ECON2004 Macroeconomic Theory and Policy

Lecture 1: Introduction. The demand side.

Reading: see Moodle

This lecture

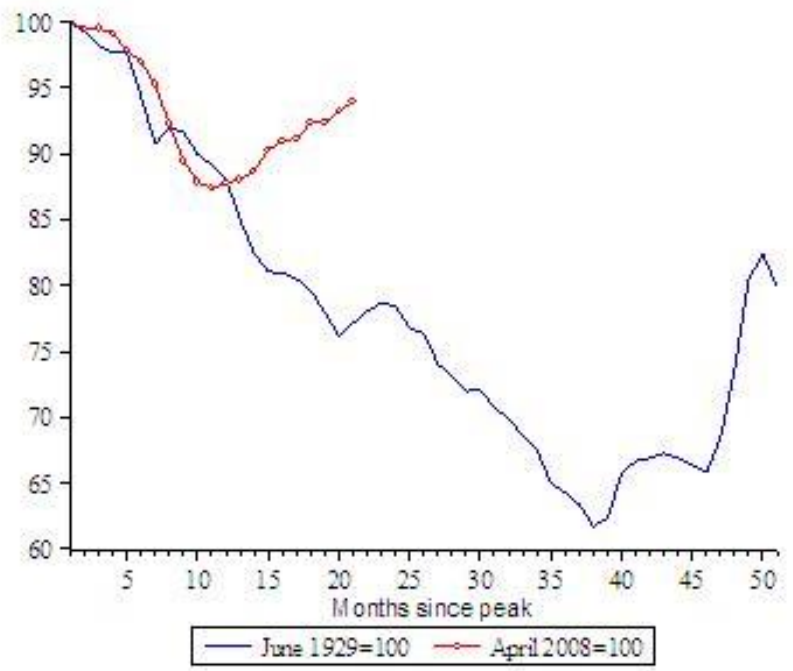
- A (brief) reminder of what macro's all about
- Course outline
- Course organisation
- Modelling consumption
- The Permanent Income Hypothesis

Macroeconomics: why bother?

Understanding interesting times:

- credit crunch (2007 – 2008)
- recession (2008 - …)
- sovereign debt crises (2009 - …)

US GDP



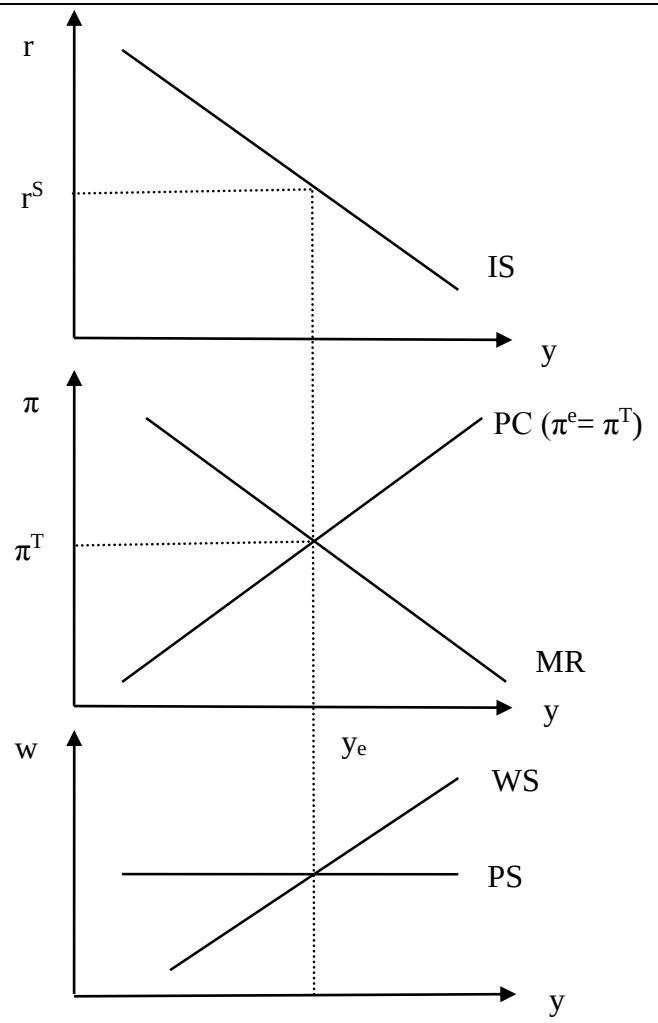
Notation

Upper case letters: nominal Lower case letters: real For example, w = W/P means "the real wage is the nominal wage divided by the price level" Interest rates always lower case: i is the nominal interest rate, r the real interest rate **Note real investment is v not i.**	Superscript e means "expected" Other super / subscripts defined when used. Dynamic models need time subscripts. e.g. the Phillips curve: $\pi_t = \pi_t^e + \alpha(y_t - y_e)$ means inflation at time t is expected inflation at time t plus a constant times the difference between output at time t and equlibrium output. Can omit time subscripts when they're all the same e.g. $y = c + v + g$ means $y_t = c_t + v_t + g_t : \forall t$

Demand and supply sides

Supply side	Demand side
What firms make	What agents buy
$y = af(k,n)$ Price and wage setting Equilibrium output: y_e Inflation: π	$y = c + v + g + (x - m)$
Supply-side policies: - labour market reform - competition policy	Demand-side policies: - monetary - fiscal

The three-equation (IS-PC-MR) model



IS: **the demand side**

- non-durable consumption of households
- investment by households (durables and housing) and firms
- government spending

WS / PS: **the supply side**

- imperfectly competitive labour market
- price setting by firms
- wage setting by firms / workers

PC: Phillips curve

- **summarising** the supply side with nominal stickiness

MR: monetary rule

- optimal monetary policy

Course outline

Building the model	**Using the model**
The demand side (IS): lectures **1,2** The supply side (PC): lecture **3** Monetary policy (MR): lecture **4** Fiscal policy and government debt: lecture **7** The financial sector: lecture **8**	Basic use: lecture **4** Expectations and policy effectiveness lecture **5** Oil shocks; the UK in the 1980s; pre-crisis monetary policy lecture **6** Fiscal policy, lecture **7** The economy since 2007: lectures **9/10**

Models, theory and data

- The macroeconomy is exceedingly complex both in cross-section and time-series.
- The models we can build are extremely simple: “three equations” to describe millions of agents interacting in endless complicated ways in an institution and technological environment that is constantly changing.
- The data we have is limited and noisy. Structural change means historical data is not necessarily useful.

Dealing with this:

- Models are not the truth (“the map is not the territory”); simply a way of structuring our thoughts
- Distrust dogmatic statements about the macroeconomy, whomsoever they may come from

"The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design." (Hayek)

- See unit 2.1 of the new CORE

General points

Lectures

- Read *BEFORE* the lecture
- Handouts / lecturecast

Classes

- problem sets consist of questions to be handed in and discussion points
- solutions will be posted on Moodle.
- you are expected to carefully work through these solutions *BEFORE* the class and prepare any questions you want to ask
- class tutors will *NOT* go through the solution to the problems. Most of the class will be spent on the discussion points

Demo lectures

- your questions
- general points on the exam
- exam questions posted on Moodle; attempt them before the lecture

FAQs on Moodle

If you didn't take ECON1001

- www.core-econ.org/. Start by reading units 12 – 14, then 10,11 and 17.

Feedback

The demand side: where we're going

An identity:

Behavioural models:

- consumption

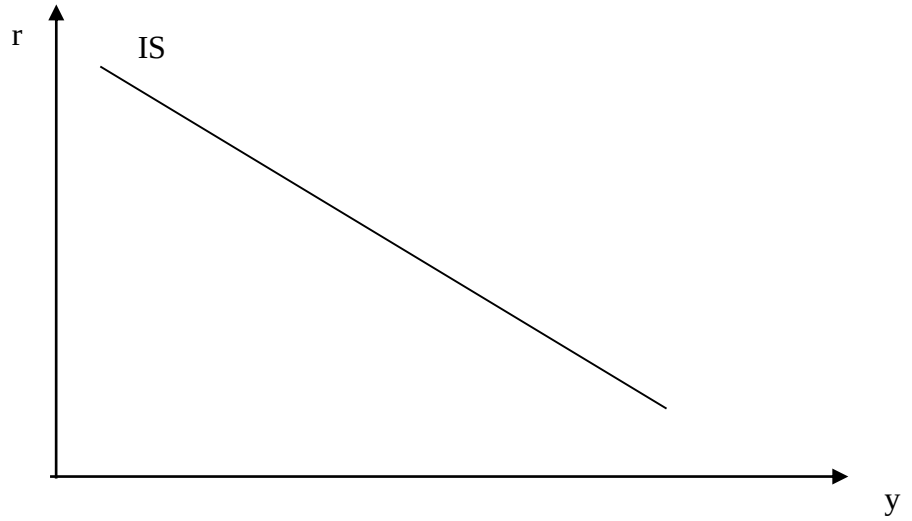
$$c_t = c_t(\Lambda_c) = c_0(\Lambda_c) + c_y(\Lambda_c) y_t + c_r(\Lambda_c) r_t$$

- investment:

$$v_t = v_t(\Lambda_v) = v_0(\Lambda_v) + v_y(\Lambda_v) y_t + v_r(\Lambda_v) r_t$$

Market clearing:

The IS curve:



The demand side

Approaches

1. Empirical

2. Theoretical

- "ad hoc" e.g. $c=c_0+c_y y$; c_0, c_y assumed constant

  "The fundamental psychological law, upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of experience, is that men [sic] are disposed, as a rule and on average, to increase their consumption as their income increases, but not by as much as the increase in their income" (Keynes)

- Microfounded
  - based on a description of the behaviour of individuals
  - aggregated to get from individuals to aggregate
  - $c_t = c_t(\Lambda_c) = c_0(\Lambda_c) + c_y(\Lambda_c) y_t + c_r(\Lambda_c) r_t$ where Λ_c is a list of variables including:

Modelling households

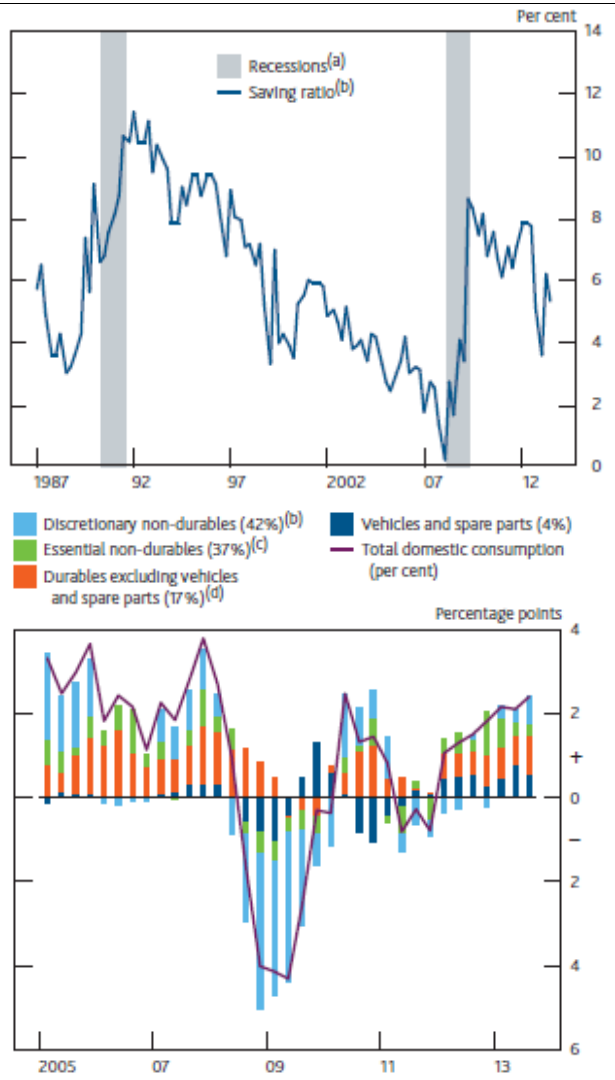
Household spending consists of:

Non-durable consumption e.g.

Durable consumption e.g.

Housing.

The second two are counted as:



From Bank of England Inflation Report Feb 2014

Modelling consumption

Heterogeneity

Let $c_{h,t}$ be the consumption of household h at time t

Then if there are N households in the economy, aggregate consumption at time t is

In principle, each household could make its consumption decision differently.

The representative agent

Assume that the decision of a single household can be used to represent the aggregate behaviour of all households in the economy i.e. ignore heterogeneity.

Is this a good assumption?

See CORE unit 12

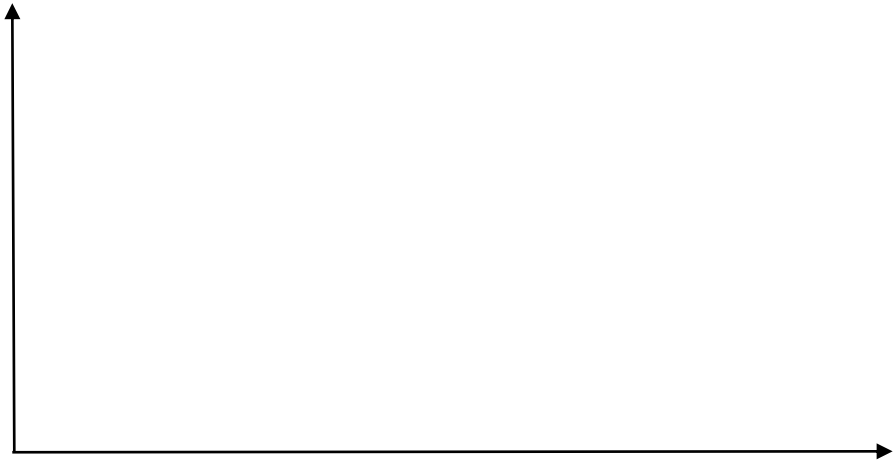
Modelling consumption: the permanent income hypothesis (PIH)

In words

- individuals optimally choose how much to consume by allocating their resources across their lifetimes
- resources include assets and current and future income
- this is a forward looking decision and will depend on interest rates, asset values, expectations of future income, expectations of future taxes…
- the result is that optimal consumption is smooth compared to income

Smoothing over the business cycle

Smoothing over the life cycle



The PIH: why is consumption smooth?

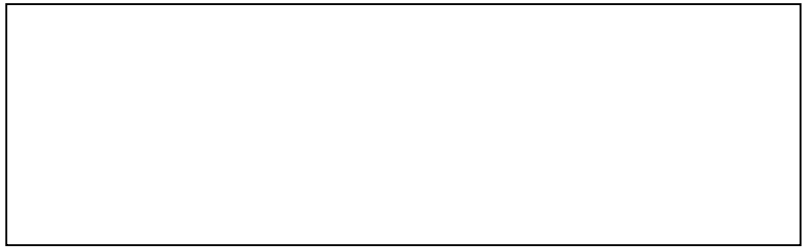
A simple example:

$$U = \log c_1 + \log c_2$$
$$c_1 + c_2 = 10$$

What is optimal consumption?

Why?

The property of the utility function which means optimal consumption is smooth is



See also CORE unit 11.

PIH: the utility function

$$U_t = \sum_{i=0}^{\infty} \frac{1}{(1+\rho)^i} \log c^e_{t+i}$$

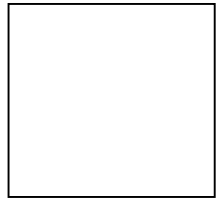
Definitions:

c^e_{t+i}

ρ

Points to note

- infinite lifetime
- time-separable utility
- what is the expected marginal utility of consumption at time t+i?



PIH: the budget constraint

$$\sum_{i=0}^{\infty} \frac{1}{(1+r)^i} c_{t+i}^e = (1+r)a_{t-1} + \sum_{i=0}^{\infty} \frac{1}{(1+r)^i} y_{t+i}^e$$

Definitions:

r

a_{t-1}

y_{t+i}^e

The left-hand side (LHS) is:

The right-hand side (RHS) is:

Solving for optimal consumption

Households choose consumption to maximise their lifetime utility:

$$\max_{\{c_{t+i}\}_{i=0}^{\infty}} \sum_{i=0}^{\infty} \frac{1}{(1+\rho)^i} \log c_{t+i}^e$$

subject to the budget constraint

$$\sum_{i=0}^{\infty} \frac{1}{(1+r)^i} c_{t+i}^e = \psi_t^e$$

How to solve this?

See derivations document on Moodle (you would not be expected to reproduce this in the exam)

Solving the problem gives an Euler equation:

(to get to this we also need to assume ρ = r)

i.e. consumption is smoothed (in expectations).

The Euler equation: intuition

Imagine consumption wasn't smooth (assume for this example that there is no uncertainty)

The permanent income hypothesis

So we know consumption is smooth, but at what level? Substituting the Euler equation into the budget constraint gives

$$c_t = \frac{r}{1+r}\psi_t^e$$

$$\psi_t^e = (1+r)a_{t-1} + \sum_{i=0}^{\infty} \frac{1}{(1+r)^i} y_{t+i}^e$$

Consumption is the annuity value of expected lifetime wealth, "permanent income".

Individuals choose their consumption to be the level at which they can keep it constant over time, given what they currently expect about their future income.

If current income is above permanent income individuals

If current income is below permanent income individuals

The permanent income hypothesis: implications

Consumption is not affected by predictable changes in income.

What changes consumption?

The marginal propensity to consume

Temporary changes in income: if current income y_t increases unexpectedly by one unit, consumption increases by

Permanent changes in income: if news arrives that current and all future income increases by one unit, consumption increases by:

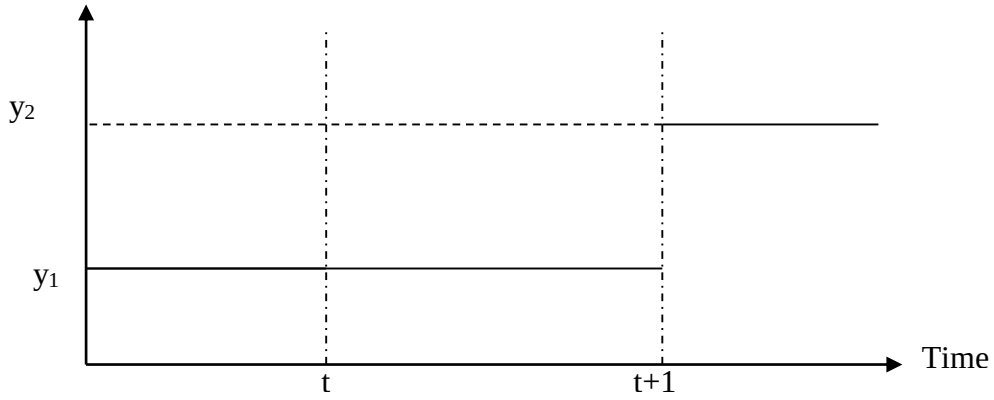
The PIH: summary

(Some of) the assumptions	Implications
• representative agent • infinite lifetime • forward-looking behavior • log utility	• consumption smoothing • expectations of future income determine consumption today • temporary changes in income have a small impact on consumption • permanent changes in income have a 1:1 impact on consumption • implications for fiscal policy (see lectures 2 & 7)

Testing the PIH

News about an increase in income from y_1 to y_2 at time t+1 is announced at time t

Assume before the news arrives $c=y_1$ (what does this mean we're assuming about a?)



Prediction: news about changes in income should lead to an immediate shift in consumption

- In the data, consumption is sluggish in responding to news

Prediction: predictable changes in income should have no effect on current consumption

- In the data, consumption changes by ~30% of the change

Summary

This lecture:	Next lecture:
• A forward-looking model of consumption • implications for consumption • testing it	• Improving the PIH • Implications for policy • Investment • The IS curve