Saving in Latin America and Lessons from Europe: An Overview

Reinhart, Carmen and Plies, William
University of Maryland

1999

in Carmen M. Reinhart, ed., *Accounting for Saving: Financial Liberalization, Capital Flows, and Growth in Latin America and Europe* (Washington DC: John Hopkins University Press for the Inter-American Development Bank, 1999), 3-47.

Saving in Latin America and Lessons from Europe: An Overview

William A. Plies and Carmen M. Reinhart[1]
University of Maryland, College Park

I.1 Introduction to the study

Numerous studies have pointed to low saving rates as a serious constraint to growth in Latin America.[2] During the last twenty years, per capita GDP growth averaged about one percent in Latin America and almost 5 percent in East Asia.[3] Over the same period, saving rates stagnated in Latin America--where they remained at around 17 percent of GDP--and nearly doubled in East Asia, where they rose to over 35 percent. The link between low saving rates and a poor growth preformance is not limited to these two regions--Sub Saharan Africa's "growth tragedy" is often partially blamed on that continent's low level of saving.[4] Not surprisingly, throughout much of Latin America and elsewhere in the world a wide-ranging spectrum of policies have been either implemented or are being considered with the aim of stimulating saving. Some policies have sought to reduce distortions in the financial sector that may depress

[1] The authors would like to thank Michael Gavin and Vincent Reinhart for useful comments and suggestions.

[2] See Edwards (1995) and Schmidt-Hebbel and Servén (1997).

[3] See Schmidt-Hebbel, Servén, and Solimano (1996).

[4] See World Bank (19xx).

saving, others have explicitly targeted saving through a variety of tax incentives, another set of policies have emcompassed ambitious reforms of entitlements programs and pension schemes.

Early theories posited a causal chain from saving to growth. In the 1960s and 1970s, proponents of financial liberalization, such as McKinnon (1973) and Shaw (1973), sought to promote saving by allowing for positive, market-determined real rates of return. The higher level of saving, in turn, was thought to support a higher level of investment and growth. This line of analysis gave impetus to policy prescriptions that called for a liberalization of the financial system that did away with directed credit policies and interest rate controls. Many countries, under the auspices of multilateral institutions, implemented ambitious reforms of their financial systems. Yet, much of the recent empirical evidence has called into question the implications of those theories, suggesting that the chain of causation runs from growth to saving and not the other way around.[5] Indeed, the evidence from Latin America fits that pattern rather well.[6] Furthermore, recent experiences with financial liberalization, including that of the United States during the 1980s and several of the episodes that are discussed in this volume, suggest that financial liberalization may ease pre-existing credit constraints and actually **reduce** saving.

Some authors have suggested that the evidence hints at the existence of virtuous circles of saving and growth and poverty traps of undersaving and stagnation. Reports published by the Inter-American Development Bank (1996 and 1997) indicate that many of the reform programs implemented in Latin America over the past decade have been designed to activate virtuous

[5] See Deaton (1989) and Carroll and Weil (1993).

[6] A recent report by the Inter-American Development Bank (IDB, 1996) examined the link between the average saving rates of Caribbean, Central and South American countries during 1991-1995 and the average real GDP growth in the preceding 10 years; the stylized evidence suggests a strong and positive correlation from growth to saving.

circles. Recent financial crises notwithstanding, the successful development experience in East Asia lends credence to the notion of virtuous circles, but it begs the question as to whether Latin American can duplicate the East Asian experience.

Seven of the case studies collected in this volume provide insights into that and other related policy questions by examining what drives saving in Latin America. The studies cover Argentina, Chile, Colombia, Mexico, Peru, Uruguay, and Venezuela and span a variety of topics ranging from assessing the impact of financial liberalization on saving to determining the role of terms of trade shocks. Many of the studies also employ new data sources, that provide a better understanding of the saving patterns of the various agents in the economy--the public sector, firms, and households. All too often past studies have relied on highly aggregated data masking important differences across these sectors. Three of studies analyze the European experience (Italy, Spain, and the United Kingdom) with liberalization and structural reforms and its effects on saving. The aim of these studies is to provide insights as to what Latin American countries can expect in the wake of structural reform.

Beyond describing past and present trends in saving across a spectrum of primarily Latin American countries, the studies that comprise this volume also analyze many topical issues that remain the subject of much debate in academic and policy circles. What is the relationship between private and public saving? Can changes in public saving be expected to influence aggregate domestic saving? If not, the case for fiscal austerity, so prevalent in adjustment programs, may well be undermined. Most of the studies in this volume address these questions by examining the evidence on Ricardian equivalence, or whether the private sector fully internalizes and offsets the actions of the public sector.

Many countries in Latin America and elsewhere have either undergone, or are contemplating, full or partial financial liberalization. Recent studies have shown that financial liberalization is usually accompanied by greater access to credit and, more often than not, by credit booms.[7] Macroeconomists and policy makers have long sought to understand what happens to private saving when there are financial sector reforms. To shed light on this issue, several of the studies in the chapters that follow examine the prevalence of liquidity constraints, the presence of a credit channel, and the role of asset price and consumption booms in explaining saving. One of the studies offers an innovative look at what drives durable goods consumption. This line of work is rich in policy implications. If financial liberalization activates a cycle of booming credit and consumption--presumably leading to widening current account imbalances and increasing the possibility of a financial crisis--is it desirable? If it is desirable, on the basis of efficiency considerations, what are the necessary prerequisites? Is there an optimal sequencing?

As noted, an earlier literature on the links between saving and growth emphasized the need for high saving rates, so as to finance higher investment and serve as the engine of economic growth.[8] Yet, the newer studies suggest that it is growth that drives saving. The outcome of this debate is filled with policy implications and many of the country studies in this volume bring new evidence to bear on this key issue. If high saving is the "passive" outcome of growth, then policy makers should be less concerned with policies aimed at stimulating saving per se and, instead, focus on those policies that foster growth through more direct channels. The vast literature on endogenous growth offers some leading candidates in this regard, ranging from

[7] See Gavin and Hausman (1996) and Kaminsky and Reinhart (1996).

[8] See, for instance, McKinnon and Shaw (197).

keeping inflation under control to improving education and reducing taxation.[9]

As in the preivious empirical literature on saving, the studies in this volume also provide evidence on the relationship between saving and its traditional determinants, including demographic factors associated with the life-cycle hypothesis (LCH), terms-of-trade shocks, foreign saving, and income inequality. On the issue of foreign saving, several of the studies assess to what extent capital inflows "crowd out" domestic saving. If capital inflows are fickle and volatile and the extent of crowding out is large--is there a case for capital controls on inflows? Should policy makers aim to influence how these capital flows are intermediated? Three of the studies also have much to say about the impact of pension reform on saving and one of the studies (Noya, Lorenzo, and Grau-Pérez, 1998) examines the determinants of public saving. While the bulk of the evidence presented in this book comes from macroeconomic data, four of the studies also draw inference from neglected micro data based on surveys of households and firms.

The remainder of this chapter proceeds as follows. The next section briefly reviews the stylized facts of saving in Latin America and its components; this section provides some descriptive background on trends and cycles in saving rates and their volatility, while Section I.3 sketches some of the key factors, analyzed in detail in the individual studies, that help explain why saving rates evolved the way they did. The concluding section summarizes and touches on the policy implications of some of the findings.

I.2 Saving and Its Components: The Styllzed Facts

[9] See Easterly (19xx).

This section discusses some of the data issues relevant to the analysis of saving, it provides a rough description of the features saving in eight Latin American countries, analyzes the trends in saving and its components, and selectively summarizes what the studies have to offer to explain its evolution in recent years.

I.2.1 Data issues

Saving data are generally calculated in questionable ways, mostly as residuals of other macroeconomic variables.[10] Measurement error is often compounded by failing to correct for capital gains/losses and unrecorded capital flight. There is considerable variation in estimated saving rates among alternative sources of data. In what follows, unless otherwise noted, all the descriptive analysis is based on the original data provided by the authors. Hence, it is based on data that have been, to the extent possible, corrected for some of the problems that typically plague data on saving. Because the sample period is not uniform across countries and not all countries have equally dissaggregated data, the data appendix gives details as to the pertinent sample period used. The case studies provide a richer discussion of the individual databases.

I.2.2 Descriptive statistics

Table I.1 presents basic descriptive statistics for the various definitions of saving defined in the previous section. We report the mean, standard deviation, maximum and minimum values, as well as the coefficient of variation for each variable. There are several features worth noting:

[10] For a detailed description of recurrent measurement problems see Edwards (1995), Schmidt-Hebbel and Servén (1997), and Held and Uthoff (1995) for a Latin American sample.

First, mean domestic saving rates have oscillated in these eight countries from a minimum of -2.8 percent for El Salvador to a high of 39.3 for Venezuela, highlighting a considerable degree of variation both across countries and across time. El Salvador, the poorest country in the sample, records the lowest mean saving rate, 9.9 percent, and one-half to two-thirds the saving rate of the remaining countries. This disparity is consistent with the predictions of a subsistence model of consumption (see Ogaki, Ostry, and Reinhart, 1996), which suggests a marked non-linear relationship between saving rates and income. A country where income is close to the cost of a subsistence consumption basket will save little; as the gap between subsistence needs and income widens saving rates increase sharply at first and then flatten out with further increments to income. Unlike East Asia, none of the countries in the sample show mean domestic saving rates above twenty-five percent. Indeed, the mean for the entire sample is about 17 percent.

Second, if domestic saving has oscillated in a wide range, we can find part of the explanation in the behavior of fiscal policy. Public saving has recorded lows of -7.0 percent in Peru and highs of 20 percent in Venezuela. The volatility of public saving is highlighted in the study on Argentina (see López Murphy, et. al., 1998 this volume). On average public saving across all the countries has averaged around 3 percent (and the mean is negative for two countries), or about 18 percent of national saving and well below the 25 to 40 percent range recorded for Asia. Hence, the inability of Latin American governments to generate substantial saving in part explain the flat profile of saving in several countries in the region. Taken together, the volatile behavior of fiscal saving, its relatively low level, and evidence on the procyclicality of fiscal policy in Latin America (see, for instance Gavin and Perotti, 1998) all suggest that lax

and erratic fiscal policy may go long way toward explaining the region's relatively low saving levels. Indeed, some studies have shown the volatility of fiscal policy in Latin America is associated with monetary and financial instability--factors which can only stimulate capital flight and reduce domestic saving rates.[11]

Third, as to who contributes to private saving, the household or the firm, the data (for the subsample of countries for which it is available) provide no conclusive evidence. In Colombia and Peru, it is households that account for the bulk of private saving while for Chile and Mexico the largest contributors are firms. Pension reform notwithstanding, households on average have negative saving rates in Chile. In two of the four cases where disaggregated data is available, household saving is more volatile than that of firms. In one case they are equally volatile, and in the remaining case the opposite is true. Hence, it is also not possible to draw firm conclusions on the volatility issue. However, to the extent that consumption-smoothing considerations are dominant in household decisions, it should not be surprising to find that the volatility of household saving is greater than that of firms.

Fourth, foreign saving also appears to be volatile across countries and across time. While data for Chile and Uruguay were not reported, the oscillations in foreign saving for the remaining sample range from about seven percent capital **outflows** to over nine percent capital **inflows**. The amplitude of the cycle is large, but the contribution of foreign saving to national saving is modest, never reaching 3 percent of GDP; on average for the six countries for which we had data, it is slightly over one percent of GDP. Hence, if foreign saving does not increase national saving by much, on average, it certainly contributes to its volatility. Combined, these

[11] See Inter-American Development Bank (1995 and 1997) and studies cited therein.

two observations call into question the desirability of capital inflows.

Lastly, and not surprisingly in light of the preceding discussion, private saving is the largest component of domestic and national saving and the most stable. Its coefficient of variation is consistently well below those recorded for both public and foreign saving. Because investment projects typically require long-term financing, this observation may, in part, help account why saving-investment correlations have typically been high.

I.2.3 Trends in saving and its components

Previous studies have suggested that the disparity in saving rates between Latin America and East Asia can be traced to secular developments affecting demographics, fiscal policy, growth, and marked regional differences in the extent of financial deepening.[12] Here, we pursue this line of enquiry. In order to answer the questions as to why have saving rates stagnated in Latin America and is there scope increasing saving over the immediate horizon, it is important to assess the past trends were for the various sectors. Tables I.2 and I.3 and the Appendix Charts address this issue. With the exception of Chile (where saving shows a marked secular increase of over 21 percentage points between 1974 and 1994) and Mexico (where saving shows a secular decline, falling over 13 percentage points in the same period), domestic saving rates in the region have remained essentially **flat.** However, before interpreting this as a common regional characteristic, it is worth noting that aggregate saving remained flat--but for **different reasons.** Table 1.2 highlights some of the findings of the studies on this issue. For instance, public saving has been trending downward throuout the sample in a pronounced way in Argentina and Mexico-

[12] See, for instance, Edwards (1995) and Faruqee and Hussain (1995).

-contributing to the downward trend in the aggregate saving rate (Table I.2). Yet, in Venezuela and Uruguay, where the aggregate saving rate has also declined, public saving has been flat or actually increased. In an attempt to further synthesize the information in Table I.2 and the charts, we constructed a matrix that divided public and private saving into three categories; downward trend, trendless, and upward trend. If a "common regional" picture of Latin American saving rates were to characterize the cross-country experience, then we should expect the bulk of the cases would fall into two cells, for instance flat public saving and downward trend in private saving. Instead, what we observe in Table I.3 is that there does not appear to be a representative pattern to the trends in public and private saving. Furthermore, what accounts for the evolution of private saving, households or firms also diverges across countries. These observations suggest that "regional" explanations of the trends in Latin American saving rates may be of limited usefulness.

To explore this possibility further, we conducted principal component analysis on several measures of the aggregate saving rates across countries and across time. We begin with six time series on saving (for the countries for which we had data) for the period 1980 to 1993 for domestic saving and the 1975-1993 period for national saving. A broader set of countries and longer sample (1970 to 1995), based on an alternative data set from the World Bank will also be examined. Principal components can describe the co-movement in time series. From the original series, we construct a smaller set of series, the principal components, so as to explain as much of the variation in the original series as possible. The higher the degree of comovement that exists among the original series, the fewer the number of principal components needed to

explain a large share of the variation in the original series.[13]

Tables I.5 to I.7 present the results from this exercise for the two measures of domestic saving, the data provided by the studies in this volume and World Bank data, and national saving. As the correlation matrix highlights, saving rates across countries in the region are not all moving in the same direction. The incidence of negative correlations is also fairly high. Furthermore, the correlations are sensitive to the choice of sample--the longer the sample the weaker the degree of comovement. For instance, for the 1980-1993 period, which weighs heavily the debt crisis years, the first principal component explains 53 percent of the total variation in the original domestic saving series. For national saving over a slightly longer sample which adds the years 1975 to 1979 to the previous sample, the R^2 is 46 percent and the first principal component explains less than half of the total variation of the original series. Lastly, for the 1970-1995 period and the full sample of countries the first principal component explains only 38 percent of the variation in saving. Hence, even in the aggregate data, a strong regional pattern does not emerge. By contrast, the same exercise for a group of (formerly) rapidly-growing Asian economies yields very different results, with the first principal component explaining anywhere between 65 to 75 percent of the variation in the original series, depending

[13] For instance, if all the original series were identical, then the first principal component would explain 100 percent of the variation of the original series. At the other extreme if the original series show no comovement whatsoever, then nothing would be gained by looking at common factors.

The procedure begins by standardizing the variables, so that each series has zero mean and a unit standard deviation. This standardization ensures that all series receive uniform treatment and that the construction of the principal component indices will not be disproportionately influenced by the series exhibiting the largest variation.

on the sample period used.[14]

[14] Indonesia, South Korea, Malaysia, Singapore, Thailand.

The degree of regional comovement in domestic and national saving rates is considerably lower than that found among external variables, such as foreign exchange reserves and real exchange rates. Perhaps, the results are not surprising in light of the idiosyncratic nature of many of the shocks that have influenced saving rates over the course of the years in these countries. For example, as noted in Rivera-Campos (1998), the civil unrest in El Salvador during 1979 to 1983 led to an output collapse, where GDP per capita fell at a rate of 1.9 percent per year during that period. Given the links between growth and saving, no doubt, this had a major influence on saving. Similarly, the oil shocks had a very different impact on oil-rich Venezuela than on the other countries.[15] Not surprisingly, private saving rates recorded their highest readings following the hikes in oil prices in the 1970s and fell markedly in the 1980s as oil prices collapsed.

I.2.4. Common cycles?

While the trends are heterogeneous, a common regional characteristic appears to emerge in the cyclical deviations around those divergent trends. Reinhart and Talvi (1997) show that the common cycle in domestic and foreign saving is not confined to the region and, indeed, cuts across developing countries in other regions. For instance as shown in Table I.8, the correlation between the cyclical components of domestic saving among Asia and Latin America is in the 0.40 to 0.51 range, depending on the detrending method used, and is statistically significant; a very similar result is shown for the cycles in capital flows (i.e. foreign saving).

One example emerges from the debt crisis (see Chart I.1). In the initial and most severe

[15] See Zambrano et.al. (1998 this volume).

stages of the debt crisis in the early 1980s, domestic saving rates fall either back to trend or below trend. This would, of course be consistent with the permanent income hypothesis, if the sharp decline in incomes at that time was seen as partially transitory. A second example of a regional cyclical pattern emerges from the early 1990s, when the region emerged from its debt crisis and regained access to international capital markets. As noted in several of the studies and summarized in Table I.2 under the heading "Recent Developments," private saving rates in Argentina, Chile, Colombia, Mexico, Peru, and Uruguay fell to either trend level (Chile) or below trend (the rest). The relaxation of liquidity constraints or upward revisions to the expected path of future income may be consistent with the observed phenomenon. Whatever the explanation, our conclusion is that, despite the broad variations in the trend and level of saving rates, Latin American countries share regional forces.

As to what may account for a common cycle, there are alternative possible explanations. First, as argued in Calvo, Leiderman, and Reinhart (1993), capital flows (foreign saving) may be responding to a shared international factor, such as international interest rates. A relaxation in international borrowing constraints may, in turn, fuel a consumption boom. Secondly, and not inconsistent with the previous explanation, the timing of structural reforms, including trade and financial sector liberalization may, to a large degree, coincide across countries in the region (see Inter-American Development Bank, 1996 and 1997) and produce concerted cycles of saving and dissaving.[16]

The lessons from the European experience, as to what happens to saving in the wake of liberalization and structural reform, are mixed. According to the findings of the authors,

[16] This issue is taken up in the next section of this chapter and discussed in detail in several of the studies.

financial liberalization (and in the case of Spain also trade liberalization) is thought to be an explanation behind the decline in private saving for Italy and the United Kingdom. Yet, in the case of Spain, the authors argue that, once controlling for revisions to the path of expected income following the reforms, the behavior of private saving is well accounted for. This result leads them to conclude financial liberalization, per se, did little to reduce or eliminate any prior credit constraints that may have existed.

I.3 Issues and Lessons: Evidence from the Case Studies

This section provides a brief overview of some the themes that cut across the case studies. We focus on the key questions addressed in these studies as regards the role of fiscal policy, the impact of financial liberalization, the extent of crowding out between domestic saving and capital inflows, and the effect of income distribution on saving. We also re-examine the evidence on the causal patterns between growth and saving. We begin this section by spelling out some basic concepts and measures of saving consistently used throughout the studies, proceed to describe the particular issue at hand in general terms, and conclude by summarizing the results from the country studies while making reference to the existing literature on the subject where relevant.

I.3.1 Basic Concepts

National saving (S_n), is the portion of disposable income not devoted to consumption or government purchases. From the basic national income identities it can be shown that national saving is the sum of **investment** (*I)* and the **current account balance** (*CA*). Given that policy

makers usually become concerned in the presence of large current account deficits, which are so often associated with currency crises, it is not surprising that that they are also concerned with

$$S_n = I + CA.$$

declining saving rates,

This basic identity implies that in an open economy, with capital perfectly mobile across borders, saving and investment need not be correlated. The early results of Feldstein and Horioka (1980) revealed a puzzlingly high degree of correlation, which was interpreted as consistent with a low degree of international capital market integration. While subsequent studies have tended to find that those correlations diminished over time, these still remain in a range that would suggest more impediments to the free flow of capital than is evident, judging from the evolution of financial markets. This pattern of a declining correlation between saving and investment is discussed in some of the studies in this volume. For instance, Lopez-Murphy, et. al. (1998 this volume) show that in the case of Argentina, the correlation for the full 1958 to 1995 period is 0.75, but becomes nil during the 1990s. A more recent explanation for high saving-investment correlations is that due, possibly, to liquidity constraints, the bulk of investment is financed through the retained earning of firms, an issue that is also investigated in several of the studies in this volume.

Public and private saving

National saving can also be decomposed into its **private** (S_p) and **public** (S_g) components. This breakdown will be particularly useful in explaining to what extent the observed stagnation of saving rates in so many countries in Latin America are due to lax fiscal

policies or to behavior of the private sector. For the countries in East Asia, public sector saving comprises nearly 25 to 40 percent of aggregate saving, implying that some portion of the rapid

$$S_n = S_p + S_g .$$

growth in that region is attributable to thrifty government spending habits.[17] Hence,

Thus, at least in the East Asian context, where public and private saving were both trending upward over an extended period, there is little evidence of a complete private sector offset to changes in public saving, as would be the case under "Ricardian equivalence." As a result, there is scope for governments to boost national saving via increases in public saving. The issue of Ricardian equivalence amassed from the case studies will be taken up in the next subsection. The study on Uruguay (see Noya, Lorenzo, and Grau-Peréz, 1998 this volume) also carefully examines the determinants of public saving; their results provide fresh evidence of an electoral/political cycle, consistent with the findings for many OECD countries.[18]

Capital inflows and domestic saving

[17] See Edwards (1995).

[18] See Mishra (1997), for recent evidence on this issue.

For very low income countries, foreign aid can be a substantial portion of national saving, while for many of the middle income countries in Latin America highly cyclical private capital flows can be an uncertain source of financing consumption, investment, and growth.[19] Much of the empirical evidence suggests that there is partial offset between **domestic** and **foreign saving** [20] The combination of evidence on "crowding out" between capital inflows and domestic saving and the volatile and uncertain nature of capital inflows--not to mention their propensity to sudden reversals--has made policy makers weary about the attractiveness of capital inflows, particularly those with a short maturity. Not surprisingly, two of the countries studied in the following chapters, Chile and Colombia, have introduced measures to discourage capital inflows and reduce foreign saving.

Furthermore, the composition of foreign saving may also influence whether it is consumed, invested or saved. For instance, Boone (1994), assessing the impact of official foreign aid in a large sample of developing countries, concludes that nearly all official aid is consumed and, hence, does little to promote growth.[21] The composition also matters as regards the stability of foreign saving, with foreign direct investment generally thought to be a more stable source of external saving than short-term and portfolio capital.[22] Hence, it is also useful to decompose national saving into its domestic (S_d) and external components (S_e),

[19] For instance, an extreme example is Mozambique, where foreign aid amounted to 76 percent of GDP in 1989.

[20] For a comparison of the cyclical relationship between domestic and foreign saving rates in Asia and Latin America, see Reinhart and Talvi (1997).

[21] See also, Obstfeld (1995).

[22] See Kaminsky and Reinhart (1998) for an Asia/Latin America study of this issue as it relates to financial crises.

$$S_n = S_d + S_e.$$

Firms and households

Lastly, we decompose private saving into the **saving of firms** (S_f) and that of **households**

$$S_p = S_f + S_h.$$

(S_h), viz:

In the past, several studies have concluded that firm and household saving are substitutes, though the degree of substitution is not one for one and varies considerably across countries.[23]

Discerning among the saving patterns of the firms and households can be a valuable ingredient in designing policies, such as tax and pension reform, which directly or indirectly aim to influence saving. For instance, following their analysis of dissaggregated private saving data, the study on Chile (see Agosin, Crespi, and Letelier, 1998 this volume) reaches the provocative conclusion that pension reform does little to explain Chile's dramatic rise in private saving. They show that the steep increase in saving rates is due to firms and that, indeed, a decline in voluntary household saving was posted after the pension reform.

I.3.2. Public and private saving: evidence on Ricardian equivalence

Fiscal policy plays a central role in macroeconomic management, particularly in developing countries, where access to international capital markets is costly and frequently erratic. As the recent crises in Asia highlight, countries often increase public sector saving on short notice, so as to restore confidence and calm financial markets. In the context of inflation

[23] See, for instance, Denison (1958), Scadding (1974), and Aghevli et.al. (1990).

stabilization plans, whether the plans use the exchange rate or a monetary aggregate as the nominal anchor, fiscal adjustment is required, to allow the central bank to pursue its goal of price stability. However, under certain assumptions about the completeness of financial markets and consumers' horizons, theoretical models admit the possibility that any effort by governments to increase public saving--presumably with the goal of increasing domestic saving--will only induce offsetting changes in private saving.

The conditions for Ricardian equivalence, however, are quite stringent. It requires households to have perfect access to capital markets, leaving no role for liquidity constraints, it assumes households have an infinite planning horizon and common discount rates for the public and private sectors. Furthermore, it requires that future income, tax, and public expenditure flows are known with certainty and taxes are nondistortionary. Notwithstanding the low likelihood that all these conditions are simultaneously met, the empirical literature on the determinants of saving has devoted considerable efforts to assess the degree of offset, or substitutability, between private and public saving.

Typically, tests for Ricardian equivalence have taken three forms. First, studies that have estimated reduced form saving equations have included the public saving rate, s_g as a regressor in explaining the private saving rate, s_p,testing whether the coefficient on public sector saving is

$$sp_t = \beta z_t + \gamma sg_t + \varepsilon_t$$

significantly different from minus one. Namely,

where z is a vector that controls for all the other determinants of private saving. Second, it is

$$Ho: \gamma = -1.0$$

possible to use a vector autoregressive (VAR) framework to test for Ricardian equivalence. This test, which is described in Appendix II, is in the spirit of Seater and Mariano (1985), who following Barro (1974), proposed that under Ricardian equivalence all that matters for the household planning problem is government consumption, as households are indifferent whether its financing is through taxes or debt accumulation.[24] Lastly, it is possible to say something about whether Ricardian equivalence holds or not via an indirect route, by either testing for the presence of liquidity constraints, infinite horizons, or both.[25]

Nine of the studies in this volume investigated empirically the issue of Ricardian equivalence, with the overwhelming conclusion it does not hold (Table I.9). Either public sector saving is not statistically significant in explaining private saving, it has the wrong sign (Japelli and Pagano, 1998), or for the most part (where the coefficient has the anticipated negative sign), estimates of the degree of offset between public and private saving rates range from around -0.70 to about -0.40 and are significantly different from -1.0. Indeed, most of the results presented in these studies are broadly in line with those obtained in recent exhaustive cross-country studies, which have found a relatively low degree of offset between public and private saving relative to the predictions of Ricardian equivalence. For instance, the results shown in Table 2.1 imply a somewhat higher degree of offset than was suggested by Loayza, Schmitt-Hebbel and Servén (1998), who find that the coefficient on public saving lies in the -0.30 to -0.20 range. However, they are in the -0.673 to -0.416 range estimated by Edwards (1995), who also rejected Ricardian

[24] Of course, this assumes taxes are lump sum. If taxes are distortionary, this test would be biased against rejecting the null hypothesis of Ricardian equivalence.

[25] See, for instance, Haque and Montiel (1989).

equivalence for his sample.

However, this evidence must be interpreted with care, as point estimates of the offset coefficient for Latin America may be subject to bias. Specifically, Gavin and Perotti (1998) note that, unlike industrial countries, for most of Latin America access to capital markets is sporadic. During "bad times" private borrowing constraints will limit the private sector's ability to offset changes in public saving, while the relaxation of these constraints during "good times" gives the private sector a greater ability to internalize the actions of the government. Their empirical estimates suggest that asymmetries are significant, with the estimated offset coefficient in the 0.70-0.75 range in the good times and roughly half that magnitude in the bad times. Nonetheless, their evidence, as the studies in this volume, rejects Ricardian equivalence.

I.3.3. Liquidity constraints, credit channels, financial liberalization, and consumption booms

While there may be more than one reason for the rejection of Ricardian equivalence, one plausible explanation for its empirical failure is that not all households have access to credit markets, and hence, some households have no ability to smooth consumption over time. Thus, for the liquidity constrained households, consumption decisions are entirely determined by current income. On theoretical grounds, it has been shown that a relaxation of liquidity constraints will be associated with a consumption boom and a decline in aggregate saving. Furthermore, the more binding the initial constraints, the greater the consumption boom that can be expected.[26]

[26] See Obstfeld (1995) for theoretical discussion and simulations of such exercises. See Copelman (1994)

for an empirical investigation of the Campbell and Mankiw (1989) model to explain consumption booms during several inflation stabilization plans in Latin America.

Many countries in Latin America and elsewhere have undergone or are anticipating substantive financial sector reforms that end a regime of financial repression, where credit was directed and interest rates on loans and deposits were set by decree. Many of the past liberalization episodes unleashed a period of rapid growth in bank lending, asset price booms, and increases in consumption that often coincided with a decline in private saving rates. Many of those episodes also ended in a full-fledged financial crisis.[27] Hence, no analysis of saving is complete without an assessment of the pervasiveness of liquidity constraints. Gauging the prevalence of constraints is important to both understand to what extent these may account for a higher level saving than would otherwise prevail and to assess what could happen to saving if the constraints were relaxed, say via renewed access to international capital markets, financial liberalization, or both mechanisms.

The tests for the presence of liquidity constraints have often been linked to a credit channel in explaining the behavior of consumption/saving. Studies that have focussed on reduced-form saving equations have tested for liquidity constraints by introducing credit (either its growth rate or as a ratio to GDP) as a regressor. The premise is that greater access to credit reduces saving. Hence, the anticipated coefficient on the credit variable is negative. A more explicit test for the importance of liquidity constraints was proposed by Campbell and Mankiw (1989). They postulated that there are two types of households in the economy: A share of households, λ, are liquidity constrained and their consumption is entirely determined by the evolution of current income, while the remaining households, $(1-\lambda)$, have free access to capital markets and can smooth their consumption intertemporally. As a result,:

[27] See Kaminsky and Reinhart (1996) for a chronology and stylized facts surrounding these episodes.

$$c_t = \lambda c^c_t + (1 - \lambda) c^u_t ,$$

where aggregate consumption, c_t, is the weighted sum of the unconstrained and constrained households, denoted by superscripts *u* and *c*, respectively. Most often, equation (7) has been estimated substituting into c^u_t the simplest form of utility function with one good and no monetary considerations.[28] Further simplifying assumptions have allowed for linearization of the Euler condition that determines the dynamics of consumption of the nonconstrained households. If the real interest rate is assumed constant then the growth of aggregate consumption is given by,

$$\Delta c_t = \theta + \lambda \Delta y_t + \varepsilon_t .$$

where embedded in θ is an estimate of the intertemporal elasticity of substitution (IES).

Most of the studies in this volume (see Table I.10) addressed this issue through direct estimation or, indirectly by discussing the stylized evidence and reviewing the existing literature. With the exception of Peru (see Gonzales, Lévano, and Llontop, 1998 this volume), who find no evidence of an important credit channel in the macro data, the bulk of the studies (using macro and/or micro data) suggest that liquidity constraints are prevalent.[29] Two of the studies, Uruguay and Venezuela, present estimates of λ in the 0.36 to 0.53 range. These estimates are line with those obtained in other countries with a similar level of development.[30] Interestingly,

[28] See Reinhart and Talvi (1997) for a survey of this literature for developing countries.

[29] These results contrast those reported for Peru in Haque and Montiel (1989), who estimate a statistically significant λ=0.25.

[30] See Vaidyanathan (1993) for the link between liquidity constraints and development.

introducing an interaction term between income and credit growth in equation (8) (see Noya, Lorenzo, Grau-Pérez, 1998 this volume) reduces λ.

The discussion in the papers on Colombia, Italy, Mexico, the United Kingdom, and Uruguay also provide some support for the view that relaxation of liquidity constraints following financial liberalization played a substantive role in explaining the observed decline in private saving rates in those countries. In a similar vein, the study on Argentina suggests that regaining access to international capital markets following the implementation of the Convertibility plan played a key role in decoupling aggregate saving and investment. Indeed, a recent study that exploits new panel cross-country data for developing and OECD countries finds that in most specifications, the credit variable had the anticipated negative sign in the saving equation.[31]

The evidence from most of the studies that use micro data on saving by firms (Chile, Colombia) and households (Mexico) seem to corroborate the results from the macro data both in terms of the existence of binding liquidity constraints. These studies also allocate a key role to the relaxation of these constraints in explaining the decline in the 1990s in private saving rates in Colombia and Mexico following financial liberalization. Furthermore, Calderón-Madrid (1998 this volume) finds evidence that the boom in real estate prices that accompanied financial liberalization in Mexico further contributed to the decline in saving by households. His results suggest that households who owned property, and could use such property as collateral to secure loans, saved less. For Peru (see Gonzales, Lévano, and Llontop, 1998 this volume), the results from the micro data are somewhat more conflicting. The authors find no evidence of high saving/investment correlations for firms, suggesting liquidity constraints were not quantitatively

[31] See Loyaza, Schmitt-Hebbel, and Servén (1998) and Edwards (1995).

important, yet their household data reveal that access to credit in post-1991 played an important role in explaining the decline in household saving. The evidence from Agosin, Crespi, and Letelier's (1998 this volume) analysis of firm's saving behavior in Chile provide support for the argument put forth in Morande (1996), that the steep rise in firm's saving during most of the 1980s had much to do with the rising liquidity constraints they faced, as bank credit dried up in the wake of the severe crisis that shook Chile's financial sector.

The studies that analyzed the recent consumption booms in Argentina and Uruguay following their exchange-rate based (ERBS) inflation stabilization plans in the early 1990s also provide interesting insights as to why private saving rates declined (Table I.11). While there is a substantial theoretical literature on the potential sources of these booms, and a more limited empirical one, the study by López-Murphy, Navajas, Urbiztondo, Moskovitz (1998) on Argentina represents one of the very first efforts to explain what drives durable goods consumption during these boom periods.[32] Indeed, the surge in durable goods consumption (these are usually imports) is at the center stage of the consumption booms that have characterized so many of the recent and past inflation stabilization plans. Unfortunately, lack of data availability on durable goods consumption has, to date, limited researchers' ability to analyze this issue formally.

The study of Argentina suggests that revisions to expectations about the path of future income played a key role in explaining the boom. Yet, the results also suggest that the evolution of interest rates also played an important role; this result is subject to more than one interpretation. There is the intertemporal story, as pioneered by Calvo (1986), that suggests that

[32] See Reinhart and Végh (1995).

if the interest rate decline is perceived to be temporary, people will consume today when the effective price of consumption is relatively low to its expected future level. However, the results are also consistent with other interpretations. Recalling that interest rates affect the relative price of the flow of durable goods services (see Ogaki and Reinhart, 1998), lower interest rates will also induce an intratemporal substitution toward relatively cheaper durable goods. Furthermore, the lower interest rates could be a function of a declining country risk premia, more favorable access to international capital markets, and hence, a relaxation of liquidity constraints. Indeed, the authors present such evidence when analyzing the saving-investment link.

Durable goods are also relatively credit intensive vìs-a-vìs services and nondurables. Hence, the results for Uruguay (Noya, Lorenzo, Grau-Pérez, 1998 this volume), which use total consumption and includes durable goods, suggest that easier availability of credit may have fueled the boom in consumption and the decline in the saving rate.

In sum, the heterogenous evidence presented in these studies suggests that agents in most countries are affected in varying degrees by liquidity constraints and that a relaxation of these constraints may partially account for a decline in the saving rate. Whether the decline in saving is secular or transitory remains to be seem and merits further study.

I.3.4. Do Capital Inflows Crowd Out Domestic Saving?

There are many parallels between analyzing the links between saving and liquidity constraints and assessing the relationship between domestic and foreign saving. In industrial countries, access to international capital markets is continuous and, by and large, taken for granted. Yet, for most developing countries--including those such as Korea, which had achieved

near-industrialized status--access to international capital is limited in scope, given that it is costly, and subject to periodic collapses. In other words, examining the link between domestic and foreign saving involves looking at liquidity constraints (and the relaxation of these) at the country level rather than at the level of the household or the firm.

Hence, like a relaxation in domestic liquidity constraints, greater access to foreign saving (i.e., capital inflows) may lead to a decline in domestic saving. This proposition is well justified on theoretical grounds (see Reinhart and Talvi, 1997) and has been documented in the empirical literature with mixed results. Capital inflows may finance consumption booms. This can occur through a variety of channels, but one channel, which is particularly relevant to the Asian and Latin American experience of the 1990s, has to do with the role played by banks. During periods in which international interest rates are markedly below domestic interest rates, it is very profitable for banks to borrow offshore (a capital inflow) and lend domestically at the higher interest rates. The greater availability of credit for both households and firms provides an opportunity to consume (and/or invest) beyond the confines of current income. Thus, the decline in private saving.

As with testing for Ricardian equivalence in the context of a reduced-form saving equation framework, most of the studies that have examined the link between domestic and foreign saving have done so by including foreign saving (or, else, the current account) as an explanatory variable for private saving or domestic saving. However, unlike Ricardian equivalence, the null hypothesis tested is whether the coefficient on foreign saving is significantly different from zero or not. Because, the relationship between domestic and foreign saving that is suggested by theoretical explanations is likely to be cyclical, while secular factors

are more closely linked to income trends and demographics, another approach has focussed on correlations among the cyclical components of domestic and foreign saving.

In four of the five studies in this volume that examined this issue closely (the exception is El Salvador, see Table I.12), the conclusion that emerges is that foreign saving crowds out, albeit not perfectly (the exception is Chile) domestic saving.[33] The bulk of the coefficients on foreign saving are clustered in the -0.40 to -0.30 range. In the case of El Salvador, the sign of the coefficient on foreign saving is not stable. However, this result may possibly be accounted for by the fact that for El Salvador an important component of "capital inflows" are workers' remittances, which are included as an additional explanatory variable in the system.[34] Indeed, worker's remittances are significant and have the anticipated negative sign in all the regressions. Focussing on the cyclical components of domestic and foreign saving, Reinhart and Talvi (1997) also conclude that the bulk of the evidence for both Asia and Latin America is that domestic and external saving negatively rather than positively related. Other things equal, the weight of this empirical evidence would suggest that a relaxation of international "liquidity constraints," via a rise in capital inflows, can be expected to reduce domestic saving, although usually the decline is not proportional.

I.3.5. Growth and Saving: What Comes First?

[33] Agosin, Crespi, an Letelier (1998 this volume) find that for Chile they cannot reject the null hypothesis that the offset is complete, that is, the coefficient on foreign saving is not significantly different from -1.0.

[34] Worker's remittances show up in the current account, not the capital account. Yet these are most often viewed as a capital inflow/outflow (see Rivera Campos, 1998).

An earlier literature on the links between saving and growth stressed the need for countries to boost their saving rates. Paradoxically, in light of the preceding discussion, it was thought that financial deregulation could accomplish this task. By allowing real interest rates to rise and, in many cases, become positive for the first time, financial deregulation would bolster saving. In turn, higher saving rates would finance higher levels of investment and fuel economic growth.[35] While financial deregulation does, more often than not, result in higher real interest rates, it has failed to produce the anticipated positive effects on saving.[36] Over and beyond the credit channel discussed in the preceding subsections, there may be important reasons why the link between saving and real rates of return may be weak, particularly for low-income countries.[37] Furthermore, even if saving increases in response to the higher real interest rates, recent studies have even questioned that the chain of causation runs from saving to growth. The evidence presented in Carroll and Weil (1993) suggests that growth drives saving rates--and not the other way around.

From a policy standpoint, taking these results at face value implies that policymakers need not be concerned with tax incentives and other policies geared toward stimulating domestic saving. Instead, their focus should be on structural reforms that increase efficiency and macroeconomic stabilization. This is, of course, a simplistic argument. Even in the absence of a saving/growth causal chain, policymakers may wish to pursue higher levels of saving. For instance, a marked decline in private saving, such as those observed in Argentina, Colombia, and

[35] See, for instance, McKinnon (1973).

[36] See Galbis (1993) on the evolution of interest rates during financial liberalization.

[37] For instance, Ogaki, Ostry, and Reinhart, (1996) argue that the sensitivity of saving to real interest rates depends on a country's level of wealth. The poorer the country and the closer it is to only being able to support a subsistence level of consumption, the less saving will respond to changes in interest rates.

Mexico in the 1990s, may precipitate an undesired deterioration in the current account, that could undermine credibility and precipitate a currency crisis. Furthermore, while the existing empirical literature has had relatively little to say about this, domestic saving is likely to be a less volatile source of funds than fickle foreign saving.

Following Carroll and Weil (1993), the most common approach to assess what comes first, when it comes to saving-growth causality, is to rely on straightforward Granger-causality tests.[38] Typically, five-year to ten-year averages for saving and growth are used and, hence, a single lag is sufficient to address the temporal precedence, or causality, issue.

The case studies that examined this issue, unlike the more clearcut findings of the absence of Ricardian equivalence, the importance of liquidity constraints, and the substitutability between domestic and foreign saving, no clear consensus emerges. Table I.13 highlights the diversity of the findings. For Chile and Venezuela, the results appear to point in the causal direction from growth to saving (and investment). For Colombia, the results are sensitive to how the "long-run" values of output and saving are measured. For one measure, there is no apparent link between saving and growth, while for another there is mutual causation. The evidence presented in Japelli and Pagano (1998 this volume) shows a strong positive influence from growth to saving; but the opposite chain of causation is not empirically investigated. For Spain, the evidence presented in Boldrin and Martin (1998 this volume) suggests that contemporaneous growth/saving correlations are high, but no causal link is evident.

In sum, the collective evidence from the studies in this volume do not provide conclusive support (or disprove for that matter) the results presented in Carroll and Weil (1993), in which,

[38] See Appendix II.

growth causes saving. Given the richness of the policy implications as to how this issue is settled, perhaps the only clear conclusion derived from these studies is that the links between long-term growth and saving merit further scrutiny in Latin America.

I.3.6. The Life-Cycle Hypothesis: macro and micro evidence

The LCH is derived from the aggregation of finite-lived overlapping generations and introduces age-related consumer heterogeneity. Consumption in any period is a function of both wealth and disposable income, where the marginal propensities to consume from either are dependent on factors such as age, life expectancy, and working years. The LCH posits that individuals will dissave when thay are young, have positive saving during their working years, and run down their savings in retirement. Hence, saving follows a hump-shaped pattern for each consumer.

Variables associated with the LCH have, most often, found strong empirical support in the cross-country macroeconomic data. Most often, studies that estimate reduced form saving equations using panel or cross-sectional data find that the age dependency ratio is significantly and negatively linked to saving. While the values of the estimated coefficients are sensitive to the set of regressors used, the sample countries, and how the dependency ratio was measured, the results appears to be robust across a broad array of specifications and data sets.[39] As the LCH would predict, the higher the share of the very young and the very old (who dissave) in the population--the lower the saving rate. As shown in Table I.14, two of the studies that examined

[39] Other demographic variables frequently included in the regression analysis are population growth rates and average retirement ages.

this issue empirically (Colombia and Peru) do, indeed, present similar evidence.

Unlike the issue of liquidity constraints, where the results from the study of the micro and macro data converged, the evidence on the LCH is less conclusive. As noted, there is some support for the LCH at the macro level. In the case of Peru, the pattern of household saving across age groups in cross-sectional micro data appeared to be broadly consistent with the hump-shaped pattern predicted by LCH. Yet, two of the studies that analyzed micro household data find little support for LCH predictions. In the case of Mexico, the number of children aged 12 or less per households has a positive and significant coefficient in the saving equations, while households headed by someone aged 65 or more (the oldest group) saved more, although its statistical significance depended on the year examined. In a similar vein, Japelli and Pagano (1998) have little success in explaining Italy's declining saving rate on the basis of the life cycle model's predictions. During a period of slowing economic growth, the LCH would predict that saving would fall, as the incomes of the highest saving age group--those middle-aged and actively employed--would be proportionately hit the hardest. Hence, a priori one should expect to find in the micro data that the decline in saving rates is largely confined to this working age cohort. The data presented in Japelli and Pagano (1998 this volume) instead reveal declines in the saving rates of all age groups. Perhaps, the lack of conclusive evidence on the causality from growth to saving in these studies reflects an ambiguity in its underpinnings in the LCH.

I.3.7. Other determinants of saving

In this subsection, we focus on two additional variables that in both theory and existing evidence emerge as potential determinants of private saving. The first variable, income

distribution, has usually been coupled with household saving, while the terms-of-trade may both affect the household and the firm.

Income distribution

The bulk of the theoretical literature on household saving has suggested that, other things equal, a more skewed income distribution would produce a higher level of aggregate saving. The argument rests on differential propensities to consume out of current income, with the rich consuming a proportionally lower share of their income. However, a recent strand of the political economy literature has suggested that there is a positive link between political instability and income inequality.[40] The argument runs as follows: Political instability increases uncertainty; uncertainty adversely affects investment, and; lower investment means lower growth. Taking this causal chain a step further, if, indeed, growth causes saving as Carol and Weil (1993) suggest, then countries with more income inequality and lower growth would also be expected to have lower saving rates. Hence, on theoretical grounds, the sign of the coefficient on income inequality is ambiguous. Previous, empirical studies (see Plies and Reinhart, 1998, for a recent survey) have found scattered evidence in favor of both positive and negative links. A recent study by Schmidt-Hebbel and Servén (1996), using a comprehensive panel cross-country data set on income distribution, found no significant link. This lack of significance was both robust to the specification of saving used as well as to the choice of sample countries. Table I.15 summarizes the results of the studies in this volume that examined this issue. The studies for Spain and Venezuela in this volume examined this issue using macro data; in neither case was the proxy for income distribution significant.

[40] See, for instance, Alessina and Rodrik (1994) and Persson and Tabellini (1994).

On the basis of the household data, the Mexican study offers some provocative results. While the issue of income distribution is not explicitly addressed, Calderón-Madrid (1998 this volume) links household saving to educational attainment, specifically, years of education. Presumably education and income levels are positively related, indeed the household survey data from Peru illustrates this positive correlation. Yet, Calderón-Madrid finds that more educated households save **less**. The interpretation given in that paper is that these households have access to credit, while less educated households heads do not.

The terms of trade

As with income distribution, the predicted theoretical sign of the relationship between the terms of trade and saving is ambiguous. When a country experiences an adverse **temporary** terms of trade shock, (a decline in the relative price of its exports), this temporary decline in current income should lead to dissaving, based on consumption smoothing considerations--this is the basis of the Harberger-Laursen-Metzler (HLM) effect and it follows from the permanent income hypothesis (PIH). The PIH suggests that there is a difference between the short-run and long-run marginal propensity to consume, where the difference depends on the perceived permanence of the change in income. If the decline in income is seen as permanent, abstracting from habit persistence, consumption would be reduced accordingly; if the shock is temporary, consumption does not adjust and saving declines.

However, this is only part of story. Following the shock, imports are now expensive relative to other goods in the basket. This relative price shift can be expected to lead individuals to substitute away from the imported good and consume less of it--this is known as the consumption-tilting effect. Hence, consumption smoothing considerations suggests a positive

relationship between the terms of trade and saving and consumption-tilting a negative one.

Presumably, the issue can be settled empirically. Of the four case studies in the following chapters that examine this issue, all find a positive and influence of the terms of trade on saving, consistent with the HLM hypothesis. In two cases, El Salvador and Peru, the terms of trade are part of the cointegrating vector, suggesting these influence the long run level of saving, if not necessarily its short-run dynamics. In the case of Venezuela, estimates of an Euler equation derived from a model that allows for consumption of traded and nontraded goods, as in Ostry and Reinhart (1992), are used to simulate the effects on saving from a terms of trade shock; these exercises suggest saving in Venezuela is highly sensitive to the terms-of-trade. Lastly, while for the case of Argentina, the correlation between saving and the terms of trade is positive, it is close to zero and not likely to be statistically significant.

Perhaps, it is not surprising to find that of the four case studies that examined the saving/terms-of-trade link, the three that find a strong systematic and positive relationship are the three countries that have the least diversified export structure and their export revenues are heavily dependent on one or a handful of primary commodities. In the case of El Salvador, it is coffee, in Peru minerals and ores, and in Venezuela oil.

I.4 Some final thoughts

As to the stylized facts, the preceding discussion has suggested that there are important common threads in saving rates across Latin America, particularly as to the cyclical behavior of saving. In addition, domestic saving rates have, more often than not, remained relatively flat over the past twenty five years. No doubt, the sharp slowdown in economic growth during the

1980s that hit most of the region has much to say about the prevalence of stagnant saving rates. Over and beyond that, it would appear that regional explanations may not be adequate. As we have shown, there is considerable cross-country variation in the evolution through time of public, firm, and household saving that are masked in the broader aggregates.

Many of the previous studies that have analyzed saving behavior in Latin America and elsewhere have relied on the highly aggregated data and have pooled countries for the purpose of conducting cross-country and panel analysis. This broad-brush approach has proven extremely useful for pinning down some of the stylized evidence on the determinants of saving. Yet, from the vantage point of designing policies that seek to directly or indirectly influence the level of saving and recalling the heterogeneity of the country experiences in our sample, ***it seems inappropriate to suggest a "regional" policy prescription.*** This highly varied experience makes it all the more necessary to gain a deeper understanding of the individual country characteristics and circumstances.

The case studies contained in this volume represent a step in this direction. From a broad pool of time series on the saving patterns of households, firms, government, and the external sector as well as from micro data for individual household and firms, these studies allow for a richer understanding of what has driven saving rates in these countries. In addition, as discussed in the following chapters, these case studies have much to contribute to a wide range of topics that are directly linked to economic policy. The most conclusive evidence from their collected results can be summarized as follows:

First, despite of the heterogeneity of approaches and case studies, the overwhelming empirical evidence seems to suggest that, while there is some degree of offset between public

and private saving, households do not fully internalize the consumption decisions of the public sector. Indeed, in most instances the estimated degree of offset is quite low. This implies that governments can have an active role in influencing the level of domestic saving.

Second, possibly explaining the absence of Ricardian equivalence, liquidity constraints appear to be quantitatively important. The bulk of the evidence from both macro and micro data on firms and households appear to suggest that: i) some portion of the population has no access to credit markets and consumption decisions are ruled by current income; ii) Credit aggregates (in the macro data) or access to credit (in the micro data) convey much information about the prevalence of constraints and can explain much of the behavior in saving rates during periods in which those constraints changed markedly--increases in firms' saving rates in Chile have been linked to the tightening of liquidity constraints during the banking crisis years and declines in saving rates in Argentina, Colombia, Italy, Mexico, Peru (for households), the United Kingdom, and Uruguay have been associated with their relaxation. In this regard, a fruitful line of enquiry would explore the role of monetary and financial sector policies in influencing aggregate saving.

Third, the study on Argentina had much to say about what drives consumption boom and, particularly, booms that are driven by a surge in household expenditure in durable goods. Broader cross-country studies in this area would enrich our understanding of consumption/saving cycles. For indeed, household decisions on whether to act now or postpone durable goods purchases have much to say about the **cycles** in consumption/saving.

Fourth, the bulk of the evidence in these studies suggests that foreign saving is more likely to displace domestic saving than to complement it--although in most cases the extent of offset is partial. Given that potentially (largely based on descriptive analysis) foreign saving is

more volatile than its domestic counterpart, as to policy these results raise call into question the desirability of having "too much" foreign saving, or capital inflows. It calls for a reassessment of the desirability (if not the feasibility and usefulness) of capital controls. It again raises the issue of liquidity constraints, whether these come from the domestic financial sector or are imposed from abroad by fickle capital markets.

Fifth, the ambiguity (although many of the results suggest a growth-saving causal link) as to what comes first--saving or growth, the results summarized here highlight the need for further study in this area. Are vast regional differences between Asia (notwithstanding its recent woes) and Latin America as regards saving rates partly explained by growth in the former in the 1980s and stagnation in the latter? These issues has not been conclusively settled and calls for greater scrutiny.

Sixth, the evidence presented here provides, at best, mixed support for the LCH and no support to suggest that income distribution has anything to add to our understanding of what drives saving rates. Certainly, if a skewed income distribution provided the boost to private saving that consumer theory tells us it should, then Latin America should have much higher saving rates than Asia! In a group of Latin American countries the ratio of income in the top quintile to that in the bottom quintile is 16, or about twice that of Asia.[41]

Lastly, it would appear that whether terms of trade shocks have a significant or minimal impact on how much is saved may depend importantly on the concentration of, and primary commodity content of, exports. Without overemphasizing this result, it would appear that the countries with the least diversified export structure and greatest primary commodity exposure are

[41] See Plies and Reinhart (1998).

the most affected (in terms of the impact on saving) by terms of trade developments.[42]

[42] See also Elbadawi and Mwega (1998) for a comparison of African countries, which are highly weighed toward primary commodity exports, to other developing countries.

References

Aghevli,

Alessina, A., and D. Rodrik, "Distributive Politics and Economic Growth," *Quarterly Journal of Economics* 109, (1994), 465-490.

Barro, R., "Are Government Bonds Net Wealth?," *Journal of Political Economy* 81, (1974), 1095-1117.

Boone, P., "The Impact of Foreign Aid on Savings and Growth," mimeograph, London School of Economics, (June 1994).

Calvo, G.A., "Temporary Stabilization: Predetermined Exchange Rates," *Journal of Political Economy* 94, (1986), 393-398.

Calvo, G.A., L. Leiderman, and C.M. Reinhart, "Capital Inflows and Real Exchange Rate Appreciation in Latin America: the Role of External Factors," *IMF Staff Papers* 40, (March 1993), 108-150.

Campbell J., and N.G. Mankiw, "Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence," in Blanchard and Fischer, *NBER Macroeconomics Annual, 1989*, (Cambridge: MIT Press).

Carroll, C., and D. Weil, "Savings and Growth: A Reinterpretation," NBER Working Paper 4470, (September 1993).

Copelman, M., "The Role of Credit in Post-Stabilization Consumption Booms," mimeograph, MIT, (1994).

David, P., and J.L. Scadding, "Private Savings: Ultrarationality, Aggregation, and Denison's Law," *Journal of Political Economy*, (March/April 1974), 225-49.

Deaton, A., "Saving in Developing Countries: Theory and Review," *World Bank Economic Review,* Special Issue: Proceedings of the First Annual World Bank Conference of Development Economics, 61-96.

Denison, E.F., "A Note on Private Saving," *Review of Economics and Statistics*, (August1958), 261-267.

Edwards, S., "Why are Saving Rates so Different Across Countries? An International Comparative Analysis," NBER Working Paper No. 5097, (April 1995).

Elbadawi, I., and F.M. Mwega, "Can Africa's Saving Collapse be Reverted?," mimeograph,

Department of Economics, Nairobi, Kenya, (September 1997).

Faruqee, H., and a. Hussain, "Saving Trends in Southeast Asia: a Cross-Country Analysis," IMF Working Paper WP/95/39, April 1995.

Feldstein, M., C. Horioka, "Domestic Saving and International Capital Flows," *Economic Journal* 90, (1980), 314-29.

Galbis, V., "High Real Interest Rates Under Financial Liberalization: Is There a Problem?," IMF Working Paper WP/93/7, 1993.

Gavin, M., and R. Hausmann, "The Root of Banking Crises: the Macroeconomic Context," in Hausmann and Rojas-Suárez (eds.) *Banking Crises in Latin America*, (Washington, DC: Interamerican Development Bank, 1996).

Gavin, M., and R. Perotti, "Fiscal Policy and Private Saving in Latin America in Good Gimes and Bad," in Hausmann and Reisen (eds.), *Promoting Savings in Latin America,* (Washington DC: Inter-American Development Bank, 1998).

Haque, N.U., and P. Montiel, "Consumption in Developing Countries: Tests for Liquidity Constraints and Finite Horizons," *Review of Economics and Statistics* LXXI, (1989), 408-415.

Held, G., and A.Uthoff, "Indicators and Determinants of Saving for Latin America and the Caribbean," Economic Comission for Latin America and the Caribbean Working Paper No. 25, April 1995.

Inter-American Development Bank, *Economic and Social Progress in Latin America*, (Washington DC: Inter-American Development Bank, 1995).

Inter-American Development Bank, *Economic and Social Progress in Latin America*, (Washington DC: Inter-American Development Bank, 1996).

Inter-American Development Bank, *Latin America After a Decade of Reforms, Economic and Social Progress in Latin America*, (Washington DC: Inter-American Development Bank, 1997).

Japelli, T., and M. Pagano, "Saving, Growth, and Liquidity Constraints," *Quarterly Journal of Economics* 109, (February 1994).

Kaminsky, G.L., and C.M. Reinhart, "The Twin Crises: The Causes of Banking and Balance of Payments Problems," mimeograph, Board of Governors of the Federal Reserve System, (September 1996).

Kaminsky, G.L., and C.M. Reinhart, "Asia and Latin America: Then and Now," forthcoming in *American Economic Review* Papers and Proceedings, (May 1998).

Loyaza, N., K. Schmidt-Hebbel, and L. Servén, " What Drives saving Across the World?," mimeograph, The World Bank, (January 1998).

McKinnon, R., *Money and Capital in Economic Development*, (Washington, DC: Brookings Institution, 1973).

Meeshra, D.

Obstfeld, M., "Effects of Foreign Resource Flows on Saving: A Methodological Overview," mimeograph, University of California, Berkeley, (April 1995).

Ogaki, M., and C.M. Reinhart, "Measuring Intertemporal Substitution: the Role of Durable Goods," Rochester Center for Economic Research, Working Paper 404, (April 1995), forthcoming in the *Journal of Political Economy.*

Ogaki, M., J. Ostry, and C.M. Reinhart, "Saving in Low- and Middle-Income Developing Countries: A Comparison," *IMF Staff Paper* 43, (March 1996), 38-70.

Ostry, J., and C.M. Reinhart, "Private Saving and Terms of Trade Shocks: Evidence from Developing Countries," *IMF Staff Papers* 39, (September 1992), 495-517.

Persson, T., and G. Tabellini, Is Inequality Harmful for Growth? Theory and Evidence," *American Economic Review* 84, (1994), 600-621.

Plies, W.A., and C.M. Reinhart, "Does Income Inequality Raise Aggregate Saving?, mimeograph, University of Maryland, (January 1998).

Reinhart, C.M., and E. Talvi, "Capital Flows and Saving in Asia and Latin America: A Reinterpretation," Working Papers in International Economics No. 35, University of Maryland, forthcoming in *Journal of Development Economics*.

Reinhart, C.M. and C. Végh, "Nominal Interest Rates, Consumption Cooms, and Lack of Credibility," *Journal of Development Economics* 46, 357-378.

Schmidt-Hebbel, K. and L. Servén, "Does Income Inequality Raise Aggregate Saving?, mimeograph, The World Bank, (October 1996).

Schmidt-Hebbel, K., and L. Servén, *Saving Across the World: Puzzles and Policies*, (Washington, DC: The World Bank, 1997).

Schmidt-Hebbel, K., L. Servén, and a. Solimano, "Saving and Investment: Paradigms, Puzzles, and Policies," *World Bank Research Observer*,

Seater, J. J., and R. Mariano, "New Test for the Life Cycle and Tax Discounting Hypotheses," *Journal of Monetary Economics,* (March 1985), 195-215.

Shaw, E.S., *Financial Deepening in Economic Development*, (Oxford: Oxford University Press, 1973).

Vaidyanathan, G., "Consumption, Liquidity Constraints, and Economic Development," *Journal of Macroeconomics* 15, (Summer 1993), 591-610.

Appendix I. Macroeconomic Time Series Used

Country	National Saving	Domestic Saving	Public Saving	Private Saving	Household Saving	Firms' Saving	Foreign Saving
Argentina	1958-1995	1958-1995	1970-1995	1970-1995	N.A.	N.A.	1958-1995
Chile	1975-1994	N.A.	1975-1994	1975-1994	1975-1994	1975-1994	N.A.
Colombia [1]	1958-1994	1958-1994	1958-1994	1958-1994	1970-1994	1970-1994	1958-1994
El Salvador	1958-1993	1958-1995	1958-1995	1958-1995	N.A.	N.A.	1958-1995
Mexico	1965-1995	1965-1995	1965-1995	1965-1995	1987-1994	1987-1994	1965-1995
Peru	1958-1994	1958-1994	1958-1994	1958-1994	1979-1994	1979-1994	1958-1994
Uruguay	N.A.	1980-1994	1980-1994	1980-1994	N.A.	N.A.	N.A.
Venezuela	1968-1994	1968-1994	1968-1994	1968-1994	N.A.	N.A.	1968-1994

Note: Several of the papers also have extensive cross-sectional data on households and firms. See Chapter 2 and original papers.

[1] The Cardenas and Escobar study (this volume) actually uses longer time series spanning 1925 to 1994.

Appendix II. Methodological Notes

AII.1. Testing for Ricardian Equicalence

The variables in the system would be private consumption (*c*), income (*y*), government consumption (*g)*, taxes (*t),* the change in public sector debt (ΔD*)*, and any other determinant of consumption or saving that needs to be controlled for (*z)*. The VAR could be estimated in levels, if the variables are stationary, or in an error correction (ECVAR) form that is associated with Johanssen (1988), if they are nonstationary. A representative equation in ECVAR system, say

$$\Delta c_t = \beta_1 c_{t-1} + \beta_2 g_{t-1} + \beta_3 t_{t-1} + \beta_4 \Delta D_{t-1} + \beta_5 z_{t-1}$$

$$+ \delta_1 \Delta c_{t-1} + \delta_2 \Delta g_t + \delta_3 \Delta g_{t-1} + \delta_4 \Delta t_t + \delta_5 \Delta t_{t-1}$$

$$+ \delta_6 \Delta(\Delta D)_t + \delta_7 \Delta(\Delta D)_{t-1} + \delta_8 \Delta z_t + \delta_9 \Delta z_{t-1} + \varepsilon_t$$

that of private consumption, with a single lag to model dynamics would take the form,

The unrestricted model, as shown in equation (A.1), would be estimated and compared to a second model, which restricts the coefficients on taxes and the change in public debt in both the long-run relationship (the βs) and the dynamics (the δs) to be zero under the assumption of Ricardian equivalence, which is the null or maintained hypothesis. The restricted and unrestricted models are compared via a χ^2 test on the exclusion restrictions.

AII.2 Saving-growth causality tests

Following Carroll and Weil (1993), the most common approach to assess what comes first, when it comes to saving-growth causality, is to rely on straightforward Granger-causality tests. in the context of a VAR framework of the following form,

$$\Delta s_t = \beta_{11} \Delta s_{t-1} + \beta_{12} \Delta y_{t-1} + \varepsilon_{1t}$$
$$\Delta y_t = \beta_{21} \Delta s_{t-1} + \beta_{22} \Delta y_{t-1} + \varepsilon_{2t}$$

Typically, five-year to ten-year averages for saving and growth are used and, hence, a single lag is sufficient to address the temporal precedence, or causality, issue.

Table I.1. Saving Rates: Descriptive Statistics

Statistic	National Saving	Domestic Saving	Public Saving	Private Saving	Firms' Saving	Household Saving	Foreign Saving
Argentina							
Mean	20.57	20.17	5.79	15.25	N.A.	N.A.	0.40
Standard deviation	3.12	4.39	4.01	2.54	N.A.	N.A.	2.23
Minimum	15.44	11.26	-0.89	7.97	N.A.	N.A.	-4.99
Maximum	29.79	31.72	14.35	20.50	N.A.	N.A.	5.58
Chile							
Mean	15.75	N.A.	4.62	10.33	12.96	-2.46	N.A.
Standard deviation	9.94	N.A.	3.91	7.95	7.12	2.76	N.A.
Minimum	2.20	N.A.	-2.40	0.80	2.60	-8.10	N.A.
Maximum	40.50	N.A.	12	22.10	23.20	3.5	N.A.
Colombia							
Mean	18.58	17.63	5.25	13.33	4.02	8.01	0.95
Standard deviation	2.42	5.13	2.36	1.74	1.26	1.33	2.9
Minimum	13.53	7.29	1.34	8.52	1.24	5.14	-6.76
Maximum	22.88	28.57	10.26	15.43	6.52	10.37	6.24
El Salvador							
Mean	12.41	9.91	-1.4	14.04	N.A.	N.A.	2.49
Standard deviation	4.49	6.04	1.87	4.48	N.A.	N.A.	2.81
Minimum	1.28	-2.81	-5.45	1.61	N.A.	N.A.	-1.32
Maximum	24.62	25.86	3.63	24.2	N.A.	N.A.	9.25

Note: Totals may not add up, as the sample periods may be different. In most cases, the breakdown of private consumption into its household and firm components is available for a subset of the total sample for the more recent period.

Table I.1 Saving Rates: Descriptive Statistics (concluded)

	National Saving	Domestic Saving	Public Saving	Private Saving	Firms' Saving	Household Saving	Foreign Saving
Mexico							
Mean	15.58	12.86	1.96	13.61	6.11	3.32	2.72
Standard deviation	5.69	6.39	2.82	3.05	1.35	1.61	2.82
Minimum	3.31	-2.28	-3.35	6.58	4.6	1.3	-4.69
Maximum	30.05	26.72	10.01	20.05	7.6	6.3	7.83
Peru							
Mean	21.47	18.91	-0.25	19.22	7.45	13.67	2.5
Standard deviation	3.71	3.69	2.31	3.46	3.01	5.51	3.05
Minimum	15.17	10.36	-6.99	12.71	2.27	3.23	-4.58
Maximum	31.12	25.89	4.87	25.89	12.87	21.08	9.16
Uruguay							
Mean	N.A.	14.59	1.25	13.33	N.A.	N.A.	N.A.
Standard deviation	N.A.	2.09	3.4	3.87	N.A.	N.A.	N.A.
Minimum	N.A.	11.3	-5.5	7.1	N.A.	N.A.	N.A.
Maximum	N.A.	17.2	6.6	19.5	N.A.	N.A.	N.A.
Venezuela							
Mean	20.93	23.25	9.52	11.41	N.A.	N.A.	-2.32
Standard deviation	4.74	4.54	4.93	3.98	N.A.	N.A.	1.43
Minimum	14.23	16.96	1.91	2.91	N.A.	N.A.	-4.72
Maximum	36.76	39.33	20.1	17.84	N.A.	N.A.	0.02

Note: Totals may not add up, as the sample periods may be different. In most cases, the breakdown of private consumption into its household and firm components is available for a subset of the total sample for the more recent period.

Table I.2. Trends and Cycles in Saving and its Components: Latin America

Country/Study	Sample Period	The trend in saving and its components	Recent Developments
Argentina, López Murphy, Navajas, Urbiztondo, and Moskovitz (1998)	1968 to 1994	Private saving has been trendless, while public saving has been in a downward trend.	Following the Convertibility Plan in early 1991 and renewed access to international capital markets, private saving rates fell sharply, recovering in 1994. A boom in durable goods expenditures by households is associated with the decline in saving rates.
Chile, Agosin,	1975 to 1994	Sharp upward trend in private	Both public and private saving have

Crespi, and Letelier (1998)		saving, while public saving is flat. Saving by firms appears to account for the steady rise in private saving.	remained close to their trends in the 1990s.
Colombia, Cardenas and Escobar (1998)	1958 to 1994	Private saving has been flat (as saving by households and firms have been trendless), while public saving showed an upward trend during this period.	Following trade and financial liberalization in 1991, private saving (particularly that of firms) fell sharply. Tax increases appear to contribute to this decline.
El Salvador, Rivera Campos (1998)	1968 to 1994	Slight downward trend in private saving; flat public saving profile.	Following its collapse during the period of civil unrest in the early 1980s, saving rates have been recovering steadily in the 1990s.
Mexico, Calderón-Madrid (1998)	1965 to 1995	Both public and private saving have been trending lower throughout this period.	Following its December 1987 inflation stabilization plan, private saving, particularly that of households, fell sharply below its trend, recovering only in 1994.
Peru, Gonzales, Lévano, and Llontop (1998)	1958 to 1994	Private saving has shown a modest upward trend, while public saving has shown a tendency to decline over time. The rise in private saving is associated with a positive trend in saving by firms, as household saving has declined steadily.	Following the "Fujishock" and its reforms, including financial liberalization, private saving fell sharply as household saving fell well below its trend. Firms' saving continued to increase during this period.
Uruguay, Noya, Lorenzo, and Grau-Pérez (1998)	1980 to 1994	Modest downtrend in private saving and upward trend in public saving.	Following its 1991 inflation stabilization plan, private saving dipped further, well below its trend. A relaxation of liquidity constraints helps explain this.
Venezuela, Zambrano, Riutort, Muñoz, and Guevara (1998)	1968 to 1994	Marked downtrend in private saving, public saving essentially flat.	Prior to the 1994 banking crisis, private saving had fallen below its secular trend.

Table I.3. Trends in Public and Private Saving

Sector	Negative trend	Flat (no trend)	Positive trend
Public Saving	3	2	3
Private Saving	4	2	2

Table I.4. Trends and Cycles in Saving and its Components: European Case Studies

Country	Sample Period	The trend in saving and its components	Recent Developments
Italy, Japelli and Pagano (1998)	1950 to 1990	Private saving has been trendless, although saving rates declined steadily in the 1980s. Households appear to account for this decline. Public saving has been in a downward trend.	Slowing growth, financial liberalization, and changes to social security appears to be important factors explaining the decline in private saving.
Spain, Boldrin and Martin (1998)	1964 to 1995	Upward trend in private saving, while public saving is has a sharp negative trend.	Following important trade and financial liberalization measures private saving fell in the early 1980s and then recovered. Structural changes in expectations about the income-generating process appear to explain this shift in private saving. The reforms did not appear to have a substantive effect.
United Kingdom, Begg and Griffith-Jones (1998)	1963 to 1995	Private saving has been flat (as saving by households and firms have been trendless), while public saving has shown a downward trend during this period.	Following financial liberalization in the early 1980s, private saving (both households and firms) fell. Saving by firms recovered in the 1990s. A relaxation of liquidity constraints and an "euphoria" factor about expected path of income appear to explain this pattern.

Table I.5 Correlation of Domestic Saving Across the Region and Factor Analysis, 1980-1993

	Argentina	**Chile**	**Colombia**	**El Salvador**	**Mexico**	**Peru**
Argentina	1.00					
Chile	-0.12	1.00				
Colombia	-0.60	0.54	1.00			
El Salvador	0.49	-0.67	-0.67	1.00		
Mexico	0.52	-0.47	-0.47	0.61	1.00	
Peru	0.23	0.49	0.49	-0.11	-0.40	1.00

Principal Component Analysis

Principal Component	Eigenvalue	R^2	Cumulative R^2
1	3.19	0.53	0.53
2	1.47	0.24	0.78
3	0.66	0.11	0.89

Table I.6 Correlation of Domestic Saving Across the Region and Factor Analysis, 1970-1995
World Bank Data

	Argentina	**Chile**	**Colombia**	**El Salvador**	**Mexico**	**Peru**	**Uruguay**	**Venezuela**
Argentina	1.00							
Chile	-0.55	1.00						
Colombia	0.04	0.42	1.00					
El Salvador	0.83	-0.53	-0.08	1.00				
Mexico	0.02	-0.26	0.07	-0.31	1.00			
Peru	0.06	-0.33	-0.09	-0.06	0.73	1.00		
Uruguay	0.15	-0.38	0.11	0.20	-0.03	0.04	1.00	
Venezuela	0.62	-0.43	-0.08	0.75	-0.36	-0.05	0.16	1.00

Principal Component Analysis

Principal Component	Eigenvalue	R^2	Cumulative R^2
1	3.03	0.38	0.38
2	1.99	0.25	0.63
3	1.14	0.18	0.77

Table I.7 Correlation of Domestic Saving Across the Region and Factor Analysis, 1975-1993

	Argentina	**Chile**	**Colombia**	**El Salvador**	**Mexico**	**Peru**
Argentina	1.00					
Chile	-0.36	1.00				
Colombia	0.06	0.70	1.00			
El Salvador	0.41	0.24	0.31	1.00		
Mexico	0.53	-0.74	-0.48	0.03	1.00	
Peru	-0.14	-0.36	-0.42	-0.37	0.49	1.00

Principal Component Analysis

Principal Component	Eigenvalue	R^2	Cumulative R^2
1	2.77	0.46	0.46
2	1.73	0.29	0.75
3	0.53	0.09	0.84

Table I.8. Saving and Capital Flows, 1970-1995: East Asia and Latin America

Cyclical components of:	Hodrick-Prescott Filter	Kalman Filter	Beveridge-Nelson Filter
Domestic Saving			
Correlation	0.44	0.51	0.40
t-statistic	2.17	2.03	1.92
Foreign Saving			
Correlation	0.36	0.42	0.46
t-statistic	3.43	2.77	2.32

Source: Reinhart and Talvi (1997).

Table I.9. Public and Private Saving: Evidence on Ricardian Equivalence

Study	Country	Sample period, frequency, and dependent variable	Methodology	Results
Agosin, Crespi, and Letelier, (1998)	Chile	1975-1994, annual, private saving rate	Johansen's ECVAR	Rejects Ricardian equivalence. Only partial substitutability is found. Coefficient on public saving is -0.608. Significantly different from -1.0.
Cardenas and Escobar (1998)	Colombia	1929-1994, 1970-1994, annual, private and household saving rates	Reduced-form saving equation, OLS.	Rejects Ricardian equivalence. Coefficient on public saving is -0.716 (full sample) and -0.507 (sub-sample) for private saving and -0.391 (sub sample) for household saving. In all cases significant.
Rivera Campos (1998)	El Salvador	1968-1994, annual real private saving	Consumption function, Johansen's ECVAR	Rejects Ricardian equivalence, real public saving is statistically not significantly different from zero, although the coefficient is negative, as expected.
Japelli and Pagano (1998)	G10, excluding Italy	panel, 1960-1994, national saving rates	Reduced-form saving equation, OLS and robust estimation	Rejects Ricardian equivalence. Coefficient on public saving ranges from 0.68 to 0.73, depending on method of estimation and the use of time trends. In all cases **positive** and significant.
Gonzales, Lévano, and Llontop (1998)	Peru	1950-1994, annual	Reduced-form saving equation, OLS	Rejects Ricardian equivalence. Coefficient on public saving is -0.43 and significant.
Boldrin and Martin (1998)	Spain	1964-1995, quarterly, percent change in real private saving	Reduced-form saving equation, OLS	Ricardian equivalence is not explicitly tested. Fiscal measure is growth rate of public income. Coefficient is -0.40 and significant.
Begg and Griffith-Jones (1998)	United Kingdom	1963-1995, annual	Reduced-form saving equation, Instrumental variables	Coefficient on public saving is -0.46 in the household saving equation. Yet, when public saving is the dependent variable, the coefficient on household saving is not different from unity.
Noya, Lorenzo, Grau-Pérez (1998)	Uruguay	1975:1-1994:4, quarterly, private consumption	Consumption function, Johansen's ECVAR	Rejects Ricardian equivalence. Coefficients are not reported, but the χ^2 statistic on the restrictions on the coefficients of public consumption, revenue, and debt in the VAR.
Zambrano, Riutort, Muñoz, Guevara (1998)	Venezuela	1968-1994, annual, private consumption	Consumption, function, Johansen's ECVAR	Rejects Ricardian equivalence. Coefficients are not reported, but the χ^2 statistic on the restrictions on the coefficients of public consumption, revenue, and debt in the VAR.

Table I.10 How Prevalent are Liquidity Constraints?

Study	+Country	Sample period, frequency, and dependent variable	Methodology	Results
López-Murphy, Navajas, Urbiztondo, Moskovitz (1998)	Argentina	1960-1994, annual national saving rate	ECM, variant of Feldstein-Horioka	There is a significant and positive relationship between saving and investment through 1989, becoming insignificant in the 1990s. Argentina's renewed entry into international capital markets is thought to account for this structural shift.
Cardenas and Escobar (1998)	Colombia	1985-1993, annual, 397 firms, saving by firms	OLS	Finds firms propensity to save out of profits fell following financial reform. Cash flow and saving decisions are independent after reforms.
Agosin, Crespi, and Letelier, (1998)	Chile, micro data from 196 firms	panel, 1986-1994, annual, saving by firm	OLS, and robust estimation	Finds evidence that firms are liquidity constrained in that they have to rely on retained earnings to finance their investment projects.
Japelli and Pagano (1998)	Italy	N.A.	Discussion and stylized evidence	Based on their earlier studies, they present evidence, as to the role of liquidity in keeping saving rates high in Italy relative to other OECD countries and the role of financial liberalization in explaining their recent decline.
Calderón-Madrid (1998)	Mexico, micro data household survey	1989, 1992, 1994, household saving rates	OLS	Access to credit reduces household saving. The coefficient on a dummy variable that takes on the value of one if the household had access to credit ranges from -0.245 for 1989 to -0.16 for 1992.
Gonzales, Lévano, and Llontop (1998)	Peru	1950-1994, annual	ECM	Growth in credit to the private sector is not significant in explaining the growth in real private saving.
Begg and Griffith-Jones (1998)	United Kingdom	N.A.	Discussion of previous studies	From the review of six studies on the UK, the balance of the results (four of the six) attach an important role to financial deregulation in explaining the decline in U.K. saving rates.
Noya, Lorenzo, Grau-Pérez (1998)	Uruguay	1975:1-1994:4, quarterly, private consumption growth	Instrumental variables, Campbell and Mankiw (1989) approach	The find that the proportion of liquidity constrained households is in the 0.39 to 0.49 range. Furthermore, they find that introducing credit significantly reduces the coefficient on current income. Yet, using dummy variables, they find no evidence that the dependence of consumption on income is lower in the post-financial liberalization period.
Zambrano, Riutort, Muñoz, Guevara (1998)	Venezuela	1968-1994, annual, growth consumption	GMM, Campbell and Mankiw (1989) approach	They find that the proportion of liquidity constrained households is in the 0.355 to 0.534, depending on whether durable goods were included in the consumption measure or not.

Table I.11. Consumption Booms and Durable Goods

Study	Country	Sample period, frequency, and dependent variable	Methodology	Results
López Murphy, Navajas, Urbiztondo, Moskovitz (1998)	Argentina	1960-1994, annual growth in consumption of durable goods	ECM	The authors weigh and test competing models to explain the boom in durable good consumption following the Convertibility Plan. They find that the decline in nominal interest rates, rise in salaries (in US dollars) and the decline in the price of durable goods all help explain the boom, suggesting both intertemporal, intratemporal, and wealth effects.
Calderón-Madrid (1998)	Mexico, micro data from household survey	1989, 1992, 1994	OLS	The results suggest that consumption boom following the inflation stabilization and financial liberalization had much to do with greater access to credit and an asset (particularly housing) price boom, which allowed households to borrow using their real estate as collateral.
Boldrin and Martin (1998)	Spain	1964-1995, quarterly, percent change in real private saving	Descriptive and OLS	A consumption boom followed the trade and financial sector liberalization in 1986. Based on their model they conclude revisions to expected permanent income can account for much of the boom.
Begg and Griffith-Jones (1998)	United Kingdom	N.A.	Literature review	Compare two competing hypotheses to explain the consumption boom in the xx. The two are easier access to credit versus revised expectations of future income. Empirical studies inconclusive, although the financial liberalization/credit channel received more weight.
Noya, Lorenzo, Grau-Pérez (1998)	Uruguay	1975:1-1994:4, quarterly, private consumption	Instrumental variables	In explaining the 1990 post-stabilization boom, the study finds that more rapid income growth, increased credit availability and lower interest rates all contributed to explanation the boom.

Table I.12 Do Capital Inflows Crowd Out Domestic Saving?

Study	Country	Sample period, frequency, and dependent variable	Methodology	Results
López Murphy, Navajas, Urbiztondo, Moskovitz (1998)	Argentina	1960-1994, annual national saving rate	Pairwise correlation	The authors report a correlation with foreign saving of -0.33.
Agosin, Crespi, and Letelier, (1998)	Chile	1975-1994, annual, private saving rate	Johansen's ECVAR	Coefficient on foreign saving rate is -1.116. Cannot reject that there is full offset (i.e., not significantly different from -1.0.)
Cardenas and Escobar (1998)	Colombia	1929-1994, 1970-1994, annual, private and household saving rates	Reduced-form saving equation, OLS.	Coefficient on foreign saving rate is -0.36 (full sample) and -0.395 (sub-sample) for private saving and -0.316 (sub sample) for household saving. In all cases significant.
Rivera Campos (1998)	El Salvador	panel, 1968-1994, real private saving	Johansen's ECVAR	Ambiguous sign, depending on which cointegrating vector is used.
Gonzales, Lévano, and Llontop (1998)	Peru	1950-1994, annual, private saving rate	OLS	Coefficient on foreign saving is -0.37 and significant.

Table I.13. Evidence on the Links Between Growth and Saving

Study	Country	Sample period, frequency, and dependent variable(s)	Methodology	Results
Agosin, Crespi, and Letelier, (1998)	Chile	1960-1994, annual, private saving rate and private investment/GDP ratio, also growth rates and levels per capita	bivariate VAR	No direct tests on growth are performed, but in all the specifications there is a unidirectional causal relationship from investment to saving.
Cardenas and Escobar (1998)	Colombia	1929-1994, annual, 10-year averages in private saving rates and GDP growth (as well as their permanent components)	bivariate VAR	No causal relationships are detected when 10-year averages are used. When permanent components are used there is a significant two-way causality.
Rivera Campos (1998)	El Salvador	1968-1994, annual real private saving	Descriptive analysis	While no causality tests are performed, the stylized evidence poinst to a positive link between saving and growth.
Japelli and Pagano (1998)	G10, excluding Italy	panel, 1960-1994, national saving rates	Reduced-form saving equation, OLS and robust estimation	While no two-way causality tests are performed, growth is a significant determinant of saving in all specifications and estimation strategies.
Boldrin and Martin (1998)	Spain	1964-1995, quarterly, national or private saving rate and GDP growth	bivariate VAR	Pairwise correlations are high for national saving (0.69) but there is no evidence of a causal relationship running in either direction. This result is robust to using levels of the variables.
Zambrano, Riutort, Muñoz, Guevara (1998)	Venezuela	1968-1994, annual, private saving rate GDP growth including and excluding oil	Bivariate VAR	There is a significant (at the 10% level) causal relationship running from growth to saving irrespective of the measure of GDP used. There is no causal relationship from saving to GDP.

Table I.14. Life-Cycle Hypothesis and Saving

Study	Country	Sample period, frequency, and dependent variable	Methodology	Results
Cardenas and Escobar (1998)	Colombia	1929-1994, 1970-1994, annual, private saving rate	Reduced-form saving equation, OLS.	The age dependency ratio is significant in all specifications. Its coefficient is -0.27 (full sample) and increasingly important in the more recent period; the range is -2.44 to -1.905 (sub-sample).
Japelli and Pagano (1998)	Italy, micro data on household saving	1984, 1986, 1987, 1989, 1991, and 1993 household saving rates	Descriptive analysis	The authors conclude that the evidence in the micro data does not provide support for the LCH in explaining the decline in aggregate saving. The decline in the propensity to save is evident across all age groups.
Calderón-Madrid (1998)	Mexico, micro data on household survey	1989, 1992, 1994	OLS	In contrast to the predictions of the LCH, the number of children per household aged 12 or less and heads of households aged 65 or older (eldest group) were either not significant or were significant with a positive sign.
Gonzales, Lévano, and Llontop (1998)	Peru	1950-1994, annual, real private saving	Johansen's ECVAR	The inverse of the dependency ratio is part of the cointegrating vector. Consistent with the LCH, the coefficient ranges from 0.297 to 0.427, depending on sample period.

Table I.15. Other Determinants of Saving

Study	Country	Sample period, frequency, and dependent variable	Methodology	Results
Income distribution:				
Calderón-Madrid (1998)	Mexico, micro data from household survey	1989, 1992, 1994	OLS	While the explanatory variable does not directly measure household income, it is years of education. Presumably education and income levels are positively related. He finds more educated households save **less**. The interpretation given is that these household heads have access to credit, while less educated households heads do not.
Boldrin and Martin (1998)	Spain	1964-1995, quarterly, percent change in real private saving	OLS	Their proxy for income distribution, the share of gross profit margin over total value added, has a positive coefficient, but it is not statistically significant.
Zambrano, Riutort, Muñoz, Guevara (1998)	Venezuela	1968-1994, annual, private consumption	Johansen's ECVAR	Find no statistical evidence, that their proxy for income distribution affects saving.
Terms of trade:				
López Murphy, Navajas, Urbiztondo, Moskovitz (1998)	Argentina	1960-1994, annual national saving rate	Pairwise correlation	The correlation between the terms of trade and saving is not statistically significant 0.03.
Rivera Campos (1998)	El Salvador	1968-1994, annual real private saving	Johansen's ECVAR	The terms of trade affect long run saving positively, are significant and are a component of the cointegrating vector. Furthermore, terms of trade changes significantly affect the short-run dynamics of saving.
Gonzales, Lévano, and Llontop (1998)	Peru	1950-1994, annual, real private saving	Johansen's ECVAR	The terms of trade affect long run saving positively, are significant and are a component of the cointegrating vector. Changes in these do not influence significantly the short-run dynamics of saving.
Zambrano, Riutort, Muñoz, Guevara (1998)	Venezuela	1968-1994, annual, private consumption	Johansen's ECVAR	The terms of trade are significant and are a component of the cointegrating vector. Furthermore, terms of trade changes significantly affect the short-run dynamics

of saving.