

# An Empirical and Theoretical Literature Review on Endogenous Growth in Latin American Economies

SUEYOSHI Ana

This paper presents empirical and theoretical studies related to economic growth and its determinants in the last decades. The literature review is divided into three major sections, which correspond to the most prevalent economic growth theories, over the last fifty years. The first section introduces the studies referred to economic growth and capital accumulation and technology, in a very neoclassical fashion. The second section presents and classifies the existent literature according to the postulates of endogenous growth theory. Finally, it identifies and classifies those studies related to the analysis of economic growth in Latin American countries (LAC).

## I. The Neoclassical model

Regardless their creeds, social and political systems, countries have pursued economic growth by applying several strategies that have varied cyclically according to different economic conditions and scenarios. The world has witnessed all sorts of theories and experiments on economic policies, which have been designed to explain and some others even to predict economic growth.

In the academic sphere, the theory of economic growth has also evolved all these years from the simplest and schematic model until those which use very sophisticated economic-modeling techniques, in an effort to search the variables that determined growth. By taking turns, different economic thought theories have prevailed and imposed their rationale toward either free market or state-oriented measures, emphasizing the importance of certain variables and mechanisms of transmission to growth over others.

The neoclassical theory of growth has its origins in the Harrod-Domar model that intends to explain the relationship between investment, growth rate and employment in an economy with stationary growth. For these two economists, production capacity was proportional to the stock of capital. Taking his antecessors model as a starting point, Solow contributed to the development of the economic thought by improving the severity of the assumptions. He focused his attention on the process of capital formation<sup>1</sup> and also assumed that production was a function of capital and labor, as well as technology. He noticed that if capital were the only constraint to economic growth then producers will substitute capital for labor. Then his contribution focused on the result that long-run growth is determined by technological change and not by savings or investment. Saving only affects temporal growth, or growth when is in its way to the long-term path, because the economy will run into diminishing returns as the ratio of capital per worker increases.

The Solow model in which long-term economic growth per worker is explained by labor augmenting technological change and by the increase of capital per worker, gives the framework for the development of “total factor productivity” (TFP) concept.<sup>2</sup> In recent years, conditional convergence,<sup>3</sup> a concept derived from these models is extensively used. This empirical property is based on the assumption of diminishing returns to capital therefore economies with relatively low capital per worker rates tend to grow faster due to higher rates of return.

As many authors had stipulated, the Solow model

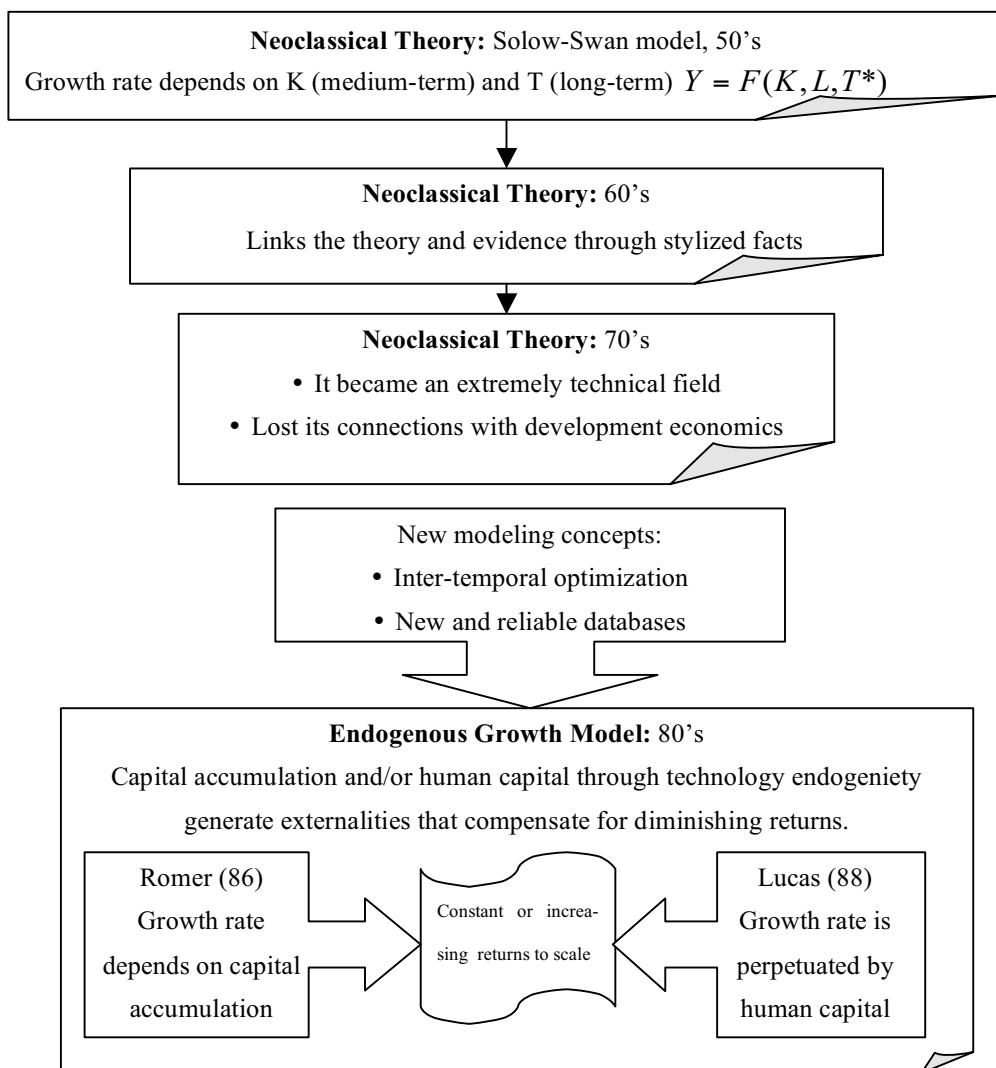
is a complete theory of growth that gives the right answers to the questions it is designed to address. But when it comes to understand the determinants of saving, population growth, and worldwide technological change, variables that are treated as exogenous in the Solow model, neoclassical growth models fail in giving an explanation on them (Mankiw et al, 1992; McCallum, 1996).

**The transition**

The Solow model<sup>4</sup> was theoretically expected to predict income per capita convergence. However, the availability of worldwide macroeconomic data made possible testing the theory and the results did not validate it. Instead, it was clear that a country’s income per capital converges to that country’s steady-

state value, after controlling determinant variables. This is called conditional convergence phenomenon. This empirical concept of conditional convergence depends on other factors like saving rate, population, production function, initial endowment of human resources, and government policies, among others, by influencing steady-state levels of capital and output per worker.

Barro and Sala-i-Martin (1992) proposed an alternative to the neoclassical model, which is considered the link between the development of new growth theory or better called endogenous growth and the Solow model. These two authors suggest that the level of technology is spread out from developed countries to developing countries, and that flow of



**Figure 1**  
**Theoretical Framework**

technology that can be translated into physical or human capital will grow faster in the catching up countries as diffusion closes. That is the so-called technology-gap, and the speed of convergence will be mainly determined by the rate of diffusion of technology. This assumption of different levels of technology according to geographic regions, removes the assumption of worldwide identical technology, one of the main reasons for the loss of popularity of neoclassical models in academic circles.

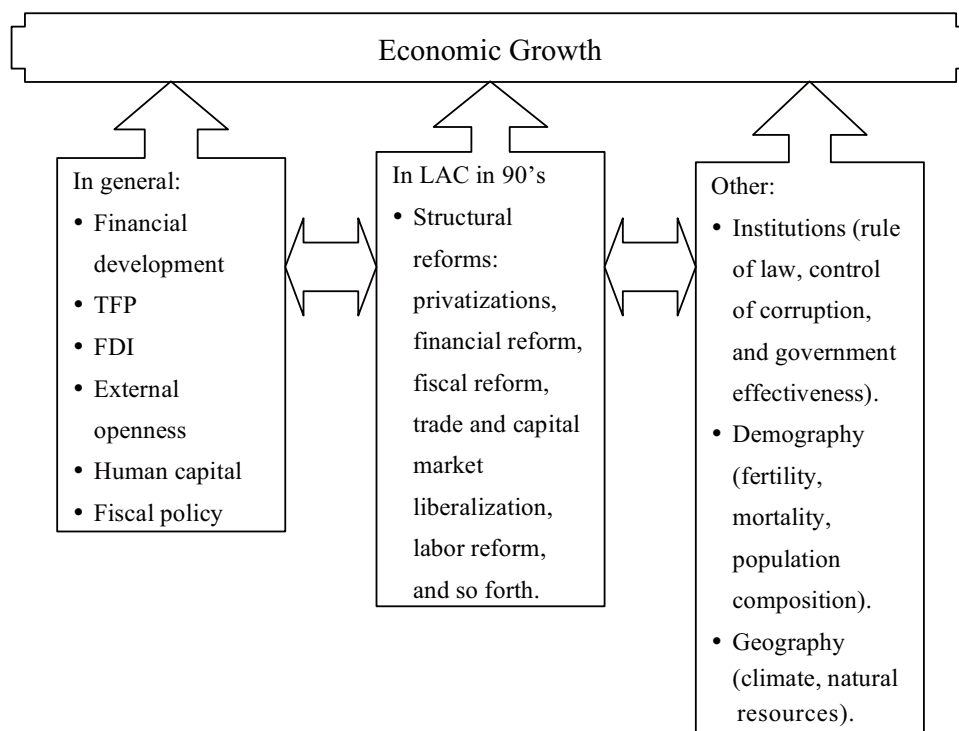
Another feature of the neoclassical model's evolution was the traditional and unconceivable separation between development and economic growth. These two related areas in economics have been studied separately, as if they were two unconnected fields. According to Sala-i-Martin (2002), Barro and Sala-i-Martin (1999), and Ray (1998), among others, the basic neoclassical growth model became an extremely technical field, losing contact with empirical evidence, while development economics focused on empirical applications in detriment of highly technical models.

The new literature trend starts as positive reaction to the apparent shortcomings of the neoclassical model in explaining actual facts in light to their theoretical postulates (Temple, 1999; Sala-i-Martin, 2002; Loayza and Soto, 2002, 2003).

Before the nineties, much of the economic literature on empirical economic growth analysis had addressed this topic by measuring factor inputs, in particular capital accumulation and technological change. Thus, Denison (1962, 1979) for example, accounted for economic growth through the growth of labor and capital inputs, with the unexplained residual assumed to represent "technological growth" or "productivity growth". Lucas (1988) introduced human capital into an export-led growth model by stressing the effects of learning-by-doing and its effects on current production. In the same line, Mankiw, Romer and Weil (1992) furthered human capital factor's analysis in the traditional neoclassical framework.

## II. Endogenous growth models

The development of the concepts of rivalry and excludability brought new air to the economic growth



**Figure 2**  
**Economic Growth Determinants**

theory. The distinctions between rival and non-rival inputs, and the distinction between excludable and non-excludable goods made possible to reformulate the role of technology as pure public good. Moreover, it opened the possibility for technology to be considered as a private sector activity rather than public. In that way, technology is a public good that has the unique feature that it does not get used up while being used, due to its characteristics of non-rivalry, and that once it is created, through its spillover effects can benefit everyone in the economy (Easterly, 1998).

The research of mid 1980s began with models of the determination of long-run growth through accumulation of all sorts of capital, including human capital, spillover effects and the endogeneity of the technological process.

In neoclassical models, perfect competition is assumed, in order to achieve economic efficiency. According to it, capital is paid its marginal product, which must be above the discount rate for investment to be profitable for the entrepreneurs. But in the long-term the diminishing returns of production factors might hinder economic growth. In the new growth models due to spillover effects, capital can remain permanently above the investment discount rate, even facing the presence of diminishing returns due to lack of the introduction of improvement in productivity. In this sort of models, it is stated that monopoly supports innovation at the expense of efficiency. In that way, growth can be sustained by continuing accumulation of the inputs that generate positive externalities (Grossman and Elhanan, 1994, Pack, 1994.)

Hence, endogenous growth models are characterized by the assumption of non-decreasing returns to factors of production, and as an implication of this, it concludes that countries that save more grow faster indefinitely and that countries do not need to converge in income per capita even if they have the same preferences and technology. On the empirical side, endogenous growth models become an alternative

to the Solow model, when this fails to explain cross-country differences, mainly related to the concept of convergence (Mankiw, 1992; Barro, 1989).

In conventional neoclassical economics only physical and human capital accumulation and technology have been considered the long-term economic growth determinants *par excellence*, while the remaining variables have been limited to transitory effects on the rate of growth. However, the development of endogenous growth model has brought along copious and novel theoretical and empirical studies, where the growth determinants has expanded to include financial development, education, population, international trade, public policy and so forth.

There is plenty of economic literature which supports the link between financial systems and growth. Efficient financial markets through economies of scale and reduction of transaction costs can stimulate economic growth by channeling savings as investment in the production cycle. Several analysis have attempted to establish whether financial development leads to improve growth performance, while others have focused on identifying the channels of transmission from financial markets to growth.

For the relationship between financial development and growth in Latin America, Roubini and Sala-i-Martin (1992) and De Gregorio and Guidotti (1995) find a negative relation between the two variables. Financial repression is an endemic problem in the region therefore it will reduce capital productivity and savings, and consequently growth. Roubini and Sala-i-Martin (1992) analyze the relationship between financial intermediation and growth by emphasizing the role of government policy. They develop a model where financial repression is used as a tool to broaden the inflation tax base.

De Gregorio and Guidotti (1995), concentrating on borrowing constraints, find that even though financial

development impact on growth can vary across countries. The final conclusion suggests that a fraction of the poor economic performance in the region might be explained by inadequate financial regulations that ruled the first efforts for financial liberalization, especially in Southern Cone countries and Mexico. These results are in line with what has happened in LAC, where financial liberalization has not necessarily increased saving rates, on the contrary has negatively affected economic growth.

Using four alternative measures of financial depth, King and Levine (1993), examine to what extent these four variables explain long-term economic growth, investment rate and total factor productivity. They find that these four indicators altogether have positive and statistically significant effects on those variables, and that the relationship operates from the former to the latter.

Also on financial development, Benhabib and Spiegel (2000), and Beck, Levine and Loayza (2000) evaluate the empirical relationship between the level of financial intermediary development and economic growth by using a cross-country methodology for a group of countries at world-wide level. These two works stress the fact that finance affects economic growth through a third variable which can be total factor productivity, investment, physical capital accumulation or private savings rates, suggesting a strong positive impact of financial development on total factor productivity, and consequently on growth.

Other big bulk of empirical literature argues that TFP determines positively economic growth, highlighting and combining the importance of other variables on growth like human resources and institutional factors, besides the traditionally known determinants as investment, technology and productivity. Easterly and Levine (2001) refer to TFP as the residual change in output not accounted for by increases in all factor inputs.<sup>5</sup>

De Gregorio (1992), De Gregorio and Lee (1999), and Fajnzylber et al.(2001) analyzed the impact of TFP in Latin American countries for the last fifty years. This study was prepared based on long-term data in order to capture all the effects even those that correspond to qualitative variables: economic reforms and economic policy measures. For the Peruvian economy, Carranza, Fernández-Baca and Morón (2003) also applied the analysis of TFP as main determinant of economic growth for the last half a century.

In microeconomics, education has been shown to impart knowledge and skills that generally result in higher productivity and wages in the labor market. In the 1990s, many researchers attempted to link aggregate schooling measures to national productivity and income. Using cross-country data, most of them found that the initial level of schooling within countries<sup>6</sup> was linked to subsequent increases in national income. However not all studies showed strong links between changes in schooling level and income growth; some other found even an empirical link between increases in women's schooling and slowdowns in growth (Prichett,1996; and Barro and Sala-i-Martin, 1995; and Barro 1997, 1990).

Barro and Sala-i-Martin (1995) find no relationship between growth and primary education level, in a 97 country analysis, but they find a positive relationship between growth and male secondary education. After that, Barro (1997) adds a multi-temporal dimension into the previously mentioned work, and in addition the authors find that female education affects growth but only indirectly, through its impact on the fertility rate, infant mortality rate, and nutrition level.

Barro and Lee (2000) construct a new series for education based on educational attainment as best proxy for the component of the human capital stock obtained at schools. For educational attainment they mean the percentage of population who has successfully completed a given level of

schooling, either secondary or tertiary. In this way, the population's attainment of skills and knowledge associated with a certain level of schooling is showed.<sup>7</sup> In their empirical work, De Gregorio and Lee (2003) quote human capital as an important determinant of the different growth paths followed by Latin America and South East Asian countries.

After the wave of macroeconomic stabilization and structural reform swept many Latin American countries, followers of the Washington Consensus' s prescription, the analysis of the main economic fundamentals as growth determinant have been broadly studied. Kormendi and Meguire (1985) and Fischer (1991, 1993) examine the cross-sectional relationship between economic growth and variables associated to a stable economic environment, represented by different variables, which showed enough empirical evidence for positive relationship.

More specifically there are some works which link structural reforms and stabilization measures such as Easterly, Loayza and Montiel (1997). They include a variety of policy-outcome indicators, and on the basis of the relationship between these outcomes and growth imply the combined effect that would be expected from stabilization and structural measures. They conclude that the expansion observed in growth was not different from what would be expected and that if growth has not been greater, the reason is that the reforms have not been deeper and the external context of the nineties has been unfavorable. On the empirical relationship between growth and macroeconomic stability, the works of Kormendi and Meguire (1985) and Easterly and Rebelo (1993) could be mentioned.

Cuadros et al. (2000) examine the causal relationship between exports and economic growth including foreign direct investment (FDI) to account for impact on growth for the three main Latin American economies: Mexico, Brazil and Argentina. Previous studies provide support to the existence of the export-growth relationship, but some others did not

succeed in proving it. According to the authors this is because previous empirical analysis did not include FDI. In the results FDI appears to be an important factor in determining growth and in influencing exports.

Likewise, trade liberalization can stimulate growth as productive resources can be freely directed toward economic activities where they are used with comparatively greater efficiency. The opening of trade also means an increase in the availability of inputs and production goods, and the transfer of technology across borders, which in turn leads to an increase in productivity. The impressive economic performance in Southeast Asia based on macroeconomic stability and export-oriented growth has been analyzed extensively according to the parameters given by this framework.

Research on the relationship between trade orientation, import or export-oriented models, and growth has been prolific, e.g., Dollar (1992) and Edwards (1992, 1993). Dollar (1992) defines trade opening as the combination of a liberal trade regime with a relatively stable real exchange rate, and measures the effect of openness on growth in a cross-section regression, where the explanatory variables are the average investment coefficient, certain measure of trade distortions, and a proxy of the variability of the real exchange rate. The main ascertainment is that distortions and variability in the real exchange rate has statistically important negative effects on economic growth in a world-wide sample.

### **III. Fiscal policy and economic growth**

In the case of cross-country evidence and theory review, it has been demonstrated how the government economic measures affect the economy growth rate. Government policies generate pernicious and beneficial effects. The first one includes the volume of consumption spending which is related to the level of taxation, distortions in foreign trade and macroeconomic instability, causing uncertainty.

Among the second ones it can be mentioned the rule of law, the institutions that the government embodies, and policies that promote economic development, such as infrastructure investment.

By mid 1980s there were virtually no empirical studies (Landau, 1986) of the impact of government in economic growth, but at the beginning of the last decade a huge literature on the nexus government policies and economic growth appeared in the academic circles. Landau (1986) concluded that larger government size, measured by the share of government consumption in GDP, depresses economic growth. Ram (1986) as well as Landau using a simple production function developed a cross-country analysis, finding a strong positive association between government size and economic growth, especially in lower-income contexts. Ram added to his study, the effect of marginal externality effect of government size on the rest of the economy.

Since the 1990s there has been a growing consensus among researchers and policy makers regarding the importance of fiscal policies on economic growth. This progress has been done both theoretically and in the application of economic policies, aimed not only at stabilizing economies, but also at reforming economies.

A negative nexus between economic growth and government spending and a weak association for growth and public investment is found by Barro (1991). Engen and Skinner (1992) develop a generalized model of fiscal policy which analyzes the nature of the effect of government spending on private productivity, returns of scale, way to the equilibrium, and intra-temporal tax distortions, by including the negative effect of taxation and the positive effect of provision of productive infrastructure on economic growth. They conclude that the overall balance of the public sector has a negative effect on economic growth.

Other works like De Gregorio (1992) also

determines a negative relation between these two variables, government spending and economic growth. Some of those studies that focus on one fiscal variable such as government size (Kormendi and Meguire, 1985; Landau, 1986; Barro, 1991; and Engen and Skinner, 1992) find a clear negative impact of the share of government spending on output growth rates, giving support to the notion that smaller governments are associated with faster growth rates.

King and Rebelo (1990) conclude that the effect of taxation in small economies with capital mobility is uncertain. It can substantially affect either positively or negatively long run growth rates. The findings of Easterly and Rebelo (1993) indicates that public infrastructure and growth are closely related, but the effects of taxation are difficult to determined due to tax effect isolation problems. At this point the empirical studies had mainly analyzed data from 1960 to mid 1980s.

One critique to these studies is based on the inclusion of developed and developing countries in the same analysis and this may lead to wrong conclusions, considering the differences<sup>8</sup> that these two clear-cut groups have (Folster and Henrekson, 1998). According to the authors, this is a plausible reason for the inconclusiveness of the empirical work so far. In the specific case of Latin America related studies, some of them demonstrate a positive relation between infrastructure investment and growth, by introducing it into the model as another factor input (Calderón, Easterly and Servén (2002a, 2002b), others show a clear negative relationship between government spending and output growth (De Gregorio, 1992).

From a comparative approach, De Gregorio and Lee (2003) examine the experience of growth performance and macroeconomic adjustment of Latin America and East Asia from 1970 to 2000, coming up with a negative relation between government spending and economic growth. In a previous work (De Gregorio and Lee, 1999) the authors by focusing

on the analysis of TFP also reached to the same conclusions. Subsequent studies developed by Loayza and Soto (2003 and 2002), and Loayza, Fajnzylber and Calderón (2002) provide basic characteristics of economic growth in Latin America and Caribbean countries and explain the differences across countries in output growth based on regression analysis. They come up with a negative relation for economic growth and government spending, and positive for economic growth and public investment.

Fiscal policy adjustment is one of the central issues of the economic reform programs which are being undertaken in developing countries. Particularly, the policy has been to cut out government expenditure and or increase revenue collection. One of the main objectives has been to reduce budget deficits and to avoid budget deficits financed by borrowing from the banking system through money creation due to its inflationary consequences and private investment crowding-out effects. Of course an important area in this regard is the growth literature exemplified by the work of Barro and his joint work with Sala-i-Martin. In empirical work, the emphasis has been stressed on the analysis of budget deficit and government consumption. For government consumption, distinction is usually made between productive government expenditure, e.g. on education, health and infrastructure,<sup>9</sup> and non-productive spending, e.g. government consumption (Barro, 1991). It is argued that high government expenditure will induce distorted taxation and/or crowd out private investment.

Barro's hypothesis that government expenditures, specifically non-productive expenditures lead to a decrease of the economic growth, by crowding-out effects on private investment, from the demand side, or the taxation that those expenses imply, on the supply side. This hypothesis has received strong support among many researchers on this topic. Regarding the main determinants of growth, Barro does a statistical analysis of growth differences across roughly a hundred countries since 1965. He identifies as main

factors for economic growth, the high levels of schooling, good health (measured by life expectancy), low fertility, low government welfare expenditure, the rule of law, and favorable terms of trade.

It is also hypothesized that large external debt discourages investment in the domestic economy. First, a large debt implies a need to carry out transfers to the creditors. This reduces available resources at the disposal of the public sector as a result, as much as public and private sector are complementary, economy wide investment activity will be affected. Second, large external debt creates uncertainty about future policy as these may require fiscal contraction and/or increased taxation and exchange rate changes. Third, Borenstein (1990) has argued that debt over-hang acts as a foreign tax on current and future incomes. This is because part of the investment return will accrue to creditors in terms of debt service payments. This may discourage capital formation and promote capital inflows. A highly indebted country will also face credit constraints in international capital markets.

There is a very interesting work developed by Giavazzi and Pagano (1990) who have found a positive relationship between fiscal contraction and economic growth, for two European countries such Denmark and Ireland, against all Keynesian principles. In the very short term the direct impact of slower government spending is clearly negative on economic growth, but the indirect effect on aggregate demand of the initial reduction in spending occurs through an improvement in expectations if economic measures are understood to be part of a credible medium-run program.

### **Empirical and theoretical literature review: conclusions**

As it can be seen in Table 1, the empirical and theoretical literature on government spending and economic growth has been vast, especially at the beginning of the 1990s. The conclusive results are: a negative relation between economic growth and government spending, and a positive relationship for



**Table 1**  
**Summary of studies examining economic growth and its determinants**

Determinant	Study	Conclusions
Financial development	Roubini and Sala-i-Martin (1992), King and Levine (1993), De Gregorio and Guidotti (1995), Benhabib and Spiegel (2000) and Beck, Levine and Loayza (2000)	Positive effect Negative effect for LAC due to financial repression
Total factor productivity	De Gregorio and Lee (1999), Fajnzylber and Lederman, Easterly and Levine (2001), and Carranza et al. (2003)	Positive effect
Education	Barro and Sala-i-Martin (1995), Prichett (1996), Barro (1997)	Insignificant positive effect
Macroeconomic stability	Kormendi and Meguire (1985), Grier and Tullock (1989), Easterly and Rebelo (1993), Fischer (1991,1993), Savvides (1995), and Loayza and Montiel (1997)	Positive effect
Foreign investment, and investment	Cuadros et. al, and Levine and Renelt (1992).	Positive effect
International trade	Fosu (1990), Gymah-Brempong (1991), Esfahani (1991), Dollar (1992), Edwards (1992, 1993)	Positive effect
Government spending	Kormendi and Meguire (1985), Landau (1986), Barro (1991), Engen and Skinner (1992), De Gregorio (1992), Easterly and Rebelo (1993), De Gregorio and Lee (2003)	Negative effect
Government spending	Ram (1986)	Significant positive effect
Fiscal contraction	Giavazzi and Pagano (1990)	Positive effect
Taxation	King and Rebelo (1990)	Ambiguous effect
Public investment	Barro (1991)	No impact
Public investment	Easterly and Rebelo (1993)	Positive effect
Public investment	Calderón et al. (2002a, 2002b)	Negative effect
Gov. spend./public inv.	Loayza, Fajnzylber and Calderón (2002), Loayza and Soto (2003,2002)	Negative and positive effect, respectively

growth and public infrastructure, and for growth and government size, if externalities are included into the analysis.

Table 1 also summarizes the main conclusions of the key empirical and theoretical studies. These are grouped according to the most salient long-term economic growth determinants that have been discussed before.

Financial development, TFP, macroeconomic stability, foreign investment and exports, and trade liberalization are certainly positive determinants of economic growth, according to the results of several

empirical studies, some of them at regional or world-wide level, which have ratified the theoretical studies of the last decade.

In spite of the alleged relevance of fiscal policy, almost all previous studies have only focused on one fiscal variable, government spending or government size. Government size, which is commonly measured by government spending to GDP ratio or government income to GDP ratio, varies its impact on growth according to the scale of the economy and its degree of economic development.

So far, the literature review finds a strong and

negative association between government size and economic growth, especially in lower-income contexts. Some of the results were obtained within a model of endogenous growth (Barro, 1990; Engen and Skinner, 1992; and Easterly and Rebelo, 1993), while others mainly focused on empirical analysis with some theoretical background, either neoclassical or Keynesian, for a world level data.

Barro (1991) includes the variable “public investment” in his theoretical and empirical analysis for a world-range data base, reaching to the conclusion that this variable has no impact on long-term economic growth, in a context of endogenous growth model.

Out of all the reviewed studies, only one, King and Rebelo (1990) include taxation in their theoretical model and stipulate as final conclusion that the incentive effects of fiscal policy can influence economic activity, where taxation can readily lead to development traps or growth miracles. Unfortunately, this paper does not provide empirical test to the proposed model.

For regional studies, there are recent works that deal with public investment in LAC. Only two studies analyze two fiscal variables, simultaneously, public investment and government spending (Loayza et al., 2002, 2003). De Gregorio (1992) and Calderon et al. (2002a, 2002b) test the impact of government spending and public infrastructure on long-term economic growth, respectively.

All studies conclude on a negative link between government spending and growth, and the two most recent analyses reach to a positive nexus for public infrastructure, while Calderon et al. find a negative relationship for the same variables. However, these empirical results are not developed in an endogenous growth model framework.

It can be stated after the literature review for endogenous growth models with emphasis on fiscal

policy in Latin American countries, that there is no study that offers a comprehensive and conclusive analysis.<sup>10</sup>

Different economic growth determinants have been widely and empirically studied, as it can be observed from the literature review, and the conclusions are commonly coherent at the global and regional level, except for individual fiscal policies. The inconclusiveness of the empirical work may hinge on the fact that many analyses mix both developed and developing countries, and this may lead to wrong conclusions, considering the differences that these two clear-cut groups have.

Government spending has been studied vastly and exhaustively from a theoretical and empirical perspective. However, theoretical models of long-term economic growth and different fiscal policies as its determinants, particularly for Latin American economies has not been deeply analyzed as other determinants, such as financial development, international trade, or total factor productivity, to mention a few. Moreover, in spite of the alleged relevance of fiscal policy, almost all previous studies only include one variable, government spending or government size.

<sup>1</sup> De Gregorio (1992), De Gregorio and Lee (1999), Fajnzylber and Lederman, Easterly and Levine (2001), and Carranza, Fernández-Baca and Morón (2003) have made important contributions to the academic literature on Total Factor Productivity in Latin America.

<sup>1</sup> Economies with initially low capital-labor ratio will have a high marginal product of capital. Then a constant portion of the income generated is saved, allowing for more investment, which in turn will exceed the amount needed to offset depreciation. Over time, the capital-worker ratio will rise, which will cause a decline in the marginal product of capital, assuming constant returns to scale and fixed technology. But if the marginal product of capital continues falling, the savings will also fall, reaching some point where savings were just enough to replace fully depreciated machines. At this point the economy enters a stationary state. During the transitional period toward the stationary state, savings and investment will become the engine to transitional growth. When this temporary

period comes to an end exogenous technology will affect positively economic growth by not letting the marginal product of capital per worker to decline.

<sup>2</sup> TFP is the “X” factor behind the tangible production factors’ contribution. It could include not only technological change, technological transfer and its spillover effects, but also managerial techniques, and all sorts of innovation leading toward an increase of productivity, basically in benefit of the production process.

<sup>3</sup> The lower the starting level of real per capital GDP, relative to the long-run or steady-state position, the faster is the growth rate (Barro, 1995).

<sup>4</sup> Although this theory was very useful for understanding the detailed structure of economic growth, it did not yield an understanding of the forces that affect it (Romer, 1986; Easterly et al., 2001).

<sup>5</sup> Using a Cobb-Dougllass production function, TFP can be specified as  $TFP = VA / (K^a L^b)$ , where VA is value-added and K and L are the production factors, capital and labor. If constant returns to scale are assumed, then  $\ln TFP = \ln VA - a \ln K - b \ln L$ , and taking derivatives with respect to time gives us percentage changes in TFP with respect to labor productivity and the capital-labor ratio. Relaxing the assumption of constant returns to scale will affect the results, when increasing the returns to scale, ceteris paribus, TFP will be higher.

<sup>6</sup> Reconciling the conflicting findings regarding schooling and countrywide productivity is a difficult task. Several reasons drive inconsistencies in the aggregate investigations. One is that it is extremely difficult to collect comparable measures of schooling across countries. For example, the schooling level classified as completed primary in one country may be considered a completed first cycle of secondary in another. Average levels of quality may differ widely. The resulting measurement error would bias the results from finding that aggregate measures of schooling affect income growth (Krueger and Lindahl, 2000).

<sup>7</sup> It is important to mention that the data does not take account of the skills and experience gained by individuals after their formal education. Second, the measure does not directly measure the human skills acquired at schools, and specifically, does not take account of differences in the quality of schooling across countries. They also propose alternative methods for measuring educational attainment such as international test scores. However, there are no time series data for that proxy variable, out of all the regional countries, only Colombia is considered in the ranking.

<sup>8</sup> First the concept of small or large government depends on the regional characteristics. OECD countries’ benchmark for small government is different from developing countries’ benchmark. Second, regarding fiscal policy in relation to business cycles, developed countries historically have implemented countercyclical measures, according

to what governments are expected to do in theory, while developing countries, on the contrary usually behave procyclically. Third, while developed economies based their tax systems on income taxes, in developing economies is based on consumption taxes, and in the past international trade taxes were also significant. Finally, the close relation between private and government consumption in developing countries is another difference between them and industrial countries. If we add the erratic pattern of output and private consumption to this peculiar structure, then the evidence shows how erratic are not only macroeconomic variables but also fiscal variables. Thus the possibility of higher volatility increases.

<sup>9</sup> This concept refers to the so-called complementary hypothesis.

<sup>10</sup> Folster and Henrekson (1998) admit that the theoretical and empirical evidence is found to admit no conclusion on whether the relation is positive, negative or non-existent. Also they add that there is no persuasive evidence that the extent of government has either a positive or negative impact on either the level or the growth rate of income, largely because the fundamental problems or identification has not yet been addressed.

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# Una Revisión Bibliográfica de Estudios Empíricos y Teóricos sobre Crecimiento Endógeno en América Latina

SUEYOSHI Ana

## Resumen

El presente documento tiene por finalidad ofrecer una revisión de la literatura existente sobre crecimiento económico desde un punto de vista empírico y teórico, en particular en América Latina. La revisión bibliográfica está dividida en tres partes, las cuales están relacionadas con las teorías de crecimiento económico en boga en los últimos cincuenta años. En la primera parte se presentan estudios de crecimiento económico, acumulación de capital y tecnología. La segunda parte presenta y clasifica la literatura existente de acuerdo con los postulados de la teoría de crecimiento endógeno. Finalmente, se identifican aquellos estudios relacionados con el análisis de economía del crecimiento en América Latina.

Como se puede observar a partir de la revisión bibliográfica, diferentes determinantes del crecimiento económico han sido amplia y empíricamente estudiados, y los resultados a nivel global y regional son coherentes, con la excepción de variables fiscales. La falta de resultados concluyentes en este tipo de variables podría radicar en el hecho de que los estudios revisados no hacen la distinción entre economías desarrolladas y en vías de desarrollo. Gasto de gobierno ha sido vasta y extensivamente estudiado, tanto desde una perspectiva empírica como teórica. Sin embargo, modelos de crecimiento endógeno con determinantes fiscales para América Latina parecen ser escasos, en comparación con la literatura económica centrada en variables determinantes como desarrollo financiero, factor total de productividad, entre otros.

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