Money Supply Process

Economics 301: Money and Banking
Goals:

- Understand balance sheets of Federal Reserve system and banking system.
- Understand how money is created and multiplied.
- Understand determinants of money supply.

Learning Outcomes:

- LO4: Explain the structure of the Federal Reserve System and the mechanisms in which it controls the money supply.
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Read Hubbard and O’Brien, Chapter 14.
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- **Assets**: securities purchased by the Federal Reserve.
- **Reserves**:
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# Federal Reserve Balance Sheet

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<tr>
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<td>Other types of deposits</td>
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Monetary base = currency in circulation + total reserves in banking system (MB = C + R).

Open market purchase of $100 in Treasury Bills from Banking system.

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- Suppose the Federal Reserve (Fed) makes a $100 open market purchase of bonds.
- Increases banks’ reserves by $100, they in turn loan full amount to non-bank public.
- Non-bank public borrows $100 and spends it.
- $100 expenditure becomes $100 income for others in non-bank public.
- Suppose non-bank public holds zero currency, puts full amount in checkable deposits.
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Suppose non-bank public holds zero currency, puts full amount in checkable deposits.
Banks deposits increase by $100.

Put puts $(0.05)(100) = 5$ in reserves (minimum required), loans out remaining $95$.

Non-bank public borrows $95$, this becomes income for others, which ends up in deposits.

Banks put $(0.05)(95) = 4.75$ in reserves, loans out remaining $90.25$.

Non-bank public borrows $90.25$, this becomes income for others, which ends up in deposits again.

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A single $100 open market purchase of bonds created an increase of deposits equal to...

\[ \Delta D = 100 + 95 + 90.25 + 85.74 + \ldots \]

Let \( \Delta R \) denote initial change in reserves ($100), \( r \) denote required reserve ratio.

\[ \Delta D = \Delta R + (1 - r) \Delta R + (1 - r)^2 \Delta R + (1 - r)^3 \Delta R + \ldots \]

Can you simply this expression? How much larger is change in deposits compared to open market purchase?
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- Recall, we assume Actual reserves = Required Reserves.

\[ R = rD \]

\[ D = \frac{1}{r}R \]

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- Money multiplier = \(m = \frac{1}{r}\).
- Money Supply = (money multiplier) (monetary base).
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Suppose people do hold currency, banks hold excess reserves.

Notation:
- C: Currency holdings.
- D: Deposits.
- RR: Required reserves.
- ER: Excess reserves.
- R: Actual reserves.
- MB: Monetary base.

For simplicity, assume ratios of currency holdings and excess reserves are constant:
- \( c = \frac{C}{D} = \) currency ratio.
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Use \( MB = R + C \) and \( M1 = C + D \) to derive money multiplier.
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General Money Multiplier

\[ m = \frac{1 + c}{r + e + c} \]

Impact on Money Supply?
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General Money Multiplier Problem

Suppose the required reserve ratio is 5%, banks hold an extra 8% of deposits in excess reserves, and consumers hold currency balances that are about 2% of what they hold in deposits in banks. Suppose the Fed makes an open market purchase of $100 million of government bonds.

1. Compute the impact on the monetary base.
2. Compute the impact on the M1 money supply.
3. Compute the impact on the amount of deposits held in the banking sector.
4. Compute the impact on required reserves, excess reserves, and total reserves held by banks.
5. Describe and illustrate the impact on the equilibrium interest rate.
Factors affecting money supply:

- Open market operations (affect non-borrowed monetary base).
- Changes in required reserve ratio.
- Changes in banks’ desire to hold excess reserves.
- Changes in consumers’ desire to hold currency versus deposits.
- Changes in borrowed reserves.
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Typical assumption: central bank exogenously influences money supply through open market operations.

Typical assumption implication for money supply function?

How might excess reserves be influenced by interest rate?

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What is the implication for the money supply function?