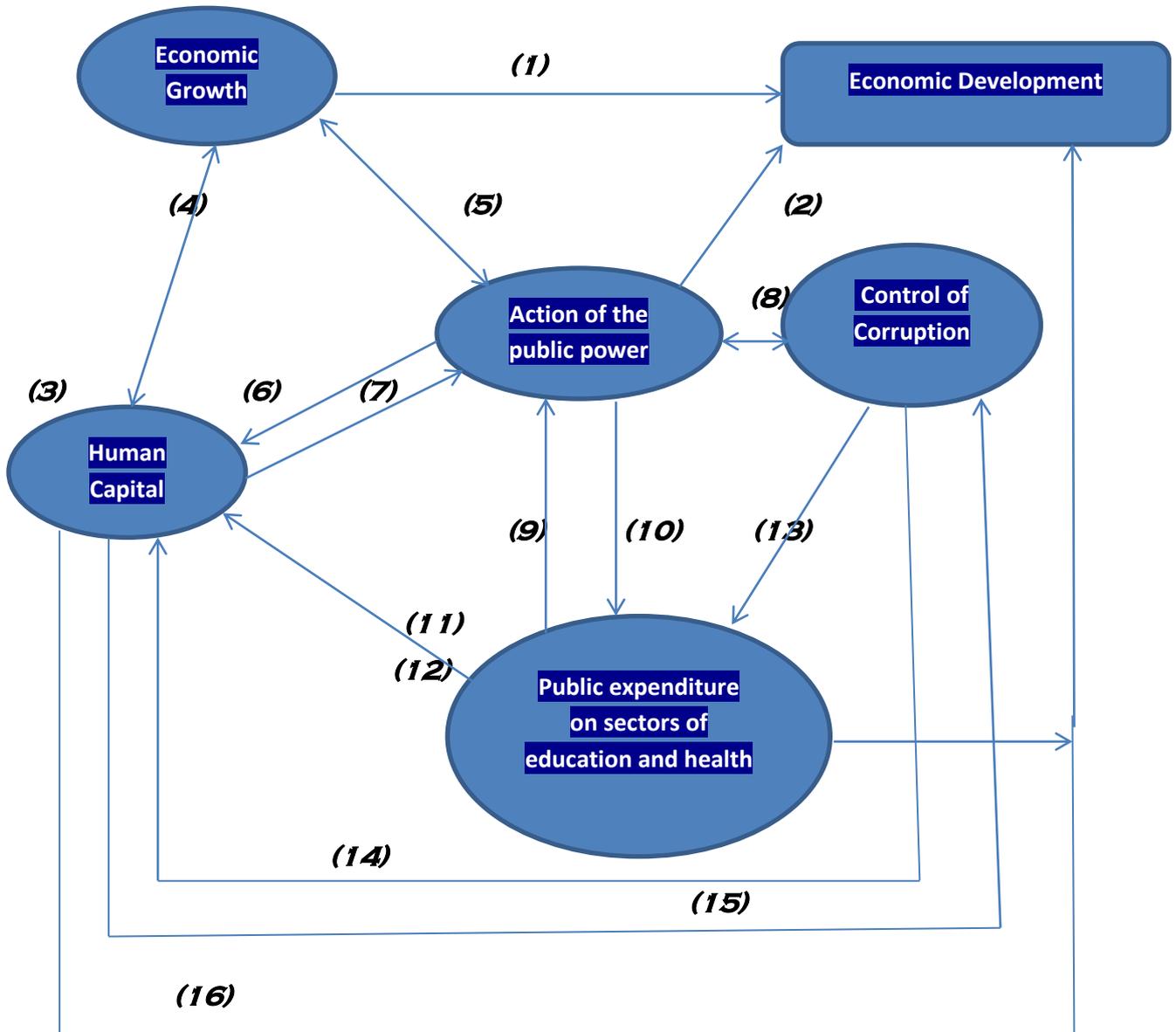
<i>Variables</i>	<i>Formulas</i>	<i>Measure adopted and Data Source</i>
<i>Economic Growth</i>	<i>GDP</i>	<i>The annual growth rate of GDP per capita. (WDI)</i>
<i>Humain Capital</i>	<i>HK</i>	<i>Tertiary enrollment rate. (WDI)</i>
<i>Domestic Investment</i>	<i>IN</i>	<i>The gross fixed capital formation to GDP. (WDI)</i>
<i>Demographic Variable</i>	<i>PDP</i>	<i>The population Growth rate. (WDI)</i>
<i>Foreign Direct Investment</i>	<i>FDI</i>	<i>Net flows of foreign direct investment. (WDI)</i>
<i>Tade Openness</i>	<i>TRAD</i>	<i>The sum of exports and imports to GDP. (WDI)</i>
<i>Government Consumption.</i>	<i>GC</i>	<i>The level of government consumption as a percentage of GDP. (WDI)</i>
<i>Quality of public services</i>	<i>GE</i>	<i>The effectiveness of government. (WGI)</i>
<i>Education</i>	<i>PSE</i>	<i>Public spending as a percentage of GDP to Education . (WDI)</i>
	<i>RD</i>	<i>Public spending on research and development as a percentage of GDP. (WDI)</i>
	<i>IR</i>	<i>Inorance rates. (WDI)</i>
<i>Health</i>	<i>PSH</i>	<i>Public spending as a percentage of GDP in Health. (WDI)</i>
	<i>MR</i>	<i>Mortality rates. (WDI)</i>

Source: Work done by the author

5. Analysis of model results

5.1. Economic growth, control of corruption, Human Capital and Development:

Simple Model



Schema: A simple model for the system of economic development⁶

⁶ The diagram made by the author.

5.2. Effects of the action of public power on growth, on the control of corruption and on human capital

Table N°2: Analysis of the results of the regression model on the effects of public power on growth, on the control of corruption and on human capital.

<i>Variables</i>	<i>Economic Growth</i>	<i>Control of Corruption</i>	<i>Humain Capital</i>
<i>constant</i>	4.192684 (1.78)*	0.0613157 (0.32)*	11.669854 (21.41)***
<i>GE</i>	0.6239878 (1.22)	0.6470029 (9.93)***	-0.2208426 (-13.89)***
<i>GDP</i>	-----	0.0120123 (1.68)*	-0.0028065 (-1.81)*
<i>HK</i>	-0.7631697 (-0.72)	0.3809584 (2.46)*	-----
<i>POP</i>	0.840811 (0.65)	-----	-----
<i>FDI</i>	0.1555243 (1.69)*	-----	-----
<i>GC</i>	1.454449 (0.45)	-----	-----
<i>Inv</i>	0.035726 (0.52)	-----	-----
<i>TRAD</i>	-0.2994704 (-0.78)	-----	-----
<i>PSE</i>	-----	-----	-0.0125085 (-2.77)**
<i>RD</i>	-----	-----	0.2582324 (15.99)***
<i>IR</i>	-----	-----	-3.20e-10 (-0.761)
<i>PSH</i>	-----	-----	0.5167472 (8.23)***
<i>MR</i>	-----	-----	-0.7454766 (-18.81)***
<i>Observations</i>	493	493	493
<i>R²</i>	0.0169	0.1648	0.4855

Note: The terms in parentheses are t-Student and *, **, ***: significant at 10%, 5% and 1% respectively.

** Effects of public power on control of corruption, on economic growth and on human capital*

We recall that the purpose of our study is to test the impact of the control of corruption on development through the action of public power.

In this case, the human factor as an endogenous element that we need to explain plays a key role in explaining the nature of relationship between economic development (application to areas of education and health) and the fight against corruption via action of public power. Our study tries to know the capacity to fight against corruption by applying a control strategy. We then analyze the effects of the action of public power on the variables to explain as corruption control (**CC**) on human capital (**HK**) and on economic growth (**GDP**).

** The direct effect of public power in the control of corruption*

The results show that there is a positive and significant relationship (**1%**) and a positive direct effect (**0.6470029**) between the annual growth rate of **GDP** per capita and the action of public power for the MENA region during the period definite (**1984-2012**).

Indeed, these results show the power and state power to provide programs for the fight against corruption in our first study region (MENA). In this case, the institutional indicator (control of corruption) plays a very important role in the fight against corruption. This positive relationship that combines the action of the public power with the control of corruption is collaborated in *Farida et al studies. (2008); Tanzi and Davoodi (1997)*. According to these authors, "*corruption in general, can hit especially the political sphere where there is the*" big "*corruption leading to distortions in the allocation of development projects related resources. These distortions are all the greater as the level of the control institutions is low.*" It is the complementarity between the action of the public power and control of corruption.

** The direct effect of public power on economic growth*

According to the table N°2, the relationship between the effectiveness of the action of public power and growth is positive but not significant so the control of corruption through the action remains sterile in the region MENA. That is to say, the action of public power is ineffective in the fight against corruption as it hinders growth and also the development. In this context, according to Mauro (2005), any improvement in the fight against corruption will have a positive effect on economic growth. This idea is also supported with the work of Kaufman, Kraay and Mastruzzi (2003). That is why the fight against corruption through the effective action of public power can block some parts reproduction of corruption in attracting foreign investors. Moreover, the action of the public power has a positive indirect effect on foreign direct investment (**FDI**) and significant (**10%**).

This positive impact between controlling corruption and foreign direct investment encourages investors to boost production and improve economic growth because corruption can hit this essential component (**FDI**) in economic growth. (Mauro, P. 2005).

According Pellegrin and Gerlach (2004) specifies: "*five transmission channels through which corruption affects growth, the most important of which are investment respectively, FDI and trade.*" In another study developed by Shleifer and Vishny (1993), corruption systems that are more predictable have a negative impact on lower foreign direct investment that systems are less predictable. According to Wei (1997): "*the effect of uncertainty of corruption on foreign direct investment is negative and statistically significant. In addition, control of corruption through public intervention a positive impact on the majority of other economic indicators such as structural indicators*".

In total, Ali and Houdan (2003) argue that a good knowledge of the determinants of corruption can help the authorities to put in place measures to weaken its harmful effect on investment and also on growth. Then, according to Bardhan Purana (1996): "*the possibility for the state to control corruption depends on its vis-à-vis credibility of its people and the establishment of credible institutions and strong.*"

We are talking about good governance with an efficiency of power and government power that enables us to provide a better institutional quality fighting against corruption while directing human capital in the correct pattern of growth for this area of study.

* *The effect of corruption control through the action of public power on human capital*

To test the effects of corruption control (CC) through public action and decisive decisions on human capital depending on the expenditure allocated to develop the basic social sectors, we have adopted the models of simultaneous equations that can be comparable with the work of Seka (2013) all by using an indicator of control of corruption rather than corruption perception index to test the corruption control input relation and development to which we added a third equation on our contribution in the model of simultaneous equations of human capital and we also adopt the same approach as that of Ouattara (2007).

The results of the panel data estimates we made describing the effect of the action of public authority on human capital is negative and significant (1%) during the period 1984 to 2010 for the MENA region. And as a result of the action of the public power in the control of corruption is positive and significant (1%) so the control of corruption has a negative effect on human capital. According Seka (2013): "*the estimate shows a negative and highly significant link between the action of the public power and the enrollment rate for higher education.*"

* *The indirect impacts of the action of public power on spending for education and health*

According to (2013), several channels exist through which corruption affects human capital, but for our work these channels will be between control of corruption on human capital). And to distinguish between grand corruption and petty corruption, we must mention some channels that we choose to develop the rest of this study, namely the allocation of resources (public expenditure on education and health) and training quality (quality of service). The estimation results of the last regression of human capital detect the following:

- Public spending on education are statically significant (1%) and they Have a negative effect on human capital. These results confirm the work of Kim and Moody (1992) and Musgrove (1996) which states that "*public spending in basic social sectors are not effectively allocated and do not allow then to promote economic growth in developing countries.*"

According to Mauro (1997): "*Public expenditure on education as a percentage of GDP are highly negatively correlated with corruption (corruption is high more less is spent on education)*" Similarly, control of corruption is one. clear effect on expenditures for research and development. This effect is positive and significant (**10%**).

Besides, Davoodi and Gupta (2000) show that "*in the same context, that the most corrupt countries spend less on education.*" The authors show that "*a high level of corruption can increase income inequality and poverty reduction through economic growth and weak human capital formation.*"

- Public expenditure on health are statically significant (**1%**) and have a positive impact on human capital (**HK**). This idea is confirmed with the recent work of Afonso, Ebert, and Schuknecht Thone (2005) mounted that "*when public spending is good, then the products services following its expenditures are efficient and can generate economic growth*".

Because of the control of corruption, there is a reduction of corruption "*that would make significant improvements in infant mortality*" (Gupta et al, 2001). In contrast, in our study the mortality rate is negatively significant (**1%**). Davoodi and Gupta Tiongson (2000) show that "*the reduction of corruption can result in significant social gains measured by a reduction in child mortality, a small percentage of babies deaths and a low rate of school dropouts*".

In total, according Delavallade (2006): "*corruption increases public spending share of order and services, energy, and culture in relation to expenditure on education and health.*" Corruption weakens the impact of public spending on education and health on social performance (literacy rates, mortality rates, etc ...) and decreases the quality of services provided (Ablo and Reinikka, 1998).

Thus, corruption may corrupt the contribution of public services, reduce the amount of services and neutralize the quality of state projects. So is the case of the member countries of the MENA region.

5.3. Effects of human capital on economic growth and on control of corruption

* The direct effect of human capital on growth

According to the results table N°2, the link between human capital and economic growth appears not significant and the human indicator has a negative effect on growth. This result does not corroborate with the work of Barro (1991).

In the model Rajhi (1996), "*human capital generates externalities in the productive sector, on the one hand and in the education sector, on the other. The central hypothesis of this model is that educational technology of the individual agent is different from the social planner that is linear.*" So, in the model of Lucas (1988), "*human capital is a key growth while recalling that this model describes a macroeconomic approach of human capital like the endogenous growth models*". Lucas "*shows that there are two sources of human capital accumulation: education and learning by doing (the effects of learning by doing). The analysis of the author follows that of Becker for which growth is mainly determined by human capital.*"

We are talking of skills and expertise that have effects on the quality of services given by this factor as management of public spending that can generate and increase domestic production and develop some basic sectors. In addition, the results confirm the found work Ramon et al. (1998), "*which analyzed the links between education and economic growth, or there is a negative impact on per capita income in most countries; and that economic policies that suppress market forces tend to reduce the impact of human capital on growth. They conclude that the investment in human capital can only have a small effect on growth unless education is acquired and used in open and competitive markets.*" But Nguyen and Schwab (1999) note that "*a positive and non-significant effect of human capital on increasing production.*" They justify this relationship "*not significant by the superiority of the result of learning by doing, which was not taken into account.*"

The impact generated by this work clarifies the non-significance of this relationship, this ambiguity shows insufficient public spending on education and research and development despite its positive effect on human capital but not significant and also what the result follows existence of ignorance in this area (MENA).

5.4. Effects of growth on the control of corruption and human capital

**** The effect of growth on control of corruption***

We note the existence of a positive significant relationship to (1%). So this study causality between indicators (indicator of growth and institutional indicator) is a source of several research works that highlight the passers effects of other variables such as investment (Mauro, 1995) and FDI (Habib and Zurawicki; 2002) and (Larrain and Tavares, 2004). By cons, Gyimah- Brempong (2002) shows that "*the claim that corruption directly reduces the level of economic growth and indirectly deteriorates the quality of public and private investment in Africa.*" In this context, corruption is often associated with poor quality of institutions and functioning of the public sector (Salinas and Salinas -Jiménez -Jiménez, 2007).

In total, the growth rate improves when there is a control of corruption, which remains bound by a good government efficiency (The existence of the action of public power). This idea is developed by Welsch (2004) who finds that "*any reduction of corruption led to an acceleration of economic growth.*"

**** The effect of growth on human capital***

The effect on human capital is significant to negatively (10%). According to Cohen and Soto(2001) provide that "*this difference will decrease only by 2010*". If human capital is an engine of economic growth as the fireplace Lucas (1988) and of technological catch as underlined Nelson & Phelps (1966), we can deduce that the use of a very effective human capital factor can improve economic growth.

So this is not the case for the MENA region, there has diminution presence of the action of public power which translate a Rating Decrease of annual GDP per capita and the absence of the development of economic activities.

* *The direct effects of education spending and health human capital*

For diagnosis of the relationship between education spending and human capital and from the table N°2, there is a negative and significant impact (**10%**) and is explained by the failure on the part expenditure for education in general. But spending on research and development have a significant positive effect (10%) to human capital which shows the importance of this share while improving the quality of education and reducing the rate of ignorance in this area (MENA).

For health spending on human capital, we note that the effect is positive and significant 1% and this conforms with the report of the Committee of the World Health Organization, in the general context of a symposium entitled: Macroeconomics and Health, led by SACHS (2001) which shows that "*the growth of income per head is much stronger than wealth by beginning of period head is low and the infant mortality rate the also.* "

The explanation takes on a political dimension that remains close to this type of social sector. Then the development of the sector through some structural reforms accompanied by an increase in expenses (purchase of new equipment technologically) that serves to improve the quality of services the hospital to decrease the mortality rate. The latter has a negative significant (**1%**) to human capital.

6. Conclusion

The income generated by this work has not clarified the significance of this relationship between human capital and economic growth, this ambiguity has shown the inadequacy of public spending on education, research and development despite its positive effect on capital human, but not significant. This result stemmed from the existence of ignorance in this area (MENA).

However, the link between the fight against corruption and economic development from education and health through human capital. We adopted the estimated model that is identical to that used by Seka (2013) to test the relationship between corruption and development, to which we added a third equation for human capital and we have also adopted the same approach Ouattara (2007).

Moreover, government corruption was explained by the handling of political decisions (in preparation of the state budget) while the corrupt behavior that was presented during the execution of the budget reflected a public corruption. This scourge has affected the allocation of public resources because it diverts the objectives of public resources. Thus, bureaucratic corruption has affected the redistribution of these resources (the way in which to manage the state budget). The weakness of public institutions and market restrictions generate the problem of corruption, which in turn acted on the different institutions of the economy.

Moreover, human capital is the set of knowledge and know-how of a country, its relationship to growth *presqu'évident*. But, misallocation of resources and mismanagement in public spending fall several effects on human capital and also on the health and educational development of the economies of nations.

To do this, we studied the weight of public power and its power efficiency within the MENA region to implement reforms in the fight against corruption by a governance indicator. Following our empirical test, we proved the effect of the control of corruption on economic growth as conceived by the economic literature; We tried to empirically verify the direct and indirect effects between controlling corruption and human capital factor.

In total, we have proven the effect of control of corruption on economic growth as conceived by the economic literature, and we tried to empirically verify the nature of the relationship between the control of corruption and the factor of human capital to distinguish among the different types of corruption.

We have shown in detail the importance of state intervention to reduce the phenomenon of corruption in the management of resources (total public expenditure and

public spending on education and health) countries since corruption as a scourge to both social and economic, may hinder the development of basic social sectors such as education and health. We found that the control of corruption in the public sector (public expenditure) was performed negatively significant with educational expenses. These results confirm the work of Kim and Moody (1992) and Musgrove (1996), which showed that in developing countries public spending in these sectors are not so efficiently allocated and do not allow the promotion of economic growth. According to Mauro (1997), public expenditure on education as a percentage of GDP are highly negatively correlated with corruption (corruption is high more less is spent on education). And because of control of corruption, expenditure on public health was positively influenced significantly, there is a reduction of corruption "*that would make significant improvements in child mortality.*" (Gupta et al; 2001). Moreover, since theoretically, corruption can deteriorate the quality of services offered and managed by governments and to analyze this problem in public spending, we distinguished between political corruption and administrative corruption. In this sense, Delavallade (2006) states that corruption increases the share expenses of order and public services, energy, and culture in relation to health and education spending.

Nevertheless, government efficiency is an indicator of governance (Kaufmann, 2003), the coefficient of this indicator is positive and has a significant direct effect (1%) on the control of corruption in both zones into consideration. These results reflect the weight of the action of government and governance in the way the majority of payas of two regions, the reliability of these results also indicates the suitability of anti-corruption programs (fight against corruption).

The impact necessarily has indirect effects on the human factor, on improving growth following an increase in administrative production and a marked improvement in the quality of services and the development of basic sectors such as industry education and health sector. So the fight against corruption requires political will, a commitment of public power and also citizens because corruption can occur to increase the cost of services of education and public health. » *It will reduce the amount of the provision of public services and it will decrease the quality of services of public health and education. Moreover, an increase in public spending on education and health leads to an increase of public resources, and a reduction in infant mortality rates* ». (Gbewopo Attila, Chambas Gerard and Jean-Louis Combes, 2006).

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Appendixes

<u>Number</u>	<u>MENA region</u>
1	Algeria
2	Bahrain
3	Egypt, Arab Rep.
4	Iran, Islamic Rep.
5	Iraq
6	Israel
7	Kuwait
8	Lebanon
9	Libya
10	Oman
11	Qatar
12	Saudi Arabia
13	Syrian Arab Republic
14	Tunisia
15	Turkey
16	United Arab Emirates
17	Yemen, Rep.

**Descriptive statistics for the model developed for the MENA region*

sum hk cc gdp inv pop trad fdi ir rd pse gc psh mr ge

Variable	Obs	Mean	Std. Dev.	Min	Max
-----+-----					
hk	493	1.183021	.3073372	-1.100672	1.783071
cc	493	-.2609519	1.133996	-14.57475	2.602149
gdp	493	4.682586	6.523964	-42.45112	46.5
inv	493	1.456008	5.00497	.0002134	26.61561
pop	493	2.914263	2.503662	-2.96236	17.48324
-----+-----					
trad	493	-.3006174	1.181017	-4.670521	1.763391
fdi	493	2.023846	3.407211	-5.288191	33.56602
ir	493	1057673	2.35e+07	.042871	5.21e+08
rd	493	.2015047	.2483775	.000029	1.10218
pse	493	3.204447	2.234166	.00011	12.02893
-----+-----					
gc	493	.5446687	.1324617	.1666667	.8733797
psh	493	.6025059	.1607512	.049789	1.058963
mr	493	1.384479	.2818594	.7993405	2.042181
ge	493	-.1623128	.7350647	-1.947088	1.91651

*Correlation matrix for MENA

cor hk cc gdp inv pop trad fdi ir rd pse gc psh mr eg (obs=493)

	hk	cc	gdp	inv	pop	trad	fdi	ir	rd	pse	gc	psh	mr	ge
hk	1.0000													
cc	-0.0515	1.0000												
gdp	-0.0341	0.1050	1.0000											
inv	0.1274	0.0054	0.0014	1.0000										
pop	-0.2527	0.2254	0.0720	-0.1325	1.0000									
trad	0.1199	0.2690	0.0122	0.4123	-0.0019	1.0000								
fdi	0.2523	0.0683	0.0783	-0.0746	0.0938	0.1175	1.0000							
ir	-0.0706	0.0100	0.0074	-0.0099	-0.0170	0.0072	-0.0086	1.0000						
rd	0.0369	0.0757	-0.0860	0.3101	-0.1450	0.2321	-0.1313	0.0285	1.0000					
pse	-0.0858	-0.0917	-0.0897	0.3268	-0.0119	-0.0054	0.0451	0.0539	0.1235	1.0000				
gc	-0.0377	0.3225	0.0435	0.0525	0.1317	0.6466	0.0612	0.0170	0.1700	-0.0605	1.0000			
psh	0.2408	-0.0739	-0.0566	-0.1134	-0.3451	0.1811	0.3297	0.0367	0.0610	0.1231	0.0188	1.0000		
mr	-0.4209	-0.2990	-0.1338	0.1165	-0.2974	-0.1890	-0.2645	0.0562	0.0354	0.1041	-0.2276	0.1385	1.0000	
ge	-0.2196	0.4032	0.0944	0.0769	0.3563	0.4098	0.1178	0.0342	0.3029	-0.0173	0.5160	-0.109	-0.409	1.00

**Analyse des résultats du modèle à équations simultanées.*

sureg (gdp = ge hk fdi inv pop trad gc) (cc = gdp hk ge) (hk = ge gdp ir rd pse psh mr)

Seemingly unrelated regression

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
gdp	493	7	6.461901	0.0169	8.76	0.2704
cc	493	3	1.035283	0.1648	105.16	0.0000
hk	493	7	.2202288	0.4855	472.31	0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
-----+-----					
gdp					
ge	.6239878	.5134135	1.22	0.224	-.3822842 1.63026
hk	-.7631697	1.062232	-0.72	0.472	-2.845105 1.318766
fdi	.1555243	.0917782	1.69	0.090	-.0243576 .3354062
inv	.0357268	.0684096	0.52	0.601	-.0983536 .1698072
pop	.0840811	.1294595	0.65	0.516	-.1696548 .337817
trad	-.2994704	.3837965	-0.78	0.435	-1.051698 .4527569
gc	1.454449	3.243182	0.45	0.654	-4.902071 7.810969
_cons	4.192684	2.352733	1.78	0.075	-.4185892 8.803956
-----+-----					
cc					
gdp	.0120123	.0071706	1.68	0.094	-.0020417 .0260664
hk	.3809584	.1549631	2.46	0.014	.0772363 .6846804
ge	.6470029	.065189	9.93	0.000	.5192348 .774771
_cons	-.6628657	.1907918	-3.47	0.001	-1.036811 -.2889207

hk						
ge		-0.2208426	.0159047	-13.89	0.000	-.2520153 -.1896699
gdp		-0.0028065	.001549	-1.81	0.070	-.0058425 .0002295
ir		-3.20e-10	4.23e-10	-0.76	0.450	-1.15e-09 5.09e-10
rd		.2582324	.0430789	5.99	0.000	.1737994 .3426654
pse		-0.0125085	.0045194	-2.77	0.006	-.0213665 -.0036506
psh		.5167472	.062802	8.23	0.000	.3936576 .6398368
mr		-0.7454766	.0396373	-18.81	0.000	-.8231643 -.6677889
_cons		1.869457	.0641457	29.14	0.000	1.743733 1.99518
