ECON 402 Discussion: Week 7

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Announcements

- Today: derive the Aggregated Supply-Aggregate Demand (AS-AD) model carefully...
- Investment-Savings Liquidity preference-Money supply (IS-LM) model $\Rightarrow$ AD slopes down
- Sticky prices or imperfect information $\Rightarrow$ SRAS curve slopes upward

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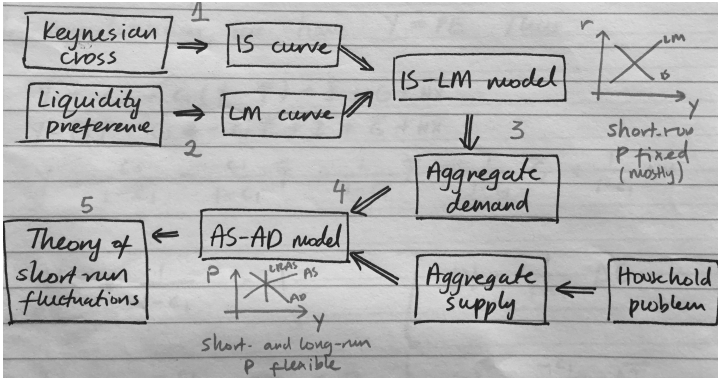


Understanding the AS-AD model

Three main goals

1. Explain sources of "fluctuations" in output around trend growth (aka recessions/booms)
2. Explain cyclicality and correlations between variables
3. Study the effects of government policies aimed at "smoothing" the business cycle

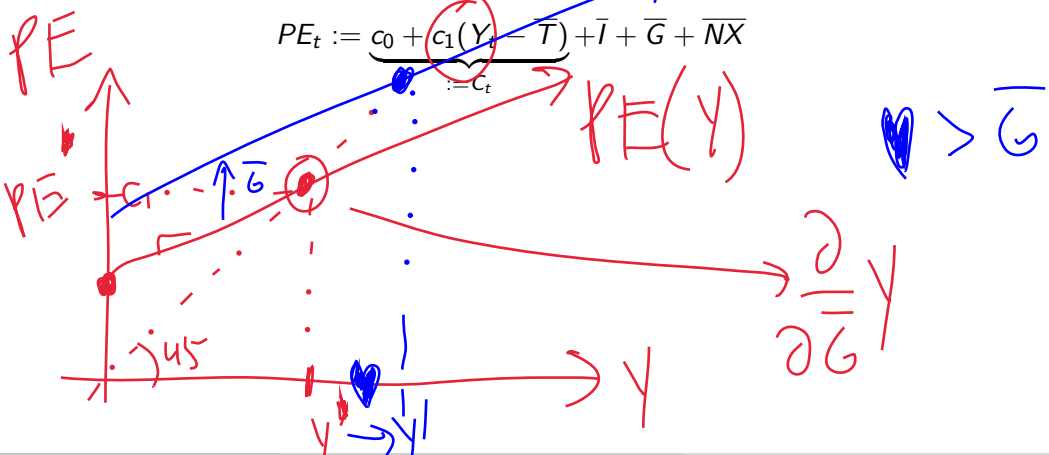
Government policy

1. Fiscal policy = government spending G and taxation T
2. Monetary policy = regulate money supply M via changes to short-run interest rates r

Keynesian Cross

- Definition: Keynesian cross plots aggregate planned expenditures (PE) versus actual expenditures/output (Y). For constants $c_0 > 0$ and $c_1 \in (0, 1)$, planned expenditures are

$$PE_t := \underbrace{c_0 + c_1(Y - \overline{T})}_{:=C_t} + \overline{I} + \overline{G} + \overline{NX}$$



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Y_t &= c_0 + c_1(Y_t - \overline{T}) + \overline{I} + \overline{G} + \overline{NX} \\
Y_t - c_1 Y_t &= c_0 - c_1 \overline{T} + \overline{I} + \overline{G} + \overline{NX} \\
Y_t &= \frac{c_0}{1-c_1} - \frac{c_1}{1-c_1}\overline{T} + \frac{1}{1-c_1}(\overline{I} + \overline{G} + \overline{NX})
\end{aligned}
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\Rightarrow \frac{\partial}{\partial \overline{G}} Y_t &= \frac{1}{1-c_1} > 1 \\
\frac{\partial}{\partial \overline{T}} Y_t &= -\frac{c_1}{1-c_1} < 0
\end{aligned}
$$

IS Curve

- We have written investment $I_t = \bar{I}$ so far, but actually $I_t = I(r_t)$ where $I'(r_t) < 0$.
- Why should this derivative be negative?

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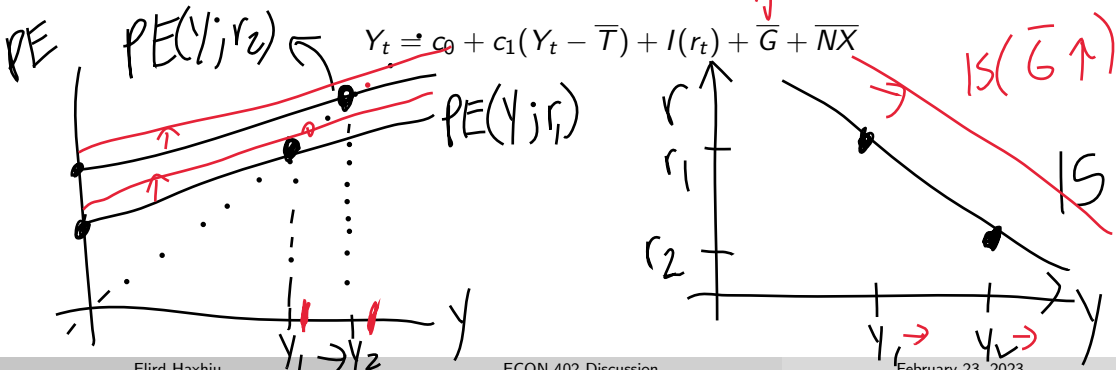
- Definition: The investment-saving (IS) curve plots all combinations of the interest rate r_t and output Y_t that lead to goods market equilibrium, where $PE_t \stackrel{!}{=} Y_t$.

$$Y_t = c_0 + c_1(Y_t - \overline{T}) + I(r_t) + \overline{G} + \overline{NX}$$



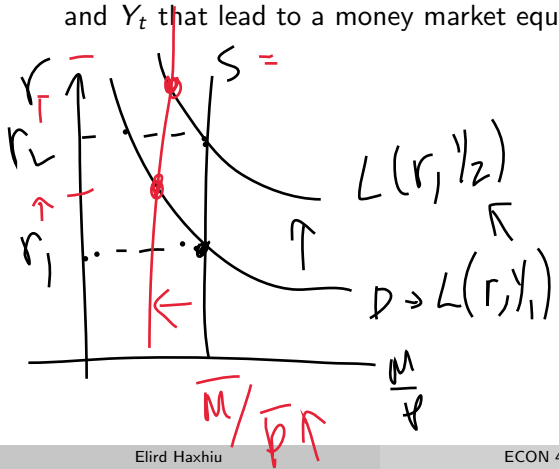
Liquidity Preference

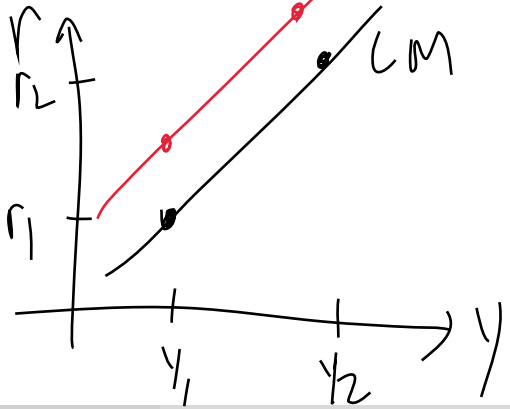
- Definition: The (real) money market is composed of
  - (i) Supply: $\left(\frac{M}{P}\right)_S = \frac{\overline{M}}{\overline{P}}$ where $P = \overline{P}$ means prices are fixed (short run).
  - (ii) Demand: $\left(\frac{M}{P}\right)_D = L(r_t, Y_t)$ where $\frac{\partial}{\partial r_t} L < 0$ and $\frac{\partial}{\partial Y_t} L > 0$.

  and r_t adjusts until we have an equilibrium where $\left(\frac{M}{P}\right)_S \stackrel{!}{=} \left(\frac{M}{P}\right)_D$.

LM Curve

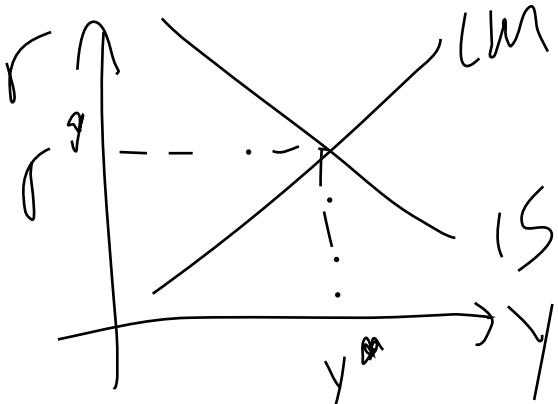
- Definition: The liquidity preference-money supply (LM) curve plots all combinations of r_t and Y_t that lead to a money market equilibrium, where $\left(\frac{M}{P}\right)_S \stackrel{!}{=} \left(\frac{M}{P}\right)_D \Leftrightarrow \frac{\overline{M}}{\overline{P}} = L(r_t, Y_t)$.





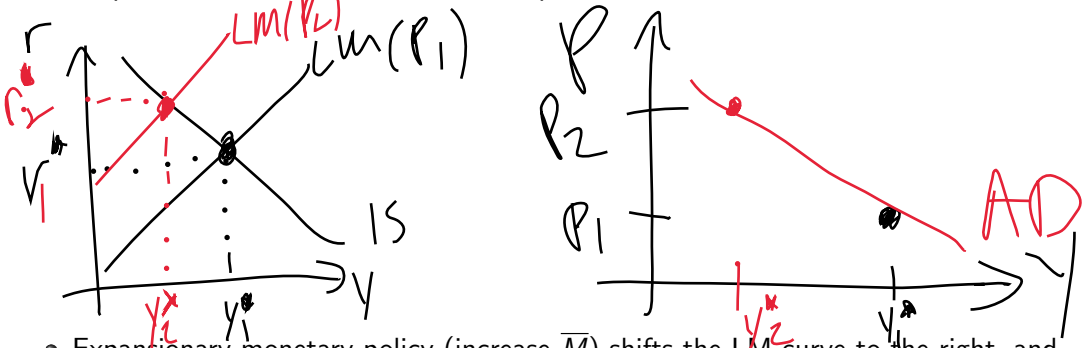
IS-LM Model: Short Run Equilibrium

- Definition: The short run equilibrium interest rate r^* and output level Y^* are the values of (r_t, Y_t) that result in a goods market and money market equilibrium, where $IS \stackrel{!}{=} LM$.



Aggregate Demand

- Definition: The aggregate demand (AD) curve plots all combinations of price level P_t and output Y_t when there is a short run equilibrium, that is where $IS \stackrel{!}{=} LM$.



- Expansionary monetary policy (increase $\overline{M}$) shifts the LM curve to the right, and expansionary fiscal policy (increase $\overline{G}$, decrease $\overline{T}$) shifts the IS curve to the right.
- Both will generally shift the AD curve to the right.

AS-AD Model

The aggregate supply-aggregate demand (AS-AD) model describes the short and long run equilibrium, and includes three curves

(i) Aggregate Demand (AD)
- (simple) $Y_t = \frac{M_t V_t}{P_t}$
- (IS-LM equilibrium Y change with P) $Y_t = ...$

(ii) Short-run Aggregate Supply (SRAS)
- (fully sticky) $P_t = \overline{P} := E[P_t]$
- (partial sticky) $P_t = E[P_t] + \frac{1}{\alpha} \cdot (Y_t - Y^*) + \varepsilon_t$

(iii) Long-run Aggregate Supply (LRAS)
- $Y_t = Y^* = F(K, L^*; A)$

Supply side, and who the bears pain of reducing inflation...

- Derive upward sloping SRAS from the imperfect information model (jk)
- Derive the upward sloping SRAS curve from the sticky price model of supply

$$
\begin{aligned}
P &= s \cdot E[P] + (1-s)[P + a(Y - Y^*)] \\
P &= E[P] + \frac{1}{\alpha}(Y - Y^*) \\
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- Derive the Phillips curve from upward sloping SRAS curve

$$\pi = E[\pi] - \beta(u - u^*) + \varepsilon$$

- Implication: unemployment related to "unexpected" movements in inflation
- SRAS logic: output related to "unexpected" movements in prices

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Why does this matter?

1. We care about real wages (w/P) and in general about real things...
2. Government is on demand side... it holds the guns (monopoly over violence, only kind of monopoly that matters in this physical reality) and therefore *makes the rules*
3. Making the rules includes rules over price setting behavior...

Supply side, and who the bears pain of reducing inflation...

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Why does this matter?

4. Government debt grows during recessions *if* cycles smoothed by increasing AD (tax revenue low in bad times). What (if anything) should be done about it?
5. Inflation reduces the real value of debt, public and private. Why do we care so much about inflation in the first place (that we may be willing to induce a recession to restrain it)? Weirdly entangled self interests: consumers, wage earners, and debt owners all hate inflation, while borrowers love inflation, since it forgives them "for free"

Supply side, and who the bears pain of reducing inflation...

Why Do We Think That Inflation Expectations Matter for Inflation? (And Should We?)

Jeremy B. Rudd
Federal Reserve Board*

September 23, 2021

Abstract

Economists and economic policymakers believe that households' and firms' expectations of future inflation are a key determinant of actual inflation. A review of the relevant theoretical and empirical literature suggests that this belief rests on extremely shaky foundations, and a case is made that adhering to it uncritically could easily lead to serious policy errors.