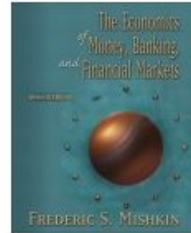


ECON 354 Money and Banking

Professor Yamin Ahmad

Lecture 12

- The Bond Market
- Fisher Effect
- Theory of Liquidity Preference: Revisited



Big Concepts

- Demand and Supply for bonds/assets
 - What factors determine the demand and supply for bonds (or loanable funds)?
- Equivalence of Loanable funds and Liquidity Preference
- Effect of changes in money growth rate on interest rates

Note: These lecture notes are incomplete without having attended lectures

Determinants of Asset Demand

Relationship to Asset Demand

- | | |
|---|----------|
| • Wealth | Positive |
| • Expected Return
(Relative to other assets) | Positive |
| • Risk | Negative |
| • Liquidity | Positive |

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Derivation of Bond Demand Curve

- Consider a pure 1 year discount bond

$$i = RET^e = \frac{(F - P)}{P}$$

Point A:

$$P = \$950$$

$$i = \frac{(\$1000 - \$950)}{\$950} = 0.053 = 5.3\%$$

- Assume demand at this price is : $B^d = \$100$ billion

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Derivation of Bond Demand Curve

Point B:

$$P = \$900$$

$$i = \frac{(\$1000 - \$900)}{\$900} = 0.111 = 11.1\%$$

- Assume demand at this price is: $B^d = \$200$ billion

Point C: $P = \$850$, $i = 17.6\%$ $B^d = \$300$ billion

Point D: $P = \$800$, $i = 25.0\%$ $B^d = \$400$ billion

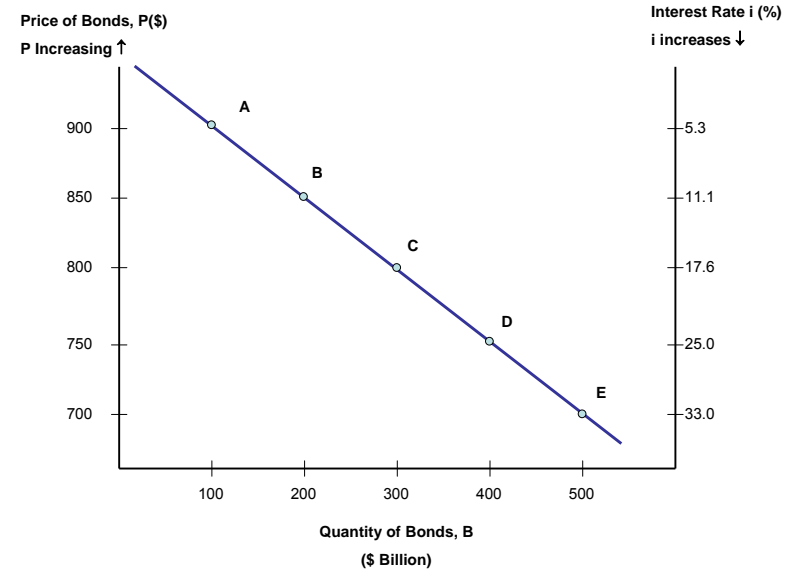
Point E: $P = \$750$, $i = 33.0\%$ $B^d = \$500$ billion

Demand Curve is B^d in Figure 1 which connects points A, B, C, D, E.

Has usual downward slope

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The Demand For Bonds



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Derivation of Bond Supply Curve

Point F: $P = \$750$, $i = 33.0\%$, $B^s = \$100$ billion

Point G: $P = \$800$, $i = 25.0\%$, $B^s = \$200$ billion

Point C: $P = \$850$, $i = 17.6\%$, $B^s = \$300$ billion

Point H: $P = \$900$, $i = 11.1\%$, $B^s = \$400$ billion

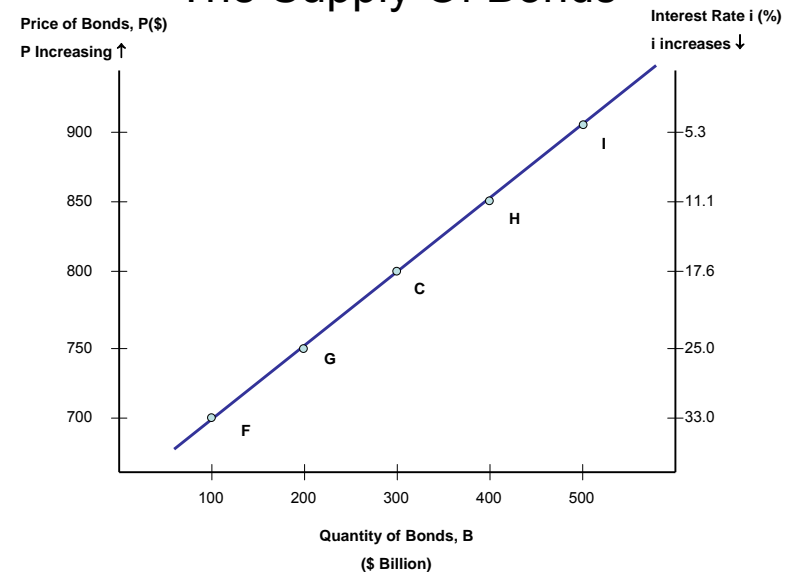
Point I: $P = \$950$, $i = 5.3\%$, $B^s = \$500$ billion

- Supply Curve is B^s that connects points F, G, C, H, I, and has upward slope

- At lower interest rates, it is less costly to finance borrowing
 - Hence more firms are willing to borrow by issuing bonds!

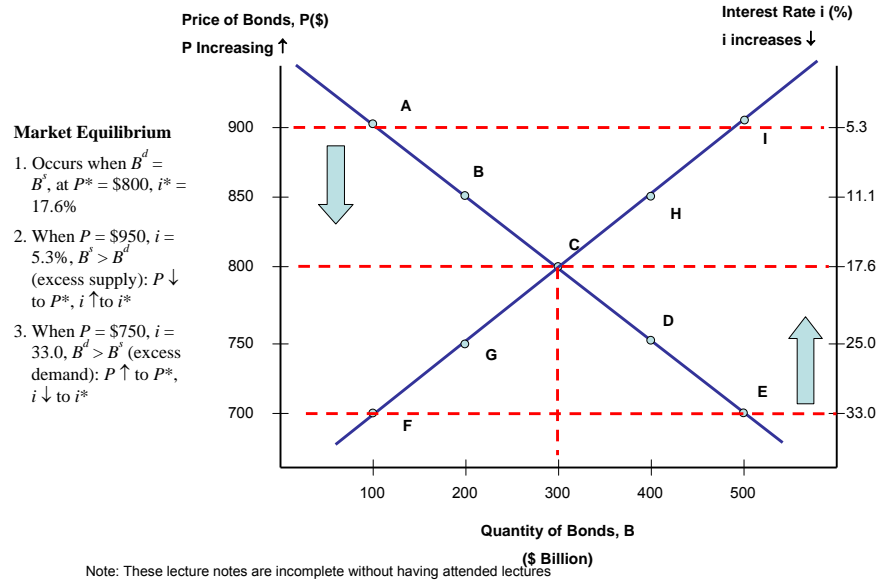
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The Supply Of Bonds

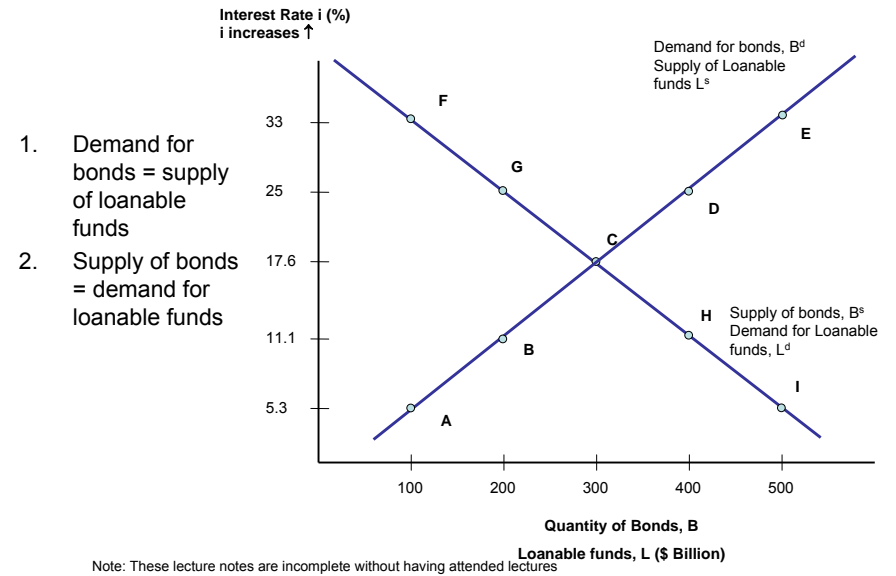


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The Bond Market



Loanable Funds Terminology

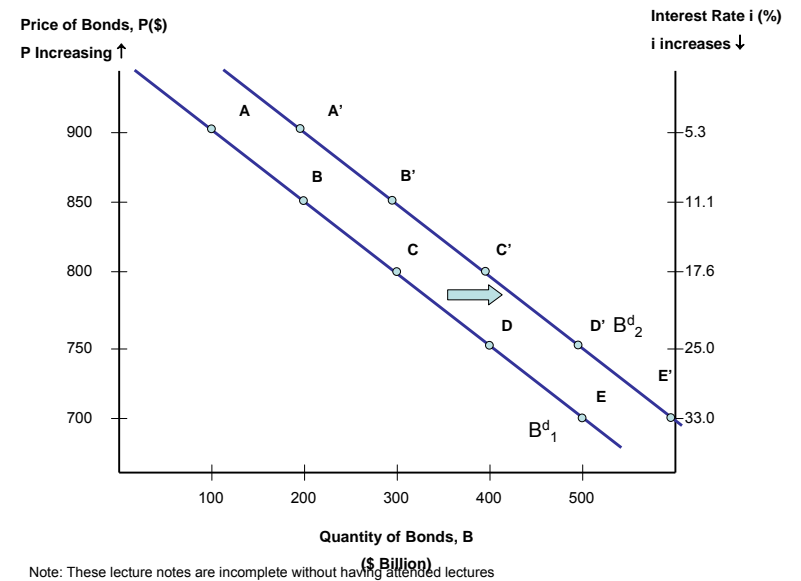


Factors that Shift the Bond Demand Curve

- Wealth**
 - Economy grows, wealth \uparrow , $B^d \uparrow$, B^d shifts out to right
- Expected Return**
 - $i \downarrow$ in future, R^e for long-term bonds \uparrow , B^d shifts out to right
 - $\pi^e \downarrow$, Relative $R^e \uparrow$, B^d shifts out to right
 - Expected return of other assets \downarrow , $B^d \uparrow$, B^d shifts out to right
- Risk**
 - Risk of bonds \downarrow , $B^d \uparrow$, B^d shifts out to right
 - Risk of other assets \uparrow , $B^d \uparrow$, B^d shifts out to right
- Liquidity**
 - Liquidity of Bonds \uparrow , $B^d \uparrow$, B^d shifts out to right
 - Liquidity of other assets \downarrow , $B^d \uparrow$, B^d shifts out to right

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Shifts in the Bond Demand Curve

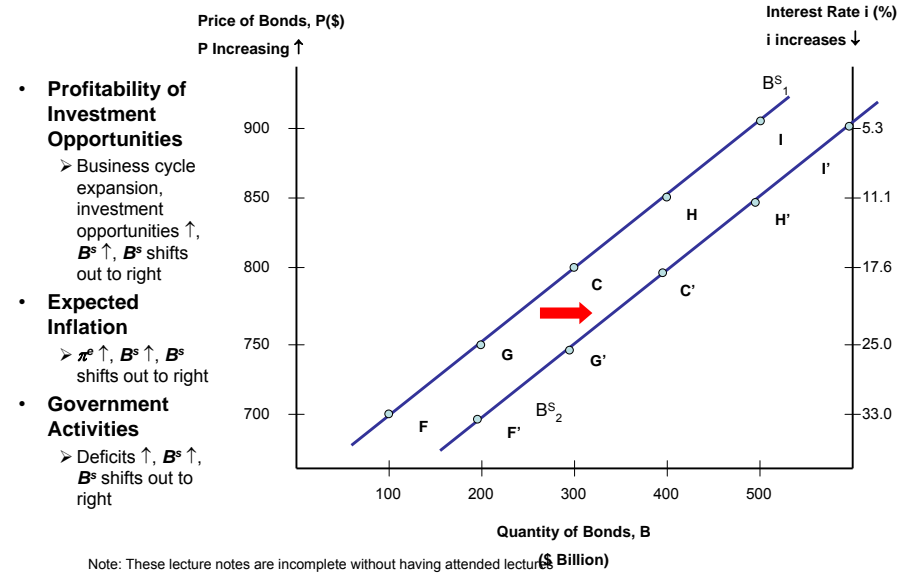


Shifts in Demand Curve For Bonds

Increases In The Following Variables	Change in Demand	Shift of Bond Demand Curve
• Wealth	↑	→
• Expected int. rate	↓	←
• Expected Inflation	↓	←
• Risk	↓	←
• Liquidity	↑	→

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The Supply Of Bonds

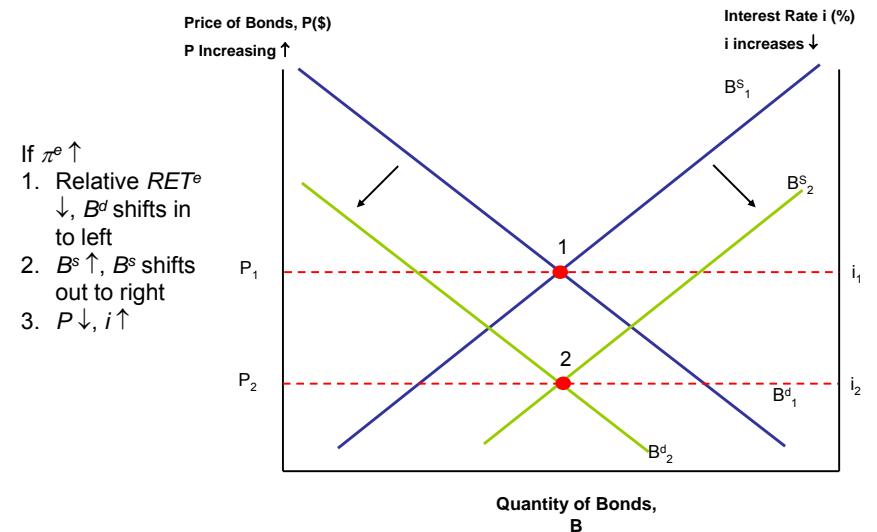


Shifts in Supply Curve For Bonds

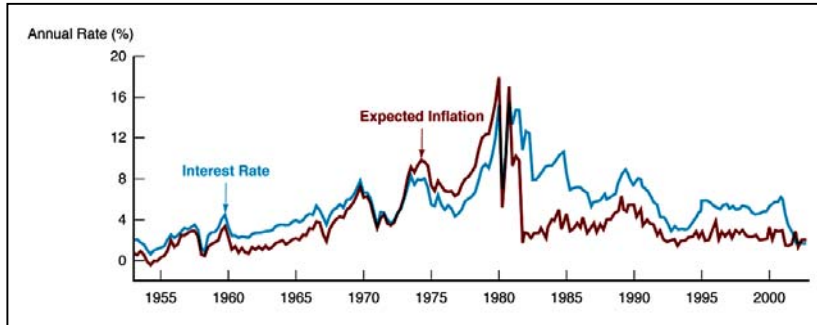
	Change in Supply	Shift of Bond Supply Curve
• Profitability of Investments	↑	→
• Expected Inflation	↑	→
• Government Deficit	↑	→

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Changes in π^e : the Fisher Effect



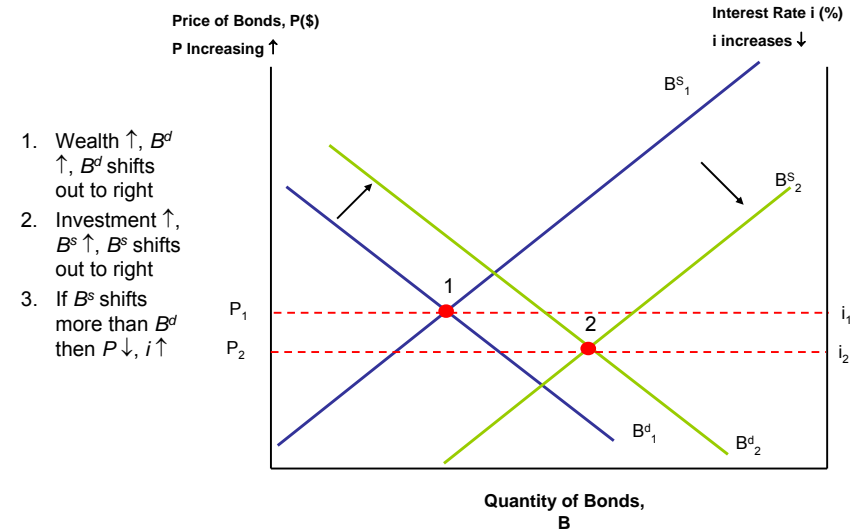
Evidence on the Fisher Effect in the United States



- **Fisher Effect:** when expected inflation rises, interest rates will rise

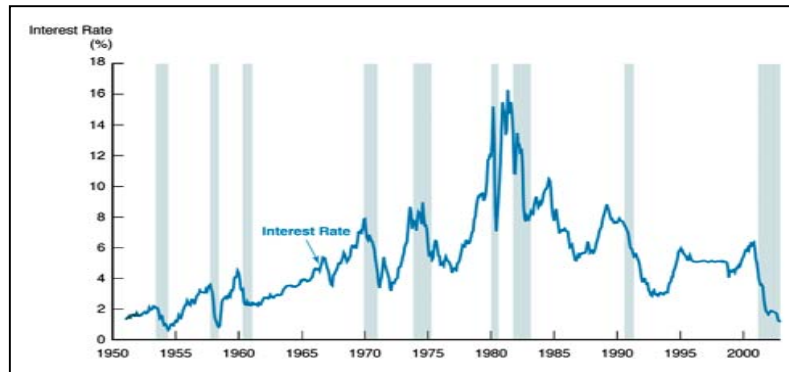
Note: These lecture notes are incomplete without having attended lectures

Business Cycle Expansion



Note: These lecture notes are incomplete without having attended lectures

Evidence on Business Cycles and Interest Rates



- **Observe:** Interest rates rise during business cycle expansions and fall during recessions

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Relation of Liquidity Preference Framework to Loanable Funds

- Keynes's Major Assumption
 - Two Categories of Assets in Wealth :
 - Money
 - Bonds

Thus: $M^s + B^s = \text{Wealth}$

Budget Constraint: $B^d + M^d = \text{Wealth}$

Therefore: $M^s + B^s = B^d + M^d$

Subtracting M^d and B^s from both sides:

$$M^s - M^d = B^d - B^s$$

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Money Market Equilibrium

- Definition: Money Market Equilibrium occurs when $M^d = M^s$
- Then $M^d - M^s = 0$ which implies that $B^d - B^s = 0$, so that $B^d = B^s$ and bond market is also in equilibrium
- Example of Walras' Law

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Equivalence of Liquidity Preference and Market For Loanable Funds

- Equating supply and demand for bonds as in loanable funds framework is equivalent to equating supply and demand for money as in liquidity preference framework
- Two frameworks are closely linked, but differ in practice because liquidity preference assumes only two assets, money and bonds, and ignores effects on interest rates from changes in expected returns on real assets

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Liquidity Preference Analysis

Derivation of Demand Curve

- Keynes assumed money has $i = 0$
- As $i \uparrow$, relative RET^e on money \downarrow (equivalently, opportunity cost of money \uparrow) $\Rightarrow M^d \downarrow$
- Demand curve for money has usual downward slope

Derivation of Supply curve

- Assume that central bank controls M^s and it is a fixed amount
- M^s curve is vertical line

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Money Market Equilibrium

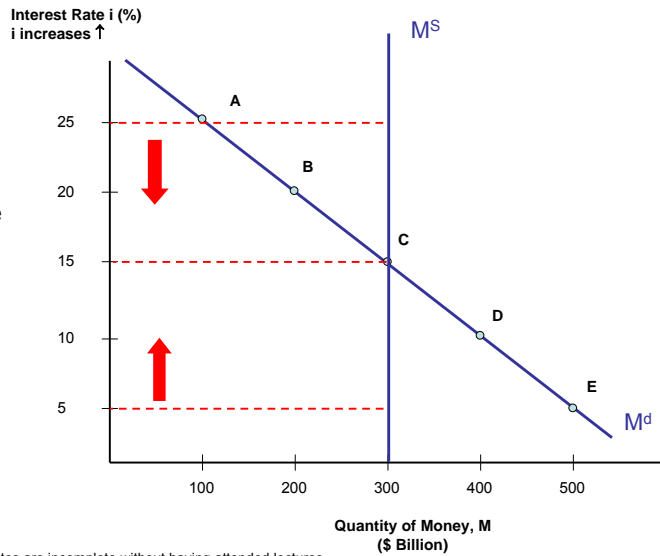
- Suppose that the money market equilibrium occurs when $M^d = M^s$, at $i^* = 15\%$
- If $M^s \neq M^d$, then interest rate adjusts:
 - If $i = 25\%$, $M^s > M^d$ (excess supply): Price of bonds \uparrow , $i \downarrow$ to $i^* = 15\%$
 - If $i = 5\%$, $M^d > M^s$ (excess demand): Price of bonds \downarrow , $i \uparrow$ to $i^* = 15\%$

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Money Market Equilibrium

• If $M^s \neq M^d$, then interest rate adjusts:

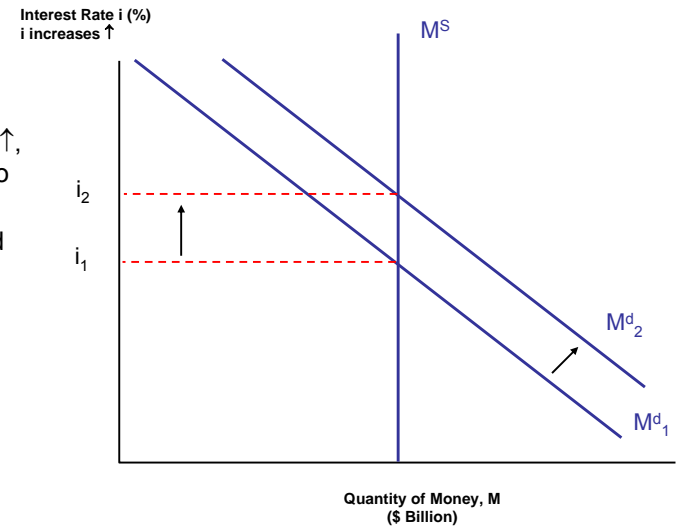
- If $i = 25\%$, $M^s > M^d$ (excess supply): Price of bonds \uparrow , $i \downarrow$ to $i^* = 15\%$
- If $i = 5\%$, $M^d > M^s$ (excess demand): Price of bonds \downarrow , $i \uparrow$ to $i^* = 15\%$



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Rise in Income or Price Level

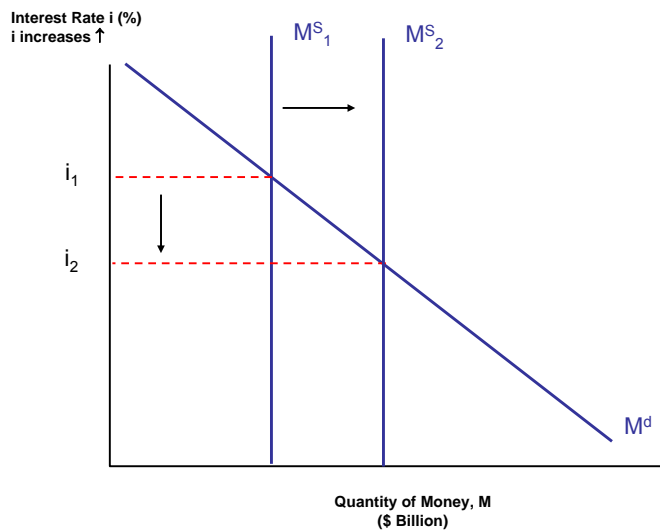
- Income \uparrow , $M^d \uparrow$, M^d shifts out to right
- M^s unchanged
- i^* rises from i_1 to i_2



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Rise in Money Supply

- $M^s \uparrow$, M^s shifts out to right
- M^d unchanged
- i^* falls from i_1 to i_2



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Summary of Shifts

	Change in Money Demand or Supply	Change in Interest Rate
• Income	$M^d \uparrow$	\uparrow
• Price Level	$M^d \uparrow$	\uparrow
• Money Supply	$M^s \uparrow$	\downarrow

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Money and Interest Rates

Effects of money on interest rates

1. Liquidity Effect

$M^s \uparrow$, M^s shifts right, $i \downarrow$

2. Income Effect

$M^s \uparrow$, Income \uparrow , $M^d \uparrow$, M^d shifts right, $i \uparrow$

3. Price Level Effect

$M^s \uparrow$, Price level \uparrow , $M^d \uparrow$, M^d shifts right, $i \uparrow$

4. Expected Inflation Effect

$M^s \uparrow$, $\pi^e \uparrow$, $B^d \downarrow$, $B^s \uparrow$, Fisher effect, $i \uparrow$

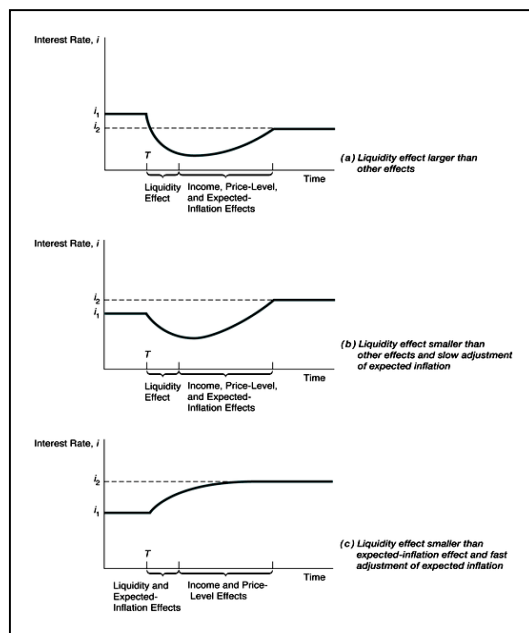
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Effect of Higher Money Growth Rate

- Effect of higher rate of money growth on interest rates is ambiguous
 - Because income, price level and expected inflation effects work in opposite direction of liquidity effect

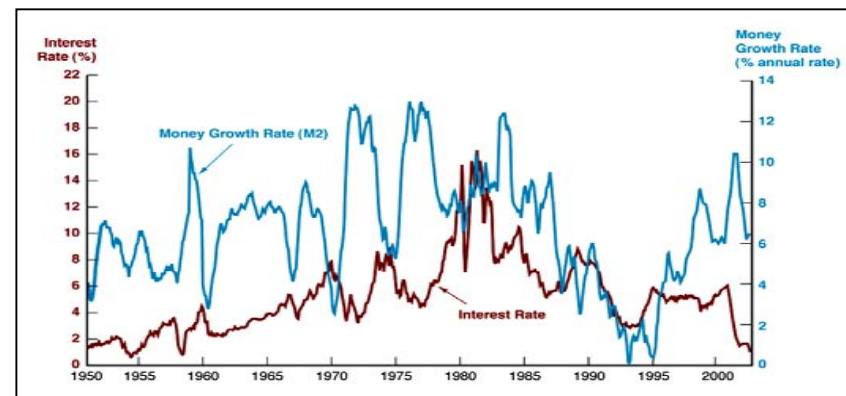
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Does Higher Money Growth Lower Interest Rates?



Note: These lecture notes are incomplete without having attended lectures

Evidence on Money Growth and Interest Rates



- Consider the following periods: 1960's, 1970's, 1980's

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