Econ 2004:
The Open Economy

Lecture 7: All about oil: macro analysis of oil shocks and natural resource windfalls

Reading.

Core:

Carlin & Soskice (2015) Chapter 11 Sections 11.1.1, 11.1.2 and 11.2.1, 10.1.1 (yes, again), 11.2.2

Optional: See Moodle page

Last lecture

Model-building:
The medium-run model: AD-BT-ERU

- The supply side in the open economy – the downward-sloping ERU curve and a range of constant inflation equilibria
- The full AD-BT-ERU model

Policy question

- Can the government use fiscal policy to choose a lower equilibrium unemployment rate? … e.g. the Labour government in the UK?

This lecture

Model-building:

1. **Using the AD-BT-ERU model to model external supply shocks like oil shocks**
2. **Balance of payments**
3. **Intertemporal approach to balance of payments**

- Applies permanent income hypothesis model of consumption to country's current account
- Intuition: current account simply reflects consumption smoothing by borrowing and lending of optimizing agents

Policy question

- How does the policy regime affect the impact of oil shocks?
- How does the discovery of a natural resource affect the macro-economy?

Three oil shocks

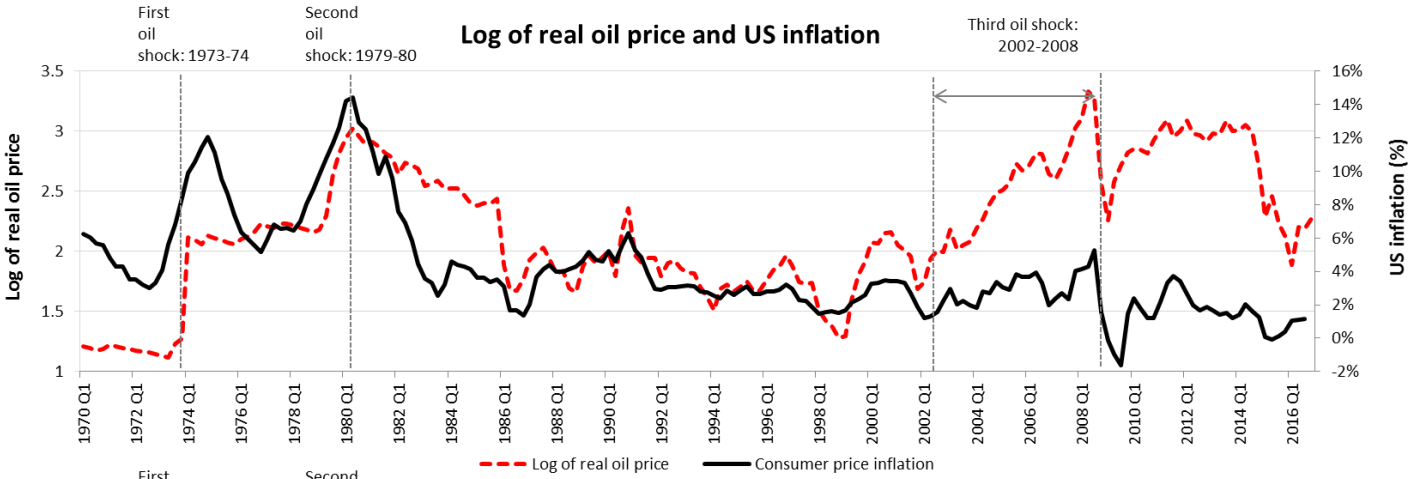
1973 OPEC I:
More than doubling in real price of oil followed by stagflation (↑π to 15%; ↑U to 10% in US)

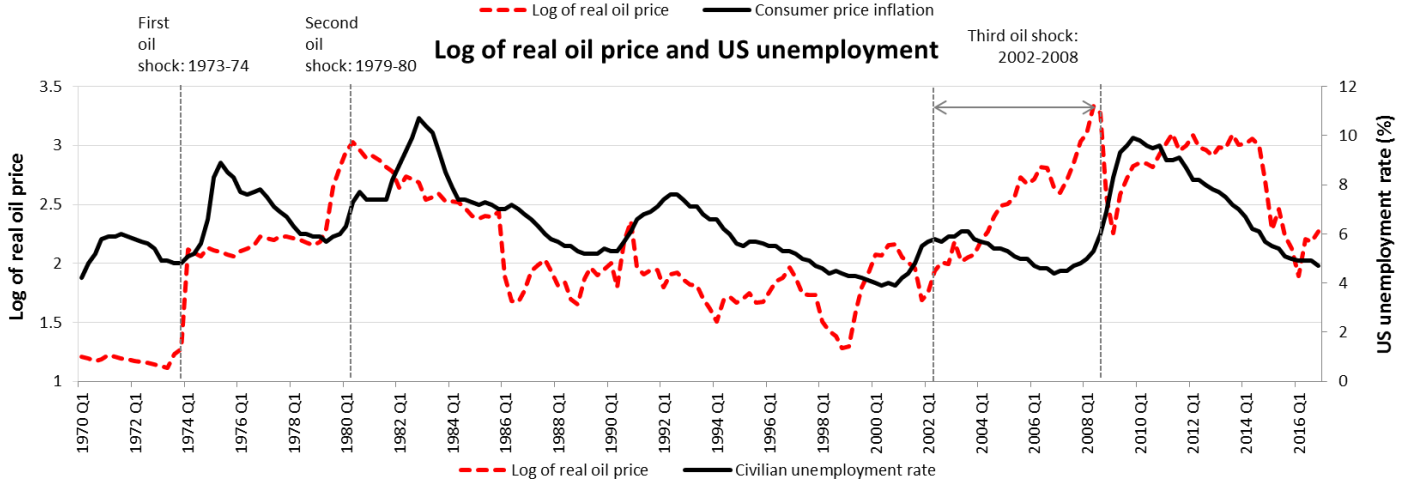
1979 OPEC II:
Oil price shock in 1979 followed by painful disinflation with high U

2002-2008:
Strong rises in real oil price, which peaks higher than in OPEC I or II but inflation and U remain low

Fall in oil price:

- 1986
- 2008-2009 – financial crisis
- 2014 – xxxx – supply and demand


First oil shock: 1973-74
Second oil shock: 1979-80
Log of real oil price and US inflation
Third oil shock: 2002-2008
Log of real oil price
US inflation (%)
Log of real oil price
Consumer price inflation


First oil shock: 1973-74
Second oil shock: 1979-80
Log of real oil price and US unemployment
Third oil shock: 2002-2008
Log of real oil price
US unemployment rate (%)
Log of real oil price
Civilian unemployment rate

Latest …

1. *Brent crude price hits 12-year low*

2. *Doha talks end in failure*

3. *Opec reaches agreement on how to distribute output cuts*

4. *Non-Opec producers such as Russia agree to join oil deal*

5. *Opec oil production cuts due to take effect*

Three oil shocks

Why were 1970s shocks so damaging?

- Poor understanding of nature of shock

Why were private & policy responses so different in 2002-08?

- Improved understanding of the nature of oil shocks
- New monetary policy regimes of inflation-targeting (e.g. Fed, ECB, BoE)
- Labour market reforms weakened labour and reduced 'real wage resistance'

How does a model help?

An oil shock is

1. Aggregate demand shock and external trade shock – why?

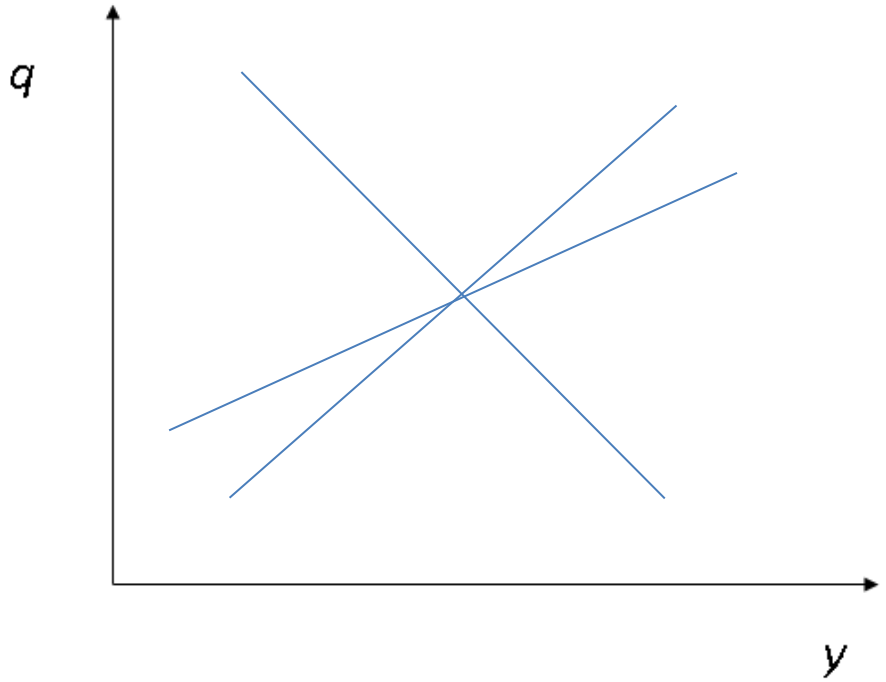
2. An external supply shock – why?

We have all the ingredients to model this:
AD and BT shift

ERU shifts

How does a model help?

What does the model predict?



What was the policy response?

This explains stagflation: lower output and higher inflation
It also helps explain why 2000s was different from 1970s

Modelling an oil shock

1. Why does an oil shock depress aggregate demand & shift AD & BT left?

2. Define the external terms of trade between raw materials (oil) and manufactures;
   Assume *all imports are raw materials*;
   Define P_M

   $$\tau \equiv \frac{P^*_{rm}}{P^*_{mf}} \text{ and } Q \equiv \frac{P^*_{\text{mf}} e}{P_{\text{mf}}}$$

   Define home's terms of trade

   Derive M

So, net exports are:

Oil shocks – model (cont.)

3. Impact on the supply side

$P_C = P + \nu\tau P^* e$, where ν is unit materials requirement of output

$$w^{PS} = \frac{\lambda(1-\mu)}{1+\nu\tau Q}$$

$\uparrow \tau \rightarrow \downarrow w^{PS} \rightarrow ERU$ shifts left

Explaining the ToT effect

- *ERU shifts left when τ rises if workers seek compensation in ↑W for cuts in real wages due to higher oil prices = 'real wage resistance'*
- *We take account of ToT effect when we have W/P_C on vertical axis in WS/PS model*

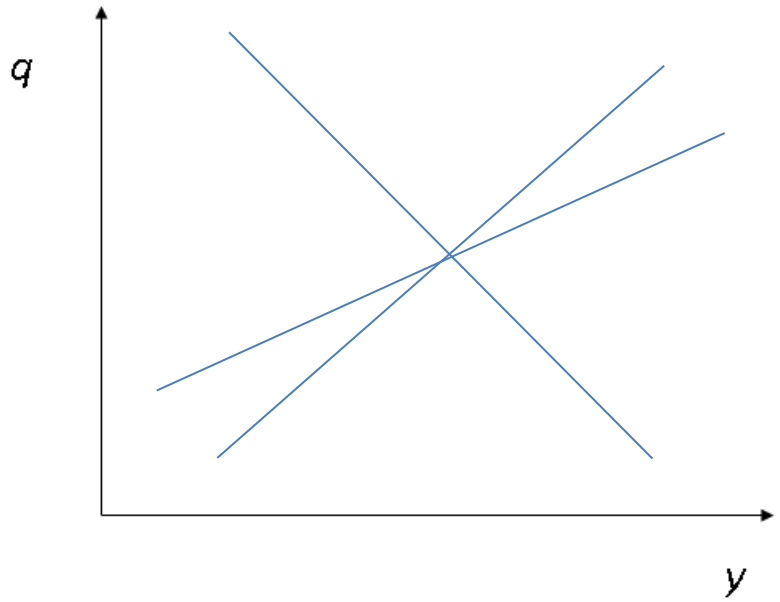
Supply-side effect: Upward pressure on inflation + higher unemployment = stagflation

1973 Oil shock

Flexible exchange rates, but not inflation-targeting CBs

Policy focused on offsetting negative aggregate demand effects → loose monetary policy called 'accommodating monetary policy'

→ Depreciation / inflation spiral:



Stagflation:

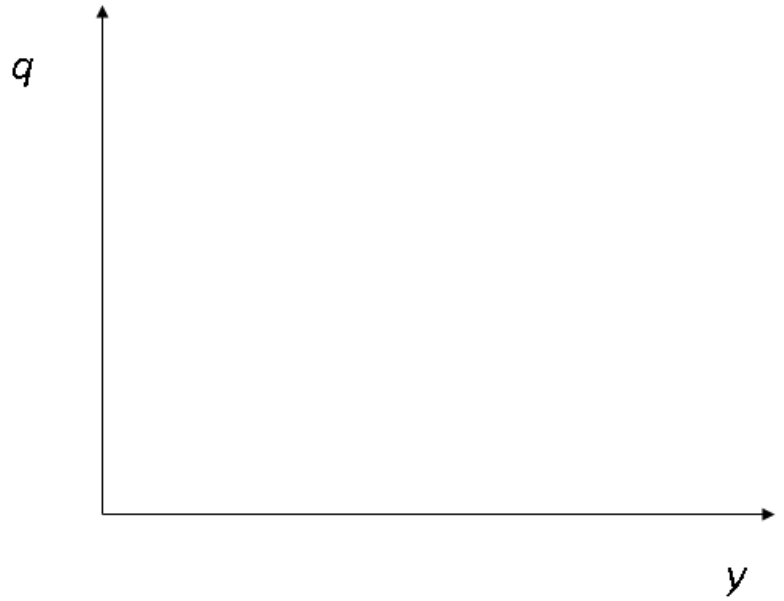
- Fuelled by
- Exacerbated by adaptive inflation expectations & real wage resistance

1979 Oil shock

Flexible exchange rates, change of regime

Policy shifted to non-accommodating MP (‘anti-inflation’) associated with Thatcher in the UK; Volcker (Fed chairman in the US)

→ Keep ‘money tight’, allow unemployment to rise as necessary to bring inflation down:



Comparison with 2002-2008 oil shock

What was different?

1. Monetary policy: inflation targeting MP NOT accommodating MP. CB will therefore not allow a depreciation / inflation spiral. CB understands the nature of the shock.

2. Impact on AD of higher commodity import costs offset by household access to

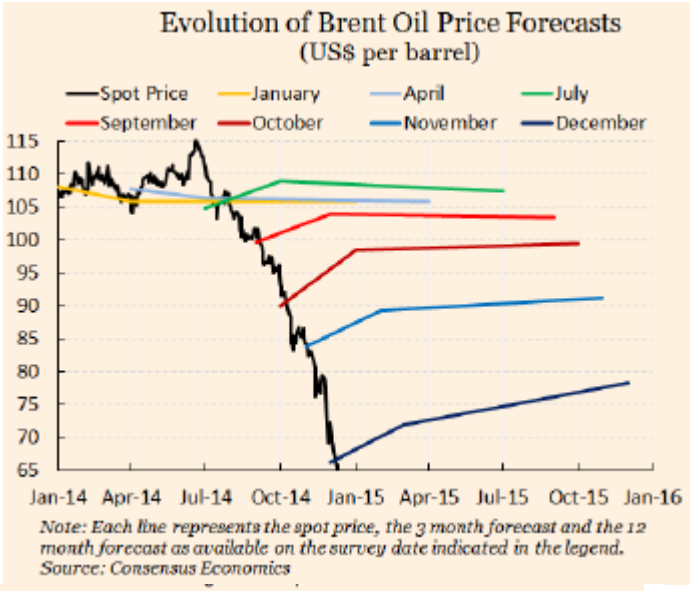
3. Inflation target also helped anchor inflation expectations (use simulator to see effect of anchored inflation expectations)

4. More flexible labour markets (following labour market deregulation from the 1980s onwards) meant less 'real wage resistance' – workers understood that the oil shock is a real shock to the economy and higher nominal wages will just lead to inflation: hence ERU does not shift left (or by much less)

The collapse in the oil price in 2014/15/16

Fall in world oil price

- A positive demand and supply-side shock
- Apply the model – with the usual assumptions
- Consider a situation in which falling inflation could lead to deflation – what problems could this raise?
- Evaluate the potential danger of this in the light of what we know about inflation expectations in the current period



See the article by Gavyn Davies (and other new articles) on Moodle – excerpts here

What about the euro area, which has virtually no indigenous oil production? Even there, pessimists (like the ECB) have found a reason to worry: the unhinging of inflation expectations. If this did occur in a sustained manner, it would be no trivial matter. As we have seen in Japan, permanently lower inflation expectations translate into lower nominal wage and price increases, and at the zero lower bound for interest rates, that makes high levels of public and private debt less sustainable.

This chain of events is, however, far from inevitable. It is more likely that a decline in headline inflation will take short term inflation expectations down for a while, but core inflation will fall much less, and inflation expectations will subsequently rebound, especially if the ECB eases monetary policy markedly.

Furthermore, wage increases seem largely independent of either expected price inflation or the tightness of the labour market at present. Assuming that wage increases are unaffected by lower oil prices, this will amount to a much needed increase in real disposable income, which will make it easier, not harder, to service existing debt. A temporary spike in short term real interest rates will not be enough to offset these real income gains.

Open economy accounting – keeping track of wealth changes
Balance of payments (Chapter 10.1.1)

$$BP \equiv \text{ current a/c} + \text{capital account } \equiv 0$$

Examples:

1. Suppose (BT + INT) > 0 and ΔR = 0	2. Suppose (BT + INT) > 0 and F = 0

Summary

1. A current account surplus (source of forex) entails as a counterpart, a capital account deficit, i.e. an outflow (or use) of forex (to purchase foreign assets), recorded as

2. A current account deficit …

Key points

- BP must by definition be zero
- Why do we care about the current account? is changing.
- How can there be a BP crisis if BP ≡ 0?
- Crisis refers to the private balance: (BT + INT) + F

  If (BT + INT) + F > 0, then ΔR > 0

  If (BT + INT) + F < 0, then ΔR < 0

- CB can run out of R … this is a crisis

Inter-temporal approach to current account – how countries can smooth consumption

Assumptions:

- Perfect international capital mobility, PCM
- Domestic consumption determined by PIH, i.e. consumption smoothing: any expected fluctuations in hh net income can be smoothed by borrowing / lending abroad

$$CA_t = -\sum_{i=1}^{\infty}\left(\frac{1}{1+r^*}\right)^i \Delta y^E_{t+i},$$

where y is aggregate household net income, including net income from abroad.

Accounting identities & definitions:

$$CA \equiv X - M + INT$$

$$X - M \equiv y - C - I - G$$

$$CA \equiv y + INT - C - I - G = y - C,$$

where $y = y + INT - I - G$

Intuition: if expect income to rise, then smooth C by borrowing now, implies CA < 0

Open economy means economy *as a whole* can borrow

Example: Unexpected fall in y_t
e.g. due to a temporary fall in exports

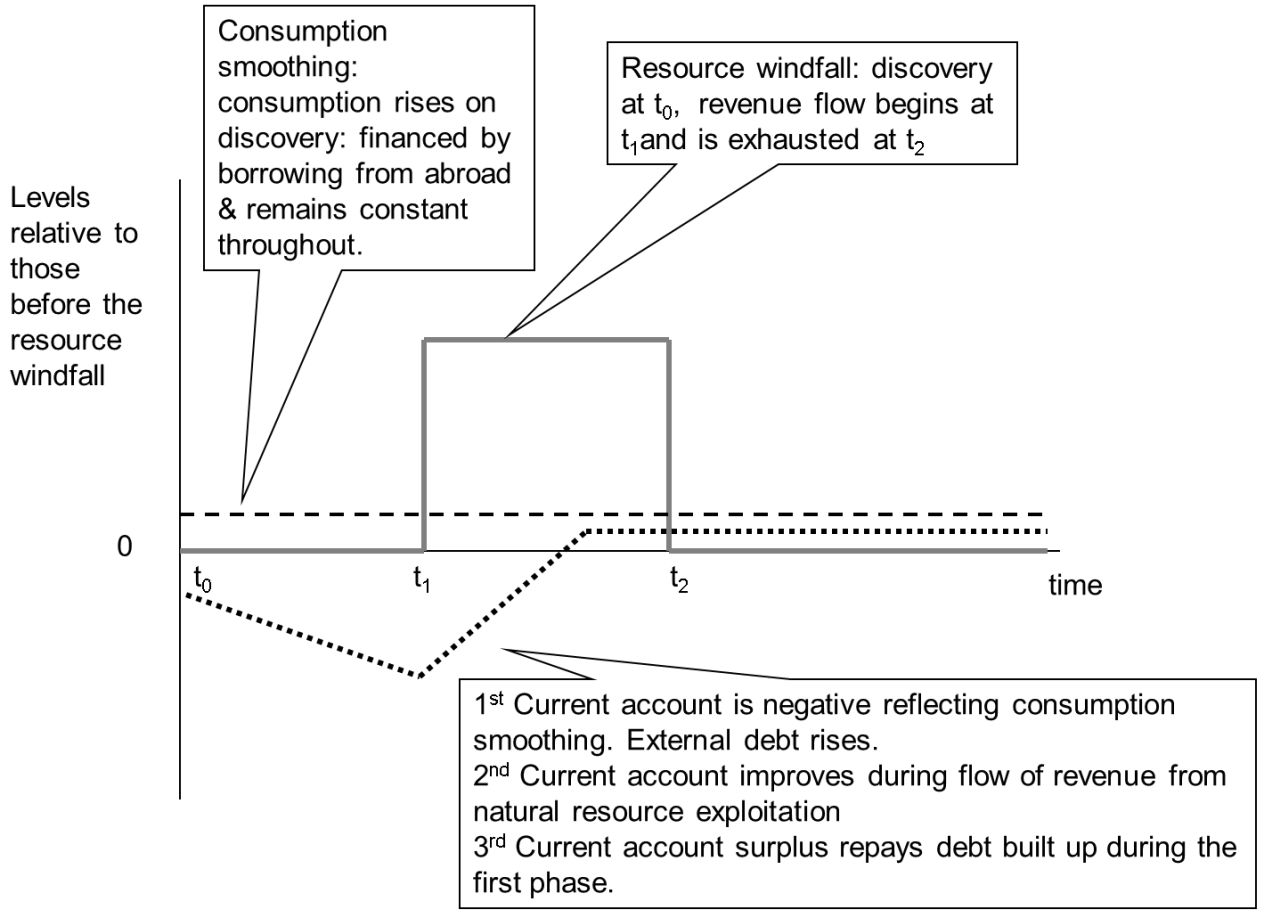
$$CA_t = -\sum_{i=1}^{\infty}\left(\frac{1}{1+r^*}\right)^i \Delta y^E_{t+i},$$

where y is aggregate household net income

- If expect higher income in future (when exports recover), then
- What if the fall in exports is permanent?
- For a temporary fall,
- In the model of intertemporal optimization, countries can borrow and lend at r*

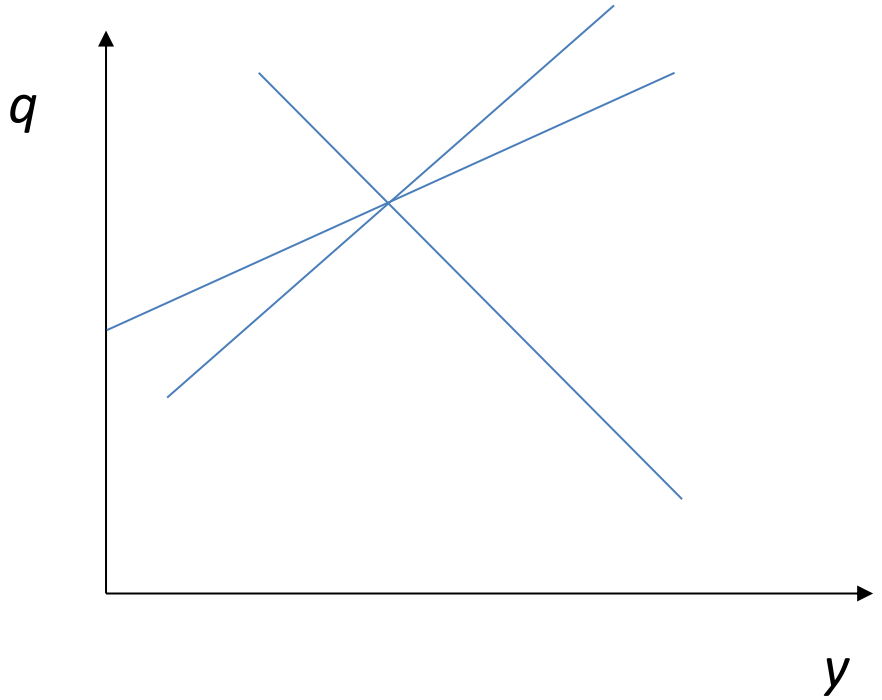
Example: Resource windfall and the current account

Model as: $\Delta y^{E}_{t+i} > 0$ when $i > 0$

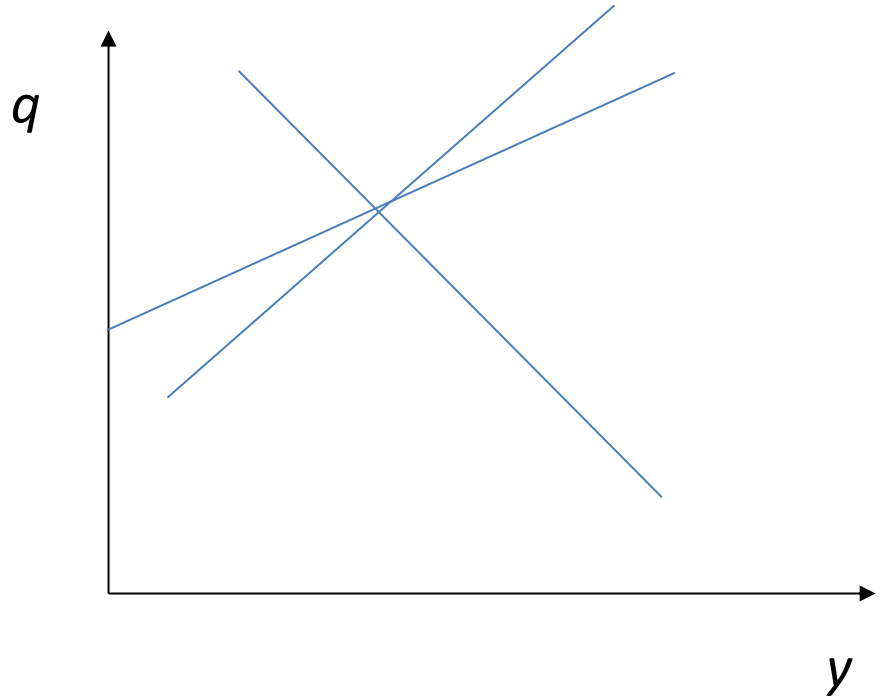


Resource windfall in AD-BT-ERU model

On discovery



Long-run equilibrium



Summary about current accounts

We have shown that a CA deficit can be benign (unproblematic) or it can be symptomatic of macro imbalance …

1. If CA balance reflects rational, intertemporal optimizing behaviour, then countries will have CA surplus or deficit reflecting differences in preferences, investment opportunities, resource windfalls, demographics
   → no policy concern

2. Myopia (short-sightedness), political pressures, etc. may mean that e.g. CA deficit reflects 'too low' rather than optimal national saving … e.g. due to unsustainably high private consumption (e.g. based on house price bubble) or high government spending
   → policy concern

Next lecture

- More about global imbalances … looking beyond a single country

Self-test questions:
Carlin and Soskice (2015) Chapter 11 questions: 1-4, 6.