

# **Public Investment: Growth and Quality Measurement**

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## INTRODUCTION

In the Century 20<sup>th</sup>, public investment sector was one of the most important factors in the economic growth all in many countries all over the globe. At that time, the governments' role was fundamental once it was the only one capable of raise a considerable amount of funds to spend in productive area. In the other hand, economic growth means demand for social services and expenditures.

Decades later, increasing needs in investment, infrastructure a public services, allied to constrains budgets, led countries an upward fiscal deficits causing poor results in social development and economic growth. So, the size and the role of state were put in discussion.

The conclusion was that, to be more effective, public sector should be smaller – The Minimal State -, providing only the essentials services and leaving economy take care of itself. The State should change directions from “enterpriser” to “regulator” in order to recovery capacity in make investments in infrastructure an provide services with quality.

In this context, reforms have been made inspired by the belief of the efficacy of market solutions, looking forward not only withdraw the public sector from areas where private sector could operate better, but also searching ways in which market could improve performance in areas that would remain in the public sector.

Nevertheless, these reforms have shown various results in different countries and, mainly in low-income and developing countries,

many times the expected growth didn't happen or happened in lower level than expected and necessary to be sustainable. The villain became current expenditures or, in another words, the resources that governments spends to maintain itself and other inefficient social policies.

So, the reforms have stocked in a certain point that , in order to cut expenses to allow government to recover investment capacity got to, it is necessaries put in place unpopular changes in laws that can take decades to happen, since sometimes involves cultures and believes as well.

But, as said in Brazil, "the optimal is good's enemy". So, in present paper it will be shown a model that defines the conditions to reach economic growth from a certain ratio of capital to current expenditure.

Besides this, since the scarcity of resources is something really hard to solve, maybe is time to discuss evaluation of public investment. By Investing with quality government can maximize the allocation of public funds and bring effectiveness to public service.

# **1 - PUBLIC SPENDING**

## **1.1 - Scarcity of resources**

The increase of the demand for public services and the increasing necessity of investments in infrastructure necessary for the economic growth put pressure under government to enlarge its structure and to increase public expenses in a bigger ratio than the growth of revenue from taxes.

In low-income and developing countries, the problem was getting worse by the degradation of public accounts caused by currency emission, that generate inflation, and by securities issuance, that compromise future revenue.

Fiscal disequilibrium led to the degeneration of services provided to population and to a harder administration of public debt that suffer with the increasing interest rates and diminishing terms. One of the consequences was the retreating of the capacity of investment in both public and private sector (crowding-out). Public debt grew skyrocket and capacity of government's spending became critical.

The solution was cutting both current and capital investments, which includes the downsizing of state institutions, privatization of public enterprises, economic liberalization and moreover, some services were transferred to private sector (under supervision of public agencies)

A general cut in expenditures, as have been done, caused harms even in those services that stayed under state responsibility, affecting areas such health and education, which are critical to a country's growth and productivity. For this reason, the quality of public services drops. It is common see crowded hospitals with no conditions for attendance and schools in shortage of basic material could still be seen providing a poor service to population.

However, this was understandable due the moment of fiscal crisis experienced for many countries and, at the time, the belief was that there was no other alternative capable to generate some results in a short period of time to avoid a general default.

The idea was balance public accounts and therefore recovers the state's capacity in providing services with quality and investing in the necessary infrastructure to the economic growth. But it is not an easy task, sometimes some cut depends on legislative brand and even in chances in the countries culture. Besides, demands for public services never stop and with lack of resources, their quality became worse and worse.

That is why many countries, even after cuts and reforms, even experiencing better fiscal and economic situation than before, seems like cannot promote the sustainable economic growth.

## **1.2 - Externality**

In an ideal competitive economy with pure private goods, the interaction occurs only is through the price system. However, when economic interaction is made through other things than prices, then market failure will arise. That is called *externalities* and demands some government action. Considering that the consumption of the product *A* for the *individual 1* affects the *individual 2* so *individual 2* has a marginal valuation of the *individual's 1* consumption. In this case, we must consider the social benefit of both consumers. In this case, there is a positive externality and the consumption of product *A* tends to be higher in an efficient equilibrium than in the market outcome. The justification for public investment (and other expenses) is accommodating the effects of externalities.

## **1.3 - Information**

This is a really critical issue involving investment. Asymmetric of information between agents is caused usually by problems of adverse selection and moral hazard. The classic example when an insurance firm does not observe which individuals in a group is more likely to get ill and those who are less likely to get ill before provide health insurance for all. This is the asymmetry of information.

If companies offer insurance at premiums which reflect the average, probably, those considered low-risk will not contract and those considered high-risk will contract. This will raise average risk of those who do buy and hence requires premiums to rise if insurers are to remain solvent. Insurance will be even less attractive for those considered low-risk. This is the classic outcome of adverse selection.

Insurance firms that cover all bad outcomes and do not consider actions of insured individuals create incentives for those individuals do not take actions that reduce the risks. It is known as moral hazard problem.

#### **1.4 - Paternalism**

Goods which the government insists must be consumed in at least a minimal quantity by all consumers, even when families are not willing (for many reasons), just can be achieved through the government providing directly and ruling that all must consume. This situation can lead government to overrule individuals preferences which they judge, in a paternalistic way. An example is when government determines the minimal number of years an individual must study. These are called *merit goods*.

#### **1.5 - Market power**

The efficiency of the competitive economy is built on the assumption that no economic agent can unilaterally affect market prices. But an agent with market power, for example a monopolistic firm, can take



advantage of its position through control of price. The equilibrium is not efficient demanding a state intervention.

## 1.6 - Infrastructure

Goods and services used to produce other goods and services are known as factors of production. These consist of land and associated natural resources, labor and capital.

To produce and distribute their products, firms need other things not linked directly to the productive process, such as highways, bridges, urbanization, etc. So, what connects all economy since initial productive process until consumers is other infrastructure capital. It is essential to the profitable and efficient production and distribution of private sector goods and services.

In his work "Public Investment and Private Sector Growth" – 1990 about United States Economy, David Alan Aschauer<sup>1</sup> says that the potential importance to the macroeconomy of trends in infrastructure spending can be expressed in labor-intensive form, to show that private sector output is a function of both private capital and public infrastructure capital:

$$y = f(k, k^g)$$

Where (all expressed per unit of labor employee):

$y$  = private sector output;

$k$  = private capital; and

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<sup>1</sup> At the time of the publication, ASCHAUER, David Alan was the Elmer W. Campbell Professor of Economics at Bates College in Lewiston, Maine.

$kg$ = public infrastructure capital

An increase in public capital expense would be expected to directly raise the level of private sector output of goods and services and, under certain circumstances, public capital and private factors of production may be complementary inputs. So, when stock of public capital increases the productivity of private factors of production, generates increased demand for labor and private capital investment goods.

The simulation made for Aschauer about the impact of public investment on private economy in the United States suggested that the negligence of the quality and quantity of infrastructure facilities would cause negative impact on the economic performance.

## 2. PUBLIC INVESTMENT AND GROWTH

### 2.1 – Rate of growth

In a study about economic growth without and with public investment, Claudio Sardonì and Paolo Palazzi<sup>2</sup> concluded that, “...the rate of growth of the economy may be positively correlated with the level of public expenditure if the ratio of current public expenditure to total public revenue (the ‘public propensity to consume’) is lower than the private propensity to consume”. Based this, the equilibrium condition for the economy is:

$$Y = (1 - s)(1 - t) Y + I_p + atY + I_g$$

Where:

$s$  = private propensity to save;

$t$  = average tax rate;

$I_p$  = private investment;

$a$  = share of total revenue devoted to current expenditure;

$tY$  = total revenue;

$I_g$  = public investment

From where can be got the equilibrium rate of growth  $g$ :

$$g = [(1 - t)s + t(1 - a)]\alpha$$

They considered that with no constrained budget (there’s no public debt), since the ratio of capital to current public expenditure is higher

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<sup>2</sup> The Economics of Public Spending: Debts, Deficits and Economic Performance – edited by Bougrine, Hassan

than private or, in another words, if public propensity to saving (assuming that all savings are invested) is higher than the private propensity, then the economic growth can occur. That happens because the public investment more than compensates the income share taken from private sector through taxes. In order to maintain the economy's expansion in the following periods, the equilibrium rate of growth requests the condition:

$$a < (1 - s)$$

## 2.2 - Productivity

However, there's another factor to be considered is that the productivity of the public investment  $a_g$  is different of the private  $a_p$  investments. The average of both is:

$$\alpha^G = \frac{I_p \alpha_p + I_g \alpha_g}{I_p + I_g}$$

In this assumption, an increase in the current expenditure by government not necessarily will affect negatively the growth rate, even if the private propensity in consume goes up in a slower pace, since the productivity of the public investment is enough higher than the private investment to compensate the elevation in public expenses. In resume, to keep the rate of the economy growth going up and the public sector's budget balanced (non-negative value of  $a$ ), the following condition must be observed:

$$\frac{I_g}{I_p} > \frac{t}{(1-t)} \frac{\alpha_p}{\alpha_g}$$

If this condition is not achieved, maybe the solution to maintain  $g$  higher than that of previous period demands to increase public investment in the growth policy. But this is limited to the government's revenue:

$$\frac{t}{(1-t)} \frac{\alpha_p}{\alpha_g} < \frac{I_g}{I_p} \ll \frac{t}{s(1-t)}$$

That works only if:

$$\frac{\alpha_p}{\alpha_g} < \frac{1}{s}$$

In resume, maybe the continuous economic growth cannot be reached in a large ratio of productivity differential between private and public investment ( $a_p/ a_g$ ). But, in the opposite way, that mean the best conditions for economic growth, it can be achieved even with a higher public propensity to consume than the private. In this sense, it is critical for a government the achievement (and maintenance) of a productivity in a level that the results of its investments compensate the crowding-out effect. Besides this, the productivity is highly affected by health and education, so in the end, the improvement in these two areas is essential to effectiveness of public investment.

## 3 – FISCAL POLICY

### 3.1 – Endogenous growth models

Differently from neoclassical, endogenous growth models have challenged the long-run policy ineffectiveness prediction by modifying some assumptions about the ways in which fiscal policy affects growth in low-income countries, the main are:

- ? Productions externalities: public capital/investment or education may enhance private sector production, once private firms ignore public inputs in their profit-maximizing decisions.
- ? Productivity growth: In low fiscal policy on the acquisition of foreign technologies.
- ? Productivity differences: assumes average and/or marginal productivity differences between government and private sectors.
- ? Fiscal effects on factor accumulation: indirectly by incentives or directly by public investment in physical or human capital.
- ? Crowding-out: unproductive public expenditures crowd-out productive private or public investment.

? Redistribution: saving rates policy, social insurance, etc

### **3.2 – Growth effects of taxes and expenditures in a “Barro model”**

According analysis made by Barro and Cashin<sup>3</sup>, focused taxes and public expenditures, rises in taxes that affects incentive in private investment cause decrease in growth rate, differently of a increasing in government productive expenditure. However, taxes that do not affect the private sector or government unproductive expenditures do not affect such rate.

Besides rate growth, the overall effect of tax or expenditure change depends on how this is financed, by compensating tax or expenditure change. Even if all government expenditure is allocated in productive sector, the effect in growth will be negative, in case the source of funds is from large level of taxes that affects private sector’s incentive to invest .

In extension to the Barro model, Swaroop an Zou (1996) consider the possibility that governments expenditure have a graduation of productivity. Supposing that from a range of investments, it is possible that government decides to over-allocate funds in the most productive ones. This situation can, indeed, reduce grow, since while more productive categories have higher average productivity in equilibrium, maximum steady-state growth is achieved where marginal productivities are equalized. So, if

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<sup>3</sup> - “Fiscal Policy in a Growth Framework”, by GEMMELL, Norman.

optimal allocation is exceeded, the over-expanded category will suffer a lower marginal productivity than normal. In conclusion, the diversification of expenditures, as well as the growth-enhancing potential of each, is crucial for long run growth results.

For the model described above to be useful, it is important the distinction between productive and unproductive expenditures and taxes that affects the private sector's incentive to invest in a certain good.

### **3.3 - Budget deficits and growth**

Considering budget deficits in Barro model, the effect of fiscal policy in growth will depend on Ricardian Equivalence holding. If private sector projects future taxes and saving adjustments to compensate changes in public saving and the expected deficit is "productive", with deficits and lump sum taxes equivalents, probably long run growth will not be affected.

Otherwise, if Ricardian Equivalence does not hold, budget deficits are assumed to be growth-retarding, *ceteris paribus*. Then, whether private sector does not adjust its savings entirely or government borrows from finances consumption goods provision, reducing factor accumulation. If deficits seem to be unsustainable, changes in both fiscal and monetary policies will be anticipated and the effect is equally of growth retarding.

However, the net effect on growth of increasing the budget deficit will depend on the simultaneous changes in taxes and expenditures. *Ceteris paribus*, increasing in deficits can be compensate or even over-



compensate by a decrease in taxes that affects private sector's incentive to invest. But the results can vary from a low-income country to another.

## **4 - PUBLIC EXPENDITURE MEASURING**

### **4.1 – Investment evaluation**

During the economic development process public investment play very important roles in regional development and planning as well as in national development. Hence, it is very important to measure the socio-economic impact of core public investment on national and regional economies. The impact measurement alternatives for the large-scale public investment focusing on urban and regional areas are developed.

Methods of measurement must be developed for the ex-ante, mid-term and ex-post evaluation of public investment projects and programmes, searching for the optimization of the use of public funds. Must

be evaluate the consistency of investment programmes and projects with economic policy guidelines, their economic and financial feasibility, their compatibility and cost effectiveness compared with alternative solutions, and their socio-economic impact in the geographical areas they aim to support.

The systematic investigation of the value or merit of investments also contributes to its success.

Program evaluation looks at the impacts of a collection investment, while project evaluation focuses on individual projects. Project evaluation can start sooner than program evaluation, which requires time for multiple projects to make progress toward program goals.

Evaluation can tell what is working and what is not. It can reveal what outputs are being produced, and with what efficiency. It can indicate when performance is improving and when performance is declining. It can answer a host of questions needed to determine if an activity or suite of activities is on track to produce desired outcomes. Evaluation can also address "why" questions. In sum, evaluation can be as much a method of learning as it is a method of documentation, and certainly far more than a mandated obligation.

The evaluation must determine project's size and releases of funds in the execution phase as in the maintenance/maturation phase. But its design is critical, once mistakes in their elaboration can leads to distortions in results or even though the diminishing in credibility of the process. It's like

evaluate a school only by the number of registered students. This way shows only the affected population, but does not evaluate the quality of the service provided (education).

In this direction, the construction of a road, for example, must be evaluated not only by its length, or by the size of the population of the cities and/or states for where it will pass but also by definitive improvements in the quality of life of affected region, either for the increase of the carrying capacity, safety, speed, etc, either in the easiness of the access the new products and services absents before the road, or even though for the easiness of the access of the producers of the region to other markets, with the reduction in price of the costs and consequent gain in competitiveness.

Back to the road example, assumes that the main objective of the project is make easier the transport of agricultural goods to the market . However, after its conclusion, the tourism sector is also developed. Notice that the subsequent accompaniment can evidence and facilitate the implementation of incentive policies to the new activity.

However, given the long time of maturation of some projects, as education and health, maybe it is necessary that their results be evaluated in short, medium and long run. Thus, the correct definition of performance indicators can help either in adjustments; either can even though determine the necessity of change in priorities or the requirement of new projects in order to achieve the considered objectives. Moreover, it assists in the elaboration of budget of maintenance of their activities.

For a best evaluation, public institutions must be able to work coordinately in investment projects where the one responsible by public funds join with those involved in providing services and put together priorities and needs to define actions to fulfill expected results with available resources. Besides this, coordination and cooperation prevent duplicated execution of policies by different agencies, causing funds waste.

Appropriated indicators permit public institutions to correctly evaluate allocation of resources in investments that can determine the necessity of integration between diverse areas of the government, by identifying common objectives policies, giving conditions to maximize resulted and to minimize costs. For example, a project of irrigation involves other institutions than the one responsible by its implementation. It also demands technical assistance to farmers, market and distribution.

In resume, institutions can guide and track the allocation (and reallocation if necessary) of resources in investments and also make a more accurate plan of the likely flow of resources will be necessary in following exercises. Moreover, this is crucial for planning the flow of resources necessary to maintain such an investment over the time (even after its conclusion), in order to prevent abandoned projects and to ensure investments to reach its social objectives as well. The evaluation phase is critical for public and private investments to ensure benefits are commensurate with costs.

Nevertheless, performance measurement depends on information, data interpretation and formulation of appropriate response in

institutions. Measures of outcome may suffer from time-lag and the effects can distort future allocations affecting years ahead. Since sometimes it is difficult to determine standard measures, in public policy this implies decisions made politically instead purely technically. That's why poor performance can be results of "bad" indicators, inadequate funds flow projection as well as poor management makes difficult for politicians and senior managers to apply sanctions.

Despite these problems, measures of institutional performance are essential to improve efficiency and effectiveness in public spending. So, the new question is how often indicators performance should be revised and the appropriate framework for further analysis. According Fozzard and Foster<sup>4</sup>, experience from some countries suggests that annual reviews do not generate much additional information, mainly in cases of slow maturation, spending too much time and human resources and distorting analysis and results. For these reasons, most OCDE countries have chosen three of five years cycle for periodic agency performance review.

A powerful tool to improve efficiency and effectiveness in public institutions is performance contracts, which can be signed between ministries and frontline institutions. Brazil, for example, has a good experience in health area with a management contract driven by performance measurement. The responsible hospital is international reference in physical rehabilitation. And this example can be applied in other areas, such as

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<sup>4</sup> "Changing Approaches to Public Expenditure Management in Low-Income Aid-Dependent Countries"

universities and road authorities, allowing them to collect fees to be used in their activities and in payment of more attractive wages.

## **4.2 – Methods**

Evaluators use a variety of methods to address questions of program performance. The methods share common features, but each has its advantages, disadvantages, and specialized purposes.

The use of some methods of evaluation depends on how a program is positioned relative to the objectives and how mature it is. Some methods are particularly useful in assessing early-stage research programs, while others are better suited for assessing later-stage, more focused programs' results. Both the utility and feasibility of methods may change as a program develops.

Generally, the more a program scope starts from research to its conclusion, the more methods evaluators can use to capture the full range of a program's impacts. Recognizing this, an initial strategy would be to design an evaluation program that lets data perform multiple duties. For instance, early evaluations may be designed to generate survey information on participants for immediate use, with the idea that the survey information can later be used as baseline information for subsequent evaluations. An initial strategy would also use multiple methods to capture the full range of a program's impacts, to triangulate findings on salient program impacts, and to identify and validate relationships and impacts not readily apparent in the construction of the initial design.

Crosscutting the methods are various approaches to collecting data. Among the approaches to collecting data for use in evaluation are systematic and anecdotal observation, review of records and searches of existing databases, testing, experimenting, recording responses of focus groups, interviewing experts, and conducting surveys by structured interviews in person or by telephone, or by mailed or electronically administered questionnaires.

## **CONCLUSION**

After played an important role in the establishment of big industries and companies to promote economic growth, governments faced pressures for increasing expenditures in social area and productive sector, through investments in infrastructure. To attend this situation its resources come from revenues that never go up at the same pace.

The solution was a reviewing in the role and in the size of the state. Reforms were put in place, trying to reestablish the investment capacity of government, with a smaller structure, providing services with quality to and making the necessities investments in infrastructure to promote economic growth.

Other major reforms are still in line, once their implementation depends on other institutions than executive branch and probably will take years or decades to happen. However social issues cannot stay await that long and, since governments must fulfill role as responsible by economic growth and social development, the choice is making the best with the available resources.



So, in this paper were shown alternatives and ideas in order to promote discussion about the necessity of maximizing public investment by making the right choices between current and capital expenditure. But, the most critical aspect is the quality of public expenses. This is achieved just by constant evaluation of the spending results, since the conception until its conclusion and sometime after this, once the social results of some investments must be evaluate during years.

But it is not an easy task. It passes through public institutions strengthening and improvement of systems of control. First, so that projects and programs can be defined on technical basis from their planning until their execution and, second, so that can be constantly evaluated for further correction and necessary adjustments.

## **Brazil**

This conclusion applies to Brazil too. The Country has achieved the monetary stability with low external vulnerability and a good level of reserves. These factors are leading the country to certify the “Investment Grade” in the evaluation given by agencies of risk measurement. Besides this, the world environment for business has been positive for developing countries. However, in the past few years, Brazilian’s economy growth rates did not reflect this situation.

To change this scenario, Brazilian Government has launched the Program Growth Acceleration Program (**Programa de Aceleração do Crescimento** (PAC) to promote:

- ? Economic growth acceleration.
- ? Employment increasing.
- ? Improvement in population welfare.

And the Program intends:

- ? To motivate Private Investment.
- ? To Increase in public investment in Infrastructure.
- ? To remove obstacles (bureaucratic, administrative, normative, legal and legislative) to the growth.

During the period from 2007 to 2010, the program forecast expenditure is about US\$ 280 billion, focusing in energy sector and social infrastructure.

So, in order to achieve the program's objectives and maximize its results, it is desirable that Brazil constantly evaluates its investments spending, mainly by a social and welfare view. But the most important thing is the commitment of both public and private sector because some changes in structures, institutions and even in culture are necessities and, without the contribution of key stakeholders, the sustainable economic and social growth will not be a reality.

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