The reality about aid and governance: the threshold theory

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THE REALITY ABOUT AID AND GOVERNANCE: THE THRESHOLD THEORY.
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ABSTRACT:

The aim of this survey is to explain the real impact of aid on governance in the developing countries: including the subsahara and the MENA region during the period 1990-2004 by using the "threshold theory".

Stephen Knack proved that foreign aid had a harmful impact on the governance of the developing countries. But, in this study we used a new econometric approach to test the existence of a threshold and to determine its value. This methodology allowed us to find interesting results in the relation between aid and governance, in the short and in the long run.

Keywords: Foreign aid, Governance, Threshold, Institutions

JEL-Classifications : F35, O19, O16, O40

1.INTRODUCTION:

The allocation of aid could be considered as an unavoidable form of international cooperation between rich and developing countries, which needing huge funds to fight the poverty in their territories.

In many recent economic studies, the effectiveness of aid has been broached by focusing on its impact on the growth of the developing countries. The most of these papers has proved that aid could be a good catalyst to stimulate growth in the recipient countries, and as a result, it could help them to combat poverty in their territories. From this result, we should highlight that assistance has a positive impact on growth, only in the countries with sound institutional environment and reformed policies[1], this deduction reflects a consolidation to the major role of governance in the aid effectiveness topic.

After examining many studies from various generations, we conclude that many papers were limited to the link between aid and growth, neglecting others concepts like the governance which argued by many international institutions, as the key to the improvement of the social and political durability in developing countries.

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[1] Burnside and Dollar (1997), *"Aid, Policies and Growth"* , Policy Research paper 1777, World Bank.

Obviously, the governance has a major role to preserve and improve the economic performances accomplished by the developing countries. The policymakers of the recipient countries could set in motion this concept by focusing on the transparency and the accountability of their institutions to consolidate its credibility and improve the quality of the plans and programs to execute.

This paper is inspired from the working paper elaborated by Stephen knack[2], his survey is focused on the impact of aid on governance in developing countries receiving assistance from donors, the results obtained by the author will be discussed later in this paper.

In our study, the major purpose is to try to determine the impact of aid on governance basing on the threshold theory, which assumes the existence of an assistance level eroding the governance in recipient countries, by using a similar data used by Stephen Knack in his working paper.

2.THE IMPACT OF AID ON THE GOVERNANCE:

The model applied in this survey is focused on the study of Stephen Knack[3], in which the author tried to prove that the assistance could have a harmful impact on the governance in the developing countries, suggesting that:

- A big amount of aid could provide opportunities of corruption in the recipient countries.
- The phenomenon of the "Dutch disease", which suggests the aid allocation could have a counteracting effects on the growth, by weakening the productive sectors of the recipient countries.
- The non linear relationship between aid and growth, which is similar to a reversed U, suggests the presence of a level from which the aid become harmful on growth.

The model elaborated by Stephen Knack in his survey, could be summarized in this form:

$$\text{ICRG} = C + \alpha\text{ICRG}_0 + \beta\frac{\Delta PIB_{par\ tête}}{PIB_{par\ tête}} + \delta\frac{\Delta population}{population} + \lambda Aide + \varepsilon_t \quad (1)$$

In his model, the author used the country risk as a measure of the governance, using the ICRG, International Country Risk Guide as a dependent variable. It depends on a scale containing 18 levels of 3 variables. Each one is measured by a 6 points scale. The 3 components constructing the ICRG are: the corruption in the government, the bureaucratic quality and the rule of law.

[2] Stephen Knack (1999), *"Aid dependence and the quality of governance: A cross country empirical analysis"*, IRIS University of Maryland.
[3] Stephen Knack (1999), *"Aid dependence and the quality of governance: A cross country empirical analysis"*, IRIS University of Maryland.

The inclusion of the initial value of ICRG is used to determine the limited opportunities of the high ranked countries, to promote their scores. The author introduced the changes of the GDP per capita, which could help us to measure the effect of the tax revenues to promote the governance in the developing countries. Stephen Knack used the changes of the population to detect if there are economies of scale in establishing effective institutions, so an increase in the population could be joined by improvements in the governance.

The author used two different measures of the aid, firstly, Knack used the "official development assistance" as a percentage of GNP and secondly, the same aggregate as a percentage of the government expenditure.

3.THE RESULTS OF KNACK:

Stephen Knack found that aid has a harmful impact on the governance of the recipient countries, the results obtained by the author are presented in the table 1:

Equation	1	2
The method	OLS	
The dependent variable	ICRG	
The measure of aid	aid/PNB	aid/gov.expenditure
Constante	8.475 (0.984)	8.535 (1.051)
initial ICRG	-0.77 (0.083)	-0.74 (0.087)
Change of the population / initial population	-0.64 (1.837)	0.027 (1.933)
Change of the GDP per capita/ initial GDP per capita	2.027 (0.748)	1.231 (0.801)
Aid	-0.067 (0.021)	-0.027 (0.01)
N	80	68
Adjusted R^2	55%	54%

Stephen Knack (1999)

Table[4] 1: The impact of aid on the governance of the recipient countries.

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[4] Standard errors are in the parentheses.

It's obvious that countries with a high level of initial ICRG registered a deterioration in them governance, (near 0.75 in them ICRG). The changes in the population couldn't have a significant impact on the governance of the developing countries, the coefficient of this variable are statistically insignificant, allowing us to deduct the lack of economies of scale in the countries studied by the author.

But, from the some table, we can conclude that rises in the GDP per capita are joined with improvements in the ICRG index of the aid recipient countries, so some revenues of the taxes and the fiscal revenues are used to compensate the costs generated by reforms in administrations and institutions of the developing countries studied in this survey.

For the variable aid, it seems that the aid has a significant negative impact on the governance of the countries studied, so a rise by 15 percentage points in the part of aid by GNP received by the developing countries, decline the index of them ICRG by 1 point, and a rise by 35 percentage points in the part of aid by the government spending, decline le level of the ICRG by 1 point.

4.THE THRESHOLD THEORY:

In the last few years, many working papers were focusing on the relationship between aid and growth in developing countries. From these studies, we were interested by an article elaborated by Aruna Gomanee and al[5], where the authors found the presence of a threshold in the impact of aid on growth.

To identify the presence of a threshold in a relationship, we need a solid scientific framework, which represent a renewal in Econometric methodology, this approach has been developed by Bruce Hansen[6]. This technique is able to test the presence of a threshold in an econometric model, and to estimate the model with and without a threshold.

Hansen has developed a scientific technique to test the presence of a threshold in an economic relationship, the econometric modeling is able to test the presence of an endogenous threshold. Which represent an innovation in Econometrics, because many authors interested to identify the presence of a threshold, were required to choose an arbitrary level and to estimate its impact on the model adopted.

In this article, we will try to find if a threshold exists in the relationship between aid and governance, and to determine its value in the short and the long run, for a panel containing: the arabic and the sub-Saharan countries.

4.1.The modeling of Gomanee and al:

In the econometric literature, there is a various ways to determine thresholds in economic relations, like the technique established by Breiman and al (1984), allowing to determine the number of thresholds in an economic relationship, or the approach

[5] Karuna Gomanee, Sourafel Girma and Oliver Morrissey (2003), *"Searching for aid threshold effects"*, Centre for Research in Economic Development and International Trade, Research Paper N°03/15.
[6] Bruce Hansen (2000), *"Sample splitting and threshold estimation"*, Econometrica 68 (3).

developed by Durlauf and Johnson (1995), called "exogenously imposed data splits", which depends on the choice of the author.

In these techniques presented above, there is a major problem in the approach itself, it remains in the arbitrary choice of the author to determine the value of the thresholds and them number. That's why we need a solid technique, based on a solid scientific base to determine thresholds, which has been developed by Bruce Hansen in 2000. The authors used this model to identify if a threshold exists in the relation between aid and growth, by using this form:

$$Y_{it} = Constant + \alpha A_{it} I(A \leq \mu_0) + \varpi A_{it} I(A > \mu_0) + \beta B_{it} + \delta C_{it} + \lambda D_{it} + \varepsilon_{it} \quad (2)$$

Where: A_{it} represents the level of assistance, μ_0 is the value of the threshold and B_{it}, C_{it}, D_{it} : are others explicative variables. ε_{it} is an error term.

Gomanee and al (2003) found that aid has a positive impact on growth for countries receiving an amount of aid more than 2% (of GNP), they interpreted them results by suggesting that the assistance is more effective in poor countries, which received an important amount of aid relatively to their GNP.

4.2. THE NEW MODELING:

In this survey, we will try to find out if a threshold exists in the econometric modeling used by Stephen Knack, and to calculate its value, using the approach elaborated by Bruce Hansen (2000). In this work, we will distinguish between the short and the long run. And we will apply a different econometric modeling than the approach used by Gomanee and al (2003), presented above in this paper.

4.2.1. The model:

In this paper, we will determine the thresholds in the relation between aid and governance according to the approach developed by Bruce Hansen (2000), it is a cross-section panel and it has this form:

- If $Aid \leq \gamma$:

$$ICRG = Cst + \alpha 0\ ICRG0 + \alpha 1 \frac{\Delta GDPpercapita}{GDPpercapita} + \alpha 2 \frac{\Delta population}{initialpopulation} + \alpha 3(Aid \leq \gamma) + \epsilon t \quad (3)$$

- If $Aid > \gamma$:

$$ICRG = Cst + \alpha 4\ ICRG0 + \alpha 5 \frac{\Delta GDPpercapita}{GDPpercapita} + \alpha 6 \frac{\Delta population}{initialpopulation} + \alpha 7(Aid > \gamma) + \varepsilon t \quad (4)$$

Where:

- ICRG is the international country risk guide, reflecting the level of governance.
- Aid is the variable reflecting the level of assistance received by the developing countries.
- $\frac{\Delta GDPpercapita}{GDPpercapita}$ is the variation of the GDP per capita.

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- $\dfrac{\Delta population}{\text{initial population}}$ is the variation of population and ε is an error term.

This survey is focused on a particular panel containing poor and developing countries, they belong to the sub-Sahara and the MENA region, which representing a priority to the United Nations and receiving huge funds from the international community as assistance. This study is based on the period starting from 1990 to 2004, the first year is taken by the United Nations as a reference in the declaration of the Millennium Development Goals and depending to the availability of data.

4.2.2. The data:
For the data, we used a database compiled by Knack and Keefer[7](1995) containing the ICRG index, which level varies between 0 to 100, with 0 representing a maximum risk and 100 the minimum risk.

For the aid, we used the EDA: Effective Development Assistance compiled by Chang and al[8] and used in many recent studies.

For the GDP per capita and the population, we used the World Bank database "WDI": World Development Indicators.

In the short run, we will use these calculations reflecting annual variation of these variables:

- Population change $= \dfrac{\sum_{1990}^{N}\left(\frac{\text{Population}_{t+1}-\text{Population}_{t}}{\text{Population}_{t}}\right)}{N-1990}$ (5)

- GDP per capita change $= \dfrac{\sum_{1990}^{N}\left(\frac{\text{GDP per capita}_{t+1}-\text{GDP per capita}_{t}}{\text{GDP per capita}_{t}}\right)}{N-1990}$ (6)

And for the long run, we will use these levels reflecting the changes for a long period of these variables:

- Population change $= \dfrac{\text{Population}_{N}-\text{Population}_{1990}}{\text{Population}_{1990}}$ (7)

- GDP per capita change $= \dfrac{\text{GDP per capita}_{N}-\text{GDP per capita}_{1990}}{\text{GDP per capita}_{1990}}$ (8)

4.3. THE RESULTS:
After using the program developed by Bruce Hansen (2000), we found interesting results in favor of the presence of a threshold in the relationship between aid and the governance of the developing countries, in the short and in the long run.

In this paper, we will present the results of two different models: the first is containing a threshold and the second is without threshold, the comparison between them will have an important contribution to determine if the "threshold theory" could be a good

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[7] Knack, S. and P. Keefer, (1995), *"Institutions and Economic Performance: Cross-country Tests Using Alternative Institutional Measures"*, Economics and politics 7 (3): 207 − 227.
[8] Charles C. Chang, Eduardo Fernandez-Arias and Luis Serven, *"Measuring Aid Flows, A New Approach",* World Bank, 1998.

argument to explain the harmful impact of aid on the governance of the developing countries.

4.3.1.The results of the short run:

For the short run, the results of the estimation with and without a threshold are presented in the table 2:

Models	A model with threshold		A model without threshold
le seuil	Aid $\leq$ 1.875	Aid > 1.875	None
Constant	57.94** (2.56)	30.07*** (4.44)	31.4*** (3.96)
initial ICRG	0.27 (1.03)	0.19* (1.82)	0.335*** (3.01)
Change of the population	-811.08* (-1.71)	588.54*** (3.59)	304.02* (1.79)
Change of the GDP per capita	-28.93 (-0.15)	183.03*** (4.25)	231.24*** (4.93)
Aid	9.98*** (3.03)	-0.18 (-1.43)	-0.26* (-1.95)
R^2	94.4%	62.1%	58.9%
Threshold	1.8745472		None
Confidence interval	[1.874547 , 2.867266]		None
Heteroskedastic test	0.18		0.34

Table[9] 2: The impact of the threshold of aid on the governance in the short run.

From Table 2, we can conclude that for a model without threshold we found similar deductions to those done by Knack, concerning the aid effect on the ICRG index. A rise in the aid allocation by 1% as a share of GDP is associated with a deterioration in the governance of the developing countries by a quarter, such effect is statistically significant at 10%.

It seems that there is a level of aid from which its effect become negative on the ICRG index, it's equal to 1.875% as a share of GDP of the developing countries, despite this impact is not significant. But, for the countries receiving assistance less than 1.875% as a share of their GDP, the aid could be considered as a good catalyst for the governance promotion, such effect is statistically significant at 1%. So, we can argue that beyond the threshold identified there is a waste of funds allocated from donors to the developing countries, having a limited financial absorption.

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[9] T-students are in the parentheses: *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Comparing the results of models with and without a threshold, we can deduct that the increase in the GDP per capita is participating in the promotion of the governance, helping the governments in the compensation of the administrative costs due to the reforms applied. For a model without a threshold and for countries receiving more than 1.875% as a share of GDP, a rise in the changes of population is joined with improvement in the ICRG index, this is a sign of economies of scale in the building of effective political and institutional institutions.

From the comparison of the level of R^2 from table 2, we can discern that the model with a threshold explains well the facts, since its R^2 is higher than a model without a threshold, so the theory focusing on the existence of a threshold in the relationship between aid and governance, has a powerful explaining ability of the reality of the aid effect on the governance of the recipient countries, retained in this survey.

4.3.2.The results of the long run:
For the long run and After applying the program developed by Hansen, we found other interesting results , summarized in the table 3:

Models	A model with a threshold		A model without a threshold
The threshold	4.63< Aid ≤ 7.41 et ChgPIB < 0.553	Aid > 7.41 et ChgPIB < 0.553	None
Constant	33.15 (1.57)	25.44*** (4.12)	29.81*** (3.44)
initial ICRG	-0.24 (-0.60)	0.09 (0.86)	0.11 (0.70)
Change in the population	47.61*** (4.5)	49.71*** (6.78)	43.51*** (4.45)
Change in the GDP per capita	13.66 (1.53)	21.24*** (4.35)	14.56*** (3.35)
Aid	2.58*** (5)	-0.24* (-1.87)	-0.22 (-1.39)
R^2	98.9%	90.9%	76.7%
threshold	7.4143244		None
Confidence interval	[7.033958 , 7.414324]		None
Heteroskedastic test	0.73		0.44

Table[10] 3: The impact of the threshold of aid on the governance in the long run.

The threshold identified in the long run is only available for developing countries registering a GDP per capita change less than 0.553 between 1990 and 2004, which means a growth in this aggregate less than 3.5% per year.

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[10] T-students are in the parentheses: *Significant at 10%, **Significant at 5%, ***Significant at 1%.

It seems that developing countries registered less than 3.5% per year and receiving aid as share of the GDP less than 7.41%, this aggregate has stimulated the promotion of the ICRG index, this effect is statistically highly significant (1%). But, for countries receiving assistance beyond this level, it appears that aid has a negative impact on the ICRG index, significant only at 10%.

An increase in the change of GDP per capita is joined with an improvement of the governance, this effect is statistically significant at 1%, proving that growth is contributing to finance the political and institutional reforms in the developing countries, by the rise of fiscal revenues.

A rise in the changes in the population is associated with an improvement in the governance of the developing countries, in the models with and without a threshold, proving the existence of economies of scale in the building of effective political and institutional institutions, in the long run.

In the long run, the initial value of the ICRG index hasn't a significant impact on the ICRG index for the developing countries, in the models with and without a threshold, it's a sign that the comparative advantage of the initial level of the governance couldn't affect the promotion of the ICRG index of the developing countries in long period.

Comparing the values of the R^2 of the 2 types of models elaborated in this survey, we can observe that value of this indicator for model with a threshold is more important than model without a threshold, from which we can conclude that the threshold theory has a major contribution to explain the aid impact on the governance, this theory could be considered as an attempt in the right way to explain the reality of aid effects in the developing countries.

5.SUMMARY:

This study is an essay to explain the mysterious effects of aid on the governance of the developing countries. In this paper, "the threshold theory" could be considered as a renewable way to explain the aid effectiveness mystery in the economic literature. Mainly, the assistance attributed by the donors will remain an available tool to enhance the promotion of the governance of the developing countries, regarded as compulsory to preserve the reaching of a sustainable growth and a sustainable human development.

This survey provides a new analysis and empirical evidence recommending the presence of a threshold in the relation lying aid to the governance in the developing countries. This level represents the limited financial absorption ability of the recipient countries, because from this level the assistance effect become harmful on the promotion of the governance of the studied countries.

The exceeding of the thresholds in the short and the long run of assistance, represents a serious danger to the recipient governments, the additional amount of aid will

contribute to the creation of a climate of risk and corruption affecting the competitiveness of the developing countries and the investors decisions (domestic and foreign).

It seems that in the short run, the initial state of the governance has a positive impact on the governance of the developing countries, but the comparative advantage between developing countries in their initial political and institutional environment, hasn't a concrete impact on the promotion of the governance in the long run.

The investigation in long period reveals the presence of a second order threshold for variable aid, limited for countries with variation in the GDP per capita less than 3.5% per year. So we can conclude that growth is contributing to promote the governance of the developing countries in the long run, by financing the costs of the institutional and the political reforms.

The assistance remains an important tool to help developing countries in the finance of their economic development, however, this instrument should be handled with care, because a wrong manipulation could affect the political and institutional environment of the recipient countries, which considered as primordial to attain a sustained human development.

ANNEXES

The countries studied in this survey are: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroun, Chad, Democratic Congo, Congo, Côte d'ivoire, Egypt, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Jordan, Kenya, Madagascar, Malawi, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, Soudan, Syria, Tanzania, Togo, Tunisia, Uganda, Yemen, Zambia and Zimbabwe.

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