

# Macroeconomics IV: The National Budget Constraint

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# introduction

- “According to the system of national liberty, the sovereign has only three things to attend to... first, the duty of protecting the society from the violence and invasion of other independent societies... secondly, the duty of protecting ... every member of the society from the injustice or oppression of every other member... and thirdly, the duty of erecting and maintaining certain public works and certain public institutions, which it can never be in the interest of any individual to erect and maintain”, Adam Smith, 1776.

# the government and the economy

- government expenditure
  - primary spending
    - consumption (teachers, pharmaceuticals, soldiers)
    - investment (schools, hospitals, tanks)
  - interest payments on government debt
- government revenue
  - taxation
    - direct (income tax, national insurance)
    - indirect (corporation tax, VAT, excise duties)

# government budget constraint

- government budget deficit = spending – revenue
  - spending = primary spending + interest payments
  - revenue = taxation – transfer payments = net taxation
  - deficit = primary deficit + interest payments
  - $B = G - T + rD$
  - government debt,  $D_t = D_{t-1} + B_t$
- how is the deficit financed?
  - bond sales to the private sector or the central bank (money creation)
- government intertemporal budget constraint
  - $G_1 + G_2 / (1+r) = T_1 + T_2 / (1+r)$
  - PV spending = PV taxation
  - Everything must be paid for; there is **no free lunch** ☹️.

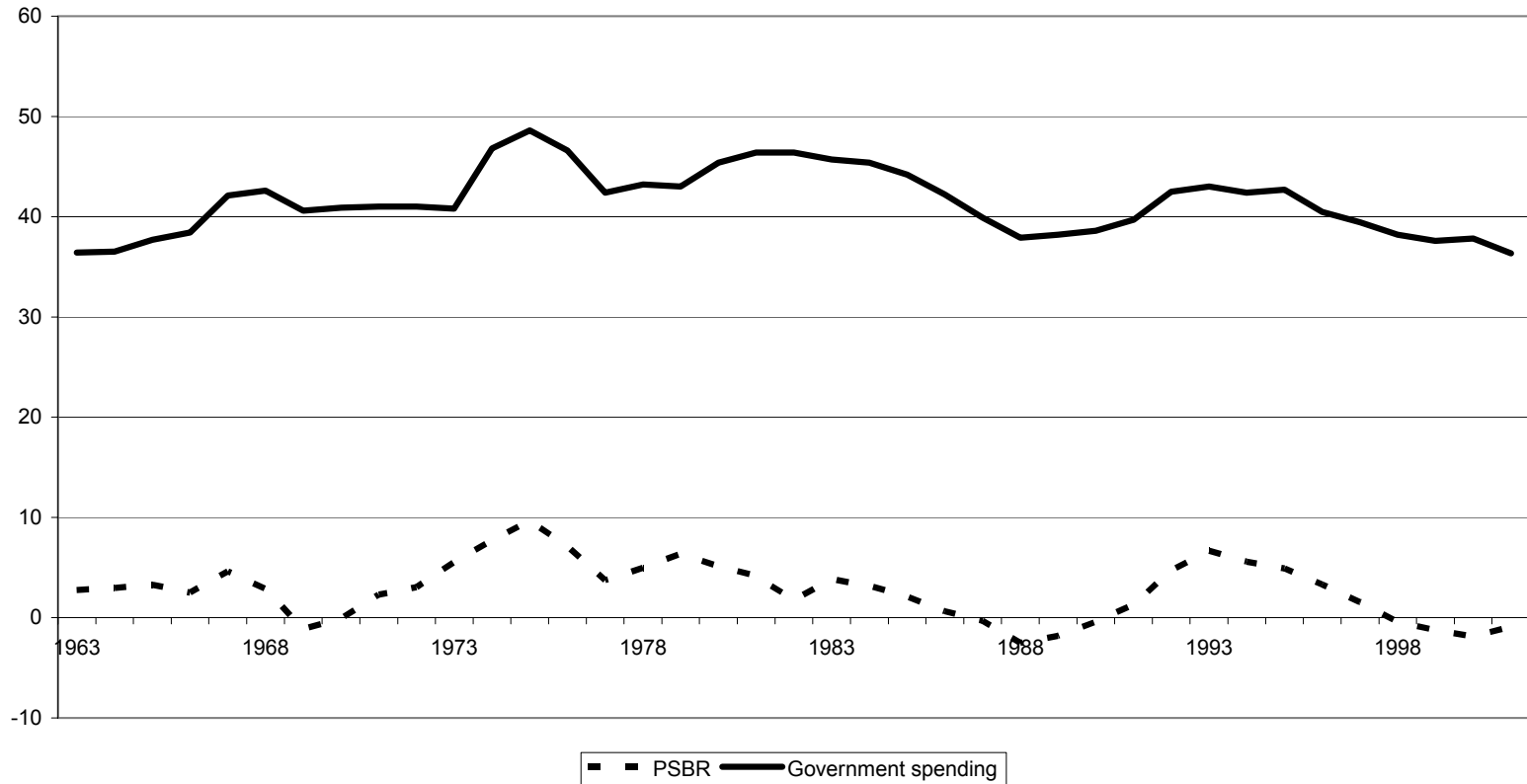
# bond prices and the interest rate

- Because the interest rate affects how much people discount the future, the price of a bond depends upon the interest rate.
- Consider a simple bond that pays 100 Euros in one year.
- How much is this worth today?  $PDV = 100/(1+r)$ 
  - if the interest rate is 5%, the bond is worth  $100/1.05=95.2$
  - if the interest rate is 10%, the bond is worth  $100/1.1=90.9$
- Consider a bond that pays a fixed coupon,  $a$ , forever: The price of that bond will be  $a/r$  (use sum of infinite geometric series).

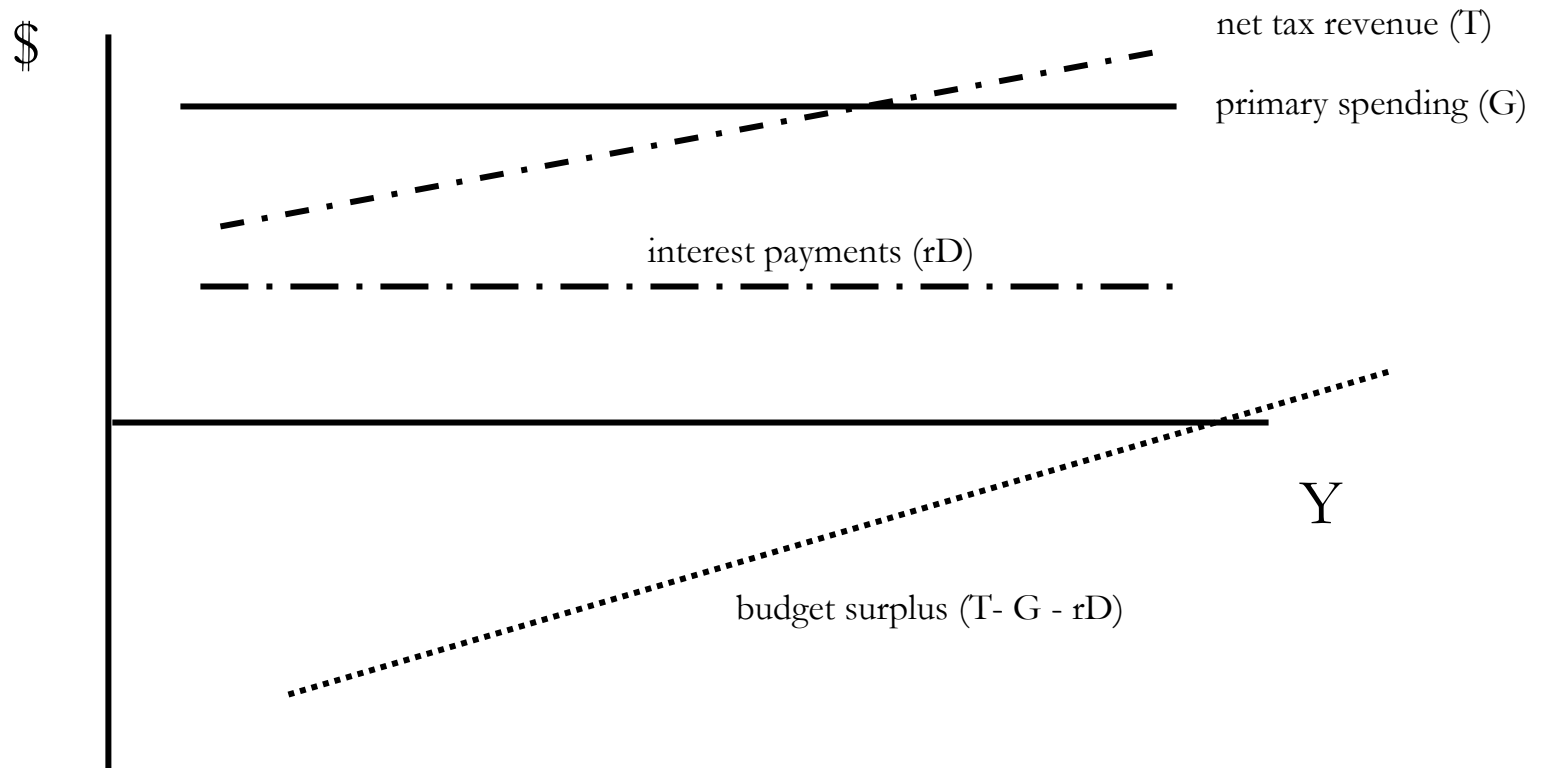
# Ricardian equivalence

- Consumers' intertemporal budget constraint:
  - $C_1 + C_2 / (1+r) = YD_1 + YD_2 / (1+r)$
  - but  $YD = Y - T$ , so
  - $C_1 + C_2 / (1+r) = (Y_1 - T_1) + (Y_2 - T_2) / (1+r)$
  - $C_1 + C_2 / (1+r) = Y_1 + Y_2 / (1+r) - T_1 - T_2 / (1+r)$
- What is the effect of a tax cut today on consumption (with government spending held constant)?
  - There is **no effect** since present value of taxation is the same.
- Assumes that consumers are rational, not credit-constrained; are infinitely lived; and that consumers and government can borrow and lend at same interest rate.

## UK Government Spending and PSBR as % of GDP 1963 to 2001

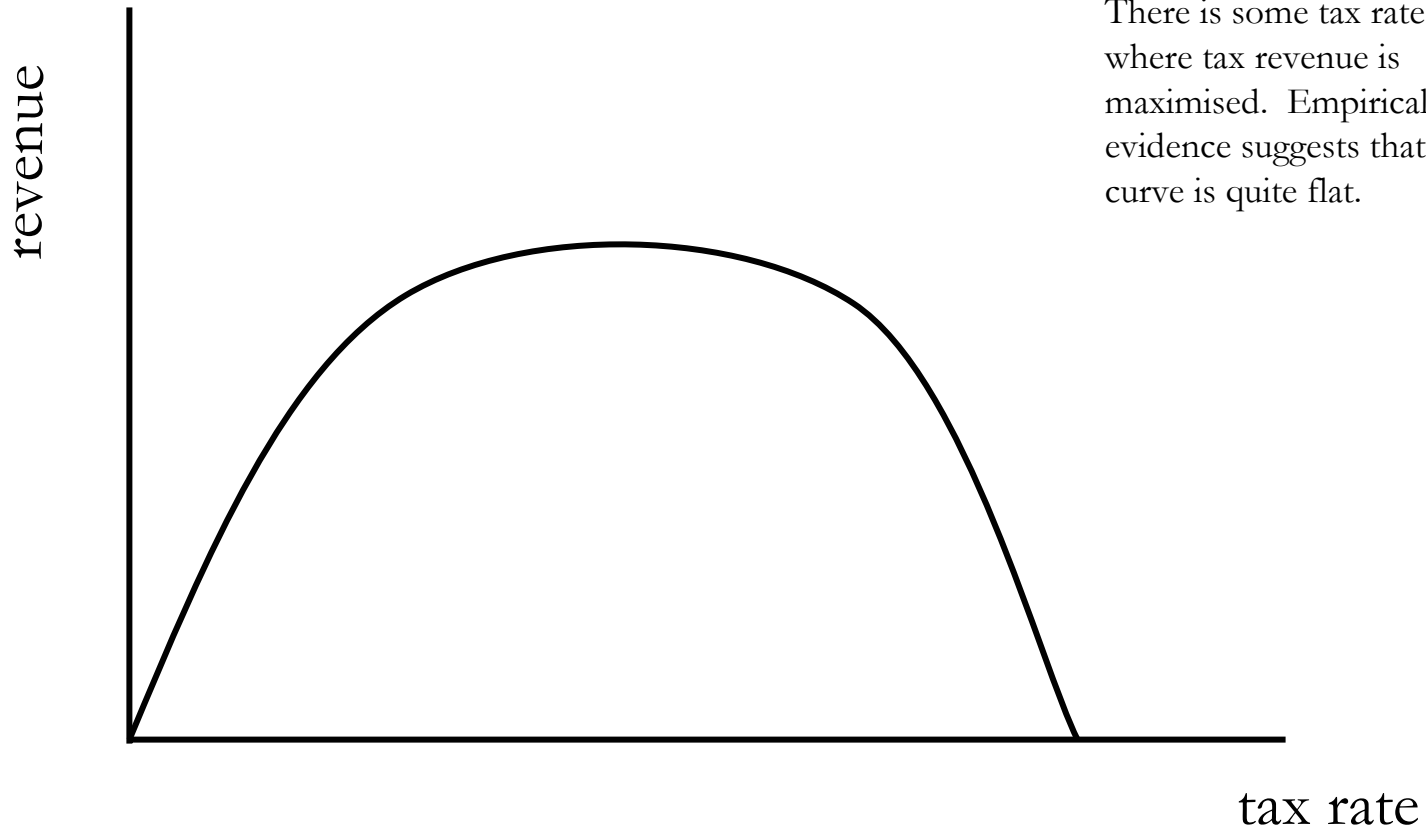


# spending, taxation and national income





# Laffer curve – motivation for supply-side economics



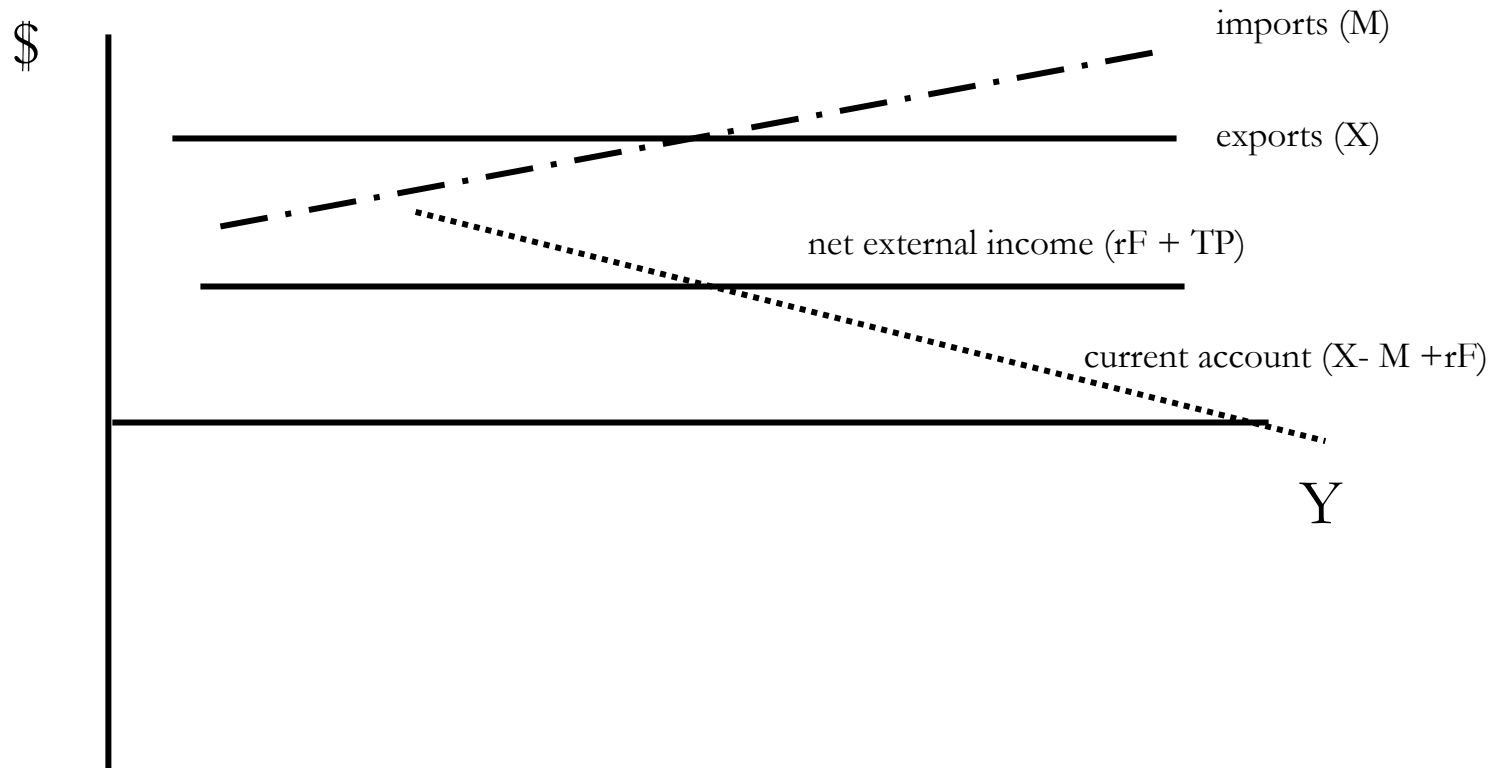
# the balance of payments

- The BOP is a record of all the transactions between residents of one country and another.
- The Current Account (CA) comprises the visibles account (trade in goods) and the invisibles account (trade in services plus net external investment income plus net transfer payments).
- The Capital Account (KA) comprises international transactions in assets (physical and financial).
- Official Financing (OF) comprises intervention in the foreign exchange market.
- balance of payments identity:
  - $CA + KA + OF \equiv 0$
  - Again, there is **no free lunch**.

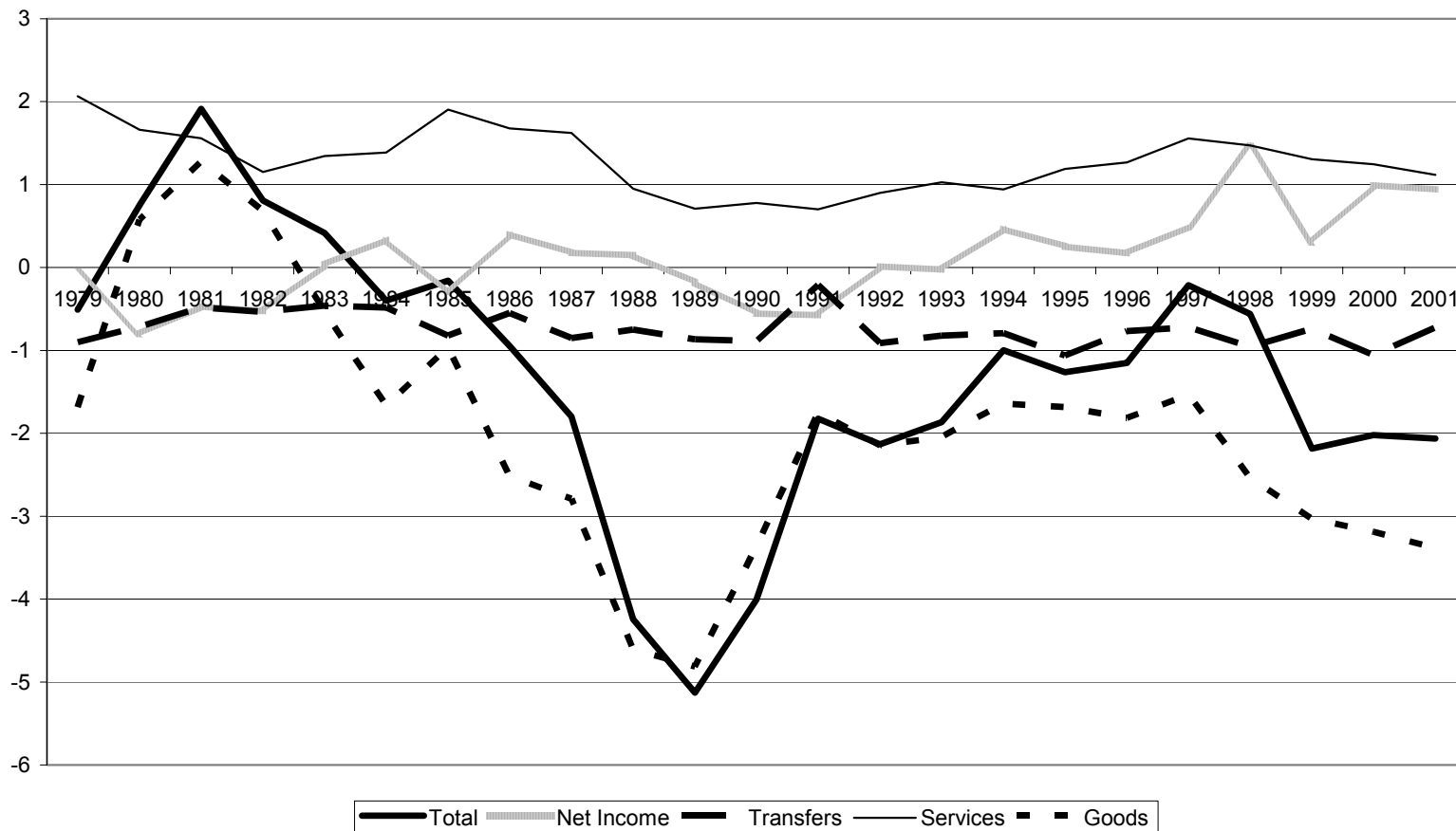
## current account

- current account = primary current account + net external income (investments + employment) + net transfer payments
  - $CA = PCA + rF + TP$
- primary current account = output – absorption
  - $PCA = GDP - (C+I+G) = X-M$
- primary current account = trade in goods + services
- A current account deficit **must** be financed by a capital account surplus or official financing.

# current account and national income



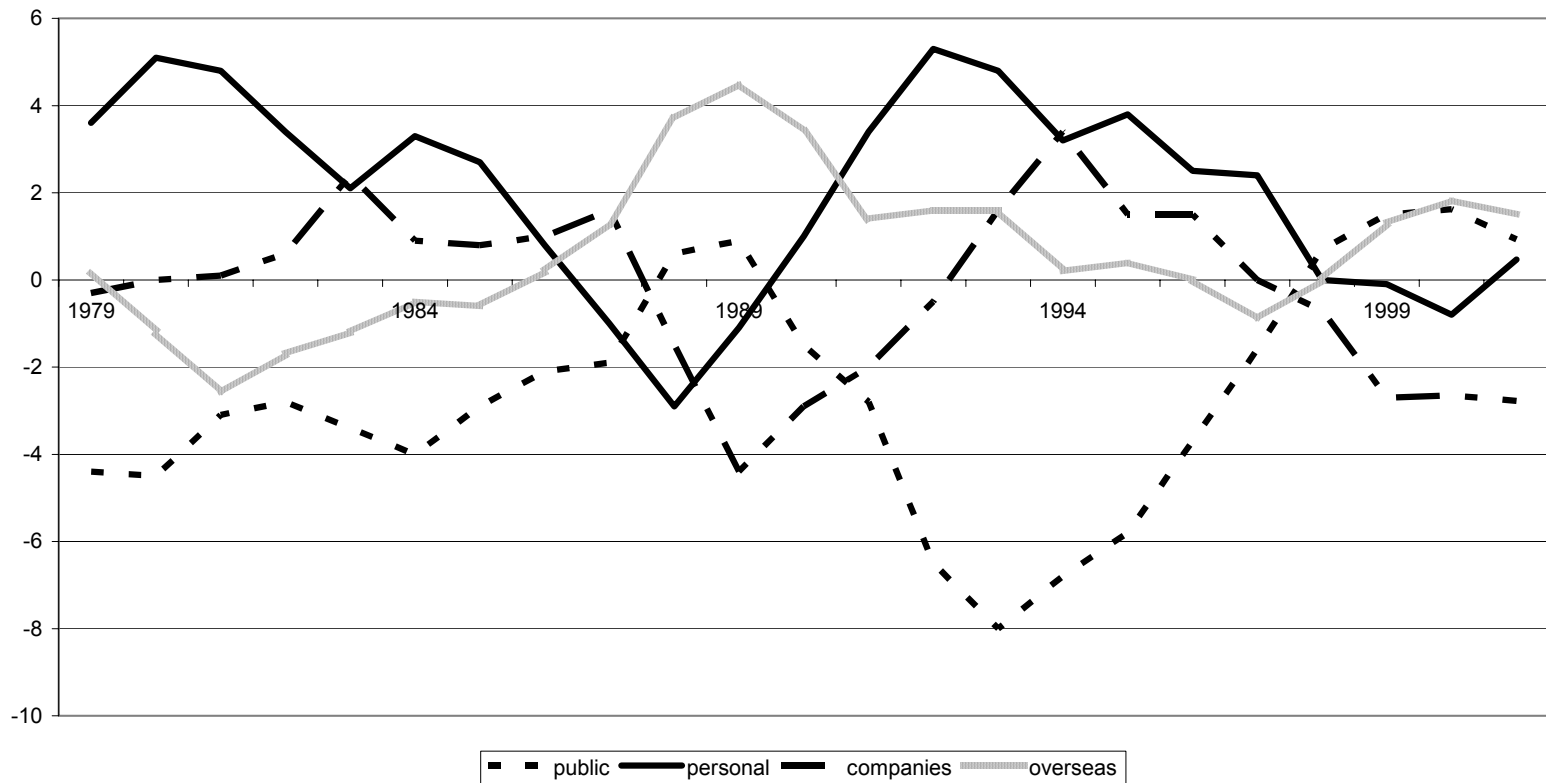
## UK Current Account as % of GDP 1979 to 2001



# national budget constraint

- recall that  $\text{GNP} = \text{GDP} + \text{net external income}$ 
  - $\text{GNP} = \text{GDP} + rF + \text{TP}$
  - $\text{GNP} = Y = C + I + G + \text{CA} = C + I + G + \text{PCA} + rF + \text{TP}$
- present value of total domestic spending must equal the present value of GDP + value of initial foreign assets
  - $C_1 + I_1 + G_1 + (C_2 + I_2 + G_2)/(1+r) = \text{GDP}_1 + \text{GDP}_2/(1+r) + F_0$
- no country can run a persistent deficit or surplus. A current deficit implies a surplus in future, and *vice-versa*.

## UK Sectoral Net Lending as % of GDP 1979 to 2001



# competitiveness

- ‘Most people who use the term "competitiveness" do so without a second thought. It seems obvious to them that the analogy between a country and a corporation is reasonable and that to ask whether the United States is competitive in the world market is no different in principle from asking whether General Motors is competitive in the North American minivan market. In fact, however, trying to define the competitiveness of a nation is much more problematic than defining that of a corporation...So when we say that a corporation is uncompetitive, we mean that its market position is unsustainable - that unless it improves its performance, it will cease to exist. Countries, on the other hand, do not go out of business. They may be happy or unhappy with their economic performance, but they have no well defined bottom-line. As a result, the concept of national competitiveness is elusive.’ -- Paul Krugman, *Pop Internationalism*.



# the exchange rate defined

- the nominal exchange rate is simply the price of one currency in terms of another
  - dollars per pound
  - euros per dollar
  - yen per pound
- currencies are traded in the international FX market
- the nominal exchange rate is usually defined as the number of domestic currency units per foreign current units. When this rises, the exchange rate is depreciating. When this falls, the exchange rate is appreciating.
  - the US exchange rate is  $E_{US} = \$/\pounds$
  - it's the **price** of a UK $\pounds$  in terms of US\$.

# supply and demand for FX

- If the \$/£ rate falls (appreciates)
  - UK goods cheaper in US
  - US goods more expensive in UK
- UK exports to US rise
  - US demands more Sterling and offers to supply more Dollars;
- US exports to UK fall
  - UK demands fewer Dollars and offer to supply less Sterling.

# the exchange rate's dynamics

- When the exchange rate floats freely, what determines its level?
- Purchasing Power Parity (PPP):
  - Similar baskets of goods in the USA and Japan should cost the same
  - PPP is the cost of the Japanese basket divided by the cost of the US basket (¥/\$)
    - *The Economist's* Big Mac and Starbucks' Latte Indices
- Uncovered Interest Parity (UIP):
  - Expected returns should be equal on foreign and domestic assets.
  - The interest rate differential between two countries is equal to the expected rate of depreciation.
- The Terms of Trade:
  - Defined as the Price of Exports over the Price of Imports.
  - Related to relative supply and demand for tradeables.

# problems with PPP

- What is in the baskets?
  - Only tradeable goods bound by law of one price. So, should be tradeable goods only (ie., not Big Macs).
  - Differences in mark-ups and indirect taxes matter.
- How quickly does arbitrage work?
- In the short-run, capital movements are likely to be more important
  - Must be true because nominal exchange rates are far more volatile than relative national price levels.
  - There can be fairly long periods where exchange rates deviate from PPP.
- In the long-run, exchange rates and/or price levels tend to adjust towards PPP (half-life of 3-4 years – very slow).
  - If a country has higher inflation, its nominal exchange rate will tend to depreciate over time.

# the real exchange rate

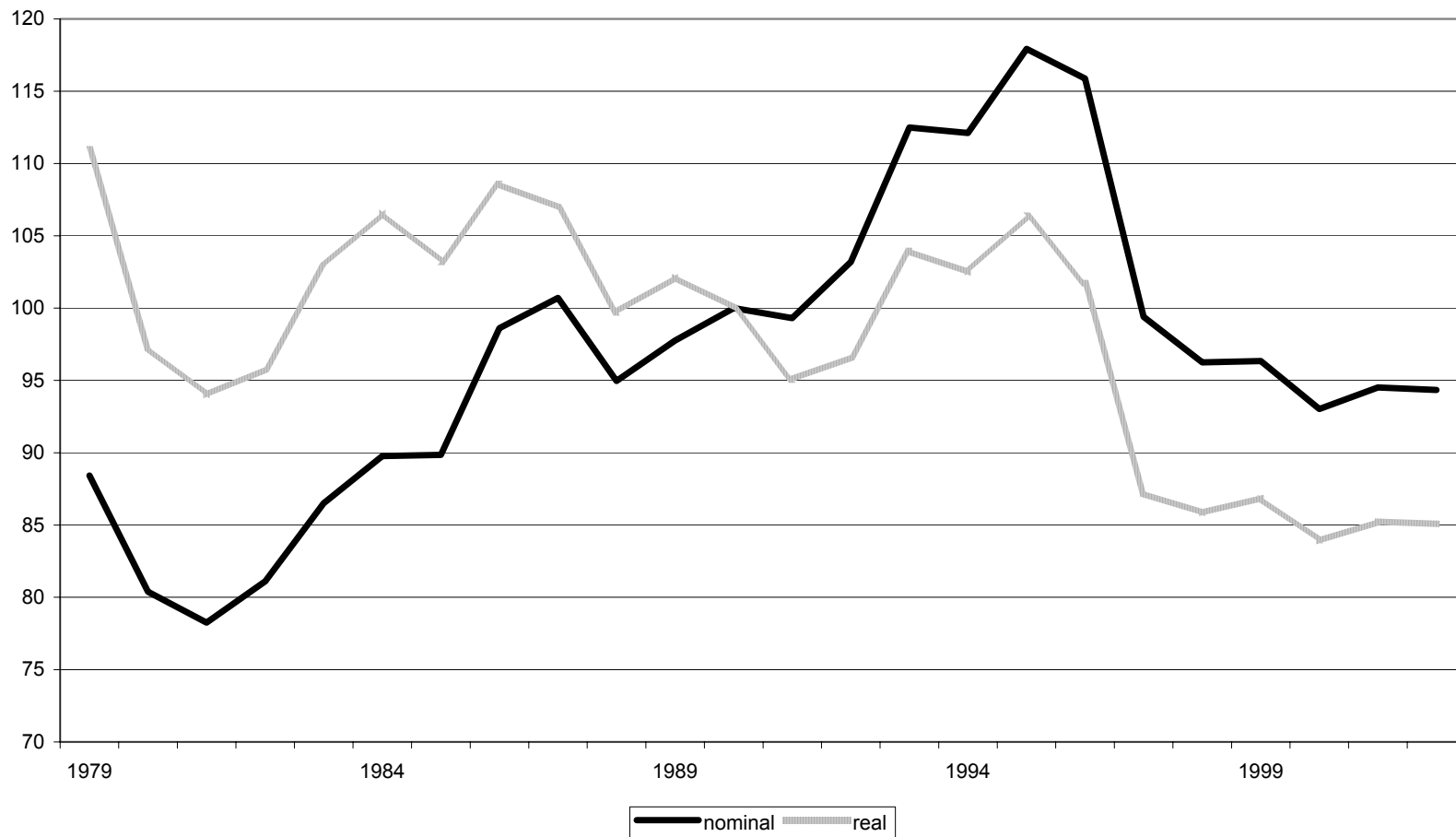
- The nominal exchange rate may be defined as
  - Units of domestic currency/Units of foreign currency
- The Real exchange rate may be defined as
  - $(\text{nominal exchange rate}) * (\text{price of foreign goods}) / (\text{price of domestic goods}) = (\text{Home output}) / (\text{Foreign output})$
- In these definitions, a rise in the exchange rate is a *depreciation* and a fall is an *appreciation*.
  - As long as goods prices move together, the real exchange rate will be stable.
  - If foreign prices rise faster than domestic prices, the nominal exchange rate will depreciate.
  - PPP is a theory of the real exchange rate.
- The Terms of Trade (a close relative of the real exchange rate) are determined by the relative supply and demand of tradeable goods.

# Nominal and real effective exchange rates for Japan

(yen per unit of foreign currency)



## Nominal and real effective exchange rates for the UK (pounds per unit of foreign currency)



# summary

- Governments and countries face budget constraints just as do households and firms. Consolidating households and firms budget constraints gives the budget constraint of the private sector.
- Assets are held by firms on behalf of households. That is, firms are a veil: they provide their owners or shareholders with a means of increasing their assets. Taxes on firms are actually taxes on households.
- The government budget constraint is also a veil. For a given profile of government spending, tax reductions today imply higher taxes in future.
- Ricardian Equivalence argues that the private sector can see through the veil and will take actions to offset those of the government: public dissaving is matched one for one by private saving, leaving national saving unchanged. However, this is unlikely to be true in the short to medium run.
- Equally, the national budget constraint is the sum of the public and private sector budget constraints. Higher primary current accounts deficits today imply higher surpluses in future.