Monetary Policy
ECON 30020: Intermediate Macroeconomics

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Inefficiency in the New Keynesian Model

- ▶ Backbone of the New Keynesian model is the neoclassical model

- ▶ The equilibrium of the neoclassical model, Y_t^f, is approximately efficient – the quantities associated with this equilibrium are optimal from perspective of a hypothetical social planner

- ▶ Because of stickiness in the price level, no guarantee that $Y_t = Y_t^f$ as equilibrium outcome in the short run

- ▶ But the *optimal* equilibrium of the New Keynesian model features $Y_t = Y_t^f$

- ▶ Basically, use *endogenous* monetary policy to implement hypothetical neoclassical equilibrium in short run

Optimal Policy in the New Keynesian Model

- ▶ Optimal Policy will involve adjustment of M_t (equivalently, interest rates r_t or i_t) in response to exogenous shocks to implement $Y_t = Y_t^f$

- ▶ Basically, don't wait for medium run dynamics to close the gap – "In the long run, we are all dead" (Keynes)

- ▶ This will involve *countercyclical/contractionary* policy in response to demand shocks (i.e. move M_t opposite what would happen to Y_t), but *expansionary/accommodative* policy in response to supply shocks (i.e. move M_t in same direction as what would happen to Y_t)

- ▶ As we will shall see, optimal policy is consistent with *price stability*: targeting a constant price level (equivalently, constant inflation) implements optimal equilibrium except conditional on shocks to $\bar{P}_t$

Why not Fiscal Policy?

- ▶ Want to use monetary policy to implement neoclassical equilibrium
- ▶ Why not fiscal policy (i.e. adjustment of G_t and/or T_t to extent to which Ricardian Equivalence does not hold)?
    - ▶ Could use fiscal policy to implement $Y_t = Y_t^f$, but because this affects *IS* curve will affect r_t^f (the hypothetical real interest rate in the neoclassical model), and hence the distribution of output across consumption and investment in the neoclassical model
    - ▶ Potentially long implementation lags with fiscal policy
    - ▶ Consensus view: fiscal policy ought to be geared more toward the long run (e.g. infrastructure), with possible exception of extreme periods where monetary policy is ineffective

Optimal Monetary Policy Responses: IS and Supply Shocks

- ▶ IS shocks:
    - ▶ Positive IS shocks cause output to rise, but do not affect Y_t^f
    - ▶ If nothing done, will open up a positive output gap, $Y_t - Y_t^f$
    - ▶ Optimal policy should *reduce* M_t (equivalently, raise r_t/i_t) to *counteract* the IS shock
- ▶ Supply shocks:
    - ▶ Supply shocks (changes in A_t or θ_t) affect Y_t^f and cause Y_t to react less than Y_t^f
    - ▶ Optimal policy should *increase* M_t (equivalently, lower r_t/i_t) to *accommodate* positive supply shocks (increase in A_t or decrease in θ_t)
- ▶ Intuition: $\frac{M_t}{P_t}$ needs to adjust to implement neoclassical equilibrium. If P_t can't adjust, adjust M_t

Counteracting a Positive *IS* Shock
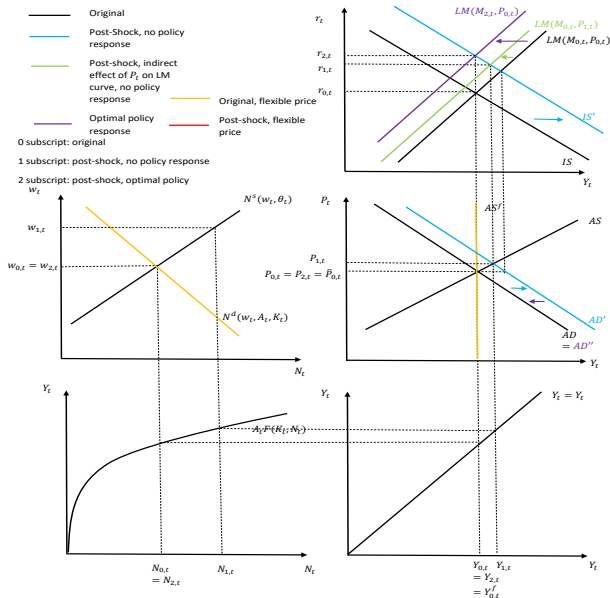
Counteracting a Positive *AS* Shock
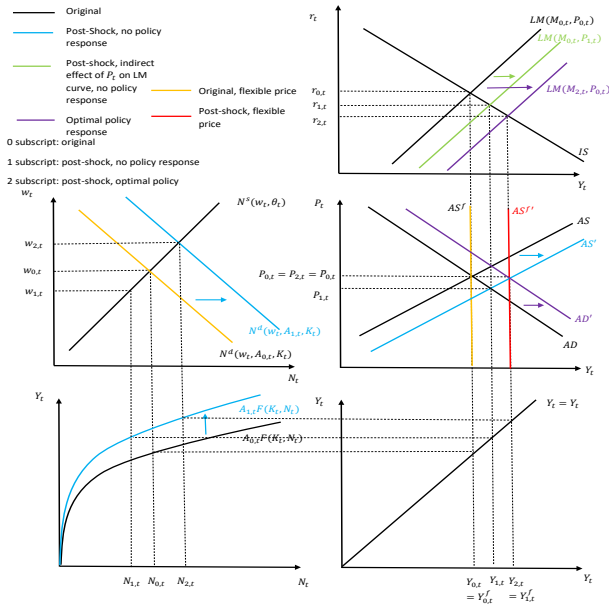
# The Case for Price Stability

- Conditional on both *IS* and *AS* shocks (coming from changes in A_t or θ_t), optimal policy response involves *no change* in price level

- In other words, a goal of *price stability* achieves the goal of no output gap, $Y_t = Y_t^f$

- This forms the normative basis for strict inflation targets adopted by many central banks around the world – targeting price stability is optimal

- A very neat result. Central bank does not need to know what Y_t^f is in order to implement optimal equilibrium – just needs to target a constant price level!

- A statement of the so-called "Divine Coincidence" (Blanchard and Gali, 2007)
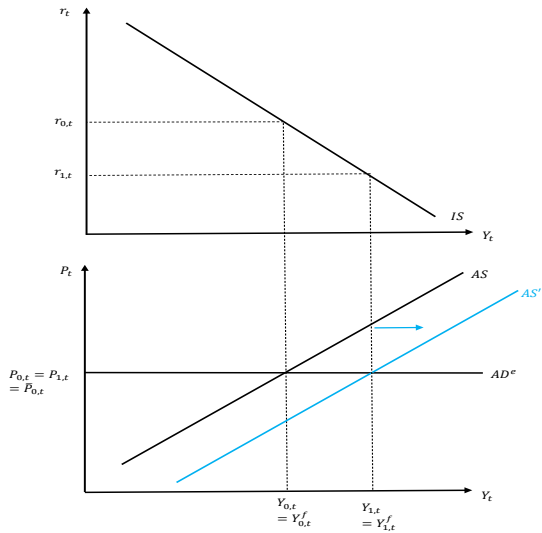
Targeting Price Stability

▶ Can think about price stability as meaning that the position of the *LM* curve is *endogenously* chosen such that the *AD* curve is perfectly horizontal at a targeted price level. Call this "effective" AD curve
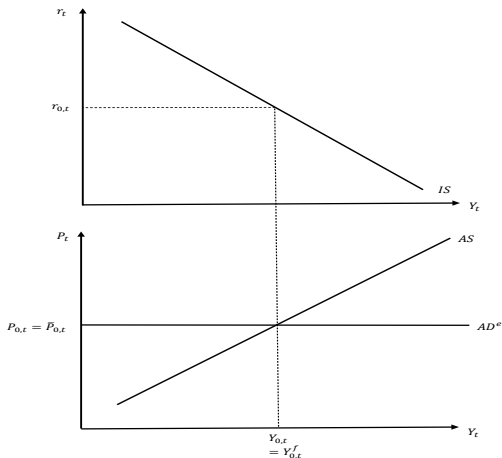
Price Stability: *IS* Shock
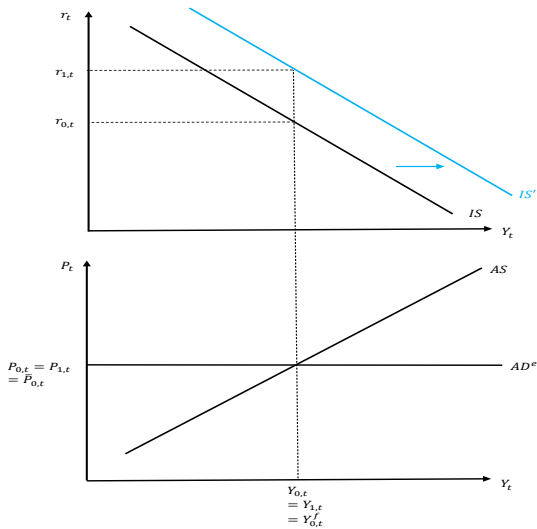
Price Stability: *AS* Shock

When is Price Stability *Not* a Good Goal?

- Price stability is *not* a good goal conditional on shocks to $\bar{P}_t$
- Such shocks shift the AS curve but do *not* change Y_t^f
- Targeting price stability involves Y_t reacting to these shocks
- Breaks the "divine coincidence"
- In a sense, this possibility *strengthens* case for price stability – if price level never changes, there is really no reason for $\bar{P}_t$ to ever exogenously change

Price Stability: $\bar{P}_t$ Shock
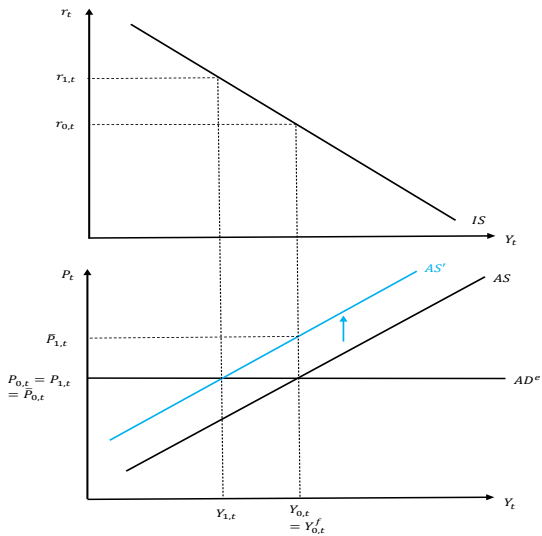
The Natural Rate of Interest

- Wicksell (1898), and later Woodford (2003): the "natural rate of interest" is r_t^f, the real interest rate which would obtain in the absence of nominal rigidities (i.e. the medium run). Satisfies:

$$Y_t^f = C(Y_t^f - G_t, Y_{t+1} - G_{t+1}, r_t^f) + I^d(r_t^f, A_{t+1}, f_t, K_t) + G_t$$

- Instead of adjusting the money supply, can think of monetary policy as trying to set the real interest rate equal to the natural rate, which automatically implements $Y_t = Y_t^f$

- Set M_t such that:

$$\frac{M_t}{P_t} = M^d(r_t^f + \pi_{t+1}^e, Y_t^f)$$

- $r_t > r_t^f \Rightarrow Y_t < Y_t^f$; $r_t < r_t^f \Rightarrow Y_t > Y_t^f$
- Recently, many feel that r_t^f fell significantly but r_t couldn't fall enough because of ZLB, resulting in negative output gap

Why not Fiscal Policy for Short Run Stabilization?

- M_t affects neither r_t^f nor Y_t^f
- Therefore a well-defined exercise to pick M_t such that the economy is at a point on the IS curve where $(r_t, Y_t) = (r_t^f, Y_t^f)$.
- Not so with fiscal policy, since G_t and G_{t+1} affect r_t^f
- In other words, could adjust G_t to implement $Y_t = Y_t^f$, but since this would affect r_t^f, you wouldn't have $C_t = C_t^f$ and $I_t = I_t^f$

Monetary Policy In Practice

- ▶ Taylor (1993) argues that a fairly simple rule written in terms of inflation and the output gap fits data well:

$$i_t = r^* + \pi^* + \phi_\pi(\pi_t - \pi^*) + \phi_y(Y_t - Y_t^f)$$

- ▶ r^* and π^* are long run targets, and ϕ_π and ϕ_y are positive coefficients
- ▶ Not exactly the optimal policy response we discussed above, and phrased in terms of nominal interest rate rather than money supply
- ▶ But embodies some of the features of optimal policy:
    - ▶ Positive output gap: raise nominal interest rate
    - ▶ If inflation above target, likely that output gap is positive (e.g. basic Phillips Curve idea), so responding to inflation kind of makes sense as well
    - ▶ Hence, the "Taylor rule" has some desirable *normative* properties

Taylor Rule versus FFR: Data

▶ The Taylor rule provides a pretty good *positive* description of monetary policy making from the early 1980s to mid 2000s
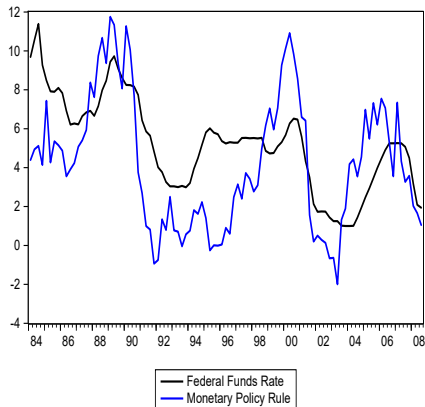
Replacing LM Curve with "MP Curve"

- ▶ Can re-write model by replacing LM curve with a Taylor rule, which is sometimes called the "MP curve" (for "monetary policy")
- ▶ Basic idea: M_t is endogenous and adjusts to hit interest rate target
- ▶ Auxiliary assumptions:
  - ▶ Adaptive expectations, so $\pi_{t+1}^e = \pi_t$
  - ▶ Re-write AS curve in terms of π_t instead of P_t (trivial to do)
- ▶ Parameter ϕ_π governs slope of AD curve in way similar to discussion about price stability above – bigger ϕ_π means AD is flatter
- ▶ See GLS Appendix D

The Zero Lower Bound

- The Taylor Rule relationship breaks down after 2008 when the economy hit the zero lower bound (ZLB)
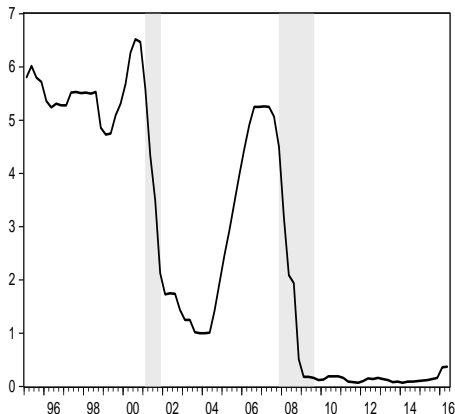
- Will next consider implications of the ZLB for policy