The Global Economy
Aggregate Supply & Demand

Roadmap
- In the news
- Where we've been...
- Aggregate supply
- Aggregate demand
- Aggregate supply AND demand
- Applications

In the news
  - Recent analysis suggests about two-thirds of all countries have become more unequal over the past two decades.
- Why do you think this is? Should we do something about it?

Where we've been...
- Where we've been: business cycle data
  - Properties: some things are more cyclical than others
  - Indicators: some things lead, some lag
- Where we're headed: business cycle theory
  - Adapt supply/demand diagram to whole economy
  - Examine sources of fluctuations, possible policy responses
  - Today: using the AS/AD diagram
  - Next week: monetary policy and interest rates

In the news
- In the news
  - Graph showing top 10% income share over time.
Aggregate supply & demand

Two perspectives

• Supply is what matters
  – If you build it, people will buy it
  – All we had prior to 1930
• Demand is what matters
  – If there’s demand, someone will build it
  – Response to Depression (John Maynard Keynes and others)
  – Paul Krugman?
• What we do
  – Supply AND demand

Aggregate supply and demand

• Adapt supply/demand diagram to whole economy
• Axes
  – P is price level
  – Y is real GDP
  – Usually interpreted as inflation and GDP growth
• Curves
  – Supply is about production of goods
  – Demand is about purchases of goods

Aggregate supply I

• Supply is about production
• Classical version [“long run”]
  
  \[ Y = A K^{\alpha} L^{1-\alpha} \]

• At any point in time
  – A is given [but may change over time]
  – K is given [but may change over time]
  – L reflects “equilibrium” in labor market
• Y must therefore be “given” [and AS vertical]
Aggregate supply I

- Reminder:
  \[ Y = A K^\alpha L^{1-\alpha} \]
- Over time, what happens when these change?
  - A?
  - K?
  - L?
- How do we represent this in the diagram?

Aggregate supply II

- Keynesian version ["short run"]
  - Production function
    \[ Y = A K^\alpha L^{1-\alpha} \]
  - At any point in time
    - A, K given
    - Simple version: nominal wage "sticky"
    - Increase in P reduces real wage, firms hire more workers
    - More L implies more Y
    - AS curve slopes upward
  - Wage eventually adjusts, bringing us back to AS*
Aggregate supply: shifts

- What happens to aggregate supply if we
  - Change A or K?
  - Change price of oil?
- Note: both AS and AS* shift – and by same amount

Aggregate supply II

Aggregate demand

- Basic version
  - Quantity theory generates inverse relation between P and Y
    \[ M \cdot V = P \cdot Y \]
    \[ P = \frac{M \cdot V}{Y} \]
  - Given (M,V), high Y associated with low P
  - What happens if M rises?
Aggregate demand

 Sophisticated version (more than we need)
- Demand for money depends on nominal interest rate \( i \)
  \[ M/P = Y/V(i) = Y/L(i) \]
- At higher interest rate, velocity higher, we hold less money
- At given \((M,V)\), high \(P\) associated with low \(Y\) (as before)
- But: if we increase \(M\), that would lead directly to higher \(M\) or \(P\), or decrease \(i\), which raises demand for interest-sensitive products (cars, houses, plant and equipment)
- Yes, this is quick and dirty, but the shortcut is worth it

Aggregate demand: shifts

- What happens to aggregate demand if we
  - Increase \(M\)?
  - Increase \(G\)?
  - Increase something that changes consumption or investment demand ("optimism"?)
**Aggregate demand: shifts**

**Equilibrium**

- Equilibrium: where supply and demand cross
  - Which ones?
- Short-run equilibrium
  - Where AS and AD cross
- Long-run equilibrium
  - Where AS* and AD cross
- Question for later: how do you get from one to the other?

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**Equilibrium?**

**Equilibrium**

- Start at A
  - At A, real wage is too high
    [How do we know that? Y is below Y*]
- How do we get to B?
  - Wage too high, so let’s say it falls
  - That moves AS to the right until it crosses AS* at B
  - Wages “sticky,” not stuck forever
  - At lower wage, firms hire more workers, output rises
Applications of the AS/AD model

Applications

- Increase money supply \( M \)
- Increase government purchases \( G \)
- Increase productivity \( A \)
- Increase price of oil

Application: more money

- Increase supply of money
- Which curve shifts? Which way?
- What happens to \( Y \) and \( P \)?

Application plan:

- Start somewhere: curves (\( AS^* \), \( AS \), \( AD \))
- Where are the short-run and long-run equilibria?
- Suggest an application – which curve shifts?
- What are the new short-run and long-run equilibria?
- What happens to \( Y \) and \( P \)?

Application: more money

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Application: more money

- Start at A: short run and long run equilibrium
- More money: AD shifts right
- New short-run equilibrium at B
  - Higher prices, higher output
- New long-run equilibrium at C
  - Higher prices, output unchanged (!)
- Why? Does this make sense to you?

Application: more money

- How does this compare to our analysis of hyperinflations?
- Hyperinflation
  - More money generates higher prices
- AS/AD
  - Short run: higher prices AND higher output
  - Long run: only higher prices
- What about Milton Friedman
  - Is “inflation always and everywhere a monetary phenomenon”?

Application: fiscal stimulus

- Increase government purchases
- Which curve shifts? Which way?
- What happens to Y and P?
• Do we need more of it?
  – Krugman and others: we should have had more stimulus
  – What's the argument?

• How powerful is fiscal stimulus?
  – The “multiplier” $m$: if $G$ goes up $1$, $Y$ goes up $m$
  – Best guess: multiplier around one, maybe less
  – Estimates range from 0 to 2
  – Takes 1-2 years to implement

• What about tax cuts?
  – We estimate 70-75% of temporary tax cuts are saved
  – Hence: not an increase in demand

• Where does this leave Krugman?

• Increase productivity $A$
  • Which curve shifts? Which way?
  • What happens to $Y$ and $P$?
Application: more productivity

- Start at A: short-run and long-run equilibrium
- More productivity: AS and AS* shift right
- New short-run equilibrium at B
  - Lower prices, higher output
- New long-run equilibrium at C
  - Even lower prices, higher output
- Why? Does this make sense to you?

Application: higher oil prices

- Increase oil prices
- Which curve shifts? Which way?
- What happens to Y and P?
**Application: higher oil prices**

- Start at A: short run and long run equilibrium
- Higher oil prices: AS and AS* shift left
- New short-run equilibrium at B
  - Higher prices, lower output
- New long-run equilibrium at C
  - Even higher prices, lower output
- Why? Does this make sense to you?

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**What have we learned?**

- Aggregate supply and demand is the analyst standard
  - Supply refers to production, affected by productivity, oil prices, etc
  - Demand refers to purchases, affected by money supply, fiscal policy, etc
- Summary
  - In the long run, output is determined by the production function (the first half of the course)
  - In the short run, things like the money supply and government purchases also matter

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**The Global Economy**

*Policy in the AS/AD Model*
AS/AD review

• Aggregate supply and demand
  – Supply concerns the production of goods
  – Demands concerns purchases of goods

• How to use them
  – Short-run equilibrium: where AS and AD cross
  – Long-run equilibrium: where AS* and AD cross

• What shifts them
  – AD: money supply, government purchases, “optimism”
  – AS & AS*: productivity, capital stock, oil prices
  – Rule of thumb: AS and AS* shift left/right by the same amount

Equilibrium

Where do business cycles come from?

Inflation and growth

• Why do they change?
• Shifts in AS and AD?
• Which one?
• How can we tell?
Inflation and growth

• Would you expect to see high growth associated with high or low inflation? Why?
• How would inflation and growth be related if
  – Most shifts were in AD?
  – Most shifts were in AS/AS*?
• Where do you see demand “shocks”?
• Where do you see supply “shocks”?

Policy goals and responses
Policy goals and responses

• The idea
  – Monetary policy should respond differently to changes in output that result from supply and demand shifts
  – Accommodate one, offset the other
  – Intuitive only when you understand it – not before!

Policy goals and responses

• What are our policy goals?
  – Low inflation or stable prices [why?]
  – Output at or near Y* [invisible hand again]

• How would we reach them?
  – Typically monetary policy, which shifts AD
  – Could use fiscal policy, too, but it takes longer to implement

Policy goals and responses

• What happens if demand shifts right?
  – What might do this?
  – Are things better or worse?

Policy goals and responses

• What happens if demand shifts left?
  – What might do this?
  – Are things better or worse?
Policy goals and responses

• How should we respond to a demand shift?
  – What should we do?
  – How would we do it?

• Does this make sense to you?

• Now do the same thing with supply shifts
  • Same logic, but keep your eyes open for something new
  • What happens if supply shifts right?
    – What might do this?
    – Are things better or worse?

Is this good or bad?
Policy goals and responses

- What happens if supply shifts left?
  - What might do this?
  - Are things better or worse?

- How should we respond to a supply shift?
  - Reinforce or “accommodate” it: shift AD in same direction as AS
  - Does this make sense?

Reminder: policy goals are
- Stable prices
- Output at or near \( Y^* \)
Policy goals and responses

- How should we respond to a supply shift?
  - Reinforce or “accommodate” it: shift AD in same direction as AS
- Does it make sense to lower output further?

What happened?

- In the mid 1970s:
  - GDP growth low, inflation jumped up
- In the early 1980s:
  - Double-dip recession, inflation fell sharply
- In the late 1990s:
  - GDP growth high, inflation remained low

Policy goals and responses

What should policy do?

Why is C good?

What happened?
What happened in the early 1980s?

- In the early 1980s?
  - Double dip recession, inflation dropped sharply
- Order of events
  - Volcker appointed head of Fed, charged with killing inflation
  - Reduced money growth, interest rates rose sharply
  - After a year or two, inflation dropped
- How did this work? Shift in supply or demand?

What happened in the early 1980s?

- Standard interpretation
  - Fed shifted AD back sharply
  - Short run impact: recession, lower inflation (A to B)
  - Long-run impact: much lower inflation (B to C)

What happened in the mid-1970s?

- In the mid 1970s?
  - GDP growth low, inflation jumped up
- Order of events
  - OPEC raised oil prices from $15 to $30
  - Output fell
  - Inflation soared – and stayed up
- How did this work? Shift in supply or demand?
What happened in mid-1970s?

- Standard interpretation of 1970s inflation
  - OPEC was a shift left in AS/AS*
  - Fed should therefore accommodate, shift AD left
  - If so, we would have seen a drop in Y but stable prices
  - But the Fed shifted AD right, raising inflation sharply
  - Long-run output response the same in both cases

What happened in the late 1990s?

- In the late 1990s
  - The economy is booming
  - Is it "overheating"?
  - What should the Fed do?
- Recall:
  - If high demand, Fed should reverse it
  - If high supply, Fed should accommodate
  - Which was it? How can you tell?

What have we learned?

- Shifts to supply and demand move GDP growth and inflation around
- AS/AD model suggests we should
  - "Offset" demand shifts
  - "Accommodate" supply shifts
- How do you tell them apart?
  - Ask yourself whether inflation and GDP growth are moving in the same direction or not
For the ride home

• Should Fed dramatically expand money supply and/or use other methods to increase demand?
• Are you worried more right now about
  – Low growth?
  – Inflation?