The Money Supply Process

1. **Extreme Case 1**: Everyone uses checks

<table>
<thead>
<tr>
<th>The Central Bank</th>
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<th>Alice I. Wonderland</th>
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2. **Extreme Case 2**: The non-bank public uses only currency

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Money Supply Process 1
3. **The General Case**

Let

- $H$: supply of central bank money (also called monetary base, or high-powered money) ($)
- $CU$: currency held by the non-bank public ($)
- $R$: reserves held by commercial banks
- $D$: checkable accounts (also called demand deposits) ($)
- $M$: stock of money ($)
- $\theta$: reserve-deposit ratio: the fraction of deposits that banks hold in reserve ($R/D$)
- $c$: currency-money demand ratio: shows the preferences of the public about how much money to hold in the form of currency, and how much to hold in the form of checkable accounts.

Superscripts $d$ and $s$ denote demand and supply, respectively.

The two demands for currency and checkable deposits can be written as:

\[
CU^d = cM^d \quad (1) \\
D^d = (1-c)M^d \quad (2)
\]

The demand for reserves (by commercial banks) can be written as:

\[
R^d = \theta D^d \quad (3)
\]

Substituting from (2) into (3) for $D^d$ we get:

\[
R^d = \theta (1-c)M^d \quad (4)
\]

Total demand for central bank money can be written as:

\[
H^d = CU^d + R^d \quad (5)
\]

Substituting from (1) and (4) into (5), we get:

\[
H^d = cM^d + \theta (1-c)M^d = [c + \theta (1-c)]M^d \quad (6)
\]

In equilibrium, supply of central bank money, $H$, is equal to demand, $H^d$. That is:

\[
H = [c + \theta (1-c)]M^d.
\]

Dividing both sides by the expression in the brackets, we get:

\[
\frac{1}{[c + \theta (1-c)]}H = M^d \quad (7)
\]

So the formula for the money supply is:
\[ M' = \frac{1}{[c + \theta(1-c)]}H. \] (8)

The expression \( \frac{1}{[c + \theta(1-c)]} \) is called the **money multiplier**.

Note that in *EXTREME CASE 1*, \( c = 0 \), therefore the money multiplier is \( \frac{1}{\theta} \). In *EXTREME CASE 2*, however, \( c = 1 \), so the money multiplier in this case is \( = 1 \).

Rough estimates for \( \theta \) and \( c \), for the U.S., before the financial crisis which led to the Great Recession were, respectively: 0.10 and 0.40. Plugging these values into the money multiplier formula we get:

\[ \frac{1}{[0.40 + 0.10(1-0.40)]} = 2.17. \]