

WORLD SAVING: TRENDS AND THEORIES*

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Abstract

The world's average saving rate has declined for the last two decades but country saving rates exhibit a large dispersion, especially in developing regions. While in a small number of developing countries saving has risen substantially –along with growth– saving has stagnated or even declined in most industrial, developing, and transition economies. This paper provides evidence on the evolution of world and regional saving rates and their correlation with selected variables. It also surveys conventional and more recent saving/consumption theories that are potentially relevant in explaining world saving patterns and correlations. Finally it identifies a selective number of research puzzles and policy issues that merit further research.

JEL class.: E21, O16.

Resumen

La tasa de ahorro promedio mundial ha disminuido en las últimas dos décadas, pero al mismo tiempo las tasas de ahorro de los países muestran una gran dispersión, especialmente en regiones en desarrollo. Mientras en un número pequeño de países en desarrollo el ahorro ha aumentado sustancialmente –junto con el crecimiento–, en la mayoría de las economías industrializadas, en desarrollo y en transición se ha estancado y aun disminuido. Este trabajo provee evidencia de la evaluación de las tasas de ahorro mundiales y regionales y su correlación con variables seleccionadas. También revisa las teorías de ahorro/consumo, tanto convencionales como recientes, que son potencialmente relevantes para explicar los patrones de ahorro mundiales y las correlaciones observadas. Finalmente, se identifica un número de dilemas y temas de política que ameritan mayor investigación futura.

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□ Schmidt-Hebbel: Central Bank of Chile; Servén: The World Bank.

1. INTRODUCTION

Over the last three decades the world has witnessed a large and increasing divergence in saving rates. World saving rates have been falling since the early 1970s and the gap between industrial-country and developing-country saving rates has widened since the mid-1970s. Within the developing world, the saving divergence has been dramatic: saving rates have doubled in East Asia, stagnated in Latin America, and collapsed in Sub-Saharan Africa. These saving disparities have been closely reflected in the respective growth performance: across world regions, higher saving rates have come with higher income growth.

From a theoretical viewpoint, there is in principle little reason to expect saving rates to behave similarly across countries. In an ideal first-best world, different saving rates could just be the result of optimal intertemporal consumption decisions when tastes, technology and/or other factors vary across countries. In the real second-best world, however, intertemporal choices are subject to a host of externalities, market failures and policy-induced distortions that in many countries are likely to cause saving to differ from its welfare-maximizing levels. Of course, the result need not be too low a level of saving. While some distortions –such as too low government saving in a non-Ricardian world, or moral hazard leading to inadequate private savings for retirement in anticipation of public bailout of the old-age poor– can result in socially insufficient saving, other types of market imperfection such as the absence of risk-sharing instruments, or policy-induced distortions such as forced saving schemes, can conceivably lead to saving above socially optimal levels.

Yet the very low saving ratios of many developing countries, particularly among poorer countries, strongly suggest that the prevailing situation is one of socially insufficient saving. Indeed, the direct association between saving ratios and growth rates across countries noted above hints at the existence of virtuous cycles of saving and prosperity along with poverty traps of under-saving and stagnation. In these circumstances, addressing the distortions that are at the root of under-saving can be key to higher long-run growth and welfare. In practice, however, the interpretation and policy implications of the saving-growth link still remain controversial.

Ensuring an adequate supply of saving is also a central policy objective for reason other than its direct growth impact. A national saving ratio broadly in line with the economy's investment need is a key ingredient to reduce countries' vulnerability to unexpected shifts in international capital flows. As illustrated by the recent turmoil in international financial markets, low domestic saving can exacerbate the likelihood and negative consequences of sudden capital outflows that may be driven by factors such as herd behavior or self-fulfilling expectations on the part of international investors. Under increasing international financial integration, high domestic saving contributes to ensure macroeconomics stability, itself a powerful growth factor –although high saving cannot provide full insurance against the consequences of weak financial systems or unsustainable exchange rate policies, as shown by the 1997 East Asian crisis.

This paper provides selective evidence on world saving trends and a summary survey of saving theories, focusing on their consistency with the stylized facts and their ability to explain them. Section 2 looks at the evolution of world

and regional saving rates and their correlation with selected variables. The next section surveys conventional and more recent saving/consumption theories that are potentially relevant in explaining world saving patterns and correlations. Both sections draw heavily on the World Bank's Saving Project research proposal (Schmidt-Hebbel and Servén 1997). The data presented herein has been partly updated making use of information presented by Loayza, López, Schmidt-Hebbel, and Servén (1998b). Section 4 of this paper identifies a selective number of research puzzles and policy issues that merit further research, covered by the ongoing World Bank Research Project on Saving.

2. SAVING TRENDS AND CORRELATIONS

The performance of saving in the world at large and in developing countries in particular has been characterized by a number of salient features during the last three decades. In this section we look at the evolution of world and regional saving rates and their correlation with a few selected variables.

Some preliminaries are in order. Our preferred measure of aggregate income, consistent with gross national saving, is gross national disposable income inclusive of all current and capital transfers from abroad (GNDI). Gross national saving (GNS) is defined accordingly, as the difference between GNDI and aggregate (private and public) consumption expenditure. Both variables are in current-price units of national currency. Our preferred saving rate corresponds to the ratio between the two latter variables. These comprehensive income and saving measures dominate both the related variables that exclude transfers and the corresponding domestic variables that reflect geographical boundaries (Gross domestic saving and GDP).

Time coverage is dictated by data availability within the period 1960-94. The starting year of the data varies across countries, but is dated mostly between 1960 and 1975. For saving trends reported below we use a *fixed sample* comprising a total of 85 countries, distributed by country regions and country groups. Each country in a specific region has a full sample of annual observations for every year from the starting year for each region (for instance, 1960 for each industrial country or 1967 for each Latin American and Caribbean country) through 1994. In other words, each region in the fixed sample is a balanced panel even though the fixed sample as a whole is not.

For cross-country correlations reported below we make use of a *full sample* comprised by the fixed sample, all annual country observations that are available before the start of the fixed sample periods, and all annual observations for any available years for countries excluded from the fixed sample. Hence the full sample is unbalanced also at the regional level.

Our data source is the World Bank Saving Project Database, documented in Loayza, López, Schmidt-Hebbel, and Servén (1998a). A detailed description of the data is provided by Loayza, López, Schmidt-Hebbel, and Servén (1998b).

Next we report the main empirical facts on world saving trends and correlations. Saving trends are depicted in figures 1-4. Long-term cross-country pairwise correlations between saving and selected economic and demographic variables are depicted in figures 5-8. We focus here only on long-term correlations

among saving and related variables that are both significantly different from zero and robust for different country groups.¹

(1) The world saving rate has been declining and the world interest rate has increased since the early 1970s

The world's average gross national saving rate (the ratio of gross national saving to gross national disposable income, GNS/GNDI) has been declining for the last three decades. Looking across decades, the median (fixed-sample) world saving rate fell from 20.7% in 1965-73 to 20.3% in 1974-84, and further to 18.7% in 1985-94. Indeed, the world saving rate attained a peak of 23% in 1973-74, at the time of the first oil shock. From then on it declined steadily to reach a trough of 18% in 1992-93.

The average (ex-post) long-term real interest rate shows the opposite pattern: from a range of 2-3% in the 1960s it plunged briefly to negative levels after the 1973 oil shock, then quickly rose to high positive levels in the early 1980s and has remained close to 4% in recent years. According to the Group of Ten (1995), this reflects a trend increase in the real interest rate of around 100 basis points over the last 35 years.

The contemporaneous correlation between the average world saving rate (the average G-10 saving rate) and the long-term real interest rate is -0.61 (-0.56). The predominant interpretation of this empirical association is that the secular rise in the interest rate is due to lower world saving, which has outweighed a parallel reduction in desired world investment levels (Group of Ten 1995, IMF 1995).

(2) Saving rates show divergent patterns across country groups and world regions

The trend decline in the world saving rate since the early 1970s conceals widely diverging saving patterns across country groups (Fig. 2) and world regions (Fig. 3).

Country aggregation is defined in terms of country groups and geographical regions. The five country groups are: industrial OECD countries (IND), China (alone), other takeoff developing countries, other developing countries, and the world. Takeoff countries are defined *a priori* as those developing countries that have achieved high and sustained saving and growth rates during the last two decades.²

¹ A more detailed discussion of both long-term (cross-country) and panel (time-series and cross-country) correlations, for these and other variables, can be found in Loayza, López, Schmidt-Hebbel, and Servén (1998b).

² This group includes China (considered separately) and 9 market economies: Hong Kong, Indonesia, Korea, Malaysia, Singapore, Taiwan (China), and Thailand in East Asia; Mauritius in Africa; and Chile in Latin America. Botswana –another high-saving and high-growth economy– has been excluded from our sample because of lack of acceptable data.

FIGURE 1
WORLD GROSS NATIONAL SAVING RATE AND REAL INTEREST RATE
 Gross national saving as percent of gross national disposable income
 (Median at current prices, fixed country sample) and Ten-year
 government bond real interest rate for G-10 (weighted average)

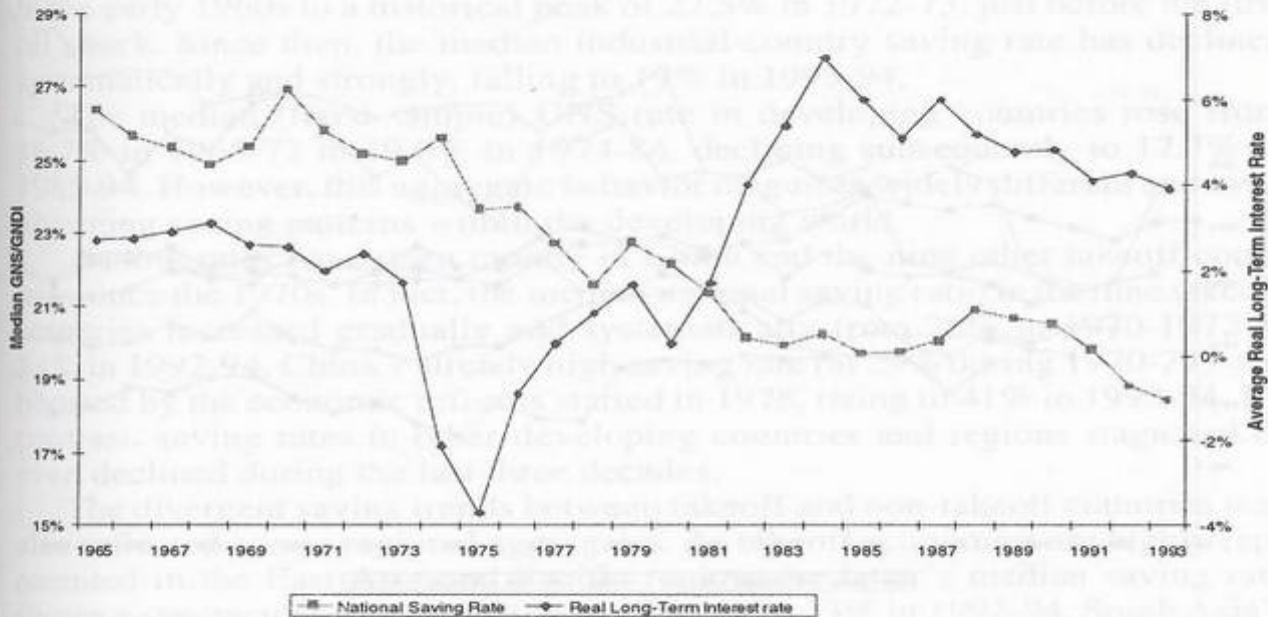


FIGURE 2
GROSS NATIONAL SAVING RATES BY COUNTRY GROUPS
 Gross national saving as percent of gross national disposable income
 (Group medians at current prices, fixed country sample)

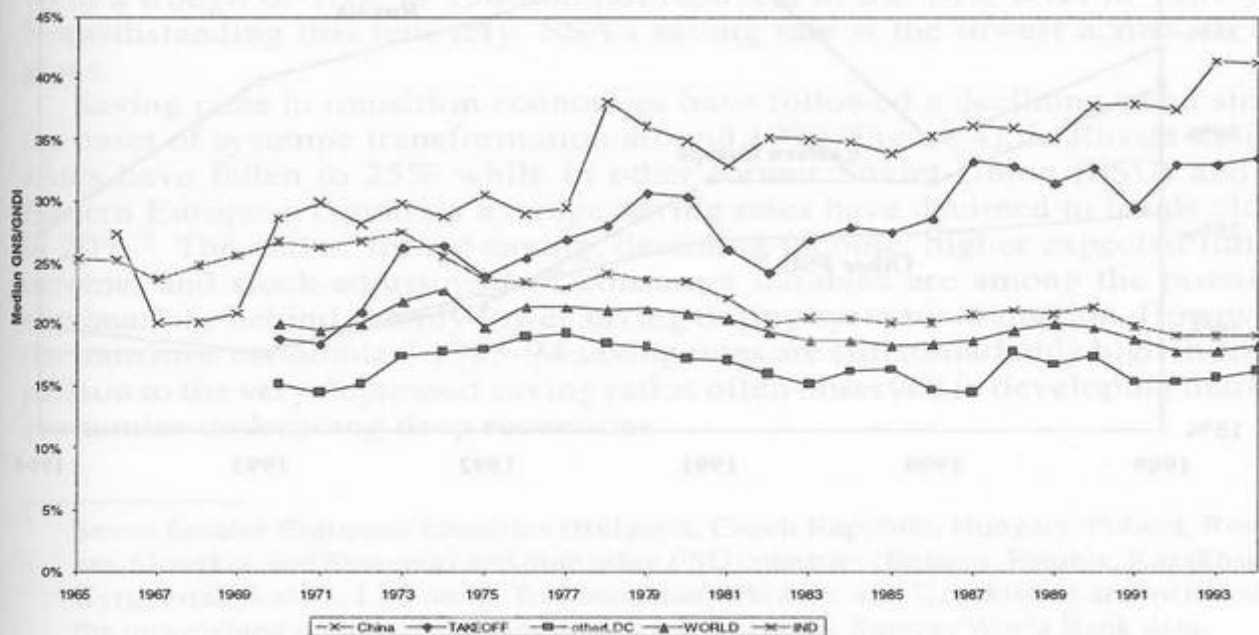


FIGURE 3
GROSS NATIONAL SAVING RATES BY WORLD REGIONS
 Gross national saving as percent of gross national disposable income
 (Regional medians at current prices, fixed country sample)

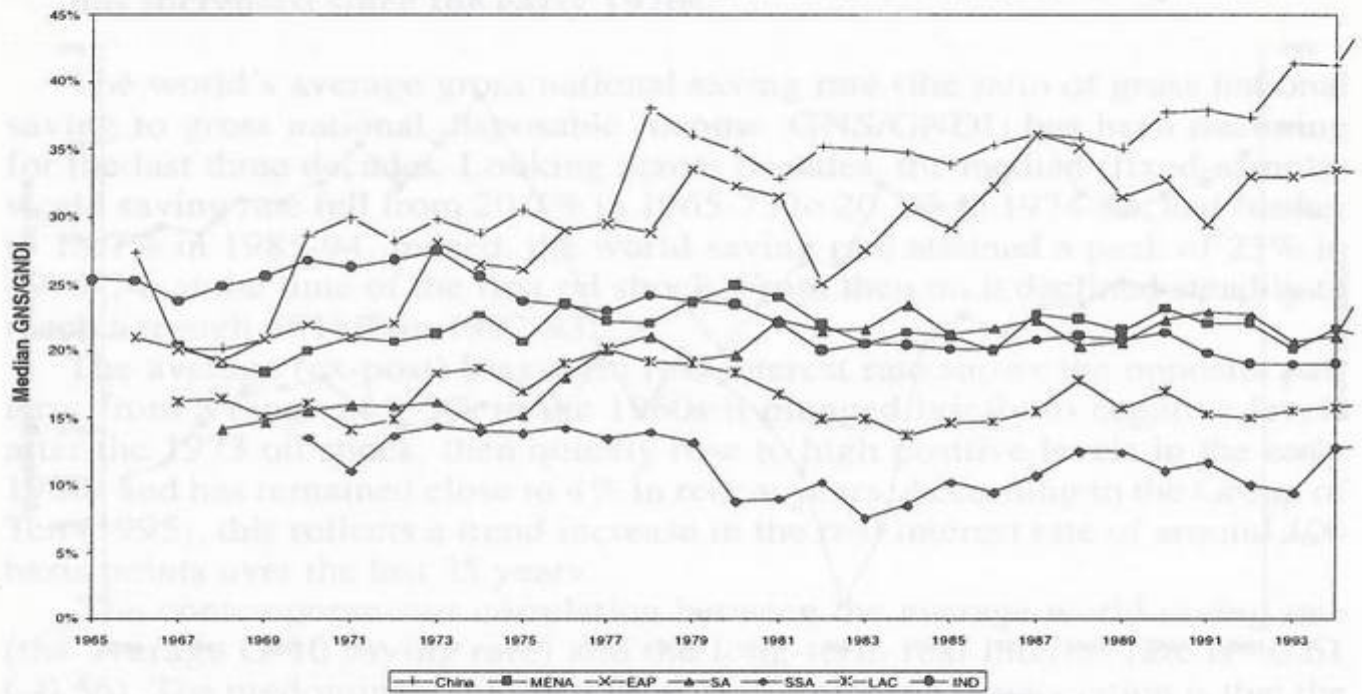
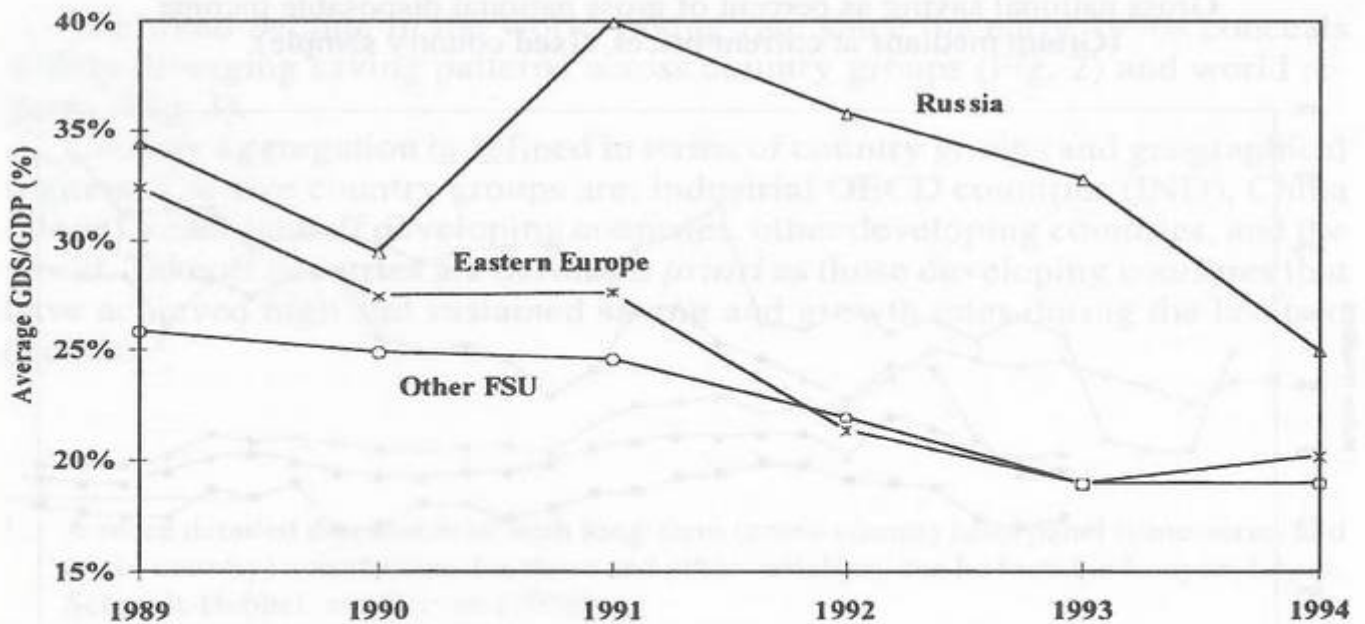


FIGURE 4
GROSS DOMESTIC SAVING RATES IN TRANSITION COUNTRIES
 Gross domestic savings as percentage of gross domestic product
 (unweighted group averages at current prices)



The country regions are defined as: industrial OECD (IND), China, other East Asia and Pacific (EAP), Middle East and North Africa (MENA), Sub-Saharan Africa (SSA), South Asia (SA), and Latin America and Caribbean (LAC).

The median GNS rate in industrial countries increased gradually from 25% in the early 1960s to a historical peak of 27.5% in 1972-73, just before the first oil shock. Since then, the median industrial-country saving rate has declined systematically and strongly, falling to 19% in 1993-94.

The median (fixed-sample) GNS rate in developing countries rose from 16.7% in 1965-73 to 19.0% in 1974-84, declining subsequently to 17.7% in 1985-94. However, this aggregate behavior disguises widely different and even diverging saving patterns within the developing world.

Saving rates have risen rapidly in China and the nine other takeoff countries since the 1970s. In fact, the median national saving ratio in the nine takeoff countries increased gradually and systematically from 20% in 1970-1972 to 34% in 1992-94. China's already high saving rate (at 29% during 1970-77) was boosted by the economic reforms started in 1978, rising to 41% in 1993-94. By contrast, saving rates in other developing countries and regions stagnated or even declined during the last three decades.

The divergent saving trends between takeoff and non-takeoff countries was also reflected across regional aggregates. As takeoff economies are highly represented in the East Asia and Pacific region, the latter's median saving rate shows a spectacular rise from 20% in 1966-68 to 33% in 1992-94. South Asia's median saving rate also shows a substantial rise, from 15% in 1968-70 to 22% in 1992-94. In Latin America and the Caribbean the median national saving rate does not show a clear trend (it hovers around an average 16% during 1967-94) but shows swings, increasing after the first oil shock (1973-80) and declining with the debt crisis (1982-84). Nor is a clear trend observed in the Middle East and North Africa although swings –correlated with the price of oil– are observed in this region around its 1967-94 median saving rate of 22%. In Sub-Saharan Africa the median saving rate declines precipitously from 14% in 1970-76 to a trough of 10% in 1980-86 but recovers to the 14% level in 1987-94. Notwithstanding this recovery, SSA's saving rate is the lowest across all regions.

Saving rates in transition economies have followed a declining trend since the onset of systemic transformation around 1990 (Figure 4). In Russia saving rates have fallen to 25% while in other former Soviet Union (FSU) and in Eastern European countries average saving rates have declined to levels close to 20%.³ The end of forced saving, declining income, higher expected future income, and stock-adjustment of consumer durables are among the possible explanations behind sharply lower saving during systemic transition. However, the transition economies' 1993-94 saving rates are still remarkably high in comparison to the very depressed saving ratios often observed in developing market economies undergoing deep recessions.

³ Seven Eastern European countries (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia) and nine other FSU countries (Belarus, Estonia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Turkmenistan, Ukraine, and Uzbekistan) are included in the unweighted regional averages depicted in Figure 4. Source: World Bank data.

FIGURE 5
LONG-TERM NATIONAL SAVING AND REAL INCOME LEVEL
 Gross national saving rate and real per capita national disposable income
 (Country averages, 1960-1995)

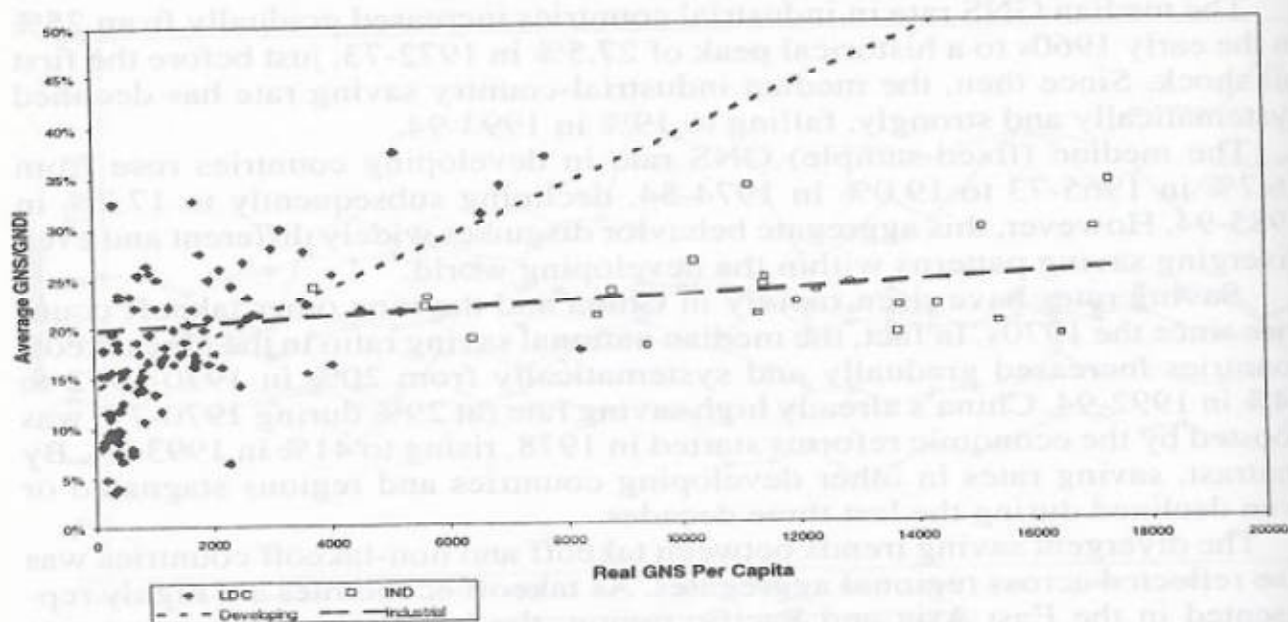
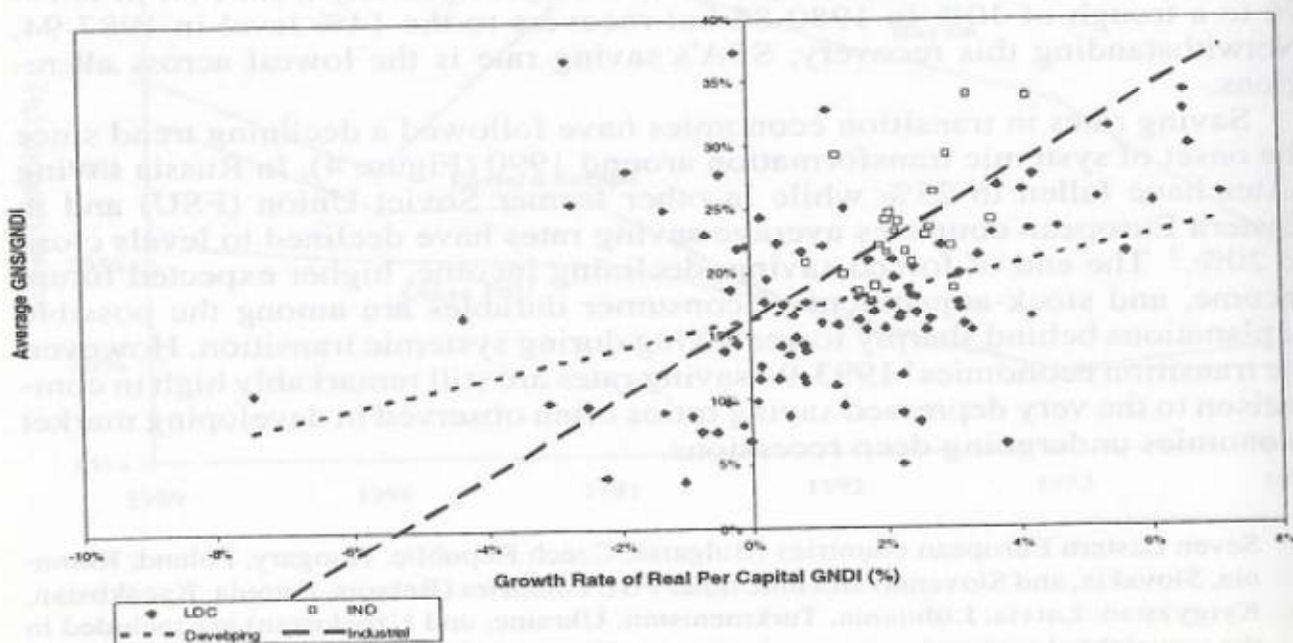


FIGURE 6
LONG-TERM NATIONAL SAVING AND REAL INCOME GROWTH
 Gross national saving rate and growth rate of real per capita
 national disposable income
 (Country averages, 1960-1995)



(3) Saving rates and income levels are positively correlated

The cross-country correlation coefficient between gross national saving rate and real per capita income levels is 0.45 and is significant at the 5% level. Fig. 5 confirms the correlation and also shows that takeoff developing countries are located at low to middle-income levels with abnormally high saving rates. In contrast, industrial countries seem to typically save less than what should be expected given their high income levels. This suggests that the saving-income relation tapers off at high income levels. Non-takeoff developing countries are clustered at low income and low saving levels. Separate regression lines for developing and industrial economies confirm the cross-regional heterogeneity in the saving-income relation, showing a larger positive correlation for developing countries.

(4) Saving rates and growth rates are positively correlated

The correlation coefficient between the GNS rate and the real per capita growth rate is 0.39 and is significant at the 5% level. As opposed to the preceding correlation between saving rates and income levels, the saving-growth correlation is higher for industrial than for developing economies.

Fig. 6 confirms the world correlation at the cross-country level. The figure also shows that industrial economies are closely clustered at moderately high saving and growth rates. Takeoff countries are clustered in the upper right-hand corner of the figures, at very high saving and growth rates. Non-takeoff LDCs show a larger dispersion and they are centered at low saving and growth rates.

(5) National saving and domestic investment rates are positively correlated

The correlation between the GNS rate and the gross domestic investment (GDI) rate is large –at 0.72– and significant at the 5% level. This close association, confirmed by Fig. 7, echoes the original finding of Feldstein and Horioka (1980). Industrial countries are more frequently located above the 45-degree line in Figure 7 (along which the current account is balanced), reflecting that they tend to be capital exporters, while most developing economies, that tend to be capital importers, are located below the line.

(6) Saving rates and young-age dependency ratios are negatively correlated

The cross-country correlation between saving and the young-age dependency ratio is -0.48 (significant at the 5% level). This negative correlation is maintained for developing and industrial countries separately, as confirmed by Fig. 8.

FIGURE 7
LONG-TERM NATIONAL SAVING AND DOMESTIC INVESTMENT
 Gross national saving rate and gross domestic investment ratios
 to national disposable income
 (Country averages, 1960-1995)

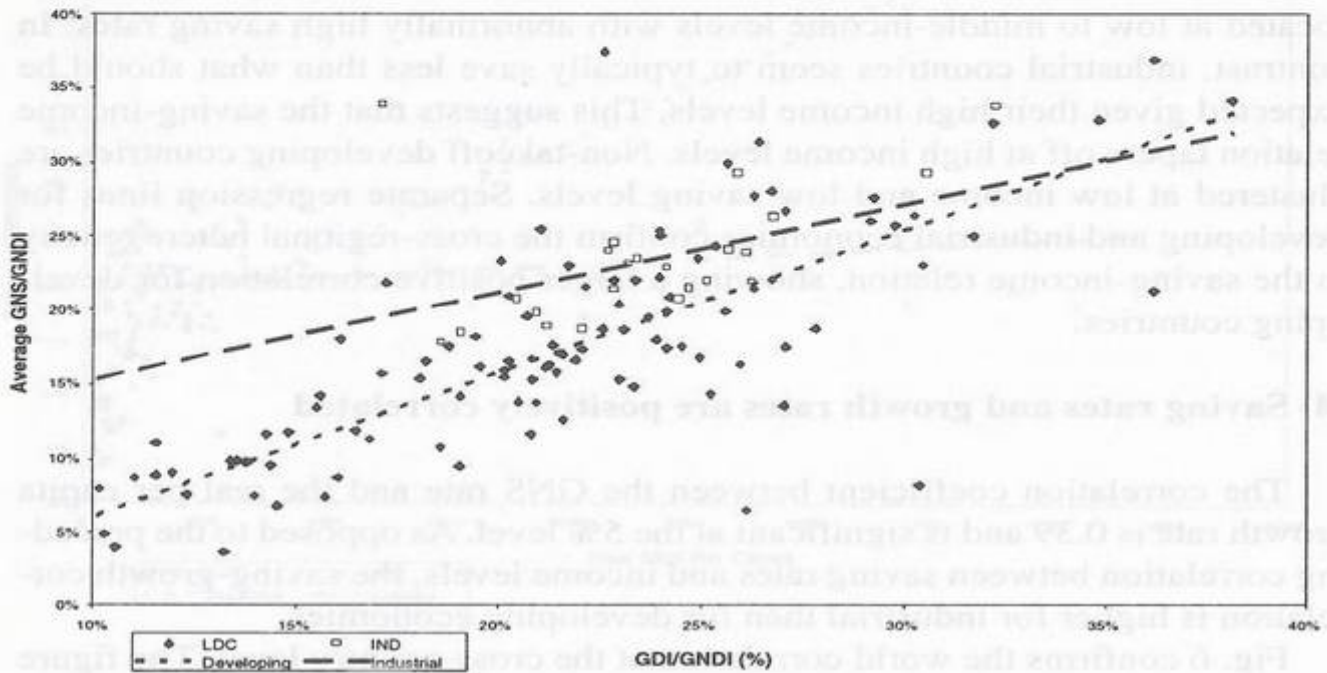
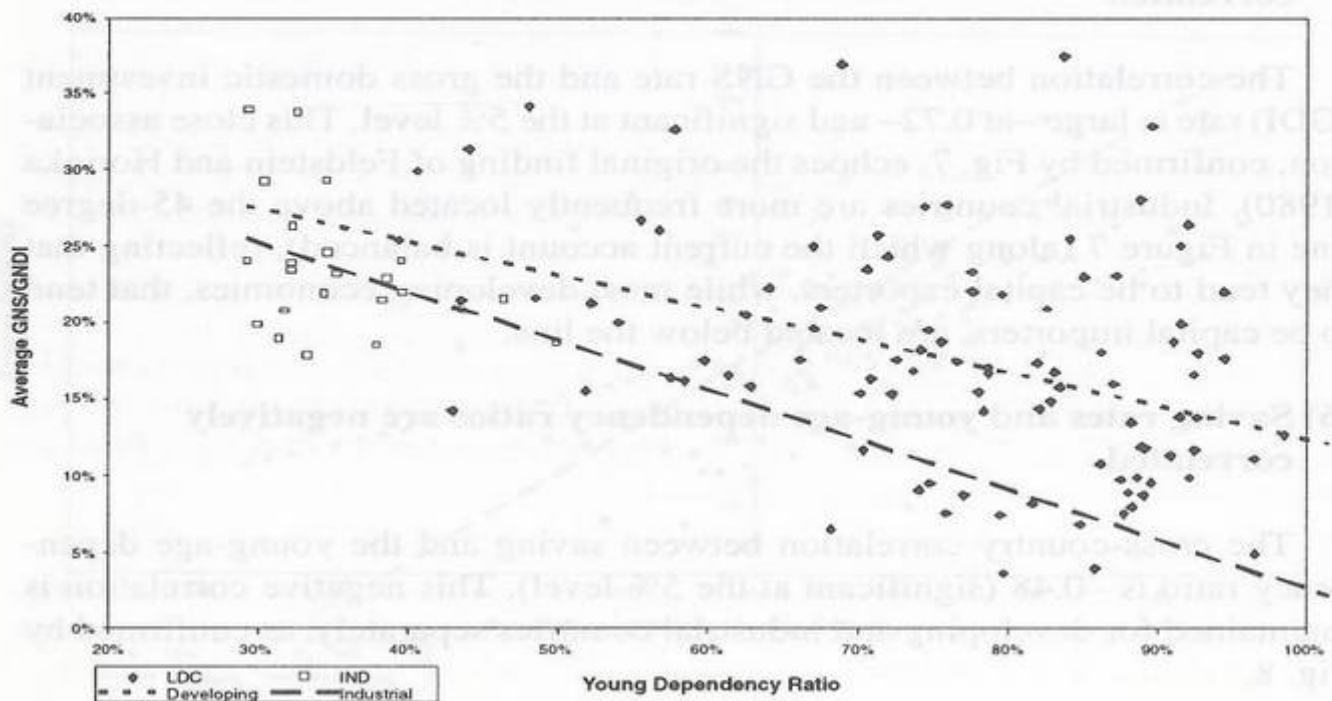


FIGURE 8
LONG-TERM NATIONAL SAVING AND YOUNG DEPENDENCY RATIO
 Gross national saving rate and the ratio of population aged 15 and
 under relative to working-age population
 (Country averages, 1960-1995)



3. SAVING/CONSUMPTION THEORIES

In this section we summarize briefly standard theories of consumption and saving and recent developments in this area, focusing on their consistency with the stylized facts and their ability to explain them.⁴

The point of departure for most modern research on consumption and saving is one of two dominant paradigms: the permanent-income hypothesis, focused on a representative infinitely-lived consumer (henceforth PIH) and the life-cycle hypothesis (LCH), derived from the aggregation of finitely-lived overlapping generations. We start by reviewing briefly the main accomplishments and shortcomings of these two polar theories and related sub-theories, and turn subsequently to other models that have taken recent research in new directions.

PIH abstracts from consumer heterogeneity by focusing on consumption of an infinitely-lived consumer or, equivalently, an infinite sequence of finitely-lived generations linked through inter-generational transfers (including bequests). Consumption is equal to permanent income –the annuity value of the sum of non-human assets and human capital (the discounted value of labor income), net of the discounted value of taxes (see Friedman 1957, Hall 1978, and Flavin 1981 for the most popular formulations of PIH). As a variant of PIH, the Ricardian-equivalence hypothesis (REH), by making use of both the consumer's and the government's budget constraint, derives permanent income as net of the discounted value of government spending (Barro 1974).

While under the simple Keynesian hypothesis (KH) consumption is determined by current income, the forward-looking PIH consumer distinguishes between temporary and permanent income. PIH consumption is smoother than income: current temporary income gains are mostly saved while permanent income gains are consumed. In other words, if desired consumption is flat over the entire future horizon, current saving is equal to the discounted value of anticipated future reductions in income –that is, saving is determined by future “rainy days” (Campbell 1987).

The rate of consumption growth –or the intertemporal consumption profile– reflects both consumer preferences for intertemporal consumption smoothing and the difference between the market interest rate and the consumer's subjective discount rate. A higher interest rate –a larger reward for postponing current consumption– tilts the consumption profile toward the future. But the effect of a higher interest rate on the level of current consumption (and hence on the level of current saving) is ambiguous, depending on the relative size of offsetting substitution, income, and human-wealth effects caused by an interest rate hike.

An important implication of PIH is that the change in consumption should be unpredictable, i.e., uncorrelated with any information known to consumers when the change takes place. Since the innovative papers by Hall (1978) and

⁴ This section draws on recent surveys of consumption theory and evidence, in particular Deaton (1992, 1999), Honohan (1999), and Obstfeld (1999), and on surveys of the saving literature for developing countries, including Mikesell and Zinser (1973), Snyder (1974), Gersovitz (1988), Deaton (1990), Schmidt-Hebbel, Webb and Corsetti (1992), Srinivasan (1993), and Schmidt-Hebbel, Servén and Solimano (1996).

Flavin (1981), a large body of empirical work has shown that consumption exhibits “excess sensitivity”, i.e., its change is correlated with predictable changes in other variables, typically contemporaneous or lagged income changes. This rejection of the standard PIH model was found initially in U.S. data, but has been extended to other OECD and developing economies. What are the reasons for excess sensitivity of consumption? The presence of either durable goods (Caballero 1990) or consumption habits (see below) makes consumption changes at least partly predictable. The same is true for borrowing constraints, that limit the ability of consumers to borrow against future income, as discussed below.

The PIH predicts that income growth –i.e., the anticipated increase of future income relative to current income levels– reduces current saving, as consumers raise current consumption in anticipation of higher future income. This prediction contradicts the positive saving-growth correlation documented in the previous section. Moreover, the assumption of homogeneous consumers portrayed by a representative agent who is closely linked to all future generations is a feature that makes PIH an implausible candidate to deal with real-world features that reflect consumer diversity along various dimensions, including age, income levels, and access to borrowing.

The LCH fathered by Modigliani and Brumberg (1954, 1979) –the main competitor of PIH-REH theories– introduces age-related consumer (or household) heterogeneity. Aggregate saving results from the addition of saving by different age-specific cohorts. Each cohort smoothes consumption over a finite horizon, given lifetime resources that –in the simple version of the LCH– are not transferred across generations. Over the life cycle, saving and consumption follow hump-shaped patterns, with dissaving until early adult age, the peak of saving at mid-life, and dissaving during retirement as households run down their retirement assets. Saving is driven only by retirement needs. Hence saving propensities depend on age and differ systematically across cohorts.

In the LCH world, a change in interest rates entails transfers among cohorts. Hence the net impact of a higher interest rate on aggregate consumption and saving –already ambiguous at the level of each individual household– is also ambiguous at the aggregate level, depending on the behavior and size of each cohort. Similarly ambiguous is the effect of growth on saving in the LCH framework. Only in the particular case when growth takes place across generations (i.e., the younger cohorts’ income levels are increased by more than those of the older generations) is aggregate saving likely to rise with income growth, because the mid-life saving of the active generations induced by growth is larger than the dissaving of the very young and the old retired cohorts.

The negative correlation between saving and young-age dependency, noted in the preceding section, provides support to the LCH. However, LCH is not problem-free when it comes to interpreting other real-world features of saving behavior. First, there is not enough hump saving to account for the high level of aggregate wealth in modern economies (see Kotlikoff and Summers 1981). Second, household survey evidence for OECD countries suggests that changes in growth do not cause the cohort-specific differences in saving levels (see e.g. Bosworth, Burtless, and Sabelhaus 1991 for the U.S.) or in intertemporal consumption patterns (see Carroll and Summers 1991 and Deaton 1991b) predicted by the LCH. Third, a growing body of microeconomic evidence for OECD countries shows that old people save or at least do not dissave as much as pre-

dicted by the LCH (Deaton and Paxson 1994, and Poterba 1995), a finding which suggests that inter-generational bequests may be an important saving motive.

Bequests tend to undermine the distinction between the PIH and LCH, as the latter theory is based on the absence of close intergenerational links among households. One popular way to discriminate empirically between these two competing theories –and hence to infer indirectly about the importance of bequests– is to include population dependency measures (the ratios of the old and the young to the overall population) among other saving determinants in empirical saving equations. While many studies show that the proportion of old-age people reduces saving –a finding that supports the LCH– the evidence is controversial (see Gersovitz 1988 for a critical review) and may not be inconsistent with the micro evidence in support of bequests (Weil 1994).

More direct empirical evidence favoring the importance of the bequest motive is provided by both the older PIH literature and more recent household survey and aggregate cross-country studies. The older PIH literature concludes that bequests are a luxury good, reflected in elasticities of consumption to permanent income that are well below one. Menchik and David (1983) use U.S. household data to test directly whether the elasticity of bequests to lifetime resources is larger or smaller for the rich than for the other income groups and find that the marginal propensity to bequeath is unambiguously higher for the wealthy. Other household survey studies similarly find that saving rates are higher for lifetime richer consumers (e.g., Paxson 1992 for Thailand, and Deaton and Paxson 1994 for Taiwan). At the aggregate level, saving rates increase with the level of income (not its rate of growth) in cross-section or panel studies of developing countries (see Collins 1991 and Schmidt-Hebbel, Webb and Corsetti 1992), while growth (not income levels) contributes to raise saving in OECD countries (Modigliani 1992). These findings are consistent with the stylized fact on the positive correlation between saving ratios and income levels discussed in the previous section. The apparent implication is that bequests are a luxury good at low and middle levels of income but a normal good at high levels of income.

Uncertainty about the future leads to precautionary saving by risk-averse consumers: people set aside a certain amount of resources to face possible future changes in income levels, taxes, interest rates, or any other consumption determinant (Skinner 1988, Zeldes 1989). Higher uncertainty about the future reduces current consumption and hence raises saving. If very high consumer risk aversion is paired with high income uncertainty, consumption will follow closely income, so that aggregate consumption appears as if it were consistent with the simple KH. The general implication of uncertainty is that it raises saving beyond the level predicted by the standard PIH or LCH models without uncertainty. Uncertainty can explain in part why consumption follows income so closely (contradicting the simple PIH) in the case of young households that expect positive but uncertain future income growth: their risk aversion is at war with their impatience (Carroll 1991). Uncertainty can also explain in part why the retired save a positive amount or dissave little, as they face large uncertainty about their life length and health costs. It is also one of the reasons why the REH might fail, as a substitution of lower current taxes for higher future taxes

reduces uncertainty of future income and hence lowers precautionary saving (Barsky, Mankiw and Zeldes 1986 and Kimball and Mankiw 1989).

One popular way to introduce risk aversion is by considering consumer preferences consistent with a marginal utility of consumption that declines with the level of consumption. For instance, under consumer preferences that satisfy constant relative risk aversion, the intertemporal elasticity of consumption substitution is equal to the inverse of the risk-aversion coefficient; both reflect the curvature of consumer preferences. This feature makes this model analytically tractable but conceptually and empirically somewhat limited. At the cost of additional complication, Epstein and Zin (1989) and Weil (1989, 1990) have proposed different ways to separate risk aversion from intertemporal substitution. A second noteworthy extension is Kimball's (1990) distinction between risk aversion (the concavity of the utility function) and prudence (the convexity of the marginal utility function). While both generalizations open promising avenues, little empirical research has been done to support their relevance.

Empirical tests of the representative-agent PIH model under uncertainty have focused mostly on the Euler equation (the first-order optimality condition for intertemporal allocation of consumption) relating the anticipated growth rate of consumption to the expected difference between interest and subjective discount rates, the covariance between consumption and interest rate, and the consumer's risk-aversion coefficient. Most tests for the U.S. economy, starting with Hansen and Singleton (1982), reject this version of PIH with uncertainty for reasonable values of risk-aversion coefficients; similar rejections are found for other OECD and developing countries. A variant of the Euler equation relates the expected consumption growth to the difference in expected yields of different assets, covariances between yield differences and consumption growth, and risk aversion. Large differences in yields (say, between stocks and treasury bills) are shown to be inconsistent with the rather smooth behavior of consumption—another rejection of PIH under uncertainty termed the equity premium puzzle (Mehra and Prescott 1985, Hansen and Jagannathan 1991). These results, closely related to the excess-sensitivity of consumption discussed above, point toward the need of extending the PIH and LCH models to consider real-world features such as borrowing constraints and consumption habits.

Direct empirical tests of the precautionary saving motive have been hampered by the difficulty of obtaining estimable closed-form solutions to theoretically-plausible models of precautionary saving. As a consequence, its actual importance remains controversial. Nevertheless, some recent empirical estimates suggest that it may account for a substantial fraction of households' wealth (Carroll and Samwick, 1995b).

Borrowing constraints, that prevent consumers from borrowing for current consumption at going interest rates in financial markets, have been traditionally held against the predictions of the standard PIH or LCH. Borrowing constraints are a result of real-world financial market features, such as the fact that interest rates on loans cannot be expected to rise to clear financial markets because they raise default risks (Stiglitz and Weiss 1981), or the impossibility of using human capital (i.e. future labor income) as collateral (see Hayashi 1987).

One popular way to model the effect of borrowing constraints on consumption (introduced by Hall and Mishkin 1982) is by simply assuming that an exogenous fraction of consumers spend their entire income. But this hardly quali-

fies for a theory of borrowing constraints and does not apply symmetrically to an inability to save. In fact, when precautionary saving and borrowing constraints are taken together, it has been shown that risk-averse and forward-looking consumers *raise* their saving when they anticipate tighter constraints (Schechtman 1976, Bewley 1977, Schechtman and Escudero 1977, and Deaton 1991b, 1992). Consumers accumulate assets during good times in order to buffer consumption in bad times, when they will be unable to borrow from financial markets. These buffer-stock savings are not a form of long-term or retirement assets but are increased and run down over short periods. While income and consumption are separated by buffer saving at high-frequency observations (say, a few years), they still match closely each other at longer horizons.

The buffer-stock saving model offers insights into the behavior of many lower-income and rural households that use cash and durables to smoothen their consumption levels over the short run but accumulate little over the long term. Hence the approach is relevant for poor and rural households and countries (see Deaton 1991a, 1992) but appears to explain little of aggregate saving and asset-to-income ratios in middle and higher-income economies. In fact, simulations of buffer-stock models suggest that the buffer asset to output ratio is well below 1, possibly as low as 10% (Deaton 1999).

Saving for house purchases is analogous to saving for retirement, only that the former takes place at an earlier point in life. In the framework of the standard LCH model, housing saving can be considered as part of overall retirement saving, with asset build-up during active life and asset run-down during retirement. However, both preferences and financial-market features seem to be at odds with this simple prediction. There is very limited evidence that the elderly run down their housing assets during retirement through reverse-annuity mortgages or other schemes. Second, restrictions on mortgage availability (such as high down payments for mortgage loans) raise required levels of pre-purchase saving. Japelli and Pagano (1994) provide empirical evidence for OECD countries showing that down payment ratios raise aggregate saving rates. This is exactly the opposite of the "financial repression" view (McKinnon 1973, 1991 and Shaw 1973), that predicted that financial liberalization would raise saving.

All models reviewed to this point share the assumption that intertemporal consumption decisions reflect preferences that are intertemporally separable, i.e., that the marginal rate of substitution of consumption between any two periods is independent of what happens in any other period. This assumption is lifted by consumption habit models, that allow for intertemporal dependencies by specifying consumer utility in any given period as a function of both consumption in that period and a "stock" of consumption habits. One form of habit is external habit formation (Abel 1990, Campbell and Cochrane 1994), where utility depends positively on the difference between each individual's consumption level and (possibly lagged) average per-capita consumption levels—a preference structure in the spirit of Duesenberry's (1949) relative-income theory of "keeping up with the Joneses". An alternative specification is internal-habit formation (see Ferson and Constantinides 1991 for the U.S.), where utility depends on the difference between each individual's consumption level and her own lagged consumption level(s). In both cases, habits act as a drag on consumption levels.

Habit models seem to be consistent with various facts that are hard to explain in their absence. As opposed to the PIH and LCH models, habits imply that future consumption changes are partly predictable, because they reflect in part past consumption changes. This is consistent with the excess-sensitivity findings discussed above. Also, habits make consumption costlier for the young, because habits have to be fed for life, hence they tip consumption profiles away from the young and toward the old. Another implication of habits is that even anticipated increases in income growth can have a positive effect on saving—which lasts as long as the drag of past consumption on current consumption holds; thereafter saving rates should fall to the levels predicted by models without habits. Nevertheless, habits are mentioned as one possible source of growth-to-saving causality that can contribute to explain the saving-growth correlation (Carroll and Weil 1994, Deaton and Paxson 1994).

An alternative preference hypothesis is that both consumption and wealth (or capital) are valued by consumers—an idea advanced in different ways by “classical” economists from Smith and Marx to Keynes and Schumpeter, and that is resurfacing in recent literature (Cole, Mailath and Postlewaite 1992, Fershtman and Weiss 1993, Zou 1993). In this “capitalist spirit” model wealth is accumulated for its own sake, and higher wealth prompts further accumulation—because consumption and wealth are gross substitutes in the agent’s utility function.

A final question of interest is the impact of poverty and income inequality on aggregate saving. One way to model the consequences of poverty is through the use of consumer preferences embodying a *subsistence level* of consumption. Along the lines of the Stone-Geary specification, utility is a positive function of the difference between current consumption and an exogenously-given subsistence consumption level, below which no saving takes place (see Christiano 1989, Rebelo 1992). This notion has an old tradition in economics, exemplified in the “autonomous consumption” coefficient of conventional KH models. The key implication is that saving ratios rise with income (or wealth) levels, in accordance with the positive correlation observed in the data. A variant of this model specifies the intertemporal elasticity of consumption substitution as an increasing function of wealth (Atkeson and Ogaki 1993) or of the distance between permanent income and subsistence consumption (Ogaki, Ostry and Reinhart 1996), so that the responsiveness of consumption substitution to the interest rate grows with the level of income. These latter studies present household and aggregate evidence, for both OECD and developing countries, in support of this view.

In turn, income inequality is another potentially important form of consumer heterogeneity ignored by representative-agent models. It played a prominent role in Post-Keynesian models of saving and growth (Lewis 1954, Kaldor 1957, and Pasinetti 1962), which focused on the *functional* distribution of income. These models stressed the notion that capitalists have lower propensities to consume than workers, so that income redistribution from wages to profits raises aggregate saving. This approach, however, does not say much about the links between saving and income inequality, because the association between the functional and personal distributions of income is empirically rather weak (Atkinson 1994). This explains the more recent resurgence of interest in the links between saving and the *personal* distribution of income. Empirical stud-

ies focusing on this issue typically use reduced-form (a-theoretical) consumption or saving specifications. For the most part, however, they find either no effects or, at best, a weak positive impact of inequality on aggregate saving (see Schmidt-Hebbel and Servén 1999c).

4. FURTHER POLICY-RELEVANT ISSUES FOR RESEARCH ON SAVING

In the preceding sections we have identified a number of empirical facts on the pattern of world saving and reviewed conventional and recent consumption theories. We finish this paper by identifying a selective number of research puzzles and policy issues that merit further research. Many of them are addressed by the ongoing World Bank research project on Saving, described in more detail in Schmidt-Hebbel and Servén (1997).

Public policies have potentially significant effects on private and overall saving. Recent research on saving in OECD and developing countries has thrown light on some issues but many areas of disagreement remain. In some cases, the disagreement is rooted in the existence of competing theories; for instance, the Ricardian equivalence and life-cycle hypotheses, summarized above, offer strikingly different predictions about the effectiveness of fiscal policy. In other cases there is a lack of a well-established conceptual body to analyze the overall saving implications of certain structural reforms, such as financial liberalization and pension system reform. Finally, still in other cases a well-understood analytical framework does not prevent strong disagreements on the size of real-world effects; for instance, in the discussion of the saving effects of specific tax incentives in the U.S.

The general objective of all these policy interventions should be to counteract distortions that result in socially inefficient levels of saving. While there is a presumption that in many LDCs saving falls short of its welfare-maximizing level, this is by no means a necessary result, and any assessment of the positive effectiveness of saving-enhancing policies should keep in mind their welfare implications. Indeed, saving can surely exceed levels consistent with economic and social optimality. Recent economic history provides many examples of countries that saved and invested in excess, up to a point where rates of return on investment were close to zero or even negative. This was the case of many socialist countries where forced saving was the result of central plans aimed at output targets and not consumer preferences—the FSU during the Brezhnev era provides an extreme example. Excessive saving could also result in decentralized market economies, from binding regulations imposing forced saving or government policies encouraging over-saving. A mandatory fully-funded pension system is an example of a policy instrument that under the wrong conditions can lead to excessive saving, but under the right ones can raise it to optimal levels. It may contribute to higher saving by forcing certain population groups to save in excess of what they would voluntarily save, at the cost of reducing their welfare. But it may be an efficient second-best tool if, for instance, it mitigates existing distortions against saving, such as the expectation of government hand-outs to the old-age poor.

Nevertheless, the very low saving ratios of many LDCs, particularly among poorer countries, strongly suggest that the prevailing situation is one of socially

insufficient saving. This may result from distorting policies, such as too low a level of government saving –which in a world not characterized by Ricardian equivalence would lead to reduced national saving– and/or from distortions due to other factors –e.g., asymmetric information leading to imperfect policy credibility, under which reforms such as trade opening can distort consumers' intertemporal decisions leading to a saving collapse. In either case, saving-enhancing policies would be called for to offset the distortions.

Next we identify 12 policy-relevant research issues that are at the core of the saving experience and the policy discussion in developing, transition, and OECD economies.

(1) Does saving drive growth or does growth spur higher saving?

While the world-wide experience shows a strong and positive correlation between saving rates and growth rates, what drives what is hotly debated. As already mentioned, this is not an abstract academic question, but rather has an enormous policy importance because its answer will determine the policy priorities for achieving high growth. If it is concluded that saving drives growth (through physical capital investment) or if causality runs in both directions, policies that encourage saving are called for. If instead investment drives growth and the latter determines saving, growth-oriented policies should primarily aim at raising investment. Finally, if the main causality runs from growth to saving and investment –because human capital, technology and ideas, not physical investment, are the main growth determinants– growth-promoting policies should focus on those three factors. Hence a closer look at the saving-investment-growth link and the pattern of causality in developing and OECD countries is warranted.

(2) How does foreign saving –and foreign aid in particular– affect domestic saving?

Foreign resource inflows involve both an external financing source and, in the case of grants and concessional loans, a unilateral transfer. In theory, their effects on investment and consumption (saving) depend on several factors: the relative importance of the grant element vis-a-vis the financing element, the recipient economy's access to world financial markets, the degree to which the inflows are permanent in time, and the extent to which they are fungible. For the most part, empirical studies analyzing whether foreign inflows crowd domestic saving in or out ignore these distinctions, and therefore the question remains largely unsettled.

(3) Who does the saving –and does it matter who saves?

While most consumption theory is developed for the individual consumer or household, a large share of aggregate saving is done by governments and firms. This opens up two issues. First, how large is saving by these three groups in developing countries? While for OECD countries there is reasonable data showing the sector breakdown of aggregate saving, there exists little data for developing countries – and the little that exists is fairly unknown and unexploited.

Putting together this data in a consistent way is an important first step. Second, does it matter who does the saving? It would not matter if households both "pierce the corporate veil" and behave according to the Ricardian equivalence hypotheses; in either case households would simply undo with their saving any change in saving undertaken by corporations and governments, respectively. That this offsetting by households is far from complete has been supported by much empirical research. With regard to the corporate-household saving dimension, this raises the question of how different corporate saving behavior (driven mostly by corporate investment) is from household saving. With regard to the public sector-private sector saving dimension, this leads to the next policy question.

(4) How effective is public saving in raising national saving?

Fiscal adjustment is typically the centerpiece of stabilization programs. While there is a general trend in developing countries towards greater fiscal orthodoxy, its likely impact on national saving remains controversial. Not only the theories are split about the overall saving effects of raising public-sector saving; the existing empirical evidence is much too inconclusive to offer good policy advice. But a more accurate answer to this question is essential to assess the effectiveness of fiscal policy in raising aggregate saving, contributing to the economy's external equilibrium, and reducing its vulnerability to shocks such as abrupt changes in capital flows. Likewise, the effectiveness of alternative fiscal instruments (transfers, taxes, government consumption) –is still poorly understood.

(5) Do tax incentives raise private saving?

The previous question refers to the issue of how overall taxation affects saving. But how effective are specific tax incentives in raising saving, and how do they compare to each other? This question is relevant at a time when tax reforms in many industrial, developing and transition countries are changing the composition of taxation. Three main policy questions arise on saving and the structure of taxation. First, does a shift from corporate profit taxes to household income taxes affect overall private saving? Second, does a shift toward consumption taxation raise private saving? Finally, do specific saving incentives –such as tax exemptions on retirement savings accounts– encourage national saving, or do they simply induce a change in the composition of the private sector's savings portfolio?

(6) What drives temporary consumption booms –those that prove ex-post to be unsustainable– in the wake of domestic liberalization, capital inflows, or terms-of-trade gains?

Recurrent episodes of high private consumption growth that prove unsustainable and lead to busts and painful corrections have been common throughout the world. Unsustainable over-spending associated to ample access to foreign borrowing was observed in the late 1970s and early 1980s in many developing countries and recurred in Mexico recently again. Commodity-led con-

sumption booms were observed in Nigeria, Venezuela, Cote d'Ivoire and many other countries during the 1970s and 1980s. Spain and the U.K. showed large declines in private saving rates in the aftermath of financial liberalization during the 1980s. There has been ample speculation about the possible causes of these booms – ranging from policy mistakes to lack of policy credibility, and from financial-sector problems to consumer myopia. However, a general understanding of the roots of private consumption booms is still lacking. In particular, a clear identification of the role played by policy mistakes and distortions in consumption booms under conditions of structural change and foreign resource inflows would help design macroeconomic policies able to reduce the frequency of recurrent cycles of boom and bust.

(7) Does domestic financial liberalization raise or reduce private saving?

Since the 1970s and especially the 1980s, many industrial and developing countries have reformed their financial systems, allowing market forces more scope in determining interest rates, the allocation of credit, and the structure of private-sector asset portfolios. While financial liberalization has surely brought about microeconomic benefits, it has also been often associated to reductions in private saving rates. This decline in saving contrasts with earlier predictions of a positive saving flow response to deregulated (typically higher) interest rates and financial deepening. In particular, deregulation of consumer and housing mortgage lending has often led –for instance in the U.K. during the 1980s and Mexico since the late 1980s– to a significant expansion in these types of loans. In regard to interest liberalization, the world-wide empirical evidence tends to show that saving is not very responsive to higher interest rates. But other questions are still waiting for answers. For instance, which are the features of domestic financial liberalization responsible for the frequently negative saving response –and is this saving decline only temporary? Are market imperfections or policy mistakes to blame for the decline in private saving?

(8) Is pension system reform conducive to higher saving?

Analysts and governments are becoming increasingly aware of the efficiency, distributive and fiscal-macroeconomic pitfalls of conventional pension systems based on pay-as-you-go transfers and state management. Since Chile's radical 1981 pension system reform, a number of other Latin American countries and some industrial countries have adopted pension systems that provide a larger role to fully-funded and decentralized pension institutions. Many other developing, transition, and industrial countries are considering adoption of such a reform. Some of them aim to raise their saving rates. Under certain conditions a shift from a pay-as-you-go to a fully-funded pension scheme could indeed contribute to higher saving. But both theory and the empirical evidence gathered to date are weak in predicting the magnitude and timing of such effects. While pension reform is justified on many grounds other than saving, reformers around the world would benefit significantly from a better understanding of the saving impact of the pension reforms they are considering.

(9) Do poverty and income inequality affect saving?

One of the stylized facts of development is that saving rates tend to increase with living standards and per capita income levels. However, the evidence is much less conclusive regarding the association between aggregate saving and income inequality (for a given level of average per capita income). Yet a deeper understanding of that link is essential to assess the overall saving implications of government redistribution and transfer programs.

(10) What drives saving in transition economies?

The depth and scale of the reforms involved in the systemic transformation of the so-called transition economies dwarf those undertaken in any other world region. Since 1981 in Eastern Europe, and 1991 in the FSU republics, structural reform and stabilization efforts have reached a scale unprecedented in modern economic history. In these economies, however, saving rates have fallen well below pre-reform levels, often in tandem with output levels. Does the decline in saving reflect the end of forced saving during socialism, the management of the transition process, or other standard factors such as fiscal imbalances, growing poverty, or consumption smoothing in the face of a transitional output drop and higher expected future income? The answer to this question will shed light on how permanent or temporary the saving decline is, and help elucidate if policy action is needed to restore saving to levels more consistent with transition economies' investment needs.

(11) What explains sustained saving-growth takeoffs?

Sustained saving and growth takeoffs have been the exception rather than the norm during the last four decades of development experience. A good understanding of how the saving-investment-growth process got started in these episodes, and what policies helped them (as well as what policy mistakes were avoided) is still missing. On the one hand, this requires revisiting the questions posed under issue No. 1, about the role of capital accumulation in growth and the causalities between saving, investment, and growth. On the other, a closer look at these success episodes is most important from the policy viewpoint, to identify the role of initial conditions and specific policy levers in getting a successful transition underway.

(12) Why have saving and growth collapsed in Sub-Saharan Africa?

Over the last three decades, Sub-Saharan Africa's has had both the lowest saving rates and the poorest growth performance among world regions. National saving rates have been declining steadily since the early 1970s—in tandem with growth. The rising gap between domestic investment and national saving has been filled by foreign saving in general and foreign aid in particular. Low investment with poor productivity and abysmally low saving are at the core of Africa's growth collapse. While bad luck—droughts, wars, and declining terms of trade—has had its share in the region's dismal performance, inap-

propriate policies have certainly also contributed to this outcome. Which policy reforms would be the most effective in raising Africa's domestic saving levels and therefore make the region less dependent on foreign aid?

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