Money and Banking System

February 18, 2019

What is money? Money (**M**) is the modern medium of exchange and the standard unit in which prices and debts are expressed. By controlling the behavior of money and credit, the government through its Federal Reserve System hopes to affect the balance of saving and investment expenditure–the level of real and money GNP, and hence the rate of price-level inflation.

In real life, what we care for is not only money–M is a **stock** magnitude, but the rate at which the stock of money is turning over per year to consummate income transactions. Economists define a concept of velocity (or income velocity) as the extent of circulation of money, **V**. **V** follows some insights:

- GNP is a flow of dollar income per year, the higher GNP is, the faster circulation of money we have
- if people hold less money relative to the same rate of GNP flow, **V** will be high
- GNP = price of apples $\times$ apples + price of oranges $\times$ oranges + ...

With these observations, we can define income velocity as:

$$\begin{aligned} V &\equiv \frac{GNP}{M} \\ &\equiv \frac{p_1 q_1 + p_2 q_2 + ...}{M} \\ &\equiv \frac{PQ}{M} \end{aligned}$$

where **P** stands for **average price level** going up and down with an index of the price level and **Q** stands for **real GNP** (distinct from current dollar) computed statistically by "deflating" GNP with a price index. Upon my understanding, GNP is a rough approximation of **V** while real GNP weighted by price levels is the accurate reflection of income velocity. Here, $\equiv$ means *by definition* these values are equal.

With equation $MV = PQ$, economists have proposed several different theories on explaining the relationship between money and prices. **The Crude Quantity Theory** simplifies the equation to the form of $P = kM$, where k is a positive proportionality constant. The assumption is simple: if the government effects a 10-ford increase in **M**, then one can predict there will be a galloping inflation in which **P** rises 10-fold also. Although few people still subscribe to the crude quantity theory, we should also embrace the truth that money supply can have important effects on macroeconomic magnitudes such as investment, employment, production and prices.

So how can the government control the supply of money? For what kind of role does the banking system play in such a game? In the following paragraphs we will conduct a brief research on banking system and explain why the government's central bank determines the supply of the **"high-powered money"**, which enables the commercial banks to produce as **amplified output** the community's supply of money (currency plus check-able bank deposit, namely M_1).

It's well-known that out of the *Legal Reserve Requirements*, banks must keep a substantial portion of its assets in non-earning cash. While it's safe for the deposit-savers that each bank keep all their deposits without investing in bonds or stocks, the main function of legal reserve requirements is not that of making deposits safe, liquid and payable on demand. Their vital function is to enable the Federal Reserve authorities to **control** the amount of demand deposits–or bank money–that banks can create.

Can banks really *create* money out of nowhere? The fact is, if a bank has $\$10,000$ as deposits, it can never lend $\$10,001$ to anyone else. You cannot invest money that you don't have. And money that you invest in buying a security or making a loan soon leaves your bank. However, even though with the limit of money used by banks, we shall see in the end the banking system is going to manufacture 10-folds of deposits it owns. Suppose every bank keeps at $\frac{1}{10}$ of its deposits because of legal reserve requirements. You put $\$1,000$ into the 1^{st} bank, while the 1^{st} bank retains $100 and acquires $900 worth of earning assets–bonds, loans or mortgages. Now others can use this $900 investment, in other words, the 1_{st} bank has created a new increase of $900 in money supply. But the banking system as a whole cannot settle down yet. The people who sold the bonds or borrowed from the bank will presumably deposit the proceeds in some other bank or pay them to someone else who will make such a deposit. So, what's the total amount of money supply?

$$\begin{aligned} \textit{money supply} &= \$1,000 \times (1 + \frac{9}{10} + (\frac{9}{10})^2 + ...) \\ &= \$10,000 \end{aligned}$$

Bank money has been created **10 out of 1**–and all the while each bank has invested and lent only a fraction of what it has received as deposits!

It's obvious now that the banking system is creating money, with a multiplier of $1/deposit\ reserve\ rate$. With this deposit reserve rate rectified by the central bank, the government have been controlling money supply **M**.