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THE IMPACT OF FINANCIAL AND FISCAL POLICIES ON SAVING

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SUMMARY

This paper reviews the literature on financial and fiscal sector aspects to saving behaviour and makes recommendations for the direction of future empirical work focusing on the developing countries. As compared with repression and inefficiency, a liberalized and effective financial sector (despite its importance for development) need not induce a higher saving ratio. On the contrary, by reducing household borrowing constraints it may result in more consumption, and even those savings that it attracts may merely have been switched from non-financial assets.

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It is now widely accepted that the existence of borrowing or liquidity constraints influences saving behaviour, both by encouraging the accumulation of liquid financial assets for precautionary purposes and by inhibiting dissaving in the early part of the life-cycle. If saving is not too much reduced, improvements in the efficiency of the financial sector that lead to a reduction in the incidence of liquidity constraints should be welfare improving.

Even if not credit-constrained, households will wish to hold financial assets. That their willingness to do so depends on the rate of return is well accepted, but a robust quantification has proved elusive. Arguably more important than interest rate, especially in developing countries, are intangible institutional aspects such as security, convenience and habit. That there is a latent demand for long-term savings media appears to be evidenced by a handful of recent successes in institutional innovation, notably in Chile and Singapore.

Industrial country experience suggests that tax incentives for saving can be very effective, if only in inducing switching from one medium to another. To the extent that tax on capital income is largely uncollectible in many developing countries, the effectiveness of tax incentives for saving will be very much smaller.

Many important policy questions remain unanswered for the developing countries and, while further progress can be made even with existing data, collection of more data on a systematic basis, and improvement of the current sources must be a priority. In particular, independent data from flow of funds accounts can help to improve the precision of sectoral and national saving aggregates. There are other data series that could be collected on an occasional basis and that, though more *ad hoc* in nature, could provide a benchmark indication on structural differences between relevant aspects of the financial infrastructure. Finally, micro-data sets are costly to collect, but continue to offer rich insights.

No single econometric project will throw light on all of the important empirical questions we would like to have answered. We suggest three different dimensions along which econometric work might be fruitfully progressed: the cross-sectional variation between saving rates in different countries; the dynamics

of financial liberalization; and the lessons of micro-data sets.

> Although there have already been several cross-section studies on aggregate saving rates, this area deserves further work, focusing in particular on fiscal and financial issues and subjecting the conclusions to robustness tests of the Leamer-Levine-Renelt-King type. We discuss this option in some detail.
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> An event study of a score of developing countries which have experienced rapid financial liberalization could be used to throw light on just how aggregate saving has evolved following liberalization and in particular to assess how widespread is the phenomenon of a sharp fall in saving.
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> Availability of household level data is limited in developing countries, but they offer the best chance of understanding developing country saving. Analysis of special purpose surveys will be of most interest, but it is still worth asking what can be done with general purpose studies. The use of a pseudo-panel constructed from standard household budget inquiry data is suggested to assess the magnitude of liquidity constraints.

Many of the policy questions of interest tend to be lost from empirical analysis because of the widespread use of (Euler) equations with rate of change of consumption as the dependent variable. For this reason, and because the theoretical models which make predictions for the rate of change of a household's consumption are unlikely to be informative for aggregate data in developing countries, we suggest that Euler equations on aggregate data be given a rest for the present.

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1 INTRODUCTION

This paper reviews the literature on financial and fiscal sector aspects to saving behaviour and makes recommendations for the direction of future empirical work focusing on the developing countries. As compared with repression and inefficiency, a liberalized and effective financial sector (despite its importance for development) need not induce a higher saving ratio. On the contrary, by reducing household borrowing constraints it may result in more consumption, and even those savings that it attracts may merely have been switched from non-financial assets.

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Not all of saving involves the accumulation of financial assets, but the role of the financial sector is nevertheless a central one. It is the use of financial instruments that offers the household saver wide, albeit indirect, access to the yield on the investment opportunities available in the economy. An established literature stresses the importance of ensuring effective operation of this channel, as intermediated savings are likely to be more productive than where the household saver is limited to its own production and storage technologies. More recently, the rapid deregulation of financial systems in many industrial countries has highlighted the fact that financial repression may have constrained some households from borrowing even more than it constrained others from saving. Although financial liberalization can enhance the efficiency with which saved resources are channelled into productive use, the suspicion that it may have contributed to the sharp decline in saving ratios in many industrial countries has brought financial sector policy to the fore in the discussion of saving.

Econometric research on financial and fiscal aspects of saving in developing countries has not been lacking. For various reasons, including the poor quality of much of the data, robust conclusions have been hard to come by. The task of this paper is to review the main empirical financial and fiscal sector issues in relation to saving and to suggest research priorities.

Overview

It is now widely accepted that the existence of borrowing or liquidity constraints influences saving behaviour, both by encouraging the accumulation of liquid financial assets for precautionary purposes and by inhibiting dissaving in the early part of the life-cycle. If saving is not too much reduced, improvements in the efficiency of the financial sector that lead to a reduction in the incidence of liquidity constraints should be welfare improving.

Even if not credit-constrained, households will wish to hold financial assets. That their willingness to do so depends on the rate of return is well accepted, but a robust quantification has proved elusive. Arguably more important than interest rate, especially in developing countries, are intangible institutional aspects such as security, convenience and habit. That there is a latent demand for long-term savings media appears to be evidenced by a handful of recent successes in institutional innovation, notably in Chile and Singapore.

Industrial country experience suggests that tax incentives for saving can be very effective, if only in inducing switching from one medium to another. To the extent that tax on capital income is largely uncollectible in many developing countries, the effectiveness of tax incentives for saving will be very much smaller.

Many important policy questions remain unanswered for the developing countries and, while further progress can be made even with existing data, collection of more data on a systematic basis, and improvement of the current sources must be a priority. In particular, independent data from flow of funds accounts can help to improve the precision of sectoral and national saving aggregates. There are other data series that could be collected on an occasional basis and that, though more *ad hoc* in nature, could provide a benchmark indication on structural differences between relevant aspects of the financial infrastructure. Finally, micro-data sets are costly to collect, but continue to offer rich insights.

No single econometric project will throw light on all of the important empirical questions we would like to have answered. We suggest three different dimensions along which econometric work might be fruitfully progressed: the cross-sectional variation between saving rates in different countries; the dynamics of financial liberalization; and the lessons of micro-

data sets.

Although there have already been several cross-section studies on aggregate saving rates, this area deserves further work, focusing in particular on fiscal and financial issues and subjecting the conclusions to robustness tests of the Leamer-Levine-Renelt-King type. We discuss this option in some detail.

An event study of a score of developing countries which have experienced rapid financial liberalization could be used to throw light on just how aggregate saving has evolved following liberalization and in particular to assess how widespread is the phenomenon of a sharp fall in saving.

Availability of household level data is limited in developing countries, but they offer the best chance of understanding developing country saving. Analysis of special purpose surveys will be of most interest, but it is still worth asking what can be done with general purpose studies. The use of a pseudo-panel constructed from standard household budget inquiry data is suggested to assess the magnitude of liquidity constraints.

Notation and framework

Although we do not develop formal results in this paper, it will prove convenient to make reference to a standard model which will often be in the background. Our notation for the law of motion of the individual household's non-human wealth a_t will be[1]:

$$a_t = r_t^d [a_{t-1}]^+ + r_t^b [a_{t-1}]^- + y_t + g(y_t, c_t, a_{t-1}, t) - c_t$$

where the square-bracketed terms select positive or negative values of wealth; the rate of return is r^d-1 on positive wealth and r^b-1 on negative wealth ($r^d \leq r^b$); y is non-interest income, g denotes the net transfer from the state, including taxation and social security; c is consumption.

[1]This particular formulation is consistent with asset stocks being measured at the end of each period, while income and consumption accrue during the period. Other timing conventions are also possible.

We will typically imagine the household as choosing the time path of consumption c_{t+j} to optimize a time-separable expected utility function:

$$u_t = \mathscr{E}_t \sum_j \beta^j v(c_{t+j})$$

with time-independent felicity (sub-utility) functions v, and where β is the intertemporal discount factor ($0 < \beta < 1$). Usually, we will consider felicity functions of the iso-elastic (constant relative risk aversion) form giving:

$$u_t = \mathscr{E}_t \sum_j \beta^j c_{t+j}^{\rho}$$

where the parameter ρ (< 1) is related to the coefficient of relative risk aversion by RRA = 1- and to the intertemporal substitution elasticity by $ISE = 1/(1 - \rho)$.

Most of the issues discussed in the paper can be seen as essentially involving different assumptions about the rates of return, the rules governing transfers, and also other constraints to the maximization.

Organization of paper

The paper is organized as follows. Following this introductory section, there are three other Sections. Recognizing that access both to credit and to savings media are relevant, the literature review is split into two main sections. The final Section is devoted to suggestions rergarding future empirical work.

Section 2 explores the role of liquidity constraints and generally the barriers to household consumption smoothing. In Subsection 2.1, the strengths and limitations of Euler equations and sample splitting, two main methodological devices commonly used in the empirical analysis of this area, are described, along with the evidence of liquidity constraints which they have revealed. Subsection 2.2 describes the two main theoretical approaches to the modelling of optimal saving behaviour in the presence of liquidity constraints, while in Subsection 2.3 the likely quantitative importance of such constraints is discussed - both for precautionary and life-cycle saving - with special mention of the role of housing finance, the impact of financial liberalization and the special features of household credit in low income areas.

Section 3 turns to the role of asset characteristics, beginning in Subsection 2.1 with the rate of return, whose ambiguous impact on savings rates is well-known. Subsection 3.2 looks at institutional characteristics of savings media which may influence their use, including confidence, convenience and habit, as well as the tax and regulatory environment facing financial intermediaries. The effectiveness of direct tax incentives for saving is reviewed in Subsection 3.3. The following Subsection is devoted to a related issue, namely the impact of social security and efficient annuities markets on saving. Subsection 3.5 addresses the question of sectoral consolidation: to what extent are government and business saving substitutes for household saving?

Section 4 is devoted to the potential for future empirical work. It begins with a discussion of some general issues: the use of fixed effect panel estimators in cross-country work; the relative merits of micro and macro data; the relative usefulness of testing benchmark theories and of obtaining parameter estimates. Subsection 4.2 highlights the importance of improved data, and makes some specific suggestions. Selecting among the possible directions for empirical research is the theme of Subsection 4.3, which focuses on three particular projects: dynamic macro analysis of financial liberalization events, construction of pseudo-panel from extant household budget inquiries, for the purpose of measuring the impact of liquidity constraints at the household level, and a cross-section analysis of aggregate savings rates. This last-mentioned project is dealt with in greater detail in Subsection 4.4, which outlines how the quasi-Bayesian methodology used by Levine and Renelt and King and Levine could be adapted to the purpose.

Three Annexes are included. The first is a checklist of the main researchable policy questions which could be explored. Annex 2 reviews the possibility of separately identifying households' willingness to make intertemporal substitution from their aversion to risk. Annex 3 explains the potential for using balance sheet data from financial institutions for improving national income account measures of household saving.

2 LIQUIDITY CONSTRAINTS

One of the important influences of the financial sector on saving behaviour is the degree to which it allows households to borrow. The fact that households cannot borrow all they would wish - or at least not without paying interest rates that are much higher than those available to depositors - is almost too well-known to require empirical proof. Indeed, it is many years since Hayashi (1987) pointed out as conclusive evidence the sizable gap between money market rates and those charged by banks for unsecured household lending even in the US, and remarked that "future research should examine the causes not the existence of liquidity constraints". In addition to the causes, it is desirable to know the magnitude of the effect of liquidity constraints on saving, particularly with a view to assessing what net benefit might be obtained from policy interventions to alleviate liquidity constraints.

An obvious point bears restating at the outset, namely that any policy search for ways of increasing the domestic saving ratio will not be assisted by measures to alleviate liquidity constraints, as these tend to reduce consumption of the constrained households and thereby increase aggregate domestic saving at any level of aggregate disposable income. The policy case for alleviation of liquidity constraints derives more from the static microeconomic efficiency gains which might ensue, particularly for lower-income households which are likely to be disproportionately affected.

2.1 Evidence of liquidity constraints: Euler equations and sample splitting

Two methodological tricks underlie much of the empirical work which has tried to detect evidence of liquidity constraints. They apply across a variety of underlying theoretical models. These are (i) the use of Euler equations predicting a relationship between optimally chosen consumption in successive periods, and (ii) (in cross-sectional data) the selection of a sub-sample of households considered unlikely to be liquidity constrained.

Euler equations

The enormous focus on liquidity constraints in saving studies over the past 15 years has largely resulted from the empirical failure of simple Euler equation models of consumption

growth. As long as the household can freely transfer resources between periods, household borrowing and lending will (according to any of a variety of simple intertemporal optimization models) be used to smooth out the consumption path relative to predictable income fluctuation. In particular, such models predict a simple dynamic structure linking consumption in successive periods, with expected change in consumption depending primarily on the rate of interest at which resources can be transferred between the periods.

In the notation outlined in section 1 above, we can obtain the very simplest form of Euler equation by assuming no uncertainty and also equality of borrowing and lending rates: $r^b = r^d = r$. Under these assumptions, the optimal consumption programme satisfies the Euler-type equation:

$$\left(\frac{c_{t+1}}{c_t}\right)^{1-\rho} = r\beta$$

Current disposable income does not enter into this equation, because the impact of fluctuations in income has been smoothed by the optimization. However, when disposable income is included in regression based on these Euler equations and using aggregate data, it is generally found to be statistically significant. The econometric rejection of the hypothesis that disposable income should not be significant suggests that current income matters more for consumption than it would were resources freely transferrable between periods at the measured interest rate. This therefore provides indirect evidence that liquidity constraints may be important.

Evidence from developing country macro-data

The first extensive tests of this type of Euler equation on aggregate savings data for developing countries were carried out by Haque and Montiel (1989), who confirm the results

of many others for industrial countries.[2] Indeed, the coefficients they obtain on disposable income for most of their 16 countries are a good deal higher than those found in industrial countries, suggesting that liquidity constraints are more important in the developing world.[3]

Raut and Virmani (1989) also found current income to be highly significant in an Euler equation estimated for a panel of developing countries. However, their results proved highly sensitive to the inclusion of interest rates, real or nominal.[4]

Sample-splitting in micro-data sets

In microeconomic data sets, there is the possibility of identifying households which are more likely to be subject to liquidity constraints. If we know that the households in a certain sub-set are not liquidity constrained, then we can estimate the parameters of unconstrained behaviour. Assuming that these parameters are common to the constrained households also, inferences can be drawn from a comparison of the complementary sub-set.

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[2]Haque and Montiel's data covers aggregate private saving for 16 developing countries over the period 1960-85. They estimate separate equations for each country. The theoretical framework underlying their estimates also allows households that have no liquidity constraints to optimize over a possibly finite lifetime, using the probabilistic formalization of finite lifetimes introduced by Blanchard and Yaari. By distinguishing between the evolution of human and non-human wealth for these unconstrained households, and by assuming that liquidity-constrained households simply consume current income, they are able to test separately the hypotheses of infinite household life and absence of liquidity constraints. They accept the first, but reject the second decisively. Their estimation procedure pays careful attention to the issue of residual correlation.

[3]Within their model, these coefficients may be interpreted as the fraction of disposable income accounted for by those who spend exactly their current income and may therefore be liquidity constrained. The point-estimate of the value of this fraction varies from 0.18 for Korea and Jamaica (but with a wide standard error in both cases) to 0.58 for Indonesia, 0.61 for Morocco and 0.71 for Thailand; the mean for the sixteen countries was 0.38.

[4]If interest rates are included in the equation, current income is no longer significant. Raut and Virmani have data on 23 countries for all or some of the period 1973-82 (although they use private expenditure, rather than consumption). Although most of the variation is between countries, the authors chose not to include fixed effects (country dummies). Accordingly, between-country differences in the mean rate of consumption growth were left to be explained by levels of per-capita consumption and income, and by the interest and inflation rates. It seems unlikely that omitted country-specific factors would be uncorrelated with the included variables; therefore the estimated coefficients are likely to be biased. Furthermore, the central bank discount rates which were used are unlikely to correspond closely to private sector opportunity costs over the period studied because of rationing of central bank funds at those rates.

The most prominent example here is where explicit questions on liquidity or borrowing constraints were used in the questionnaire. The respondents to some surveys were asked whether they had been refused credit, or whether they had not sought credit because they anticipated refusal.[5] Apart from providing a direct estimate of the number of households who are constrained, this allows a very precise cut of the sample, from which the quantitative impact of the liquidity constraints may be estimated.

More indirectly, one can separate (as unlikely to be liquidity constrained) those households which are currently saving from those who are not, or those which currently have liquid assets, or those who are currently in employment. (Hayashi, 1985a, 1987, Alessie et al., 1989, Runkle, 1991, Zeldes, 1989).[6,7]

The fitted values of a savings function estimated for the unconstrained households can be applied to the remainder of the sample, and the scale of the consumption shortfall attributable to the liquidity constraints can be deduced.[8] Alternatively, sample splitting can be applied

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[5]The 1983 US Survey of Consumer Finances (SCF) was the first such survey. Since then the Banca d'Italia has also asked similar questions (cf. Guiso and Jappelli, 1991). The questions asked in the SCF were "In the past few years has a particular lender or creditor turned down any request you (and your husband/wife) made for credit or have you been unable to get as much credit as you applied for?" and "Was there any time in the past few years that you (or your husband/wife) thought of applying for credit at a particular place but changed your mind because you thought you might be turned down?". Using the answers to these questions, it is possible to deduce that about one-in-five respondents reported themselves to be liquidity constrained (Jappelli, 1990).

[6]However, Jappelli (1990) highlights the fact that simple indicators such as wealth select rather different subsets of liquidity-constrained households than do the explicit SCF questions.

[7]An early application of this kind of approach was to Indian data (Bhalla, 1979), where a subsistence level of consumption was defined, and households with income below this were assumed not necessarily to obey the permanent income hypothesis.

[8]This was the approach used by Hayashi (1985a), who worked with consumption levels, rather than with an Euler equation. He estimated a linear consumption function for that sub-set of households whose consumption was comfortably less than disposable income. (Actually, the cut-off which he used was: consumption less than 85 per cent of the sum of disposable income plus 20 per cent of liquid assets). Because the sub-set was selected on the basis of the dependent variable, the Tobit estimator, correcting for sample-selection bias, was used. We return to the findings of this study below.

to the Euler equation.[9] Many studies (an exception is Runkle, 1991) have found that the Euler equation restrictions are more nearly satisfied by the sub-sample not thought to be liquidity constrained, thereby providing more focused evidence than can be obtained from aggregate data that liquidity constraints may be the source of the problem.[10]

Limitations of Euler equation approach

A drawback of analysis based on the Euler equation is that, because of its focus on the rate of *change* of consumption, it often yields little information about the determinants of the *level* of consumption or the saving rate. This is partly because obtaining explicit solutions to models of optimal behaviour is usually more difficult than deriving these Euler equations (and may be impossible),[11] and partly because the focus of the research is on testing a precise hypothesis. What may be regarded as nuisance parameters from the point of view of a test of the permanent income hypothesis are often exactly the parameters of interest in a more general study.[12]

Some authors have used strong assumptions to obtain sharp empirical conclusions. For

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[9] This has the advantage that, while current saving behaviour of households who may in the future experience liquidity constraints will differ from those who don't anticipate any restrictions, the growth rate of consumption should not be affected by anticipation of future constraints.

[10]The micro-studies have the advantage of providing data from what may be the individual decision-unit, and therefore do not require the heroic aggregation assumptions that are involved in moving from individual optimization to aggregate data. If a household is hitting a borrowing constraint such as $a_t \geq 0$, the Euler equation will not apply: instead, the growth rate of consumption will be greater than predicted by the Euler equation. Evidence of a positive difference may thus be evidence of a liquidity constraint. But because households differ in their composition, and in the tax rates that they face, as well as in other particulars, there is a risk that under-specified equations may lead to spurious rejection of the hypothesis that there are no liquidity constraints (in particular, sensible results will not be obtained if one sticks to the assumption that each household has the same iso-elastic felicity function). If they are to be relied upon for evidence of liquidity constraints, panel studies should therefore include fixed effects, and other variables explanatory of differences between households in consumption behaviour.

[11]In the presence of uncertainty or in the absence of perfect capital markets, even the proper definition of wealth becomes problematic.

[12]In his discussion of Poterba (1987), Hall goes so far as to suggest that measurement of income, and therefore of savings, raises so many conceptual problems as to make its avoidance highly desirable in empirical work. Nevertheless, measuring income seems unavoidable for many of the questions of interest in the present context.

example, if it is assumed that households accounting for a fixed proportion of national income neither borrow nor lend, while the remainder follow the predictions of the simple permanent income hypothesis, then that fixed proportion may be recovered from the estimated equation (it is typically equal to the coefficient on current income in the regression of the rate of growth of consumption). Such behaviour would be consistent with optimizing households being at a corner solution because of a gap between r^d and r^b: the latter being too high to make borrowing worthwhile, the former too low to make saving worthwhile. However, as discussed in the next sub-section, in the presence of uncertainty, and if financial savings media are available, zero saving is not always the optimal response to liquidity constraints, and so such inferences may be unreliable.[13]

2.2 Optimal household behaviour under liquidity constraints

There are two main approaches to the analysis of optimal household behaviour under conditions of liquidity constraint, namely the approach which posits a wedge between borrowing and lending rates, and that which proposes instead an exogenous borrowing limit.[14] (The former may be regarded as a special case of the latter with borrowing rates at infinity).

Wedge between borrowing and lending rates

Naturally, the analysis is more tractable if uncertainty is neglected. In this case, if the household does have borrowing possibilities, but only at a much higher interest rate than for household lending (deposits), there will be a range of income over which households will not choose to borrow, but will instead consume exactly their current income (Flemming, 1973, Pissarides, 1978). Only an exceptionally low income will trigger some borrowing. It follows that the size of the wedge between borrowing and lending rates will influence the level of

[13]Besides, this kind of regression, when run on data for the UK (which certainly experienced considerable financial liberalization in the 1970s and 1980s), produces ratios that actually increase between the 1950s and the 1980s (Muellbauer, 1994).

[14]A third approach, which makes the household's borrowing limit a function of its current earnings, has also been proposed (Alessie et al. 1989) and should be distinguished from the other two in view of its rather different implications. If they can adjust their household labour supply, such households may be able to ensure that, despite the borrowing constraint, they are not at a corner solution. In their application, Alessie et al. suggest that all employed persons should be assumed to be in this position.

saving and the marginal propensity to consume out of disposable income.[15]

If data on the average wedge in an economy is available, it may plausibly be modelled as a function of macroeconomic conditions (e.g. rate and trend of unemployment) as has been done by King (1986).[16] He found that fluctuations in the wedge were negatively associated with aggregate consumption in the UK.

So far as developing countries are concerned, the availability of short-term loans from money lenders in all societies would seem to argue for the wedge theory as opposed to an absolute borrowing limit. However, in order to test the theory, one needs to have some indication of the size and variability of the wedge. Time series or cross-section data on the interest rate wedge, or on the cost of borrowing from money-lenders is rarely available.[17] Fitted values of an equation estimated for some other country and which relates the wedge to macroeconomic conditions could conceivably be used as a proxy for the wedge in situations where explicit wedge data is not available.

A fixed borrowing ceiling

The alternative assumption of a fixed ceiling on household borrowing (possibly zero) is sufficiently simple to allow rigorous analysis of household responses to uncertain income flows. In the framework proposed by Deaton (1991), the household is in receipt of a stochastic income flow, and may hold a liquid asset which yields a given rate of return: no borrowing is possible. If the household optimizes the discounted present value of expected utility (with a constant discount rate and a time-invariant felicity function) then its optimal consumption decision rule is a function only of the cash resources in hand - current income

[15]Pissarides' model takes account of the existence of illiquid assets, which can be realized at a cost intermediate between that of liquid assets and borrowed resources.

[16]The emergence of such a wedge may reflect an equilibrium in the financial market considering the probability of default (even in the absence of the kinds of asymmetric information and adverse selection discussed by Stiglitz and Weiss, 1981). King (1986) describes such a situation within a two-period partial equilibrium framework where neither the bank nor the household knows in advance whether it will be in a high-earning or low-earning condition in the second period.

[17]Though Aleem (1990) has an interesting account of the determination of the wedge in an environment of monopolistic competition in the informal household credit market in Pakistan.

plus liquid assets. If these are low, all current resources are consumed, but beyond a certain threshold (which will depend on interest rates and the parameters of the utility function), liquid assets are held over into the next period. They represent a kind of precautionary balance against the risk of high-frequency income fluctuations. Thus consumption is a kinked function of the cash-in-hand: a 45° line up to the threshold and a shallower curve thereafter.

Deaton has shown that the shallow curve can be well approximated by a straight line, thereby offering a very simple rule-of-thumb approach: "if you have any cash left after reaching the threshold consumption, save about 30 per cent of that remainder". The 30 percent figure is not perturbed much by alternative plausible assumptions about utility function parameters, but the model is clearly applicable primarily to low-income households and where bequest motives are not very important.[18,19]

2.3 How big an effect on saving?

The size of precautionary liquid balances, whether accumulated because of liquidity constraints or because of the curvature of the utility function, is not thought to be very high. This conclusion comes both from simulations of theoretical models (cf. Aiyagari, 1994), and directly from survey data.

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[18]Both theoretical approaches to liquidity constraints provide a rationale for why year-to-year fluctuations in household consumption may track household income more closely than would be implied by the permanent income hypothesis. An alternative theoretical framework, which does not rely on what might be regarded as *ad hoc* restrictions on borrowing, has been advanced by Carroll (1992). Carroll's households would prefer to borrow were there no uncertainty, but because of the possibility of catastrophic and permanent loss of income, they do hold precautionary savings. (Note that Carroll's framework does not take account of the possibility of households defaulting on their borrowings, and thus of shifting some of the longer-term income risk to lenders.) The behaviour he describes may be seen as a variant of the liquidity constraint model where adherence to the zero borrowing is imposed through curvature of the felicity function rather than through an exogenous constraint. For a single parameter felicity function like the iso-elastic, the two theories can be observationally distinguished, since the parameters required to generate precautionary savings at low incomes despite the absence of borrowing constraints will imply particular behaviour at high incomes also. Attempts to do this have tended to be disappointing for the Carroll model. A more complex felicity function, whose curvature changes more quickly as consumption falls, would seem necessary to rescue this theory.

[19]Past accumulations of household debt can also affect behaviour in important ways, potentially acting as a destabilizing factor (King, 1994), but such problems seem unlikely to be important in the experience of developing countries up to now.

Guiso, Jappelli and Terlizzese (1992b), focusing on risk aversion rather than liquidity constraints, and drawing on Italian survey data of self-reported income uncertainty, found a very small effect on consumption. They estimated that this kind of precautionary saving reduces consumption by less than 0.2 per cent of permanent household income.[20]

However, just because precautionary liquid balances (held to smooth high frequency income fluctuations) may not be large does not at all imply that saving is little affected by the existence of liquidity constraints. Indeed, the main effect would be present even in the absence of uncertainty and would come from the impact of borrowing constraints over the life-cycle. Plenty of evidence indicates that young households do not dissave as much as would be predicted by intertemporal optimization at money-market interest rates. Instead life-cycle consumption patterns track the hump-shaped life-cycle income patterns fairly closely. Attempts can be made to explain this away, for example by pointing out that the felicity functions themselves may be life-cycle dependent, with greater expenditure being required by large families to equalize the marginal felicity with that attained when young.[21] But the favoured explanation of many for much of this hump is the existence of borrowing constraints, restraining consumption below desired levels on a long-term basis and even when income flows are non-stochastic or substantially predictable.

The evidence reported by Hayashi (1985a) is relevant here. He estimated the unconstrained consumption level for the households in his (1963 US-SCF) sample, on the basis of the equation estimated for unconstrained households. He arrived at a shortfall of 2.7 per cent of household consumption, which has sometimes been described as a rather small figure - but by 1991 net household saving was so low that an addition of 2.7 per cent to consumption

[20]Their methodology involved fitting to cross-section household consumption a nonlinear function of total human plus non-human wealth and computed variance of the self-reported income uncertainty. Income expectations were based on a question which invited respondents to assign probability weights to each of twelve possible ranges for the growth in income over the coming year. It seems churlish to doubt whether such a complex question can really provide reliable evidence on income uncertainty.

[21]As W.M. Gorman's schoolteacher put it: "a penny bun costs threepence when you have a wife and a baby".

consumed (rather than involving just a portfolio shift) and that this additional consumption accounts for essentially all of the very substantial fall in the UK personal savings ratio from 12 per cent to less than 5 per cent during the 1980s (see also Bayoumi, 1993).

Special characteristics of developing countries

The relevance of these considerations for households in developing countries will differ widely from country to country and between income levels in any given country. Middle and upper-income households will find much the same factors entering their decisions as the bulk of households in the industrial countries. For low income households, while they will certainly often tend to be in the liquidity-constrained category, no conceivable financial liberalization is likely to alter this situation. Their forms of precautionary saving may also be focused more on non-financial mechanisms, such as co-insurance through village or extended family networks (Townsend, 1994, Udry, 1990).

In addition the forms of debt contract and the collateral provided sometimes differ qualitatively in developing countries, particularly in rural areas. Hoff and Stiglitz (1990) point out the use of such devices as pledging the harvest from a stand of cocoa trees, or giving the lender the usufruct of a parcel of land, in lieu of conventional collateral. (Indeed such innovative tailored financial contracts have had some vogue in international lending to developing countries too.) Simply using quoted wholesale financial market interest rates as a measure of the cost of borrowing is unlikely to give reliable results in such circumstances.

The use of local and idiosyncratic credit and insurance mechanisms in parts of the developing world means a major departure from the conventional picture of household savings being collected in a national pool which can be allocated to efficient uses. Instead the picture is more of a highly segmented set of credit and savings markets between which arbitrage is imperfect. Udry's (1990) finding that 97 per cent of loans in rural northern Nigeria were between individuals in the same village or at least the same kinship group is illustrative here. The informational problems which localize the demand for credit are clear enough: the supply-price of such funds depends partly on the opportunity cost in terms of alternative savings media. It is to the latter that we now turn.

3 INSURANCE AND INTERTEMPORAL SUBSTITUTION: THE FINANCIAL ASSETS OF HOUSEHOLDS

We turn to the question of financial asset holdings of households. Not all savings are held in financial form - far from it. Indeed, a larger part of household assets in many countries are in the form of housing (Miles, 1992). So far as financial assets are concerned, in few developing countries do relatively illiquid claims on pension rights have as large a share as they do in industrial countries (especially for middle-income households, cf. Wolff, 1994). Currency and bank deposits are relatively more important in developing countries. The decision as to how much financial savings to accumulate and in what form to hold them will depend in part on the availability of various types of asset, on their rate of return (taking account of taxation considerations), and on the existence of complementary assets, including the existence of Government social insurance programmes.

Within the framework proposed in section 1, these government interventions can be modelled as variations in the transfers function g. For instance, this function allows one to distinguish between income and consumption taxes, and (through the dependence on a) can also be adapted to include specific incentives for wealth holding in certain forms.

3.1 The rate of return

The rate of return at which resources can be transferred between different periods of a household's life-cycle is the most obvious financial factor which needs to be taken into account in considering saving behaviour. For households which have access to financial assets, the rates of interest on these will be the natural reference point. In optimizing models, only under special conditions will saving be insensitive to the rate of interest. On the other hand, because of the wealth and current income effects which will generally be present, there is no presumption as to the direction of the aggregate saving response to an exogenous interest rate change. Despite many studies, this remains a controversial area.

The empirical analysis of this issue has attracted partisans, as it has been linked with the debate on whether or not financial liberalization is "good". If higher interest rates could be shown to increase savings, thereby fuelling productive capital investment and boosting

growth, then this would seem to be a powerful argument for a financial liberalization that does increase interest rates. In fact, such a simple proposition does not have strong empirical support.

So far as developing countries are concerned, the literature has recently been reviewed again by Srinivasan (1993), who updates the study by Balassa (1990). Basically the conclusion remains that more studies have found a positive interest elasticity of savings than a negative one, but the coefficients have generally been small and often insignificant. If there are strong and consistent interest rate effects on savings, they are not evident in the data. The fragility of the evidence is illustrated by the succession of papers by Fry (1988) and Giovannini (1983, 1985).[23] Giovannini cast doubt on Fry's positive coefficients by adding or subtracting countries and years by comparison with Fry's samples. In addition, the low Durbin-Watson statistics reported by Fry in many of his panels suggests that there may be a bias from missing variables (or at least important country effects) and there may also be autocorrelation. These are only partly technical questions of econometric technique: underspecified equations cannot always be rescued by the application of robust estimation techniques.

Since the interest elasticity of saving is theoretically ambiguous, some economies may exhibit positive income elasticity and others negative. A parametrization of the interest response according to observed country characteristics (e.g. per capita income, growth rate, region) may allow a reconciliation of the diversity of results hitherto obtained.[24]

The effect of interest rates on saving could be non-linear, perhaps involving threshold effects. At the level of the individual household, a degree of non-linearity could be present both in the Euler equation (depending on the functional form of the felicity function - and the iso-

[23]Other multi-country papers which explore the role of interest rates include Leite and Makonnen (1986), Ostry and Reinhart (1992), Rossi (1988) and Schmidt-Hebbel et al. (1992) - the latter paper looking specifically at household sector saving. The paper by Ostry and Reinhart employs a two-good model - traded and non-traded goods - in order to identify the role of terms of trade changes. For the most part, however, it seems premature to be thinking in terms of multi-good models, such as surveyed by Blundell (1988).

[24]That such an approach has some promise is illustrated by a recent paper by Ogaki et al. (1994) who go some way in this direction by estimating an Euler equation with (in our notation) ρ parametrized as a non-linear function of per capita income.

elastic felicity function generates a log-linear effect as seen above) and in the formula for the level of savings, in which case non-linearity would be induced by the non-linear influence of the level of interest rates on household wealth.[25] From the systemic point of view, the notion that the reduced form impact of an exogenous change in the interest rate in a repressed economy might be non-linear (with small deviations from the unrepressed equilibrium generating only a modest impact on system performance) is well established.[26] A further source of non-linearity could lie in the consideration that very high real interest rates may reflect political uncertainty, peso-effects and the like. If so, the observed interest rate may overstate the saver's expected return. Then even if the response of saving to expected return were linear, the response to observed interest rates might become flat at high interest rates.

Whatever the source, it would be worth estimating the importance of such non-linearity in future empirical work, whether through simple power and interactive terms, or using more sophisticated techniques such as neural network approximation, cf. Granger (1991).

While it is real interest rates that influence the intertemporal substitution aspects of saving in a world of certainty, inflation may have an additional role over and above that which it plays as deflator of nominal interest rates. Accelerating inflation may create confusion over relative prices, and may be associated with a generalized increase in uncertainty, in either case tending to increase saving. The separate role of inflation therefore needs to be allowed for in empirical studies.[27]

Far more important for aggregate saving is the availability of a variety of alternative non-

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[25]Another source of non-linearity could be the kind of option consideration that can be introduced by transactions costs inhibiting immediate response to reversible interest rate changes.

[26]Notably by Dornbusch and Reynoso (1989). They observe that, although measured saving has increased following major stabilization programs, there are some ready explanations which cast doubt on the reality of the increase. In particular, capital flight through misinvoicing of trade serves to conceal saving that is being hidden abroad: an apparent increase in saving may really be a reduction in capital flight. Furthermore, stabilization tends to reduce the incentive for saving in the form of durable goods purchases, which are usually counted as consumption in the data. Nevertheless, a recent theoretical contribution which formalizes the notion of a genuine nonlinearity in the relationship between inflation and saving is Azariadis and Smith (1994).

[27] Cf. Lahiri (1989), who also distinguishes between anticipated and unanticipated inflation.

financial assets, the return on which may not be captured by deposit interest rates. While the use of real interest rates implicitly builds in the holding of goods inventories as an alternative to financial assets, it may be necessary to take explicit account of alternative investment opportunities, notably the rate of return on owner-occupied housing and other real estate investment. Many developing countries have experienced property booms, and household saving may have been very sensitive to the after rate of return on investment in real estate.[28]

Increasingly important too in some countries are the rates of return on quoted equities and bonds, and on foreign-currency denominated assets. The degree to which households have access to such assets for their saving, and the channels by which such savings are intermediated are quite diverse, and analysis using such data will need to be informed by country specific institutional knowledge.

It is worth stressing that the interest elasticity of saving cannot in general be deduced from the coefficient of the interest rate in Euler equations of short-term consumption growth rates (discussed in the previous section). Even if consumption growth rates are positively correlated with interest rates, a shock to interest rates will in general alter the whole intertemporal consumption path resulting in ambiguous predictions for saving.

3.2 Intangible institutional aspects

Econometric work has tended to neglect a number of obviously important but somewhat intangible issues relating to expectations, psychology and institutions in the mobilization of savings. These have been discussed in a qualitative literature and can be summarized as referring to security, convenience, yield, and habit.

Security and confidence.

Security is probably the single most important characteristic sought by savers in a store of value. There are many dimensions to security, and they relate not only to the risk characteristics of the contracted instrument, but to the issue of default on the part of the financial intermediary and to a variety of political risks including the risk that the instrument

[28]The Scandinavian experience in this regard is documented by Koskela and Virén (1994).

could be subject to confiscation, devaluation or unexpectedly onerous taxation, or that the use of the proceeds on maturity could be restricted (for example through the imposition of foreign exchange controls).

Risk of default by the financial institution is clearly a significant issue in developing countries. Much discussion centres around the desirability of maintaining confidence in the banking system, partly because of the importance of the smooth functioning of the payments system and partly because of the large share which the banking system has in the intermediation of funds. Many countries have introduced deposit insurance schemes designed to boost depositor confidence, despite worries that the adverse selection and moral hazard consequences of such schemes can be very costly indeed, as shown above all in the US. But in practice depositors have lost comparatively little directly as a result of bank defaults, even where no explicit deposit insurance has been in place, and it remains somewhat unclear to what extent the introduction of deposit insurance has contributed to deposit mobilization.

Because they do not normally benefit from the same degree of implicit or explicit government backing, fear of default in respect of non-bank financial institutions is presumably greater and this probably helps to explain the comparative degree of underdevelopment of such institutions in most developing countries. On the other hand, it is argued that mutual funds not guaranteeing a fixed minimum return (the so-called par value guarantee) may be immune to the worst forms of bank runs, and may weather confidence crises more effectively. If so, their introduction in such developing countries as have an adequate range of marketed financial assets could be successful, as it has been in the industrial countries.

Default is not confined to the private sector. In some countries, governments have incurred lengthy payments arrears in respect of financial liabilities they have incurred, such as the postal savings system or Treasury bills. Lengthy delays without compensation amount to partial default, and such governments have little ability to generate further voluntary savings in similar forms.

Fear of taxation or expropriation can be a strong disincentive to placing one's savings with a domestic financial institution whose accounts may be examined by the government

authorities. Recognizing this, many governments have granted bank depositors a degree of confidentiality. Where political institutions are sufficiently stable for this to be credible, it can contribute to a sense of security. But confidentiality of bank deposits facilitates illegal transactions and there have been moves in recent years to limit the scope of such confidentiality.

At the macroeconomic level, fiscal or international payments imbalances, or distorted relative prices (especially the exchange rate), and volatile inflation certainly contribute to political risks, as much as do non-economic political factors. Institutional traditions weigh heavily in savers' perceptions of the political risks to their savings. In some countries, currency reforms have had the effect of expropriating savers;[29] where this has happened, savers reasonably fear a recurrence, perhaps under a different guise. Where such expropriation would, in contrast, be considered "unthinkable" in political and administrative circles, most savers will attach a small probability to its occurrence, even if fiscal and payments difficulties prevail. Whatever its basis, political risk encourages capital flight, where residents choose to place their savings with foreign financial intermediaries despite incurring transactions costs and settling for lower yields than apparently available at home. Conversely, it is common for special tax and exchange control privileges to be available to non-resident depositors, and this has been effective in some countries in inducing emigrants to hold substantial deposits in their home country.

Convenience.

Under the heading of convenience, the physical location of bank branches comes first. Opening a branch is a sure (but often costly) way for a bank to obtain deposits. Conversely, many savers will not choose to travel long distances to obtain access to a financial intermediary, especially if information flows are so poor that the trustworthiness of that intermediary may be hard to evaluate. Fry (1986, 1988) reports regressions for six Asian countries which suggest a large effect on the aggregate savings rate of increases in the density

[29]Recent examples would be the 1993 demonetization of old rubles in Russia, the 1991 forced exchange of cash for blocked deposits in Brazil and the earlier demonetization of high-denomination banknotes in Ghana. Holders of on-shore foreign currency accounts have not been exempt, as in Mexico in 1982 when foreign currency accounts were compulsorily converted to Peso accounts at the over-valued official exchange rate.

of rural bank branches. He estimates that increased banking density over twenty years increased the Indian savings rate by 5 percentage points.[30] While it may very well be that the push to increase rural branching in, for example, India did more to divert savings from the informal financial sector (and for this reason measured increases in national saving may exaggerate the reality), the effect is suggestive of the importance of institutional arrangements for attracting household savings.

Assuming sufficient proximity, other convenience features become relevant. Even among the prosperous countries, banking systems differ in the degree to which they provide these conveniences, though to a large extent most banking systems seem to aim at much the same type of service. Inefficient or under-staffed bank branches result in long waiting periods for deposits or withdrawals of funds. The degree and ease of transferability of funds through cheques, direct debits, and suchlike also affect the convenience of assets of the more liquid type. Compulsory periods of notice before withdrawal, short branch opening hours, minimum deposit amounts that put bank accounts beyond the reach of a large segment of the population, or a process of interrogation as to the intended use of the funds withdrawn are familiar inconveniences in many developing countries.

For low-income households, and in remote rural areas, other types of institutions become relevant. In the poorest countries of Africa and Asia the formal financial system (licensed banks, insurance companies) has limited penetration in terms of the percentage of households using its services. Cash is universally held, but is a very poor store of value where inflation is high. Saving of poor households is not then predominantly in the form of financial assets or housing but commonly takes the form of livestock, grain or (in some areas) precious metals.[31] A network of informal financial institutions often known as rotating savings and

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[30]A fall of 10 per cent in the rural population per rural branch was estimated to result in an increase in the saving rate of 0.16 percentage points. In contrast to the fragile coefficients on interest rate, which become insignificant when Cochrane-Orcutt adjustment for serial correlation is introduced, the coefficients on branching in these studies seem robust (Fry, 1986). Alternative measures of branch density could be envisaged, such as percentage of population within a given radius of a branch, no. of branches per unit area, etc.

[31]A notable recent study by Rosenzweig and Wolpin (1993) stresses the role of bullocks as the main store of value in Indian agriculture.

credit associations (roscas) is also important. Despite many micro-studies documenting the operation of these informal financial institutions, too little is still known about their quantitative importance. Some estimates of the amount of financial assets outstanding in roscas are very high (Chandavarkar, 1986, Hoff and Stiglitz, 1990), but the basis for most of these estimates is unsure and there may be a considerable degree of double-counting.

In socialist and planned economies, a very limited range of financial instruments was traditionally available, both to households and to enterprises. Households were substantially precluded from holding equities or corporate bonds, and life assurance was largely unknown. Deposits in a national savings bank were the main alternative financial asset to cash. On the other hand, government provision of pensions and health-care, and limited nominal income risk, limited the need for life-cycle accumulation or precautionary balances. Despite this, goods-market rationing meant that involuntary savings in the form of cash and deposits accumulated to produce the famous monetary overhang by the late 1980s. It seems that these features would preclude casual inclusion of the planned economy experience in historical cross-section studies.[32]

The role of institutional structures in affecting yield.

What the bank or other intermediary will offer to the saver depends on the yield it is able to obtain on its use of the funds, on the degree of competition in the financial sector, and on the tax treatment. That government regulations can strongly affect all three is clear.

Although explicit taxation of interest income can be central (and the role of explicit tax incentives for saving is discussed in the next sub-section), but only if an effective tax regime is in place. Except where indexed,[33] income tax on deposit interest has tended to be quite onerous in time of inflation. However, unless a withholding tax on bank interest payment is

[32]Though a comparative analysis of the historical experience of different planned economies in this respect could be informative, especially as striking differences between the saving behaviour of China and the FSU seem to have contributed to their contrasting macroeconomic fortunes, cf. Sachs and Woo (1994).

[33]In a growing number of countries, especially those which have been prone to high inflation, the tax system has begun to be indexed so that tax is paid on *ex post* real interest income.

in effect, banking confidentiality will often make it impossible for the government to collect more than a fraction of income tax owed to it on foot of interest payment of depositors. On the other hand, since most jurisdictions either do not impose a withholding tax on the interest paid to non-residents, or refund it promptly, it large depositors will have a strong incentive to shift their funds offshore to evade even a withholding tax. The choice is for the government to make: either forgo most of the income tax due interest income, or opt for a withholding tax which will likely result in lower deposit mobilization. Implicit taxation on banking activities through unremunerated reserve requirements, gross receipts taxes and the like will also tend to reduce the return to depositors, though - as with income taxes - some of the incidence will fall on borrowers or on the owners of the financial institutions.

Lack of competition can also result in banks and other financial institutions operating such a high-cost administrative operation that little is left to pay interest to small (and therefore cost-intensive) depositors.

In non-bank areas such as life assurance it is common to see onerous regulations that have the effect of greatly reducing the yield that such intermediaries can offer to savers. The contrasting development of life assurance in several European countries is normally attributed to contrasting regulatory regimes in the different countries.[34] For example restrictions (introduced for prudential reasons) on the nature of the contract offered, and on the investment portfolio of the insurance company, mean that life assurance has made little headway as a savings vehicle in Germany. In contrast the hitherto relatively light insurance regulation in the United Kingdom (combined with favourable tax treatment of the savings) has been associated with a very high market share for life assurance companies in the savings market.

Habit

(a) Historians of finance stress the importance of bounded rationality and information costs in determining the range of savings instruments which will be considered in a society at any given time. Kindleberger (1993) gives many examples of newly fashionable financial

[34]As well as to differences in the scope of social security.

instruments emerging and later waning. For instance, the boom in foreign securities in many European countries in the 19th century may, he argues, have resulted in the neglect of profitable lending opportunities in the home countries. Also shown by this and other historical episodes is the observation that a fall in the yield on commonly held instruments to what savers consider inadequate will trigger an increased receptivity to higher risk and novel instruments (the experience of US mutual funds in the early 1990s may be a recent instance of this).

Even though modern financial technology has reduced information costs dramatically, household savers are still creatures of bounded rationality and habit. The differing degrees to which various classes of financial institution have succeeded in mobilising saving in different countries may be partly attributed to this consideration. As Thaler (1994) points out, awareness that "experts" consider a savings medium to be good value is a powerful inducement to shift resources in its direction.

(b) Among others, Thaler and Shefrin (1981) have argued for the importance of habits along a different type of dimension, namely the fact that saving is a type of activity where self-discipline comes into play. Whereas standard time-consistent preferences do not generate the sorts of issue discussed by Thaler and Shefrin, they propose a more realistic modelling of household behaviour according to which the household (or individual) may find it optimal to pre-commit to saving so that problems of time-inconsistency and lack of self-discipline will be reduced.[35] Regular contractual savings schemes which impose penalties for failure to keep to a pre-established saving profile can be attractive for households in this type of situation. It is also a possible rationale for compulsory savings schemes mandated by government, especially in regard to provision for old age.

3.3 Tax incentives for saving

The industrial country literature has considered the question of tax incentives for saving, both

[35]Thaler's (1994) suggestion, that an immediate reward to the saving has a stronger effect (for equal present value) than a high yield accruing over a long interval, can be seen as an aspect of this point too.

in terms of the overall tax structure (expenditure tax versus income tax) and in terms of specific tax-favoured investment media. Both positive and normative issues are discussed in the excellent survey by Boadway and Wildasin (1994), but we do not consider normative issues here.[36] The general question of incentivising saving by a switch from income to consumption taxes is one which may only be of modest importance in developing countries, given the leaky nature of the personal income tax system in such countries,[37] and the likelihood that much of capital income can avoid heavy income taxation anyway. Perhaps more interesting is the potential for targeted savings incentives (though as mentioned above, the tax treatment of mortgage interest can also be very important, and is sensitive to the rate of inflation).

A number of micro-level studies of the response of households in the US to special federal income tax concessions available to long-term savers through so-called IRAs and other incentive schemes have not concluded unambiguously whether or not these have led to an increase in household savings. A recent study plausibly suggests that, while the long-term effects of the incentives would be to increase savings, the short-run effects are small, as savers substitute IRAs for other already accumulated assets (Engen, Gale and Scholz, 1994).[38]

In the process of analyzing household behaviour in response to the tax incentives, researchers have uncovered what appears to be evidence for irrational behaviour. For instance, though this is possible to rationalize in terms of expected changes in tax rates, or in terms of liquidity, there is a very strong preference for front-loaded over back-loaded savings

[36]Industrial country experience is reviewed in greater detail in OECD (1994).

[37]Indeed many developing countries have recently been switching the emphasis of their tax system in the direction of consumption taxes.

[38]Unfortunately, this remains a contentious area. Previous work, such as Venti and Wise (1990), suggested stronger effects for the tax incentives. The differences are at least partly due to different approaches to sample splitting (as discussed above). In particular, different authors take different approaches to the problem of distinguishing between characteristics which make one eligible for the tax incentive and characteristics which may be correlated with savings preferences.

incentives even when they are equivalent in present value terms.[39] Furthermore, while savers would benefit more from the tax deferral on accruals (see previous footnote) early in the tax year, most IRA savers wait until the end of the tax year. Such hard-to-explain behaviour has strengthened the case for the kinds of psychological factors and rule-of-thumb behaviour discussed above.

More generally, one of the important messages for developing countries to come from the analysis of household response to savings incentives is that households may differ significantly in the degree to which they accumulate assets for retirement, and indeed in the degree to which their asset accumulation behaviour can be rationalized. Bernheim and Scholz (1993) note significant differences in this regard between college-educated and other US households. The less educated households appear to accumulate too little relative to their post-retirement consumption needs. In addition, the less educated respond much less vigorously to targeted tax incentives and to employer-provided pensions. With a much lower proportion of college-educated households, many developing countries might also be expected to exhibit systematic under-saving whether in a life-cycle sense, or in the degree to which they respond to specific saving incentives. The differential role of the social safety net in affecting the saving behaviour of low-income households needs to be kept in mind.

3.4 Social security and annuities

Although there are dissenting voices, a plausible case can be made for the proposition that a very high proportion of bequests are accidental, in the sense that they represent wealth held

[39]Tax incentives for saving (such as IRAs) often provide that accrued income on the fund saved is not taxed before it is withdrawn ("tax deferral on accruals"). This is a valuable concession (since it effectively allows the tax that would otherwise be due to earn interest). In addition, such incentives may allow savers to defer the income tax that would otherwise be due on the amount saved until the savings are withdrawn at retirement ("tax deferral on amount saved"). Specifically, it may be possible to opt for a front-loaded arrangement, where the amount saved is tax deductible on entry, but the total amount accumulated on withdrawal is taxed, or a back-loaded arrangement, where the amount originally saved is not tax-deductible, but the total amount accumulated is tax free on withdrawal. Simple calculations show that the deferral on the amount saved is no concession in present value terms unless the saver anticipates a lower marginal tax rate at withdrawal. Admittedly, the front-loaded arrangement does provide liquidity, which may be help meet a precautionary saving motive. Cf. Engen, Gale and Scholz (1994).

for the purpose of smoothing consumption flows in old age. Because the age at death is uncertain, and in the absence of well-functioning annuities markets, it will not be possible to programme one's wealth holdings so that they are just exhausted at the moment of death.

Provided it is a credible one (something that cannot be guaranteed for all developing countries for reasons such as inflation and a poor record of government payments), the establishment of a social security system that provides an annuity to retired persons can obviously reduce this precautionary saving motive, and the effect may be an important one. Although early studies both for the United States and for a cross-section of industrial countries suggested a sizable impact here (e.g. Feldstein, 1980), the empirical literature on this area has been very controversial (Atkinson, 1987, Davis, 1995). At a theoretical level, labour supply (age of retirement) may also be affected by the introduction or improvement of social security benefits, and there may accordingly be an increase in life-cycle savings in anticipation of the earlier retirement, so that the net effect on savings is ambiguous. At the empirical level, results have tended to be sensitive to the measures of households' "social security wealth", both at the aggregate level and in micro-data. Although Feldstein's early claims of a one-for-one substitution of social security wealth for other savings do not appear to hold up, it would be unwise to conclude that there is no effect. Atkinson (1987) counsels agnosticism.

The potential role of private annuities markets in influencing the story here should not be neglected. The presence of private intermediaries offering actuarially fair annuities would make it more likely that any effects of the introduction of a social security system will tend to be neutralised by offsetting transactions in the market for annuities. Furthermore, there is no presumption that the introduction of actuarially-fair private annuities on its own will reduce private saving: an income effect of the introduction will tend to be offset by a substitution effect.[40] Even though fair-pricing appears to be absent in annuities markets (Friedman and Warshawski, 1990), these are important considerations to bear in mind in assessing the savings impact of alternative institutional designs for pension provision. For example, the much-discussed systems of Singapore and Chile have defined-contribution characteristics, unlike the defined-benefit social security system commonly analyzed in the

[40]The substitution effect is absent from the typical social security system, to the extent that it does not allow for choice over the amount of savings to be held in the form of social security (cf. Abel 1985).

literature, and there is no guarantee that fairly-priced annuities will be purchasable at retirement (Vittas, 1993). Because of the institutional diversity, it would appear necessary to analyze such schemes on a case-by-case basis.

Whatever about these theoretical issues, growing awareness of the aging population structure in many countries has put pension finance to the top of many agendas, and many commentators expect pension finance to be a growth area in the years ahead. The modest size of pension funds in all but a handful of developing countries to date indicates that the potential for growth is significant. Of course, of itself the aging process tends to reduce the size of pension funds as a share of GDP compared with a population structure that has already stabilized. Nevertheless, the emergence of doubts about the ability or willingness of the public sector to fund generous pensions in the coming decades is beginning to lead to a growing interest in privately-funded pensions, whether funded by employers or by individuals.

The semi-automatic and often quasi-involuntary nature of the pension fund contribution probably accounts for the considerable share of pension funds in many industrial economies today, as it does in such developing country models as the Singapore provident fund and the Chilean retirement savings scheme. But, it must not be forgotten that the very long-term nature of the pension contract means that political uncertainty assumes an important role. Despite the success of mandatory schemes for pension saving managed by private intermediaries in Chile and elsewhere (Corsetti and Schmidt-Hebbel, 1994), it remains unlikely that any society without a modicum of political and economic stability will enjoy a significant growth in voluntary saving in on-shore pension funds.

3.5 Sectoral consolidation

As households are the ultimate owners of private corporations, and to the extent that government debt must ultimately be serviced out of taxation, it is unlikely that household saving behaviour is entirely unaffected by the saving of corporations and of the government. Indeed, going further, if the household sector acted as if it had fully consolidated its claims on corporate savings and all future tax liabilities, then (*ceteris paribus*) all changes in corporate and government saving would be fully offset by changes in household saving. To

be valid, this extreme consolidation hypothesis would seem to require somewhat implausible assumptions regarding the efficiency of capital markets and regarding the interdependence of current and future generations. Nevertheless, this extreme proposition is taken very seriously in the literature, both theoretical and empirical, and its practical significance is of the utmost importance in assessing the potential role of public policy in influencing aggregate national saving.

To take the issue of government saving first, the consolidation proposition (known in this context as "Ricardian equivalence") has generated a lively macroeconometric literature. As this topic is dealt with by Weil (1995), discussion here will be brief. A trenchant review of the literature by Seater (1993) concluded that the proposition is a good approximation to empirical reality. He criticizes on econometric grounds - omission of important variables, spurious correlations of integrated variables, endogeneity bias - studies which do not find this. Seater dismisses a little too quickly the fact that the 1980s have not been as kind to the hypothesis in US data as had earlier periods, but overall his reading of the literature casts considerable doubt over an important maxim in development economics, namely that the government's own deficit is the most powerful instrument for influencing national saving. If the Ricardian proposition is true, then the government's deficit is actually powerless in this regard.

Despite Seater's robust defence of Ricardian equivalence, it is hard to avoid coming away from the literature without a sense that we don't know with what confidence to accept the defence. Much of the evidence in support of Ricardian equivalence is a failure to reject a null hypothesis, and while the size of the tests may be correct, their power may not be as high as Seater assumes.

For developing countries, the cross-country panel study of Corbo and Schmidt-Hebbel (1991) (which regresses private consumption on government saving for 13 developing countries) suggests imperfect substitution of public for private savings.[41] Inasmuch as their study is

[41]The Corbo and Schmidt-Hebbel study is careful to distinguish (as far as possible) between consumption expenditure and capital formation, and between "permanent" and "current" concepts. They also include fixed country effects in their panel estimates, normalize most variables by expressing

largely free of many of the problems mentioned by Seater on US studies, it certainly does cast doubt on Ricardian equivalence for developing countries, and suggests the value of further work in this important area.

It is important to bear in mind that Ricardian equivalence would not deny a potential impact of changing marginal tax rates or changing levels of government expenditure on private saving. Such changes do alter marginal conditions and would in general lead to a behavioral response. Karras (1994) looks specifically at the issue of whether government spending may be complementary to private consumption, and finds this to be the case in a 30-country study.

The integration of corporate and household decisions is implicit in the specification of private sector savings as the dependent variable in many developing country studies. However, researchers often acknowledge that this practice is driven more by data availability than by a firm belief in the transparency of the corporate veil for savings. It is true that liquidity constraints are unlikely to bind for many corporate shareholders, as they are almost exclusively drawn from the higher wealth quantiles, so one of the major *a priori* arguments against Ricardian equivalence does not apply to consolidation of corporate saving. The relative tax treatment of distributed and retained earnings is obviously an important factor influencing the quantity of corporate savings, but it is not the only one, and indeed it is hard to explain why corporations in economies where the full imputation tax system[42] does not apply still pay substantial dividends - the so-called "dividend puzzle". Some of the proposed resolutions of this puzzle rely on the fact that managers are but imperfect agents for shareholders, so that retained earnings may not have the same value to shareholders as cash-

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them as a proportion of current disposable income, and use two-stage least squares estimators. Thus their approach is free of the most pervasive econometric problems in this area. Eight of the thirteen countries in the sample are in Latin America. The balance of payments deficit on current account is included as an explanatory variable and has a strong and significant effect. In contrast, interest rate, inflation and the liquidity ratio do not contribute significantly. The estimated impact of a $100 increase in government saving on private saving is a reduction of between $16 and $50 if the saving results from an increase in government spending and between $48 and $65 if the saving is from increased taxation.

[42]With a full imputation system, all corporate tax paid is credited against individual income tax on dividends received by shareholders. Many countries do not have a full imputation system, but either allow a partial credit or no credit at all. Without full imputation, there may be a tax disincentive to the payment of dividends.

in-hand.[43] If so, there will not be full consolidation.

Any attempt to estimate the degree to which increases in corporate savings influence household savings at the aggregate level is liable to fall foul of the econometric problem of simultaneity, as most of the factors influencing corporate saving are liable to influence household saving also. Poterba (1987, 1991) suggests the use of changes in the relative tax treatment of distributed and retained earnings as an instrument in the estimation: such changes are likely to be independent of household savings behaviour.

The balance of payments deficit on current account has often been included as an explanatory variable in aggregate savings relationships estimated for developing countries, but is rarely seen in studies for the industrial countries. Hard to rationalize on the basis of a micro-modelling of savings decisions, the inclusion of this variable typically implies that the equation being estimated must be seen as a quasi-reduced form, where the balance of payments deficit is seen as affecting saving not directly, but indirectly through its effects on such unmodelled aspects as tax rates and other aspects of fiscal policy as well as interest rates and the degree of credit availability. Furthermore, as the deficit would be endogenously determined for a small open economy facing a competitive capital market, its inclusion as a regressor implies that this assumption is not being made and that instead availability of foreign borrowing is assumed exogenous: effectively a national liquidity constraint.

[43]Among the resolutions of the dividend puzzle that do not rely on agency problems is the "trapped equity" argument, according to which the company may not have sufficient profitable investment opportunities to absorb cash flow from existing operations. If so, the extra dividend taxes will have to be paid sooner or later and there remains no real tax advantage to retention.

4 MAKING EMPIRICAL PROGRESS: SOME ISSUES

4.1 General considerations

Panel studies of countries

Although the developing countries can be seen as an additional source of data variation on which standard theories may be tested, the usefulness of this perspective depends on the degree to which saving behaviour is homogeneous across countries and regions, and also on the quality of the data. If countries differ widely in unobserved dimensions such as the distribution of household rates of time preference, or of risk aversion, or in other unmodelled structural features, then a cross-country study which neglects such differences risks exaggerating the role of measured variables (such as financial market depth) through omitted variables bias.[44] Furthermore, data deficiencies in most of the developing countries means that adding them to the sample may introduce more noise than precision to the estimation of hypotheses about saving. For the same reason, I believe that studies of aggregate behaviour from a panel of developing countries should err on the side of including a large number of fixed individual, regional, and structural effects, both as to intercept and as to slope. Underspecified panel studies risk serious biases. For the same reason, broad-brush modelling strategies that are sure to help in summarizing the data variation are to be preferred to complex theoretical models relying on hard-to-identify or subtle effects.

Micro vs. macro data

Analysis based on micro-data (cross-section or panel), allows a greater degree of flexibility in estimating national or regional preference parameters (though identifying assumptions of homogeneity are still required). Indeed, it could be argued that micro-data sets are indispensable if we are to obtain precise estimates of the parameters specified in many microeconomic theories. Even in simple situations, heroic assumptions are required to permit such parameters to be recovered from aggregate regressions. In addition, aggregate data often display little or no variability on the elements of concern or, if an available aggregate data

[44]Carroll, Rhee and Rhee (1994) find no evidence that immigrants to Canada from different parts of the world differ in their saving behaviour, suggesting an absence of cultural differences. However, international heterogeneity remains an issue, even within OECD countries, cf. Kessler, Perelman and Pestieau (1993).

series does vary, the variation is often in a dimension which is not correlated with the underlying concept of interest.[45] On the other hand, micro-data is subject to a variety of errors, including sampling error and response bias, which may well be larger than the errors associated with aggregate or economy-wide data. Some questions - such as sectoral consolidation - may be better analyzed by aggregate data. Furthermore, the costs of collecting micro-data are considerable. So one should proceed with a judicious balance between improving macro data sources and collecting new micro-samples.

The huge economies of scale in data collection means that collection of micro-panel data should be contemplated only for the larger countries. And, since it is scarcely practical to integrate panel analysis fully across countries, it would be desirable to formalize international comparative work on the basis of a more systematic meta-analysis, with nationally-estimated parameters being used as the raw data for the international comparisons. One worthwhile tactic is to cross-fertilize work on different countries by considering whether certain results from one country can be used to help fill gaps in knowledge about other countries.

Testing theories vs. estimating parameters

We can usefully distinguish between research strategies which attempt to test the validity of a benchmark model of unconstrained optimal behaviour, and those which seek to quantify the effects of some institutional or policy distortion which cause a deviation from the optimum. The policy-oriented focus of the present research suggests a preference for the latter. Furthermore, it is useful to begin a research programme with a prior notion of the likely magnitudes of different effects. Research to date offers the basis for such priors, and guides us in the direction of researching issues that are likely to be of quantitative importance.

4.2 More data

A high priority in the research agenda should be the improvement and refinement of existing data sources and the collection of new data. The existing data base has been decried as

[45]Compare, for example, two approaches to measuring the influence of credit rationing on household saving: (a) by use of aggregate time series on household saving and the measured average wedge between borrowing and lending rates; and (b) by use of a survey in which each household reports whether it has been credit constrained.

inadequate by all who have examined it. Perhaps the most urgent improvements are in the basic construction of the main tables in the national accounts. Although the administrative methodology for making such improvements is beyond the scope of this study, the suggestions which we make below for some new data sources should not distract from the priority of bringing existing data systems up to standard.

Flow of funds approach to measuring saving

At the macro-level, the major concepts have long been defined in the System of National Accounts (recently revised, cf. Inter-Secretariat Working Group, 1993). In particular, despite well-known difficulties, the SNA does provide a usable definition of saving . However, the precision with which saving is measured is not high. All surveys of saving behaviour in developing countries stress this point, but it is also true for industrial countries as witness the very large revisions in the UK saving ratio documented by Muellbauer (1994). For the most part, national private and household saving concepts are measured as a residual in a commodity balance framework. In practice, national accounts statisticians rarely take account of an important alternative data source, namely the balance sheets of financial institutions. Yet, by constructing the so-called accumulation accounts of the flow of funds using balance sheet information, it is possible to obtain a useful independent check on the accuracy of the commodity balance equations. After all, saving results in the accumulation of assets, whether physical or financial, and to neglect available data on the accumulation of financial assets is clearly an important omission.

Flow of funds accounts distinguishing between the household and business sector exist, at least on a partial basis, for about twenty developing countries (Honohan and Atiyas, 1993). A considerable extension of the list could be achieved by analysis of data already available to national statistical authorities and central banks. Of course this is not a perfect data source either, and is not necessarily a more reliable approach to estimating national saving aggregates. For example, capital flight does not show up directly in the balance sheets of national financial intermediaries (although some further development of the international bank

deposit statistics could help).[46] Nevertheless, an effort to improve the assembly of this data in order to use it as a cross-check on existing sources seems worthwhile for two reasons. First, much of the basic data should already be available to the monetary authorities from returns provided to them by the major financial institutions for the purpose of monetary policy: collating this data and rearranging it for the purpose of the flow of funds tables may not be all that costly. Second, the lower the quality of commodity-balance based estimates of saving, the higher the added value of looking at the financial-balance based estimates.[47]

Micro data

That more data can be collected that focuses on the issue of financial constraints is evidenced by the US Survey of Consumer Finances, and in particular its explicit questions on whether the household has been liquidity-constrained[48]. The Banca d'Italia also asks relatively detailed questions focused on issues of interest to the present study, such as liquidity constraints and subjective income risk. Although household surveys are costly, and surveyors have to ration the number of questions asked, it seems likely that relatively usable information could be obtained on the issue of liquidity constraints. It would in particular be possible to focus the questioning on the impact of credit conditions on saving by asking specifically whether a credit refusal has led the household to defer or cancel items of consumption.

However, an important caveat must be entered here about the quality of the data obtained from household surveys on portfolio composition. The two major US surveys, carried out for the Federal Reserve Board in 1963 and 1983, captured little more than one-half of the total

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[46]A caveat: there is comparatively little beneficial spin-off into other policy analysis from the availability of flow-of-funds data, largely because established theories do not make robust predictions about likely correlations involving the elements of the flow of funds, cf. Roe (1985).

[47]Discrepancies between financial flow and commodity flow-based estimates of saving proved to be an early warning of very serious errors in the Irish National Accounts during the late 1970s and early 1980s

[48]See above. An interesting use of this data by Jappelli, Pischke and Souleles (1994) illustrates the potential of combining information from different data sources. By modelling the probability of reporting oneself as credit constrained to the SCF as a function of other observable household characteristics (using a probit model), the authors obtain a method for generating predicted probabilities of constraint for a (different) panel sample of households (the PSID) thereby widening the scope and usefulness of the information obtained.

financial assets expected from independent information. Even when augmented by a special non-random sample of high-income households the 1983 FRB survey only identify less than three-quarters of the total, and still captured only 40 per cent of the holdings of US savings bonds for example.[49] Despite these known deficiencies, there has been a tendency for econometricians to employ these data as if they represented unbiased information.

Ad hoc data sources and spotting ingenious uses for existing data

Although the sophistication of theoretical models has greatly evolved over the years, it could be said that (to some extent at least) the early literature was theory driven, while the more recent literature has been driven by data availability. After all, the rapid development of National Income Accounting was strongly influenced by Keynes' model of aggregate income determination, at the centre of which was the Keynesian consumption function. More recently, attempts to understand the consumption behaviour of households and how it differs over time and across countries has often been dominated by pragmatic use of available data which has not been primarily assembled to investigate these matters. Examples of this arise both for macro and for micro data.

An important example among the micro-data sets comes from the widely used US Panel Survey of Income Distribution (PSID). Although this survey measures the household's purchases only of food, these data have been widely used as a proxy for total household consumption. A further difficulty applies at the level of attempting to proxy permanent income - and there have been a number of quite ingenious studies for developing countries

[49]US studies (Ferber, 1965; Ferber *et al.* 1969a and b) suggest a definite pattern of underreporting of wealth in US surveys. Based on a sample of households for whom asset information was known from bank records, they report that failure to report ownership of an asset is by far the most important source of error on average. For savings accounts, for example, 1 in 3 of holders reported no holdings to the US survey. On the other hand, the average amounts reported by those who acknowledged holdings were almost exactly equal to the true average holdings, with overstatement of small accounts being offset by understatement of large. The second most important source of error was the fact that non-respondents were much more likely to have substantial savings account balances than respondents: those with savings balances greater than $5,000 (in 1963) were twice as likely to refuse to respond as those with less than $1,000.

which cast have around for plausible instruments.[50] When it comes to modelling financial sector influences, the available data series are most imperfect - even ignoring serious measurement error. For instance, data on household asset holdings at the beginning and end of year from a single cross-section have been differenced to infer saving - an invalid procedure in the presence of capital value changes. Household samples have been truncated at high levels of income, or of liquid assets, with a view to excluding those who may have been faced with credit rationing. Modelling the likely impact of fiscal measures on the budget constraints or opportunity sets of individual households often requires considerable ingenuity in coaxing plausible information from micro-data sets.

In macroeconomic analyses, the use of data proxies has also become widespread. Although some of these can be described as far-fetched, and are easily criticized, the basic strategy is a constructive one, and should be refined rather than dismissed.

Among the proxy measures of the prevalence of credit constraints are: expert assessments of the "normal" maximum mortgage ratio (minimum down-payment ratio) in different countries, the percentage of home-owners in certain age-groups, and the interest rate wedge on consumer and mortgage loans (Jappelli and Pagano, 1989); the value of consumer credit and the rate of consumer credit delinquencies (Carroll, 1992).[51] Admittedly, albeit suggestive of the magnitude of credit constraints, these series are much further conceptually from the ideal data than are the aggregate savings data from their ideal.

The interest rate wedge (between borrowing and lending rates for households), whether for mortgage lending or for unsecured consumption loans, is closer to a theoretical concept of

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[50]For example, Wolpin (1982) used average weather conditions as an indicator of permanent income for a study of farm households in India. Ramanathan (1968) computed normal income in Indian household data by averaging over certain groups (occupation, age etc.), with a modification for the expected growth in income. Again working on Indian data, Bhalla (1980) used the as permanent income the fitted value from an earnings function estimated from a panel of households. Betancourt (1971) explored the permanent income hypothesis by grouping Chilean household data and testing Friedman's idea that the marginal propensity to consume between groups will be significantly higher than the average of the within groups propensities.

[51]The inclusion of lagged aggregate income as an indicator of the pervasiveness of credit constraints in aggregate Euler equations can be thought of as another example.

credit market imperfections, but in this case as in others the data is collected on a basis which is not harmonized across countries even to the limited extent that is achieved for industrial countries in the System of National Accounts.

International comparability would also be an issue for measures of density of the rural branch network of the formal banking system (Fry, 1988), which represents an attempt to measure access of households to the banking system. The various measures of the evolution of financial liberalization that have been proposed for industrial countries would also need to be adapted for use in other countries on a case-by-case basis.

Despite the obvious difficulties, there is much to be said for continued efforts to improve, refine and expand the scope of such *ad hoc* variables.

4.3 Possible econometric priorities

No single econometric project will throw light on all of the important empirical questions we would like to have answered (cf. the checklist of selected researchable questions in Annex 1). In particular, at least three different dimensions[52] need to be considered, namely the cross-sectional variation between savings rates different countries; the dynamics of financial liberalization; and the lessons of micro-data sets.

Cross-section variation between aggregate savings rates

This important area has not been neglected to date, but deserves further work. Our suggestion here is to add a number of financial variables, and also to subject the equations to more demanding robustness checks. It would be best to approach this exercise as essentially a search for statistical regularities rather than a focused attempt to test a particular theory. This theme is amplified in the following section.

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[52]Other dimensions are deserve mention. For instance there is something to be said for a disaggregated analysis of the demand for each of the main component financial assets, particularly where comprehensive data is not available. Although the cross-equation restrictions that theory provides for these demands can in principle help add precision to estimates, a single equation approach that captures the special features of each asset and its most important substitutes has much to offer. It can allow a more detailed analysis of such aspects as the role of deposit insurance, and of asset-specific and covariance risk.

Dynamic macro analysis

How has aggregate saving evolved in the immediate aftermath of rapid financial liberalization? It would be worthwhile analyzing this question on the basis of the experience of, say, a score of countries. The idea would be to conduct an event study, aligning the time series for each country to the dates of liberalization. Extant single-country dynamic studies of aggregate saving rates (such as those of Muellbauer and others for the United Kingdom) would be used as the basis for a template for the analysis. Post-liberalization behavioral changes could be measured by any of a variety of parameter-shift techniques. For example, overall excess saving post-liberalization could be measured against that predicted by the model of aggregate savings fitted for the pre-liberalization era. Alternatively, a purely statistical ARIMA model estimated over the pre-liberalization era could provide the base-line predictions against which the actual was compared. By pooling the experience of the different countries, the effect of the liberalization *per se* could be isolated.

Although many liberalizations happened gradually, so that there is no unique date from which to measure variations in saving, a number of alternative standard events in the codification of financial liberalizations, such as liberalization of interest rates, liberalization of exchange controls, reductions in implicit taxation, elimination of quantitative credit controls, could be used to anchor the dynamics. It might also be possible to measure the degree of liberalization, e.g. by comparing average pre-liberalization interest rates with those generated by uncovered interest parity, or by estimating the degree of portfolio discretion allowed to banks.

Standard aggregate data sources should be sufficient to carry out this kind of exercise, assuming some degree of familiarity with the historical experience of the countries concerned. Because the analysis would be relatively short-term, covering only a few years after the liberalization, and because the comparison was being made between hypothetical and actual saving rates for the same country, it would not be necessary to include such long-term determinants of the saving ratio as demographic effects. However, analysis of the pattern of the deviations obtained might throw some light on whether other country characteristics (such as level of development and history of inflation stability) influence the response of saving dynamics to liberalization.

A micro study: evidence of liquidity constraints in a pseudo-panel

Availability of household level data is limited in developing countries, but they offer the best chance of understanding developing country savings. Analysis of special purpose surveys will be of most interest, but it is still worth asking what can be done with existing general purpose studies, i.e. *without* collecting new data. Our idea here is to take data from "standard" household budget inquiry (family expenditure survey) sources, to construct a "pseudo-panel", as recently used (for example) in a different context for data on Taiwan by Deaton and Paxson (1994), and to use this to assess the potential role of liquidity constraints. Use of existing surveys in this way would be much cheaper than conducting new surveys.

Many - though far from all - developing countries conduct periodic household budget inquiries. A number of other household surveys, carried out for various reasons also contain information on household consumption and income.[53] This data, which is already extant, could be used at modest cost to examine the role of liquidity constraints at a micro-level.[54]

The simplest application would be to follow Hayashi (1985a). One would begin by computing savings ratios for each household, and selecting those households with high savings.[55] Then one would estimate a fairly unrestricted (Tobit) regression of the determinants of the saving of these households. Using the resulting equation to predict the consumption which the other (unselected) households would have had were they unconstrained, one would finally aggregate the shortfall of actual consumption for these in order to obtain a measure of the degree to which liquidity constraints increase aggregate saving.

This procedure requires only one cross-section. However, several problems are evident,

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[53]This would include a variety of surveys carried out under the World Bank's Living Standards Measurement Study (LSMS).

[54]The same data could be also be used (as it has often been before, see footnote 50 above) to examine many other aspects of the saving decision not specifically related to financial and fiscal policy, including income elasticities.

[55]An alternative approach, suggested to me by M. Devereux (and explored by him in forthcoming work on UK data), is to treat households that have bought a car in the sample period as being not liquidity constrained.

including the widespread underreporting of incomes in such surveys. The proposed procedure implicitly assumes that the computed savings ratios differ from the true by a common constant plus at most a random residual.

A more complex application requires a sequence of cross-sections and involves the development of pseudo-panels. Although more complex, this method too does not require new surveys, and so is comparatively inexpensive. For each cross-section the mean consumption (and the mean of other variables) is computed for each cohort (cohorts should include an age range at least τ -years wide, where τ is the number of years between successive cross-sections. Treating each cohort as a single agent we can then compute the Euler equation, and test for the inclusion of other variables (including current income) which should not appear in the absence of liquidity constraints. If we do this exercise again, but begin by filtering out low-income households in each period, then we have an approximate pseudo-panel of high-income, or high-saving households (of course this assumes that few households cross-over between low and high income between successive cross-sections). Computing the Euler equation again, this provides a control: if our sample split has indeed removed the liquidity constrained, the significance of the extraneous variables should be eliminated.

4.4 Cross-section Variation in Saving Rates: Are Financial and Fiscal Variables Consistently Important?

In this section we consider one of the suggested econometric projects in a little more detail. Our choice is a cross-section study, in which the objective will be to try to pin down the role of financial sector differences in contributing to the wide variation between countries in the average level of household saving.

A feature of the macro studies to date has been a certain lack of robustness. Variations on specification or sample have frequently overturned the central conclusions of the research. While this problem has not been unique to work on developing countries, nevertheless, the potentially almost open-ended nature of the sample of countries from which data may be chosen, and the set of possible regressors which could be justified on aggregate data, risks

vitiating the chance of drawing any robust conclusions at all.

It seems to be time for a systematic stock-taking of what robust findings can be established for developing country savings. An unashamedly empiricist approach seems preferable here to the spurious precision of a complex model based on optimization, especially considering the implausible requirements for strict aggregation of most such models. What we would like to identify are robust empirical regularities linking saving to variables measuring financial and fiscal conditions.

The approach used by Levine and Renelt (1992) and King and Levine (1993), could now usefully be used to detect whether any robust macro correlations can be established on standard specifications. Loosely speaking, Leamer's extreme bounds analysis, as adapted by these authors in the context of growth regressions, attempts to identify from a pre-selected list of potential explanatory variables which remain significant in the regression regardless of the inclusion others. In principle, the exercise can be done for all countries and all available time points, or for subsets of countries and time periods. Experience shows that few variables survive this rigorous test and, while this can result in a lack of positive results, it does mean that, when robust explanatory variables are found, they must be taken seriously.

King and Levine used the rate of *per capita* GDP growth and the rate of capital formation as dependent variables. For an analysis of saving, the rate of growth of consumption could be considered as a possible dependent variable (Euler equation approach). However, for reasons already discussed above, the rate of saving (solved-out approach) seems the most promising and useful in the context of aggregate data. To be more precise about the numerator of the ratio, private saving is available for far more countries, so most effort should be concentrated on that.[56] However, there is enough data on household (personal) saving for this to be analyzed also (cf. Schmidt-Hebbel et al., 1992). The denominator could be personal disposable income (for household saving) or private income or GDP. For the purpose of testing for Ricardian equivalence, the choice of denominator can be quite important depending on the exact specification of the remainder of the equation. Otherwise, the choice of

[56]The use of "gross domestic saving" is not recommended. This variable, which equals gross domestic investment, and thus includes the current account deficit, does not equal the saving of any sector.

denominator can be made on statistical grounds. There would be scope for both a single cross-section and a pooled cross-section and time series analysis using fewer variables.

Embedding in a general model of saving

Of course, this approach is not confined to financial and fiscal sector issues, and could really be fruitful in a wider context. Indeed, it will be essential to embed the analysis in a standard model including the main non-financial variables thought to affect cross-sectional variation in savings behaviour. Underspecification of the equations by leaving out important non-financial variables would seriously risk biassing the estimated impact of the included financial and tax variables. As a basic non-financial testbed one could, for example, use the equations devised by Kessler et al. (1993) in their panel study of 17 OECD countries. These equations included the following variables: disposable income, growth rate, unemployment rate, expected inflation, government deficit, tax rate and dependency ratios. In addition, a dynamic structure should be introduced by means of lags, to take account, among other things, of permanent income and long-run trend rate of growth.

Possibly the most important question which can be addressed in this framework is that of Ricardian equivalence. Because of its importance, it would probably be worth exploring various specifications of the relevant variables as a separate module of the study. The Kessler et al. variables do include one specification of Ricardian equivalence as a special case, but bearing in mind the earlier discussion of this issue above, it will be worth assembling a refined collection of fiscal variables. For instance, according to Seater's approach, the government deficit variable should exclude capital formation, and that the value of non-human wealth and domestically held government bonds should also be candidate regressors. The average income tax rate is the usual implementation of "tax rate", though this may be very imperfectly correlated with marginal income tax rates. Furthermore, the role of indirect taxes in affecting the total tax wedge between income and consumption should not be neglected.

Financial and fiscal variables

As to the financial variables that should be included, we can begin with the indicators used by King and Levine (1993) to measure the level of financial development (financial depth; one minus the share of central bank in total bank credit; share of bank credit going to non-

bank private sector; bank credit to non-bank private sector as share of GDP). These variables are available for a large number of countries, and can be employed as general purpose measures of financial sector efficiency. King and Levine found that each was quite strongly positively correlated with growth and with capital formation.[57,58]

To the extent that the Feldstein-Horioka observation of correlation between national saving and investment rates remains valid, we can expect to see correlation between the King and Levine variables and saving rates also. What would this imply? Bearing in mind our earlier discussion of the role of liquidity constraints and availability of deposit facilities, efficiency on the deposit side of the financial sector would likely promote saving, while on the lending side it would probably discourage saving. That would seem to imply a positive coefficient on the first, and a negative on the remainder. However, the last three indicators are more a measure of the degree to which government absorbs available funds and really do not provide much of an indication of household access to bank finance. A major difficulty with the first and fourth of these indicators is that of endogeneity: high savings tends to result in financial deepening. For this reason, and also to help discriminate between different financial effects, it is necessary to seek supplementary data series.

The search for additional variables can best be considered under the headings already identified, namely, liquidity constraints, availability of mortgage finance, yield, confidence, and convenience.

In order to include a direct measure of liquidity constraints applying to the household sector some data collection would be required. The interest rate wedge (between the rate charged by banks on unsecured personal borrowing and the deposit rate) and the ratio of personal non-mortgage borrowing to GDP are two variables for which data could be collected. The estimated coefficient on current income from a country-by-country Euler equation would be

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[57]They employed as regressors both the average values of the financial variables over the sample period, and their initial values.

[58]A potentially useful additional variable here is the percentage of the banking system's resources that are freely allocable, i.e. not tied up in required reserves, compulsory holdings of government securities or directed credit.

an indirect measure. The "normal" maximum mortgage ratio data used by Jappelli and Pagano (1994) could be extended to other countries as an indication of the efficiency of the mortgage market.

For yield, a nominal rate of interest on bank deposits and (to detect non-linear effects) its square should also be introduced. Even where competitive conditions prevail in the banking sector, quoted interest rates vary widely within a country depending especially on the size of the deposit and also on its liquidity. Where banking systems are distorted, the variations are much wider. The comparability of the data provided in *IFS* is not assured, and some effort should be made to obtain standard rates. For example, the rate of interest on two basic contracts could be collected:

> a small time deposit - measured as equal to one month's average urban wages - at about one weeks notice.
>
> a larger time deposit - measured as twice annual urban wages - at about three months' notice.

The issue of taxation of capital income arises immediately. As with the raw interest rates there is the problem of multiplicity of rates and a lack of information about which marginal rates of tax actually apply to interest receipts. Most researchers have tended to choose simplifying assumptions such as assuming that income tax is not paid, or that it is always paid at a standard rate. For a multi-country study some such standard assumption must be made. Probably a realistic assumption in most cases is that the only tax paid by most taxpayers on interest income is a withholding tax. If so, including the deposit interest rate on a net-of-withholding tax basis would be appropriate.

It should also be possible to obtain a qualitative indication as to whether tax incentives exist for long-term savings (pension funds, life assurance). This could be included as a zero-one dummy in the regressions. In some countries, other rates of return, such as bond yields and stock market return will also be relevant (as mentioned above). However, inclusion of these may not be possible for a study which involves many countries. The world rate of interest

could also be relevant for a panel.

As already mentioned, the most obvious variable to measure convenience is density of bank branches.

Confidence can be measured in a variety of different ways, not all of which are available for developing countries and the interpretation of which is often ambiguous. The gap between on-shore and offshore interest rates for assets denominated in the local currency is often used for industrial countries, but data on offshore interest rates is not available for the currencies of most developing countries. The gap between official and parallel market exchange rates is much more widely available, and is a good measure of the potential for drastic adjustment of financial and fiscal policies. Other macro-economic uncertainty indicators such as the volatility of inflation could also be used. For micro-uncertainty, an indicator of the number of bank failures might also be helpful, though this would be unlikely to correlate with the scale of depositor losses.

Finally, a regression of this kind will still not be adequate to deal with the wide variation in other conditions experienced in developing countries, and it will be necessary to augment the list of explanatory variables. A level of development term (e.g. squared per capita GDP) will certainly need to be added, and (bearing in mind the common practice of others), the current account balance of payments deficit and the terms of trade could also be candidates. Finally, the political variables used by Levine and Renelt (1992) could also be adopted. Of course country fixed effects as well as time fixed effects should certainly be included in the panel estimates (the presentational treatment by Kessler et al. of the time and country effects could usefully be adopted), and even in the single cross-section, the significance of regional dummies should be tested.

Econometric issues

The basic econometric framework here is well-established in the papers to which reference is being made. The main difficulties are not ones of estimation technique but of testing for

conditions of endogeneity and for an adequate specification of dynamics.[59] As to the latter, many of the newly-collected variables will only be available on a single observation basis, so much of the analysis will be confined to a single cross-section. Even for panel regression using a shorter list of variables, dynamic issues are more easily dealt with than endogeneity. The level of consumption is an integrated variable in most countries, and it is important to avoid problems of incorrect inference in such circumstances. In addition, attention must be paid to the dynamic structure of the equation. While this might be done by examining whether the levels equation can be treated as a cointegrating regression, and then specifying a dynamic error-correction model around this cointegration, it may be enough to deflate the aggregate variables by income, and proceeding with econometric analysis of the ratios. That procedure essentially imposes the (not unreasonable) assumption that a common integrating factor exists in the aggregates.

Endogeneity of several of the candidate variables is a potentially acute problem. All of the variables are to some extent endogenous, and the intertemporal dependence of saving behaviour makes it unlikely that the use of lagged values as explanatory variables (as used by King and Levine in their panel estimates) or instruments will be enough to eliminate such endogeneity, though it may help, as may the use of averages over several years instead of treating each year as a single data point. Some variables seem more prone to endogeneity on *a priori* grounds (in addition to those mentioned above, the balance of payments deficit falls into this category). Careful attention must be given to the use of instruments, and it will be important to test the validity of instruments in the finally adopted equations. We would suggest following King and Levine in employing two-stage least squares or other instrumental variables or method-of-moments estimators (even though, to the extent that the extreme bounds analysis has been developed chiefly for an environment where ordinary least squares analysis is valid, there may be some methodological issues to be addressed here).

[59]Arellano and Bond (1991) contains valuable suggestions for dealing with these problems in panels.

Annex 1 RESEARCHABLE QUESTIONS

Here is a checklist of the main researchable questions that continue to call for econometric work and which could be pursued using data on developing countries. [Square-bracketed notes indicate the type of analysis likely to be effective].

(i) Can government increase household saving by increasing its own saving? [International macro panel data - cf. §§ 3.5, 4.4].

(ii) Will financial liberalization cause a collapse of national saving? [Single country dynamic macro - cf. § 4.3].

(iii) Can tax-favoured schemes for retirement savings help boost national savings? [Detailed case studies essential; aggregate time-series results unlikely to be convincing, but US studies show that even rich micro data sets leave important ambiguities - cf. § 3.3].

(iv) Are credit constraints important? [Normally tested by deviations from the unconstrained Euler equation either on aggregate, or more convincingly on micro-panel (or pseudo-panel) data; Hayashi technique on micro-data is more informative than Euler equation - cf. §§ 2.1, 2.3, 4.3].

(v) What is the impact of social security on savings? [A case-by-case approach is likely to be more fruitful than seeking a larger cross-country data-set to resolve the debate - cf. § 3.4].

(vi) Can we identify empirical regularities about the interest elasticity of savings - even on a regional basis or within certain country income ranges? Can we distinguish between measures of intertemporal substitution elasticity and risk-resolution-preference? Because of little evidence of yield variation across households this is best estimated on aggregate data; expectations of future evolution of returns also important; international panel of aggregates may be most promising - cf. §§ 3.1, 4.4 and Annex 2].

(vii) Informal financial sector: just how important is it for influencing the magnitude of aggregate savings? A degree of scepticism seems in order regarding some of the claims which are made in this area. The rather vague calculations that are often presented in this area badly need to be explicitly incorporated within a conventional accounting framework as used in the monetary survey or in the capital accumulation accounts of the SNA. [This is a data collection exercise rather than econometrics - cf. §§ 2.3, 4.2].

(viii) How important are differences in the efficiency and regulation of institutions for mortgage finance in influencing savings in the middle income countries? [Use of panels of aggregate data, together with new, perhaps qualitative, data on mortgage finance efficiency, along the lines initiated by Jappelli and Pagano (1994) could be fruitful - cf. §§ 2.3, 4.2]

(ix) Non-financial household savings in developing countries: a difference of degree or of kind as compared with industrial countries? [Detailed case studies of low income groups in urban and rural settings required - cf §§ 2.3, 3.2].

(xi) Does a shift in income distribution influence aggregate saving? Aghevli et al. (1990) remark that there is no theoretical presumption for this and that the proposition that redistribution in favour of lower income households will result in lower saving also lacks empirical support. This question is important in assessing the importance of targeted policies for saving. If the rich make the bulk of savings, then fiscal and financial policies that affect only the net saving of lower income households will have little effect on aggregate saving. [Cross-sectional wealth and income elasticity of saving may be estimated from household surveys - cf § 4.3].

Annex 2 DISTINGUISHING INTERTEMPORAL SUBSTITUTION FROM RISK AVERSION

Several researchers have found it discouraging that the standard expected utility model of intertemporal consumption with a constant elasticity utility function employs the same parameter as a measure of intertemporal substitution and of risk aversion.[60] There have been a number of recent suggestions as to how to break out of this straitjacket, and (since the questions of risk aversion and financial assets are closely linked) it is worth reviewing the issue here.

From several points of view it is not surprising that intertemporal substitution and risk aversion should be closely related. To begin with, it is clear that a linear felicity function implies risk-neutrality, and will also lead to a corner solution in the intertemporal decision, with all consumption taking place at one time period. Concavity of the felicity function will both reflect risk-aversion and limit intertemporal substitution. But if non-linearity in the felicity function is captured by a single parameter, then that parameter has to cover both aspects.

More generally, it is concavity which induces smoothing behaviour, both in terms of time and in terms of potential states of nature - where there is uncertainty.[61]

If the felicity function is allowed to vary in a more complex parametrization, it is possible to distinguish between the response to risk, and the response to changes in the intertemporal rate of substitution (interest rate). Thus, for example, since the precautionary saving response to a change in future income risk is proportional to the third derivative of the felicity function - more strictly to the ratio of this and the second derivative, or "prudence" to use the term of Kimball (1990) - whereas the saving response to a change in interest rate is influenced by the second derivative, we can, by employing a two-parameter class of felicity functions, distinguish between households with different saving responses to income risk, but the same saving response to interest rate.[62]

A second consideration is that this issue arises with additively separable intertemporal preferences with each period's consumption influencing total utility only through its felicity function. When goods at different periods enter the utility function in a more complicated way than the additively separable model (as with models of durable goods or with habit

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[60]The elasticity of intertemporal substitution and the coefficient of relative risk aversion are reciprocals of one another.

[61]It may be worth recalling here that concavity is a cardinal property, and thus cannot influence behaviour based on static utility functions under conditions of certainty. However, under the axioms underlying the expected utility hypothesis, there is a cardinal representation of preferences under uncertainty. Effectively, expected utility theory selects one of the certainty utility functions and applies probability weights to it. Note also that these weights may not necessarily correspond to "objective" probabilities.

[62]Note however, that the saving response to interest risk remains a function of the coefficient of relative risk aversion rather than of prudence.

formation) the simple identity of risk aversion and intertemporal substitution is again broken.

Finally, we have the newer models of non-expected utility. Proposing an alternative axiomatic framework to that of Von Neumann and Morgenstern, Kreps and Porteous laid the foundations for a theory of preferences in which it is not only diminishing marginal rates of substitution that lead to risk aversion, but agents may have a fundamental preference for the early resolution of uncertainty. In the axioms of expected utility theory, time is not of the essence, and it is the ultimate consumption basket that matters. In the axioms of Kreps and Porteous, agents may prefer earlier resolution of risk to later, even at the cost of some reduction in the basket of goods ultimately consumed. (Attanasio and Weber, 1989, Epstein and Zin, 1991, Farmer, 1990, Weil, 1990).

Staying with the commonly used α-mean approach to functional form, Epstein and Zin's application of these ideas leads to modelling individual consumption choice as the optimization of an aggregator function:

$$u_t(c_t,\mu_t)=[(1-\beta)c_t^{\rho}+\beta\mu_t^{\rho}]^{1/\rho}$$

where

$$\mu_t=[\mathscr{E}_t\, u_{t+1}^{\alpha}]^{1/\alpha}$$

is the weighted α-mean of future values of u. (With the logarithmic functional form as the limiting value when α or ρ tends to zero). The three parameters of this functional form can be identified with time preference (β), intertemporal substitution (ρ), and risk aversion (α). When $\alpha<\rho$, the agent prefers early resolution of uncertainty to late. When $\alpha = \rho$, then the aggregator function reduces to an expected utility form and is equivalent to optimization of:

$$u_t=\mathscr{E}_t\sum_j \beta^j c_{t+j}^{\rho}$$

The Euler equation for the relationship between consumption growth and the rate of return on wealth is a generalization of that derived in the expected utility framework:

$$\mathscr{E}\left[\beta\left(\frac{c_{t+1}}{c_t}\right)^{\rho-1} M_t\right]^{\gamma}=1$$

where $\gamma = \alpha/\rho$, and M is the gross return on the optimal wealth portfolio. Only if the curvature of this non-linear stochastic relationship can be precisely determined will we be able to identify α and ρ separately from this Euler equation, and this is empirically unlikely unless there is very considerable variation in available data on M. Indeed, if the distribution of the return M were log-normal, the parameter α would not be identified (Hall, 1988, Weil, 1990), and the response of consumption to changes in mean return on wealth would depend only on β and ρ.

Weil (1990) has shown that optimal consumption in this set-up (assuming non-stochastic non-interest income) is proportional to wealth, and that the factor of proportionality is:
where,

$$\psi = 1 - \left(\frac{\beta}{1-\beta}\right)^{\frac{1}{1-\rho}} \tilde{M}^{\frac{\rho}{1-\rho}}$$

$$\tilde{M} = (\mathscr{E} M^{\alpha})^{1/\alpha}$$

This shows most clearly why we have described α as the risk-aversion parameter. A change in the distribution of M which leaves its α-mean unchanged will not affect the propensity to consume out of wealth. The α-mean of the rate of return M thus acts as a certainty-equivalent for this particular set of preferences.

Clearly it is when behaviour towards a variety of different probability distributions has been observed that we have the best empirical prospects of identifying α separately. For instance, if the returns on different assets are not too closely correlated, the Euler equations for the individual component assets of the wealth portfolio may allow a more precise estimate of the behavioral parameters α and ρ. These individual asset Euler equations are also generalizations of the consumption-based capital asset pricing model:

$$\mathscr{E}\left[\beta\left(\frac{c_{t+1}}{c_t}\right)^{\rho-1} M_t\right]^{\gamma}\left(\frac{R_{j,t}}{M_t} - 1\right) = 0$$

Whether usable data on different asset returns and their correlations can be available for many developing country situations is a moot point. At the micro-level, there might be some prospect of inferring behaviour from different production choices made by farmers (cattle versus tillage, for example), but for aggregate data the considerable differences in portfolio composition, and the non-overlapping nature of the portfolios held, would argue against use of this framework. Besides, the gross rejection of Euler-equation specifications for aggregate data in the expected utility case[63] (consumption growth persisting alongside positive real rates of return; significance of lagged income terms, etc.) are not likely to be resolved by this particular generalization.

[63] Such as the consumption-based capital asset pricing model which performs very poorly as an explanation for the relative returns of different assets.

Annex 3 USING FINANCIAL FLOWS TO ESTIMATE AGGREGATE SAVING

The construction by national income statisticians of aggregate saving measures is usually based primarily on a set of commodity balance identities. National private and household saving is usually treated as a residual in this set of commodity accounts. Logically, however, aggregate saving is also a key element in a set of identities involving financial and other capital assets. Basically, the point is that any sector's net saving must be reflected in the accumulation of some asset. Changes in the capital value of assets will complicate this identity, but the basic point still holds. To the extent that much of household saving is reflected in an increase in the liabilities of banks and other financial institutions, it is clear that availability of data on the balance sheet composition of the se financial institutions can provide useful independent information contributing to the measurement of household saving.

The System of National Accounts (Inter-Secretariat Working Group, 1993) presents a consistent conceptual framework which reconciles these two approaches to aggregate saving. Using this methodology, the financial flows and the commodity flows are in principle reconcilable through a single figure for savings. In practice, the figure which one obtains from the commodity balance approach can differ widely from that constructed using financial flows - sometimes by a wide margin. There are obvious difficulties with the data drawn from financial flows. For example, capital flight does not show up directly in the balance sheets of national financial intermediaries (although some further development of the international bank deposit statistics could help).

But there are weaknesses in the commodity flows too, and there is no *a priori* basis for considering one to be invariably superior to the other. Yet, in practice, national accounts statisticians rarely take account of the financial flows. An effort to improve the assembly of the financial flows data and to use it as a cross-check on existing sources seems worthwhile.

It is essential to use a comprehensive conceptual framework if the saving data constructed from the financial flows is to correspond to the usual national accounts concept.[64] The *System of National Accounts 1993* (Inter-Secretariat Working Group, 1993) provides such a framework which will now be outlined. There are two main flow of funds accounts, now known as the Accumulation Accounts, namely the Financial Account and the Capital Account.[65] Since financial assets represent claims between agents, the sectoral structure of these accounts is of importance. The main[66] standard sectors are households[67]; non-financial corporations; financial corporations; general government and the rest of the world.

The *Financial Account* (formerly known as the Capital Finance Account) presents each

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[64]For example, the saving data published for the US by the Federal Reserve Board, and based on financial flows, differs conceptually from national accounts saving, cf. Engen et al. (1994).

sector's accumulation of financial assets and liabilities of different types. The balancing item is the sector's net lending. The main financial assets identified are: currency and deposits; securities other than shares; loans; shares and other equity; and the technical reserves of insurance. Trade credit is sometimes also identified separately. These assets can all be further subdivided. Each sector's accumulation of financial assets or liabilities of each identified type is entered in the matrix. The net sum equals that sector's net lending (or net borrowing if negative).

The *Capital Account* (formerly known as the Capital Accumulation Account) presents the accumulation of non-financial assets which make up the difference between a sector's net lending and its saving. The four main asset classes identified here are produced tangible and intangible[68] fixed assets; non-produced assets;[69] and inventories. An additional item in this table is capital taxes and transfers. For households, accumulation of housing assets is typically the main item in the Capital Account.

The net accumulation of these assets plus net capital transfers or taxes paid represents the difference between net lending and saving for a sector. Thus an estimate of net lending based on financial flow data, combined with the data of the capital account, provides an independent estimate of sectoral saving.[70] Reconciling these two estimates is of course a matter of judgement.[71]

Flow of funds accounts distinguishing between the household and business sector exist, at least on a partial basis, for about twenty developing countries (Honohan and Atiyas, 1993). However, many of these involve only the capital account and have been constructed to be consistent with the saving data from the commodity balance accounts. In other words, they were not built up from the financial account, and cannot therefore be used for the main purpose sought in the present exercise, namely an independent source of saving data.[72]

Capital flight effected through misinvoicing of trade typically results in an underestimate of saving from the commodity balances. To the extent that international sources, such as the

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[68]E.g software.

[69]The latter include such items as land, uncultivated forestry and mineral deposits.

[70]It should be noted that a further step would be required to obtain the change in the sector's wealth, notably to take account of capital value changes. These can be crucially important in inflationary economies. The necessary adjustments may be recorded in the "other changes in assets account".

[71]One way of doing so is to add a set of adjustment factors to the main components of each of the identities leading to the estimate of saving. The adjustment factor must be such as to reconcile the two estimates. If we attach a prior estimate of the precision of each of the main data elements. Then the adjustment factors can be chosen in such a way as to minimize a sum of squares (weighted by the reciprocal of the prior precision). The least-squares approach derives from that suggested by Geary (1973) in a related context.

[72]For only eight of the countries studied by Honohan and Atiyas was the financial account available, namely Cameroon, Cote d'Ivoire, Ecuador, Korea, Portugal, Thailand and Yugoslavia.

BIS/IMF banking statistics, can be harnessed in this context, accumulation of foreign financial assets enters directly into the financial account and thus into the financial flow-based estimate of saving.

What is being suggested is not a special effort to perfect the financial accounts, but merely an attempt to bring readily available data from the balance sheets of financial institutions to bear on the problem of measuring saving, a task for which a rigorous methodology already exists. The task is not a light one[73] and would have to be carried out in coordination with national statistical agencies as a part of the ongoing effort to improve the national statistical base.

[73]And could not be considered as a regular part of model maintenance at the World Bank, a task which is already costly, see Serven and Schmidt-Hebbel, 1994.

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