

Intermediate Macroeconomics II

Lecture 2: From RBC to IS–LM

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Spring 2026

Lecture 2: IS–LM

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Today: why we move from RBC to IS–LM

- Last time (RBC): output and the **real interest rate** are pinned down by **real** constraints and intertemporal choices.
- This semester's focus: **inflation and the price level** — so we must add a **nominal side**.
- IS–LM is our **first bridge model**:
 - IS = goods market equilibrium (a reduced-form view of intertemporal demand)
 - LM = money market equilibrium (how nominal variables enter)

What you should be able to do after Lecture 2

Explain how **goods demand** and **money demand** jointly determine (Y, r) in the short run, and how policy shifts the system.

Lecture 2: IS–LM

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Opening (1–2 min). Remind students what last lecture delivered: a real allocation + a real rate.

Motivation. This semester is about P and π : we need nominal variables on the board.

Learning goals. Tell them: today is all about reading comparative statics from diagrams.

Quick check. Ask: “In RBC, what pins down the real interest rate?” (preferences/technology).

Transition. “IS–LM is not the final model—it is our first bridge to inflation.”

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Lecture 2: IS–LM

└─ Recap: what RBC gives us

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RBC in one slide: what we learned (and what we did *not*)

- **RBC core idea:** flexible prices \Rightarrow markets clear \Rightarrow output is tied to productivity and factor supply.

- The key intertemporal price is the **real rate** r_t :

$$1 = \beta \mathbb{E}_t \left[\frac{u'(C_{t+1})}{u'(C_t)} (1 + r_t) \right].$$

- In that world, monetary variables are typically **neutral** for real allocations (classical dichotomy logic).

So why add IS–LM?

Because once we care about **nominal interest rates, money demand, and the price level**, we need equations that speak to them explicitly.

Lecture 2: IS–LM

└─Recap: what RBC gives us

└─RBC in one slide: what we learned (and what we did *not*)

Emphasize dichotomy. RBC delivers Y and r from real forces; nominal side is absent/irrelevant for allocations.

Key phrase. “RBC is silent about the *price level* unless we add a nominal anchor.”

Bridge idea. IS–LM adds a money market and a nominal rate so we can start asking: what happens to Y and P when policy moves?

Pitfall to avoid. Students may think “money doesn’t matter” always—clarify: that is a property of the flexible-price benchmark.

RBC in one slide: what we learned (and what we did not)

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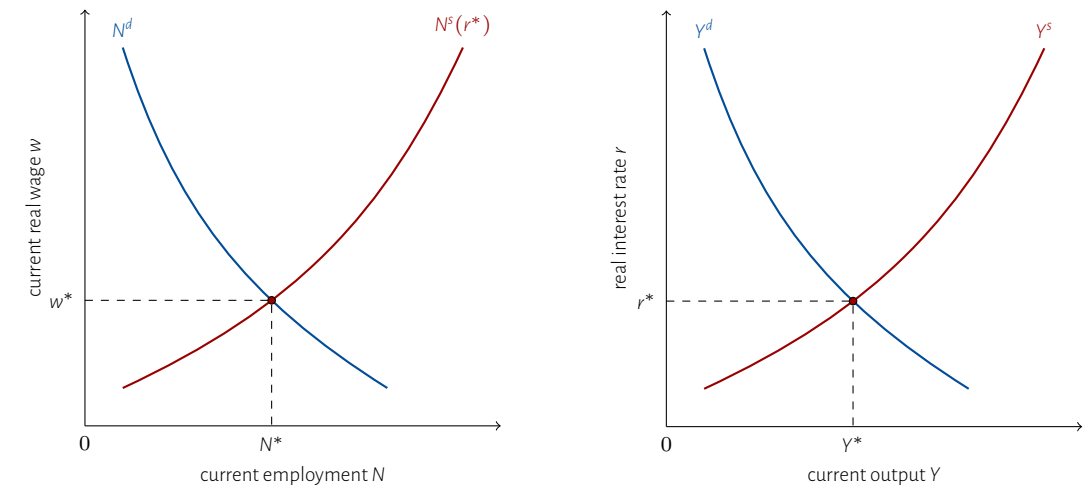
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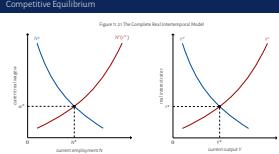
Figure 11.21 The Complete Real Intertemporal Model



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Lecture 2: IS–LM

- Recap: what RBC gives us
- Competitive Equilibrium



Purpose. This is your “baseline map”: with flexible prices, two real markets pin down (N, w) and (Y, r) .
Walk-through. Left panel: N^d and $N^s(r^*)$ intersect at (N^*, w^*) . Right panel: goods market Y^d and Y^s intersect at (Y^*, r^*) .
Key contrast. In RBC, r moves because of real forces; money is not in the picture.
Transition line. “Now we add a
emphthird market: money. That extra condition will change how we think about interest rates in the short run.”

A clean map: same economy, more markets on the board

Think of the macro economy as **two big clearing conditions** plus a policy rule:

- **Goods market:** planned spending equals production (IS logic).
- **Money market:** money supplied equals money demanded (LM logic).
- **Policy:** central bank and fiscal authority pick instruments / regimes.

Important perspective

IS–LM is a **different representation** that highlights **demand** and **nominal variables**. Later we replace its weak spots with NK microfoundations.

Lecture 2: IS–LM

└─Recap: what RBC gives us

└─A clean map: same economy, more markets on the board

Big picture. Tell students: every macro model is “markets + policy.” IS–LM just chooses a different pair of markets to foreground.

Board plan. Draw two boxes on the board: (1) Goods market clearing (IS), (2) Money market clearing (LM). Add a third box called “Policy regime.”

Expectation management. Acknowledge limitations up front: IS–LM is intuition/benchmark; NK will microfound the same logic with expectations and price setting.

A clean map: same economy, more markets on the board

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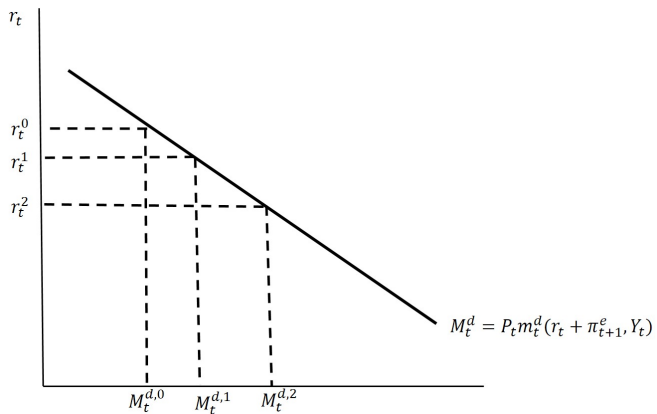
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Money market and LM

Step 1: Money demand (why people hold money)



- Money provides **liquidity** (transactions/convenience).
- Holding money has an **opportunity cost**: the interest you could earn on bonds.
- A standard reduced form:

$$\frac{M_t^d}{P_t} = L(Y_t, i_t), \quad L_Y > 0, L_i < 0.$$

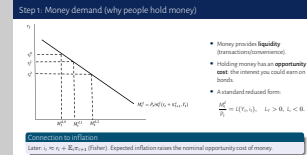
Connection to inflation

Later: $i_t \approx r_t + \mathbb{E}_t \pi_{t+1}$ (Fisher). Expected inflation raises the nominal opportunity cost of money.

Lecture 2: IS–LM

Money market and LM

Step 1: Money demand (why people hold money)



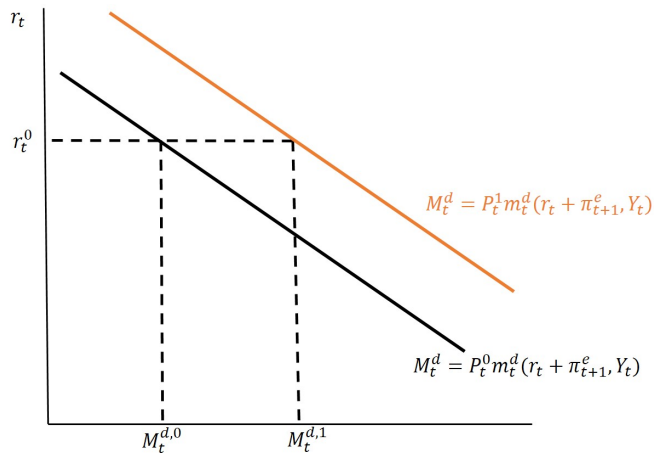
Micro intuition. Ask: “What is money good for if it pays (almost) no interest?” (transactions, liquidity).

Key distinction. Emphasize real money balances M/P : purchasing power of money holdings.

Opportunity cost. Bond versus money: when i rises, holding money is more expensive.

Bridge to inflation. Plant the seed: nominal rate is real rate + expected inflation (Fisher); expected inflation makes people want to hold less money unless M rises.

Money demand shifts I: higher price level means higher *nominal* money demand



- Real balances are what matter for transactions: M/P .
- If P rises, then to keep the same real balances you need **more nominal money**.
- So for given (Y, i) , the **nominal** money demand curve shifts outward.

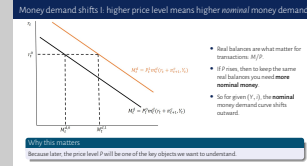
Why this matters

Because later, the price level P will be one of the key objects we want to understand.

Lecture 2: IS–LM

└ Money market and LM

└ Money demand shifts I: higher price level means higher *nominal* money demand

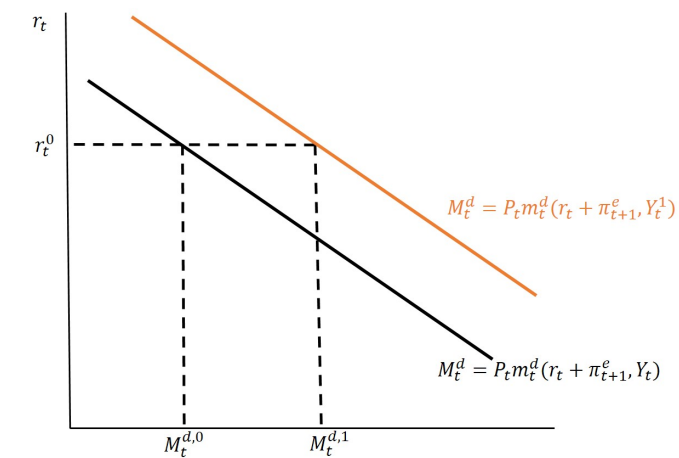


Do a wallet thought experiment. “If all prices double, how many dollars do you need in your pocket to buy lunch?”

Main point. Money demand is about *real* balances. A higher P shifts *nominal* money demand out.

Transition. “This is the first place P enters the model—through real balances M/P .”

Money demand shifts II: higher income means more transactions



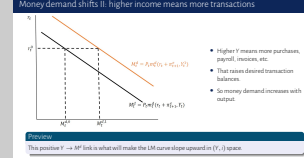
- Higher Y means more purchases, payroll, invoices, etc.
- That raises desired transaction balances.
- So money demand increases with output.

Preview
This positive $Y \rightarrow M^d$ link is what will make the LM curve slope upward in (Y, i) space.

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Lecture 2: IS–LM

- └ Money market and LM
- └ Money demand shifts II: higher income means more transactions

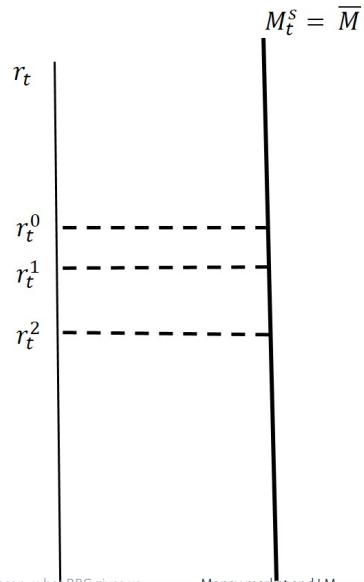


Scale effect. Tie Y to transactions: more output/income means more purchases, so households/firms want to hold more cash-like balances.

Immediate implication. Higher Y creates excess money demand at the old interest rate, so equilibrium requires a higher i (to reduce M^d).

Transition. “Now let’s put money demand together with money supply to build LM.”

Money supply: the central bank side (first pass)

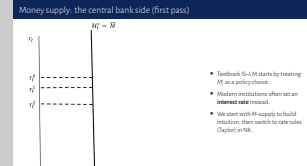


- Textbook IS–LM starts by treating M_t^s as a policy choice.
- Modern institutions often set an **interest rate** instead.
- We start with M -supply to build intuition, then switch to rate rules (Taylor) in NK.

Lecture 2: IS–LM

└ Money market and LM

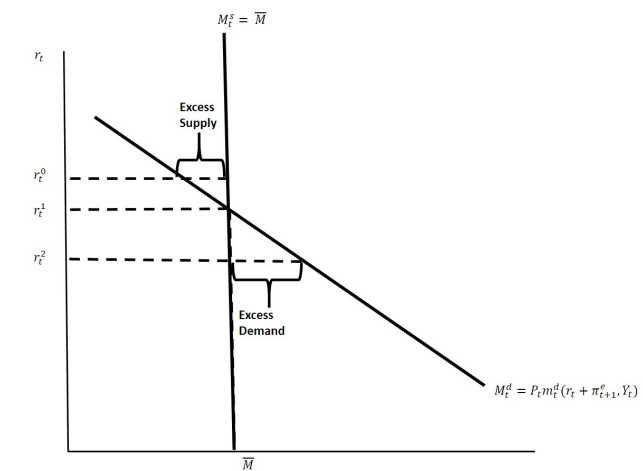
└ Money supply: the central bank side (first pass)



Be explicit about the simplification. “For the next 20 minutes, pretend the central bank chooses M directly.”
Then link to reality. Mention: today most central banks set an interest rate target; the money stock adjusts endogenously.

Why we still do this. Starting with money supply makes it easy to see how P matters through M/P ; later we swap this for a Taylor rule.

Money market equilibrium: where $M^s = M^d$



Key takeaway

Money market equilibrium is a restriction linking (Y, i) given (M, P) .

- Equilibrium nominal rate i adjusts so that money demand equals money supply.
- At a higher i , people hold less money.
- At a higher Y , people want more money.

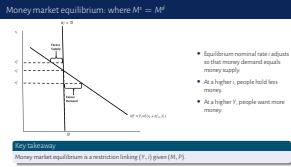
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Lecture 2: IS–LM
└ Money market and LM
└ Money market equilibrium: where $M^s = M^d$

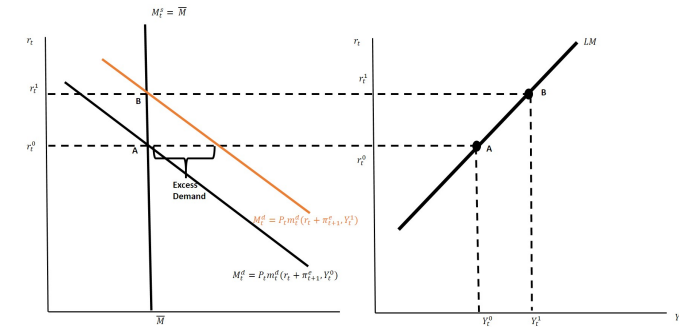
Interpret the picture. Stress: for a given Y , there is a unique i that clears the money market (given M and P).

Common confusion. Students may think i is “set by the central bank” even here; clarify: in the money-supply version, i adjusts endogenously.

Bridge line. “Now let’s trace those equilibria as Y changes—that trace is the LM curve.”



From money market equilibrium to the LM curve



LM equation (reduced form)

$$M_t^s = M_t^d = P_t \cdot m_t^d(Y_t, r_t + \pi_{t+1}^e).$$

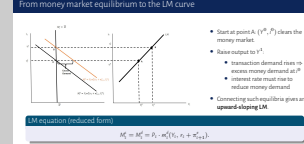
- Start at point A: (Y^0, i^0) clears the money market.
- Raise output to Y^1 :
 - transaction demand rises \Rightarrow excess money demand at i^0
 - interest rate must rise to reduce money demand
- Connecting such equilibria gives an upward-sloping LM.

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Lecture 2: IS–LM

Money market and LM

From money market equilibrium to the LM curve



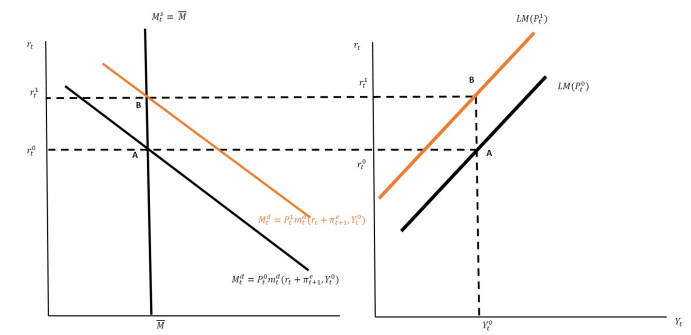
Derivation story. Narrate the step A \rightarrow higher $Y \rightarrow$ excess money demand $\rightarrow i$ must rise.

Why upward sloping? Because higher Y increases transactions and money demand.

Notation discipline. Tell students you will use i for nominal rate in this lecture; later you will separate i, r , and expected inflation via Fisher.

One-line summary. LM is the set of (Y, i) pairs consistent with money market clearing for given M and P .

How LM shifts I: higher P shifts LM left



Interpretation
Inflation/price level changes affect money market tightness.

- If P rises, then at a given (Y, i) people need **more nominal money** to support the same real balances.
- With M^s fixed, equilibrium requires a **higher** interest rate (to discourage money holding).
- So the LM curve shifts **up/left**.

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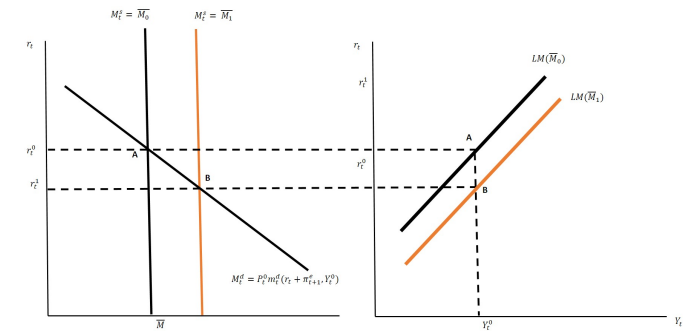
Lecture 2: IS–LM

- └ Money market and LM
- └ How LM shifts I: higher P shifts LM left

Key link to inflation. This is the first comparative static where P matters directly: higher P lowers real balances M/P .
Mechanism sentence. “With fewer real balances, the economy needs a higher interest rate to make people content with holding less money.”
Prep for AD. Tell students: this is why a change in P will shift LM and generate a downward-sloping AD later.



How LM shifts II: higher M^s shifts LM right



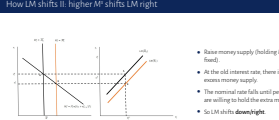
- Raise money supply (holding P fixed).
- At the old interest rate, there is excess money supply.
- The nominal rate falls until people are willing to hold the extra money.
- So LM shifts **down/right**.

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Lecture 2: IS–LM

- └ Money market and LM

- └ How LM shifts II: higher M^s shifts LM right

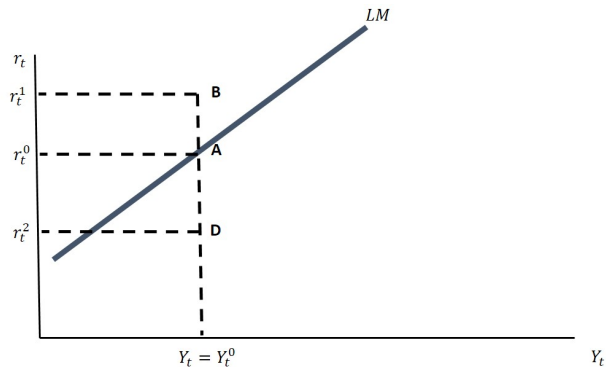


Interpretation. More nominal money supply means the money market is “looser”: at the old i there is excess supply.

Adjustment. Interest rate must fall to raise money demand until it matches the higher supply.

Connect to later. Under an interest-rate target regime, this logic gets flipped: the central bank chooses i , and M adjusts.

What LM is (and is not): avoid a common confusion



- **On LM:** money market clears.
- **Off LM:** excess money demand or supply.
- LM does *not* mean “money market alone determines i .”
- It is one equilibrium condition inside a general equilibrium system.

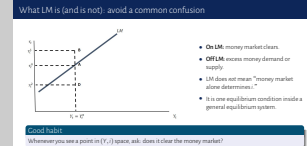
Good habit

Whenever you see a point in (Y, i) space, ask: does it clear the money market?

Lecture 2: IS–LM

└ Money market and LM

└ What LM is (and is not): avoid a common confusion



Pedagogical pause. This slide prevents a common mistake: treating LM as “the central bank sets i ” or as a causal law.

Explain on/off. On LM: $M^s = M^d$. Above LM: excess money demand (people want more money than supplied) pushes i up. Below LM: excess supply pushes i down.

Transition. “We have one equilibrium condition (LM). Next, we need a second one (IS) to pin down a unique point.”

Goods market and IS

IS: goods market equilibrium (bridge from RBC to textbook)

- In RBC, the intertemporal Euler equation is the foundation.
- IS–LM uses a reduced-form but keeps the same comparative statics:

$$Y_t = C(Y_t - T_t, i_t) + I(i_t) + G_t.$$

- Lower interest rates stimulate spending (especially investment) \Rightarrow higher goods demand.

Interpretation

IS is a schedule of (Y, i) pairs where the **goods market clears**.

2026-02-18

Lecture 2: IS–LM

└ Goods market and IS

└ IS: goods market equilibrium (bridge from RBC to textbook)

Bridge from RBC. Say: “IS is a shortcut for the Euler equation + investment condition + market clearing.”

Key mechanism. Lower i encourages current spending (especially I), so equilibrium output must rise.

Clarify i vs r . At this stage, treat i as “the relevant interest rate for spending.” Later, we will separate real vs nominal via Fisher.

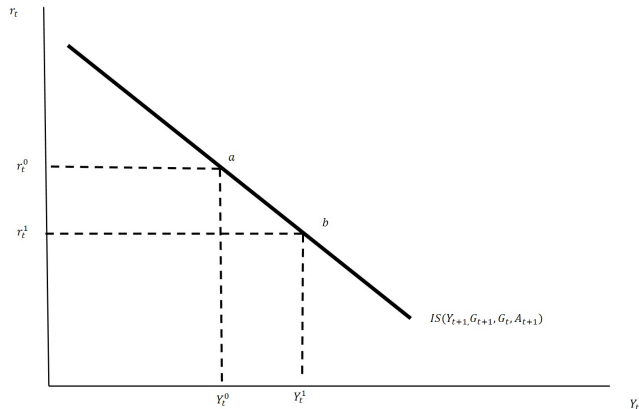
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Interpretation

IS is a schedule of (Y, i) pairs where the **goods market clears**.

IS curve (visual): why it slopes downward



- Move down along IS: i falls.
- Lower i raises investment and interest-sensitive spending.
- To clear the goods market, output must rise to meet higher demand.

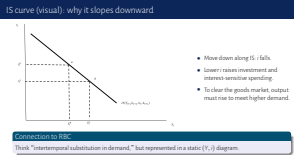
Connection to RBC

Think “intertemporal substitution in demand,” but represented in a static (Y, i) diagram.

Lecture 2: IS–LM

└ Goods market and IS

└ IS curve (visual): why it slopes downward



Read the diagram slowly. Move from i_0 to $i_1 < i_0$: demand rises; to restore goods-market clearing, Y must rise.

Interpretation. IS is a locus of equilibria, not a single behavioral equation by itself.

Connect back to RBC. Remind them: in RBC we solved a forward-looking system; IS–LM compresses that into a reduced-form demand schedule.

Shifts in IS: what moves goods demand

- **Fiscal expansion** ($G \uparrow$ or taxes \downarrow) shifts IS right.
- **Optimism / higher expected income** shifts IS right (consumption rises today).
- **Higher uncertainty / tighter credit** shifts IS left (spending falls).

What IS is not

IS is not “Keynesian by assumption.” It is a **reduced-form representation** of intertemporal demand that we will later microfound (NK IS / Euler equation).

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Lecture 2: IS–LM

- └ Goods market and IS

- └ Shifts in IS: what moves goods demand

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What IS is not
IS is not “Keynesian by assumption.” It is a **reduced-form representation** of intertemporal demand that we will later microfound (NK IS / Euler equation).

Make a taxonomy. Separate “shifts” from “moves along”: shocks to autonomous spending shift IS; changes in i move along IS.

Interpret each bullet. $G \uparrow$ is a direct spending injection; optimism raises desired C today; uncertainty/credit tightness lowers desired I and C .

Forward link. Tell them: in NK, the IS curve becomes an Euler equation with expectations of future output and interest rates.

Putting IS and LM together

IS–LM equilibrium: one point that clears two markets

- IS: goods market clearing \Rightarrow a relation between (Y, i) .
- LM: money market clearing \Rightarrow another relation between (Y, i) .
- Their intersection gives (Y, i) consistent with both markets.

Why this is the “bridge model”

RBC emphasized **real** equilibrium. IS–LM adds a **money market** so we can start talking about nominal rates and (soon) the price level.

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Lecture 2: IS–LM

- └ Putting IS and LM together

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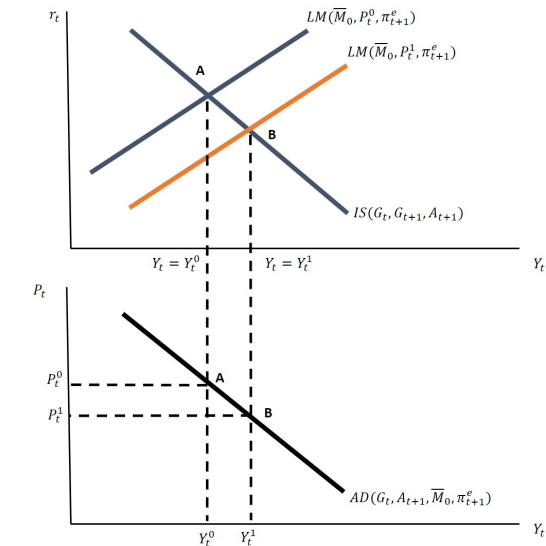
Why this is the “bridge model”
RBC emphasized **real** equilibrium. IS–LM adds a **money market** so we can start talking about nominal rates and (soon) the price level.

One-line recap. “IS tells us what (Y, i) combinations make spending match production; LM tells us what combinations clear the money market.”

Classroom check. Ask: “If output rises, which curve tells you what happens to the interest rate?” (LM, holding M, P fixed).

Bridge sentence. “Now that we have a place for P (through real balances), we can derive AD.”

From IS–LM to Aggregate Demand: why AD slopes down



- Hold M fixed and lower P :
 - real balances M/P rise
 - money market becomes “looser” \Rightarrow LM shifts right
- New IS–LM intersection has higher Y .
- Therefore: lower P corresponds to higher $Y \Rightarrow$ AD slopes down.

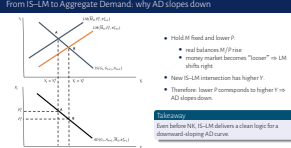
Takeaway

Even before NK, IS–LM delivers a clean logic for a downward-sloping AD curve.

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Lecture 2: IS–LM

- └ Putting IS and LM together
- └ From IS–LM to Aggregate Demand: why AD slopes down

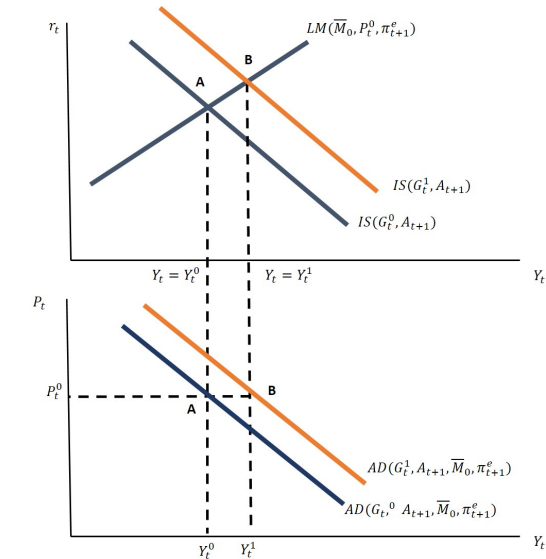


Do it as a 4-step chain on the board. $P \downarrow \Rightarrow (M/P) \uparrow \Rightarrow$ LM right/down $\Rightarrow i \downarrow$ and $Y \uparrow$ at IS intersection.

Emphasize what AD is. It is the mapping from P to equilibrium Y holding policy instruments fixed (here: M).

Set up next lecture. “AD alone does not tell us inflation. For that we need AS.”

Policy experiment I: fiscal expansion shifts AD right



- $G \uparrow$ shifts IS right.
- For a given price level P , equilibrium output rises.
- In (P, Y) space: AD shifts right.

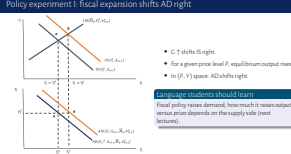
Language students should learn

Fiscal policy raises demand; how much it raises *output* versus *prices* depends on the supply side (next lectures).

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Lecture 2: IS–LM

- └ Putting IS and LM together
- └ Policy experiment I: fiscal expansion shifts AD right

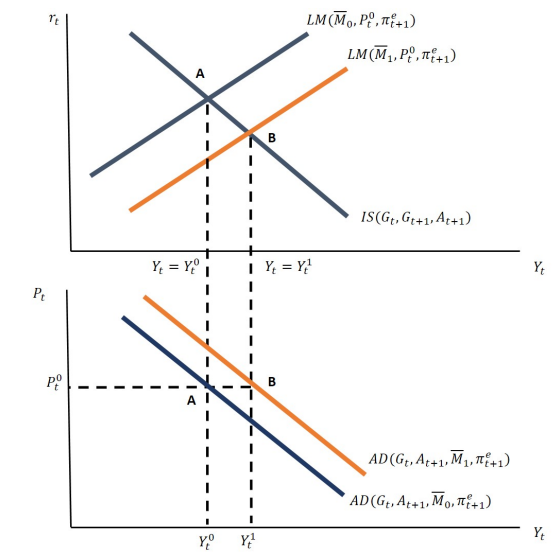


Translate the diagram into words. Fiscal expansion shifts IS right; for each P , equilibrium Y rises. That is an AD shift.

Important warning. This does not mean output rises one-for-one: the final split between Y and P depends on supply/price adjustment.

Bridge to inflation course. “This is where inflation enters: if AS is steep or expectations move, more of the adjustment shows up in prices.”

Policy experiment II: monetary expansion shifts AD right

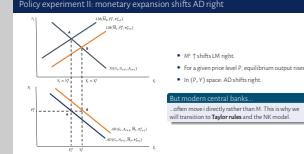


- $M^s \uparrow$ shifts LM right.
- For a given price level P , equilibrium output rises.
- In (P, Y) space: AD shifts right.

But modern central banks...
...often move i directly rather than M . This is why we will transition to **Taylor rules** and the NK model.

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Putting IS and LM together

Policy experiment II: monetary expansion shifts AD right



Same logic, different tool. In the money-supply version: $M \uparrow$ shifts LM right. In modern practice: the central bank cuts i directly, which is like moving along a money-market condition.
Preview Taylor rule. Tell them: NK replaces LM with $i_t = \phi_\pi \pi_t + \phi_y y_t + \dots$, giving a different “anchor” story.
Connect to 2021–22 motivation. This is why the timing of rate moves matters in interpreting inflation episodes.

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Lecture 2: IS–LM
└─ Where we go next

Where we go next

Where we go next

Why IS–LM is useful (and why we won't stop here)

- **Useful:** great for quick comparative statics and building intuition.
- **Limitations:**
 - Inflation expectations and credibility are awkward.
 - Central banks target interest rates, not money supply.
 - Price setting is not microfounded (no Phillips curve discipline).

Next step

Replace “LM + ad hoc IS” with the **New Keynesian triad**: NK IS (Euler), NK Phillips curve, Taylor rule.

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Lecture 2: IS–LM

└ Where we go next

└ Why IS–LM is useful (and why we won't stop here)

Be candid. Students often ask “Is IS–LM true?” Answer: it is a useful reduced-form map; NK is the modern microfounded version.

Make the substitution explicit. IS → Euler equation with expectations; LM → Taylor rule / monetary policy; AS → Phillips curve.

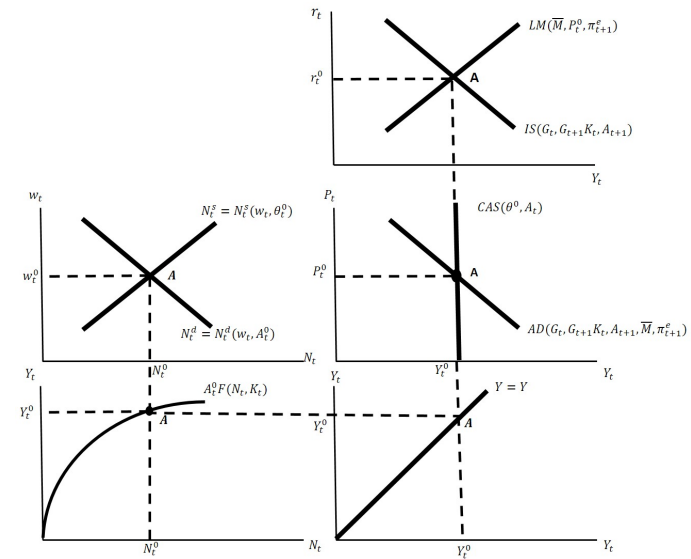
Motivation tie-in. Mention: once we introduce expectations, we can talk about credibility, forward guidance, and disinflation without huge recessions.

Why IS–LM is useful (and why we won't stop here)

- **Useful:** great for quick comparative statics and building intuition.
- **Limitations:**
 - Inflation expectations and credibility are awkward.
 - Central banks target interest rates, not money supply.
 - Price setting is not microfounded (no Phillips curve discipline).

NEXT STEP
Replace “LM + ad hoc IS” with the **New Keynesian triad**: NK IS (Euler), NK Phillips curve, Taylor rule.

Preview: the AD–AS view (one slide teaser)



- IS–LM gives us **AD**.
- To talk about inflation, we need a theory of **AS** (price setting).
- AD–AS is the next “bridge” before NK.

Big picture
RBC (real core) → IS–LM (add money) → NK (expectations + sticky prices) → inflation + price level regimes.

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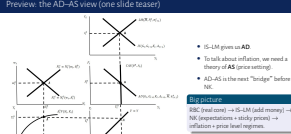
Lecture 2: IS–LM └ Where we go next

└ Preview: the AD–AS view (one slide teaser)

Set expectations. AD–AS is the next “language” before NK: it lets us discuss inflation/output tradeoffs cleanly.

Explain AS qualitatively. In the short run, sticky prices mean firms do not instantly adjust; that generates an AS relation between inflation and output (Phillips-curve-like).

Link to your course goal. “Our objective is to explain inflation episodes and the price level anchor; AD–AS and NK are the tools.”



- AD–AS: what moves inflation vs what moves output?
- Short run vs long run: when do we get “crowding out” versus “inflation” ?
- Then: New Keynesian model as the modern workhorse.

2026-02-18

Lecture 2: IS–LM
└─ Where we go next
└─ Next time

Close with a takeaway question. “If you hear: ‘rates rose and inflation fell’—what must also be true about expectations and/or supply?”

Assignment / reading suggestion. Ask them to review Fisher equation and distinguish i , r , and expected inflation.

Transition. Next lecture: build AS and talk about why inflation can move without big output changes.

Next time

- AD–AS: what moves inflation vs what moves output?
- Short run vs long run: when do we get “crowding out” versus “inflation” ?
- Then: New Keynesian model as the modern workhorse.