

Intermediate Macroeconomics

Chapter 9
Money Demand

Money Demand Equation

$$M_d = k * Y - h * i$$

M_d = demand for real balances, M/p
(i.e., purchasing power)

Positive function of income

Negative function of nominal interest
rate

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Money Demand

- Benefits and Costs of Holding Money
- Transactions Motive
- Precautionary Motive
- Speculative Motive
- Empirical results

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1. Benefits and Costs of Holding Money
Benefits

- Transactions Motive (M1)
 - avoid transaction costs
- Precautionary Motive (M1 and M2)
 - money available for unexpected expenses
- Speculative Motive (M2)
 - optimize return and risk of investment portfolio

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1. Benefits and Costs of Holding Money Costs

Opportunity cost of holding money:

Interest or profits that could be earned from better paying but illiquid or riskier non-money investments.

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2. Transactions Motive Benefits and costs

- Benefit of holding cash (M1):
Reduce transaction costs of converting cash to interest-bearing deposit and back to cash
- Cost of holding cash:
Interest on deposits not earned

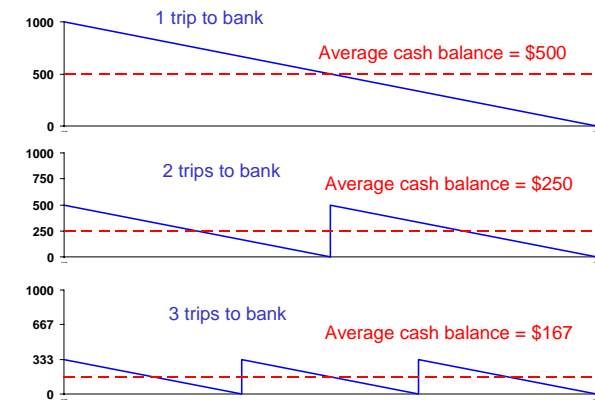
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2. Transactions Motive Example

- \$1,000 monthly income deposited directly in bank at beginning of month.
- Cost \$1 each trip to bank (transaction cost)
- Maximize net benefits =
Interest earned on bank deposits
– transaction costs

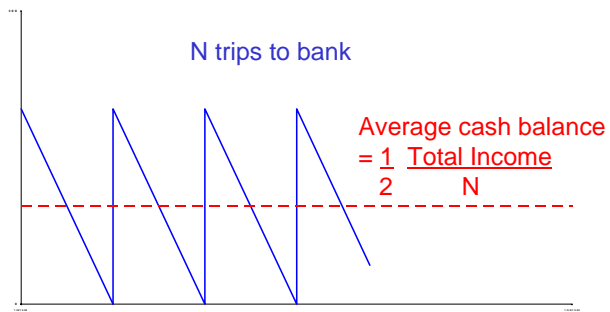
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2. Transactions Motive Example – money held by individuals



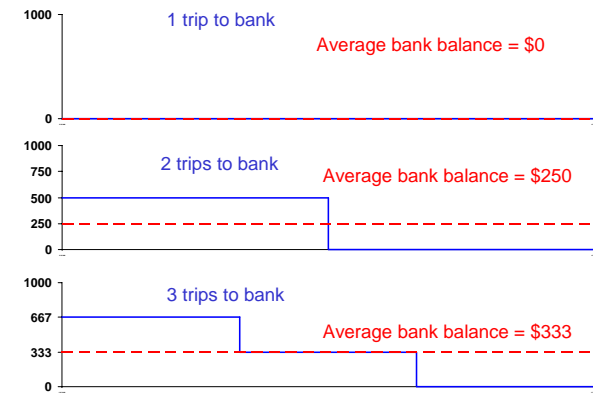
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2. Transactions Motive Example – money held by individuals



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2. Transactions Motive Example – bank deposits



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2. Transactions Motive Example - average balances

- For N trips to bank
- **Average cash holdings**
= $\frac{1}{2} \frac{\text{total income}}{N}$
- **Average bank balance**
= $\frac{1}{2} \text{ total income } \left(1 - \frac{1}{N}\right)$
= $\frac{1}{2} \text{ total income} - \text{average cash holdings}$

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2. Transactions Motive Average Balances

Assume: \$1,000 income earned at beginning of every month

Number of Transactions	Average Cash Holdings	Average Bank Balance
1	\$500	\$ 0
2	\$250	\$250
3	\$167	\$333
4	\$125	\$375

Average cash holdings (money demand) = $\frac{1}{2} * \text{income} / N$
Average bank balance = $(\frac{1}{2} * \text{income}) - \text{average cash holdings}$

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2. Transactions Motive

Interest earned on deposits

Number of Transactions	Average Bank Balance	Interest Earned at Nominal Monthly Interest Rate of		
		½ %	1 %	1 ½ %
1	\$ 0	\$ 0	\$ 0	\$ 0
2	\$250	\$1.25	\$2.50	\$3.75
3	\$333	\$1.65	\$3.33	\$4.95
4	\$375	\$1.88	\$3.75	\$5.63

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2. Transactions Motive

Tobin-Baumol model

Money demand (average cash holdings)

$$M^d = \frac{(Y \cdot tc)^{1/2}}{(2 \cdot i)^{1/2}}$$

i = nominal interest rate

Y = monthly income

tc = transaction cost

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3. Precautionary Motive

- Benefit of holding cash (M1 and M2):
 - Uncertainty over future expenses. Shortage of cash leads to additional costs.
- Cost of holding cash:
 - Interest on deposits not earned on better paying but *illiquid* investments.

illiquid investment - not quickly converted to cash

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3. Precautionary Motive

Implications

Real money demand (purchasing power) increases if:

- Decline in Interest Rate (on illiquid assets)
- Increase in uncertainty over future expenses or income (e.g., recessions)
- Higher cost of illiquidity (not having enough cash to cover emergencies)

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4. Speculative Motive Capital Asset Pricing Model (CAPM)

- Portfolio - all the securities held for investment by an individual
- Role of Money in Portfolio of Assets
 - Return on most assets (stocks, bonds, etc.) is uncertain (risky)
 - Investors are (to some degree) risk averse
 - Hold some “safe” assets (e.g., certificates of deposit) with low returns to reduce overall risk of investment portfolio
- How much of safe asset to hold? Depends on willingness to take risk and difference in returns.

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4. Speculative Motive

- Benefit of holding cash (M2):
 - reduce overall risk of investment portfolio
- Cost of holding cash
 - lower average return on investments

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4. Speculative Motive Implications

Nominal money demand (M2) increases if

- Decline in return on risky assets
- Increase in interest rate of safe assets (e.g., insured certificates of deposit - M2)
- Increase in riskiness of other assets

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5. Empirical Results

- M2 money demand more stable than M1
- Short-run elasticities smaller than long-run elasticities

Elasticity - % change in real money demand arising from a 1% change in interest rate or real income

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