
macroeconomía del desarrollo

Savings, investment and
growth in the global age:
analytical and policy issues

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Abstract

One of the controversies in growth analysis is the relative role of capital accumulation and productivity growth in driving output growth. As we interpret the evidence, discussed in this paper, part of the controversy on the role of capital accumulation in the growth process is due to the time span of the analysis (growth transitions versus steady states/long run growth). In fact, the empirical importance of various growth determinants will depend on what we want explain: long run growth, say growth over half a century or a century as different from growth dynamics over one or two decades. New evidence is showing that growth fluctuations at frequencies of a decade or so are very important part of the growth story for many developing countries. Growth is an irregular and volatile process in which the same country may experience shifts in growth regimes that can entail growth take-off and booms, stagnation and/or growth collapses. In this context, investment and savings become important variables whose determinants and dynamics we want to understand for designing public policies affecting positively the rate of economic growth.

I. Introduction

One of the most complex and empirically unsettled subjects in economics is the explanation of the process of economic growth. As the creation of wealth is of critical importance for the welfare of most people around the world the current disarray in growth economics is not only a topic of analytical interest but also of practical importance. One of the controversies in growth analysis is the relative role of capital accumulation and productivity growth in driving output growth. As we interpret the evidence, discussed in this paper, part of the controversy on the role of capital accumulation in the growth process is due to the time span of the analysis (growth transitions versus steady states/long run growth). In fact, the empirical importance of various growth determinants will depend on what we want explain: long run growth, say growth over half a century or a century as different from growth dynamics over one or two decades. New evidence is showing that growth fluctuations at frequencies of a decade or so are very important part of the growth story for most countries except probably high per capita income economies. Growth is an irregular and volatile process in which the same country may experience over a period of several decades various shifts in growth regimes that can entail growth take-off and booms, stagnation and/or growth collapses. The description of steady growth around a well-defined and stable trend is clearly not a good description of the actual growth experience for most economies in the world, certainly not for developing countries. In this context, investment and savings become important variables whose determinants and dynamics we want to understand for affecting positively the rate of economic growth. A growth boom can be driven by positive terms of trade shock, the discovery of natural resources or the adoption of pro-growth economic

policies. To support and consolidate growth beyond a boom phase, investment is a critical vehicle to create productive capacities and probably generate knowledge spillovers and new technologies. At the same time, ensuring an adequate level of national savings is important as foreign savings can be volatile and lead to “sudden stops” that force costly macroeconomic adjustment and eventually growth crises.

The relation between savings and investment involve analytically important and critical policy issues of great relevance. First, the discrepancies between intended savings and desired investment creates macroeconomic fluctuations and growth cycles in a world of less than perfect price and wage flexibility. Second, the causality between savings, investment and growth can run in various directions, depending on how the theorist views the working of the economic system at macro level. Third, in a world of capital mobility we want to know how close is the relationship between domestic savings and domestic investment.

This paper examines various topics around savings, investment, their determinants and relationship between them (particularly in a world of increased international capital mobility) and to economic growth. The paper first discusses, briefly, alternative causality lines in the relationship between these three variables putting them in the perspective of macroeconomic theory and growth economics. In addition, we show how different schools of economic thought “close” the relevant economic model. Second, the paper looks at the main determinants of savings and investment from a national point of view, highlighting transmission channels and empirical evidence that are more relevant for developing countries. Third, the paper reviews recent empirical evidence on the role of capital accumulation in accounting for growth both during shifts between different growth regimes and in the medium and long run. Fourth, the paper discusses the relationship between domestic savings and domestic investment in a world of capital mobility, the so-called Feldstein–Horioka “puzzle”. The paper also discusses the evolution of global savings–investment balances in a historical perspective starting from the period of the gold standard and the first wave of globalization of the second half of the 19th century until First World War, the inter-war period and the post 1970s-late twentieth century wave of financial globalization that dominates the international economy today. It shows the changing pattern of savings–investment in main economies and the role of savings flows to and from developing countries. The paper closes with some final remarks on the analytical and empirical results examined in the paper as well as policy implications for the savings and investment process from a pro-growth perspective.

II. National growth, savings and investment: causality issues

In the Keynesian and post-Keynesian traditions investment plays a critical role both as a component of aggregate demand (often the most volatile) as well as a vehicle of creation of productive capacity on the supply side. In post Keynesian demand-driven models investment still plays a crucial role in determining medium run growth rates. Most of these models assume unemployment and idle productive capacities. A variant but assuming full employment of labor is provided by Nicholas Kaldor who postulated growth models with changes in functional income distribution as a mechanism of macroeconomic adjustment acting through national savings in which capitalists have a greater marginal propensity to save than workers.

In a different vein we have the Austrian school of Von Mises, Hayek and others. In this school, the real interest rate (relative to the prospective return on physical assets) is the equilibrating variable between the supply of loans (savings) and the demand of loans for productive purposes (investment). An investment boom is created when banks or monetary policy keep the interest rate below the “natural rate” (a concept developed by the Swedish economist Knut Wicksell), say the interest rate which equilibrates the demand for loans (investment) with the supply of funds (savings).

In the 1950s neoclassical economics gave rise to a celebrated long run, supply-driven, growth models such as Solow (1956). In this model, the rate of technical change, the savings ratio and the rate of population growth are the three parameters that determine the rate of

growth of the economy in steady –state. In this model, the investment ratio plays a role only in the *transition* between steady –states (in practice that transition may take a few decades) but not in the configuration of the long run growth equilibrium of the economy. We will see that these transitions are empirically very relevant; in fact, new papers in growth economics are starting to focus more on growth transitions rather than on long run growth. In the Solow model, as said before, there is no independent investment function (a concept central to the Keynes of the *General Theory*). Full wage-price flexibility solves any ex-ante discrepancy between intended savings and desired investment avoiding the sort of macroeconomic fluctuations that were the concern of Keynes and Austrian economists alike. In the “endogenous” growth theory developed since the mid 1980s a new role was recreated for investment to affect long run growth by making the rate of technical change and productivity growth linked either to the accumulation of physical capital or the accumulation of human capital.

The issue of causality between savings, investment and growth has plagued growth economics since the start. The controversy can be cast in terms of two leading theoretical perspectives: the “Marx–Schumpeter–Keynes view” versus the “Mill–Marshall–Solow view “(see Chakravarty, 1993; and Solimano, 1997). The first view posits that investment (Keynes, and to some extent, Marx) and innovation (Schumpeter, Marx) are the two variables that drive output growth. In this context, savings adjusts passively to meet the level of investment required to hold macroeconomic equilibrium and deliver a certain growth rate of output. In this view growth *leads* savings. In contrast, in the Mill–Marshall–Solow approach that channel of causality is reversed as it assumed that all savings is automatically invested and translated into output growth under wage–price flexibility and full employment. As a result, in the Mill–Marshall–Solow approach savings *leads* economic growth. The two schools deliver alternative lines of causality between savings, investment, innovation and growth. These causality issues are still relevant in an open economy with capital mobility, as we shall see in a later section.

III. The determinants of savings

The research on savings has identified some key factors explaining savings rates such as income (both level and growth rate), the degree of macroeconomic stability, foreign borrowing constraints, financial and demographic variables and income distribution. We also discuss the evidence on the relation between government savings and private savings, and government savings and national savings.

1. Savings and income

A positive association between national savings and current income levels is observed both in time series and cross section data (micro and aggregate) as savings (as a proportion of GDP) rises with the level of income per capita. The evidence has found a type of inverted “U” relation between savings and the level of income per capita (Masson, Bayoumi and Samiei, 1998). It has become an accepted stylized fact that savings rates rise at the initial stages of development (although not at very low per capita income levels) and declines as the countries reach higher per capita income and more mature development levels (see also Ogaki, Ostry and Reinhart, 1995). In low-income countries that are closer to subsistence levels we may expect that most income be consumed (with little left for savings). Higher income levels make it possible to save more; however, the size of the effect declines as income raises, in line with a decline of investment and growth opportunities, the aging of the population, and lower fertility rates these are features that tend to be observed in countries that approach higher per capita income levels.

Evidence is also extensive on the positive association between savings and growth (see Carrrol and Weil, 1994; Edwards, 1996; Loayza, Schmidt-Hebbel and Serven, 1999). The permanent income theory implies that consumption is determined by permanent (long run) income, implying that savings follows current (transitory) growth.¹ The life-cycle model, first developed by Franco Modigliani, argues that productivity growth makes the working young richer than the old, and the young will be saving more than the old are dis-saving. Aggregate income growth would follow from increasing the lifetime profiles for succeeding generations.² In turn, habit formation in consumption is a factor that helps to rationalize the positive correlation between savings and growth. Carroll and Weil (1994) argued that people adjust consumption habits slowly, which makes savings positively related with current growth of income.

2. Foreign credit constraints

Theory says that one of the purposes of borrowing is to allow people to smooth consumption in face of shocks. However, consumption will follow more closely current income at low-income because credit constraints are more binding at those income levels. In contrast, consumption is expected to follow more closely permanent (or expected income) at higher income levels. Foreign credit restrictions are more relevant for low income and financially distressed middle-income countries; in those cases we should expect that consumption would adjust more to shocks, as smoothing is more difficult. In the context of foreign borrowing constraints, additional foreign savings is likely to lead to higher consumption and, *ceteris paribus*, lower national savings. There is evidence about a *negative* relationship between national and foreign savings, with the offsetting effect ranging between 50% and 70% (see Schmidt-Hebbel and Serven, 1999).

3. Financial development, domestic credit constraints, and interest rates

The research on financial development has found an ambiguous effect of financial variables on national savings. Deeper financial markets and strengthened prudential regulation of financial institutions help to enhance saving (and investment) opportunities by offering a wider variety of financial instruments to channel savings and also by providing more security (in the case of effective regulation) to investors. However, financial development is also often associated with an increased availability of credit for consumption relaxing domestic liquidity constraints. Savings can be discouraged as more credit becomes available, particularly credit for consumption.³

The association between interest rates and savings is also ambiguous theoretically (income and substitution effects may work in opposite directions). The income effect produced by higher interest rates may be positive or negative depending whether the saver is a net wealth holder or a net debtor. The (positive) income effect of an increase in interest rates for a net wealth-holder may run in opposite direction than the substitution effect that induces a cut in current consumption (substituting for future consumption). The empirical evidence on the effects of interest rates on savings has proven to be inconclusive (see Schmidt-Hebbel and Serven, 1999). Some have explored the sensitivity of savings to the rate of interest as a function of income levels. Ogaki, Ostry and Reinhart (1995) provided evidence showing that savings are more responsive to rates of return at higher income levels. As indicated before, at lower income level people cannot smooth

¹ The terms of trade effect is viewed as a transitory deviation of national income from its trend. The Milton Friedman's consumption hypothesis would argue that the additional income resulting from transitory improvements in the countries' terms of trade would be mostly saved.

² In more extensive models of consumer behavior the relationship is theoretically ambiguous (Carroll and Weil, 1994).

³ Most likely both effects interact affecting the results of the effects of financial development on savings (Piles and Reinhart, 1999).

consumption over time. At higher income levels it is possible to save and dis-save. Thus, according to this evidence the inter-temporal elasticity of substitution between present and current consumption varies with the level of wealth.

4. Macroeconomic uncertainty

In the literature an important reason to save is the precautionary motive, as people would save more at times of uncertainty to anticipate the possibility of difficult times. One such a source of uncertainty is of macroeconomic nature. This can be reflected in high and erratic inflation, exchange rate volatility, cycles of boom and contraction, and instability in the financial system. One response to these uncertainties is capital flight as people leave domestic assets due to this uncertainty (Edwards, 1996; and Taylor, 1996 and 1999).⁴

Inflation has been a factor strongly associated with macroeconomic instability; however, the effects of low to moderate inflation on savings is bound to be very different from the impact of high or even explosive inflation of the type that destroys the payments and banking systems and financial savings along the way. The classic example is the hyperinflation of Germany in 1923 although there are more recent cases such as Argentina during the hyperinflation of the late 1980s and Brazil in the early 1990s. In 2001-2002 Argentina suffered a banking crisis following the abandonment of the currency board adopted in 1991. In this later banking crisis, people (mainly from the middle class) --that believed in the system-- and had deposits in the banks experienced the loss of part of their financial savings.

5. Fiscal policy

The stance of fiscal policy is expected to affect savings. One channel is the size of the fiscal deficit or surpluses that has been found to affect the level of national saving rates. Low fiscal deficits or surpluses contribute to national savings, as complete Ricardian equivalence has been refuted empirically (i.e. an increase in public savings is not fully offset by a decline in private savings). This effect is stronger in developing countries subject to subsistence consumption and liquidity constraints (see Corbo and Schmidt-Hebbel, 1991). The evidence confirms the partial offset between government and private savings with the offset coefficient in the range 40%-70%. This means that 1% of additional government savings (in terms of GDP) adds about 0.5% of GDP to national savings. Another channel is the level of taxation on factors that affect savings as interest rates, dividends of firms or other variables.

6. Demographics

The age structure of population is another determinant of national savings. According to the life-cycle hypothesis a larger working population relative to the older population (or young family dependents) contributes to raise national savings. The working young are net savers and the retired old have often-negative savings. In economies with higher proportions of working populations the national savings rates would be higher than in ageing economies with higher shares of old people in their populations. Studies using cross-country data have been more successful in confirming the negative effect of dependency ratios (say the share of population below 15 and above 65) on saving, probably because demographic variables change slowly over time (Masson, Bayoumi and

⁴ Precautionary motives may help to explain the positive association between saving and consumption of young consumers (who expect positive but uncertain future income growth) and the positive saving of retired people (Loayza, Schmidt-Hebbel and Servén, 2000).

Samiei, 1998). Some microeconomic studies conflict with the findings at country levels, which maybe partly due the aggregation of cohorts of different ages in macro studies. Bequests may also contribute to reduce aggregate savings even if the old do not dis-save (Carroll and Weil, 1994; Deaton and Paxson, 2000). The literature mostly agrees on a negative correlation between age dependency ratios and national savings confirming the theory and empirical evidence.

7. Income distribution and savings

Richer people are expected to save more as a proportion of their income than poor people (savings is, in a way, a superior good). Some formulations make savings depending upon *functional* income distribution (i.e. Nicholas Kaldor who assumed that capitalists have a higher propensity to save than workers) whereas others make a link between *personal* income distribution and saving. While for the most part, the empirical literature based on cross-section micro-data suggest a positive relation between *personal* income inequality and overall personal savings, the evidence on this issue is more mixed at aggregate, country level. Empirical studies such as Schmidt-Hebbel and Serven (1998) (see also Schmidth-Hebbel and Seven, 2000) indicate that cross-country data do not reveal a strong association between personal income distribution and aggregate saving. The authors show that this relation holds for samples of developing and developed countries, and is robust to alternative saving measures, income distribution indicators and functional forms.

New political economy literature emphasizes that regressive income distributions are a factor contributing to political instability and through this channel they may depress both growth and savings. Lower growth contributes to reduce savings through the growth-savings link but also political instability may discourage savings because of the uncertainties about saving prospects.

8. National savings and growth

Empirically, national savings and growth are positively *associated*, especially in the case of developing countries. The evidence also shows that investment and national savings are positively related, reflecting the existence of foreign credit constraints an issue we take up later. In terms of causality, the research on the determinants of savings has generally considered growth as a *determinant of national savings, suggesting that the causality runs from growth to national savings* (the typical regression is one in which national savings relative to GDP is the dependent variable of the regression and GDP growth is a right-hand side explanatory variable).⁵ The evidence on the association between GDP growth and foreign savings is mixed: there are episodes of *high* growth with relatively *low* levels of foreign saving rates (i.e. some East Asian economies) and episodes of *low* growth episodes and *high* foreign savings (i.e. low income countries in Africa and Latin America that receive sizeable levels of foreign aid).⁶

The issue of causality between savings and growth is more controversial as discussed before. In the neoclassical growth model a la Solow saving is exogenously given. In contrast,

⁵ In the case of the link between investment and growth, growth in most cases is regressed against investment, therefore, implicitly assuming that investment causes growth. A mutual reinforcing process between national savings and growth, and investment and growth is assumed in the literature (see for example Attanasio, Picci and Scorcu, 2000; Solimano, 2006; Hausmann, Pritchett and Rodrik, 2004; Gutiérrez, 2005).

⁶ See Gutiérrez (2006) for Latin America.

in the Keynesian school saving is endogenously determined as a result of the interactions between income and consumption. Higher growth generates higher incomes that lead, in turn, to higher savings (as the propensity to consume out of income is less than one). Carroll and Weil (1994) provided strong evidence that growth causes saving (Granger causality), but Attanasio, Picci and Scorcu (2000) questioned Carroll and Weil results, showing that the causality may go both ways depending on the data (sample and frequency of the data) and the econometric technique used to estimate the relationship between both variables.

IV. The determinants of investment

Wicksell, Bohm-Bawerk, Fisher and others developed a capital theory in the late 19th century and early 20th century. However, John Maynard Keynes in *The General Theory* (1936) was among the first that postulated an independent investment equation in a demand-driven macro model.⁷ Keynes emphasized that the determinants of savings were of a different nature than the determinants of investment, challenging the view of the classics, prevailing at the time, that assumed that the real interest rate was the key variable that equilibrated savings and investment.

In Keynes it was disposable income and possibly wealth the main determinants of savings whereas investment depended upon the difference between the real cost of capital relevant for firms and the marginal efficiency of capital (or productivity of capital). Expectations were critical in the determination of investment as it was the prospective estimate of the *future profitability* of capital that mattered for investment decisions. The investment function experienced several refinements and reformulations after Keynes original formulation adding other determinants that the practice of macroeconomic adjustment, reforms and growth are showing as relevant to better understand investment decisions.

⁷ In the early 1930s the Polish economist Michael Kalecki put forward, independently, a somewhat similar formulation to Keynes. See Don Patinkin (1982) for a different view in which Keynes and Kalecki formulations of investment are interpreted to be quite different in scope.

1. Profitability and appropriability

The return of investment is obviously important in investment decisions but the capacity of investors to *appropriate* those returns is also ultimately very relevant.⁸ If property rights are weakly enforced *potentially* high returns may not induce higher actual investment as the appropriability or internalization of those returns may not take place. The respect of property rights and the capacity to internalize returns from investment require a certain level of trust that guide economic transactions and also a judiciary system that allow contracts to be draw and respected at a reasonable cost. Recently, new attention as been devoted to analyze issues of profitability of investment in terms of the “cost of doing business” a concept that involves the cost of obtaining permits, licenses and other requisites to set-up a plant and start and maintain business.⁹ The profitability variable, in turn, is affected by factors such as cash flows, corporate income taxes, depreciation rules and others fiscal policy variables (see Alesina, Ardagna and Perotti, 2002; Schmidt-Hebbel, Serven and Solimano, 1996). Political economy variables are also important in the determination of investment. In fact, political stability and social peace are also factors that private investors—national or foreign – attach great importance. For the return of capital to accrue to capitalists (i.e to make them appropriable) the risks of destabilizing policies and/or confiscator actions by governments --that have the monopoly of force and law enforcement --- have to be low. Also labor–capital relations must be reasonably harmonious or at least no conflictive to ensure social peace. In this vein, a social equilibrium characterized by high inequality, political polarization, conflictive labor–capital relations tends to lead to policies that are ultimately against capital and therefore penalize investment. This may operate through unsustainable polices that try to buy social peace in the short run by artificially rising real wages (i.e. through fixing an overvalued exchange rate), or through higher taxation. Also downright hostility to private property in highly unequal societies may develop with negative consequences for private investment.

2. Growth cycles and capacity utilization

As indicated before a stylized fact of the process of economic growth, particularly for developing countries, is the high frequency of cycles of growth take-offs, growth collapses and stagnation. In other words, past growth is often a poor predictor of future growth for a given country.¹⁰ The behavior of investment in growth cycles (see later) is important. Investment is affected and also affects the type and duration of those cycles in a double causation fashion. The literature on investment has emphasized the effects of capacity utilization on investment stressing the fact that investment is deterred in an economy with unused productive capacity and possibly uncertain expectations by the private sector on the duration and intensity of various stagnationary and recessive cycles (Serven and Solimano, 1993). Empirically, the effects of capacity utilization variables in empirical investment equations are often very strong and statistically significant but caution is required when establishing causality between investment and the degree of unused capacity.

3. Fiscal policy and investment

The effect of *fiscal policy* on private investment acts through at least three channels: (a) the fiscal deficit in general tends to reduce private investment through its effects on real interest rates

⁸ Rodrik (2006) discusses the role of appropriability in formulating successful growth strategies.

⁹ See World Bank (2005).

¹⁰ This fact was brought to attention by Easterly , Kremer, Pritchett and Summers (1993) and confirmed by subsequent empirical work on growth.

and the absorption of private savings to finance the deficits. It also signals a lack of sustainability of fiscal policy that deters private investment; (b) another channel is through the level, composition and quality of public investment that complements (or substitutes) private investment (see Schmidt-Hebbel, Serven and Solimano, 1996), (c) the level of taxation on corporate earnings and depreciations rules.

4. The role of uncertainty and irreversibility

Another important topic is the effect of *uncertainty* on private investment. To explain the channels through which uncertainty affects investment, research in the last decade or so has developed and tested new theories that highlight the role of *irreversibility* on investment. As physical capital once installed in a particular firm or sector cannot be changed or disinvested, except at a large cost: in a sense capital, once installed becomes “irreversible” (see Dixit and Pindyck, 1994). This feature of investment makes it very sensitive to risk and uncertainty. In general there is a high “*value of waiting*” in an uncertain environment, as firms do not wish to get stuck with an excessive stock of capital in the event that conditions that affect profitability change. In the context of developing countries this is very relevant as economic structures and policies are often more volatile and unstable than in advanced countries. Pindyck and Solimano (1993) investigated the effect of macroeconomic volatility as measured by the level and variance of inflation rates on the marginal profitability of investment using a formulation of irreversibility investment constraints (political instability variables were also tried with no significant statistical results). The paper also studied the slow response of investment after stabilization in several countries suffering from high inflation in the 1970s, 1980s and early 1990s. The long investment pause that led to a slow recovery of economic growth, in the aftermath of stabilization has been considered as a case of an increased value of waiting after large macro shocks take place.¹¹

A considerable literature has studied the effect of macroeconomic uncertainty on investment and growth in developing countries (see Serven and Solimano, 1993; Schmidt-Hebbel, Serven and Solimano, 1996, among others). In general, topics of interest have been the effects of unanticipated currency devaluations, external shocks, debt problems, financial crises, and other shocks on investment.

5. Finance and investment

The effect of financial constraints and the structure of finance has been another topic of research on investment (see Summers, 1981; Fazzari, Hubbard and Peterson, 1988; Bruinshood, 2004). In general firms have two sources of finance: external (equity, bank loans, bonds) and internal (retained profits, accelerated depreciation). At the margin, the optimal capital structure among different sources of finance is the one in which the marginal cost of different types of finance (adjusted by risk, taxes and currency denomination) is equal among different sources. The problem is that the supply of external financing in developing countries is restricted, particularly for small and medium size enterprises. External borrowing may relax internal credit constraints but again often mainly for large and well-connected firms that have access to foreign borrowing. Retained profits are a main source of investment financing in developing countries giving the constraints and imperfections of capital markets.

¹¹ In the context of market-based economic reforms in Latin America, Eastern Europe and the former Soviet Union it was also observed a relatively slow initial reaction of private investment. This may reflect the lack of a private sector in the former socialist countries but also reflects the effects of uncertainty on the consolidation of largely untried reform packages, again an increased value of waiting at work.

6. The composition of investment

The structure of investment by type of assets matters for economic growth because the different types of investment goods have different effects on productivity and growth. Some quantitative studies have emphasized the role of machinery and equipment investment in augmenting the role of physical capital (and labor) in the growth processes. Since the industrial revolution machinery investment has played a key role, directly as a production factor, and also as a mean of acquisition and transmission of technological improvements across countries and within countries. De Long and Summers (1991 and 1993) found evidence of high social returns from investments in machinery, assigning to machinery investment a primary role in boosting productivity growth (proxied by per capita GDP growth). They showed that high rates of machinery investment accounted for most of Japan's successful growth experience after World War II. They also concluded that fast-growing countries were those with favorable supply conditions for machinery investments and that developing countries benefited as much as richer economies from the technologies embodied in machinery. Building projects are usually less effective in promoting growth because the technologies embodied in constructions structures have lower potential of being transmitted across production process. In addition, the output of the construction sector is mostly non-tradable and technologically less dynamic.

There are also potential complementarities between *private investment and public investment* (Kahn and Kumar, 1997; Kahn and Reinhart, 1990; Serven and Solimano, 1993; and Greene and Villanueva, 1991), mainly public investment in infrastructure and education.¹² The roles played by foreign direct investment (FDI) have been addressed by Lim (2001), Borensztein et al. (1998), and Olofsdotter (1998)

¹² The roles of infrastructure have been addressed by Easterly and Pack (2001) for Africa and Moguillansky and Bielchowsky (2000) for Latin America.

V. The empirical role of investment in long run growth and in growth transitions

In evaluating the impact of capital accumulation and investment on output growth it is useful to draw a distinction between medium-long run growth processes and growth transitions. In addressing the first issue a strand of the literature tends to attach a greater role to total factor productivity (TFP) growth than to capital accumulation in accounting for output growth. In the words of Easterly and Levine (2001) “although physical and human capital accumulation may play key roles in igniting and accounting for economic progress in some countries, something else—TFP—accounts for the bulk of cross country differences in the level and growth of GDP per capita in a broad cross section of countries”. The authors find that the contribution of capital growth typically explains less than half of output growth and that the share of TFP is usually larger for fast growing economies.

The issue of causality is important here and growth accounting does not imply causality. Disagreement persists about the role of investment in the growth process. Some authors have concluded that investment has been the main factor explaining economic growth. In a study for East Asia, Young (1994) concluded that investment was the main source of growth in the experience of the East Asian economies downplaying the importance of TFP growth in the Asian case. Other economists have acknowledged the important role played by fixed investment but argued that productivity has been the engine that has marked the difference between fast and slow growth experiences

(Blomstrom et al., 1996; Harberger, 1996 and 1998; Gutiérrez, 2005; Klenow and Rodriguez-Clarke, 1997). Elias (1992) produced evidence showing that total factor productivity explained about one-third of GDP growth in Latin America during 1940-85.

Some studies find that output growth causes, in the Granger sense, investment rather the other way around (Blomstrom, Lipsey and Zejan, 1996). Also as mentioned before in this paper, Carroll and Weil (1994) show that causality runs from output growth to savings rather than the other way around. Departing from the standard, Barro-type of cross country growth regressions methodology, new studies have investigated “growth transitions”, say processes in which the growth rate of output changes upwards or downwards, i.e. growth accelerations and/or growth collapses or growth crises. These studies are Hausmann, Pritchett and Rodrik (2004), Jones and Olken (2005) and Solimano and Soto (2006). These studies investigate the role of investment and capital accumulation in the transition from one growth regime to another. In Hausmann, et. al (2004) *growth accelerations* (say a significant increase in growth rates relative to a decade or so before a certain turning-year) that often last near a decade have been accompanied *by an increase in investment* and trade and also come along with real exchange rate depreciations. In general the pattern seems to be that growth accelerations are correlated with increases in export, imports and investment ratios but do *not* seem to be driven by pure accelerations in total factor productivity. The study by Jones and Olken concludes that changes in the rate of factor accumulation (including, of course, capital) explain relatively little of growth reversals specially growth accelerations; in contrast, according to these authors reversals are “largely due to shifts in the growth rate of productivity”. For these authors the weak role of capital accumulation in growth transitions suggests an efficiency story. In fact, Jones and Olken find that growth accelerations are coincident with major expansions in international trade (exports and imports) and attach to sector reallocations of labor and other factors to higher productivity sectors the accelerations in output growth rates. However the authors detect an asymmetry in accelerations and decelerations with a much larger change in investment in growth decelerations than in accelerations. Solimano and Soto (2006) focused on Latin America growth experiences and cast the analysis in terms of growth cycles and sustained growth episodes. The authors find a higher incidence of growth crises (negative growth) in the 1981-2003 period than in the 1960-1980 period; in addition, they show that the countries that were rapid growers before 1980 (i.e. Brazil and Mexico) are not the same as those that grew faster after 1980 (i.e Chile and the Dominican Republic). The study shows a relatively even importance between capital accumulation and TFP growth in changes in growth regimes and emphasize that the TFP story tends to be of a more long run nature.

Summing up, the empirical evidence on the role of investment in explaining output growth is far from conclusive. Investment plays a greater role in explaining growth transitions (that last around a decade or so) than in accounting for medium-term and long run growth paths (that last several decades). In turn, the determinants of long run growth seem to be more in line with the Solow model (and to some extent the endogenous growth theories) that stress the role of TFP growth in driving long term GDP growth and highlight that investment is important in the transitions between steady states.

VI. National savings and investment under international capital mobility

In an era of globalization, another important theme is the correlation between domestic savings and domestic investment under international capital mobility. In an influential paper Feldstein and Horioka (1980) argued that in a world with perfect capital mobility domestic savers would seek the higher rate of return irrespective of the home or foreign origin of the assets to be invested. In turn, attractive investment projects would find adequate financing irrespective if the funds would come from the pool of national savings or from foreign savings. The authors pose that under perfect capital mobility, national savings and domestic investment would be largely *uncorrelated*. However, Feldstein and Horioka found empirically that, contrary to the predictions of perfect capital mobility theory there was a strong correlation (and statistically significant) between domestic savings and domestic investment (a high “savings retention coefficient”) when the relation was test for cross section data of industrial economies with (5 years-average) data of the 1960s and 1970s. Other authors that tested the relation between national savings and domestic investment using a larger sample of countries and longer time periods further investigated the results of Feldstein and Horioka. Taylor (1996) reports those results of various studies included his own that basically find a close correlation between national savings and national investment, a finding that is relatively robust across space and time although it varies in periods of higher capital mobility (i.e. during the gold standard and since the 1970s, a second period of financial globalization)

The high correlation of national investments and domestic savings demonstrates that the financial markets are not more integrated today than at the beginning of the 20th century, although a change occurred between the two periods in the composition of capital flows, especially an increase of the short-term capital flows relatively to long-term capital flows (Baldwin and Martin, 1999; Taylor, 1996). In any case, the results of the Feldstein and Horioka tests reported by Taylor (1996) suggest the existence of “home biases” in terms of the allocation of savings towards national assets and towards national investment projects. More recent work by Bordo and Flandreau (2003) finds that the degree of financial integration is high in developed economies and has increased since the mid 1980s (a lowering in the savings retention coefficient). This trend, according to the authors, is not observed by developing countries.

Let us now briefly review some historical evidence pertaining to this topic. One feature is that countries change their position of net exporter (or net importer) of capital over time.¹³ From the 19th century until the 1980s the United States was, on average a net exporter of capital. After World War I, British financial hegemony was replaced by the United States as the main capital exporter of the world economy. The U.S. role as a *net* capital exporter lasted until the early 1980s when it started to run current account deficits, importing savings from the rest of the world to finance a level of expenditure above its real output¹⁴ financing the gap with savings from the rest of the world, mainly from positive net savings economies in Asia and also from international reserves held by Central Banks in developing countries held mostly in U.S. securities. In addition, the U.S. became a net debtor as its foreign liabilities exceed its net foreign assets. Interestingly, under current conditions, there is a transfer of savings from developing countries (and from “emerging economies”) to the richest economy in the world that spends more than its income generated by nationally owned factors of production. Thus, national savings are diverted from the financing of growth at home to finance consumption and investment in the richest country of the world. In the 19th century and up to World War I, a period known as the first wave of globalization, the most important flow of capital occurred from Great Britain to a group of countries known as the “New World Countries” (Argentina, Australia, Canada, New Zealand, and the United States). London constituted the financial center of the global capital market and was called the “banker of the world”. It is estimated that the surplus of domestic savings over investment in the U.K was around 50 percent in the first decade of the 20th century (Obstfeld and Taylor, 2004). The British pound was the dominant currency in the context of the international gold standard. The United Kingdom contributed to a peak average of 80 percent of total global foreign investment.¹⁵

In the early 20th century capital flows were characterized by the accumulation of enormous one-way positions and a great portfolio diversification by the principal creditor countries, in particular Great Britain, and inversely little diversification and high foreign capital “dependence” by the debtor New World countries.¹⁶ It is interesting to note that capital flew to rich and labor-scarce New World countries instead of going to poor and labor-abundant Asian and African countries, where it could, in principle, have been more profitable given the abundance of cheap

¹³ This analysis draws from Solimano and Watts (2005). See also Flandreau and Zumer (2004) for the review of capital flows during 1880-1913.

¹⁴ In the 1980s and up to 1993 and after 2000, U.S. public sector deficits contributed significantly to create the current account deficits.

¹⁵ Between 1907 and 1913, Britain’s foreign assets were estimated at £1,127 million, from which 61 percent or £689 million went to Canada, Australasia, Argentina and the United States. This percentage rises to 76% or £857 million if we add the other countries of Latin America. (see Taylor and Williamson, 1994; Taylor, 1999).

¹⁶ For example, foreigners held one-fifth of the capital stock of Australia and owned almost half of the capital stock of Argentina. Even the United States presented high levels of foreign capital dependence at the end of the 19th century, in spite of its increasing domestic savings and investments since the 1830s (O’Rourke and Williamson, 2000, p.209). Thus, gross assets during this period were almost equal to net assets. Also, investments took the form of long-term finance to less developed countries, what Obstfeld and Taylor (2004) called “development finance”. For example, in 1900, one third of global assets went to countries in Latin America and, to a lesser extent, Asia and Africa.

labor. This is the so-called “Lucas Paradox”.¹⁷ In today’s global capital markets in which capital flows and foreign investment aim for risk sharing and diversification instead of long-term financing to build infrastructure and housing as was the case in the pre 1914 world. Regarding the direction of international capital flows we face also the “Lucas Paradox” in which there is *too little capital flows to capital-scarce, poor countries*. We may think in various factors why capital does not go to low income countries: the lack of educated and properly trained work force in poor countries, lack of enforceable property rights, bureaucracy, political instability, weak institutions, small domestic markets and other factors. The literature of growth under increasing returns suggests that capital, skilled labor, superior institutions tend *to go together* and concentrate in a certain group of countries (Easterly, 2001) in which they find favorable conditions for international investment. Another difference between the first wave of globalization and contemporaneous financial globalization is the importance of capital flows as proportion of savings and investment in both source and receiving countries. Although financial globalization since the 1970s and 1980s has expanded very rapidly in relative terms it is lower than in the pre-1914 world. In fact, Obstfeld and Taylor (2004) report that in 1900-1913 overseas investment represented about one half of domestic savings of the U.K. (and one-third, on average, between 1870 and 1914). In other capital exporter countries such as Germany, overseas investment represented about 10 percent of national savings in 1910-1913. In turn, as said before, around 50 percent of the capital stock of Argentina in 1914 was in hands of foreigners (in Canada and Australia that percentage was in the range 20-30 percent). These numbers are lower in the new wave of globalization. After 1970 the ratio of net capital outflows over savings in the capital exporting countries never exceeded 5 percent (this is influenced by the large current account deficits of the United States). In turn, capital inflows, on average, in the same period never exceeded 15 percent of investment in capital importing countries (Obstfeld and Taylor, 2004).

In 2005 the current account deficit of the U.S. is about 6 percent of its Gross Domestic Product or near 600 billion U.S. dollars. In contrast, countries such as Japan, China, Korea are running large current account surpluses in these years contributing to finance the savings short-fall of the United States.

¹⁷ Indeed, the labor-scarce New World countries, where only a tenth of the world’s population lived, received two-thirds of the British capital in 1913-14, while labor-abundant Asia and Africa, accounting for two-thirds of the world’s population, only received a quarter of European foreign investment (Clemens and Williamson, 2000).

VII. Final remarks and policy implications

Recent literature on economic growth emphasizes the role of productivity growth in determining output growth thereby downplaying the contribution of factor accumulation in this process. In this paper we argue that the role of investment (and factor accumulation in general) is different if the focus is on growth transitions rather than long run growth. Now, the empirical relevance of *growth transitions* is highlighted by the fact that the growth process is more a shift between different growth regimes over time rather than steady-growth around a stable trend. Growth is characterized by volatility and low correlation between current and past growth rates (low time persistence), particularly in developing countries and transition economies. In this context, the role of investment in these growth transitions is bound to be important. The efficiency story of productivity growth is more appropriate to explain long run growth within countries and in explaining cross-country differences in growth performance. Still, a reform process can trigger short-term productivity gains leading to faster growth initially if economies start from very distorted levels.

This paper reviews the various determinants of savings such as income, wealth, age structure of the population, credit constraints, macroeconomic volatility and inequality of income and wealth. On the investment side, we underline the role of profitability and appropriability of investment returns and stress the influence of property rights, the cost of doing business, political stability, inequality and quality of capital-labor relations as background factors

that affect the appropriability of the return on capital investment. Other factors that also affect investment are macroeconomic uncertainty and volatility, fiscal policy, anticipated and unanticipated changes in policy regimes and credit constraints. Another topic analyzed in the paper is the extent to which increased capital mobility affect the correlation between domestic savings and domestic investment. Empirical studies show that in spite of growing financial integration there is still a high and significant correlation between national savings and domestic investment both in time series national data as well as in cross country data, contrary to the predictions of perfect capital mobility theory. The evidence confirms the existence of *home biases* in the savings-investment process.

In general, it is apparent that the benefits of international financial intermediation go more to advanced, financially mature, economies rather than countries with limited access to private capital financing. Financial integration in a context of speculative and pro-cyclical capital flows can induce macroeconomic volatility and financial crises disrupting orderly investment processes. Finally, current global economic imbalances in which rich economies have become net capital importers affect the global allocation of savings and therefore the financing of investment needed for growth in developing countries. Several emerging economies and developing countries have become exporters of capital to developed countries (particularly to the United States). The consequences for global growth of these new patterns of allocation of savings across countries remain to be seen.

From a *policy perspective* it is important to identify the factors that: (a) accelerate economic growth, (b) maintain a growth momentum once it is reached and (c) help to avoid traumatic stops of growth (i.e. such as growth collapses or growth crises). A main mechanism for igniting growth and possibly generate new knowledge and productivity growth is investment. But investment is still an “intermediate variable” that will be activated if new opportunities are open either by policy reforms, by growing international integration or by the discovery of valuable natural resources. In turn, factors that can boost investment refer to profitability, adequate property rights, and reasonable cost of capital, predictable policy environments, absence of acute social conflict and others. In the sequence after a growth momentum is set in motion it is important to ensure macro stability and the absence of macro imbalances whose sharp correction often derail ongoing growth. In addition, investment has to be financed some way or the other and therefore savings enter into the picture. Assuring an adequate level of national savings is critical as an excessive reliance on foreign capital can be a risky course of action in a world of imperfect international capital markets and often-volatile capital flows. Public savings can be a mechanism to spur national savings given the empirical evidence showing that an increase in public savings is less than fully offset by a decline in private savings. This analysis illustrates that two critical variables through which public policies can affect growth is savings and investment. The trick is to mobilize the adequate policy instruments that will affect, in a desired direction, these variables during the different phases of the growth process.

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