The Flow-of-Funds Account

The table below shows the flow-of-funds account for a simple economy. There are three sectors—households and firms (hf), banks (b), and government (g) (the central bank is grouped with the government). There are only two financial assets, money M and bonds B.

We assume that the households and firms hold no currency. Consequently the monetary base (high-powered money) equals bank reserves, and the money supply equals bank deposits.

Flow-of-Funds

	Households and Firms		Banks		Government		Economy	
	U	S	U	S	U	S	U	S
S		S				$T-G$		$S+(T-G)$
I	I						I	
M	ΔM_{hf}		ΔH	ΔM_b		ΔH	$\Delta M_{hf}+\Delta H$	$\Delta M_{hf}+\Delta H$
B	ΔB_{hf}		ΔB_b			ΔB_g	$\Delta B_{hf}+\Delta B_b$	ΔB_g
	Total = Total		Total = Total		Total = Total		Total = Total	

For each sector, total sources equal total uses.

Households and Firms

For households and firms,

$$S = I + \Delta M_{hf} + \Delta B_{hf}. \tag{1}$$

The household and firm saving S is divided into investment I and financial asset accumulation $\Delta M + \Delta B_{hf}$, the accumulation of money plus the accumulation of bonds.

Banks

For banks,

$$\Delta M_b = \Delta H + \Delta B_b. \tag{2}$$

The flow-of-funds for banks says that the increase in bank deposits ΔM_b (which is also the increase in the money supply) equals the sum of the increase in bank reserves ΔH (the increase in the monetary base—high-powered money) plus the increase in bank loans and investments ΔB_b (the increase in bonds held by banks).

Government

For government,

$$G - T = \Delta H + \Delta B_g. \tag{3}$$

The government deficit $G-T$ is financed by printing money ΔH and by borrowing ΔB_g.

Investment Equals Saving

Three accounting identities underpin the totals in the right column.

First, investment equals total saving,

$$I = S + (T - G). \tag{4}$$

Total saving is the sum of household and firm saving S plus government saving $T-G$.

Money

Second, money sources equal money uses,

$$\Delta M_b + \Delta H = \Delta M_{hf} + \Delta H.$$

The increase in money ΔM_b in banks equals the increase in money ΔM_{hf} held by households and firms.

Bonds

Third, bond sources equal bond uses,

$$\Delta B_g = \Delta B_{hf} + \Delta B_b.$$

The increase in the government debt ΔB_g is financed by the increase in bonds held by households and firms and by banks, $\Delta B_{hf} + \Delta B_b$.

Structural Model: Portfolio Balance

The portfolio balance model of Tobin [2] deals with stocks, not flows. For the two-asset structural portfolio balance model, in market equilibrium the stock supply of money equals the stock demand for money; and the stock supply of bonds equals the stock demand for bonds.

The portfolio demands depend on the interest rate R on bonds. One solves the structural model for the equilibrium interest rate R. The reduced form expresses the equilibrium R in terms of the stocks of money and bonds.

Structural Model: Flows

Because a change in a stock is a flow, one can set up an analogous model in terms of flows [1]. The flow model is the "first difference" of the portfolio-balance model: if a variable y depends on another variable x, then the change Δy depends on the change Δx.

In market equilibrium, the flow supply of money equals the flow demand for money; and the flow supply of bonds equals the flow demand for bonds.

The flow supply and demand depend on the change ΔR in the interest rate, and one solves the structural model for the change ΔR. The reduced form expresses the change ΔR in terms of the changes in the factors determining the supply of money and bonds.

Endogenous and Exogenous Variables

We put forward a structural demand and supply model of the flow of funds. The endogenous variables are the flow supply and demand for money and bonds and the change ΔR in the interest rate. The exogenous variables are the household and firm investment I, household and firm saving S, taxes T, government expenditure G, the flow supply of high-powered money ΔH, the flow supply of government bonds ΔB_g, and the change ΔY in national income and product.

Households and Firms

For households and firms, let

$$\Delta M^d_{hf} = M_I I + M_S S + M_R \Delta R + M_Y \Delta Y$$
$$\Delta B^d_{hf} = B_I I + B_S S + B_R \Delta R + B_Y \Delta Y$$

denote the flow demands for money and bonds. The explanatory variables are investment I, saving S, the change ΔR in the interest rate, and the change ΔY in national income and product.

Flow Budget Constraint

From equation (1) in the flow-of-funds accounts, the budget constraint for the flow demands for money and bonds is

$$\Delta M^d_{hf} + \Delta B^d_{hf} = -I + S. \tag{5}$$

As this relationship must hold for arbitrary values I, S, ΔR, and ΔY, it follows that the structural coefficients must satisfy

$$M_I + B_I = -1$$
$$M_S + B_S = 1$$
$$M_R + B_R = 0$$
$$M_Y + B_Y = 0.$$

Signs of Coefficients

One expects $M_I < 0$ and $B_I < 0$; investment is financed partly by money and partly by bonds. One expects $M_S > 0$ and $B_S > 0$; for fixed investment, saving partly adds to money and partly to bonds. One expects $M_R < 0$ and $B_R > 0$; a higher interest rate causes a demand shift away from bonds toward money. Also, one expects $M_Y > 0$ and $B_Y < 0$; because a higher national income and product calls for more money to carry out increased transactions, there is a demand shift away from bonds toward money.

Money Supply

Banks set the money supply. We use the following model:

$$\Delta M^s_b = M^s_H \Delta H + M^s_R \Delta R.$$

In the simplest model of the money supply, the coefficient $M^s_H > 0$ is the money multiplier; and the coefficient $M^s_R = 0$.

More generally, an increase in the interest rate should increase bank lending and thus increase the money supply, so $M^s_R > 0$.

The money supply determines the demand for bonds by banks. From the flow-of-funds identity (2), we have

$$\Delta B^d_b = \Delta M^s_b - \Delta H = (M^s_H - 1)\Delta H + M^s_R \Delta R. \tag{6}$$

Market Equilibrium

In market equilibrium, the flow supply of money (by banks) must equal the flow demand for money (by households and firms),

$$\Delta M_b^s = \Delta M_{hf}^d. \tag{7}$$

Also, the flow supply of bonds (by the government) must equal the flow demand for bonds (by households and firms and by banks),

$$\Delta B_g = \Delta B_{hf}^d + \Delta B_b^d. \tag{8}$$

Walras's Law

In the portfolio balance model, the market equilibrium condition that money supply equals money demand is equivalent to the market equilibrium condition that bond supply equals bond demand. The equivalence follows from Walras's law: the excess supply of money equals the excess demand for bonds.

Analogously, in the flow-of-funds model, the market equilibrium condition (7) is equivalent to the market equilibrium condition (8). The equivalence follows from Walras's law for flow demand and supply.

We show that the excess flow supply of money equals the excess flow demand for bonds:

$$\begin{aligned}
&\Delta M_b^s - \Delta M_{hf}^d \\
&\quad = (\Delta B_b^d + \Delta H) - (S - I - \Delta B_{hf}^d), \text{ by (6) and (5)}, \\
&\quad = (\Delta B_{hf}^d + \Delta B_b^d) - \Delta B_g + (\Delta B_g + \Delta H - S + I) \\
&\quad = (\Delta B_{hf}^d + \Delta B_b^d) - \Delta B_g + \{I - [S + (T - G)]\}, \text{ by (3)}, \\
&\quad = (\Delta B_{hf}^d + \Delta B_b^d) - \Delta B_g, \text{ by (4)}.
\end{aligned}$$

Thus the excess flow supply of money equals the excess flow demand for bonds. Equilibrium in one market implies equilibrium in the other market.

Reduced Form

Consequently, one can solve for the equilibrium change ΔR in the interest rate by solving either (7) or (8). One finds

$$\Delta R = \frac{1}{M_R^s - M_R}(M_I I + M_S S + M_Y \Delta Y - M_H^s \Delta H).$$

Here $M_R^s - M_R > 0$. Hence R rises as I rises, as S falls, as ΔY rises, and as ΔH falls.

References

[1] Patric H. Hendershott. *Understanding Capital Markets, A Flow-of-Funds Financial Model*, volume 1. Heath, Lexington, MA, 1977. HG181U52v.1.

[2] James Tobin. A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking*, I(1):15–29, February 1969. HG201J6.