Sensorveiledning
ECON 4325 Monetary policy and business fluctuations
Spring 2004

A

Question 1
Describe a useful strategy for obtaining empirical cycles. Describe some important stylized facts of business cycles that are common in most countries. Emphasize in particular the role of money in the business cycles.

Key words: Ultimate choice of the appropriate transformation of the data will essentially depend on the nature of the underlying dynamic properties of the time series. Test for unit roots to distinguish between (trend-)stationary and non-stationary time series. Choose detrendings method that is consistent with the underlying properties of the time series. Different detrending methods give very different cyclical behaviour in the time series.

Stylized facts:

- Autocorrelation: Business cycles last from 4- 8 years
- Volatility: Investment and inventories more than three time volatile as GDP
- Comovement (correlation) with GDP: Components of GDP (consumption, investment, import etc.) are pro-cyclical. Unemployment counter-cyclical. Prices counter-cyclical and real wage pro-cyclical (but not much). Evidence of supply shocks? Dunlop Tarshis critique of Keynesian model where real wage are countercyclical. Prices and real wage are important indicators of the driving force of the business cycle.
- Money and GDP procyclical, but money may not be leading the cycle. Long run effect on money falls almost entirely on prices, (no real effect). A very good reply should also contain some results from VAR analysis, see chapter 1.3.4 in Walsh.

Question 2
Define the concept of driving force and persistence in (a) Lucas's imperfect information model and (b) Real business cycle models. Identify briefly some of the main criticism against the real business cycle models.

Distinguish between what drives the model (shocks) and what assures that the shocks are persistent (long lasting). Assume for instance:

$$y_t = \alpha y_{t-1} + \bar{y} + \varepsilon_t$$

ε is the impulse/shock and α implies persistence. If $0<\alpha<1$, we observe temporary fluctuations (around trend), while if $\alpha=1$, all fluctuations will be fluctuations in the series itself. Shocks have a permanent effect on the series.

a) Driving force: Unexpected nominal shocks (aggregate and idiosyncratic); Persistence: Phillips curve dynamics, but producers do no observe the aggregate price and make their decisions based on limited information on relative prices.
b) Driving force: Productivity (real shocks); Persistence: Cost of adjustment (for example time to build), intertemporal substitution etc.

Criticism of RBC

- Little evidence to support the argument that substantial shocks to technology and the intertemporal substitution of labour are the cause of the observed fluctuations.
- The variability and autocorrelation are mostly explained by the exogenous random variable. *Output dynamics are essentially the same as impulse dynamics.*
- Since the capital stock grows smoothly, the most important endogenous source of variability in output is employment fluctuations. Requires a sizeable wage elasticity of the supply of labour. Not found empirically.
- The practice of evaluating the RBC program by how well the model matches features of aggregate data is a weak test of a model.
- The way the RBC approach removes the trend in the data prior to the evaluation of the business cycles has become debatable from a statistical point of view.

Question 3
Distinguish between price inertia and inflation inertia. Briefly discuss the effectiveness of policy in stabilizing the real economy if there is inflation inertia.

See Walsh 5.3.3

Question 4
Characterize and contrast a targeting regime and an instrument rule. Give examples of both.

See for example Walsh 11.5 and Bernanke and Mishkin (1997).

B

a) The loss function can be written as
$V = 1/2\lambda\,[(a(\pi - E\pi)-k]^2 + 1/2\pi^2$,

and the central bank's first order condition under discretion is

$a\lambda\,(a(\pi - E\pi)-k) + \pi = 0$

or

$\pi =(a^2\lambda E\pi+a\lambda k)/(1+a^2\lambda)$

Taking expectations yields
$E\pi = \lambda ak.$

Hence, equilibrium inflation under discretion is equal to
$\pi =(a^2\lambda\lambda ak +a\lambda k)/(1+a^2\lambda)= \lambda ak.$

A rise in k increases the equilibrium rate of inflation. With the loss function depending on $y - y_n - k$, the gap between the central bank's desired output level, $y_n + k$, and actual output (that is k) is directly proportional to the level of the natural rate of output.

b) See Walsh p. 374

c) The loss function can be written as
$V =1/2\lambda\,[(a(\Delta m +v-E\pi)+\varepsilon-k]^2 + ½(\Delta m +v)^2,$

and the central bank's first order condition is

$a\lambda\,(a(\Delta m -E\pi)+\varepsilon-k] + \Delta m = 0$

or

$\Delta m =(a^2\lambda E\pi+a\lambda(k-\varepsilon))/(1+a^2\lambda)$

Taking expectations yields
$E\pi = E\Delta m = (a^2\lambda E\pi+a\lambda k)/(1+a^2\lambda)\lambda ak.= \lambda ak>0$

Hence, equilibrium inflation under discretion is equal to
$\pi =a\lambda k –[(a\lambda)/(1+a^2\lambda)]\varepsilon + v.$

d) $\pi =v.$
Yes.