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FLOW OF FUNDS: IMPLICATIONS FOR RESEARCH ON FINANCIAL SECTOR DEVELOPMENT AND THE REAL ECONOMY

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**FLOW OF FUNDS:
IMPLICATIONS FOR RESEARCH ON
FINANCIAL SECTOR DEVELOPMENT AND THE REAL ECONOMY ***

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Abstract

This paper provides a selective survey of the leading theoretical and empirical issues surrounding the flow of funds: its meaning and origin, problems of construction, and more particularly the key issues involved in financial modelling. It is argued that there is an intimate connection between the flow of funds, interest rate and asset price determination, and hence incomes and expenditures in an economy. The paper also explores the reasons for lack of success at empirical flow of funds modelling and proposes “promising research ideas” (PRIs) for future research on the relationship between financial sector development and the real economy, especially in order to identify effective financial sector policies for promoting poverty-reducing economic growth in low-income developing countries.

Keywords: flow of funds; intersectoral financial flows; poverty-reducing economic growth
JEL Classification No: G1, E44, E43

1. Introduction

Flow of funds analysis provides a general framework for studying a wide range of issues concerning the financial sector and its relationships with the real economy. It has been widely used in the industrial economies as a basic information tool, in general empirical research, and for detailed financial policy analysis. However, relatively little flow of funds work has been done for developing countries, notwithstanding its potential importance in studying the process of financial sector development (e.g. the evolution of financial institutions and markets) in order to identify effective financial sector policies for promoting poverty-reducing economic growth. Exceptions include Green and Murinde (1998) who develop a theoretical flow of funds model, and Bahra, Green and Murinde (1999) who apply the model to conduct simulation experiments for the analysis of financial policies for economies where data limitations are particularly severe. In addition, Sen, Roy, Krishnan and Mundlay (1996) analyse a simple flow of funds model for explaining saving and investment behaviour in India.

- This paper conducts a selective survey of the leading theoretical and empirical issues surrounding flow of funds analysis, focusing in particular on its use in financial modelling and as a tool of analysis of intersectoral financial flows. The idea is to analyse the key relationships between the financial and real sectors of the economy and the role of the financial sector in the development process. The survey particularly seeks to identify those main features where existing flow of funds models need modifying in the light of the specific economic, financial and social structures of low-income developing countries.
- The remainder of the paper is structured into five sections. Section 2 outlines the basic principles of flow of funds. Section 3 focuses on the construction of flow of funds models to underpin, among other things, the evolution of financial institutions and markets; while the application of flow of funds methodology to studies of asset demands and asset pricing is discussed in Section 4. The main flow of funds applications in a developing country context are examined in Section 5. Section 6 concludes by putting forward some promising research ideas (PRIs) for further research on flow of funds, in the context of financial sector development and the real economy.

2. The Principles of Flow of Funds

Flows of funds arise from the transactions which take place in an economy -- whether involving purchases or sales of goods and services or exchanges of assets and liabilities. These transactions generate flows of funds from one agent to another and from one sector to another. National flow of funds accounts provide a record of these flows for the whole economy; the accounts covering individual or corporate transactions are more usually called sources-uses statements. Virtually all macroeconomic models call for the use of some part of the flow of funds. However, the expression "flow of funds models" has a more specific meaning, referring to a general approach to modelling and understanding the flow of funds as a whole, and its role in interest rate determination (Green, 1992).

Copeland (1952) is generally regarded as the pioneer of flow of funds analysis. He showed how comprehensive "moneyflows" accounts could be compiled and used to analyse the U.S. economy. He aimed to show all transactions in the economy -- involving goods, services (including factor services), assets and liabilities, and distinguishing between purchases and sales in each category. Indeed, he originally conceived his work as an alternative to the national accounts. The implementation of flow of funds accounts in

official statistics, first in the United States and later under the aegis of the UN (1968), was less ambitious than this, and flow of funds came to be seen as just one (albeit major) component of the whole national accounts system (see Dawson, 1996).

Modern flow of funds accounts show net transactions in financial instruments among broad sectors of the economy. They are typically presented in a matrix in which each row (i) represents an asset, and each column (j) a sector. Each cell (i,j) in the matrix shows net purchases(+) or sales(-) of asset i by sector j during the unit time period (usually a quarter or a year). The row sums of the matrix are zero as net purchases of an asset must equal net sales, and each column (j) sums to the j 'th sector's surplus or deficit -- its Net Acquisition of Financial Assets (NAFA). Sector NAFA's can be calculated either by summing each sector's transactions in assets and liabilities, or from the income side as the difference between gross investment (plus net capital transfers) and gross saving. They therefore provide the link between the flow of funds and national income accounts. Flows of funds are also related to the stocks of assets and liabilities in the economy through the identity that the change in the stock of an asset over any time period must be equal to the sum of the net transactions in the asset (*i.e.* the flow of funds) and capital gains or losses on existing holdings.

These accounting identities offer alternative means of estimating the entries in the flow of funds matrix and, in general, the estimates of the sectoral NAFA's arrived at from the income-expenditure side do not correspond to those arrived at using flow of funds data (Dawson, 1991).¹ Indeed, the resulting "statistical discrepancy" is often disturbingly large, prompting periodic reviews of official statistics (US Commerce Department, 1977; Bank of England, 1985). Studies of savings behaviour invariably utilise data calculated from the income-expenditure side on the questionable assumption that these are more reliable than flow of funds data. In fact, much of the flow of funds is typically based on statistical reports from financial institutions and central government and, with some exceptions, is of census-like quality, whereas the national income accounts (apart from those of the central government) include a higher proportion of lower quality sample survey data (Gorman, 1983). The relationships between flows of funds and asset stocks raise similar issues: the changes in stocks of assets and liabilities calculated from one source are rarely equal to the sum of the capital gains or losses and the flow of funds calculated from another source. In this reconciliation there may be three independent sources of data -- for asset stocks, asset prices and flows of funds. Moreover, the reconciliation is complicated by the fact that over the intervals between which stock data are available, transactions may have taken place at different prices.

One approach to this problem of consistency is to consider pooling the information provided by different data sources. Stone, Champernowne, and Meade (1942) proposed the use of constrained least squares regression to reconcile the income, expenditure, and output estimates of national income. In general, official statisticians have eschewed such "purely statistical" methods of adjustment, preferring instead to provide users with data which include a discrepancy and to let them do their own adjustments if desired. However, the computational size of the least squares adjustment problem is potentially vast as it can involve adjusting every entry in the national accounts at every date and at

¹ The paper by Dawson (1991) demonstrates methods of estimating a simple flow of funds system, especially for developing countries; see also an earlier application to Kenya by IMF (1981).

each revision of the data. Indeed, this has been cited by official sources as an objection to the procedure. Moreover, the validity of least squares adjustment to reconcile stock and flow data (as opposed to national income and flow of funds data) can be questioned because of the need to recognise both arithmetic and geometric identities; and more simple procedures are typically used in practise. More recently, interest in least squares adjustment has been revived (Barker, van der Ploeg, and Weale, 1984; Central Statistical Office, 1989), but there is no immediate prospect that it will become an established feature of official statistics.

3. The Flow of Funds Model and the Evolution of Financial Markets

The flow of funds accounting matrix can be transformed into a basic flow of funds model by assuming that each cell in the matrix contains a variable to be explained by an asset demand function whose arguments may include interest rates and other variables. The column sums amount to sector budget constraints and state that each sector's acquisitions of financial assets must sum to its total NAFA, which could be regarded as determined independently of the flow of funds model. Each row sum is interpreted as a market-clearing condition which states that in equilibrium, desired net purchases of an asset must equal desired net sales. Desired net purchases or sales are determined by the asset demand functions. If the sectoral NAFA's are exogenous, an N market flow of funds model provides $N-1$ independent market clearing conditions to determine $N-1$ endogenous variables. These are typically thought of as $N-1$ interest rates with the (N th) rate on currency fixed at zero. However, interest rates do not have to be the equilibrating mechanism. In a fixed exchange rate system one of the market clearing variables is the monetary authorities' holdings of foreign exchange: the authorities deal in foreign exchange to peg the exchange rate at the pre-assigned level, given the movements in private demands and supplies. In effect, the monetary authority acts like a market maker, although the time horizon over which it expects to deal at the quoted rate is clearly longer than that over which a private sector market maker would deal. Knight and Wymer (1976) have argued that, conceptually, all financial markets can be viewed as having one sector which acts as market maker. This device simplifies the computational task of solving a flow of funds model, and it appears to reduce the problem of "excess volatility" of interest rates which sometimes occurs in such models. However, the device is also rather arbitrary and has not proved popular.

In discrete time, the evolution of financial markets in a flow of funds model can be thought of as follows. Each sector enters any given time period with a certain stock of assets and liabilities. The sectoral NAFA's and asset demands, and the market clearing conditions jointly determine the flow of funds and the structure of interest rates and asset prices. The end-period values of the stocks of assets and liabilities are then equal to the sum of: the beginning of period stocks, net capital gains on these stocks, and the flow of funds. The equilibrium thus reached is temporary for the end-period stocks are carried over to the next period and together with a new set of sectoral NAFA's and asset demands will determine a new temporary equilibrium. A long-run equilibrium is one in which stocks are stationary from period to period in some well-defined sense.

It is useful to distinguish between flow of funds models and one-sector studies of flows of funds. Sector studies are the essential building blocks of a flow of funds model, but the central characteristic of a flow of funds model is that it is a general equilibrium model, and therefore explains the flows of funds and the movement of interest rates jointly in a

consistent framework. This requires modelling the market clearing process as well as the demands and supplies of assets.

Flow of funds analysis and forecasting using informal procedures is almost as old as the flow of funds itself. However, the main intellectual foundation for modern flow of funds modelling was provided by Tobin and his associates (Tobin, 1963a, 1963b; Tobin and Brainard, 1963; and Brainard, 1964). Initially, this work focused on the relationship between stocks of financial assets and interest rates, although there are also some examples of sector studies of flows of funds, notably Heston (1967) and Pierce (1967). It was soon apparent that static models of asset demands could not explain the characteristically autocorrelated time series properties of asset stocks. Indeed, Tobin and Brainard's (1968) "Pitfalls" paper already advocated the use of "general disequilibrium" models. The characteristics of such models, explained by Smith (1975), are: first, that the demand for any particular asset in the short-run may differ from its long run level, because of transactions and other costs of adjustment; and second, that the short-run demand for an asset has to be related not just to its own disequilibrium but also to the disequilibria in all other asset holdings which may "spill over" onto the demand for the asset in question.

The Pitfalls model is a generalised partial adjustment model which specifies that the change in asset holdings is determined by deviations of previous actual from desired holdings, and other factors. Its solution determines asset prices and stocks and hence the flow of funds which is identical to the difference between the change in asset holdings and net capital gains. However, in Pitfalls models, it is the demands and supplies of asset stocks which determine interest rates. It could be argued instead that it is the flow demands and supplies of funds which determine interest rates more or less independently of the outstanding stocks of assets (Bain, 1973). The relation between these "stock" and "flow" views of interest rate determination was clarified by Friedman (1977) who argued that the difference had to do mainly with the size of adjustment costs, and is more a difference of emphasis than of substance. The larger are the costs of adjusting asset stocks, the more important are financial flows in interest rate determination, and vice-versa. As adjustment costs in most financial markets are usually thought of as being rather small, it is often more reasonable to suppose that it is the outstanding stocks of assets which are the major determinants of interest rates, rather than the flow of funds. Thus, the Pitfalls model constitutes one class of flow of funds models.

The partial adjustment scheme on which the Pitfalls model is based is clearly oversimplified. Friedman (1977) introduced a more general "optimal marginal adjustment model" based on the argument that investors find it less costly to allocate new flows of funds than to rearrange existing portfolio holdings. Roley (1980) extended the model to allow adjustment speeds to differ as between inflows and outflows of funds, and Green (1984) considered a scheme in which capital gains contribute differentially to adjustment speeds. Such models are typically special cases of a general dynamic specification (Hendry, Pagan, and Sargan, 1984). Friedman (1979, 1980b) and Roley (1980) have estimated disaggregated models of the US corporate and government bond markets using the optimal marginal adjustment model. However, it too is not without problems. First, it is difficult to derive the model from an underlying objective function, whereas the standard partial adjustment model minimises a quadratic cost function (Sharpe, 1973). Second, the model imposes few constraints on the estimated coefficients, although

symmetry of the matrix of interest rate responses can be recovered and tested (Roley, 1983).

Early flow of funds models typically assumed that portfolio and consumption-savings decisions were, in some sense, separable, implying that portfolio demand functions and flow of funds equations could be specified, estimated (and perhaps solved) independently of the consumption function. Such separability is at the heart of the ubiquitous IS-LM model, and its logic (but in models with more than two assets) was spelled out by Tobin (1969). It was questioned by Foley (1975) who argued that separability was only possible in "beginning of period" specifications of financial models in which asset trading and price-setting occur at the beginning of any time period when stock demands and supplies are equated. Flow demands and supplies associated with consumption-savings decisions are equated separately during the ensuing period. The alternative "end of period" specification cannot allow separability as it calls for asset-holding plans to be made at the beginning of each period in anticipation of certain flows occurring during the period. Trading and price-setting occur, and asset demands are satisfied at the end of each period. According to Foley the two specifications also gave different results in otherwise identical models. However, Buitier (1980) showed that these different results stemmed from different implicit assumptions associated with each specification and that it is never conceptually correct to separate portfolio and spending decisions if the underlying model is to be properly specified. Tobin (1982) has shown how a general IS-LM framework can, with few modifications, be adapted to an integrated approach in which portfolio and consumption-savings decisions are taken simultaneously. In integrated flow of funds models, the sectoral NAFAs are no longer taken as exogenous but emerge endogenously as asset holdings and consumption are adjusted simultaneously in response to changes in variables, such as income and interest rates, which are taken as exogenous by individual agents, but may be endogenous from the point of view of the system as a whole (Purvis, 1978; Smith, 1978).

The Pitfalls model was generated and solved using calibrated coefficients and artificial data. Empirically estimated Pitfalls models have often had rather unsatisfactory properties. Interest elasticities and speeds of adjustment of actual to desired asset holdings are often signed incorrectly or are appreciably lower than intuition would suggest is plausible. This produces excessive volatility in interest rates when the model is solved and simulated. Green and Kiernan (1989) showed that multicollinearity and measurement error among the interest rates can produce estimated coefficients which are substantially too small in magnitude and sometimes of the wrong sign in relation to their true value. Multicollinearity is almost inevitable if assets are close substitutes, as their interest rates will tend to move closely together; measurement error arises in the estimation of the unobserved expected real interest rates which are the explanatory variables. A related problem is that theory imposes few constraints on the signs and magnitudes of short-run interest rate coefficients. Hypotheses such as symmetry and gross substitutability are invariably propositions about long-run (static) asset demands. Although these can be tested (Roley, 1983), it is the short-run demands which are largely responsible for the system-wide simulation properties of the model in the short and medium term. Even if the implied long-run demands appear plausible, the short-run estimates can still give rise to implausible simulation paths for interest rates.

The main practical difficulty in implementing flow of funds models has been that they all too easily become large and unwieldy. Indeed Johnson (1970) has commented that the

approach tends to produce models in which everything depends on everything else and nothing clear-cut can be said. Large size is not an intrinsic property of flow of funds models. Friedman (1980a) compared the results of an 8 sector model of the US corporate bond market with that of a two sector model, and concluded that disaggregation was only marginally useful in improving the performance of the model. However, once one is committed to a general equilibrium model, it can be difficult to avoid either undue simplicity or undue size, and it is not altogether surprising that flow of funds models have not proved popular in small-scale research. Hendershott's (1977) model of the US contains considerable complexity but explains only three market-clearing interest rates. Green's (1984) model of the UK is more ambitious in attempting to explain seven market-clearing interest rates in a five-sector model but he reports difficulty in simulating his model. Keating (1985) is more ambitious yet but his model requires strong and implausible theoretical restrictions to be estimated and solved (Courakis, 1988). Kearney and MacDonald (1986) report on a one-sector four-market model of the UK, but find it necessary to use prior information to obtain satisfactory results. Christofides (1980) studied the substitutability between Canadian short-term and long-term bonds utilising the Pitfalls approach. Among all these studies, it is the smaller, more highly aggregated models which appear to have proven the more useful.

Sector studies are far more numerous than flow of funds models but necessarily have less to say about interest rate determination. Included among these are some integrated portfolio and expenditure models, notably those of Backus and Purvis (1980) and Owen (1986). However, the sheer size of integrated models has discouraged researchers from considering the properties of their solutions for interest rates and other variables. A more recent approach to sector studies has been to treat asset demands as analogous to consumer demand systems and utilise flexible functional forms to specify the demand functions (Aivazian, Callen, Krinsky, and Kwan, 1990; Barr and Cuthbertson, 1991).

The difficulties in estimating flow of funds models led Tobin and his associates to utilise a more Bayesian approach. This resolves the problems of multicollinearity and measurement error by imposing more plausible values on coefficients with large standard errors. However, it requires the prior specification of all the coefficients in the model including their covariance matrix. This is potentially a Herculean task, and one which is subject to complex consistency conditions. See Smith (1981). In an integrated flow of funds model (but estimated only for the financial block), Backus, Brainard, Smith and Tobin (1980) report that the use of prior information was successful in removing virtually all the "peculiar" elements in the matrices of adjustment coefficients, but still left certain anomalies in the matrices of interest rate responses. The simulation properties of their model were, however, reasonable.

4. The Solution of Flow of Funds Models: Asset Demands and Asset Prices

The solution of a flow of funds model is carried out by setting estimated asset demands equal to supplies and solving for interest rates. The result is described as showing the effects on interest rates of exogenous shocks to asset supplies in a freely clearing market. However, this implies that it is exogenous asset supplies which determine the endogenous interest rates. If so, the estimation of asset demands by the regression of an asset quantity on interest rates is not a meaningful exercise since it amounts to regressing an exogenous variable on a collection of endogenous variables. If this argument is accepted, then the appropriate way of modelling interest rates is to regress an (endogenous) interest rate on

(exogenous) asset supplies rather than the other way round. This insight was used by Frankel and Engel (1984) in an analysis of foreign currency risk premia and has subsequently been applied to other asset returns. Frankel and Engel's key contribution was to demonstrate the simple and intimate link between portfolio demand functions and properly specified interest rate equations, and thus to exploit the connection between portfolio theory and asset pricing theory, particularly the Capital Asset Pricing Model (CAPM). This approach also delivers a parameterization which makes it easier to test certain theoretical hypotheses. Frankel (1985) and Frankel and Dickens (1984) estimated such an "inverted portfolio model" using post-war US data and obtained results which were broadly unsympathetic to the mean-variance model of asset demands and pricing. Similar investigations were carried out by Green (1990) using UK data, with broadly similar results namely: that the data rejected the CAPM but that portfolio data made a significant contribution to the time variation in excess returns. These models have been extended further to allow for autoregressive conditional heteroskedasticity in the error process, which is equivalent to allowing for time-variation in risks. See Bollerslev, Engle and Wooldridge (1988).

Interest in inverted portfolio models is one example of a more general shift in financial market research in the 1980s away from flow of funds models towards more direct efforts at modelling asset prices and returns. Just as there is a close connection between "non-integrated" flow of funds models and the CAPM, so there is also a natural connection between the integrated approach to modelling the flow of funds and the Intertemporal Capital Asset Pricing Model (ICAPM). The ICAPM starts from the hypothesis that agents trade assets (usually in perfect capital markets) to maximise an intertemporal utility function and to smooth consumption over time. Merton's (1973) ICAPM generates simultaneous asset demands and consumption function analogous to those considered in the Pitfalls literature. However, Merton's specification is awkward to test, and Breeden's (1979) version has proven far more popular. This emphasises regression relationships among asset returns and the change in aggregate consumption and thus side-steps the flow of funds entirely. However, if markets are not perfect, aggregate consumption cannot be a sufficient statistic for asset returns and portfolios and flows of funds must be of independent significance. Thus, as promising research idea (PRI), a next logical development in financial research is to reintegrate the flow of funds with consumption-based asset pricing theories. Such new theories of the flow of funds will be more rigorously founded than their predecessors and offer a better prospect of achieving a fully integrated account of the flow of funds and their relationships with interest rates, asset prices, income, and expenditure.

5. Flow of Funds Analysis for Developing Countries

5.1 Intersectoral financial flows

In some recent literature, flow of funds methods are used to study the pattern of intersectoral financial flows in developing economies, and to relate the financial flows to the overall development strategy (see Murinde, 1996, Ch. 2). At the economy-wide level, international flow of funds bridge the savings-investment gap.² At the sectoral level, financial flows help to meet the savings-investment gap of one sector, say households, vis-à-vis another sector, say the business sector, as in the work by Honohan and Atiyas

² See the international study by Feldstein and Horioka (1980).

(1989, 1993). At both the economy-wide and sectoral levels, the elasticity of financial flows between two economies or sectors, respectively, bears important implications for the behaviour of savings, investment, and financial markets, and the nature of development strategy.

One main motivation of studying the pattern of intersectoral financial flows in developing economies is to isolate the borrowers and the lenders. For example, it is interesting to investigate the extent to which the financing of business investment depends on the availability of foreign funds rather than domestic finance. It is equally interesting to determine whether or not the degree to which households accumulate financial assets is conditional on either the state of economic development or the availability of foreign sources of finance. In addition, flow of funds modelling is useful in identifying the type of assets which characterise financial intermediation.

Generally, the intersectoral financial flows framework reconciles domestic and external sources of funds and the competing sectors which use these funds, by asking the following leading questions:

- (a) To what extent does the business sector finance its own investment from (i) its own savings (ii) external financing or the foreign sector (iii) the government sector (iv) the household sector ?
- (b) How significant is the role played by the banking system as well as the curb financial markets in intersectoral financial flows in developing economies?
- (c) To what extent can a shortfall in flows from the foreign sector to the business sector be alleviated by the establishment and/or revitalisation of emerging stock markets?
- (d) In general, what are the obstacles to efficient intersectoral financial flows in developing economies; and what policy alternatives are available for policy makers in these economies?

5.2 *A stock-flow accounting structure for a developing economy*

It is useful to construct a simple accounting framework for a low-income developing economy, as presented in Table 1 below. In part 1 of the table, rows represent income-expenditure flow variables, namely taxes (T), consumption (C), investment (I); while in part 2 of the same table, rows represent stocks of assets and liabilities, namely physical capital (K), loans (L), domestic money (M) and foreign money (F). Columns represent the major broad sectors of the economy namely the private sector (P), the banks sector (BA), the government sector (G) and the foreign sector (FO). Thus a single row distributes the stock or flow of a variable or asset over the supplying and demanding sectors; while a single column represents a sector's sources and uses of funds (flows) or a sector's balance-sheet (stocks).

The horizontal sums and vertical sums of the flows as well as the stocks of the accounting structure presented in Table 1 can be written out to explain how financial resources flow from one sector to another. The framework also offers us a set of identities that demonstrate the sectoral balances that are consistent with financial flows.

Table 1
A simplified accounting structure for a developing economy

		Private sector (P)	Banks sector (BA)	Government sector (G)	Foreign sector (FO)
1.	<i>Income-expenditure</i>				
	1.1 Taxes (T)	T ^P	-	T ^G	-
	1.2 Consumption (C)	C ^P	-	C ^G	C ^{FO}
	1.3 Investment (I)	I ^P	-	I ^G	I ^{FO}
	Net acquisition (S)	S ^P	-	S ^G	S ^{FO}
2.	<i>Assets and liabilities: balance-sheet accounts</i>				
	2.1 Capital (K)	K ^P	-	K ^G	K ^{FO}
	2.2 Loans (L)	L ^P	L ^{BA}	L ^G	-
	2.3 Domestic money (M)	M ^P	M ^{BA}	M ^G	-
	2.4 Foreign money (F)	-	-	F ^G	F ^{FO}
	Net worth (W)	W ^P	W ^{BA}	W ^G	W ^{FO}

Note: The private sector (P) can be further disaggregated into the household sector (HH) and the corporate sector or firms (FF). The empirical disaggregation is conditional on data availability, for example from integrated household surveys.

The standard procedure is to use the intersectoral financial flows, presented in Table 1, to generate behavioural equations about consumption, saving and investment. Financial constraints, such as the government budget constraint and the foreign exchange constraint, can also be carefully captured using the framework.³

Basing on Table 1, Murinde (1996, Ch. 2) uses country specific data, from published national accounts, to construct empirical intersectoral financial flow tables for a number of developing countries including Kenya for 1991⁴ and Zimbabwe for 1987. It is found that the private sector in both Kenya and Zimbabwe generates virtually all the government tax revenue. As regards consumption expenditure flows, it is shown that in the case of Zimbabwe the private sector undertakes consumption and investment expenditure far in excess of government expenditure. However, Murinde notes that the scenario of high tax revenue and reasonable expenditure control may not be reproduced in other sub-Saharan African countries which have an underdeveloped corporate sector and an expanding government sector, and may not even be sustainable in the long run in Zimbabwe. In terms of assets and liabilities, it is found that there appears to be some active flow of capital resources between the private and the government sectors in Kenya. Much of domestic money is shown to be in the hands of the banking sector in Kenya and Zimbabwe; in addition, there is a higher proportion of domestic money in the private

³ This approach may be followed for purposes of macroeconomic and financial modelling, as in Green and Murinde (1998), or to study the pattern of intersectoral financial flows, as in Murinde (1996).

⁴ For particular aspects of financial development, Table 1 is more helpful than the analysis in IMF (1981) for Kenya; however, IMF (1981) is more useful in incorporating fiscal aspects of the economy.

sector than in the government sector. Foreign money, however, in both Kenya and Zimbabwe, is found to be predominantly in the hands of the government sector; this largely reflects the tendency towards exchange controls in these economies during the sample period.

The main limitation to the application of the above framework is lack of data, especially for low-income developing countries in sub-Saharan Africa and South Asia. To go around this problem, it is necessary to first explore the standard official sources, before resorting to country sources. For example, Murinde (1996) obtains most of the data from the *International Financial Statistics Yearbook*, the *Government Finance Statistics Yearbook* and some country publications. In addition, in most existing studies, data for sectoral flow of funds are mainly obtained from national accounts compiled by the United Nations. Moreover, the United Nations System of National Accounts (SNA) is a well established statistical framework for presenting flow of funds accounts; see Dawson (1991) and UN (1968, 1993).⁵

For flow of funds analysis, like in most applied work in national accounting economics, two components of the SNA are particularly relevant. The first is the capital accumulation account. This shows, for each sector, sectoral savings including depreciation allowance (which provides for capital consumption), the relevant capital transfers to the sector, as well as the non-official assets accumulated by the sector. The second component of the SNA is the capital finance account. It provides a breakdown of net lending (or the balancing item of the capital accumulation account). Nevertheless, in some detail, the SNA differs from the accounting framework in Table 1. The main difference between the two frameworks is that the former clearly distinguishes between its two component account while these accounts are not explicit in Table 1. SNA data may therefore allow extra mileage in capturing intersectoral financial flows. For example, Honohan and Atiyas (1989, 1993) use SNA data to construct a flow of funds representation for Korea for 1984. It is shown that the capital accumulation account for Korea represents the transition between the national income accounts which reflect the concepts of savings and capital accumulation and the financial accounts which underpin the concepts of net financial surplus or net lending. The analysis captures the following relationships broadly defined:

$$GS_i - GK_i = FC_i \quad (1)$$

where, GS_i is sector i 's gross savings including of capital consumption provisions; GK_i is sector i 's gross capital formation inclusive of stock accumulation; and FC_i is the accumulation by sector i of financial claims on other sectors; this is given as net lending. It is thus shown that $(GS - GK)$ represents the excess of each sector's GS over its GK . However, adjustments are made in the framework for capital transfers and for purchases and sales of land and intangible assets. One example of capital transfers, featured in the analysis, is a government grant disbursed to the private sector in order to facilitate capital accumulation. This item is, however, relatively small in other developing economies.

Also in the SNA, gross fixed capital formation and an increase in stock entries is explained using the incremental capital stock concept, namely:

⁵ Dawson (1991) carefully shows the conceptual relation of flow of funds accounts to the SNA. A brief review of the evolution of the SNA itself is presented, including the original 1953 version, the 1968 version and the current version released in 1993.

$$K_t = I_t + (1 - \delta)K_{t-1} \quad (2)$$

where, K_t is the capital stock; I_t is investment; δ denotes depreciation; t is a time subscript. The entry for land represents flows (purchases and sales) which do not enter into the current income and outlay account. However, a sector may sell land to augment available funds in order to purchase capital financial assets. A sector may also use some of its savings to acquire land at an opportunity cost of acquiring capital or financial assets. Sectors which purchase intangible assets are also featured in the representation of flow of funds used by Honohan and Atiyas (1993), indicating that the SNA represents a number of features which are typical of many developing countries.

5.3 Evidence on intersectoral financial flows in developing countries

The evidence obtained by applying a modified form of the framework in Table 1 to Malaysia and Singapore⁶, by Murinde (1996), leads to several interesting conclusions, with reference to the four questions that were raised in this section. First, it is found that the private sector in Malaysia is a net lender to the government sector; second, capital formation is largely financed by domestic sources of funds; third, the intersectoral flows are mostly achieved through the banking systems; fourth, by the end of 1989, the Malaysian capital market did show some significant contribution as a source of capital; and finally, it is found that although the foreign sector did not provide substantial amount of financing, there is no clear sign that the private sector reduced its investment; thus a shortfall in foreign finance does not cause the business sector to cut down on its investment, especially if domestic savings are high.

Some of these conclusions are consistent with earlier detailed application of flow of funds data for 17 developing economies by Honohan and Atiyas (1989, 1993). In the context of the earlier questions, the conclusions of the Honohan-Atiyas studies are as follows.

- (a) It is found that the household sector is a net lender in an intersectoral financial flows framework. The sector lends an average 7 percent of GNP. This finding, however, is inconsistent in economic environments provided by countries which are more open and which enjoy higher income levels; it is reasonable to argue that small less open poor countries may not reproduce this result. It is interesting to note that the household sector typically saves more than twice the amount of funds it needs to finance its own accumulation of real assets. Thus it lends the rest to other sectors and emerges eventually as a net lender.
- (b) The evidence suggests that in developing economies the business sector is a net borrower in an intersectoral financial flows framework. It is found that about half of real capital formation in the business sector is externally funded. This sector is thus a beneficiary of an efficient intersectoral financial flows network.
- (c) It is found that the government sector is sometimes a net lender; however, in most developing economies this sector emerges as a net borrower. This mixed result depends on the *tax effort* and *expenditure control* in place in various developing economies; an issue we return to in subsequent chapters.
- (d) The foreign sector is shown to be a residual provider of funds to the domestic economy. As such the sector cannot be relied upon as a main source of finance. This is an unfortunate scenario for developing economies which have serious foreign exchange bottlenecks (see Murinde 1996).

⁶ It is useful to recall that the economies of Malaysia and Singapore share common historical foundations (see Murinde and Eng, 1994).

5.4 Further flow of funds data problems in developing countries

It is worthwhile to note that the methodology for preparing flow of funds accounts in the SNA is plagued by data pitfalls. In general, there are two main conceptual problems. The first problem relates to capital value changes. The use of successive balance sheet statements to generate flow of funds data does not involve adjustment for the capital value changes. The plausible procedure would be to make valuation changes and to show these separately in a reconciliation account.

The second main problem relates to the problem of inflation; see Kennedy (1988) and Honohan and Atiyas (1989). It has been recommended that analysis of sectoral savings and financial data should be performed using adjustment for inflation; precisely, data should reflect real rather than nominal values. Kennedy (1988) shows that adjustment for inflation can dramatically change the pattern of intersectoral financial flows for a given economy.

In addition, most often data are drawn from different sources and so wide variances may occur between the data presented and the definitions of the concepts measured. It would not be reasonable to sanctify the data used by current researchers; the main point is that this useful methodology will continue to be perfected as better data sets are generated.

6. Conclusions and PRIs

In this paper, we have selectively surveyed the leading theoretical and empirical issues surrounding flow of funds analysis, as a financial modelling technique and as a tool of analysis of intersectoral financial flows. Below we highlight some of the main PRIs for further research on the key relationships between the financial and real sectors of low-income developing countries.

Given the modern advances in constructing and estimating flow of funds as shown in UN (1993) and Dawson (1996), a major PRI involves incorporating these recent advances in knowledge in order to develop a flow of funds framework that would be suitable for studying the relationship between financial sector development and the real economy in a low-income developing country such as India or Kenya. In this context, the flow of funds analysis can be useful in shedding light on: intersectoral financial flows and their volatility; the role of financial institutions in the economy; particularly in generating private savings and channelling them into productive investments; the requirements of the corporate sector for financing investment and their implications for interest rates and asset prices, and thereby for the economy as a whole; and the financial relationships between the formal and informal sectors.

In the light of the issues surveyed above, a PRI is to consider how the flow of funds framework may be applied by policy makers for the analysis of financial problems in developing countries. The studies by Murinde (1996), Green and Murinde (1998), Honohan and Atiyas (1989, 1993) and Bahra, Green and Murinde (1999) suggest that flow of funds models may be used as a framework to set out and analyse the broad policy choices facing low-income developing countries with rudimentary financial markets. However, it is noted that a major limitation to the application of flow of funds models in these countries has been the lack of data. In principal, the application of flow of funds models calls for relatively detailed flow of funds data, which are not generally available in

most developing countries. However, considerable progress can still be made in understanding economic problems by using the simulation approach pioneered by Brainard and Tobin (1968). In this approach, a flow of funds model is built and calibrated using benchmark values for parameter values which are guesstimated using a combination of existing home country data and consensus estimates of comparable parameters in foreign countries. The calibrated model is used to carry out policy experiments, accompanied by sensitivity analysis to assess how robust policies are in the face of considerable of the considerable uncertainty about the exact structure of the economy. This approach has been used by Bahra, Green and Murinde (1999) with some success in the context of the transition economies of Eastern Europe. In this PRI, therefore, it is intended to use the simulation approach as a tool for analysing alternative financial policy choices for India and Kenya.⁷ Thus, the flow of funds model will be used to simulate economic and financial policies in order to capture the effects of financial sector reform on investment and output, and to gauge the effect of monetary and fiscal policy on sectoral net acquisition of financial assets and liabilities.

Another PRI is to use flow of funds models to investigate the pattern of intersectoral financial flows in a sample of low-income countries in South Asia and sub-Saharan Africa, focusing in particular on household choice (including consumption, saving and investment), the corporate sector (investment and financing), the banks (intermediation, debt and equity financing), the government sector (taxation and spending), and the overseas sector (debt, aid and foreign direct investment). Evidence on the pattern of intersectoral financial flows in developing economies is to identify the borrowing and the lending sectors or economic agents. For example, the idea is to identify the extent to which the financing of business investment depends on the availability of foreign funds rather than domestic finance, or vice versa. The evidence also helps determine the degree to which households accumulate financial assets, conditional on either the state of economic development or the availability of foreign sources of finance. Moreover, evidence on the pattern of intersectoral financial flows is useful in identifying the type of assets which characterise financial intermediation; the financial markets, institutions and instruments that are conducive to poverty-reducing economic growth can therefore be identified.

⁷ The approach suggested here differs from some research where a flow of funds component is built into a large scale computable general equilibrium model (CGE); not only is CGE modelling a different research problem from ours, but we also believe that this would be cumbersome without yielding some positive value added. See Murinde (1996) on the comparison of flow of funds, SAMs and CGEs.

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