Traslated by Tim Ennis

NEW GROWTH MODELS
LITERATURE REVIEW AND ELEMENTS FOR A DEVELOPMENT STRATEGY*

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Since the second half of the 1980s new models of economic growth have began to appear in the literature. Due to the importance of this topic as well as a dissatisfaction with respect to the neoclassical model that had been predominant until then, these other models have quickly gained great popularity in academic circles. Unlike the neoclassical model (where steady-state growth is exogenous), long-term growth is generated by variables and processes that are determined within the model itself. As a result they receive the generic name of "endogenous growth models".

This article has two basic objectives. First and foremost, to provide a review of the literature on the new growth models, their differences from neoclassical models, their empirical implications and the evidence found so far. Secondly, to see how the evidence could be applied to the Chilean case and what policy lessons can be drawn.

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1. Introduction

The average per-capita growth rate of the Chilean economy over the last 30 years has been quite low in comparative terms. There have been short periods of great boom (for example 1978-81 and 1985-89) and other periods of severe recession; however on average, ever since there have been reliable figures, Chile has not stood out as a country that has enjoyed a significant and sustained growth process. On the contrary, in a study carried out by Robert Summers and Alan Heston[1], where comparable data are displayed for 114 countries over the period 1960-1985, Chile is in 85th place in terms of average per-capita growth, with the meager rate of 0.7%[2]. The highest per-capita growth during this period was Singapore with an average of 7.4% per year, while Chad is in bottom place with a -2.8% annual average. The annual average rate for the 114 countries is 2.0% (see Table Nº 1). Clearly, if we include the last four years (1986-1989), Chile would improve its relative position; however, even so, it would still be a country of mediocre average performance over the last three decades[3].

This poor performance has caused Chile to lose its relative position among the highest per-capita income countries. Whereas in 1960 it was in 25th place, today it is 39th, with a 1985 per-capita income of US$ 3,486 in PPP (Purchasing Power Parity) terms.

The traditional or neoclassical[4] theory of growth has little to offer regarding the growth process in different countries: why certain countries that started out from similar levels have grown apart over time? Why the economic miracle of certain countries? Why some countries that once were rich now are not?[5], etc. According to the neoclassical model, differences in long-run per-capita growth are explained solely by differences in the process of technological advance in the different countries. Those with greater technological progress will grow faster than those progressing more slowly.

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[1] See Robert Summers and Alan Heston (1988).

[2] The figures may differ from those in the National Accounts because those of Summers and Heston are adjusted in line with purchasing power parity in each country so as to make them comparable.

[3] Including the period 1986-1989 (according to figures published in the National Accounts of Chile) average per-capita growth in Chile for the period 1960-1989 amounts to 1.35%. This is still significantly less than both the mean and median of the other 113 countries.

[4] See Solow (1956).

[5] Argentina is the most cited case in this category. Díaz Alejandro (1970) puts Argentina among the richest countries at the turn of the century, with a per-capita income similar to Holland, Germany and Belgium, and above Austria, Italy, Switzerland, Sweden, Norway and Spain, whereas by 1985 it was way behind this group.

Certainly, differences in technology may explain inequalities in growth rates; however, in practice this explanation ends up being a tautology. In other words, one sees certain countries with higher growth rates than others, and to validate neoclassical theory one assumes that this is because they have progressed faster technologically. Moreover, in neoclassical theory there is no room for policies that encourage saving or investment to affect long-term growth rates. Higher saving will affect the level of output only, but not the steady-state rate of output growth[6]. It is clear that by affecting the level of output, also one affects the rate of growth during the transition to steady state, but not in the latter situation.

For this and other reasons discussed below, empirical studies in various countries have come up against serious difficulties when they have tried to put forward the neoclassical theory as an explanation of long-run growth processes.

As from the second half of the 1980s, new growth models began to appear in the literature[7]. In these models one of the traditional assumptions of the neoclassical approach, constant returns to scale, is replaced by an assumption of increasing returns. These models, of great popularity in recent years in a academic circles, go under the generic name of "endogenous growth models", as growth is generated by processes and variables that are determined within the model itself, unlike the neoclassical model where there is an exogenous technology parameter that determines the steady-state growth rate.

The implication of these models is that many factors which under the neoclassical model only affect the level of income, now have an effect on its growth rate. The interesting thing is that a series of aspects which economic-policy specialists have always identified as determinants of the growth rate, now come to have a theoretical foundation (for example the rate of saving, taxes, foreign trade distortions, etc.).

Undoubtedly, for a developing country like Chile, the topic of growth is fundamental. The more we understand about it, the better prepared we will be to promote practices that encourage growth and avoid others which impede it.

This article has two basic objectives. First and foremost, to provide a review of the literature on the new growth models, their differences from neoclassical models, their empirical implications and the evidence found so

[6] Steady state is defined as a state of rest in the economy where a series of variables grow at the same rate. In practical terms, it relates to the state of the economy in the long run.

[7] See, among others, Romer (1986, 1987a, 1987b, 1989a, 1990a), Lucas (1988), Barro (1990), Rebelo (1991) and Easterly (1989).

TABLE Nº 1

	Country	1960-1985 Average per-capita GDP growth (%)	1985 GDP per capita (US$)
1	Singapore	7.4	9,834
2	Hong Kong	6.6	9,093
3	South Korea	6.0	3,056
4	Japan	5.8	9,447
5	Malta	5.7	5,319
6	Taiwan	5.7	3,581
7	Gabon	5.4	3,103
8	Botswana	5.1	1,762
9	Lesotho	4.6	771
10	Cyprus	4.6	5,310
11	Malaysia	4.5	3,415
12	Greece	4.4	4,464
13	Barbados	4.4	5,212
14	Thailand	4.1	l,900
15	Swaziland	4.0	1,187
16	Spain	3.9	6,437
17	Portugal	3.8	3,729
18	Indonesia	3.7	1,255
19	Norway	3.7	12,623
20	Brazil	3.5	3,164
21	Tunisia	3.5	2,050
22	Egypt	3.5	1,188
23	Congo	3.5	1,338
24	Syria	3.4	2,900
25	Panama	3.4	2,912
26	Italy	3.3	7,425
27	Austria	3.3	8,929
28	Finland	3.3	9,232
29	Surinam	3.3	3,522
30	Morrocco	3.2	1,221
31	Belgium	3.2	9,717
32	France	3.2	9,918
33	Israel	3.2	6,270
34	Cameroon	3.1	1,095
35	Iran	3.0	3,922
36	Ecuador	2.9	2,387
37	Pakistan	2.9	1,153
38	Germany	2.9	10,708
39	Irleland	2.9	5,205
40	Turkey	2.8	2,533
41	Paraguay	2.8	1,996
42	Canada	2.8	12,196
43	Denmark	2.7	10,884
44	Iceland	2.7	9,037

(continue)

(Table Nº 1)

	Country	1960-1985 Average per-capita GDP growth (%)	1985 GDP per capita (US$)
45	Holland	2.6	9,092
46	Colombia	2.6	2,599
47	Sweden	2.6	9,904
48	Jordan	2.5	2,113
49	Mexico	2.5	3,985
50	Mauritius	2.5	1,869
51	Dominican Rep.	2.4	1,753
52	Burma	2.4	557
53	United Kingdom	2.2	8,665
54	Luxembourg	2.2	10,540
55	Australia	2.1	8,850
56	Tanzania	2.1	355
57	United States	2.1	12,532
58	Algeria	2.0	2,142
59	SaudiArabia	2.0	5,971
60	Malawi	2.0	387
61	Fiji	l.9	2,893
62	Costa Rica	l.9	2,650
63	Sri Lanka	l.8	1,539
64	Sierra Leone	l.8	443
65	Philppines	l.8	1,361
66	Switzerland	1.8	10,640
67	Zimbabwe	1.7	948
68	Niger	1.7	429
69	South Africa	1 6	3,885
70	Bangladesh	1.5	647
71	New Zealand	1.4	8,000
72	India	1 4	750
73	Trinidad and Tobago	1.4	6,884
74	Rwanda	1.3	341
75	Papua New Guinea	1.2	1,374
76	Mauritania	l.l	550
77	Kenya	l.0	598
78	Guatemala	l.0	1,608
79	Nicaragua	0.9	1,989
80	Ivory Coast	0.9	920
81	Bolivia	0.8	1,089
82	Peru	0.8	2,114
83	Honduras	0.8	911
84	Gambia	0.8	526
85	Chile	0.7	3,486
86	Togo	0.7	489
87	Jamaica	0.6	1,725
88	El Salvador	0.5	1,198

(continue)

(Table Nº 1)

89	Argentina	0.5	3,486
90	Iraq	0.4	2,813
91	Nepal	0.4	526
92	Guinea	0.4	452
93	Liberia	0.4	491
94	Thiopia	0.3	310
95	Uganda	0 3	347
96	Uruguay	0.2	3,462
97	Nigeria	0.2	581
98	Haiti	0.2	631
99	Senegal	g.g	754
100	Guyana	-0.4	1,259
101	Mali	0.4	355
102	Central African Rep.	-0.4	434
103	Benin	-0.5	525
104	Burundi	-0.7	345
105	Sudan	-0.8	540
106	Zambia	0.9	584
107	Madagascar	-1.1	497
108	Somalia	-1.3	348
109	Angola	- I .5	609
110	Zaire	-1.6	210
111	Venezuela	-1.6	3,548
112	Mozambique	-l .7	528
113	Ghana	-1.7	349
114	Chad	-2.8	254

Source: Summers and Heston (1988).

far. Secondly, to see how the evidence could be applied to the Chilean case and what policy lessons can be drawn.

Macroeconomic theory can be divided broadly into two areas: theories about business cycles and theories of growth[8]. Generally, in day-to-day discussion there is much more interest in the current conjuncture, or aspects more related to the business cycle. This concern has some justification, because we are always confronted by what is going on at the moment; but it is also true that if the ultimate goal is the development of the country, we should not neglect elements that relate to long-term growth. That is precisely what this article addresses. Apart from anything else, understan-

[8] However, it should be noted that proponents of real business cycle theories argue that both are part of the same process, and so must be modeled in the same way (see Kydland and Prescott (1982) and Long and Plosser (1983)).

ding the growth process probably has a much higher social value than understanding the mechanics of business cycles. For if such understanding leads into policies implemented being which raise the growth rate by a few tenths of a percent, the accumulated effect after a few years will be considerable[9].

Understanding the growth process also helps to take better short-term decisions. Indeed, better understanding of the variables that have the biggest effect on the long-run growth rate will avoid short-term measures which negatively affect it[10].

This paper is organized as follows: in Section 2 we briefly describe the neoclassical growth model, its empirical implications and why, in the light of the evidence, it has not been successful. The new growth models are described in Section 3, with special emphasis being placed on how they differ from the neoclassical model. In addition, the main empirical studies on this issue are discussed. Section 4 applies the conclusions of the two previous sections to the case of Chile, and finally Section 5 offers conclusions.

2. The neoclassical growth model[11]

In the neoclassical growth model (or Solow model), the per-capita growth rate in steady state is determined solely by exogenous technological change. Countries with higher rates of growth are those which experience greater technological progress. The rate of capital accumulation has no effect on the long-term growth rate: i.e. countries with higher saving/investment rates will have higher levels of income, but not higher steady-state growth rates. Clearly, in getting to this result, such countries will grow more in the transition to steady state, but not once steady state has been achieved. The same happens with another type of variables which in

[9] Lucas (1987) makes an explicit calculation in this respect. It is not surprising that the change in welfare resulting from higher growth is substantially greater than that produced by a smaller variability in the business cycle. It has to be stressed, however, that this calculation assumes both processes are separable. Below it is argued that one of the ways of promoting long-term growth is by avoiding sharp economic fluctuations in the short run (i.e. avoiding instability). If this was so, smoother cycles would be beneficial not only because individuals prefer less fluctuation, given that their are risk averse, but also because smoother cycles mean a higher average growth rate in the long run.

[10] The literature on time inconsistency is illustrative here. This concludes that when the government tries to obtain short-term advantages, the equilibrium of the economy is sub-optimal, as agents realize what the government is doing and incorporate this into their own behavior (see Kydland and Prescott (1978), Barro and Gordon (1983)).

[11] See Romer (1987b) for a brief review of pre-Solow growth literature.

day-to-day discussion are assumed to affect countries' growth rates: factors such as domestic distortions —taxes, tariffs, the composition of investment, etc. In the neoclassical model none of these is relevant for explaining the long-run growth rate.

Given that in this model the rate of capital accumulation is the variable that endogenously reflects any change in the model's parameters, and given that the rate of capital accumulation does not affect the steady-state growth rate, the neoclassical model has endogenous components which explain countries' growth rates in the long run.

2.1. The Solow growth model

The Solow (1956) model assumes a production function that has capital and labor as inputs, together with as a parameter indicating the state of technology. The function is degree-one homogeneous. Both the saving rate (s) and the rate of population growth (n) are exogenous. Under these assumptions it can be shown that the steady-state growth rate is equal to the rate of population growth. Hence, the rate of growth of per-capita income is zero. If one includes technical change in the model[12], then the per-capita growth rate becomes the rate of technology growth.

Let us assume a production function with constant returns to scale of the form:

$$Y_t = F(K_t, A_t L_t) \qquad (1)$$

where: Yt = Output in t

L_t = Employment in t

K_t = Capital stock in t

$A_t = A_0^{gLt}$, represents the state of technology in t. This grows at a rate of gL.

It is easy to show that in this context the growth rate of per-capita output in steady state is equal to gL.

Therefore, policies that affect the rate of saving will not affect the long-run growth rate. They will only affect the level of income, and hence

[12] This should be Harrod-neutral. This means that it affects labor, i. e. effective units of labor grow at a rate of n (the rate of population growth) plus the rate of technological change (gL).

the rate of growth in the transition to steady state. This implication of the model puts economists in a position that is hard to defend. Indeed, it is difficult to match this up with what can be seen in different countries throughout the world (see Section 2.3 for greater detail on this and other points where the neoclassical theory seems inadequate in the light of the evidence).

One of the earliest criticisms of the Solow model related to the exogeneity of saving rates. A more sophisticated version of the model endogenizes the saving rate, for which purpose one starts from the intertemporal utility maximization of a representative agent, on the basis of which agents make their saving/consumption decisions. This paradigm is known as the Ramsey (1928), Cass (1965) and Koopmans (1965) model.

However, the conclusions of the model under this new assumption are the same as with an exogenous saving rate: the rate of growth of per-capita output, in steady state, is equal to the rate of technological progress. Capital accumulation does not cause faster or slower growth in the long run. It is clear that what leads to this conclusion is the form of the production function and not whether the saving rate is exogenous or endogenous. Indeed, with constant returns to scale and the rate of population growth exogenous, capital accumulation cannot be a source of growth in the long run. If the stock of capital begins to grow more rapidly than the population, the law of decreasing returns kicks in, and growth starts to slow down.

2.2 Implications of the neoclassical model

As was mentioned in the previous subsection, the neoclassical model implies that all per-capita growth in the long run is due to productivity or technology growth. The saving rate only affects the level of income, but not its rate of growth.

A second implication of the neoclassical model is that countries tend to converge over time. That is, poor countries during the transition period will tend to grow faster than rich countries, so per-capita incomes become more equal. As the capital-labor ratio (K/L) is smaller in lower income countries, marginal productivity of capital is greater, so these countries invest more and, during the transition to steady state, they grow faster. It is important to emphasize this point: only during the transition to steady state do they grow faster. In the long run, if the rate of technical progress is the same, they grow at the same rate.

Another implication of the model is that, in open economies, capital will flow from rich countries to poor ones, because of the differential

returns to capital in the two types of country. Poor countries have less capital, so the return is higher, and this will encourage capital inflows.

Apart from that, in this model there is no relation between population growth and the long-run per-capita growth rate. Countries with higher rates of population growth simply accumulate more capital, so the K/L ratio equalizes in the long run.

In the end, as Kaldor argues: "the interpretative value of this theory is extremely small" (Kaldor, 1961, quoted in Romer, 1987b, p.61). All growth is explained by supposed technological progress, the meaning of which is not clear. What is technological change? How is it explained? Why does it differ between countries in the long run? As Romer argues:

> The problem with this theory is that it is nothing more than a description of the data. It says that the rate of growth is higher in some countries in certain periods because exogenous technological change is greater. This description of the data does not leave space for the theory to say anything about the process of growth in countries. (Romer, 1987b, p. 71).

2.3 Empirical problems

Table Nº 2 shows growth rates for different regions of the world between 1965 and 1980 and between 1980 and 1988. Certain situations immediately stand out. To start with, the lowest growth rates do not correspond to the richest countries, as neoclassical theory would predict. Indeed, the countries with the highest growth rates in the period 1965-1980 are the high-income group of countries that are not members of the OECD. Other groups of countries have quite similar growth rates in this period, except for OECD members which have slightly lower rates. In the period 1980-1988 this same group of countries, which in the previous period had the highest growth, now appear with the lowest rates, followed by low-income countries excluding China and India. OECD countries have comparatively high growth in this second period. In brief, one sees no tendency for countries to converge. Instead, growth rates seem not to be related at all to countries' income levels.

Table Nº 3 shows per-capita GNP growth rates for the period 1965-88[13]. The group of countries with least growth is comprised of low-income

[13] Remember that growth theories relate to per-capita growth and not to the total growth of the economy.

TABLE Nº 2: AVERAGE GDP GROWTH BY GROUPS OF COUNTRIES

Group	1965-1980	1980-1988
Low-income countries	5.4	6.4
China and India	5.3	8.7
Others	5.5	2.0
Middle-income countries	6.1	2.9
Low Middle-income	6.5	2.6
High Middle-income	5.6	3.3
high-income countries	3.7	2.8
OECD members	3.6	2.9
Others	8.0	-1.3
Regional Aggregates		
Esat Asia	7.2	8.5
Europe, Middle East and North Africa	6.1	n.a.
Latin America and Caribbean	6.0	1.5
South Asia	3.7	5.1
Sub-Saharan Africa	4.8	0.8

Source: World Development Report 1990, World Bank.
n.a. = Not available.

TABLE Nº 3: AVERAGE GROWTH OF GNP PER CAPITA BY GROUPS OF COUNTRIES

Group	1965-1988
Low-income countries	3.1
China and India	4.0
Others	1.5
Middle-income countries	2.3
Low Middle-income	2.6
High Middle-income	2.3
high-income countries	2.3
OECD members	2.3
Others	3.1
Regional Aggregates	
Esat Asia	5 2
Europe, Middle East and North Africa	2.4
Latin America and Caribbean	1.9
South Asia	1.8
Sub-Saharan Africa	0.2

Source: World Development Report 1990, World Bank.

countries apart from China and India. For their part, high-income non-OECD countries have the second highest growth rate over this period. In the geographical regional groupings it can be seen that Sub-Saharan African countries, among the poorest countries in the world, are also those with the lowest rates of growth. Here again, one does not seem to discern any clear correlation between levels of income and the rates of growth.

Finally, in Figure Nº 1 this conclusion is corroborated. Here per-capita GDP growth rates between 1960 and 1985 are shown together with 1960 per-capita income levels, for the 114 countries shown in Table Nº 1. If the highest income countries were growing faster, then the series of points representing the different countries should trace out a downward sloping curve; however, the points do not seem to plot any clear relation at all.

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Figure Nº 1

GDP per capita in 1960

Average per-capita growth rate, 1960-1985.

In synthesis, the evidence shows us that the Solow model's prediction of convergence between countries does not seem to be confirmed. Econometric studies corroborate this conclusion. Romer (1986) carries out different empirical tests for individual industrial countries, as well as for groups of countries over time, and concludes that there is no evidence of convergence. Baumol (1986), on the other hand, takes 16 industrialized countries *(ex-post)* for the period 1870-1979, using Maddison's figures, and shows that there is convergence. In response to Baumol, De Long (1988) argues that the Baumol study clearly has a problem of selection bias, because if one considers countries that *ex-post* are those of highest income, is highly likely that *ex-ante* they were more dispersed. The correct procedure is to take the highest income countries *ex-ante* (i.e. in 1870) and see whether they have converged over time. Accordingly, De Long takes seven countries from the Baumol sample (Argentina, Chile, East Germany, Ireland, New Zealand, Portugal and Spain) and discards one Japan[14]. He

[14] According to this index, Chile in 1870 was in 2ist place among the highest-income countries of the world , with a per-capita income similar to that of Finland and Norway.

does not find evidence of convergence. Baumol (1988), in a reply written together with Wolf, concedes the point and offers a *mea culpa*. Finally, Barro and Sala-i-Martin (1990) undertake a study of different countries and different North American states. They find convergence after controlling for other variables that might affect long-term growth. Having said that, their evidence is only consistent if diminishing returns to capital act extremely slowly (using production function parameters thought to be unacceptable). This evidence, the authors argue, would be consistent with two types of models: (1) a neoclassical model with a broad definition of capital (including human capital) and, as just mentioned, a very limited role for diminishing returns to capital; and (2) endogenous growth models, with constant returns to capital and gradual diffusion of technology among countries.

Table Nº 4 shows annual GDP growth rates per man-hour among the leading countries in different periods. As can be appreciated, the evidence suggests a significant rise in the rate of growth. The only way to explain this within the neoclassical model is to argue that there has been an acceleration in the rate of technological change. Although this is possible, as was mentioned in the previous sub-section, the argument leaves the sensation of simply being a tautology: higher growth is explained through higher growth.

TABLE Nº 4: AVERAGE PRODUCTIVITY GROWTH IN LEADING COUNTRIES

Leading country	Period	Annual average rate of GDP growth per man-hour
Holland	1700-1785	-0.07
United Kingdom	1785-1820	0.5
United Kingdom	1820-1890	1.4
United States	1890-1970	2.3

Source: Maddison (1982)

Another empirical problem that neoclassical growth theory faces is the positive relation that seems to exists between the growth rate and trade. Data in Maddison (1982) for 16 industrialized countries shows a clear positive relation between the two variables for different periods. Distortions that might inhibit trade only cause a fall in the level of income in the neoclassical model, but do not affect the growth rate. This is inconsistent with the evidence cited above.

The evidence for different countries over time also suggests that capital mainly flows between high income countries. There is no massive capital flow towards lower-income regions where capital scarcity increases its return. The same is true for skilled labor: in fact, both skilled and unskilled labor emigrate towards countries of higher average income levels. In practice, flows of capital and labor do not generate an equalization of returns to these productive factors. This reality is difficult to explain in the neoclassical model. Arguments such as restrictions on the flow of inputs do not seem to be suffficient to explain this phenomenon. In the new growth models, as we shall see below, this difference in the return to capital does not exist (there are no diminishing returns to capital), so the new models do not predict a massive flow of capital to lower-income countries.

Finally, it is interesting to draw attention to the inconsistency that exists between neoclassical growth theory and the practical policy recommendations emanating from multilateral agencies such as the World Bank and the International Monetary Fund. One frequently finds oneself with studies by these agencies which recommend the elimination of trade distortions, and the installation of an efficient tax system to increase saving and investment, and induce more efficient channeling of the latter etc., so as to achieve higher growth. According to neoclassical theory, none of these measures, and other similar ones, would affect the growth rate in the long run. Both common sense and the evidence suggest that the model is more likely to be wrong than the policy recommendations. This is so certain, that neoclassical growth theory for a long time has been considered an interesting theoretical exercise, but whose practical importance is to say the least dubious. In synthesis, the neoclassical model does not seem relevant for studying the effects of different policies on countries' long-run growth processes.

Clearly one could counterargue that during the transition to steady state these policies do have effects on the growth rate, according to the neoclassical model. However, the empirical relations discussed above are long term and not merely transitional. Moreover, King and Rebelo (1989) find that the dynamic of transition in the neoclassical model only explains a small proportion of the growth experienced by the different countries.

2.4 Growth accounting models

On the basis of neoclassical growth theory, a whole theory of growth "accounting" has appeared[15] attempting to explain growth in terms of increases in capital and labor inputs. The residual is technological change.

[15] See Solow (1957) and Abramowitz (1956).

Assuming a production function that is homogeneous in degree one (constant returns to scale), with competitive markets, it can be shown that:

$$g_y = \alpha g_k + (1 - \alpha) g_L \qquad (2)$$

where:

g_y = growth of rate of output
g_k = rate of growth of capital stock
g_L = is rate of growth of employment
α = share of capital in total income
$(1-\alpha)$ = share of labor in total income

If a technology parameter of the form A(t) is included in the production function, equation (2) would also contain a term representing the rate of technical change. This would be the fraction of growth not explained by increases in capital and labor inputs.

The problem is that, empirically, this residual turns out to be very high. On average it accounts for nearly half of the growth of countries; even when other factors such as human capital are included, the residual continues to be important. Thus, not even as an accounting approach is neoclassical growth theory successful. Of course a defender of neoclassical theory might argue that the entire residual is indeed technological change. However, the magnitude of the figures and the big differences between countries, make this argument difficult to sustain.

Furthermore, Boskin and Lau (1990), estimate a production function for five countries (United States, United Kingdom, France, West Germany and Japan) to test whether the three basic assumptions used to measure productivity in this type of exercise —constant returns to scale, neutral technological progress and utility maximization— are observed in practice. They found that the three assumptions are rejected by the data.

3. New growth models

It is curious that with the neoclassical model being unsatisfactory not only theoretically but also empirically, a new line of growth theory has taken so long to appear.[16]

New growth models do away with a series of assumptions made in neoclassical theory. First and foremost, the assumption of constant returns

[16] Especially considering that there are certain writings by Adam Smith and other classical authors which put emphasis on increasing returns to scale (see Romer, 1987b).

to scale is discarded and replaced by an assumption of increasing returns. In addition, the assumptions of technological change and exogenous human capital are discarded. These models are called "endogenous growth models" to draw attention to the fact that long-term growth does not depend on exogenous factors alone.

However, when increasing returns to scale are introduced, these models are confronted by a serious theoretical challenge. Under increasing returns to scale, competitive equilibrium does not exist, because the total amount produced is not enough to pay the factors of production. In the light of this, endogenous growth models have recourse to one of two alternative assumptions: (1) external economies to the firm, and (2) the absence of competition. Under the first assumption there are increasing returns at the aggregate level, but constant returns at the level of the firm. This ensures the existence of competitive equilibrium, although this equilibrium is not optimal[17]. The first increasing-returns-to-scale models mainly used this assumption (see Romer 1986, Lucas 1988, Barro 1990, King and Robson 1989, Stokey 1990). We shall discuss these models in further detail below. Under the second assumption, the absence of perfect competition is accepted, i.e., different types of monopoly and monopolistic practices are assumed: specifically that technology is produced and or transmitted in non-perfectly competitive markets (there are patents, copyrights, etc., which prevent a new technology being used freely by everyone). It is precisely this market power that gives the incentives needed for individuals and industries to develop new technologies (see Romer 1990a and 1990b; Grossman and Helpman 1989a and 1989b).

Perhaps the most important feature of these models is that they give space for policies affecting saving and investment to affect countries' long-term growth rates. This is a fundamental difference from the neoclassical model[18].

In the remainder of this section, the main characteristics of the Romer (1986) model, which gave rise to this whole line of research, will firstly be set out, to see how these models function technically. In the

[17] We are referring to the concept of "externalities". In other words the firm does not realize that some of its actions will have positive effects at the aggregate level. For example, a discovery by one firm in particular will spread throughout the market. The concept of "learning by doing" (Arrow, 1962) has been an important source of inspiration in this literature. According to this, technological discoveries have a social benefit effect that is not perceived by the person making the discovery, as other firms and activities can freely use them.

[18] King and Rebelo (1990), in an endogenous growth model, show that the effects of policies are quantitatively much more important than in the neoclassical model, as they affect not only the transition but also the long run.

second place, a brief review of the theoretical literature will be made, divided according to the emphasis of the different models. Finally, the empirical evidence found in various studies will be analyzed.

3.1 Romer (1986): Externalities and growth

In order to generate endogenous growth Romer assumes increasing returns to scale, but with economies that are external to the firm, so as to ensure the existence of competitive equilibrium. The production function assumed is:

$$Y_i = F(K_i, L_i, \kappa) = K_i b L_i^{(1-\beta)} \kappa^{\eta} \quad (3)$$

where:

Y_i = Output of firm i

K_i = Capital stock in firm i

Li = Employment in firm i

$\kappa = \sum_{i=1}^{N} K_i$ = Stock of knowledge

"N" firms are assumed with "N" sufficiently large, and all firms are identical. Thus:

$$\kappa = NK_i$$

Given that "N" is large, each firm takes the aggregate capital stock, or stock of knowledge, as Romer calls it, as given, and the firm is unable to affect it (in this sense increasing returns are external to the firm). However, it is clear if all firms increase their κ_i, the total stock of knowledge will increase, benefiting all of them.

Competitive equilibrium in this case is not optimal, given that each firm individually does not take into consideration the effects their actions have on the other producers. Accordingly, the total capital stock will be less than the social optimum.

As there are increasing returns to scale in the production function, capital accumulation can generate endogenous growth[19]. The decreasing returns to capital which slow down long-term growth in the Solow model are not present here. A higher saving rate, the result of a lower inter-temporal discount rate, for example, will translate into a higher steady-state growth rate. Various policies affecting the saving rate will, therefore, have an influence on the long-run growth rate.

In synthesis, Romer puts forward an endogenous growth model where output per person can grow without limit. The rate of investment does not decline over time as capital accumulates, because the marginal productivity of this factor is not decreasing. This means that poor countries do not necessarily invest more than rich countries, and so there is no convergence.

3.2. Brief literature review

To obtain endogenous growth, one way or another, the economy must have increasing returns to scale (or more specifically, constant returns to factors that can be accumulated). Different alternatives have been used to satisfy this requirement, depending on what different authors have wanted to stress as the main determinants of growth. Some of these, which we discuss below, are:

a) Externalities resulting from research and development (R&D), b) human capital, and c) specialization. These alternatives are not mutually exclusive nor do they exclude others; i.e. a given model may generate endogenous growth with more than one of the assumptions mentioned. In fact most of the models in this new literaturedo include more than one of these elements. The division that has been chosen here is for methodological purposes only.

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[19] To be more rigorous we should say that increasing returns is not a sufficient condition for there to be positive endogenous growth in the long run (note that in this model there is no technological growth, so according to the neoclassical model the steady state growth rate ought to be equal to zero). One requires at least, constant returns to factors that can be accumulated (in this case capital). In other words we need $\beta + \eta \geq 1$. If $\beta + \eta = 1$ growth will be constant in the long run, whereas if $\beta + \eta > 1$, growth will be explosive (see Sala-i-Martin, 1989, for a technical discussion on this point). Note also that increasing returns is not a necessary condition to generate endogenous growth, because if the production function included a single factor of production that could be accumulated, that would be enough to have constant returns.

a) Externalities

The Romer (1986) model, described above, was the first in this line of research.

In another article the same author constructs a model where the main source of growth, as in Solow, is technological progress (Romer 1990a). However, unlike Solow this comes from maximization decisions by economic agents; i.e. it is not exogenous. The good "technology" or "knowledge" is "non-rival" and partially "non-excludable"[20]. It is only partially non-excludable because the person developing the technology can patent it and produce intermediate goods with it, in which he will act as a monopoly. Hence, there are incentives to develop technology. It is not totally excludable because this technology will help to produce new technology, which *ex-ante* is non-appropriable. Romer assumes that the production function for new technology is linear with respect to the already existing technology stock, and depends also on the stock of human capital. Increasing returns in the human-capital-producing sector produces endogenous technology growth which translates into a growth rate for the economy that is also endogenous. Finally, as the benefits of technology are not fully appropriable, less will be produced than the socially optimal amount, so any policy tending to reduce the difference between the private and social return to technology production (e.g. a research subsidy) will raise the economy's growth rate.

Grossman and Helpman (1989a and 1989b), in models which emphasize the effects of international trade on growth and welfare, also include a positive externality in research and development. In general, policies tending to shift resources from the R&D-producing sector towards any other sector will retard growth.

b) Human capital

Lucas (1988) presents two models in which he stresses the accumulation of human capital as a fundamental determinant of long-run growth. In the first of these, two factors of production are assumed, physical capital and human capital. As both factors can be accumulated, and as constant returns are assumed in the production function, the model can generate

[20] The terms "non- rival" and "non-excludable" come from the public finance literature. A pure public good is non-rival (several individuals can use it at the same time) and non-excludable (nobody can be excluded from using the good). A typical example is national defense. A private good is rival and excludable.

endogenous growth. An additional requirement, however, is that the human capital production function should not be decreasing in the stock of human capital. Lucas assumes a human capital production function which depends only on its stock, and which is linear (i.e. it has constant returns to scale). Thus, the marginal productivity of human capital does not fall as its stock increases, for which reason there are incentives to continue accumulating it. Thus it is the human-capital-producing sector that drives the economy and generates perpetual growth. Although, under the above assumptions, it is not necessary to assume externalities to generate endogenous growth, Lucas incorporates them by assuming that an individual's productivity improves when he or she works with other individuals of "high" average quality (in terms of human capital)[21]. This model, like Romer (1986), does not predict convergence and gives rise to a positive relation between saving and growth.

In his second model, Lucas (1988) focuses on the concept of "learning by doing" to generate the same results as before.

As has already been mentioned, the article by Romer (1990a) on technological change also places emphasis on human capital as a fundamental determinant of long-term growth. Indeed, this factor is used intensively in the production of technology. However, unlike Lucas (1988), what drives growth is not the human-capital-producing sector but the sector producing technology. Thus, if it were impossible to act directly through policies in the technology-producing sector, the second best alternative would be to promote the development of human capital.

Becker, Murphy and Tamura (1990) relate human capital to fertility and growth. A human-capital production function with non-decreasing returns to this factor is the basis for a perpetual growth process and also implies that the profitability of investing in human capital rises along with its stock. Thus, the higher of the stock of human capital, the higher the investment in human capital and the lower the investment in children. For the same reason, societies with high educational levels tend to have lower fertility rates and higher rates of growth than those with lower levels of education[22]. In this model two stable steady states are produced. One involving under-development with a low stock of human capital, high fertility and low growth, and another involving development with a high human capital stock, low fertility and high growth. The elements that determine an economy's starting point (which these authors call history) will be impor-

[21] This assumption helps him to obtain certain desired results relating to migration.

[22] In other words, greater economic development reduces the quantity but increases the quality of children.

tant determinants of which steady state a given country achieves. Various shocks can shake an economy off one steady state and move it on to a course leading to the other. Hence, what these authors call "luck" can also be important. Likewise, policies that encourage the development of human capital over a prolonged period can lift an economy from a state of underdevelopment.

In Stokey (1990) investment in human capital has a positive externality in the productivity of future generations' human capital, and this boosts growth. Romer (1989b) emphasizes the stock of human capital (rather than its rate of growth) as a determinant of economic growth.

c) Specialization

Another group of models highlights specialization as a source of growth[23].

The idea that specialization leads to increasing returns to scale has been formalized by Ethier (1982) and widely used in international trade models. According to this, the production function is an increasing function of the number of intermediate inputs used in production. Thus the higher the number of intermediate inputs, the greater the specialization in their production, and therefore the greater the final output. However, there is a limit to specialization given by the fixed costs that have to be incurred to produce a new intermediate good. This avoids a solution where there are an infinite number of firms, each producing an infinitessimal amount.

Romer (1987a) uses a model of this type, where increasing specialization produces permanent growth. Greater accumulation of capital translates into a larger number of intermediate inputs (i.e. in greater specialization in production) and hence into higher growth rates. For the same reason, policies to encourage saving promote long-term growth.

Grossman and Helpman (1989a and 1989b) use the same type of model for the case of international trade. Commercial openness gives access to a larger number of intermediate goods and technology, and this promotes growth. In Romer (1990a) access to the rest of the world's markets (i.e. to a larger market) promotes greater research and so translates into higher growth. Here, however, the size of the market is related to the stock of human capital more than to the number of consumers.

[23] The idea of specialization as a source of growth originates with Adam Smith, who argued that the division of labor stimulated economic growth.

3.3. Empirical evidence

The new growth models gained enormous popularity because they solved several of the problems of the neoclassical model. Specially, they gave a theoretical basis to different elements which in day-to-day discourse are assumed to affect growth.

However, as there are several models, there is a need for one or more criteria to discriminate between them. Clearly one criterion, perhaps the most important, relates to empirical evidence, which will tell us whether a factor that is assumed to affect growth finds support in the data or not. If it does not, then it is likely to be quickly rejected[24]. The need to verify many of the assumptions and results of the new growth models has generated a boom in the empirical literature on this issue. The main empirical studies on the determinants of long-term growth are reviewed below.

Perhaps the most important study on this issue is Barro (1989) which uses the Summers and Heston growth figures, as well as other series from different sources for 98 countries (for the vast majority of which he obtains series for all the relevant data). The period used is 1960-1985. Clearly having a series for a longer period would enable more robust conclusions be obtained, but unfortunately such series do not exist for a big enough sample of countries.

As a proxy for a initial human capital Barro uses attendance rates at primary and secondary school in 1960 (United Nations figures). In the regressions each of these variables shows a positive and significant correlation with growth, and the results do not change when other proxies are used for human capital. Furthermore, when human capital is controlled for, there is evidence of convergence, i.e. the initial level of income shows a negative correlation with the growth rate.

The Barro regressions also show that government consumption is negatively correlated with long-run growth, whereas public-sector investment and growth are not correlated[25]. The results for public-sector consumption can be interpreted, according to the author, as indicative of the distorting effects of taxes and government spending programs.

The data also show that political stability[26] is positively correlated with growth, which could be pointing to the benefits of having property

[24] The failure to find evidence, however, may also be due to a lack of adequate information.

[25] Government consumption expenditure excludes defense and education that the author considers them more related to investment. Both variables —consumption and public sector investment— are measured in relation to GDP.

[26] Barro uses different proxies to measure political stability, such as the number of deaths due to political causes and the number of revolutions or *coups d'état* per unit of time.

rights firmly established. One also sees a negative correlation between growth and distortions in capital goods prices.

Finally, despite the fit of the regressions being highly satisfactory, there are two regions of the world —Latin America and Sub-Saharan Africa— where the growth performance is significantly poorer than can be explained by the variables mentioned. This would mean that there are other variables that have not been considered which have been important factors in the meager performance of these regions.

De Long and Summers (1991) find a positive association between long-term growth and investment in machinery and equipment. Indeed, controlling for initial GDP and for growth of the labor force, they find that one additional percentage point of investment in machinery and equipment (as a percentage of GDP) translates into an addition to the average annual growth rate of one third of a percentage point. The sample used includes data for 25 countries with per-capita GDPs over 25% of the USA's in 1960, for the period 1960-1985. A similar result —although slightly less significant— is obtained when 61 countries for which there is data are included.

Romer (1989b), using data from 112 countries over the period 1960-1985, finds that the proxy he uses for human capital —literacy— is not significant in a growth regression. However, it does appear as significant in the investment regression, whereby human capital would be affecting growth by promoting greater investment in physical capital.

Barro and Sala-i-Martin (1990) find evidence of convergence in a study of 98 countries over the period 1960-85, but only after controlling for human capital and government consumption spending as a percentage of GDP. However, the convergence is very slow and very difficult to reconcile with credible parameters for a constant-returns-to-scale production function. The results are more consistent with endogenous growth models displaying constant returns to scale. The results are more consistent with endogenous growth models that display constant returns to capital (capital which also includes human capital) and with a gradual diffusion of technology among countries.

Fischer (1991) finds that countries that administer short-run macroeconomic variables better (for example, inflation and the fiscal deficit) tend to have a higher long-term growth rate. Part of this is explained because better macroeconomic management increases investment. However this type of variable seems also to exert an independent influence on growth.

Easterly and Wetzel (1989) find that long-term growth is positively correlated with investment, its efficiency, and the economy's degree of openness to international trade, whereas it correlates negatively with the level of distortions in the economy.

Murphy, Shleifer and Vishny (1990) argue that growth depends not only on the stock of human capital, but also on the distribution of talents among the different occupations. In particular, if the economic system allows those with business talent to devote themselves to "doing business", this will be highly beneficial for economic growth. In contrast, when the system induces talented people to become rent-seekers, growth will be harmed because these individuals will become rich by causing income to be redistributed towards them, instead of creating wealth. To verify this hypothesis empirically, the authors use the same Barro (1989) regression, but add, the percentages of students entering university to study law and engineering, as explanatory variables. The percentage starting law degrees would be a proxy for talents dedicated to rent-seeking, while the percentage of those studying engineering would proxy for those dedicated to productive activities or technological innovation[27]. The empirical results confirm the author's assumption: the percentage of engineers does seem to affect growth positively, while that of lawyers does so negatively.

Finally, it should be noted that there are also authors who have come out in defense of the Solow model. For example Romer and Weil (1990) carry out a series of estimations from which they conclude that when human capital is included in the Solow model, the model provides results that are consistent with the empirical evidence.

4. Some implications for a development strategy: Chilean case

The new growth models stress aspects such as human capital, openness to international trade, the absence of distortions, political and social stability, the size of the government, research and development in technology, patents, efficiency of investment, etc., as factors determining economic growth. A better level in these variables will not only translate into greater output, but also into higher long-term growth. In these models, distortions not only produce the well known Harberger triangle, representing the welfare loss in static terms, but also have a negative effect in dynamic terms, which translates into lower growth.

[27] It is clear that the choice of these proxies is quite arbitrary and therefore highly controversial.

Over the last 30 years Chile has had a meager economic performance in growth terms; however, when the variables that appear as important for long-term growth are evaluated, future prospects are more encouraging.

Perhaps the variable most emphasized in both the theoretical and empirical literature is human capital. If variables such as schooling or the illiteracy rate are used to measure human capital, Chile seems to be a relatively privileged country. For example, in the Barro study (1989) in 1960 Chile is among the top 20 countries in terms of primary schooling and in the top 40 counties as regards secondary schooling[28].

Moreover, the literacy rate according to the World Bank —98%— is probably the highest in Latin America and similar to that of developed countries[29]. Although it is encouraging to think that this country has a good reserve of human capital which would be beneficial for achieving high growth rates in the future, it is also true that Chile has been in that position for a long time (remember that the data used by Barro are for 1960), yet it has not had a high average rate of growth. This suggests that to explain our poor performance we should seek other alternatives. Despite this, one should not ignore this variable which appears highly correlated with long-run growth in all studies on this issue. Spending on the quantity and quality of education should be seen as a highly profitable investment.

Government spending is a variable which, in various studies, is negatively correlated with growth. Probably this reflects the distorting effect of taxes, so there is a need to be careful not to promote a disproportionate growth in the size of the state. According to Barro's data, our country is in 39th place out of a total of 98 in terms of public spending as a percentage of GDP[30].

The fact that investment in machinery and equipment appears as more productive than investment in infrastructure (De Long and Summers, 1991), gives rises to explicit policy recommendations on this question. Indeed, as these authors argue, if this result is to be believed, then taxes and subsidies encouraging such investment will promote growth. The possible costs of these policies will be minimal compared with their supposed benefits. In any case, even if there are no explicit incentives, at least all types of disincentive for this type of investment should be avoided. A proportion of

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[28] Barro uses schooling in the year 1960 to measure the human capital stock, because he is interested in having a proxy for the initial stock of this variable.

[29] In this World Bank study on quality of life, Chile is in 24th place (World Bank 1990), a result that is heavily influenced by the high rates of literacy and life expectancy in our country.

[30] Excluding education and defense.

Chile's investment in machinery and equipment is imported, so any obstacle in this sense would be harmful. It is worth nothing that in the De Long and Summers study, Chile is 60th out of 61 countries as regards this type of investment as a percentage of GDP.

International trade is another of the variables that appears strongly correlated with growth. This result is probably influenced by the spectacular performance of East Asian countries which have used development strategies oriented towards international trade. For much of the last 30 years Chile followed a policy of import substitution, with all kinds of international trade barriers. This may partly explain the low growth rate which has been referred to. Prospects on this issue today are clearly better, as the strategy being applied is one of openness to the outside world.

Price distortions have appeared in several studies as negatively correlated with growth. Chile does not have a very distinguished record in this regard —in the Barro (1989) study, Chile features as the country with the second greatest relative price distortion; however, once again the prospects are promising in this respect, for it is clear that such distortions have been substantially reduced in our country in recent years.

On the question of political stability, Chile also does not do well according to indicators used in various studies. However, as in the previous cases, the future looks more promising. Finally, there are two issues that are worrying for their effect on our country's growth, and they add a note of caution to the general optimism about future prospects in which this section has been presented.

The first point relates to the stability of policies and the macroeconomic environment in general. Chile has not been characterized in the last 30 years as a country with a stable economic climate, and this has doubtless harmed investment and growth. Various studies have corroborated the relation between stability and investment. Solimano (1990) shows that the variability of the real exchange rate (which would be a proxy for instability) has negatively affected investment in Chile. Likewise, Larraín and Vergara (1991), advance evidence that macroeconomic stability (again measured as the variability of the real exchange rate) is one of variables that explains the high rates of investment in East Asian countries. Table Nº 5 is a good example of this point. It can be seen that volatility in the real exchange rate in the period 1975-1988 is much greater in Latin American countries that in East Asian ones[31]. Moreover, of Latin American nations

[31] Having said that, it should be stressed that the period in question is quite special for Latin America. Indeed, it is difficult to find another period in the history of the region where there has been such instability. It would have been ideal to have a longer series for real exchange rate volatility; however, no reliable and comparable information is available on this.

included in this table Chile has the worst instability index after Argentina. If one accepts that instability affects investment, and if one believes in endogenous growth models, then the conclusion is that this type of instability produces negative effects on long-term growth. In any development strategy, therefore, a fundamental task should be to produce and foment a climate of macroeconomic stability.

It should be stressed, however, that a climate of consensus as regard the optimal economic strategy to follow, such as has emerged in Chile in recent times on the advisability of maintaining a market economy, certainly helps in the issue of macroeconomic stability.

TABLE Nº 5: VARIABILITY OF THE REAL EXCHANGE RATE, 1975-1988

	Average coefficient of variation*
East Asia	
Korea	0.0393
Singapore	0.0434
Thailand	0.0368
Malaysia	0.0430
Average	0.0406
Latin America	
Argentina	0.1704
Brazil	0.0491
Chile	0.1052
Colombia	0.0652
Mexico	0.1015
Peru	0.0838
Uruguay	0.0884
Average	0.0884

* Defined as the average of the coefficients of variation between 1975 and 1988.
The coefficient of variation for each year is calculated considering the period between (t-2) and t, where t is the corresponding year.
Source: Larraín and Vergara (1991).

The second point relates to income distribution. Table Nº 6 shows figures for income distribution for 46 countries[32]. The indicator used is the quotient between the percentage of income received by the richest quintile of the population and the percentage earned by the poorest quintile. The

[32] The World Bank presents data for 42 countries. For the other four countries (Taiwan, Singapore, Chile and Kenya) the source is Larraín and Vergara (1991), based on specific information for each country.

TABLE Nº 6: INCOME DISTRIBUTION

	Country	(1) % of Income received by 20% lowest income	(2) % of Income received by 20% highest income	(2)/(1) Income distribution
1	Taiwan	8.8	37.2	4.2
2	Japan	8.7	37.5	4.3
3	Holland	8 3	36.2	4.4
4	Belgium	7 9	36.0	4.6
5	Germany	7.9	39.5	5 0
6	Ireland	7 2	39.4	5.5
7	Sweden	7 4	41.7	5.6
8	United Kingdom	7.0	39.7	5.7
9	Switzerland	6 6	38.0	5.8
10	Spain	6 9	40.0	5.8
11	Finland	6.3	37.6	6.0
12	Norway	6 0	38.2	6.4
13	Israel	6 0	39.9	6.7
14	Bangladesh	6.6	45.3	6.9
15	India	7 0	49.4	7.1
16	Italy	6 2	43.9	7.l
17	Denmark	5.4	38.6	7.1
18	Indonesia	6 6	49.4	7.5
l9	United States	5 3	39.9	7.5
20	Canada	5.3	40.0	7.5
21	Singapore	6 5	49.2	7.6
22	France	5 5	42.2	7.7
23	South Korea	5 7	45 3	7.9
24	Egypt	5 8	48 0	8.3
25	Sri Lanka	5.8	49.8	8.6
26	El Salvador	5 5	47.3	8.6
27	Hong Kong	5 4	47.0	8.7
28	Australia	5.4	47.1	8.7
29	New Zealand	5 l	44.7	8.8
30	Thailand	5 6	49.8	8.9
31	Portugal	5.2	49.1	9.4
32	Philippines	5.2	52.5	10.1
33	Argentina	4 4	50.3	11.4
34	Trinidad and Tobago	4 2	50.0	11.9
35	Chile	4.2	60.4	14.4
36	Mauritius	4 0	60.5	15.1
37	Malaysia	3 5	56.1	16.0
38	Turkey	3.5	56.5	16.1
39	Costa Rica	3 3	54.8	16.6
40	Zambia	3 4	61.1	18.0
41	Venezuela	3.0	54.0	18.0
42	Mexico	2 9	57.7	19.9
43	Ivory Coast	24	61.4	25.6
44	Panama	2.0	61.8	30.9
45	Peru	I 9	61.0	32.1
46	Brazil	2 0	66.6	33.3

Source: (1) World Development Report 1989. World Bank. (2) Larraín and Vergara (1991).

bigger this quotient, the more unequally income is distributed. Chile is one of the countries in the world with the worst income distribution (35th out of 46), although here Chile compares favorably with other Latin American countries.

If one agrees with Barro (1989) that well defined property rights are important for achieving high growth rates, than a bad distribution of income is worrying. Indeed, social pressures for greater equality can translate into expropriations and transfers affecting property rights. Moreover, a bad distribution of income can also be negative in terms of instability. When governments come under pressure from social demands, they tend to act precipitously to satisfy these demands, and this gives rise to what is known as the "populist cycle"[33]. If this is repeated with some frequency it causes instability, and growth is harmed. Improving the distribution of income therefore ought to be an important priority in any long-term strategy. However, here one has to be extremely cautious, for attempts to produce drastic changes in the income distribution over short periods leads to the populist cycle, which in the long run is damaging not only for growth, but also for the income distribution itself.

5. Conclusions

For a developing country like Chile, the study of the determinants of long-term growth is of the utmost importance. Although it is understandable that attention often gets focused on immediate and short-term issues, one should never forget that if the goal is to achieve a state of development, the only way of achieving this is by growing.

The neoclassical growth model does not offer an adequate analytical framework for the growth process. The fact that exogenous technological change is the only variable determining long-run growth in this model, is incompatible with the empirical evidence.

New growth models, or endogenous growth models, provide a highly promising theoretical framework for studying the determinants of growth. In these models, unlike the neoclassical model, a higher rate of saving will not only translate into a higher level of income, but also into a higher growth rate.

One of the greatest merits of this new line of research is that growth theory appears as quite closely linked to the literature on development.

[33] See Sachs (1989).

Previously a absurd situation existed where the two topics had little or nothing in common. Economic growth theory was an interesting theory but of dubious practical application; development studies bore little relation to this at all, and in addition lacked a sound theoretical base. New growth models have managed to bring the two fields significantly closer together.

Aspects such as human capital, international trade, distortions, the efficiency of investment and technological innovation are among others factors that endogenous growth models identify as important determinants of long-term growth. In these models, convergence does not have to occur; i.e. it is likely that rich countries will continue to be rich, while poor countries remain where they are at the present time.

Finally, despite its poor growth performance in the past, Chile is facing a promising future. However, instability in macroeconomic policies and the unequal income distribution in our country may prove to be two sources of frustration for these expectations.

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