General Equilibrium of a Regional Economy with a Financial Sector - Part 1: An Accounting framework with Budget and Balance Sheet Linkages

Merritt R Hughes, University of Massachusetts Boston

Available at: https://works.bepress.com/merritt_hughes/4/
ABSTRACT. An accounting framework is presented that can be used as a basis for a regional general equilibrium economic model that meaningfully incorporates both real and financial activity. The accounting framework describes a circular flow from regional income to credit base, and back to regional income, including the balance of payments identity. Both real market transactions and capital stock changes are explicitly recognized. Linkages between real activity flows and sectoral balance sheets are highlighted. Financial activity is recognized as a service, and all assets are assumed to be valued at market prices.

1. INTRODUCTION

Among the topics traditional to regional economics, the determinants of differential rates of growth in regional income are prominent. But only recently has interest turned to the role of financial factors in explaining differential growth rates. Early attempts frequently adopted a Mundell-type approach, but did not incorporate institutional or structural detail. Several recent papers analyze more detailed models of regional financial markets and their role as determinants of regional growth through their impact on the regional credit base. Moore and Hill (1982), Dow (1987), and Harrigan and McGregor (1987) advance the theory of regional financial markets but do not attempt to model the mutual determination of regional credit conditions and regional income. Moore, Karaska, and Hill (1985) present separate models of regional credit markets and regional income expansion. Finally, Amos and Wingender (1988) integrate previous models of regional financial markets and regional income generation and conclude that the expansionary impact of an exogenous increase in regional exports is reinforced by the inclusion of a financial sector. They do not, however, incorporate all accounting identities and hence do not fully exploit a general equilibrium framework for studying the mutual determination of financial and real product markets.

In this paper, Part I of a two-part article, I present an accounting framework that can be used as a basis for a regional general equilibrium economic model that
meaningfully incorporates both real and financial activity. I advance the discussion by presenting an accounting framework for a regional economy that describes a circular flow from regional income to credit base, back to regional income, including the balance of payments identity. Both real market transactions and capital stock changes are explicitly recognized. Linkages between real activity flows and sectoral balance sheets are highlighted. Financial activity is recognized as a service, and all assets are assumed to be valued at market prices. The issue of loanable funds as a determinant of regional development is addressed in Part II of the article (to appear in the February 1992 issue of this Journal) by introducing behavioral assumptions into the integrated real product and loanable funds markets presented here.

In this paper, I formalize interdependencies of real and financial activity by integrating regional actors' income statements, presented by a social accounting matrix (SAM), and their balance sheets, presented by a wealth matrix. It is shown that a savings-investment balance is implicit in the SAM and a wealth-capital balance in the wealth matrix. Given further definitional linkages between the SAM and the wealth matrix pertaining to definitions of asset accumulation and the value of financial services, a third implicit relationship is derived: household savings equals the change in household net worth.

SAMs have been widely used in economic development literature (e.g., Dervis, de Melo and Robinson, 1982; Pyatt and Round, 1979; Taylor 1979) and are beginning to be used in regional economics as well (Kraybill, 1989; Harrigan and McGregor, 1988). The SAM may be thought of as a convenient summary of interrelated flow or budget identities.

Detailed wealth accounts are available for a number of national economies, though as yet scarce or nonexistent for regions within nations. Not all nations have wealth accounts or flow of funds data systems that are integrated into the national accounts. Some national economies, such as the U.S., have both accounts that can be integrated, and complete sets of balance sheets. For some example discussions on national flow-of-funds accounts and their integration with income and product accounts, see Harrigan and McGregor (1988), Pyatt and Round (1985), Ruggles and Ruggles (1982), Stone (1966).

Flow of funds data has been used widely for several decades both for checking the consistency of the national accounts data, and as a basis for models of financial markets. Very few studies, using detailed flow of funds data, however, analyze economic simulation models that incorporate nontrivial linkages between financial markets and real sectoral activity. Three exceptions are Patrick (1966), Brainard, Backus, Tobin, and Smith (1980), and Bourguignon, Branson, and de Melo (1989).

The regional aspect of the system of accounts is highlighted by extended delineation of the way in which interregional real and financial investment are an integral part of regional activity. The economic position of the region vis-a-vis the rest of the nation is defined by the balance of payments identity, which relates the current account on the flow side with changes in the capital account and
interregional settlements on the stock side. A change in the region’s trade balance (inclusive of net transfers), to the extent that it is not neutralized by a change in extraregional investment, initiates a net regional outflow or inflow of primary deposits.\(^1\)

Some abstractions from complexities required for empirical analytic comparative statics are made in the accounting framework presented here in order to form a convenient basis for the analysis offered in Part II of this article. For example, while the accounting framework could be expanded to include any number of sectors, the system presented here is reduced to the minimum number that are necessary to illustrate the major economic relationship between real and financial flows and the sectoral activity to which they are due: one industry, one household and one financial service sector are distinguished.

In Section 2, I present real flows of the system in terms of a SAM, and I lay out stock holdings in the regional economy by reference to a wealth matrix in Section 3. Finally, in Section 4, I detail the linkages between the SAM and the wealth matrix. My concluding remarks are in Section 5.

2. REAL FLOWS

An accounting system of real flows is presented in Table 1 in the form of a social accounting matrix (SAM), reflecting an underlying system of interconnected budget constraints or income statements for all agents in the economy. The SAM presented here is a simplified version of the standard presentation in that within the productive sectors it combines recognition of the activity of production with recognition of the resulting commodities. Activities and commodities are frequently separated in order to allow greater flexibility in the determination of relative prices, as well as industrial structure. Here, we are concerned instead with accounting relationships between real and financial flows, hence do not distinguish between the two.

The accounting identities implicit in the rows and columns of the SAM are listed as Equations (1) through (6) in Table 2. Cell entries are denoted in terms of variables to facilitate the tracking of flows through the system. Variable definitions are also in Table 2.\(^2\) Greek letters refer to average behavioral propensities, whose determinants are not examined in this paper.

---

\(^1\)Why does the balance-of-payments identity hold? Consider the example of two regional economies, A and B. Both produce goods, consume goods, engage in trade, and are initially in equilibrium. Interaction between the regions consists of real trade and financial flows, where for purposes of this simple example financial flows can be considered as an exchange of IOU’s for real goods. An increase in import demand by region A that is not accompanied by an increase in exports must be financed through borrowing from region B. This argument can be extended to any number of regions with the same result: a change in the net trade balance for any of the \(n\) regions is matched by a financial capital movement of equal magnitude in the opposite direction. This does not imply that the sum of interactions between any two regions equals zero, in general it will not.

\(^2\)Throughout this paper, capital letters are used as aggregate indices for total regional output \((X)\), the weighted average unit labor costs \((\Omega H)\), and the weighted average profit rate \((P)\) in the SAM. Let
TABLE 1: Social Accounting Matrix

<table>
<thead>
<tr>
<th>Expenditures and Receipts</th>
<th>Industry</th>
<th>Financial Services</th>
<th>Household</th>
<th>Rest of World</th>
<th>Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>$\alpha_i x_i$</td>
<td>$\gamma(P + \Omega H)x$</td>
<td>$\varepsilon P + \Omega H X$</td>
<td>$E$</td>
<td>$I_i$</td>
</tr>
<tr>
<td>Financial Services</td>
<td>$\alpha_i x_i$</td>
<td></td>
<td>$\gamma(P + \Omega H)x$</td>
<td>$\varepsilon P + \Omega H X$</td>
<td>$E$</td>
</tr>
<tr>
<td>Household</td>
<td>$(\pi_i + \omega_i \eta_i) x_i$</td>
<td>$(\pi_i + \omega_i \eta_i) x_i$</td>
<td></td>
<td>$E$</td>
<td>$I_i$</td>
</tr>
<tr>
<td>Rest of World</td>
<td>$\theta x_i + iF$</td>
<td></td>
<td>$\tau P + \Omega H x$</td>
<td>$\beta(P + \Omega H X)$</td>
<td>$SF$</td>
</tr>
<tr>
<td>Savings</td>
<td>$RE$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All demands for industry output can be identified by reading across row 1 of the SAM. Total demand that industry faces for its product ($x_i$) has four sources: financial-sector demand for intermediate inputs, domestic consumption, domestic investment, and exports.

The industry-industry cell is left blank because receipts net out against expenditures to itself. It should be noted, however, that there is no logical necessity in doing so and, particularly if the dataset were to be utilized in a model concerned with intrasector organization, there would be reason to fill the cell. The same reasoning holds for the other diagonal entries.

Use of receipts generated by sale of industry products is shown in the first column of the SAM. In order to fulfill demand for its product, industry purchases some per unit of output amounts of labor ($\omega_i \eta_i x_i$) and noncompetitive imports ($\theta x_i$), pays dividends to entrepreneurs ($\pi_i x_i$), purchases some proportion of services from the regional finance sector ($\alpha_i x_i$) and extraregional creditors ($iF$) and develops some business savings ($RE$), either through retained earnings or equity issues.

The first row and first column of the SAM are equivalent to Equations (1) and (2), which, when equated, may be interpreted as the budget constraint for the industry. That is, total revenue ($x_i$) must equal total expenditure ($x_i$) of Equation (2).

Reading across the second row of the SAM, final demand for regional financial services consists of orders placed by industry ($\alpha_i x_i$) and households [$\varepsilon(P + \Omega H X)$]. Reading down the second column of the SAM, the financial sector uses the income it receives from providing its service to purchase intermediates from industry ($\alpha_i x_i$), to pay wages ($\omega_i \eta_i x_i$) and proprietor income ($\pi_i x_i$). The financial sector budget is met because the sum of its expenditures ($x_i$) in Equation (3) equals the sum of its receipts ($x_i$) in Equation (4).

The SAM could be generalized to allow the financial sector to issue equity or accumulate capital. Such savings by the financial sector would be recognized in the

$$\Omega H X = \omega_i \eta_i x_i + \omega_i \eta_i x_i$$
denote total labor earnings, and $P X = \pi_i x_i$ denote total profits paid out to households. Then

$$\Omega H = (\omega_i \eta_i x_i + \omega_i \eta_i x_i)/(x_i + x_i)$$

$$P = (\pi_i x_i + \pi_i x_i)/(x_i + x_i)$$

$$X = x_i + x_i$$
TABLE 2: Equations and Variables

**Equations**

**Flow Balance Identities—SAM**

1. \( x_i = \alpha_{ix} x_f + \gamma(P + \Omega H)X + I_i + E \)
2. \( x_i = \alpha_{ix} x_f + \omega_i \eta_i x_i + \tau_i x_i + \delta x_i + RE + iF \)
3. \( x_f = \alpha_{fx} x_f + \epsilon(P + \Omega H)X \)
4. \( x_i = \alpha_{ix} x_f + \omega_i \eta_i x_i + \tau_i x_i \)
5. \( \gamma(P + \Omega H)X + \epsilon(P + \Omega H)X + \tau(P + \Omega H)X + \delta(P + \Omega H)X = (\pi_i + \omega_i \eta_i)x_i + (\pi_f + \omega_i \eta_f)x_f \)
6. \( SF = 6x_i + (P + \Omega H)X + iF - E \)

**Wealth Balance Identities—Wealth Matrix**

7. \( W_i = K_i + Q_i - L_i - F \)
8. \( Q_h = L_h + L_h + R - Q_h \)
9. \( W_h = W_i + Q_h - L_h \)
10. \( W_f = -F \)

**SAM—Wealth Matrix Linkages**

11. \( (W_i - W_o) = RE \)
12. \( I_i = (K_i - K_m) \)
13. \( \alpha_{ix} x_f = iL_i - i_o Q_i \)
14. \( \epsilon(P + \Omega H)X = iL_h - i_o Q_h \)
15. \( cur = (R - R_o) \)
16. \( SF - (F - F_o) + cur = 0 \)

**Variables**

- \( \alpha_{ix} \) Per unit demand for intermediate inputs
- \( \alpha_{ix} \) Per unit use of financial services by industry
- \( E \) Export demand
- \( \Omega H \) Weighted average unit labor costs
- \( \omega_i, \omega_f \) Wage rate for industry and finance, respectively
- \( \eta_i, \eta_f \) Industry and finance per unit labor use, respectively
- \( \tau_i, \tau_f \) Industry and finance profit payments per unit output, respectively
- \( RE \) Retained earnings
- \( X \) Total output \((X = x_i + x_f)\)
- \( x_i, x_f \) Industry, finance sector output, respectively
- \( i \) Interest rate on loans and extraregional finance charge
- \( i_o \) Rate at which interest payments on deposits are made
- \( F \) Total amount of funds borrowed from extraregional institutions
- \( SF \) Current account deficit
- \( \theta \) Per unit import-use coefficient
- \( \gamma \) Household average propensity to consume the industry good
- \( \epsilon \) Household average propensity to consume finance
- \( \tau \) Household average propensity to consume imports
- \( \beta \) Household average propensity to save
- \( K_i \) Physical capital of industry
- \( Q_o \) Deposits of industry (compensating balances)
- \( L_i \) Industry loans, contracted in the present period and outstanding at end
- \( W_h \) Net worth of households
- \( R \) Bank reserves
- \( L_h \) Consumer loans
- \( Q_h \) Bank deposits owned by households
- \( W_f \) Assets owned by extraregionals
- \( W_f \) Equity, or net worth of industry
- \( I_i \) New investment
- \( cur \) Change in currency in the region
- \( P \) Weighted average profit rate
- \( F_o, K_o, L_o, Q_o, W_o \) Past period values
Savings row and the Financial Services column of the SAM. Extraregional business activity by the financial sector would appear in the Financial Services row and the Rest of World column, where rest of world (ROW) includes all agents outside of the regional economy. Investment goods demanded from the financial sector would appear in the Financial Sector row and Investment column. One way to represent physical capital investment made by the sector is to include a second Investment column, specific to the financial services sector. Physical capital investment would appear in the new column and the Financial Services row.

The household budget constraint is shown in row 3 and column 3 of the SAM, or by Equation (5) in Table 2. Household income is the sum of industry and financial services wages, and entrepreneurial income (i.e., dividends or proprietor income) from industry and financial services. Household consumption is spent on the industry good, imports and financial services. Additionally, some fraction of household income is saved. These four choices are exhaustive of the possible ways household income may be spent given the broad framework delineated here.

As in standard balance-of-payments accounting, interregional trade flows may be represented by the current account, where the current account deficit (SF) equals the sum of this region’s payments for noncompetitive imports for production (Ox), consumer imports \( \tau(P + \Omega H)X \), and extraregional remittances (IF), minus export demand for the industrial good (E). Total imports are defined in the fourth row, while exports and the net value of the current account appear in the fourth column. The balance-of-trade identity is defined in Equation (6).

Equations (1) through (6) define a series of accounts for each agent. Not only must each agent’s budget constraint hold, but an aggregate balance for the economy must hold as well. In the national income accounts of the United States this balance is expressed by GNP equaling national income. In a regional model the analogous condition is that gross regional product equals total regional income. In terms of the SAM itself, the sum of the row sums equals the sum of the column sums.

Because each agent’s budget constraint holds and the budget constraint of the region as a whole holds, it is implied that regional savings equals regional investment. This is, the sum of the elements in row 5 of the SAM equal the sum of the elements in column 5

\[
I = \beta(P + \Omega H)X + SF + RE
\]

There are three forms of savings in this simplified framework: savings of households, the current account deficit (foreign savings) and the business savings of industry. In the consolidated accounts presented here the only real investment activity that takes place is in the one industry sector, hence \( (I) \) refers equally to both tangible investment demand and supply of tangible investment.

3. SPECIFICATION OF CAPITAL STOCKS

Balance sheets for each agent in the regional economy can be formulated in terms of a wealth matrix, similar to the SAM formulation of agent budget constraints. The wealth matrix defines intersector claims, mapping stocks from “contractee” to “contractor,” and is inclusive of all stocks held in the region. In the
accounts I present here, in Table 3, all financial instruments in the system are grouped into the three major types commonly recognized: debt, equity and deposits. Balance sheets are completed with the inclusion of tangible capital, bank reserves, and foreign investment.

All pairs of the sectors of the regional economy are linked by at least one intersector claim category. Two sector pairs, households-financial services and industry-financial services, have two links, deposits \( (Q_h) \) and loans \( (L_h) \). Between households and industry there is one link, labeled stocks or industry net worth.\(^3\) The framework presented here can therefore be interpreted as subsuming all financial instruments within the regional economy in the three types of financial instruments explicitly recognized.

Additionally, this framework recognizes one financial link between the local economy and the rest of the world, this is, between the Industry sector and ROW. Such a link may include transactions between extraregional banks and local industry, or the extension of trade credit. Financial links between households and extraregionals, or between the financial sector and extraregionals are excluded from the framework presented here. They could, of course, by included by recognition of terms in the \([4,2]\) and \([4,3]\) cells of the wealth matrix for stock values and the corresponding cells of the SAM for current payment flows.

Each agent may be conceptualized as maintaining a balance sheet in which assets are equal to liabilities plus net worth. The balance-sheet equations are represented in the wealth matrix in Table 3, where each agent’s assets are another’s liability or net worth.

The framework differs from the flow of funds data published by the Board of Governors of the Federal Reserve System (FRB) in that here the accounts map from sector to sector rather than from sector to instruments. In effect, the U.S. national statistics recognize an intervening marketplace that subsumes some of the information presented here.

Identities implicit in the wealth matrix are listed as Equations (7) through (10) in Table 2.\(^4\) A sector’s assets are listed across the corresponding row, while its liabilities are listed down the corresponding column. Just as the SAM can be interpreted as budget constraints describing real flows, balance-sheet Equations (7) through (10) are implied by the wealth matrix.

In particular, as may be seen in row 1 of the wealth matrix, industry’s assets are defined as the sum of its physical capital \( (K_i) \) and the deposits or compensating balances \( (Q_i) \) that it keeps with the bank for its working capital needs. Industry’s liabilities are the bank loans outstanding against it \( (L_i) \) and extraregional financial

\(^3\)Consistent with standard economic theory, households are described as the ultimate owners of all wealth of the system, aside from extraregionals. All net worth of each sector, except households and ROW, is owned by other sectors in the form of market valued equities. The simplified framework presented here could, of course, be extended by including the equity of the financial services sector.

\(^4\)Other formulations of financial accounts with respect to their integration with income and product accounts have been suggested as databases for national models (e.g., Pyatt, 1989; Morishima, 1984) but in general do not incorporate balance-sheet identities. Unlike SAMs, wealth matrices do not have wide acceptance, perhaps due to the difficulties of developing reliable estimates of the values of the entries.
capital ($F$) with a balancing term of net worth ($W_f$). The implied balance may also be written in the form of Equation (7) in Table 2.

The business activity of the financial sector can be described as either to grant credit which, in the process, creates matching deposits, or to channel loanable funds from regional savers to borrowers. It is the latter interpretation that is followed in this paper. The stock balance for the financial sector is represented by the second row and column of the wealth matrix, Equation (8). Reserves ($R$) plus loans to industry ($L_i$) and households ($L_h$) are matched by its liabilities, namely, deposits held by the bank for industry ($Q_i$) and households ($Q_h$).

Household assets, the sum of the equity value or net worth of industry ($W_i$) and household deposits at the bank ($Q_h$), are equal to its liabilities, which are loans ($L_i$) and net worth ($W_h$). In other words, the sum of the entries in column 3 of the wealth matrix is equal to the sum of entries in row 3 of the wealth matrix, as expressed in Equation (9).

Stocks held by the rest of the world (ROW) appear in the fourth row and column of the wealth matrix with the analogous identity being Equation (10). Net liability that the region accrues due to extraregional lending ($F$) equals the assets within the region owned by extraregionals ($W_f$).

In this accounting framework, households are recognized as the ultimate owners of all regional wealth. Hence, total net capital of the region is equivalent to “net worth” of households. This implication may be derived by using Equations (7), (8) and (10) to substitute expressions for ($W_i$), ($Q_h$) and ($W_f$) into Equation (9). Net worth of households is equal to total physical capital, minus extraregional investment, plus bank reserves

\[ W_h = K_i - W_f + R \]

This may also be interpreted as an implied balance identify on the stock side, similar to the savings equal investment identity of the flow side. It is the same as is recognized at the national level by the FRB accounts except that households and extraregional investors are explicitly recognized at the ultimate owners of business net worth. In the FRB accounts all sectors are described as the ultimate owners of some part of system wealth.

4. FLOW-STOCK LINKAGE EQUATIONS

The following section lays out the equations that link the SAM and the wealth matrix. Following the literature on the theory of loanable funds, this framework

<table>
<thead>
<tr>
<th>Liabilities and Assets</th>
<th>Industry</th>
<th>Financial Services</th>
<th>Household</th>
<th>Rest of World</th>
<th>Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>$Q_i$</td>
<td>$L_i$</td>
<td>$L_h$</td>
<td></td>
<td>$K_i$</td>
</tr>
<tr>
<td>Financial Services</td>
<td>$L_i$</td>
<td>$Q_h$</td>
<td></td>
<td></td>
<td>$R$</td>
</tr>
<tr>
<td>Household</td>
<td>$W_i$</td>
<td>$Q_h$</td>
<td></td>
<td></td>
<td>$W_h$</td>
</tr>
<tr>
<td>Rest of World</td>
<td>$F$</td>
<td></td>
<td></td>
<td>$W_f$</td>
<td></td>
</tr>
<tr>
<td>Wealth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
recognizes that the financial sector influences industrial production and household consumption by loosening the current budget constraints of industry and households, respectively.

In the FRB flow of funds data, balance sheet data is directly related to the National Income and Product Accounts (NIPA) only through one link between tangible investment and net worth. That link incorporates depreciation and revaluation, in addition to new investment.

More can be said on a conceptual level, however, about the relationships between the economic flow and stocks. In the set of accounts presented here, industry, finance, households and ROW each have a set of equations linking the flows to stock values. The SAM-wealth matrix linkage equations are listed as Equations (11) through (16) in Table 2.

In the national flow of funds data published by the FRB, financial flows are categorized as either sources, defined as issues net of payback, or uses, defined as acquisitions net of sales. In effect, the FRB data series group financial transactions according to market type; i.e., primary or secondary, with net primary market activity being a net savings activity, and net secondary market activity being a net investment activity.

In the framework here, an alternative distinction is made. Changes in holdings are grouped according to the direction of money flows. Thus, for example, the act of making a loan would not be distinguished from buying a secondary market security by loan contracts; both are categorized as an increase in assets, or a use of funds. Moreover, here sources of funds appear on the liability (and net worth) side of the balance sheet; contracting for a loan, or selling loan-backed securities would imply an increase in liabilities. As previously mentioned, in this simplified framework all physical capital is valued at current market prices. Excluding depreciation from this framework implies there are neither capital gains nor losses.

Given these alternative definitions, the change in net worth of industry can be equated to retained earnings. Sources of financial capital for industry are retained earnings \( RE \) and the change in domestic bank loans \( L_i \). Financial capital is used for changing the level of physical capital \( K_i \) and working capital deposits \( Q_i \).

Sources equal uses is an identity

\[
(11') \quad RE + (L_i - L_i^o) - (F - F_i) = (K_i - K_i^o) + (Q_i - Q_i^o)
\]

By taking the change during the period of all elements in the industry balance sheet equation

\[
(7') \quad (W_i - W_i^o) = (K_i - K_i^o) + (Q_i - Q_i^o) - (L_i - L_i^o) + (F - F_i)
\]

and subtracting Equation (11') from (7'), the result is that the change in industry net worth is equal to retained earnings of the period, Equation (11)

\[
(11) \quad (W_i - W_i^o) = RE
\]

By recognizing that investment equals the change in the physical capital during the period, an implicit relationship between industry debt and investment is forged. Differencing Equation (7) and using Equation (12) in order to explicitly recognize investment

\[
(12') \quad I_i = (W_i - W_i^o) - (Q_i - Q_i^o) + (L_i - L_i^o) - (F - F_i)
\]
Since there is only one industry sector here, the same sector both supplies and demands physical investment. The relationship expressed in Equation (12') details the financial underpinnings of physical investment. An increase in industry loan volume, to the extent it is not neutralized by changes in other financial stocks, increases physical capital investment. Short-term (within-period) debt is accommodated in this framework as well as long-term (multiperiod) debt. To the extent that industry contracts for financial capital in order to obtain short-term liquidity, deposits \((Q_i - Q_{io})\) are increased rather than investment.

There is also a link between the volume of financial capital borrowed or lent, and the value of financial services. Intermatrix equations translate the stock of financial capital entered on the balance sheets of the financial sector into flows of services to industry and households. Lending is described as a process of redistributing financial capital from savers to investors, hence the product that the financial sector provides is an intermediation service. Through providing this service to the economy, using labor and capital, the sector generates value added.

Since the only function performed by the financial-services sector in this simplified framework is to shift financial capital from savers to investors, the overall value of financial services \((x_f)\) is defined in Equations (13) and (14) as equaling net financial profit (i.e., interest income minus interest expense). In the broad categories defined in this framework, loans are the only interest-earning asset for the financial sector. Revenue accrues at a rate of \((i)\), so that interest income equals \(i(L_i + L_j)\). Likewise, deposits are the only instrument generating interest expense. Interest payments are made at a rate of \((i_d)\) on total outstanding deposits \((Q_i + Q_{ih})\).

As established by Equation (3), total financial services are composed of services for industry and households. The value of financial services provided to industry is defined as the difference between which industry must pay on its outstanding loans and the interest payments accruing on industry deposits during the period, Equation (13).

Similarly to industry, household purchases of financial services equal their interest payments on outstanding loans, net of interest received on deposits. As defined in Equation (14), household demand for financial services \([e(P + \Omega H)X]\) is comprised of interest payments on outstanding consumer loans net of interest payments on deposits.

Two final flow-stock identities describe the interface of the regional economy with the rest of the world. Cash-in-hand and interregional capital transfers that occur entirely within a single organization are excluded from this framework. This allows currency inflow to be presented as having a simple relationship to reserves of the financial services sector, as defined in Equation (15). The balance of payments identity, as written in Equation (16), states that the net trade deficit, minus investment by extraregionals into the region, plus the inflow of currency to the region, equals zero. The balance-of-payment identity always holds; deficit in the current account \((SF)\) can be financed both with interregional settlements, or change in primary deposits \((cur)\).

The budget constraints, balance-sheet constraints, system-balance con-
straints and flow-stock linkage equations outlined above imply one further important relationship; that between household savings and net worth.

Household deposits represent gross savings and exceed net household savings. Substituting the definition of savings as formulated in the savings-investment balance (6') into the industry debt-investment Equation (12')

\[(12') \quad \beta(P + \Omega H)X + SF + RE = (W - \dot{W}) - (Q - \dot{Q}) + (L - \dot{L}) - (F - F')\]

Then using the financial services sector balance-sheet Equation (8) and the balance of payments Equation (16)

\[(9') \quad (W - W_h) = \beta(P + \Omega H)X + RE\]

Since less household savings implies less household wealth, it also implies, ceteris paribus, less wealth for the region overall; households are, ultimately, the only owners of wealth within the region.

To set the stage for Part II of this article, I would like to point out two implications of the accounting framework outlined here. Using the differenced version of the household balance sheet constraint (9), and Equation (11), it can be shown that more consumer loans implies, ceteris paribus, less household and, hence, regional savings

\[(9'') \quad \beta(P + \Omega H)X = (Q_h - \dot{Q}_h) - (L_h - \dot{L}_h)\]

And, by extension, ceteris paribus, less regional investment

\[(6') \quad I = (Q_h - \dot{Q}_h) - (L_h - \dot{L}_h) - SF - RE\]

5. CONCLUSION

In this, Part I of a two-part article, a market-value accounts framework was developed that explicitly links stocks and flows with respect to both real and financial activity. Special emphasis was placed on defining a simple financial services sector that can play a key role in channeling loanable funds from savers to investors and, hence, is a potential arbiter in the allocation of credit for consumption versus investment. The financial service sector was also recognized as a contributor of intermediation services.

While the discussion highlighted the key role of the financial services sector, abstractions from the real world that were incorporated into the framework were also pointed out. In particular, grouping all agents of the economy into three sectors imposes strong simplifying assumptions that abstract from many details that could be important in a model that specifies behavior. For example, delineation of only one real activity sector, labeled “Industry” in the preceding discussion, excludes the potentially interesting distinction between extractive, manufacturing and nonfinancial service activities, or between tradable and nontradable goods. Having only one financial services sector, which engages in simple bank-like behavior, (e.g., buying deposits and selling loans), excludes the potential for economic impacts from disintermediation or securitization. Exclusion of federal and local government makes explicit policy analysis difficult.

Most of these simplifications subsume sets of economic concepts under unifying rubrics and are easily generalized. However, some of the simplifications
may be restrictive. Whether these restrictions jeopardize the integrity of the accounting framework depends on its ultimate use.

The accounting framework outlined in this paper is unusual in its extended articulation of the dual nature of financial services. The second part of this article, A Simple Behavioral Model, combines the framework presented here with additional behavioral assumptions. The resulting general equilibrium model of a regional economy is used to analyze the role of financial activity in determining the level and composition of economic activity.

REFERENCES


