



# Foreign aid and economic growth: the case of the countries south of the Mediterranean

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**FOREIGN AID & ECONOMIC GROWTH: THE CASE OF  
THE COUNTRIES SOUTH OF THE MEDITERRANEAN**

**APPLIED ECONOMICS LETTERS, 2010, 8 (3), pp. 187-190**

**Abstract**

Mediterranean countries provide a test case for examining the effectiveness of foreign capital in promoting economic growth. Focusing on the supply side of the economy, the econometric model answers two questions, using available panel data from 1960 to 1996:

- does foreign aid have a positive impact on growth of per capita income?
- does aid substitute or complete domestic savings?

We find three significant results:

- *aid efficiency is indirect*, it is dependent on the way it will be transmitted to other exogenous variables, specially to savings and to FDI and thus, on the efforts of the Mediterranean countries to change in-depth their productive structure;
- *aid must be differentiated*, in its contents as well as in its objectives depending on the development model of the beneficiary country;
- *aid must be more regular*. Aid allocation in south of the Mediterranean is often chaotic and caused by geopolitical logic.

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## **Introduction**

The subject of this paper is to answer two questions :

- does foreign aid have a positive impact on growth of per capita income ?
- does aid substitute or complete domestic savings ?

Econometric study of aid has always met with difficulties and hasn't produced very good results (Islam, 1992), but new works allow to clarify the link between aid and growth in a lot of developing countries. They generally take into account a wide sample of poor or very poor economies. But, numerous middle income countries can't finance their growth either, in particular the countries south of the Mediterranean, and, in this case, the results of the econometric tests are probably quite different. Our sample includes the three North African countries, Egypt, Syria, Jordan, Israel, Cyprus and Turkey. The tests use panel data on the long period (1960-1996). The first area is made up of the three Maghrebi countries, the second area of Egypt, Syria and Jordan and, the last one of Cyprus, Israel and Turkey. This cut-out follows the rationality of aid allocated to the southern Mediterranean economies. All the variables were subjected to unit root tests (or, Dick and Fuller's tests) to avoid artificial regression problem. They are generally stationary once they were differentiated. Estimation methodology by Ordinary Least Squares (OLS) respect temporal behaviour of the variables. The T-ratio linked to each coefficient are indicated into brackets. Finally, we have taken into account dynamics, considering endogenous lagged variable like an exogenous in order to reveal some steadiness in growth rate and foreign capital flows.

### **1. The initial model**

We test the effective contribution of official assistance towards development of the southern countries in two different ways:

- first, the direct effect of aid on growth (ODA)<sup>i</sup> on per capita income growth;
- secondly, the indirect effect of aid on development through the other exogenous variables;

This analysis based on “ expansion methodology ” allows to show aid-growth link fluctuate according to its economic context ; i.e. its saving rate, FDI and exports (Casetti, 1991). The parameters of the initial model are redefined to insert ODA in the first equation<sup>ii</sup> :

(1)  $GGDPC = a_0 + a_1 S + a_2 FDI + a_3 POP + a_4 X$  with GGDPC, the Gross Domestic Product per capita growth, S, the saving rate, FDI, the FDI income ratio, POP, the population growth rate and X, the export growth rate ;

(2)  $a_0 = b_{00} + b_{10} ODA$

$a_1 = b_{01} + b_{11} ODA$

$a_2 = b_{02} + b_{12} ODA$

$a_4 = b_{04} + b_{14} ODA$  where ODA represents the aid income ratio ;

(3)  $GGDPC = b_{00} + b_{10} ODA + a_1 S + a_2 FDI + a_3 POP + a_4 X$  ;

(4)  $GGDPC = a_0 + b_{01} S + b_{11} S.ODA + b_{02} FDI + b_{12} FDI.ODA + a_3 POP + b_{04} X + b_{14} X.ODA$

The first equation results from neo-classic theory on growth in an open economy within domestic savings and foreign aid finance capital accumulation necessary to reach the expected growth.

The initial model to test is :

$$GGDPC_t = \alpha + \beta GGDPC_{t-1} + \chi S_{t, t-1} + \delta POP_{t, t-1} + \varepsilon FDI_{t, t-1} + \phi X_{t, t-1}$$

The results in chart 1 show that all the exogenous variables initially defined have a positive impact on growth. FDI contribution towards growth is essentially due to their settlement in primary and manufacturing sectors in the North African countries. The case of exports is similar ; the positive export growth relationship comes from the substantial openness of most of the southern countries and from the exports of gas and oil products. On the other hand, the coefficient tying per capita income growth and savings in the second area, masks capital flies in Jordan where saving rate is more often than not negative on the period.

**Chart n°1 : initial growth model (\* : gives the T-ratios)**

Furthermore, the demographic variable is assumed curbing growth in the countries south of the Mediterranean. However, reality seems to be more different. Most of these countries have achieved substantial efforts as far as birth control is concerned, but, they are not so obvious in the Maghrebi countries. One can think that a positive coefficient linked to the POP variable is not always a wholesome growth guarantee, as far as population growth curbs capital labour substitution and, consequently, technological renewal.

We now integrate aid direct impact on per capita income growth in order to see if capital flows change the previous results and if they have a positive contribution on development. While some economists suppose that growth rate increases with investment rate, itself being improved with foreign aid, others show that investment increase is not sufficient to reach a high level of growth and aid can lead a rise of aggregated consumption as well as investment.

## 2. The aid direct effect

$$GGDPC_t = \alpha + \beta GGDPC_{t-1} + \chi S_{t, t-1} + \delta POP_{t, t-1} + \varepsilon FDI_{t, t-1} + \phi ODA_{t, t-1} + \gamma X_{t, t-1}$$

with ODA : ODA share in GDP (in %).

The results in chart 2 show that :

- in the case of the whole sample as well as of the different areas, aid has a significantly negative impact on per capita income growth on the long period. It could be explained by the fact that foreign capital flows finance emergency projects and short term requirements or, they are used in sectors with weak spillover effects on economy ;
- on the other hand, domestic savings and exchange openness have always a positive impact on development, domestic capacities and trade being more efficient than Official Development Assistance. This result reinforces the “ Trade-No Aid ” theory ;
- finally, if one distinguish ODA from FDI, aid can have a lagged effect on growth whereas FDI have a short term one. In fact, Assistance is used to finance infrastructure projects with a weak immediate impact because of their strong capital output ratio. Direct investment, on the other hand, is directly tied

to technology transfers. The extent the southern countries take advantage of this growth potential depends on their political stability and/or their economic system.

If we only consider aid direct effect on growth, as for the most part of the studies, the results with panel data show that there is an opposite relationship between aid and per capita income growth. Does the insertion of aid indirect effect change the previous outcomes ?

**Chart n°2 : Aid direct effect on growth** (\* : gives the T-ratios)

### 3. The aid indirect effect

Aid is supposed to have a positive impact on growth through other exogenous variables. The equation to test is :

$$GGDPC_t = \alpha + \beta GGDPC_{t-1} + \chi S_{t,t-1} + \delta S.ODA_{t,t-1} + \varepsilon POP_{t,t-1} + \gamma FDI_{t,t-1} + \eta FDI.ODA_{t,t-1} + \iota X_{t,t-1} + \varphi X.ODA_{t,t-1}$$

**Chart n°3 : Aid indirect effect on growth** (\* : gives the T-ratios)

When interactions between ODA and other explanatory variables are taken into account, we note that :

- savings, FDI and exports always have a significant direct effect on per capita income growth ;
- the coefficient linked to the interaction between aid and savings is generally positive. Two explanations can be stated : aid is either allocated to higher saving rate countries, which seems the case of countries in areas 1 and 3 or completes domestic savings. It thus reinforces its significant positive contribution to development. One note that in the case of North African countries, aid has an immediate positive impact on domestic accumulation but it becomes negative in the medium and long term : there is either a substitution effect between these variables, or savings, too much concentrated on a single sector, the gas and oil one, have no effects on the productive structure as a whole ;
- finally, aid is either allocated to higher FDI rate countries, or, it takes the place of foreign private investments. If we compare FDI and aid development, we opt for the first explanation<sup>iii</sup>.

## Conclusion

At the end of this study, it isn't possible to say that aid is efficient or not, but we can conclude that :

- *aid efficiency is indirect*, it is dependent on the way it will be transmitted to other exogenous variables, specially to savings and to FDI and thus, on the efforts of the Mediterranean countries to change in-depth their productive structure ;
- *aid must be differentiated*, in its contents as well as in its objectives depending on the development model of the beneficiary country. Instead of aiming at a structural adjustment logic, aid must tend to reinforce the density of the productive system and to bring it towards people consumption needs ;
- *aid must be more regular*. Aid allocation in south of the Mediterranean is often chaotic and caused by geopolitical logic (Teboul and Moustier, 2000). This lack of rationality probably leads to unstable econometric relationships on time.

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**Chart n°1 : initial growth model (\* : gives the T-ratios)**

|               | Cst              | GGDPC <sub>t-1</sub> | S               |                 | FDI             |     | X               |     | POP             |     |                               |
|---------------|------------------|----------------------|-----------------|-----------------|-----------------|-----|-----------------|-----|-----------------|-----|-------------------------------|
|               |                  |                      | t               | t-1             | t               | t-1 | t               | t-1 | t               | t-1 |                               |
| <b>Panel</b>  | 0.016<br>(3.64)* | 0.104<br>(1.84)      | 0.439<br>(5.25) | 0.157<br>(1.88) | 1.092<br>(2.80) |     | 0.049<br>(2.34) |     |                 |     | R2 :<br>0.199<br>DW :<br>2.01 |
| <b>Area 1</b> | 0.011<br>(1.88)  |                      |                 |                 | 1.418<br>(2.72) |     | 0.076<br>(2.46) |     | 3.749<br>(4.23) |     | R2 :<br>0.262<br>DW :<br>2.18 |
| <b>Area 2</b> | 0.012<br>(1.76)  | 0.333<br>(3.57)      | 0.436<br>(4.58) |                 |                 |     |                 |     |                 |     | R2 :<br>0.245<br>DW :<br>2.17 |
| <b>Area 3</b> | 0.025<br>(2.91)  |                      | 0.677<br>(3.00) |                 |                 |     | 0.107<br>(2.27) |     |                 |     | R2 :<br>0.256<br>DW :<br>1.82 |

**Chart n°2 : Aid direct effect on growth (\* : gives the T-ratios)**

|               | Cst                  | GGDPC <sub>t-1</sub> | ODA               |                   | S               |                 | FDI             |     | X               |     | POP |                         |
|---------------|----------------------|----------------------|-------------------|-------------------|-----------------|-----------------|-----------------|-----|-----------------|-----|-----|-------------------------|
|               |                      |                      | T                 | t-1               | t               | t-1             | t               | t-1 | t               | t-1 | t   | t-1                     |
| <b>Panel</b>  | 0.015<br>(3.36)<br>* | 0.097<br>(1.72)      | -0.427<br>(-2.74) |                   | 0.395<br>(4.69) | 0.142<br>(1.71) | 1.057<br>(2.73) |     | 0.061<br>(2.86) |     |     | R2 : 0.218<br>DW : 2.01 |
| <b>Area 1</b> | 0.011<br>(1.78)      |                      | -0.898<br>(-2.53) |                   |                 |                 | 1.384<br>(2.51) |     | 0.052<br>(1.63) |     |     | R2 : 0.176<br>DW : 2.35 |
| <b>Area 2</b> | 0.012<br>(1.73)      | 0.321<br>(3.45)      | -0.275<br>(-1.68) |                   | 0.403<br>(4.18) |                 |                 |     |                 |     |     | R2 : 0.265<br>DW : 2.14 |
| <b>Area 3</b> | 0.024<br>(2.70)      |                      |                   | -1.226<br>(-1.75) | 0.703<br>(3.07) |                 |                 |     | 0.117<br>(2.41) |     |     | R2 : 0.280<br>DW : 1.87 |

**Chart n°3 : Aid indirect effect on growth (\* : gives the T-ratios)**

|                         | Cst              | GGDPC <sub>t-1</sub> | S               |     | SA              |                   | FDI             |     | FDIA              |     | X               |     | EA |     | POP |     |
|-------------------------|------------------|----------------------|-----------------|-----|-----------------|-------------------|-----------------|-----|-------------------|-----|-----------------|-----|----|-----|-----|-----|
|                         |                  |                      | t               | t-1 | t               | t-1               | t               | t-1 | t                 | t-1 | t               | t-1 | t  | t-1 | t   | t-1 |
| <b>Panel</b>            | 0.021<br>(4.99)* |                      | 0.352<br>(4.65) |     | 7.448<br>(4.60) |                   | 0.962<br>(2.59) |     | -25.81<br>(-2.03) |     | 0.046<br>(2.27) |     |    |     |     |     |
| R2 : 0.232<br>DW : 1.86 |                  |                      |                 |     |                 |                   |                 |     |                   |     |                 |     |    |     |     |     |
| <b>Area 1</b>           | 0.010<br>(1.85)  |                      |                 |     | 36.91<br>(4.43) | -24.04<br>(-3.21) | 1.454<br>(2.95) |     |                   |     | 0.077<br>(2.69) |     |    |     |     |     |
| R2 : 0.347<br>DW : 1.89 |                  |                      |                 |     |                 |                   |                 |     |                   |     |                 |     |    |     |     |     |
| <b>Area 2</b>           | 0.017<br>(2.45)  | 0.201<br>(2.06)      | 0.397<br>(4.32) |     | 5.472<br>(3.18) |                   |                 |     | -22.69<br>(-1.69) |     |                 |     |    |     |     |     |
| R2 : 0.321<br>DW : 2.06 |                  |                      |                 |     |                 |                   |                 |     |                   |     |                 |     |    |     |     |     |
| <b>Area 3</b>           | 0.025<br>(2.89)  |                      | 0.656<br>(2.86) |     |                 | 24.65<br>(1.44)   |                 |     |                   |     | 0.117<br>(2.40) |     |    |     |     |     |
| R2 : 0.273<br>DW : 1.91 |                  |                      |                 |     |                 |                   |                 |     |                   |     |                 |     |    |     |     |     |

Notes

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<sup>i</sup> it's net ODA that's at stake here, i.e. balance between new ODA and loan repayments.

<sup>ii</sup> We take up Bowen, J. (1998)'s work, but, it seems essential to take into account population growth in high fertility rate countries where birth control remain one of the priorities.

<sup>iii</sup> Teboul, R. and Moustier, E. (2000).