# 4. The Money View, Micro and Macro

http://www.federalreserve.gov/releases/z1/Current/z1.pdf (see full matrix at very end)
Notable features—household deleveraging, switching from credit to money, instrument discrepancy is repo, sectoral discrepancies

Last time we saw how the US banking system was born from the strains of war finance and financial crisis, and we also saw how understanding balance sheet relationships can help us to understand the underlying processes. Today we focus more specifically on the balance sheet approach that will be used throughout the course, and to aid that focus we confine our discussion to the most placid of events, namely the use of the banking system to facilitate ordinary daily exchange.

## Payment Systems: Money and Credit

Suppose you and I do regular business with each other. You produce a good that I want, and I produce a good that you want, but for some reason supply and demand for the two goods are not precisely coordinated over time. One way of organizing our interaction is with the help of money. I buy your goods by giving you money, and you buy my goods by giving me money. Over time, my money balances fluctuate and so do yours, while total money stays the same.

| Me | | | You | |
|---|---|---|---|---|
| Assets | Liabilities | | Assets | Liabilities |
| +goods<br>-ΔM | | | -goods<br>+ΔM | |

Note however that another way of organizing our interaction is with credit or promises to pay. I buy your goods by giving you an IOU and you buy my goods by giving me an IOU of your own, or giving me back one of my own, so there is only net indebtedness between us. Note that the promise to pay is never actually paid, only offset by other promises, so there is no real need for money as such. We could organize the whole thing by promising to pay some abstract unit of account with no physical existence. In some ways this **pure credit** payment system is more flexible than the pure money payment system, since we are not limited by the total money supply, only by mutually agreed credit limits. Observe that in this system, unlike the money system, the quantity of outstanding IOUs fluctuates over time.

| Me | | | You | |
|---|---|---|---|---|
| Assets | Liabilities | | Assets | Liabilities |
| +goods | +ΔIOU | | -goods<br>+ΔIOU | |

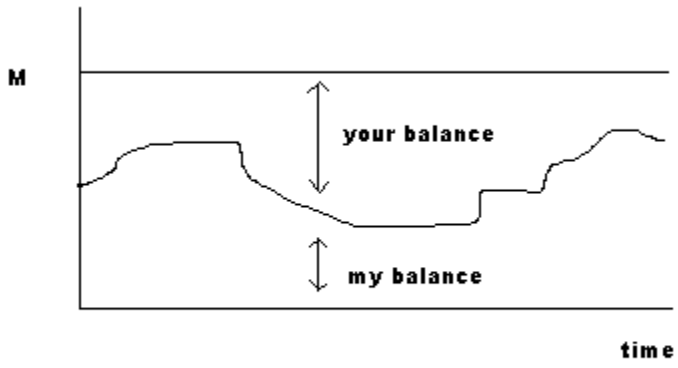
Now consider yet a third way we might organize our interaction. Suppose neither of us trusts one another sufficiently to extend bilateral credit, so the bilateral credit limit is zero. But we both trust some third party, and that third party also trusts each one of us. In this case we can organize our exchange by issuing IOUs to and accepting IOUs from the third party. It seems reasonable to call these third party IOUs "money", and to call the third party a "bank". Then the relevant balance sheet entries are as follows:

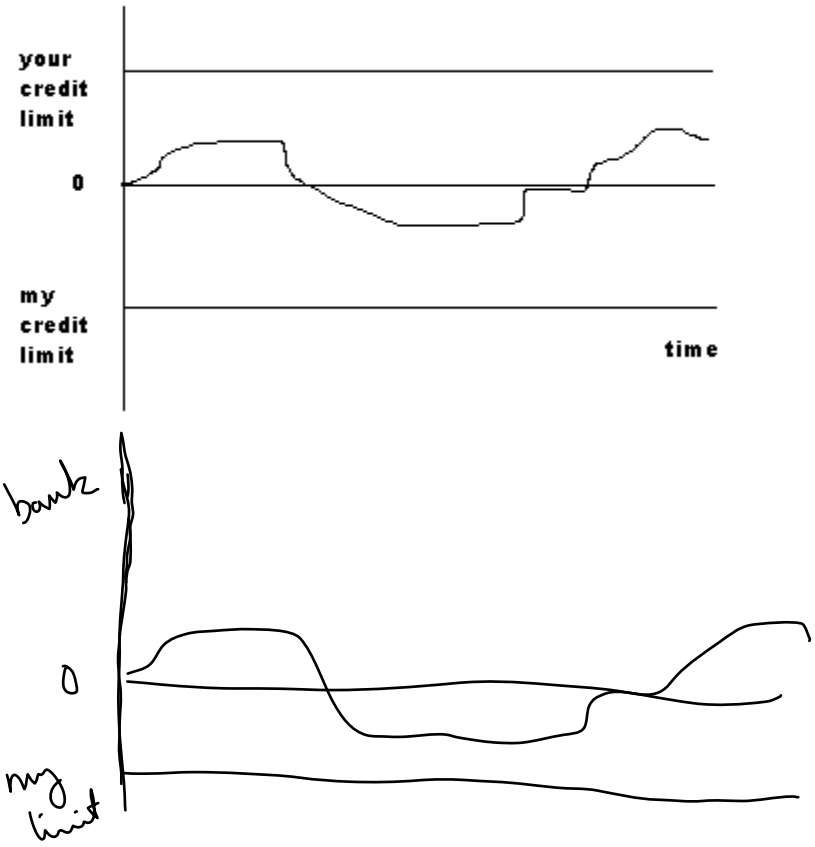
| Me | | Bank | | You | |
|---|---|---|---|---|---|
| Assets | Liabilities | Assets | Liabilities | Assets | Liabilities |
| +goods | +ΔIOU | +ΔIOU | +ΔM | -goods<br>+ΔM | |

Note how the quantity of bank money fluctuates over time, as bank credit expands and contracts in order to facilitate the time pattern of trade. It is of course this third system that most resembles the institutions of the modern developed economy.

## Discipline and Elasticity

I have emphasized before that at every moment in time there is a balance between discipline (which comes from the scarcity of money) and elasticity (which comes from the availability of credit). In our first example, the discipline came from the limited quantity of money—when either side ran out of money, they could no longer buy and trade stopped. In the second example, the discipline comes from the bilateral credit limit. In the third example the discipline comes from the credit limit and terms imposed by the bank on each borrower, and the elasticity comes from the willingness of the bank to swap its own IOU (which is money) for IOUs farther down the hierarchy (which are credit). We can understand these three examples as representing different balance between discipline and elasticity.






## Money and The Real World: Micro

**Cash Flow** is the most basic concept in this course. Here we follow the lead of Hyman Minsky who writes:

> To analyze how financial commitments affect the economy it is necessary to look at economic units in terms of their cash flows. The cash-flow approach looks at all units—be they households, corporations, state and municipal governments, or even national governments—as if they were banks. (Minsky 1986, p. 198)

What this means is that we view every economic agent as an entity experiencing a certain inflow of cash (receipts of various kinds) and outflow of cash (expenditures of various kinds) over time. The most basic **survival constraint** (or "reserve constraint", also Minsky's terminology) facing the agent is that the inflow must be at least as big as the outflow. Receipts and expenditures on commodities fluctuate over time relative to one another. If at a moment in time expenditures are greater than receipts, then cash flows out from hoards. If hoards are exhausted they may be replenished by borrowing, but that

just puts off the day of reckoning, so it only works if there is a date when receipts are expected to be greater than expenditures.

$$\text{Cash Flow} - \text{Cash Commitment} \geq 0$$

**Sources and Uses** accounts can help us to understand all this in more detail. Every transaction can be captured as a simultaneous 4-part entry (at least) in this system of accounts.

| | Uses | Sources | |
|---|---|---|---|
| Goods and Services | Expenditures | Receipts | |
| Financial Assets | Accumulation | Decumulation | Credit |
| Financial Debts | Repayment | Borrowing | Debit |
| Money | Hoarding | Dishoarding | Money |

This set of accounts differs from the T-accounts of last lecture in that all entries are flows, not stocks.

You can see the hierarchy of money below the line, and real expenditures above the line. (Note that I have a separate entry for Financial Assets and Financial Debts, in order to capture the feature that individuals are responsible for their gross debts, not just their net debts.) We could subdivide even more finely to take account of the different kinds of money and the different kinds of credit. Just so, if this were a bank, we would want "money" to refer to reserves. If this is an individual, we might want money also to refer to deposit accounts.

Two rules structure the accounts:

**Rule 1**: For each agent, every use has a corresponding source, and vice versa.
**Rule 2**: Each agent's use is some other agent's source, and vice versa.

Example 1: Money. Buy a cup of coffee from Oren's Daily Roast for $2 cash

| Me | | Java City | |
|---|---|---|---|
| Use | Source | Use | Source |
| Expenditure, coffee | | | Receipt, coffee |
| | Dishoarding, $2 | Hoarding, $2 | |

Example 2a: Credit. Buy dinner at Vareli for $20 using credit card

| Me | | Vareli | | Mastercard | |
|---|---|---|---|---|---|
| Use | Source | Use | Source | Use | Source |
| Expenditure | | | Receipt | | |
| | | Accumulation (MC) | | Accumulation (Me) | |
| | Borrowing (MC) | | | | Borrowing (Vareli) |
| | | | | | |
| | | | | | |

Example 2b: settle MC account (Vareli)--daily

| Me | | Vareli | | Mastercard | |
|---|---|---|---|---|---|
| Use | Source | Use | Source | Use | Source |
| | | | | | |
| | | | Decumulate | | |
| | | | | Repay | |
| | | Hoarding | | | Dishoarding |

Example 2c: settle MC account (Me)--monthly

| Me | | Vareli | | Mastercard | |
|---|---|---|---|---|---|
| Use | Source | Use | Source | Use | Source |
| | | | | | |
| | | | | | Decumulate |
| Repay | | | | | |
| | Dishoarding | | | Hoarding | |

This example shows the intimate connection between cash and credit in the payments system. Observe the enormous amount of action "below the line" that is necessary in order to make goods and services transactions "above the line" possible. Observe further the way that credit provides elasticity, expanding to facilitate transactions, while money provides discipline, the requirement to contract credit back down again after a certain time.

## Money and the Real World: Macro

The Flow of Funds set of accounts is built on Sources and Uses methodology. There is however a lot of aggregation and netting.

> Aggregation into sectors: Households, businesses, financial institutions, etc…
> Some netting within sectors, so missing some household to household flows
> Considerable netting over time, quarterly statements only

Despite all this netting, rules 1 and 2 still apply, and the consequence is a disciplined matrix structure of accounts. For any agent, total uses and total sources must balance (column sums). And for any instrument, total uses and total sources must balance (row sums).

http://www.federalreserve.gov/releases/z1/Current/z1r-3.pdf

This set of accounts was originally promoted by Morris Copeland as a possible framework for macroeconomic analysis, in his book A Study of Moneyflows in the United States (1952). He explicitly proposed it as an alternative to the national income and product accounts, which had been the basis of the Keynesian revolution:

$C + I + G + X-M = Y$

In NIPA accounts, the emphasis is on value added and employment, so we focus on final production. But used goods are also exchanged, and also financial assets. These exchanges are shunted off to one side by NIPA but are at the same level of analysis in FoF. Indeed, the sale of goods and the sale of assets are equivalent ways of achieving a source of funds.

The accounts were also intended as an alternative to the traditional quantity theory:

$MV = PT$

In this accounting system, transactions includes everything, not just final income transactions, but all transactions are treated as if they are made with money. In a way the Keynesian framework grows from the quantity theory, with C+I+G+X-M serving as a kind of disaggregation of MV, and Y serving as a specification of a subset of PT. Copeland wanted to go even farther but he did not win out. Actual macroeconomic debate was between Keynesians and monetarists, and FoF remained a specialty interest for those who wanted to track developments in the financial world (below the line).

## Money and Time: Liquidity and Solvency

The central concern from a banking perspective is not solvency but **liquidity,** i.e. the survival constraint. Are current cash inflows sufficient to cover current cash outflow commitments? If yes, then we satisfy the survival constraint. If no, then we have to raise additional cash flow in some way and there are only three ways to do it:

(1) Spend down hoards of money
(2) Liquidate accumulations of financial assets
(3) Borrow, i.e. build up additional stocks of financial liabilities.

Notice that both (2) and (3) depend on finding someone else to take the other side of your trade, and that might be impossible or extremely expensive in times of crisis. In times of crisis only (1) is dependable. That is why reserves are important.

The survival constraint must be met not only today but also at every moment in the future. Thus, generally, **the problem of satisfying the survival constraint is a problem of matching up the time pattern of cash flows with the time pattern of cash commitments**. The central question is whether at any moment in time actual cash flows are **validating** promised cash commitments. Problems on that score show up in the money market where people unable to make payments from their existing cash flow face the problem of raising cash, either by issuing a financial asset (borrowing) or selling one (liquidation).

To see the point concretely, consider the following example. In all cases cash inflows are much greater than cash commitments, so there is no problem with solvency. But in the first case the survival constraint is met in every single period. In the second case the survival constraint is met in future periods but not the current period, so there is a current problem. And in the third case, the survival constraint is met in present periods but not future periods, so there is a potential problem.

Liquid Capital Structure

| | T | t+1 | t+2 | t+3 |
|---|---|---|---|---|
| Cash Flow | 10 | 10 | 10 | 10 |
| Cash Commitment | 5 | 5 | 5 | 5 |

Illiquid Capital Structure (current mismatch)

| | | | | |
|---|---|---|---|---|
| Cash Flow | 10 | 10 | 10 | 10 |
| Cash Commitment | 20 | 0 | 0 | 0 |

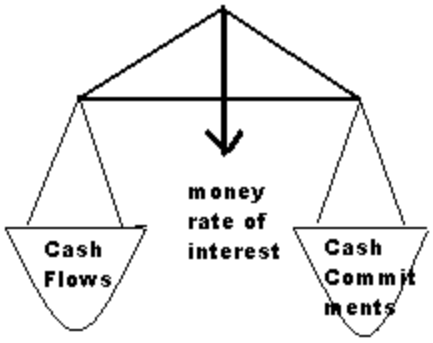
Illiquid Capital Structure (future mismatch)

| | | | | |
|---|---|---|---|---|
| Cash Flow | 10 | 10 | 10 | 10 |
| Cash Commitment | 0 | 20 | 0 | 0 |

The point to emphasize is that at any moment in time there are agents in the economy who fit into each of these cases, and all of them meet in the money market. The ones with current mismatch are necessitous borrowers—they have to borrow no matter what it costs. The ones with future mismatch may enter the money market today in order to avoid future problems, or they may decide to wait. The ones with current liquidity may decide to help the others out, or they may decide to do something else. The result of all this pushing and pulling is the money rate of interest.

The economy thus comes to appear as a system of interlocking balance sheets in which individuals depend on one another's promises to pay (financial assets), and build these promises into their own projections of future cash flows. In the economy as a whole there is a pattern of cash flows emerging from the "real" side, production and consumption and trade. And there is a pattern of cash commitments more or less explicit in the financial structure. At any moment there is a balance between the two, which shows up as a price (interest rate). If there is mismatch, then someone in the economy must be persuaded to give up current cash for a mere promise of future cash, and the relative price of these two is the rate of interest. It is for this reason that **problems of mismatch between cash flows and cash commitments show up as upward pressure on the short term money market rate of interest**.

**Flow Balance**




At the most basic level, the mismatch between cash commitments and cash flows is something that we see in the current pattern of payments. However that current pattern reflects also a forward-looking view since people can and do anticipate problems they may face in satisfying the survival constraint in the future. If they can move a future

problem into the present where it is easier to handle, they do so. This rearrangement can put current pressure on the money market today even though there is no problem making current payments. In this sense, the state of the money market is an indication of how well or how poorly the structure of financial commitments matches the pattern of cash flows, not just today but also looking forward.

## From Flows to Stocks

These fund flows link up to our balance sheet T accounts as changes in the outstanding stock of each particular asset or liability. The stock of outstanding IOUs of any particular description is just the sum of all the past flow accumulations of that particular asset. Just so, we can cumulate all the flows and write the balance sheet for any agent as

| Assets | Liabilities |
|---|---|
| Money<br>Financial Assets | Financial Liabilities<br>Net Worth |

Every agent has a balance sheet like this, so we can conceptualize **the economy as a set of interlocking balance sheets**, in which the financial liabilities of one agent are the financial assets of another. These liabilities are promises to pay, usually promises to make a specific series of payments at specific times in the future.

In standard accounting practice, there is a lot of attention paid to the matter of **solvency**:

Value of Total Assets-Value of Total Liabilities = net worth > 0

To make this assessment, we need to value the assets and liabilities. Standard finance theory approaches this problem of valuation as a matter of finding the present value of future cash flows. We want to include not just financial assets but also real assets, since they presumably also involve future cash flows. From a financial point of view, a factory is nothing more than a particular kind of bond.[1]

For example, a factory that is expected to produce an annual net cash flow of $10 in perpetuity has a present value of $200 if the interest rate is 5% and expected to remain so.

Net Cash Flow = {10, 10, 10, 10, …..}
Present Value CF = $\{10/(1+R), 10/(1+R)^2, 10/(1+R)^3, ….\}$
Capital Value CF = $\Sigma\delta^t CF_t = 10/R = \$200$.

Some such calculation gives us the value of financial assets, and the value of financial liabilities. The value of money is of course much easier because the face value is the present value.

[1] Minsky, Stabilizing an Unstable Economy, p.

For our purposes the question of solvency is interesting mainly as an outer bound on **the credit limit** facing each agent. Intuitively it makes sense that that credit limit will be somehow related to the net worth. Solvent agents have unused borrowing power on their balance sheets which they can potentially mobilize to make payments. Thus we can see how asset price fluctuations can cause fluctuations in borrowing power, which might have consequences for immediate liquidity. Solvency problems can easily become liquidity problems.