

# ME2720 Macroeconomics for Business

## Lecture 8

Luis Perez

KTH Royal Institute of Technology

November 28, 2017

# Outline

- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

# The Intertemporal Dimension of Fiscal Policy

- When discussing Fiscal Policy we must start by recognizing that countries (and governments) are in for the long term
- They don't need to balance the books year-by-year (*governments vs. households*)
  - ★ Govs. can spend in excess of tax revenue today, e.g. through debt
- Standard textbook treatment:
  - ★ **Short run:** increases (decreases) in government spending (taxation) increase aggregate demand and output
  - ★ **Medium/Long run:** government debt crowds out capital and leads to a reduction in output
  - ★ **Twist** (advanced undergrad textbooks): fiscal deficits, if associated with large debt increases, may be contractionary (e.g. role of expectations)

- Fiscal policy is the use of government spending and taxation to influence the economy
- Often used to push the economy out of recessions or to cool down expansions
- Before 1930s the *laissez-faire*'s approach prevailed
- After that, countries scaled the size and function of government. . .
- Some controversy however in how governments should've responded to the 2007s crises

- 1 Introduction
- 2 Government Spending**
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

# Government Spending I

The size of the public sector varies considerably across countries

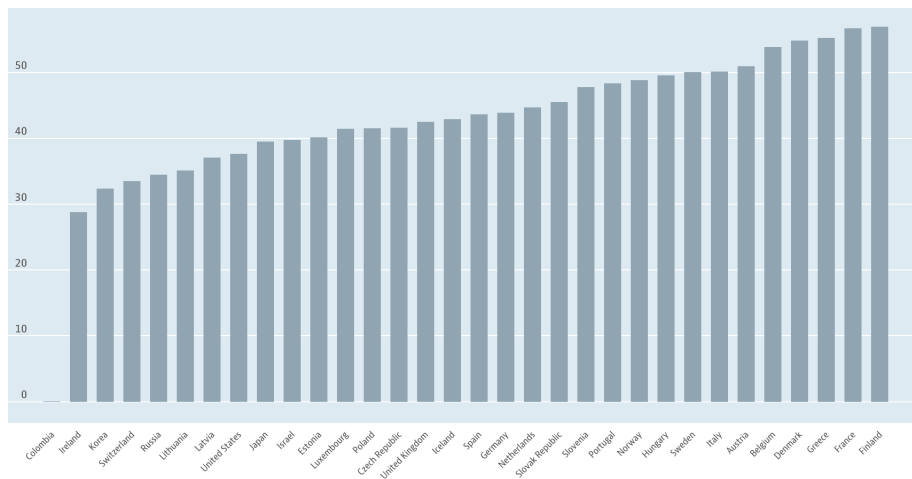


Figure: General government spending in 2016, % of GDP

# Government Spending II

Although government spending has historically increased over time, it has remained more or less constant in recent years

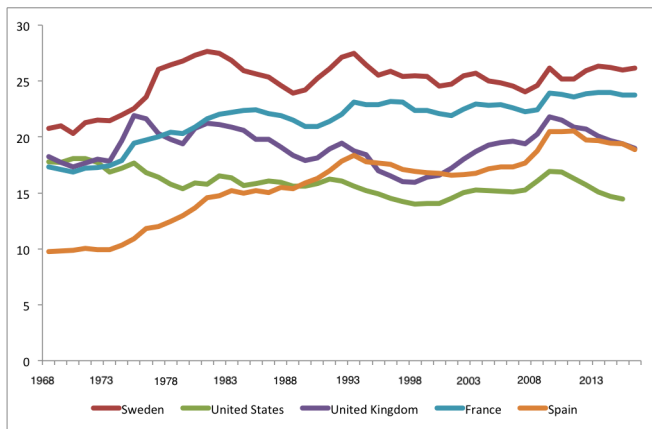


Figure: Government expenditure as % of GDP, 1968-2016



# Government Spending III

Some things that governments do could NOT be provided by the private sector, e.g. legal system, defence

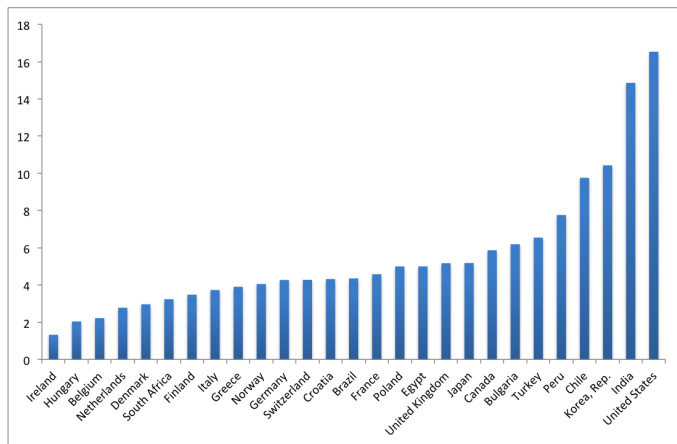


Figure: Military expenditure in 2013, % of GDP

# Government Spending IV

Some (essential) things that governments do could yet be provided by the private sector, e.g. education

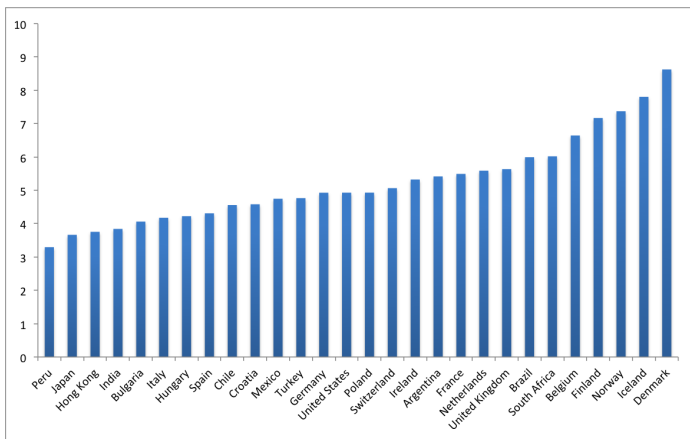


Figure: Government expenditure on education as % of GDP, 2013

# Government Spending V

Some (essential) things that governments do could yet be provided by the private sector, e.g. health

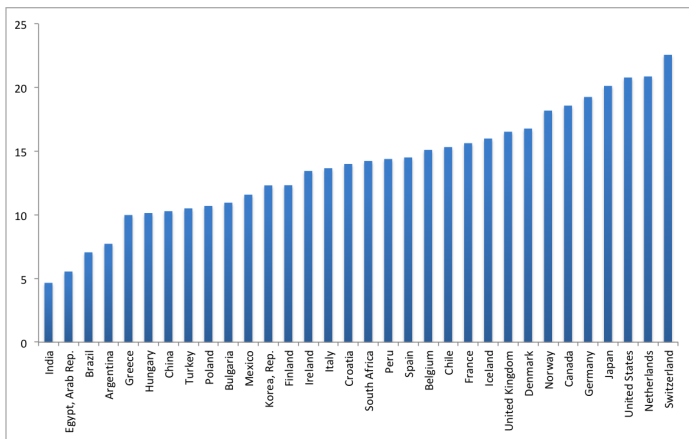


Figure: Public health expenditure as % of GDP, 2013

# Government Spending VI

Now the majority of government spending (in developed countries) involves transfers, e.g. cash- and unemployment- benefits, pensions, disability payments, etc.

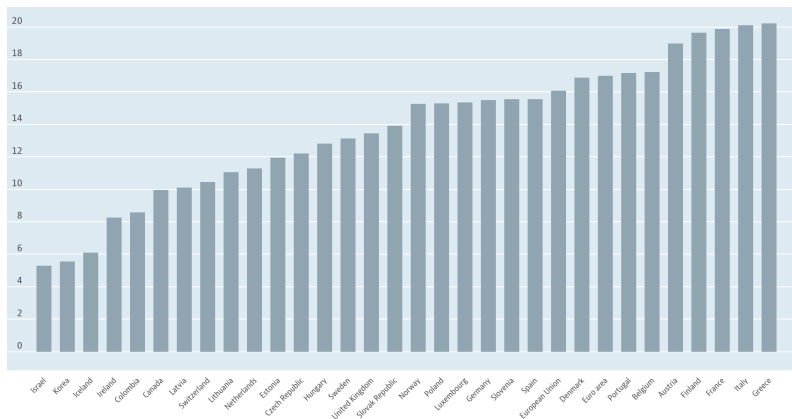
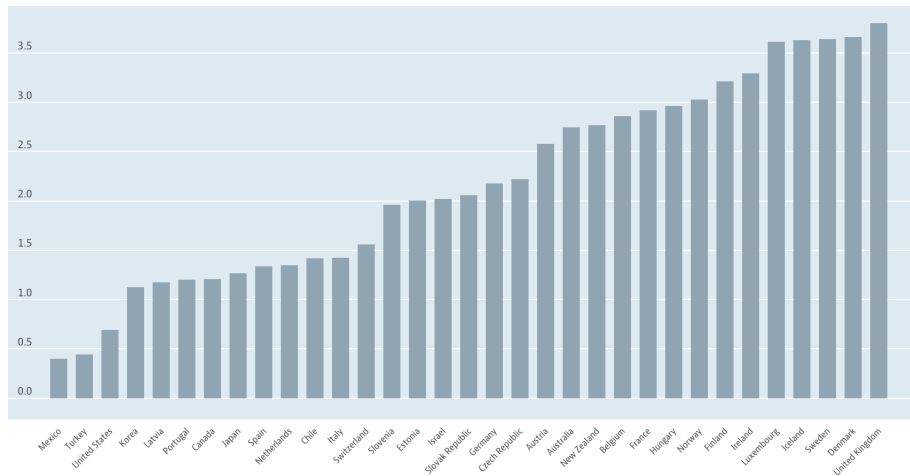


Figure: Social benefits as % of GDP, 2016

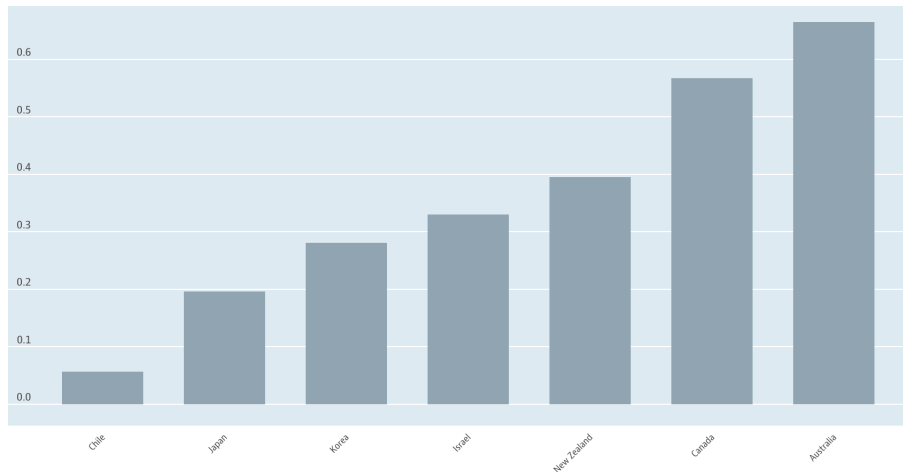
# Government Spending VII

Figure: Family benefits as % of GDP, 2016



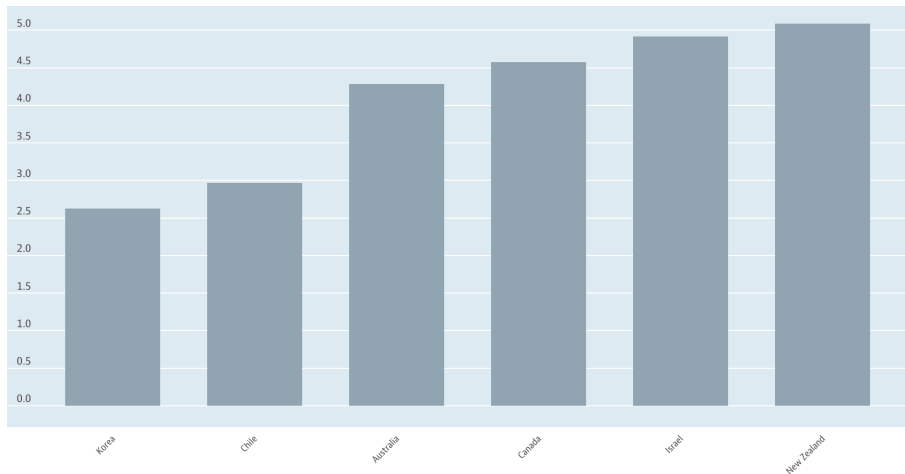
# Government Spending VIII

Figure: Unemployment benefits as % of GDP, 2016



# Government Spending IX

Figure: Pensions as % of GDP, 2016



# Government Spending X

## Summarizing

- The size of the public sector varies considerably across countries
- Historical tendency of government spending to rise over time
- Necessary role of government in the economy (e.g. safety, legal system) but societal choice to decide government's size!
- Nowadays, developed-economies' governments spend most of their money in social transfers



- 1 Introduction
- 2 Government Spending
- 3 The Role of Government**
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

# Two Approaches to Government's Role

- 1 The **Laissez-faire** (started with Adam Smith 1776): the invisible hand and how own self-interested actions take the economy to efficient equilibria
  - Assumptions: agents discern between goods, rationality, perfect competition, complete markets, etc.
  - Efficiency as *Pareto efficiency*, i.e. reallocation/redistribution does not make anyone better off without making someone worse off
- 2 The **Paternalistic approach** (Keynes 1936) and the welfare state:
  - Government intervention justified by market failures (e.g. nasty NE, public goods and incentives to cheat) and irrationality
  - Many people do not act in their own (*long-term*) interest: underconsumption of education, no future planning (e.g. pensions)
  - Positive externalities (e.g. underprovision of clean tech) vs. negative externalities (e.g. excessive pollution)
  - Despite of *Pareto efficiency*, the distribution of income might still be highly unequal → call for redistribution? (ethics and morality, crime and social disruptions, . . . )

- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation**
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

- Even advocates of the laissez-faire (Locke, Hume Smith, etc.) do recognize the need for the state (PRs, defence, . . .)

*“can't live with it, can't live without it, don't want to pay for it”*

- Public goods are non-excludable, i.e. difficult in practice to avoid citizens to enjoy their benefits, and there are incentives to cheat
- Need for taxation!

# Taxation II

High correlation between government spending and tax revenue!

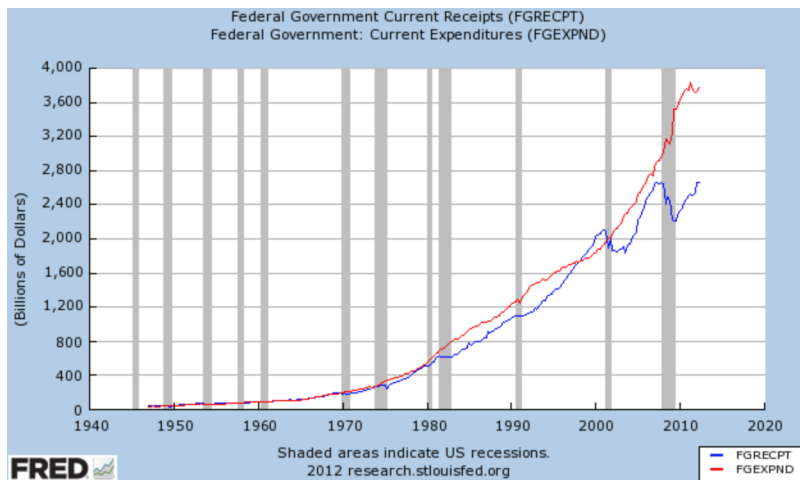


Figure: US, 1940-2014

# Taxation III

Different types of taxes (also, different taxation schemes) to finance spending!

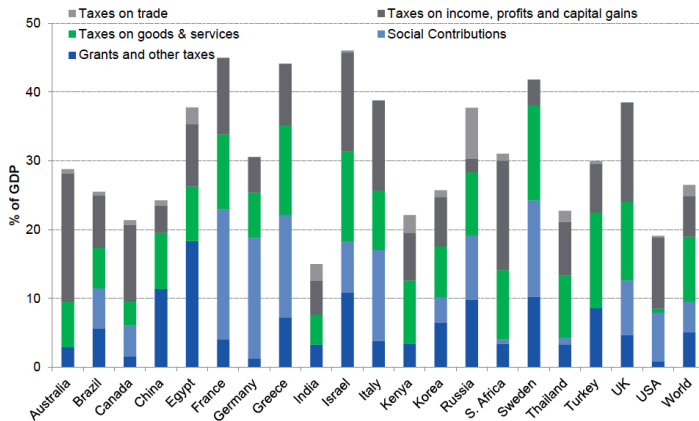


Figure: General government tax revenues as % of GDP, 1998-2008

# Taxation IV

Different types of taxes (also, different taxation schemes) to finance spending!

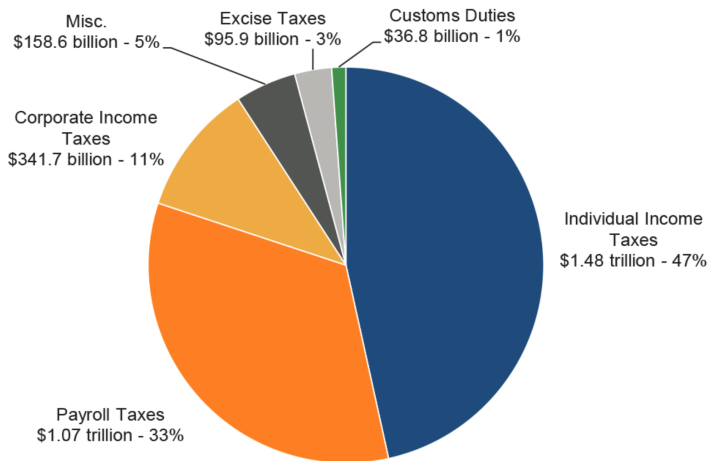


Figure: US federal tax revenues, 2015

- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium



## Tax Wedge (OECD definition)

The **tax wedge** is the ratio between the taxes paid by an average single worker and the corresponding labour cost for the employer. It measures the extent to which tax on labor income discourages employment.

- The concept of tax wedge can be easily generalized, i.e. difference between what sellers receive for supplying goods and/or services and what buyers pay
- Higher taxes, in either income or consumption, discourage economic activity
- Taxes distort patterns on spending, i.e. they affect behavior: labor supply, firm's investment schemes, individuals' wealth allocation (real state vs. stock market), individuals consumption (unhealthy vs. healthy goods), firm's producing behavior (to pollute or not to pollute)

# Tax Distortions II

Distortions can be understood in terms of how taxes affect supply and demand of the taxed good, e.g. income-labor, unhealthy goods-consumption, etc.

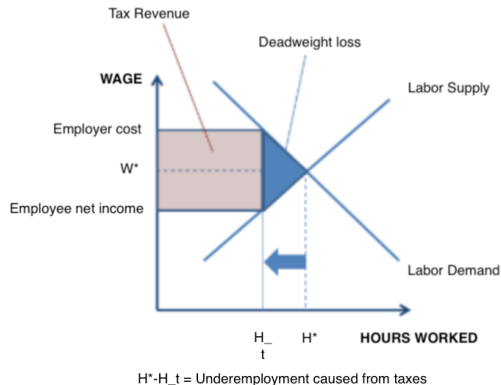
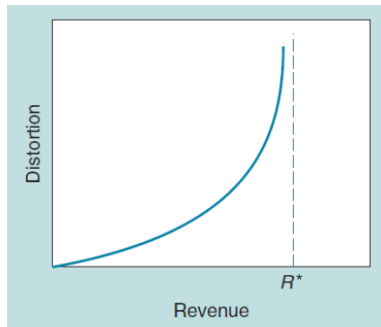


Figure: Taxes and Labor

# Tax Distortions III

- The cost of the tax rises more than proportionally with the tax rate, e.g. 0-10% vs. 40-50%
- The cost of taxation gets infinitely close to  $R^*$ , the maximum revenue
- Taxes greatly differ across countries (94% in the US in 1944-45!!!!)



# Tax Distortions IV

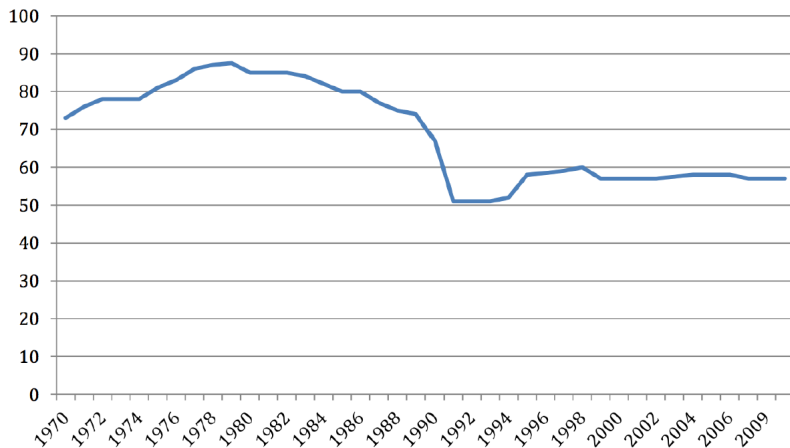


Figure: Highest marginal tax rate in Sweden, 1970-2012

# Tax Distortions V

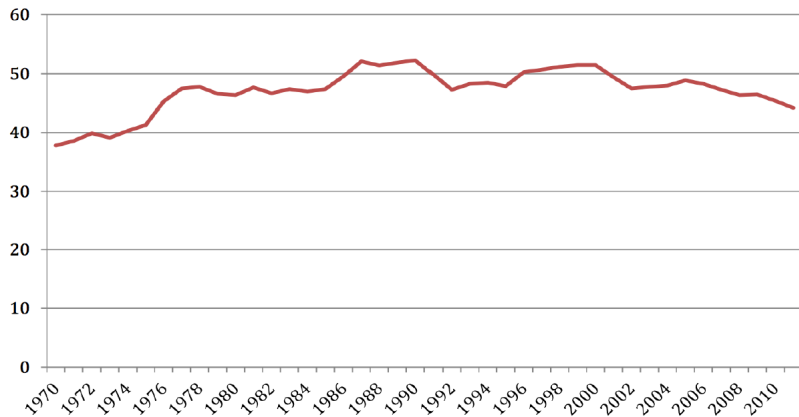


Figure: Tax burden in Sweden as % of GDP, 1970-2012

# Tax Distortions VI

## The Laffer Curve

- Tax revenue increases as the tax rate departs from zero but it will ultimately fall when taxes deter workers from supplying hours

$$\text{Tax revenue} = \tau Wn$$

- Same tax revenue is possible with different tax rates

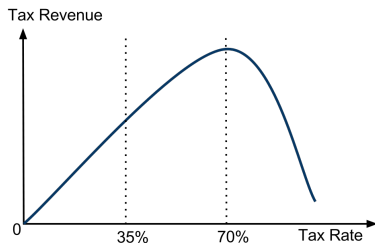
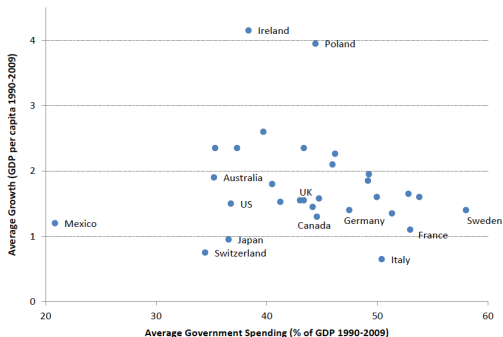


Figure: Laffer curve

# Tax Distortions VII

- Inconclusive evidence to date about what's best in terms of taxation. . .
- At the end efficiency, i.e. the share of a dollar that reaches public goods and services, is key!
- Same tax revenue is possible with different tax rates



- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt**
  - Optimal Budget Deficits**
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium



- Recall the high correlation between government spending and tax revenue
- However, expenditure and spending barely match in any given year
- Governments include in deficits and surpluses
- Governments (vs. households): far greater ability to borrow, also at lower costs, since they can generate revenue without offering goods and services
- When the government runs a deficit it borrows to finance the gap between expenditures and (tax) revenues, thus increasing the stock of debt

Figure: US budget deficit/surplus by year, 1930-2015

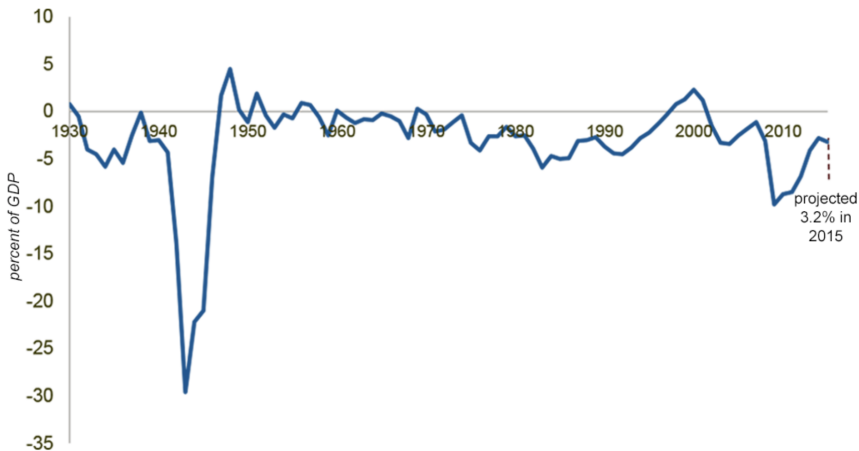


Figure: US budget deficit/surplus by administration, \$ billion

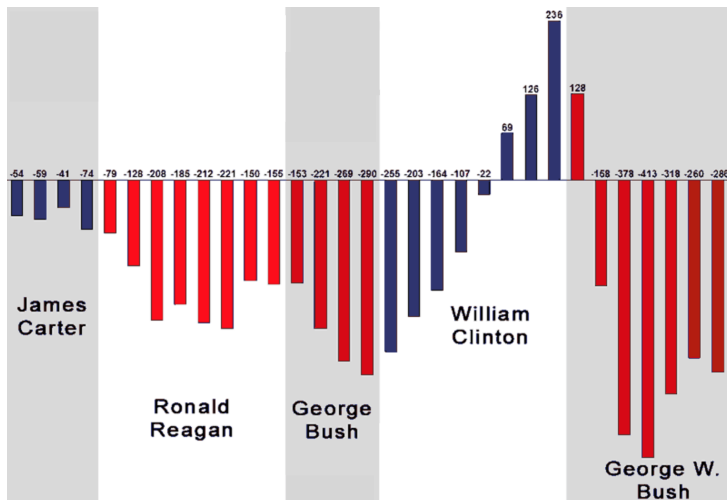


Figure: Surplus/deficit by country-year, 1970-2010

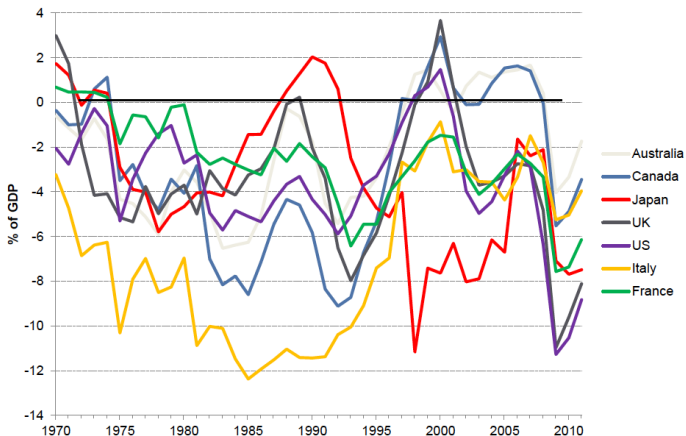
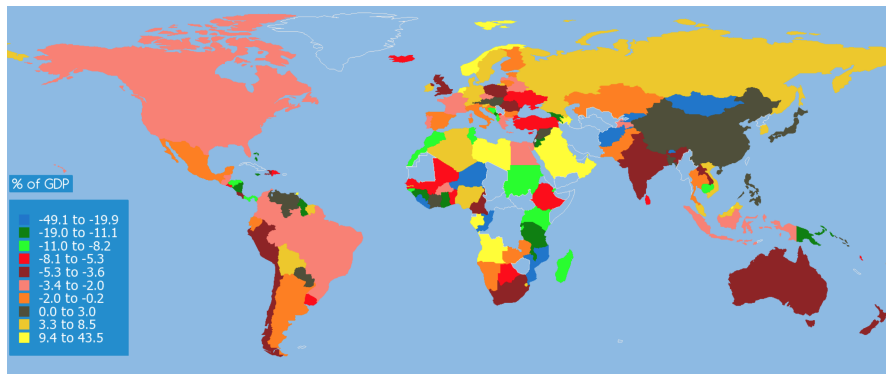


Figure: Current account balance as % of GDP, 2012



- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

# Optimal Budget Deficits I

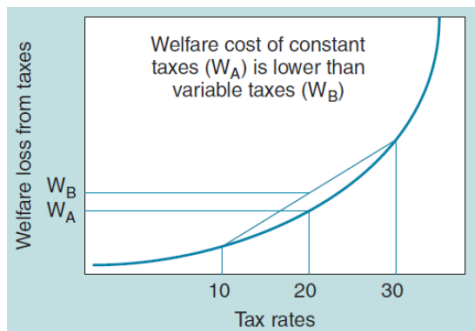
- Deficits could be both a problem or a blessing, e.g. corruption vs. infrastructure
- Institutions play an important role here!
- Deficits can be desirable as a response to temporary shocks
- **Tax smoothing:** considering the costs of increased taxation, governments should keep a smooth level of taxes rather than try to yearly balance the budget

# Optimal Budget Deficits II

Consider 2 tax policies:

- 1 Constant tax rate at 20%
- 2 Taxes are 10% in expansions and 30% in recessions

Figure: What policy works best?





- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy**
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

# Stabilization Policy I

- Governments should avoid using fiscal- and monetary policy, except in extreme scenarios, and rather rely on discretionary policy, i.e. fixed rules aimed at stabilizing the economy
- General arguments against stabilization policy:
  - ★ Automatic stabilizers
  - ★ Uncertainty
  - ★ Policy-making lags
  - ★ Problems with fiscal policy
  - ★ The Ricardian Equivalence
  - ★ Expectations
  - ★ Crowding out
  - ★ Monetary policy
  - ★ Liquidity traps

# Stabilization Policy II

## Automatic Stabilizers

- Government spending and revenue respond automatically to BCs
- Recessions:
  - ★ Revenue decreases as the level of economic activity is low
  - ★ Spending increases as there are, for instance, more unemployment claims
- Expansions:
  - ★ Revenue increases as the level of economic activity is high
  - ★ Spending decreases as there are, for instance, lower unemployment claims
- Automatic stabilizers reduce the need of active stabilization policy!

# Stabilization Policy III

## Uncertainty

- Difficult to know sometimes what's going on and what's the underlying cause
- What's the duration and severity of the problem=
- Exemplified in the 2007s financial crisis: Austrian- and neoclassical school vs. Keynesians

# Stabilization Policy IV

## Policy-making Lags

- 1 **Informational lags:** economic data published with delay
- 2 **Decision lags:** once equipped with the data, the government must decide how to respond
  - ★ Relatively quick for monetary policy
  - ★ Fiscal policy cannot adjust rapidly
- 3 **Implementation lags:** it takes time for the policy to have real effects on the economy ( $\approx 2$  yrs), and the policy might be inefficient once it affects the economy

# Stabilization Policy V

## Problems with Fiscal Policy

- Changes in taxation schemes are difficult in practice and require lots of planning!
- Same true for defence, health, education, etc.
- Governments wish to achieve many goals through FP
- Governments often use FP in their advantage, e.g. elections coming up. . .

# Stabilization Policy VI

## The Ricardian Equivalence I

- Not important how government finances debt
- If government issues debt it must increase taxation in future dates to pay back the debt
- Consider a two period model with government and households
- Government budget constraint is,

$$D_1 = G_1 - T_1 \quad (1)$$

$$\begin{aligned} T_2 - G_2 &= D_1(1 + r) \\ &= (G_1 - T_1)(1 + r) \end{aligned} \quad (2)$$

- Households' budget constraint is,

$$C_2 = Y_2 - T_2 + (1 + r)(Y_1 - T_1 - C_1) \quad (3)$$

# Stabilization Policy VI

## The Ricardian Equivalence II

- The present value of consumption equals the present value of pre-tax income minus the present value of taxes

$$C_1 + C_2(1+r) = Y_1 - T_1 + Y_2(1+r) - T_2(1+r) \quad (4)$$

- The present value of tax revenue equals the present value of government spending

$$C_1 + \frac{C_2}{(1+r)} = Y_1 + \frac{Y_2}{(1+r)}G_1 - \frac{G_2}{(1+r)} \quad (5)$$

- Plugging Equation (5) in Equation (4)

$$C_1 + \frac{C_2}{(1+r)} = Y_1 - G_1 + \frac{Y_2}{(1+r)} - \frac{G_2}{(1+r)} \quad (6)$$

So that the present value of (household) consumption equals the present value of pre-tax income



# Stabilization Policy VII

## Consumer Expectations

- How consumers respond to tax cuts depends on whether they are perceived as transitory or permanent
- Remember the Permanent Income Model, and the role of expectations
- If tax cuts received as temporary, consumption will not react much!

# Stabilization Policy VII

## Crowding Out

- A larger fiscal deficit could reduce the amount of credit available to other borrowers, e.g. corporate sector and consumers
- Credit restrictions are associated with higher interest rates
- This obviously affects investment and consumption behavior
- Firms cut investments plans and consumers reduce consumption, all of it impacting aggregate demand and output

# Stabilization Policy VIII

## Monetary Policy

- More flexible and quicker to implement than FP!
- Central banks can change IRs overnight
- Lag between decision and implementations is practically zero!
- ... but Central Banks do only control short-term, nominal IRs
- So monetary policy has (in principle) a very indirect effect on real prices, what ultimately guides private-sector behavior
- All in all, monetary policy would be efficient only if Central Banks can affect expectations of inflation and future interest rates so that policies are self-fulfilling!

# Stabilization Policy IX

## Liquidity Traps

- The exception in which FP is necessary and highly effective (e.g. New Deal, Plan Marshall, etc.)
- Most economist agree on this, not however on whether the economy is experiencing a liquidity trap
- Liquidity trap: IRs are close to the zero lower bound and monetary policy, e.g. QE, becomes ineffective
- Fiscal policy must be the response (e.g. Japan 1990s)!
- Quite controversial topic still. . .
  - ★ The Great Recession
  - ★ The Giants' Fight (Krugman vs. Barro)

- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

# The IS Curve I

- Consumption and investment (*at least*) negatively affected by interest rates
- The (*downward-sloping*) IS curve represents the negative relation between the interest rate and the equilibrium output

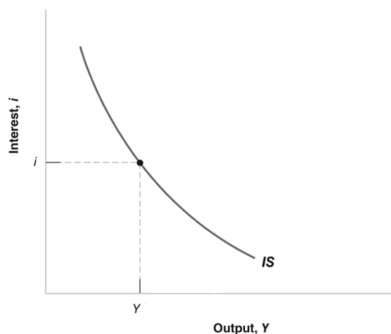


Figure: The IS Curve

# The IS Curve II

- Any change (decrease in government spending, increase in taxes, decrease in consumer confidence) that, for a given interest rate, decreases  $AD$  creates a shift of the IS curve to the left (*and viceversa*)

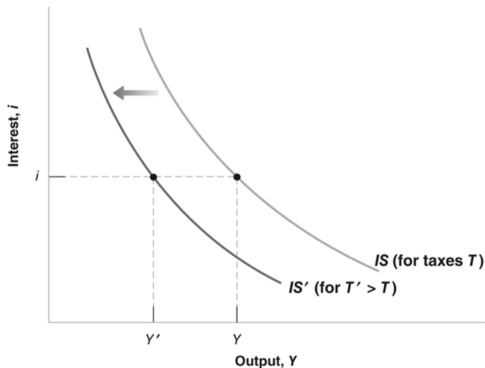


Figure: Effect of increased taxation on the IS Curve



- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

# The LM Curve I

- The “Liquidity preference-Money supply” (LM) curve
- The LM curve shows equilibrium in the money market ( $MS = MD$ )
- The (*upward-sloping*) LM curve represents the positive relation between income and interest rates, i.e. higher income, higher money demand

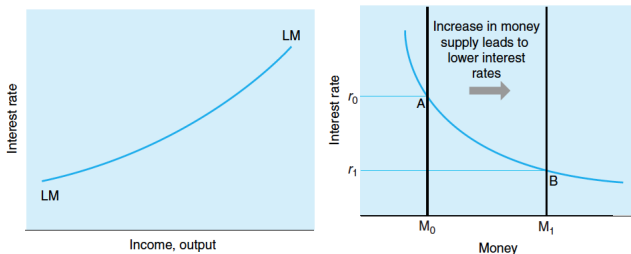


Figure: The LM Curve

# The LM Curve II

Increases (decreases) in the money supply shift rightwards (leftwards) the LM curve

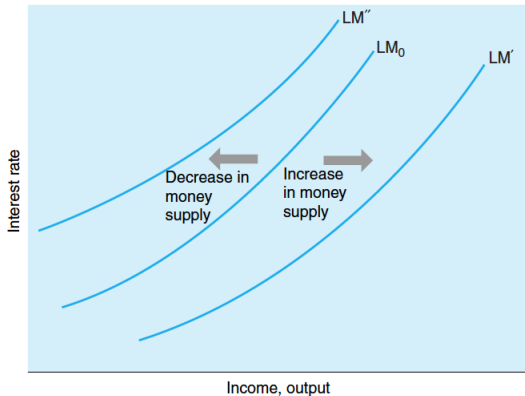


Figure: The LM curve and variations in the money supply

- 1 Introduction
- 2 Government Spending
- 3 The Role of Government
- 4 Taxation
  - Tax Distortions
- 5 Deficits and Debt
  - Optimal Budget Deficits
- 6 Stabilization Policy
- 7 The IS-LM Model
  - The IS Curve
  - The LM Curve
  - Intersection & Equilibrium

# Intersection & Equilibrium I

Equilibrium in real and financial markets when both curves intersect!

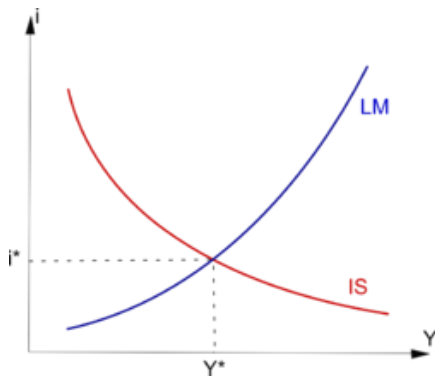


Figure: Equilibrium in the IS-LM model

# Intersection & Equilibrium II

## Shocks

Aggressive fiscal policy (e.g. increase in  $G$  or decrease in  $T$ ) shifts the IS curve upwards

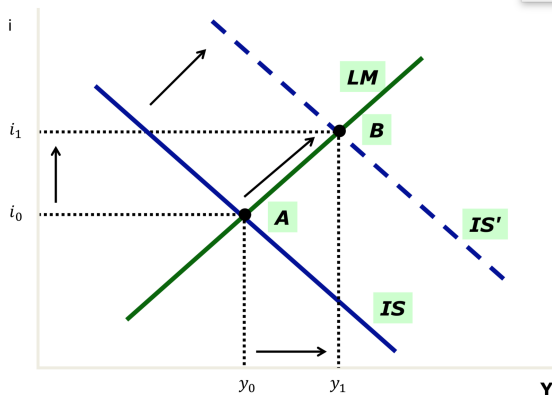


Figure: Aggressive fiscal policy

# Intersection & Equilibrium II

## Shocks

Expansionary monetary policy (e.g. QE) shifts the LM curve rightwards

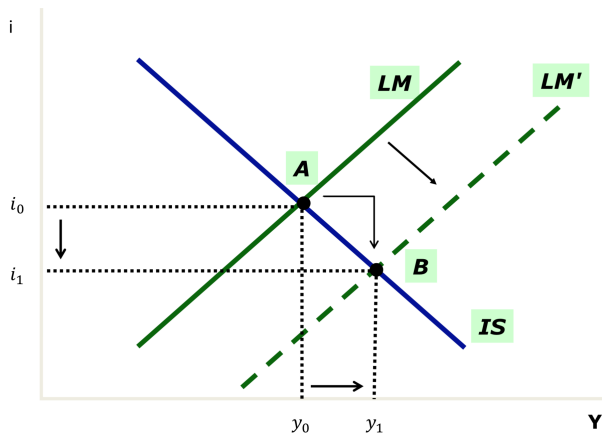


Figure: Expansionary monetary policy

Thank you for your attention!