

Estimation of the GDP Growth Rate in Algeria 1965 – 1987

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المستخلص:

تهدف هذه المقالة أولاً لإختبار مدى أهمية العلاقة بين معدل نمو الناتج المحلي الداخلي وبعض المتغيرات الكلية مثل معدل نمو السكان، معدل نمو الاستثمار وأخيراً معدل نمو الصادرات، ثانياً محاولة قياس مدى رد فعل معدل نمو الناتج المحلي الداخلي للتغيرات الحاصلة في كل من معدل نمو السكان، معدل نمو الاستثمارات، وكذا معدل نمو الصادرات. لقد أظهرت نتائج التقدير وجود علاقة واضحة بين معدل نمو السكان، معدل نمو الصادرات، وكذا معدل نمو الاستثمارات على معدل النمو العام خلال فترة التقدير 65 - 87. جاءت هذه النتائج في توافق مع عدة دراسات سابقة أجريت على مجموعة من البلدان منها الآسيوية وكذا مجموعة بلدان ذات تخطيط مركزي.

Résumé: The objectives of this study are firstly, to test how important is the relationship between the GDP growth rate and population growth rate, investment growth rate, and export growth rate. Secondly, to measure the GDP growth rate response to a change in the population growth rate, the investment growth rate, and finally to the export growth rate.

Testing and measuring these relationships has an important effects on decision-making policy.

As a matter of fact, it helps policy makers to classify the importance of variables in accelerating (or slowing down) the Algerian GDP growth rate.

As well as, to allow answering this question: Why did the Algerian economic system prove non viable after many years of growth? Thus we need to understand how the amount of growth coming from a given investment level worsened so markedly over time.

This study will use a time series analysis of the period 1965-87. Choice of this period is conditioned by the importance of this period of heavy central planning on the Algerian economy as well as the identification the contribution of investment and other factors to growth which require probably a switch away from simple cross-sectional regressions to a time-series studies of individual countries

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INTRODUCTION

The objectives of this article are firstly, to test how important is the relationship between the GDP growth rate and population growth rate, investment growth rate, and export growth rate. Secondly, to measure the response of GDP growth rate to a change of the population growth rate, the investment growth rate, and finally to the export growth rate.

Testing and measuring these relationships has an important effects on decision-making policy. As matter of fact, it helps policy makers to classify the importance of these variables in accelerating (or slowing down) the Algerian GDP growth rate. As well, to allow us answering this question: Why did the Algerian economic system prove nonviable after many years of growth? Thus we need to understand how the amount of growth coming from a given amount of investment worsened so markedly over time.

The current article relay upon the use of time series analysis for the period 1965-87. The Choice of the period is conditioned by, firstly, the need to find out the importance of this period characterized by heavy central planning system on the Algerian economy.

Finally, it is believed that, to identify the determinants of investment and other factors contributing to growth will probably require a switch away from simple cross-sectional regressions to time-series studies of individual countries (Fisher; 1992).

Measurement and definition of Growth.

Professor Simon Kuznets, who received the Nobel prize in economics in 1971 for his pioneering work in the measurement and analysis of the historical growth of national incomes in developed nations, has defined a country's economic growth as "a long term rise in capacity to supply increasingly diverse economic goods to its population, this growing capacity based on advancing technology and institutional and ideological adjustments that its demands" (Todaro, 1977).

The term "growth" is usually used in relation to real output. There are (is), however, a variety of growth concepts even in relation to output. For example, such as gross or net output, real output or output per head, and finally, output per year per work force or output per man hour year. Do we mean by growth the absolute or proportional (percentage) increase in the variable that interests us ?. There is no single correct answer to these

problems, because the answer is depends on the question we are asking. For example, if our concern is economic welfare, net output per head is probably the most appropriate variable while if we are interested in productivity we may prefer gross output per man hour year.

In the present paper, our concern is with the broad aspects of "economic growth.". This is defined as follows: the growth rate of a variable is its percentage increase per annum. To define the economic growth we must have to specify both the variable we wish to measure and the period. In our study, the variable, that will be used is the GDP, for the period of 1965-87. Which measures the ability of Algerian economy to produce a net output or value added in money term.

In the current study the GDP growth rate will be used as an indicator of the economic performance of Algeria. Indeed, it measures the ability of the Algerian economy to use efficiently an amount of inputs to produce the required output. Generally speaking, a country's goal is to increase its GDP growth rate to a high level, at which, it allows the country to be able to satisfy its population needs. Harrod-Domar model defines a state of stagnation for any country, when the GDP growth rate is equal the natural population growth rate, and this means that per capita GDP growth rate is equal to zero. As we can see from Table 1, that there is a clear indication of a strong relationship between GDP growth rate and population growth rate. A large per capita GDP growth rate is associated with the situation when the GDP growth rate is greater than the population growth rate.

Table 1: Average Growth Rate

	1965-1979	1980-1987
Per capita GDP Growth Rate	4.21	0.09
GDP Growth rate	7.36	3.17
Population Growth rate	3.02	3.15

The Relationship Between GDP Growth rate and Population, Investment, and Export growth rate.

The recipe for many countries certainly varied from country to country, but a set of countries studies demonstrates that a core of sound economic policies laid the necessary foundation for all. The countries studies reinforce the view that sound macroeconomic policies, investment in both physical and capital , and external orientation along with political stability are central to growth success in many countries.

Development strategy carried out by the Algerian policy makers since the independence has given a voluminous role to few macroeconomic variables for accelerating the GDP growth rate. This development strategy had been based on a heavy industrial sector. The policy makers knew that this choice needs an allocation of high rate of investment expenditure. Thus, in order to finance its development strategy, Algeria has given first priority to the hydrocarbons sector (exportation of oil). Between 1967 and 1977 hydrocarbons absorbed 49 % of total industrial investment. Throughout this period actual investment in hydrocarbons consistently exceeded plan targets at the expense of the other industrial branches. Therefore, the declining of the GDP growth rate during the period 1965-87 was associated with sharp declining in the export growth rate (Table 2). The official statistics indicate a clear relationship between the GDP growth rate and the export growth rate during the period of 1965-87 (Table 2). This seems to support the argument that outward orientation is a route to growth (Fisher, 1993). So did export play a vital role in accelerating GDP growth rate in Algeria.

Table 2: Average GDP and Export Growth Rate

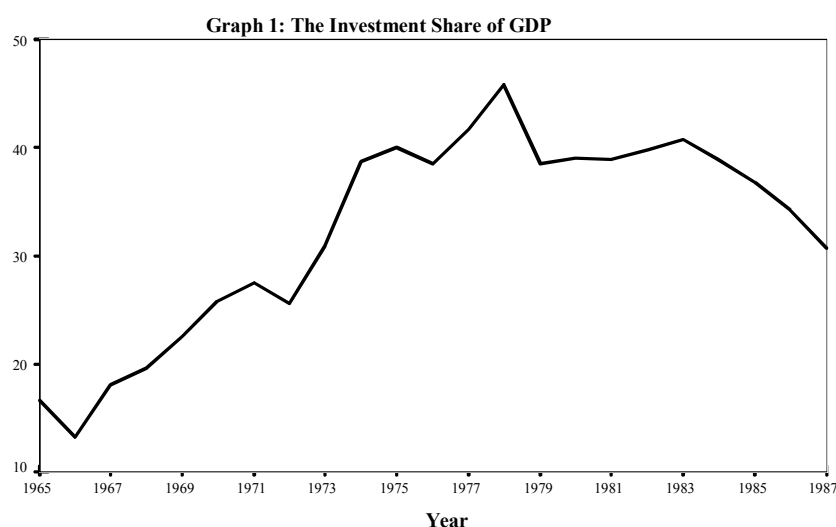
	1965-79	1980-87
GDP Growth (%)	7.36	3.17
Export Growth (%)	4.88	- 1.03

Another important element of a sound economic policie is the investment in both physical and human factors. In this respect, the Algerian policy makers believed that in order to accelerate economic growth and to improve the performance of the economic sectors, a large amount of investment expenditure must be invested every year. This belief has solid and quite reasonable conditions, where a high rate of unemployment , lack of infrastructures and shortage of necessary conditions for future development strategy support it . Graph 1, demonstrates a fast growing investment share of GDP, especially before 1987. The declining of investment expenditure, mainly the productive investment expenditure, could be explained by two important events:

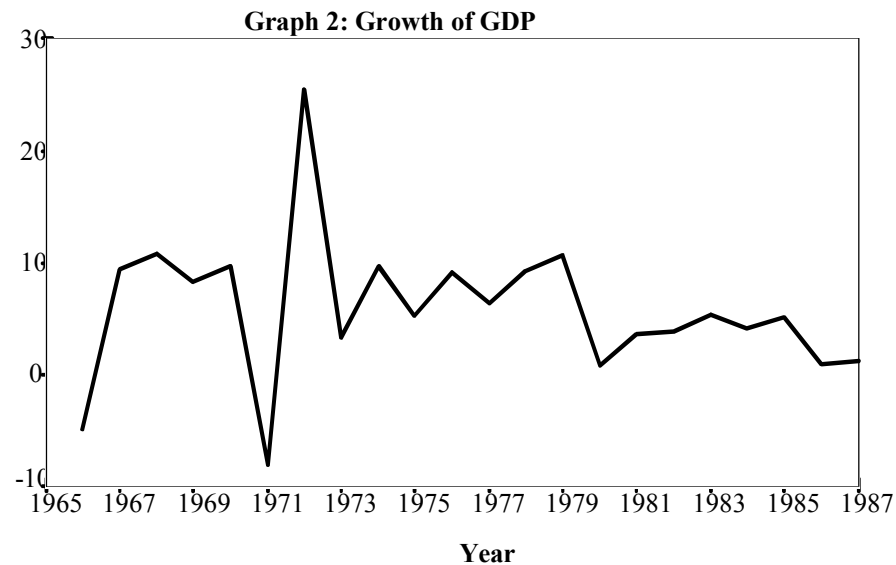
1: After 1979 there was new economic policy, in which it has given more attention to final consumption over productive investment ;

2: After the sharp cut in the oil prices in the mid-eighties had dropped Algeria's financial resources to up to 60 %.

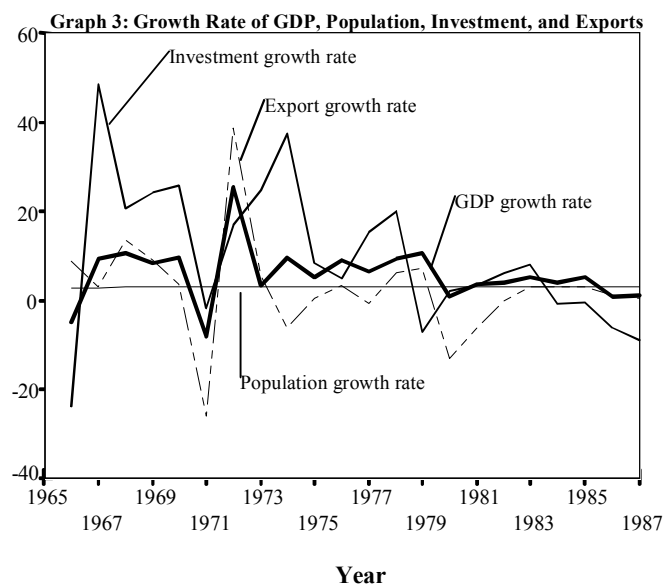
Whereas Graph 2, shows the path of GDP growth rate over the period of 1965-87, which it seems to follow the same path as the investment expenditure. (If we look at the two graphs, we notice that GDP did not grow over the period considered here as did the investment rate over the same period. So I think this description of the two graphs should be reconsidered). This leads us to ask the following question: What is the relationship between GDP growth rate and the investment rate? Or why did the Algerian GDP growth rate fall sharply at the end even the investment rate stays, relatively, high?.



Since the independence, the Algerian policy-makers have in mind that an allocation of a higher investment rate could push up GDP growth rate. Perhaps, this seems to be true at the beginning, but today, it seems that even at a high investment rate, the growth performance no longer looks so satisfactory.



The Algerian economy has experienced two major periods (Graph 3), the first one starts from 1965 to 1979, in which it had known the highest investment rate, but it was associated with a quite high GDP growth rate (GDP growth rate on the average was 7.36 % against 16.1 % growth rate of investment). whereas the second period, from 1980 until 1987 had experienced a sharp cut in an investment rate, principally for productive investment, but it was associated with a declining GDP growth rate (GDP growth rate on the average was 3.17 % during this period against 0.43 % growth rate of investment).



Finally the population growth has traditionally been considered a positive factor in stimulating economic growth (Todaro, 1977). A large labor force means more productive manpower, while a larger overall population increases the potential size of domestic markets. Moreover, a larger population growth rate rises the potential size of domestic saving.

The 1980's were also the decade in which macro economists returned to growth theory and turned to development (Fisher, 1993). The empirical work associated with the new growth theory consists largely of cross-country regressions. The strongest findings are that investment in physical capital, as well as an increase in either the level or the rate of change of human capital, increase the growth rate (Fisher 1993).

The aim of this regression is to identify the impact these variables on GDP growth are, because Algeria has put much faith on such variables to speed up the growth rate. In order to do so, regress these variables on the GDP growth.

Data and Estimation of GDP Growth Rate in Algeria

Data Variables

Data is used from the World Bank and IBRD publication in 1990 on African Economic and Social data (STARS, 1990). All data are used in US Dollars in 1980 prices.

The regression of GDP growth rate in Algeria over population growth rate, gross domestic investment growth rate and export growth rate for the period of 1965-87, has been done by using SPSS package. This regression will help finding out what the contribution of population growth rate (GP), export growth rate (GEXP), and gross domestic investment growth rate (GI), to the GDP growth rate (GY). The following Linear equation will be estimated using Ordinary Least Squares technique.

$$GY = a_1 + a_2 GEXP + a_3 GI + a_4 GP.$$

Results of Estimation

Running the equation by using SPSS package, gives the following results:

Multiple R	0 ,92955
R Square	0 ,86406
Adjusted R Square	0 ,84140
Standard Error	2,60826

Analysis of Variance (ANOVA)

	df	Sum of Squares	Mean Square
Regression	3	778,34565	259,44855
Residual	18	122,45451	6,80303
F =	38,13	F sig	0000

The Dependent Variables = GY: Growth of Algeria's GDP.

Independent Variables	Coefficients	SE B	Beta	t-Test	Sig. t
GEXP	0 ,436210	0,050789	0 ,766794	8,589	0,0000
GI	0 ,164928	0,034762	0 ,417067	4,744	0,0000
GP	17,016572	5,103784	0 ,294351	3,3344	0,0037
C	-48,802606	15,602902		-3,128	0,0058

The estimation of the previous equation has showed a good result in term of statistical tests and the expected signs. All explanatory variables are statistically significant (T-test is greater than 2 in absolute value), moreover all have the correct sign. For this reason, none of the variables should be dropped from the regression. As expected, the growth rate of population coefficient is positive. An increase of one percentage point in population growth is expected to lead to 17 units in GDP growth, also, if the investment growth rate rises by 1 percentage point, GDP's growth rate will rise by 0.17 %, with the effects of all other variables held constant. Finally, the estimated export growth rate coefficient tells us that if the export growth rate goes up by 1%, GDP's growth rate will go up by 0.44 %.

The R^2 and adjusted R^2 statistics are very closed in magnitude as expected. The F statistic with 3 and 18 degrees of freedom is highly significant, allowing us to reject the null hypothesis that all explanatory variable coefficients are jointly 0.

Conclusion

The primary concern of the present article is to measure the response of the GDP growth rate to the gross domestic investment growth rate, the population growth rate, and the export growth rate. The results from the regression of the above equation confirm the existence of clear relationship of population growth rate, export growth rate and investment growth rate on the GDP growth rate during the period of 1965-87.

The results of Algerian case confirm the findings of many empirical studies concerned Asian countries and centrally planned economy that investment variable has a significant effect on the economic growth rate, especially, at the beginning of the development strategy.

The declining of growth rate since 1980s is associated with a sharp cut in export growth rate, and investment growth rate. But for population growth rate was stable during the period of 1965-87. Thus it is believed that the fluctuations in GDP growth rate is due to the fluctuations of the investment growth rate and export growth rate. As it is argued by many economists that infrastructure investment rises the growth rate, so the high growth rate during the seventies was due to the high investment in infrastructure at that time in highway, building new industrial cities such as Annaba, Skikda, Bedjaia, and Arzew. The massive of investment expenditures and the high export growth rate during the first periods had contributed to

push the GDP growth rate up to higher level, whereas, in the second period, the declining of both investment expenditure and export expansion had led to sharp cut in GDP growth rate.

In most growth studies published in the last two decades, regresses the growth rate over given period against a variety of variables; well over fifty regressors have been used in these studies (Fisher 1993). These empirical studies have showed a strong relationships between GDP growth rate and many marcoeconomic variables. As far as the East Asia experience, there are many factor that have played an important role in accelerating the economic growth rate. From 1965 to 1990, the region's 23 economies grew faster than those of all other regions (Finance & Development, 1994). This success is believed to be due to (Finance and Development, 1994):

- * more rapid output and productivity growth in agriculture;
- * higher rates of growth of manufactured exports;
- * Earlier and steeper declines in fertility;
- * higher growth rates of physical capital;
- * higher initial levels and growth rates of human capital;
- * generally higher rates of productivity growth.

Investment variables retain their strong statistical significance in the pooled regression, which also gives some evidence on the dynamics of the relation between output and investment.

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