



Econ 208

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Lecture 4
The Role of Government
Expenditures



Where are we?

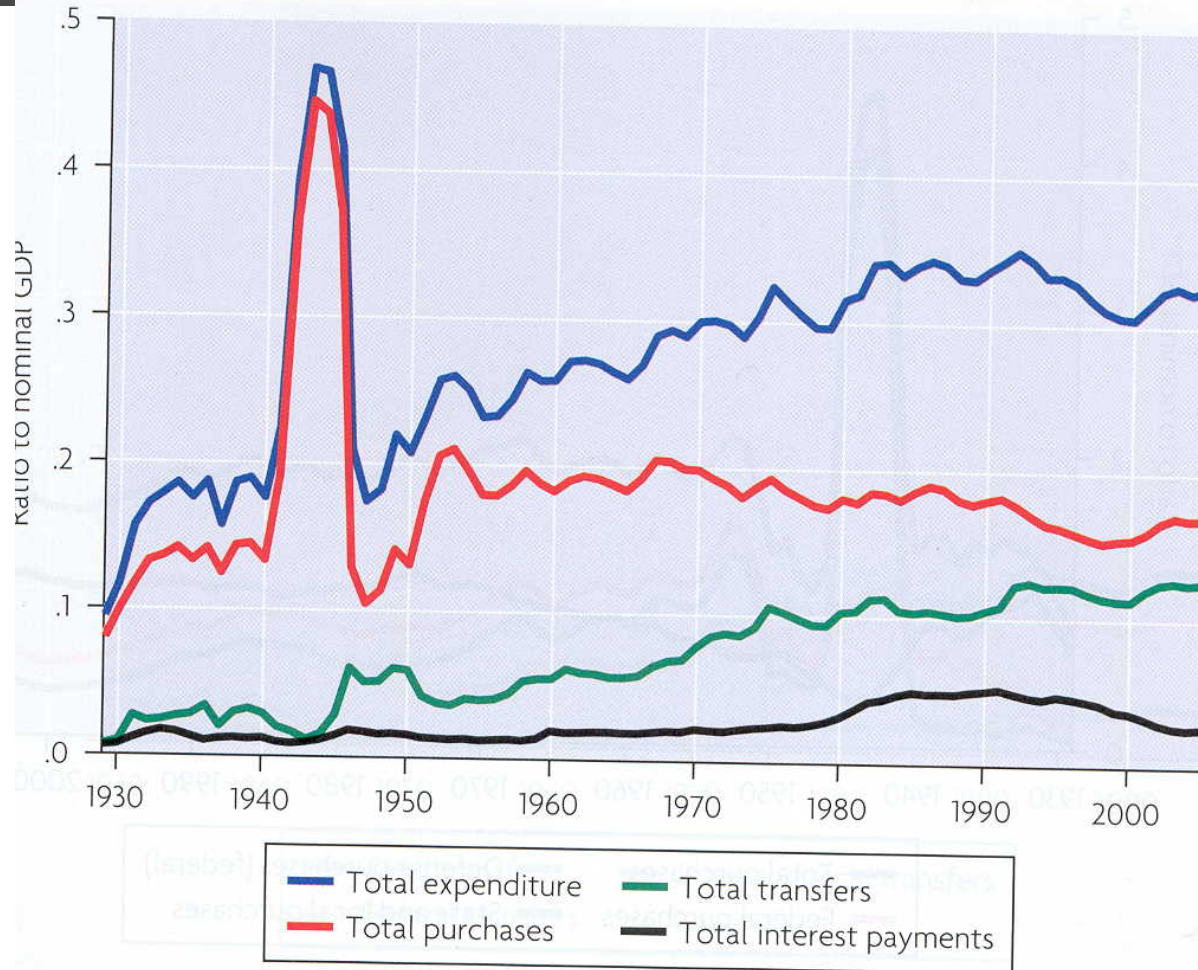
- Introduction: A model with no Government
- **The Effects of Government Spending**
- Government Taxation and Government Debt
- Fiscal and Monetary Policy
- Optimal Monetary Policy
- Financial Intermediation
- Current Account Determination
- Fiscal Deficits and Current Account



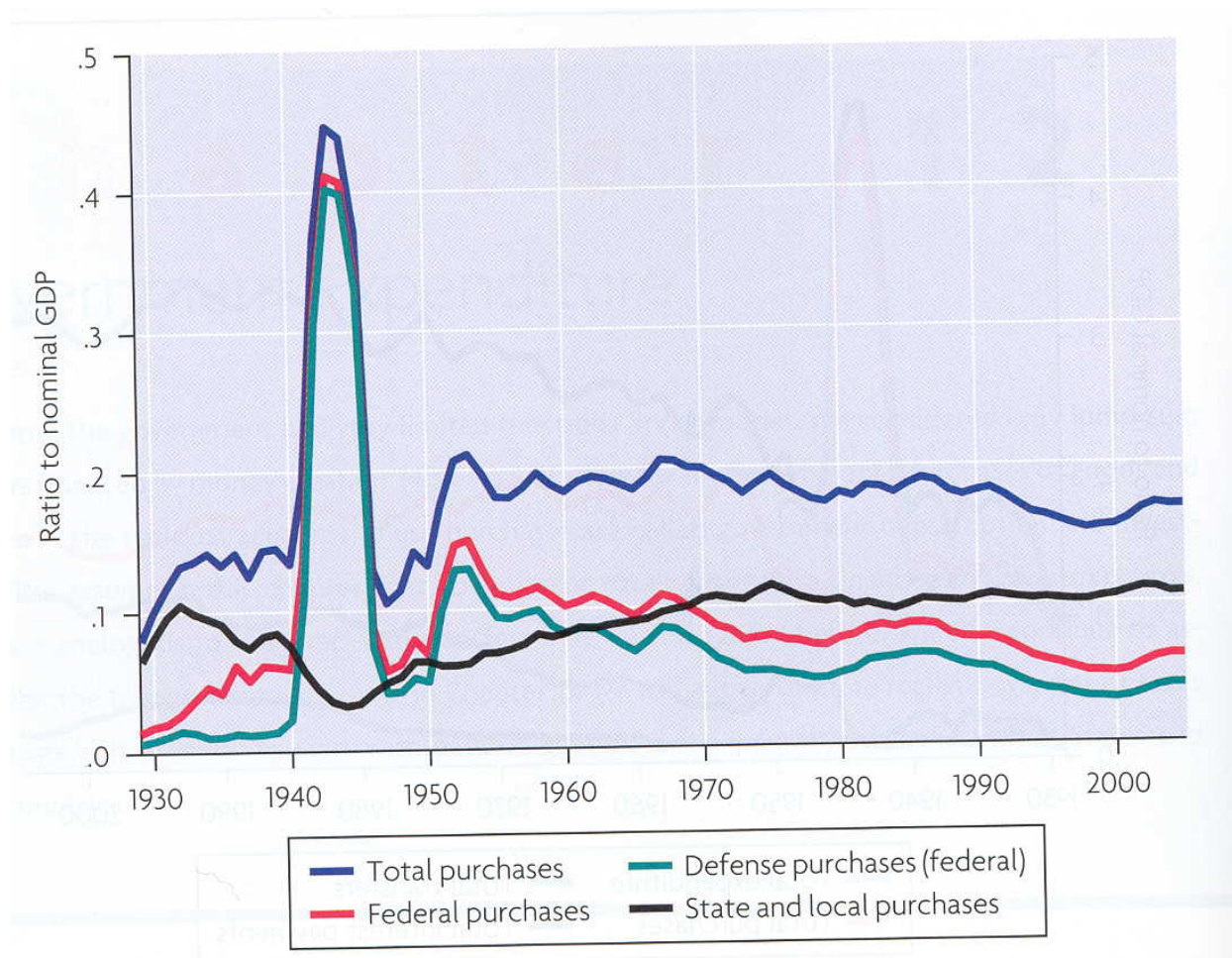
Roadmap

- Government Expenditures
 - A) Data on Gov't Expenditures
 - B) The effects of Changes in Gov't Spending
 - B1) Permanent Changes in Gov't Spending
 - B2) Temporary Changes in Gov't Spending
 - C) Social Security

A1) Government Expenditures



A2) Government Purchases





B) The Effects of Government Expenditures

- Questions:
 - How do changes in government purchases affect
 - Consumption, output, capital stock?
 - Interest rates, wages?
 - Crowding out?



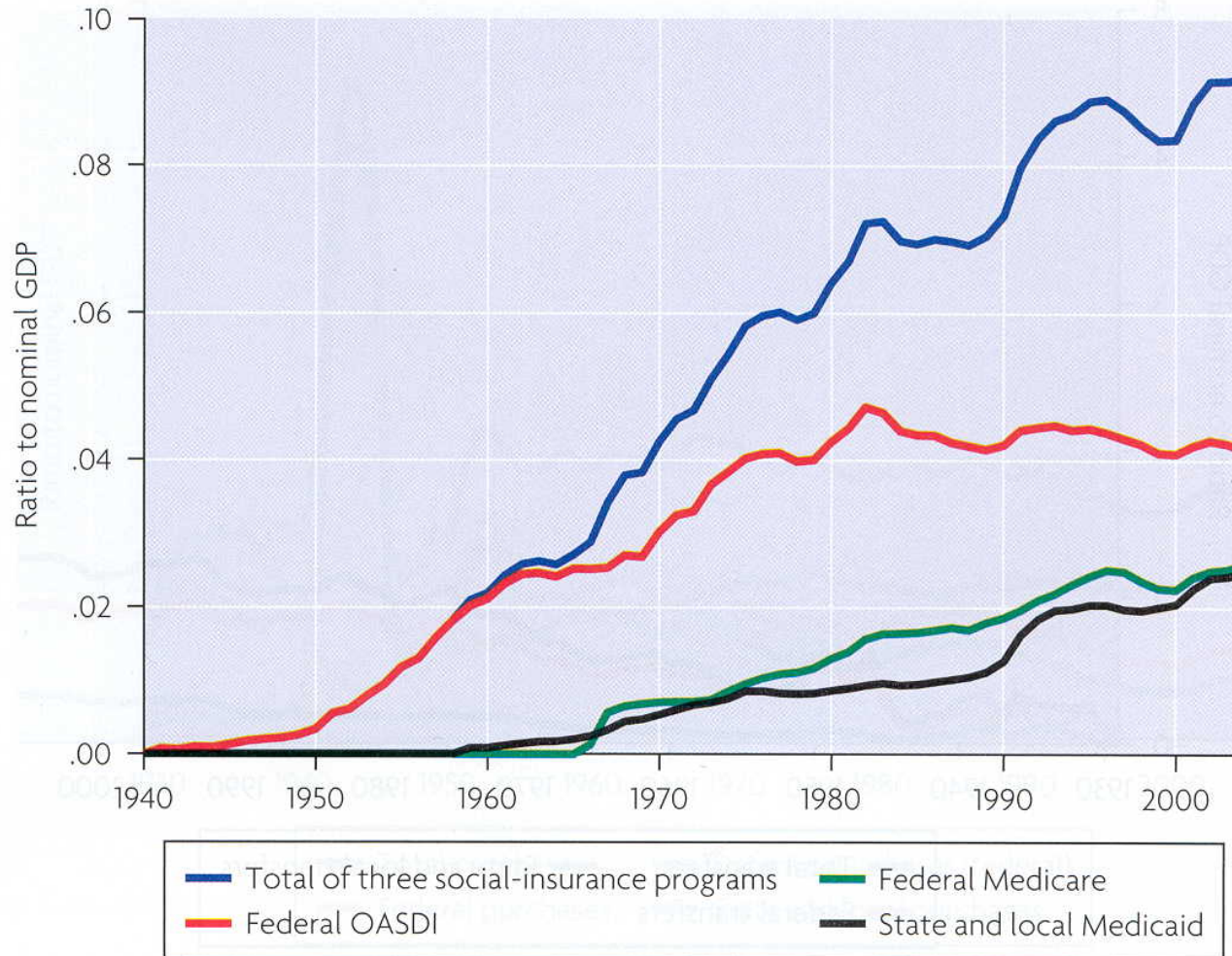
B) The Effects of Government Expenditures

- How are gov't Expenditures useful?
 - Productive services (legal system)
 - Consumption services (public parks)
 - Focus on the first role
- Government production:

$$Y_t^G = \phi G$$

- ϕ measures the efficiency of the public sector

A3) Transfers





B) The Effects of Government Expenditures Consumers

- Preferences

$$\max_{\{C_t, K_{t+1}\}} \sum_{t=0}^{\infty} \beta^t U(C_t)$$

- Taxes are Lump-Sum: $T=G$
- Budget Constraint in each period

$$C_t + B_{t+1} = \Pi_t + (1+r)B_t - T_t$$



B) The Effects of Government Expenditures

Firms

- Invest in Capital Stock
- Production Function

$$Y_t^P = K_t^\alpha$$

- Law of motion for capital

$$K_{t+1} = (1 - \delta)K_t + I_t$$

- Profits

$$\Pi_t = K_t^\alpha - I_t$$



B) The Effects of Government Expenditures Government

- Budget Constraint

$$G_t = T_t$$

- Production:

$$Y_t^G = \phi G_t$$



B) The Effects of Government Expenditures

Pareto Problem

- Pareto Problem:

$$\max_{\{C_t, K_{t+1}\}} \sum_{t=0}^{\infty} \beta^t U(C_t)$$

s.t.

$$C_t + K_{t+1} + G_t = K_t^\alpha + \phi G_t + (1 - \delta)K_t$$

K_0 given



B) The Effects of Government Expenditures

Euler Equation

- Consumption satisfies:

$$U'(C_t) = \beta[\alpha K_{t+1}^{\alpha-1} + 1 - \delta]U'(C_{t+1})$$



B1) Permanent increase in Gov't spending

Steady State

- In a Steady State,

$$K_t = K_{t+1} = K_{ss}$$

$$C_t = C_{t+1} = C_{ss}$$

$$I_t = I_{t+1} = I_{ss}$$

- Solve for the steady state capital stock:

$$K^{ss} = \left(\frac{\alpha}{1/\beta + \delta - 1} \right)^{\frac{1}{1-\alpha}}$$

- Independent of Government Spending!



B1) Permanent increase in Gov't spending

Steady State

- Output, Consumption and Investment

$$Y_{ss} = K_{ss}^{\alpha} + \phi G$$

$$C_{ss} = K_{ss}^{\alpha} - \delta K_{ss} - (1 - \phi)G$$

$$I_t = \delta K_{ss}$$

- Steady State Output *increases* in gov't spending
- Consumption *decreases* in gov't spending
(**crowding out**)

B1) Permanent increase in Gov't spending

Extension #1: Efficiency of Government Spending depends on capital stock

- Assume that

$$Y_t^G = \phi K_t G_t$$

- Pareto Problem:

$$\max_{\{c_t, k_{t+1}\}} \sum_{t=0}^{\infty} \beta^t U(C_t)$$

s.t.

$$C_t + K_{t+1} + G_t = K_t^\alpha + \phi K_t G_t + (1 - \delta) K_t$$

K_0 given

B1) Permanent increase in Gov't spending

Extension #1: Efficiency of Government Spending depends on capital stock

- Consumption satisfies:

$$U'(C_t) = \beta[\alpha K_{t+1}^{\alpha-1} + 1 - \delta + \phi G]U'(C_{t+1})$$

- Steady State

$$K^{ss} = \left(\frac{\alpha}{1/\beta + \delta - 1 - \phi G} \right)^{\frac{1}{1-\alpha}}$$

- Increasing in government spending !

B1) Permanent increase in Gov't spending

Extension #1: Efficiency of Government Spending depends on capital stock

$$Y_{ss} = K_{ss}^{\alpha} + \phi K_{ss} G$$

$$C_{ss} = K_{ss}^{\alpha} - \delta K_{ss} - (1 - \phi K_{ss}) G$$

$$I_t = \delta K_{ss}$$

- Steady State Output *increases* in gov't spending
- Consumption may increase or decrease in gov't spending



B1) Permanent increase in Gov't spending

Extension #1: Labor Supply

- Assume that the utility depends on labor supply

$$U(C, L) = \ln C - \frac{L^{1+\eta}}{1+\eta}$$

- Production function given by

$$F(K, L) = K^\alpha L^{1-\alpha}$$



B1) Permanent increase in Gov't spending

Extension #1: Labor Supply

- Pareto Problem:

$$\max_{\{C_t, K_{t+1}\}} \sum_{t=0}^{\infty} \beta^t \left[\ln(C_t) - \frac{L_t^{1+\eta}}{1+\eta} \right]$$

s.t.

$$C_t + K_{t+1} + G_t = K_t^\alpha L_t^{1-\alpha} + \phi G_t + (1-\delta)K_t$$

K_0 given

B) The Effects of Government Expenditures

First Order Conditions

- Euler Equation:

$$U'(C_t) = \beta \left[\alpha \left(\frac{K_{t+1}}{L_{t+1}} \right)^{\alpha-1} + 1 - \delta \right] U'(C_{t+1})$$

- First order condition in labor supply

$$L_t^\eta C_t = (1 - \alpha) \left(\frac{K_{t+1}}{L_{t+1}} \right)^\alpha$$



B) The Effects of Government Expenditures

Steady State

- Euler Equation:

$$\frac{K^{ss}}{L^{ss}} = \left(\frac{\alpha}{1/\beta + \delta - 1} \right)^{\frac{1}{1-\alpha}} = \theta$$

- First order condition in labor supply

$$L^{ss\eta} C^{ss} = (1-\alpha)\theta^\alpha$$

- Resource constraint

$$C^{ss} + (1-\phi)G = L^{ss}(\theta^\alpha - \delta\theta)$$



B) The Effects of Government Expenditures

Steady State

- Steady State effect on Consumption

$$\frac{dC^{ss}}{dG} = -\frac{1-\phi}{1 + \frac{\theta^\alpha - \delta\theta}{\eta} \frac{L^{ss}}{C^{ss}}}$$

- Still crowding out, but smaller
 - Depends on the elasticity of labor supply η



What have we learned?

- Long term effects of government spending: crowding out of consumption
- The effect depends on
 - The efficiency of public expenditures ϕ
 - Whether public expenditures increase productivity of capital
 - How responsive is labor supply