Chapter 7 : A Monetary Intertemporal Model (Part 2)

EE312

Macroeconomics, Stephen Wiliamson, Chapter 12

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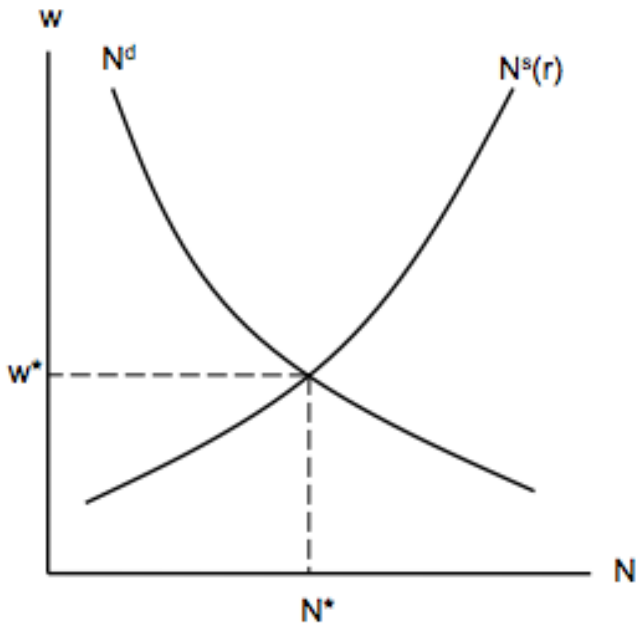
Complete monetary model

- The current labor market:
  - The real wage and employment.
- The current goods market:
  - Output demand and output supply.
- The current money market:
  - The price level; demand and supply of money.
- The credit market:
  - The real interest rate.

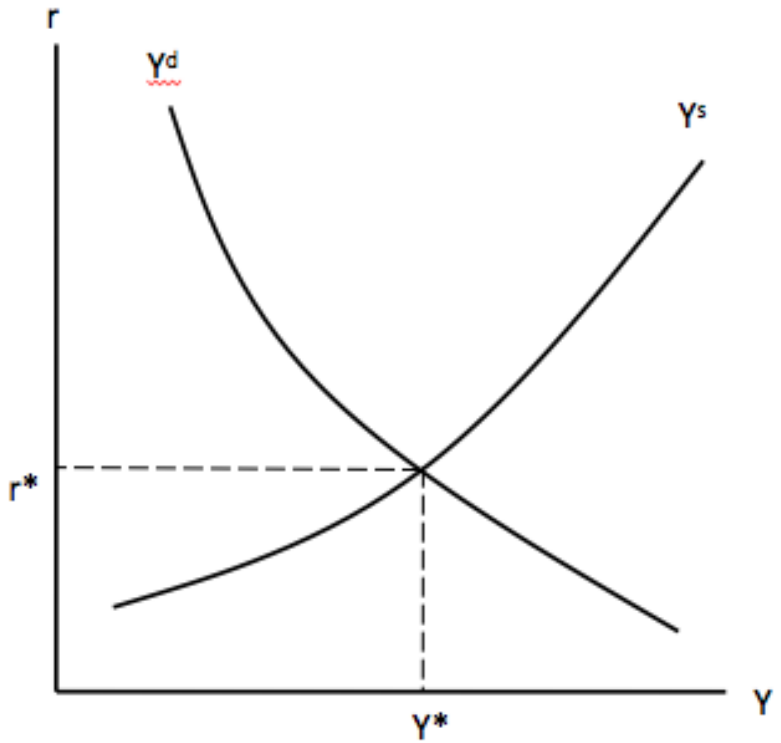
The current labor market

$$N^s = h - \ell(w)$$
$$N^d = MP_N = w$$
$$N^s(r) = N^d$$



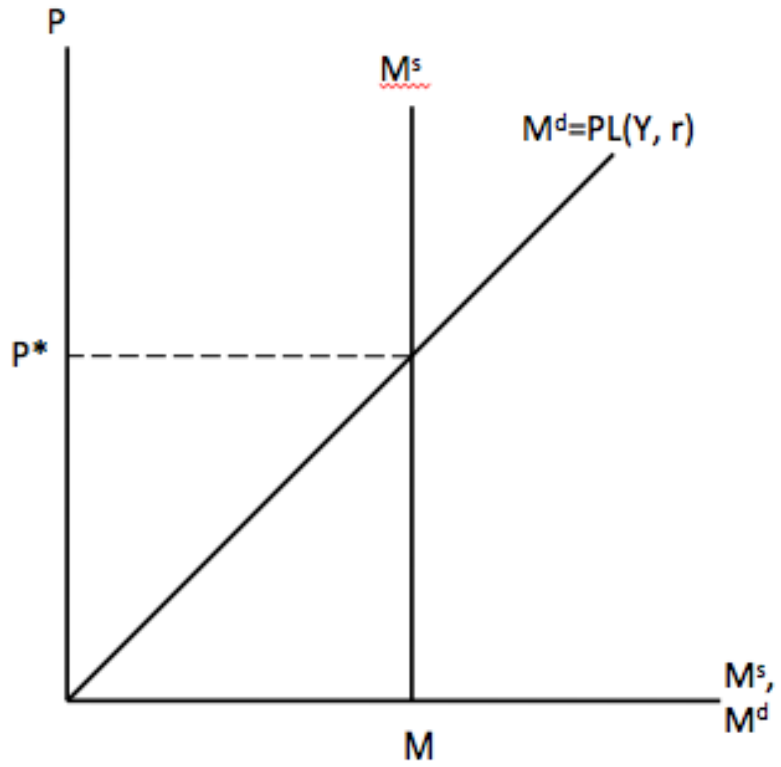
The current goods market

$$Y^s = Y(r)$$
$$Y^d = C^d(Y_d, r) + I(r) + G$$
$$Y^s = Y^d$$



The current money market

$$M^d = L(Y, r)$$
$$M^s = M$$
$$M^d = M^s$$



Competitive equilibrium

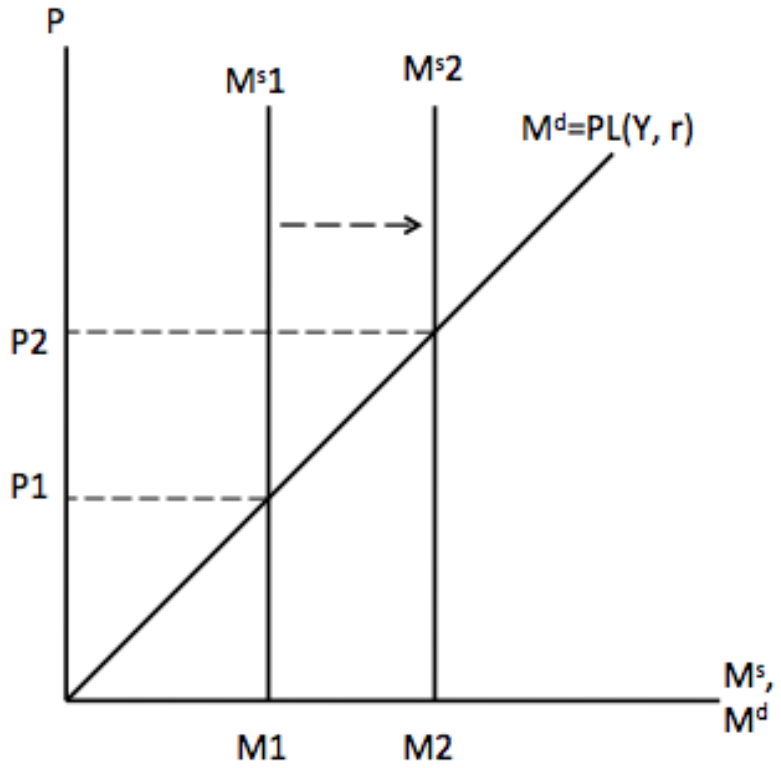
- The current goods market determines the equilibrium output (Y*).
- The credit market gives the real interest rate.
- Given r*, the current labor market determines the equilibrium real wage (w*) and employment (N*).
- Given Y* and r*, the current money market determines the price level (P*).

The Neutrality of money

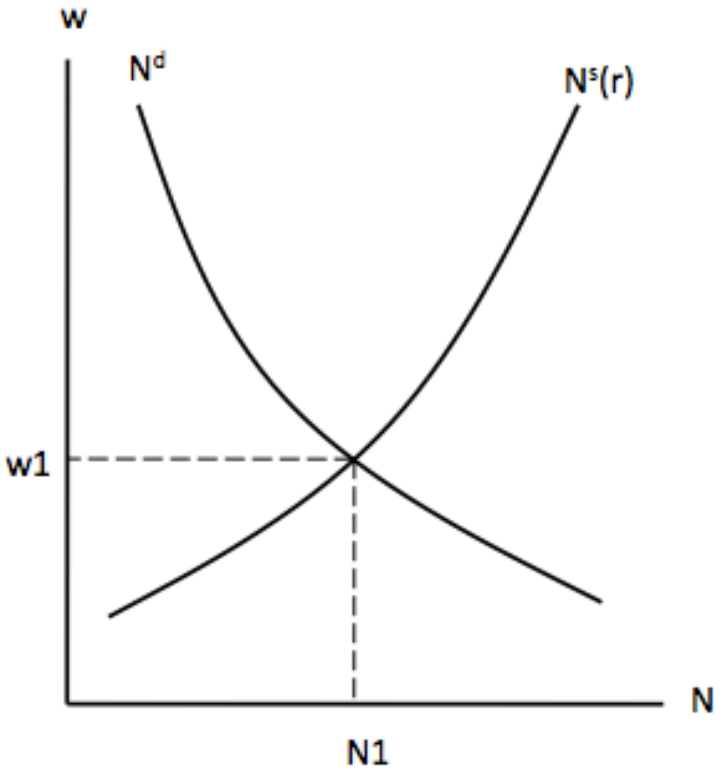
- Assume an one-time increase in the money supply: $M - M^{-} = M_2 - M_1 = \Delta M > 0$.
  - A decrease in taxes (T) increases household disposable income.
  - An open market purchase of bonds by the central bank.
  - An increase in government spending (G) financed by printing new money.
- The M^s curve shifts to the right.
  - The price level increases proportionally to ΔM.

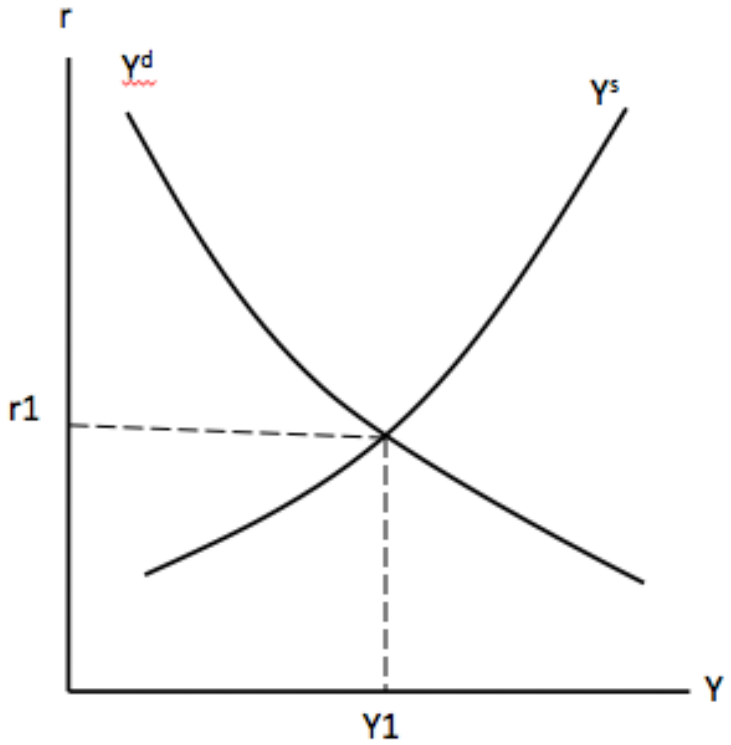
An one-time increase in Ms

- An increase in M^s from M1 to M2 causes the price to rise proportionally from P1 to P2, given Y and r.



No change in other markets





The classical dichotomy

- All the real variables (r*, w*, Y* and N*) remain the same.
- The real variables are separated completely from the nominal variables (M^s, M^d and P).
  - The current labor market (Ns and Nd) and the current goods market (Y^s and Y^d) are not affected.
- The real money demand is not affected:
  - $\frac{M^d}{P} = L(Y, r)$ is constant; $\Delta M = \Delta P$
  - One-time inflation until the new price is reached.

Long-run monetary neutrality

- The monetary neutrality holds in the long run.
- In the short run, money may not be neutral, depending on:
  - The method of injecting money into the economy.
  - Who receive the additional purchasing power first?

Monetary debates

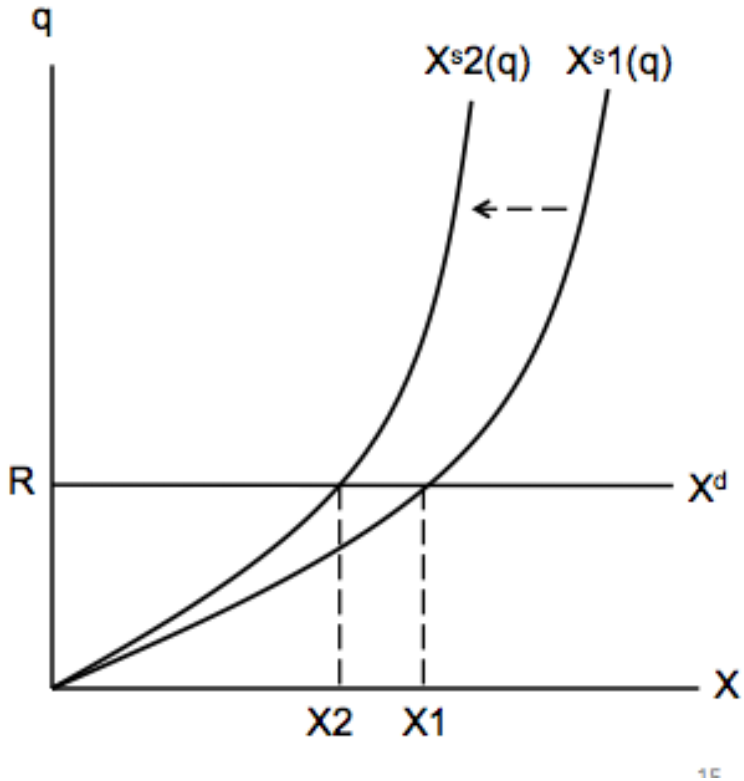
- In the long run, a money-increase has no effects on real variables.
  - Only one-time inflation and the higher price level.
- Short-run effects on real variables disappear in the long run — but how?
- What is the transmission mechanism from money to the price level?
  - The real balance effect? The wealth effect?

Shifts in money demand

- Factors that affect the supply or demand for credit card services shift the money demand curve.
- Assume the supply of credit card services shifts left:
  - Ex: communication failure between banks and retailers.
  - The amount of service decreases; the price = q.

Supply of credit card services

- The supply of credit services shifts left.
- The amount of service decreases from X1 to X2.
- The service price is still R = q.



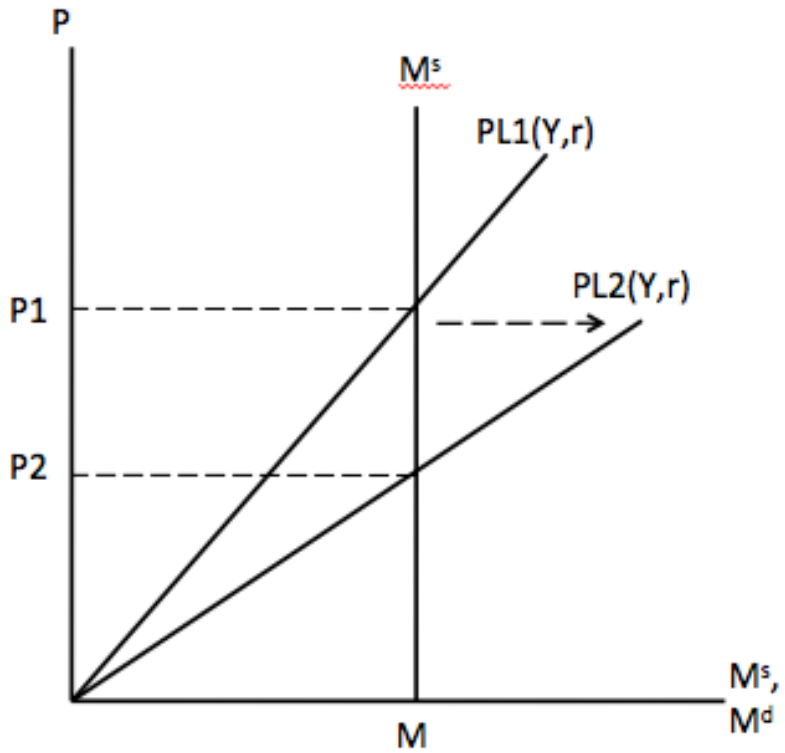
$$M^d = P\left[Y - X^*(R)\right]$$

$$M^d = P \times L(Y, R)$$

- As X decreases, money demand increases.
  - The money demand curve shifts right.
  - The price level decreases.
- No effects on other markets.

An increase in money demand

- A decrease in supply of credit card services raises the money demand.
- The price level decreases.



Changes in demand/supply of credit card services

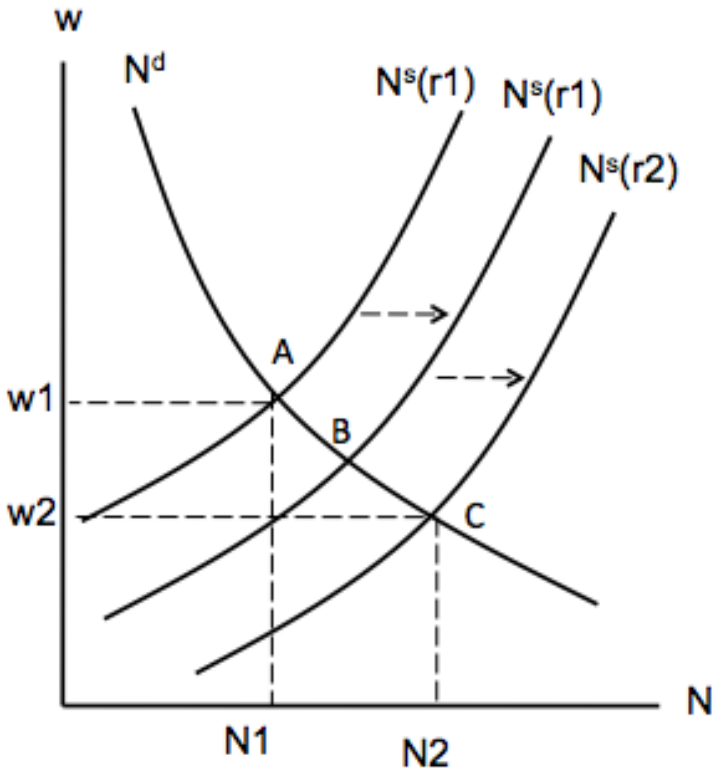
- New technology reducing the cost of banking services.
- New financial instrument reducing the bank's operating costs.
- A change in government regulations.
- A change in the perceived riskiness of banks.
- Shocks in the financial systems.

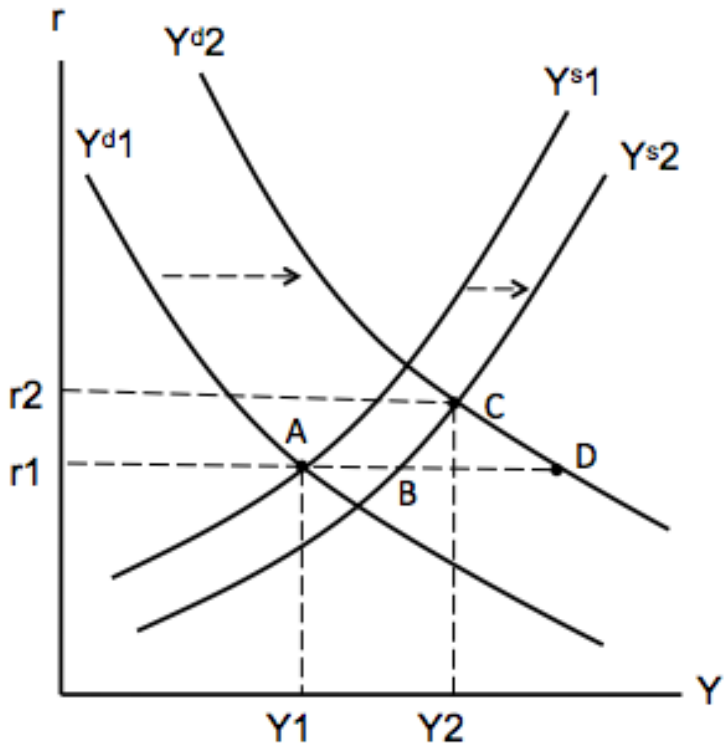
Shock experiments

1. Current government purchases increase temporarily (G);
2. Current capital stock decreases due to a natural disaster or war (K);
3. A temporary increase in current total factor productivity (z);
4. An increase in future total factor productivity (z').

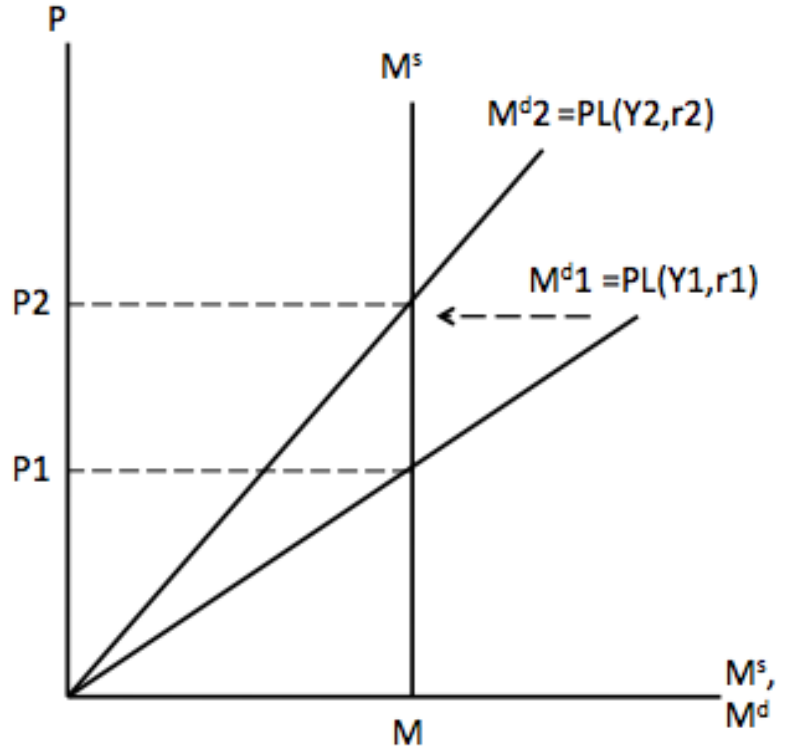
1. A temporary increase in G

- Higher lifetime taxes; lower lifetime wealth.
  - Leisure decreases; labor supply increases (Ys).
  - Current consumption decreases (Yd) .
- The G increase raises total demand for goods (Yd); higher income and real interest rate.
  - Leisure decreases and labor supply (Ns) increases.
  - Lower current consumption and investment demand.


w
N^d
$N^s(r1)$
$N^s(r1)$
$N^s(r2)$
A
B
C
w1
w2
N
N1
N2


r
Y^d2
Y^s1
Y^d1
Y^s2
r2
r1
A
B
C
D
Y
Y1
Y2

- Higher Y raises money demand but rising r decreases it.
- If the latter is strong, M^d shifts left and P rises.



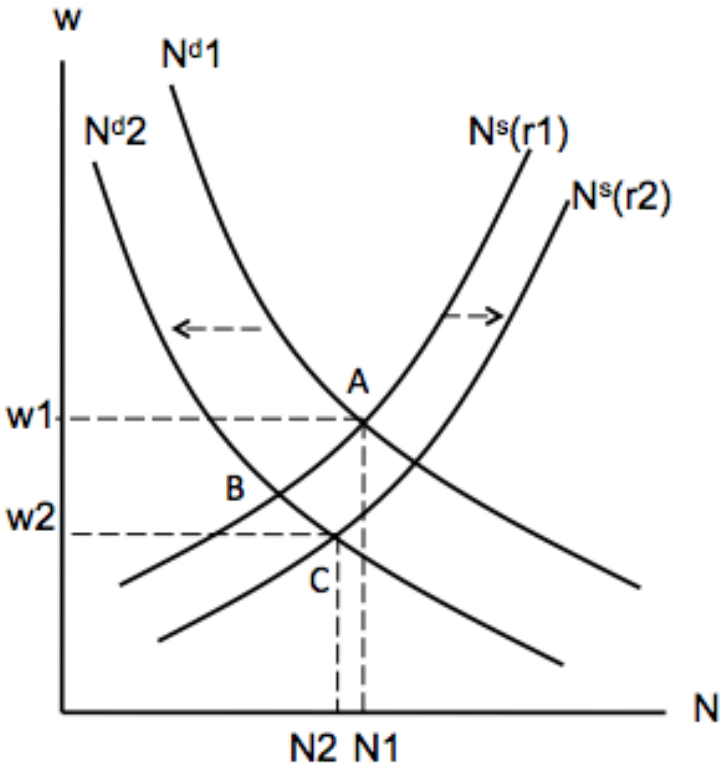
Overall effects of rising G

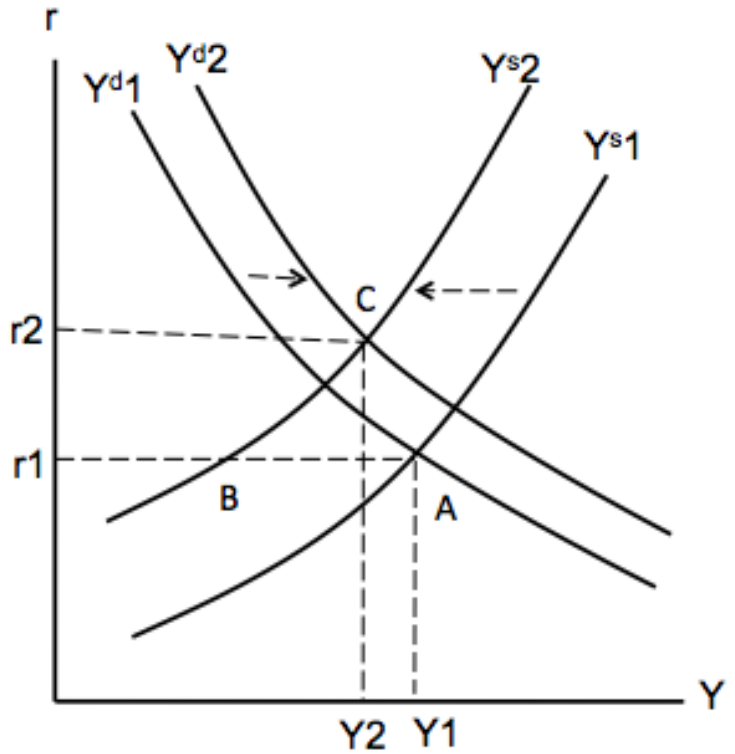
- Higher income and a higher real interest rate.
  - The effect of rising G on Y^d in the current period is stronger.
- Lower current consumption and investment.
- Higher employment and a lower real wage.
- The higher price level.

2. A decrease in current capital stock

- A lower MP_N, falling labor demand (Y^s shifts left).
- A lower K' and higher MP'_K; investment demand increases (Y^d shifts right).
  - The higher real interest rate reduces leisure (labor supply, N^S), current consumption and investment demand.
  - The real wage, employment and output fall.

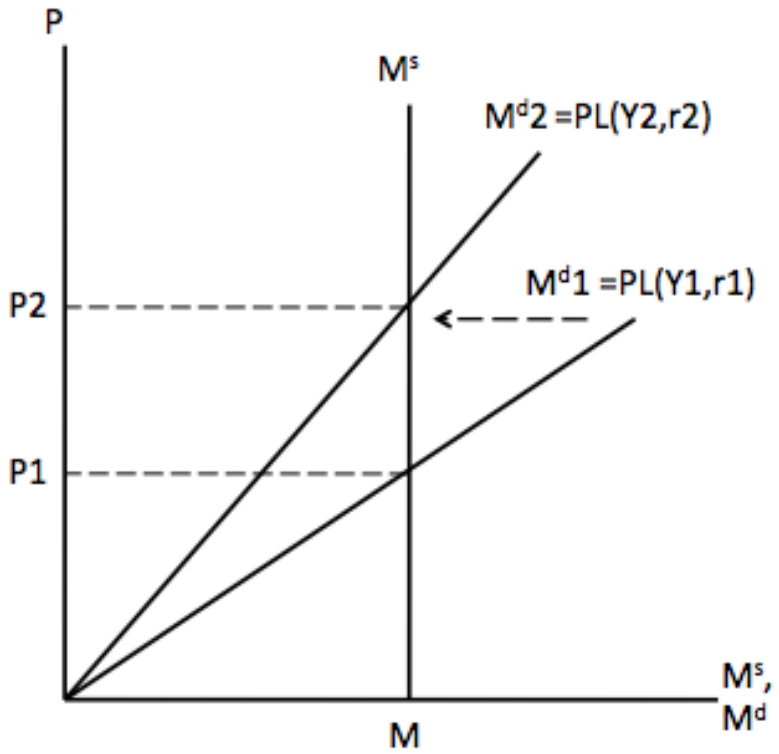
Falling K: labor and goods markets





Falling K: money market

- Lower income and higher real interest rate decrease money demand.
- The price level increases.



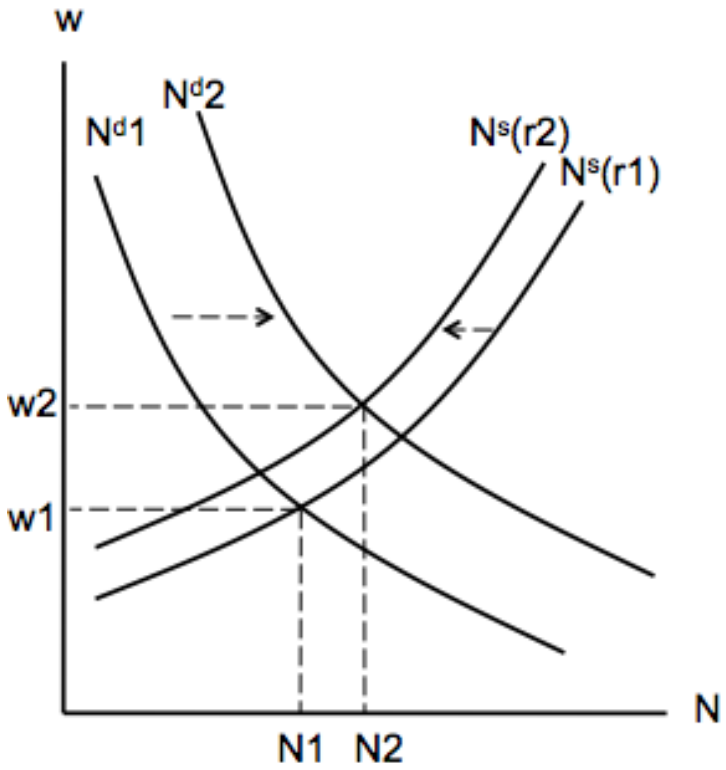
Overall effects of falling K

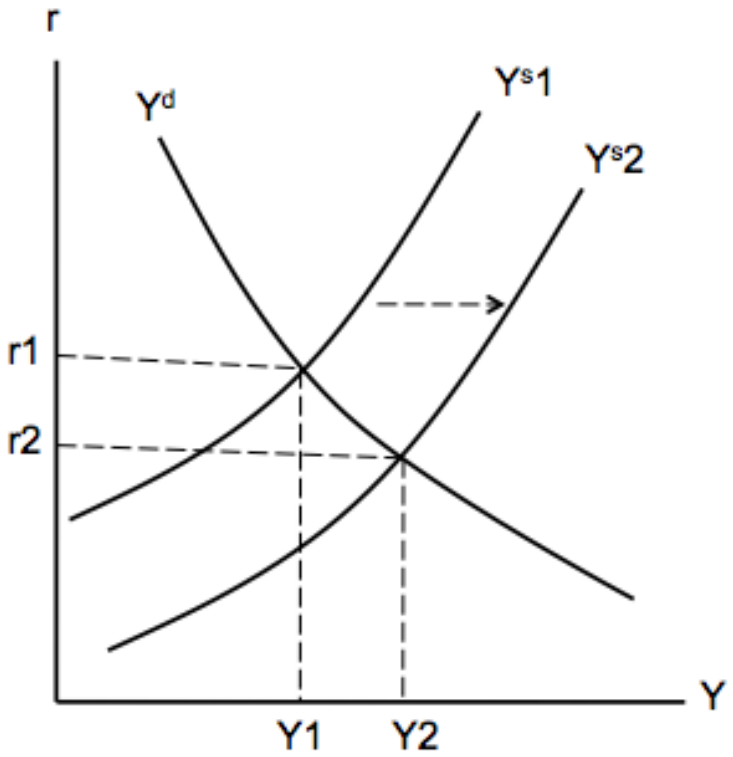
- Output and income are lower.
- The real interest rate is higher.
- Current consumption decreases; investment increases (net effect).
- Employment and the real wage decrease.
- The price level is higher.

3. An increase in current z

- Current MP_N and labor demand increase; Y^S shifts right.
- The real interest rate decreases.
- Leisure increases; labor supply (N^S) decreases.
- The real wage increases.
- Employment and output increases.
- Current consumption and investment increase.
- Higher money demand and price level.

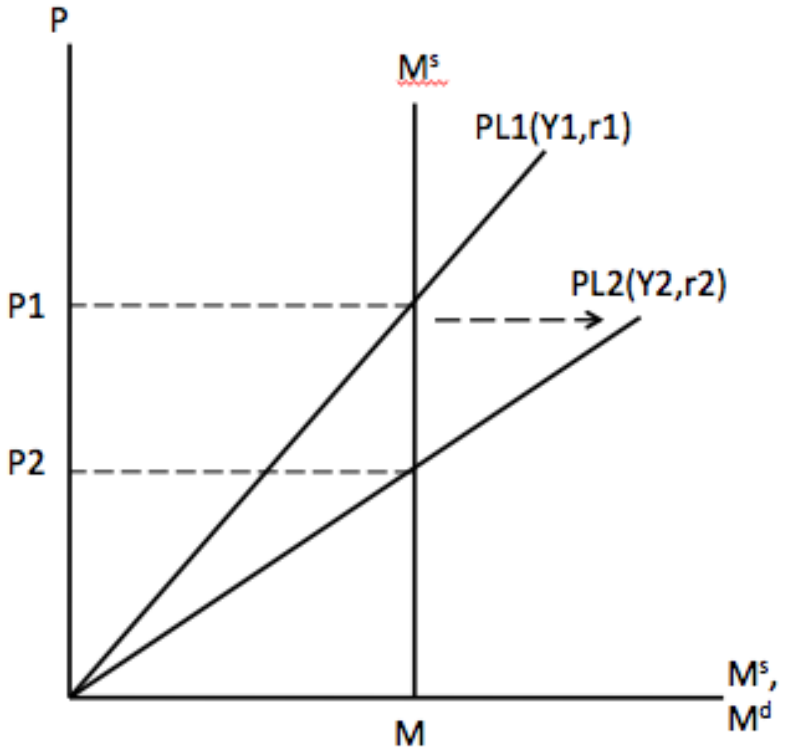
A rising z: labor and goods markets





A rising z: money market

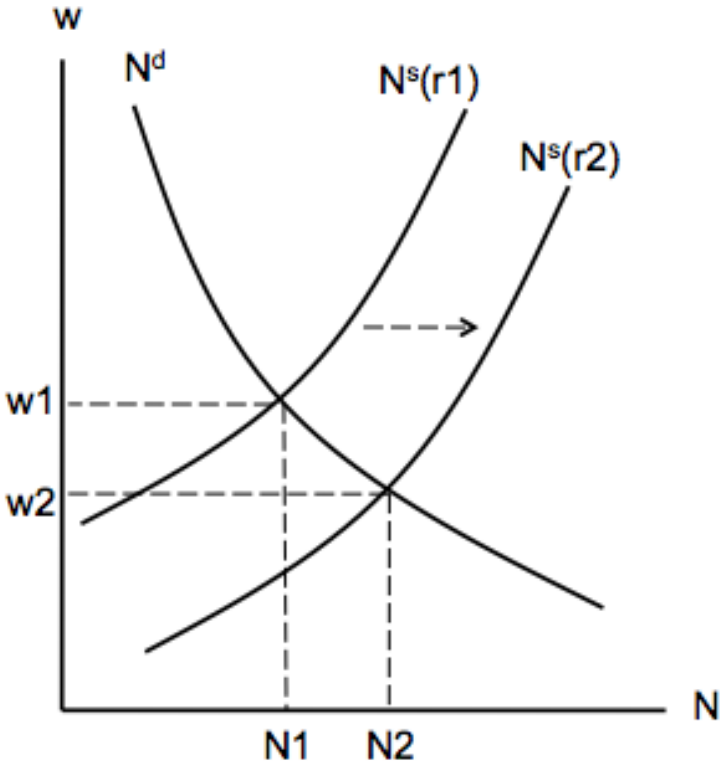
- A lower real interest rate and higher income raise money demand.
- The price level decreases.

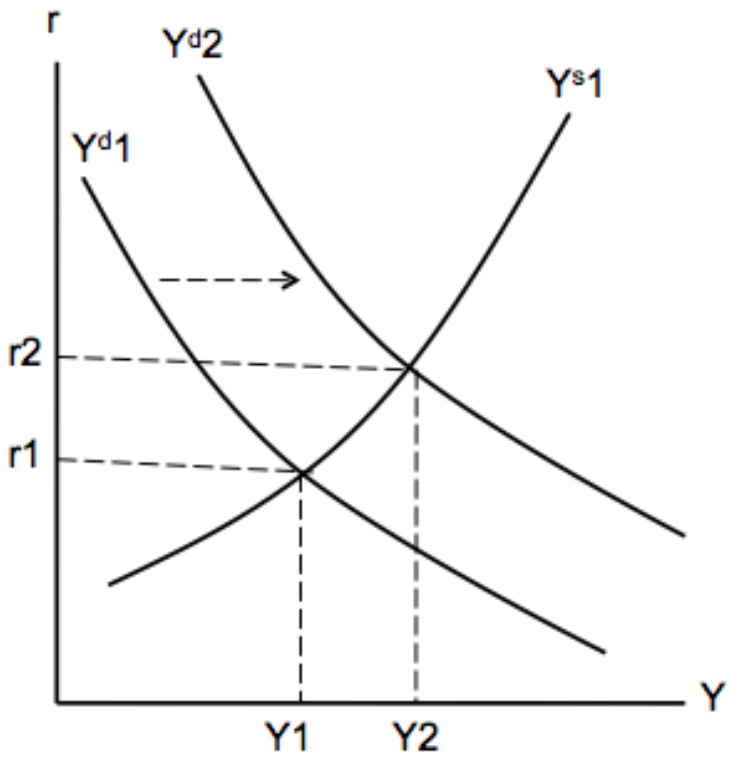


4. An increase in z'

- Higher MP'_K and investment demand; Y^d shifts right.
  - Higher output and real interest rate.
  - Lower leisure, more labor supply (N^S).
  - Employment and the real wage increase.
  - Current consumption is uncertain; investment increases (net effect).
- If M^d decreases, the price level increases.

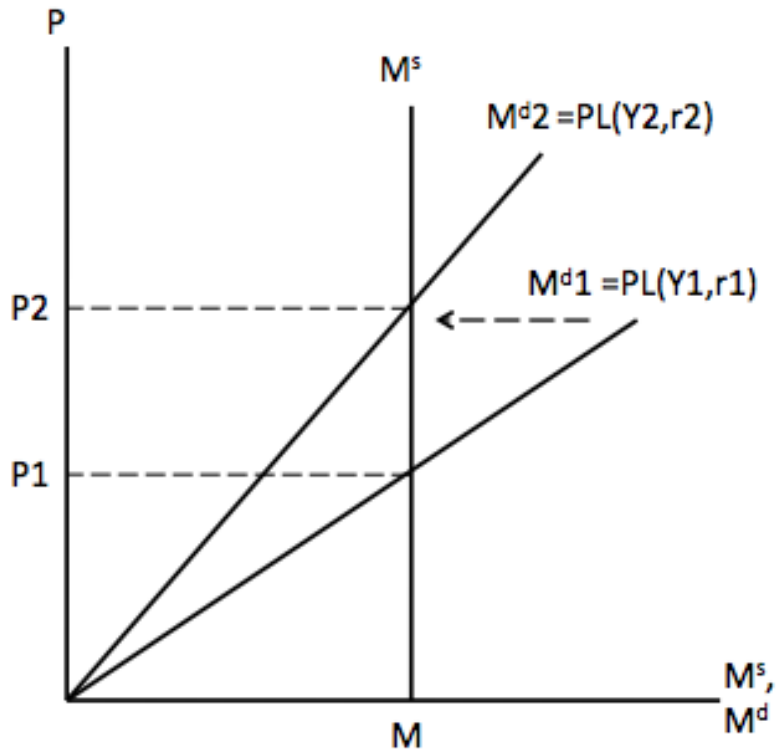
Rising z': labor and goods markets





Rising z': money market

- Higher Y raises money demand, but higher r reduces it.
- If the latter is strong, the price level increases.



Discretionary monetary policy

- Keynesians believe that the market is not efficient and too slow in adjusting to shocks
- Fiscal policy to stabilize the economy.
- **Discretionary monetary policy** by the central bank (to influence private spending).
  - Easy-money policy in times of a slowdown.
  - Tight-money policy in times of expansion.
- But the central bank never has the full information about the economy.
  - Discretionary monetary policy is difficult and costly; targets are missed most of the time.
  - Persistent high inflation in the 1970s discredited such policy.
- **Monetary policy rules** are recommended.
  - The rules for the central bank to control the money supply in response to observable variables in the economy.

The monetary policy rule

- Inflation affects consumers' welfare.
  - Price stability is preferred by consumers and firms.
- Types of monetary policy rules:
  - Money supply targeting.
  - Interest rate targeting.
  - Inflation targeting.
  - Nominal GDP (NGDP) targeting.

Money supply targeting

- Recommended by Milton Friedman in 1968.
  - The doctrine of monetarism (1970s).
- The constant money-growth rule:
  - Set a constant growth rate of some monetary aggregates (e.g., M1 or M2).
  - Popular in the 1970s and 1980s, then abandoned.
  - Missing the targets due to shocks from Md.
- Good for reducing runaway inflation.

Interest rate targeting

- The Fisher relation: R = r + i. ($R = r + \pi$; $\pi$is inflation rate)
- The central bank targets R = R*.
- If R* = r, then i = 0 (or $\pi = 0$). Good for M^d shocks.
- If R > R*, the central bank reduces M growth.
- If R < R*, the central bank raises M growth.
- Not efficient if shocks from real variables.

Inflation targeting

- The central bank sets a target inflation rate (π^*).
  - If $\pi > \pi*$, the central bank raises the nominal interest rate.
  - Short-run interest rate targeting to achieve medium-run inflation target.
- But other shocks may cause the central bank to miss the target.

Nominal GDP targeting

- The central bank sets a future path of nominal GDP growth (NGDP*).
  - Then it uses short-run targeting (e.g., interest rate targeting) to achieve the medium-run target.
  - If NGDP > NGDP*, it raises the nominal interest rate.
  - If NGDP < NGDP*, it lowers the nominal rate.