Purchasing Power Parity

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[1]I wish to acknowledge Battista Severgnini for providing last year's slides to me. His generosity saved me much time, and these slides are partially based on his. Any errors are of course my own.

This time

- Chapter 16:
  - Purchasing Power Parity
    - The law of one price
    - Relative vs. Absolute PPP
  - Exchange rates and PPP
    - Long-run, monetary approach
    - Clash of predictions
    - Fisher effect
  - Empirical evidence on PPP
    - It bad
    - Why it bad
  - A generalized PPP model
    - Real exchange rate
    - Interest and the real exchange rate
    - Real interest rate parity

Plan for Today

Chapter 17:

- Determinants of aggregate demand in the short run
- Short run equilibrium for aggregate demand and output (DD curve)
- Short run equilibrium in the asset markets (AA curve)
- Short run equilibrium (AA & DD)
- Temporary changes in monetary and fiscal policy
- Permanent changes in monetary and fiscal policy
- Odds and ends

But first a review

Purchasing Power Parity

- PPP is the application of the law of one price across countries:
  - Price of a basket goods should be independent of currency
  - Compares general price level across countries
  - Neither implies nor requires law of one price to hold
- PPP predicts a DKK/Euro exchange rate of

$$E_{DKK/EURO} = \frac{P_{DK}}{P_E}$$

- where
  - P_{DK} is the DKK price of a reference commodity basket sold in Denmark
  - P_E is the euro price of the same basket in the Euro zone

Flavors of Purchasing Power Parity

1. Absolute PPP: exchange rates equal relative price levels

$$E_{DKK/EURO} = \frac{P_{DK}}{P_E}$$

2. Relative PPP: the percentage change in the exchange rate between two currencies equals the difference between the percentage changes in national price levels.

$$\frac{\left(E_{DKK/EURO,t} - E_{DKK/EURO,t-1}\right)}{E_{DKK/EURO,t-1}} = \pi_{DK,t} - \pi_{E,t}$$

where π_t = inflation rate from period $t-1$ to t

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

- Relative PPP is an approximation of the following relation:

$$\frac{E_{DKK/EURO,t}}{E_{DKK/EURO,t-1}} = \frac{\frac{P_{DK,t}}{P_{E,t}}}{\frac{P_{DK,t-1}}{P_{E,t-1}}}$$

Pause

- We have defined the law of one price
- We have defined absolute PPP
  - Law of one price $\rightarrow$ absolute PPP
  - Absolute PPP $\not\rightarrow$ law of one price
- We have defined relative PPP
  - Absolute PPP $\rightarrow$ relative PPP
  - Relative PPP $\not\rightarrow$ absolute PPP
- Does law of one price imply relative PPP?
  - Each condition weaker than the last
- Next: how do changes in inflation affect exchange rate?

PPP and Money Market

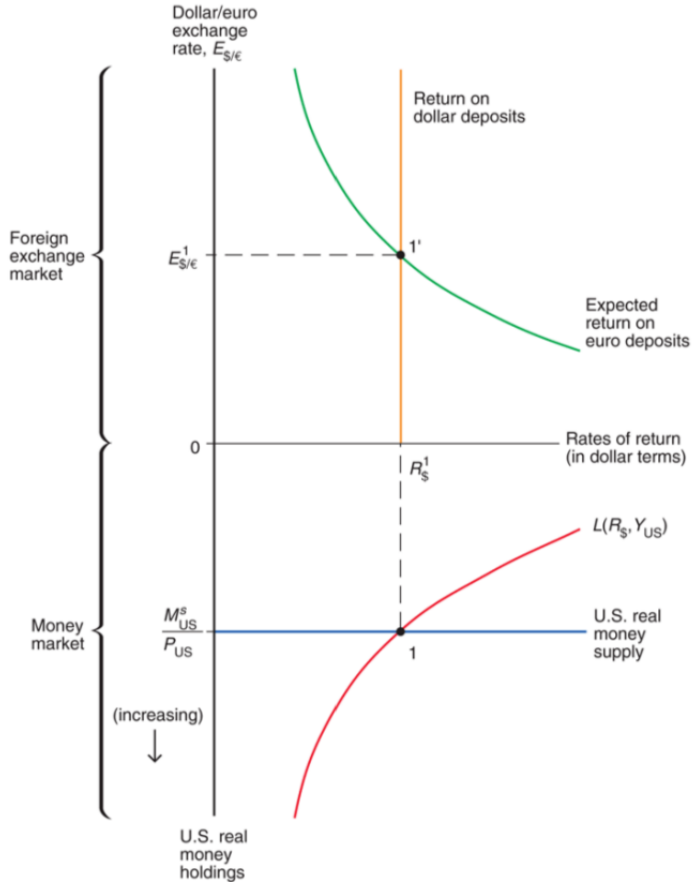
$$E_{USD/EURO} = \frac{P_{US}}{P_E} = \frac{\frac{M^s_{US}}{L(R_{USD}, Y_{US})}}{\frac{M^s_E}{L(R_{EURO}, Y_E)}}$$

Specific Predictions:

1. Money supplies: if $M^s_{US} \Uparrow \Rightarrow$ long-run depreciation of the dollar against the euro
2. interest rates: if $R_{USD} \Uparrow \Rightarrow$ causes a depreciation of the dollar against the euro
3. Output levels: a rise if $Y_{US} \Uparrow \Rightarrow$ causes an appreciation of the dollar against the euro.

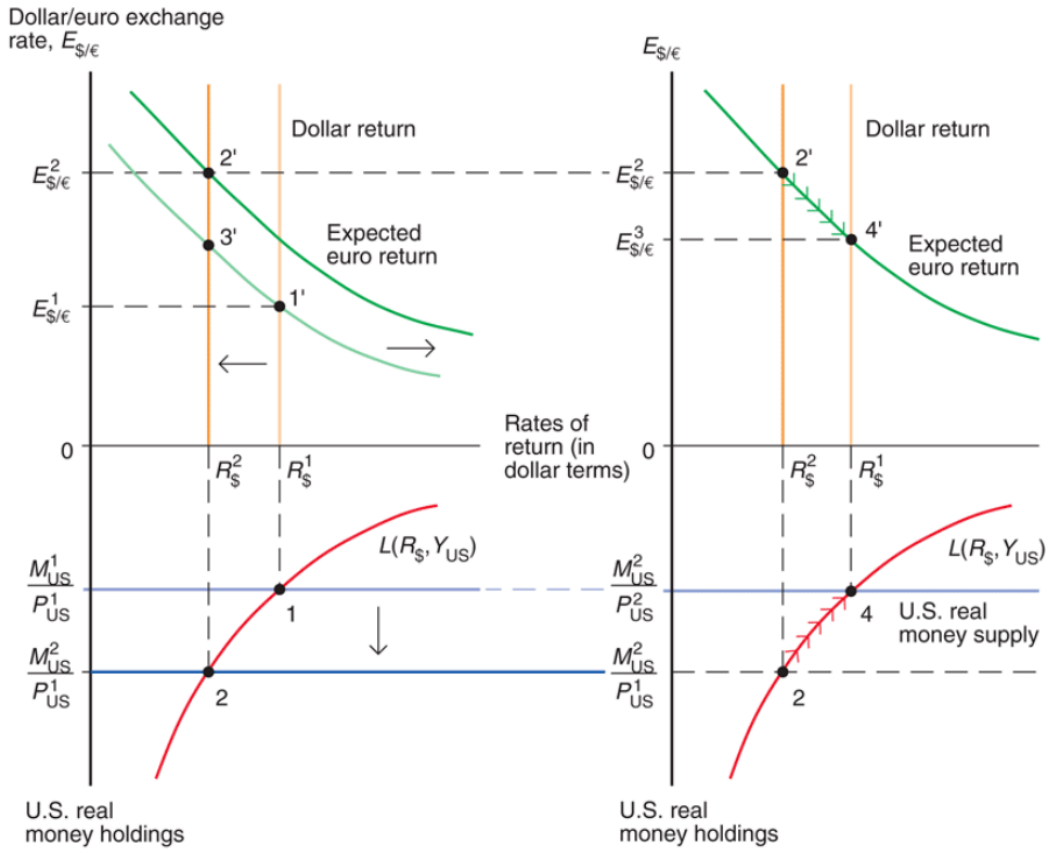
Whoops!

- interest rates: if $R_{USD} \Uparrow\Rightarrow$ causes a depreciation of the dollar against the euro



Not as bad as it seems

- Comparing short run with long-run
- In previous chapter, long-run interest rate cannot move



Long-run interest rate changes

- What could cause a permanent (long-run) change in the interest rate?
- Solution: a change in the growth rate of money supply (inflation)

Inflation and interest rates

- Interest rate parity still has to hold:

$$R_{USD,t} = R_{EURO,t} + \left(\frac{E^e_{USD/EURO,t+1} - E_{USD/EURO,t}}{E_{USD/EURO,t}} \right)$$

- Relative PPP holds (implied by absolute PPP)

$$\frac{\left(E_{USD/EURO,t} - E_{USD/EURO,t-1}\right)}{E_{USD/EURO,t-1}} = \pi_{US,t} - \pi_{E,t}$$

$$R_{USD} - R_{EURO} = \pi^e_{US} - \pi^e_E$$

or

$$R_{USD} - \pi^e_{US} = R_{EURO} - \pi^e_E$$

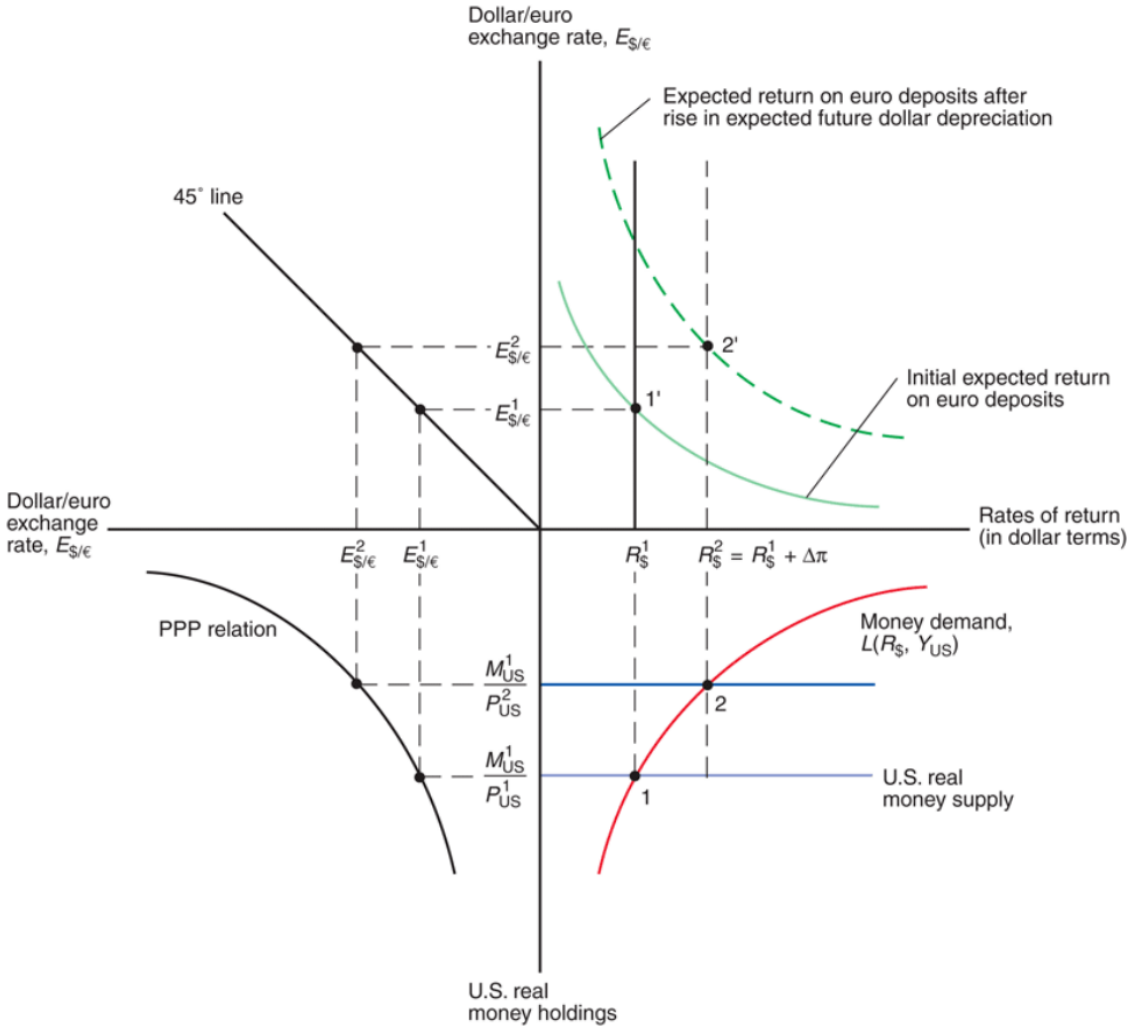
- *Real* interest rates are the same

The Fisher Effect

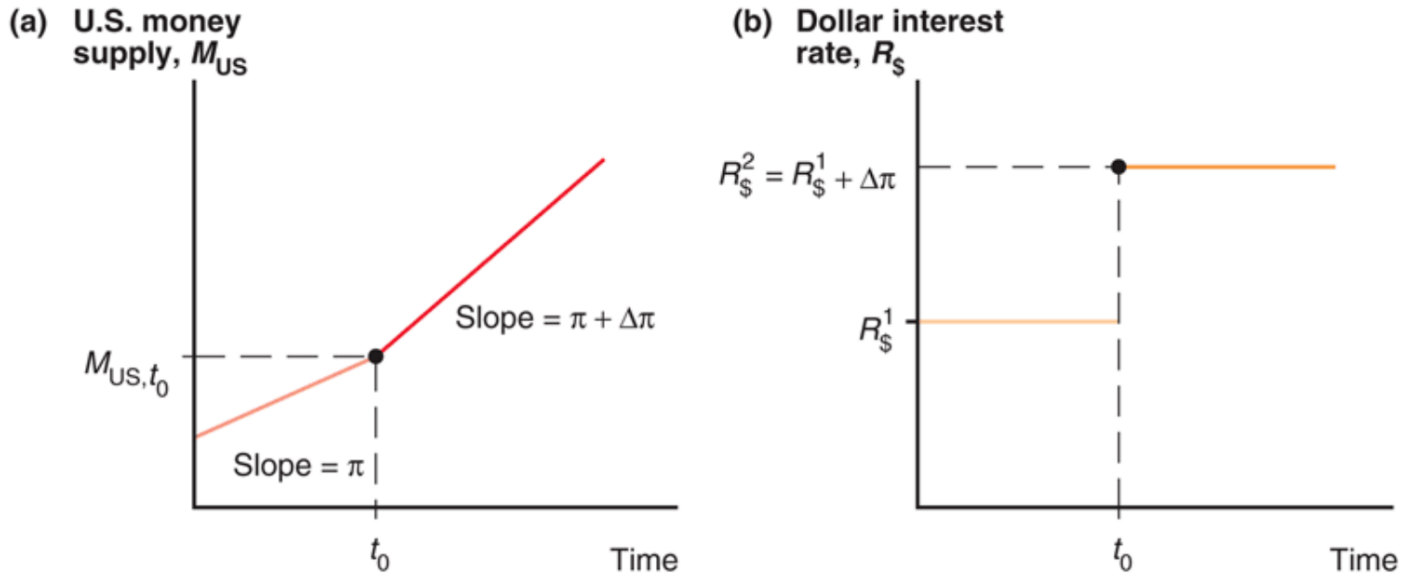
$$R_{USD} - R_{EURO} = \pi^e_{US} - \pi^e_E$$

- A rise in a country's expected inflation rate will eventually cause an equal rise in the interest rate that deposits of its currency offer
  - In the long run, purely monetary developments should have no real effects (neutrality of money)
  - Expected growth in money supply affects the interest rate through inflation

Money growth and exchange rates



(Long-term) Time trends following a change in growth rate



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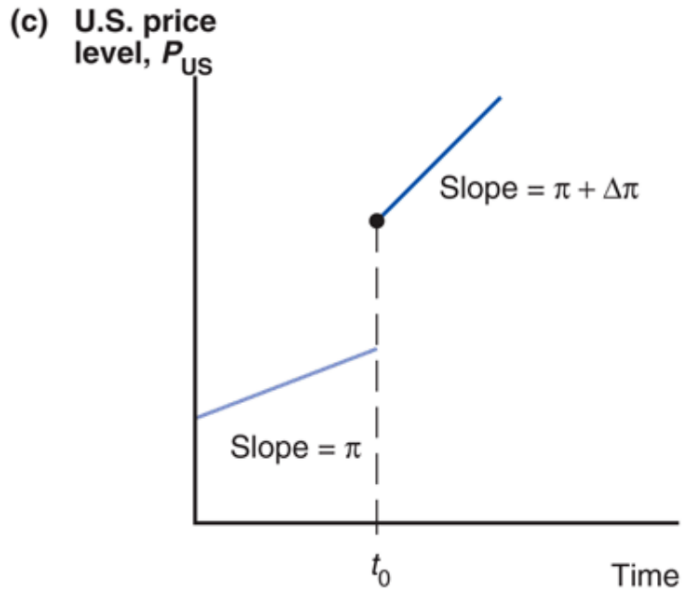
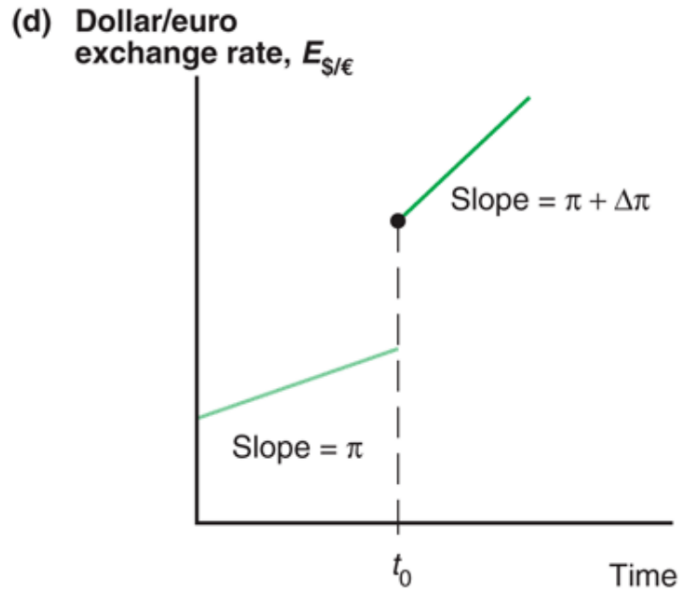
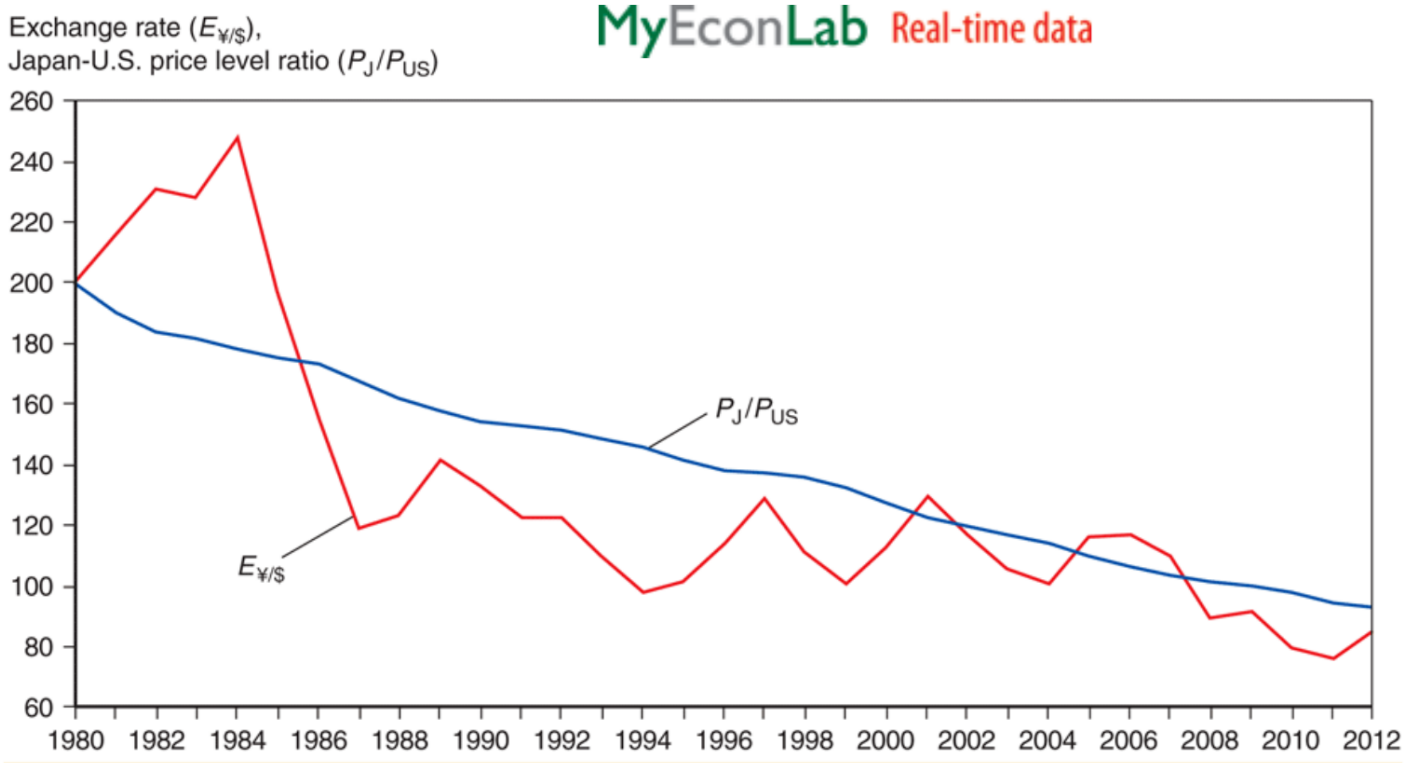




Pause

- We defined Purchasing Power Parity
- We derived the inflation rate/rate of return connection
- We saw the three predictions of the PPP long-run model
  - $M^s_{US} \Uparrow \Rightarrow E_{\$/€} \Uparrow$
  - $R_{USD} \Uparrow \Rightarrow E_{\$/€} \Uparrow$
  - $Y_{US} \Uparrow \Rightarrow E_{\$/€} \Downarrow$
- Next empirical evidence on the PPP long-run model
  - Preview: Not good

The Yen/Dollar Exchange Rate and Relative Japan-U.S. Price Levels, 1980-2012



Source: IMF, *International Financial Statistics*. Exchange rates and price levels are end-of-year data.

Why does PPP do so badly

1. Trade barriers and non-tradable products
2. Imperfect competition
3. Differences in measures of average prices for baskets of goods and services

Pause

- We defined Purchasing Power Parity
- We derived the inflation rate/rate of return connection
- We saw the three predictions of the PPP long-run model
  - $M^s_{US} \Uparrow \Rightarrow E_{\$/€} \Uparrow$
  - $R_{USD} \Uparrow \Rightarrow E_{\$/€} \Uparrow$
  - $Y_{US} \Uparrow \Rightarrow E_{\$/€} \Downarrow$
- PPP doesn't do so well empirically. Why?
  1. Trade barriers and non-tradable products
  2. Imperfect competition
  3. Differences in measures of average prices for baskets of goods and services
- Next: Build a model allowing deviations from PPP

A General Model of Long-Run Exchange Rates

The Real Exchange Rate

- Measure of the prices of one country's goods and services relative to the other's.
- The real exchange rate is the dollar price of the European basket relative to that of the US price:

$$q_{US/E} = \frac{(E_{USD/EURO} x P_E)}{P_{US}}$$

- Absolute PPP only holds for $q_{US/E} = 1$
- Relative PPP only holds for $\frac{q_{US/E,t}}{q_{US/E,t-1}} = 1$
- In other words, relative PPP holds if $q_{US/E}$ is a constant

A General Model of Long-Run Exchange Rates

The Real Exchange Rate

- Under *PPP*: let $E_{USD/EURO}$ and price levels, but must obey PPP
- If real exchange rate $q_{US/E}$ is not constant, PPP is violated
- If q moves around, change in relative real value of good baskets!
- If $q_{US/E}$ goes down, American goods suddenly worth more European goods

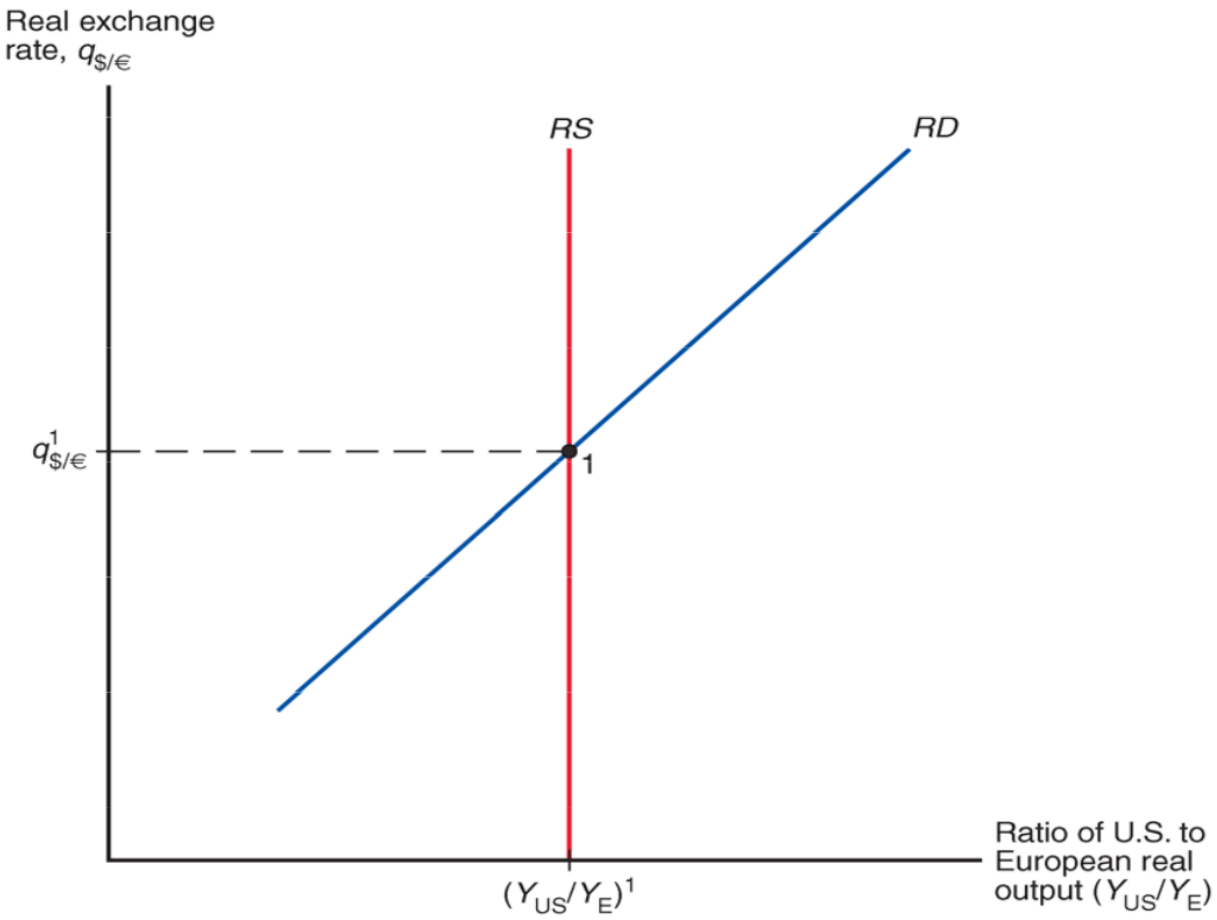
A General Model of Long-Run Exchange Rates

- Real depreciation (q increases): US basket worth less European goods
- Real appreciation (q falls): If US basket worth more European goods
- PPP Exchange rate relation $E_{\$/€} = \frac{P_{US}}{P_E}$
- Real exchange rate relation $E_{\$/€} = q_{US/E}\frac{P_{US}}{P_E}$
- Looks suspiciously like adding an error term...

Changes in the real exchange rate

- What could change $q_{US/E}$?
  1. Change in world relative demand for US products
     - People want the American basket more
     - value rises relative to EU basket
     - q goes down
  2. Change in world relative supply
     - US can suddenly produce more
     - More US baskets, decrease in value relative to EU basket
     - q goes up

Changes in real exchange rate



Exchange rates in the general model

$$E_{USD/EURO} = q_{US/E} \frac{P_{US}}{P_E}$$

- Changes in money supply
  - Will not affect q as money is neutral
  - One-time increase in money supply (Chpt. 15)
    - Long-run: Prices and exchange rates adjust
  - Change in money growth rate
    - Changes interest rate, price level, and exchange rate
- Changes in demand and supply
  - Will affect q as well as other prices
  - Change in relative output demand
    - Will not affect price levels (doesn't change either GNP or interest rate)
    - Will change q and also the exchange rate
    - Exchange rate responds to non-monetary stuff
  - Change in relative output supply
    - Suppose American productivity increases
    - Causes rise in $q_{US/E}$
    - But also increases demand for liquid assets, lowering P_{US}
    - Ambiguous total effect

Interest rates and real exchange rates

- We defined relative PPP as:

$$\frac{E^e_{USD/EURO} - E_{USD/EURO}}{E_{USD/EURO}} - (\pi^e_{US} - \pi^e_{EURO})$$

- That is, the expected depreciation of USD equals the difference in USD and Euro growth rates
- We argued that q is a constant is relative PPP holds
- We might think of changes in q as deviations from relative PPP

$$\frac{q^e_{US/E} - q_{US/E}}{q_{US/E}} = \frac{E^e_{USD/EURO} - E_{USD/EURO}}{E_{USD/EURO}} - (\pi^e_{US} - \pi^e_{EURO})$$

- In words, the part of the change in the nominal exchange rate not explained by inflation is change in the real exchange rate

Interest rates and real exchange rates

$$\frac{q^e_{US/E} - q_{US/E}}{q_{US/E}} = \frac{E^e_{USD/EURO} - E_{USD/EURO}}{E_{USD/EURO}} - (\pi^e_{US} - \pi^e_{EURO})$$

- Remember interest parity?

$$R_{USD} - R_{EURO} = \frac{E^e_{USD/EURO} - E_{USD/EURO}}{E_{USD/EURO}}$$

- Combine:

$$R_{USD} - R_{EURO} = \frac{q^e_{US/E} - q_{US/E}}{q_{US/E}} + (\pi^e_{US} - \pi^e_{EURO})$$

- Long run difference in interest rates is a combination of money growth rates and expected change in real exchange rates

Real Interest parity

- Define expected real interest rate:

$$r^e = R - \pi^e$$

- Real interest rate is the nominal interest rate we have been studying, net of inflation
- We can write:

$$r^e_{US} - r^e_E = R_{USD} - \pi^e_{USD} - (R_{EURO} - \pi^e_{EURO})$$

- Now combine with the relation between interest rates and real exchange rates from last slide:

$$r^e_{US} - r^e_{EU} = \frac{\left(q^e_{US/EU} - q_{US/EU}\right)}{q_{US/EU}}$$

- This is real interest parity
- Differences in real interest rates are equal to the expected real exchange rate depreciation

Review

- End review

Chapter 17: Output and the Exchange Rate in the Short Run

Determinants of Aggregate Demand in the Short Run

- Runs:
  1. Long run: flexible prices
  2. **Short run**: prices are sticky (reasons: menu costs, long-term contracts)
- Last classes: Money supply, exchange rate in the short and long-run
- Last class: Output and exchange rate in the long-run
- In this class: relationship between E and Y ($E = f(Y)$) in the short run

Determinants of Aggregate Demand in the Short Run

- We have seen that money is neutral in the long-run
- Changing the money supply will not affect the real economy
- In the short run, can have an effect
- Today: Policy relevant
  - Governments want to smooth the business cycle
  - Use monetary policy to affect aggregate output in the short-run
  - Big question: How does macroeconomic policy affect production

Determinants of Aggregate Demand in the Short Run

- *Aggregate demand* is the amount of a country's goods and services demanded by households, firms, and governments throught the world.
- Aggregate demand D can be expressed by:

$$D = C + I + G + CA$$

  where
  - C: consumption expenditure
  - CA: current account
  - I: investment expenditure
  - G: government purchase
- Only products again, no assets!
- Let's take these components one at a time

Determinants of Aggregate Demand in the Short Run: C

- Consumption expenditure is a function of disposable income

$$C = C\left(Y^d\right)$$

Determinants of Aggregate Demand in the Short Run: C

- Consumption expenditure is a function of disposable income

$$C = C\left(Y^d\right)$$

- Disposable income is total income less taxes $Y^d = Y - T$
- Consumption is increasing in disposable income
- However, the elasticity of consumption with respect to disposable income is less than one. Why?

Determinants of Aggregate Demand in the Short Run: C

- Consumption expenditure is a function of disposable income

$$C = C\left(Y^d\right)$$

- Consumption should also depend on real interest rate (return to investment)
- Consumption should also depend on wealth (savings from last period)
- Ignore both for now
- *In the short run, consumption depends only on disposable income*

Components of aggregate demand

1. Consumption is a function of national product, elasticity less than one

Determinants of Aggregate Demand in the Short Run: CA

$$CA = EXP - IMP$$

$$CA = CA\left(\frac{EP^*}{P}, Y - T\right)$$

Determinants of Aggregate Demand in the Short Run: *CA*

$$CA = CA\left(\frac{EP^*}{P}, Y - T\right)$$

Current account is a function of

- $\frac{EP^*}{P}$: if $\frac{EP^*}{P} \Uparrow$ (real depreciation)
- Rise in exports (in terms of domestic product)
- Two effects on imports:
  1. Increase in the value of each import (foreign baskets each become more expensive)
  2. Decrease in the volume of imports
- Assumption: Volume effect dominates
- Necessary condition on demand: *Marshall-Lerner condition*
- Real depreciation leads to increase in current account

Determinants of Aggregate Demand in the Short Run: CA

$$CA = CA\left(\frac{EP^*}{P}, Y - T\right)$$

Current account is a function of

- $Y - T$: if $Y - T \Uparrow$ (increase in disposable income)
- Rise in imports (in terms of domestic product)
- No effect on exports (qualified a bit)
- Increase in disposable income leads to lower current account

Current Account summary

Change	Effect on Current Account, CA
Real exchange rate, $EP^*/P \uparrow$	$CA \uparrow$
Real exchange rate, $EP^*/P \downarrow$	$CA \downarrow$
Disposable income, $Y^d \uparrow$	$CA \downarrow$
Disposable income, $Y^d \downarrow$	$CA \uparrow$

Components of aggregate demand

1. Consumption is a function of national product, elasticity less than one
2. Current account is a increasing function of real exchange rate, and decreasing function of disposable income

Determinants of Aggregate Demand in the Short Run: G, I

- For entire chapter, assume that I spending on investment is fixed
  - In particular, assume that product not used as consumption spent on imports
- Government spending will be treated later
- For now let G be fixed

Components of aggregate demand

1. Consumption is a function of national product, elasticity less than one
2. Current account is a increasing function of real exchange rate, and decreasing function of disposable income
3. Investment spending is fixed
4. Government spending is fixed

Determinants of Aggregate Demand in the Short Run

Aggregate demand:

$$D = C + I + G + CA$$

Plug in components as functions

$$D = C\left(Y - T\right) + I + G + CA\left(\frac{EP^*}{P}, Y - T\right)$$

or

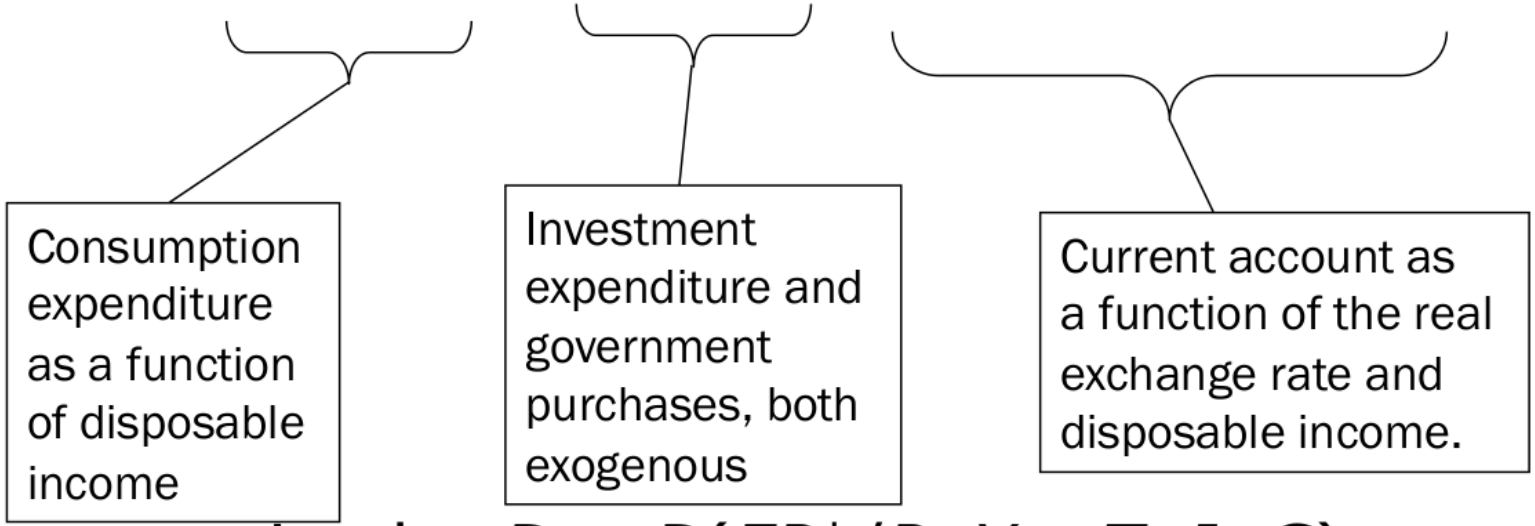
$$D = D\left(\frac{EP^*}{P}, Y - T, I, G\right)$$

I and G are set outside our model
D is increasing in real exchange rate
What happens to D after a rise in disposable income?

Aggregate demand

- Aggregate demand is therefore expressed as:

$$D = C(Y - T) + I + G + CA(EP^*/P, Y - T)$$



- Or more simply: $D = D(EP^*/P, Y - T, I, G)$

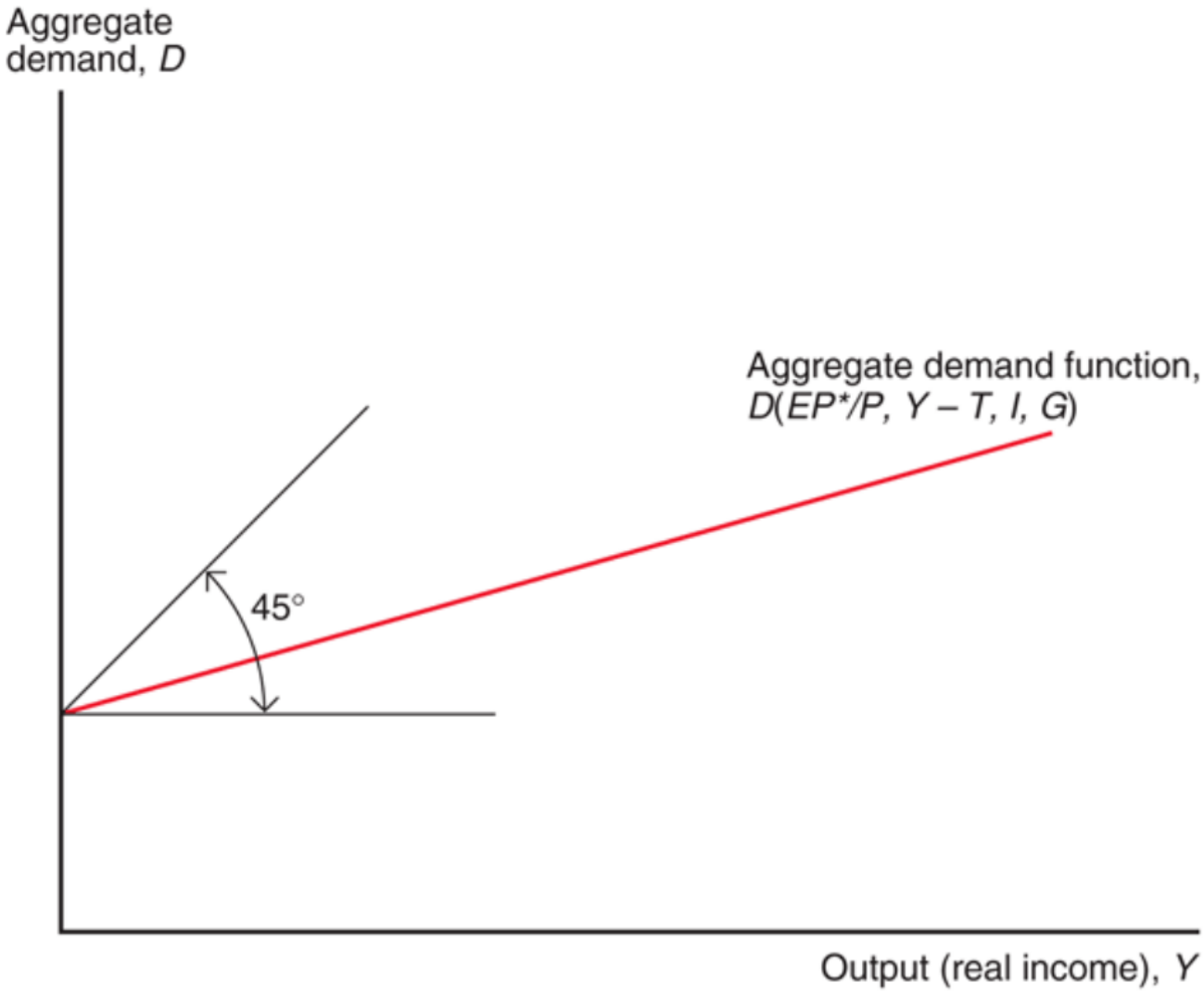
Determinants of Aggregate Demand in the Short Run

Two effects:

1. **Real exchange rate:** $\frac{EP^*}{P} \Uparrow \Rightarrow CA \Uparrow \Rightarrow D \Uparrow$
2. **Disposable income:** $(Y - T) \Uparrow \Rightarrow C \Uparrow, CA \Downarrow$

- Assume that if consumers get one more dollar, spend most of it on domestic production rather than foreign $\Rightarrow D \Uparrow$

Aggregate demand



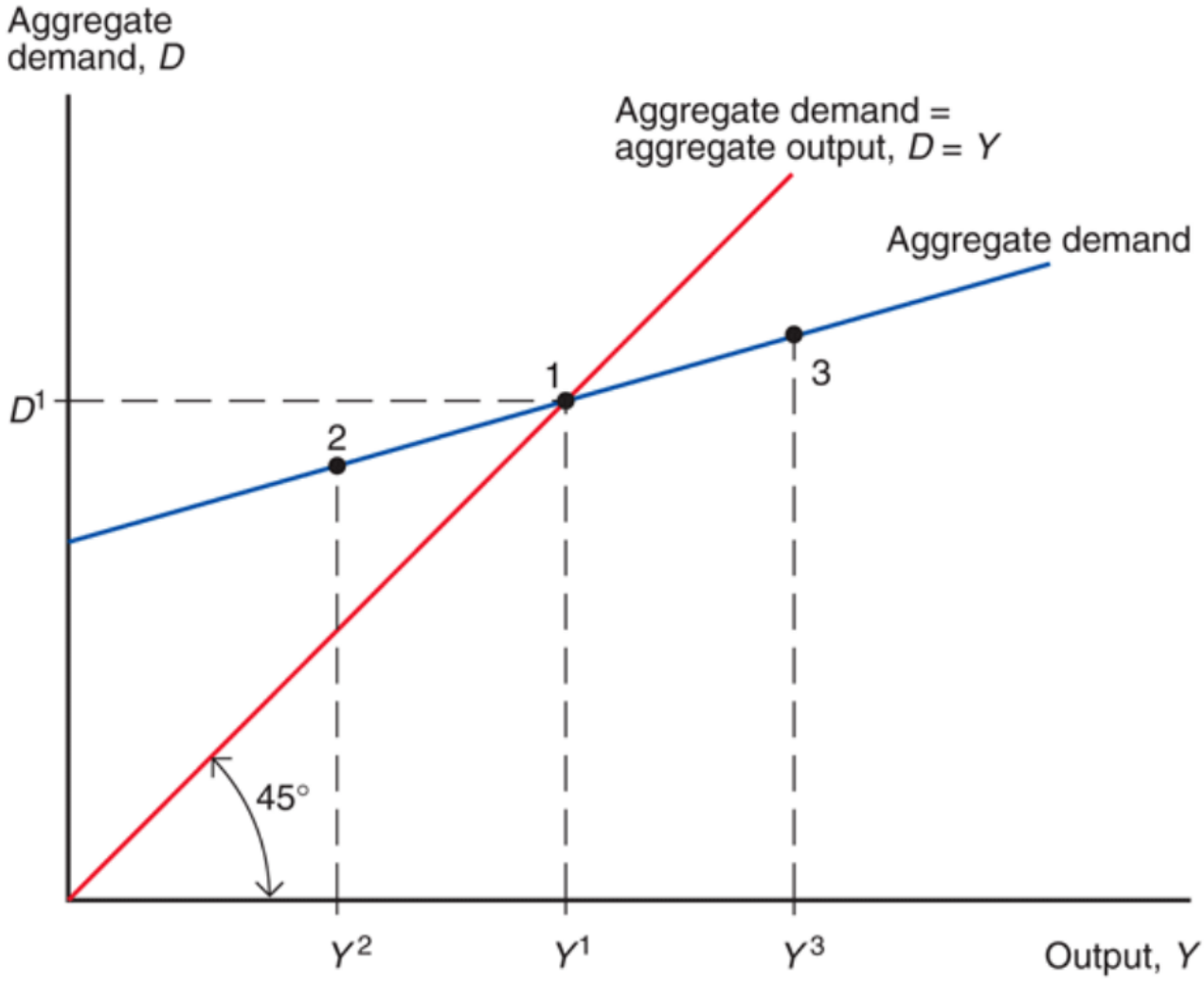
Short Run Equilibrium for Aggregate Demand and Output

- Equilibrium is achieved when the value of income from production (output) Y equals the value of aggregate demand D.

$$Y = D\left(\frac{EP^*}{P}, Y - T, I, G\right)$$

- Short run, because we don't allow money prices of goods to adjust
- Later in chapter, we will show how demand moves towards long run equilibrium

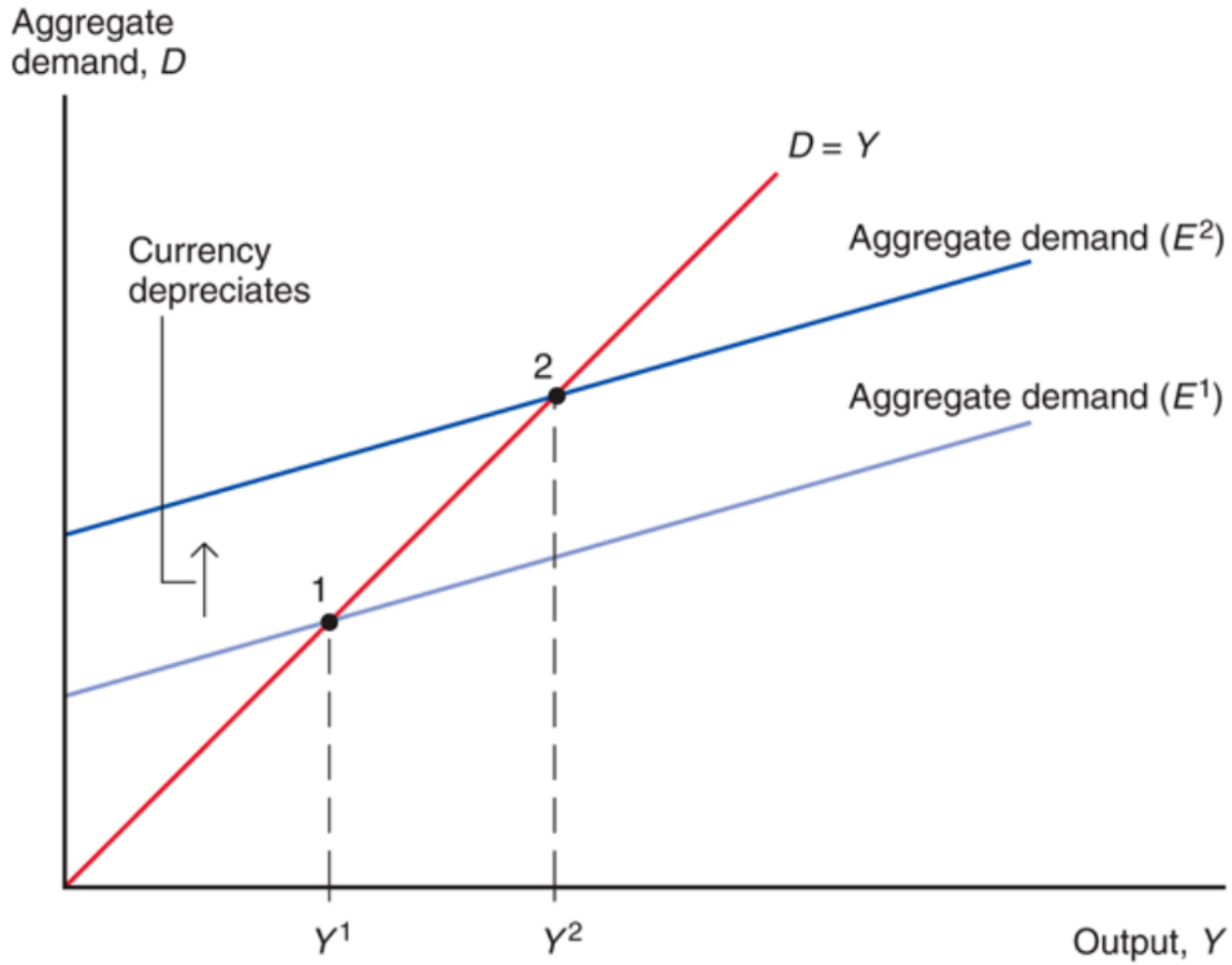
The Determination of Output in the Short Run



DD Schedule

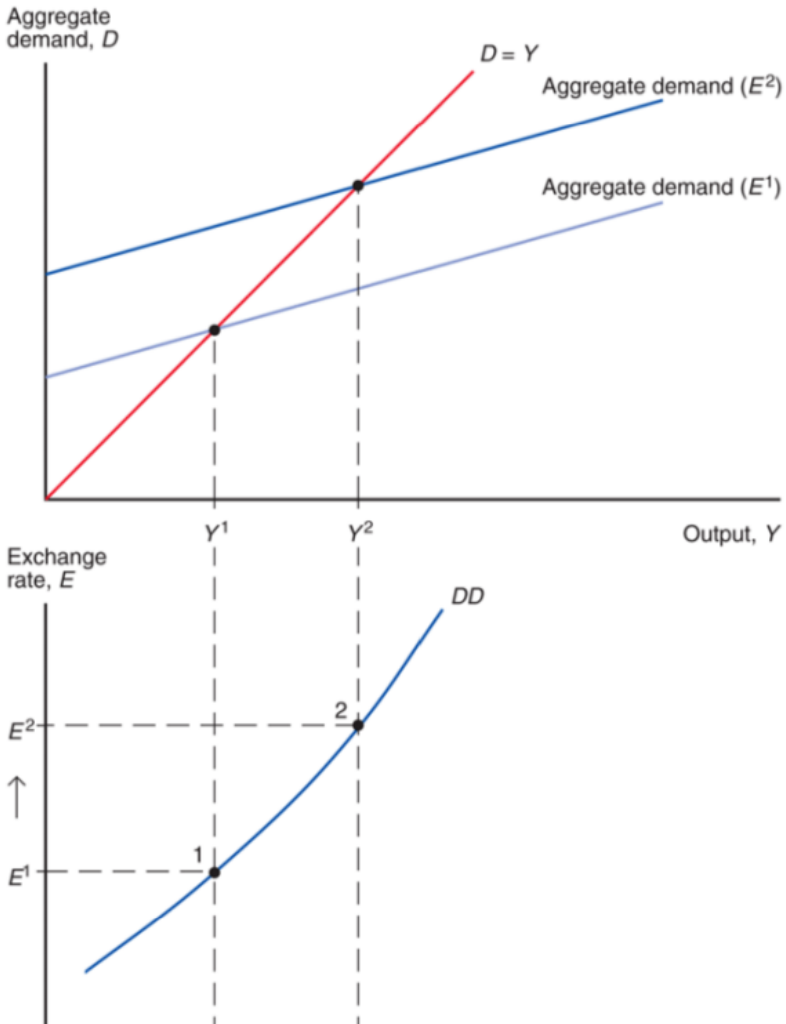
- The DD Schedule is the relationship between exchange rates and output
- Real depreciation of domestic currency increases demand for domestic goods
- Production has to increase to meet demand

Output Effect of a Currency Depreciation with Fixed Output Prices



DD Schedule

- Fix everything in aggregate demand except output Y and nominal exchange rate E
- DD: Set of all Y and E at which the output market is in short run equilibrium

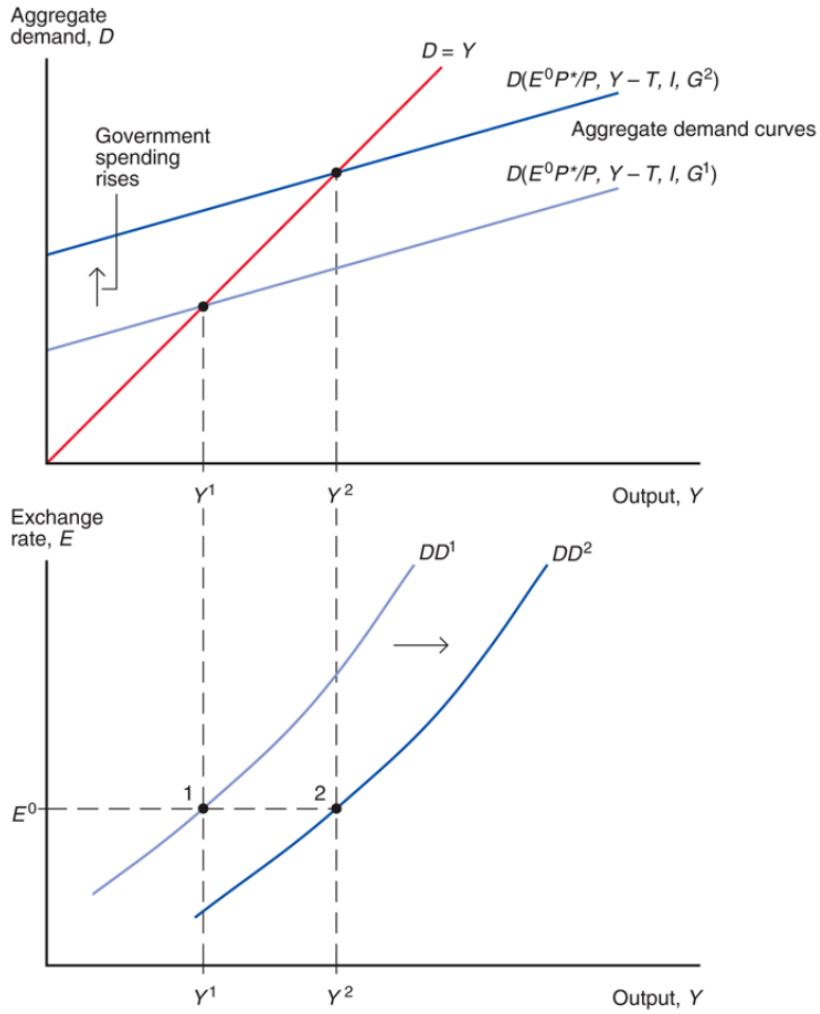


DD Schedule

$$Y = D\left(\frac{EP^*}{P}, Y - T, I, G\right)$$

- What causes changes in the DD schedule?
  - G: If government spending goes up, aggregate demand and output do too

Government Demand and the Position of the DD Schedule



DD Schedule

$$Y = D\left(\frac{EP^*}{P}, Y - T, I, G\right)$$

- What else causes changes in the DD schedule?
  - T: if $T \Downarrow \Rightarrow C \Uparrow \Rightarrow D\&Y \Uparrow$
  - I: if $I \Uparrow \Rightarrow D\&Y \Uparrow$
  - $\frac{P}{P^*}$: if $\frac{P}{P^*} \Downarrow \Rightarrow D\&Y \Uparrow$
  - C: if $C \Uparrow \Rightarrow D\&Y \Uparrow$
  - demand of domestic goods with respect to the demand of foreign goods: $D\&Y \Uparrow$

DD Schedule

- Moral of the story:
  - Whatever causes an increase in aggregate demand causes a rightward shift of *DD* curve

Pause

- So far:
  - The *DD* curve is the *set* of possible output market equilibria
  - That is every possible short-run equilibrium pair of E and Y
- Discussion:
  - For now E (or real interest rate) and Y output are the only endogenous objects
  - Everything else is fixed
  - Even then: Can't pin down a single equilibrium
- Next:
  - We need the sets of E and Y that put the asset market in short-run equilibrium
  - DD curve slopes up, so don't be surprised taht our asset market curve will go down!

Short Run Equilibrium in Asset Markets

Two sets of assets markets:

1. Foreign exchange markets

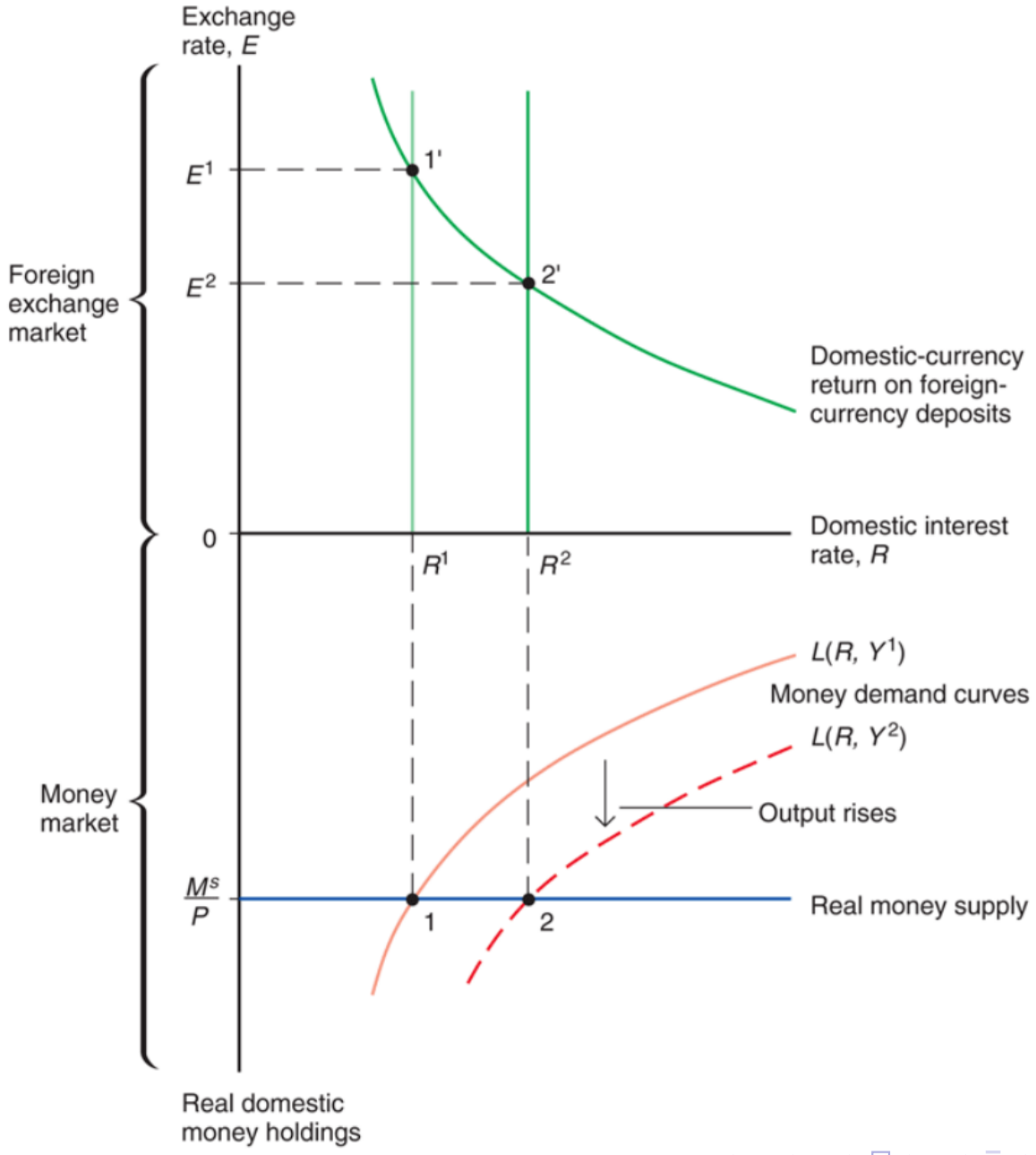
$$R = R^* + \frac{(E^e - E)}{E}$$

2. Money market

$$\frac{M^s}{P} = L(R, Y)$$

Something we are used to!
BUT: Now we are going to fix everything but Y and E

Output and the Exchange Rate in Asset Market Equilibrium



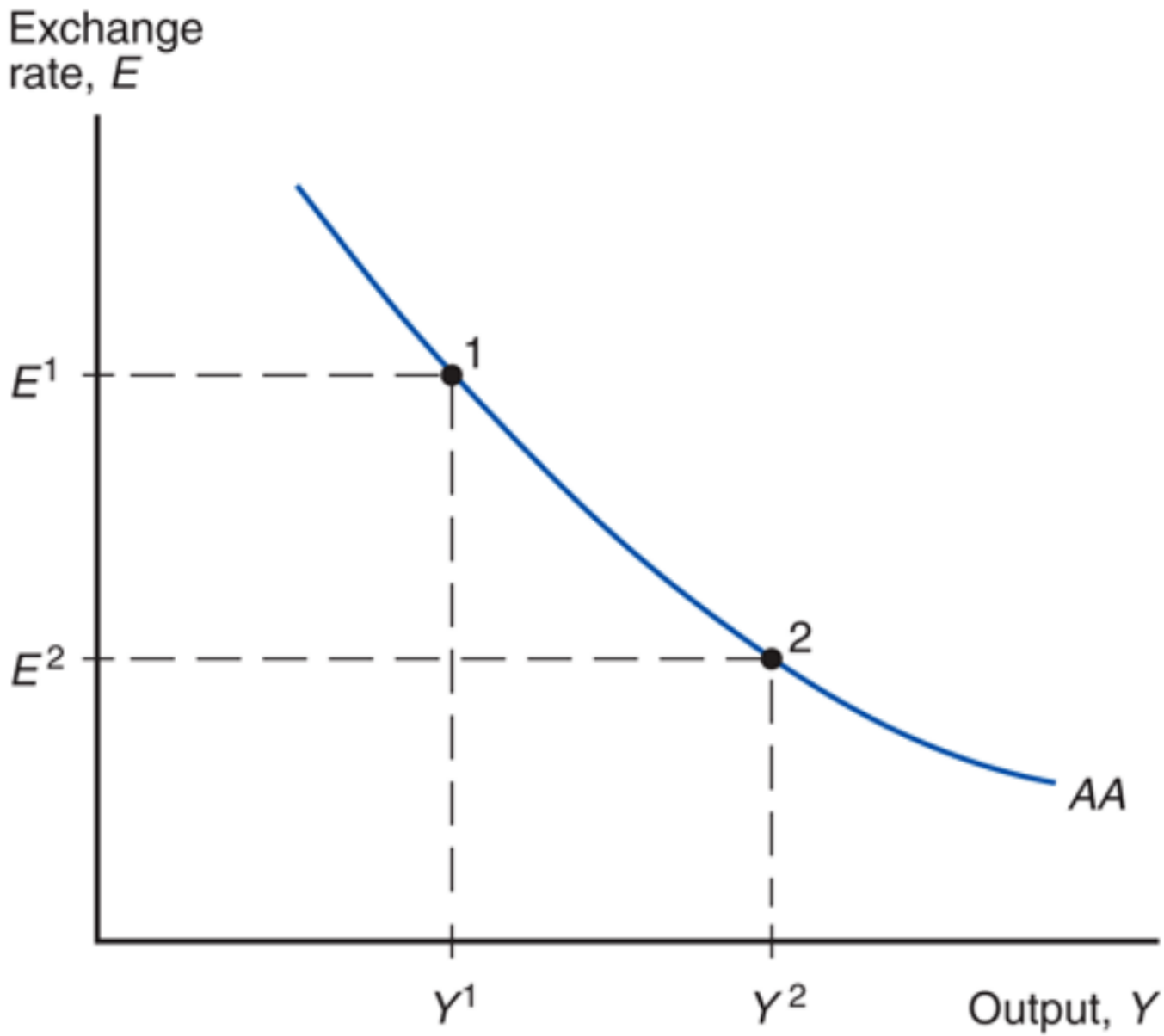
Short Run Equilibrium in Asset Markets: AA Curve

If $Y \Uparrow$:

1. $L(R, Y) \Uparrow$
2. $R \Uparrow$
3. $E \Downarrow$

Output up, exchange rate down (appreciation)
How convenient, going to give us a downward sloping AA curve!

The AA Schedule

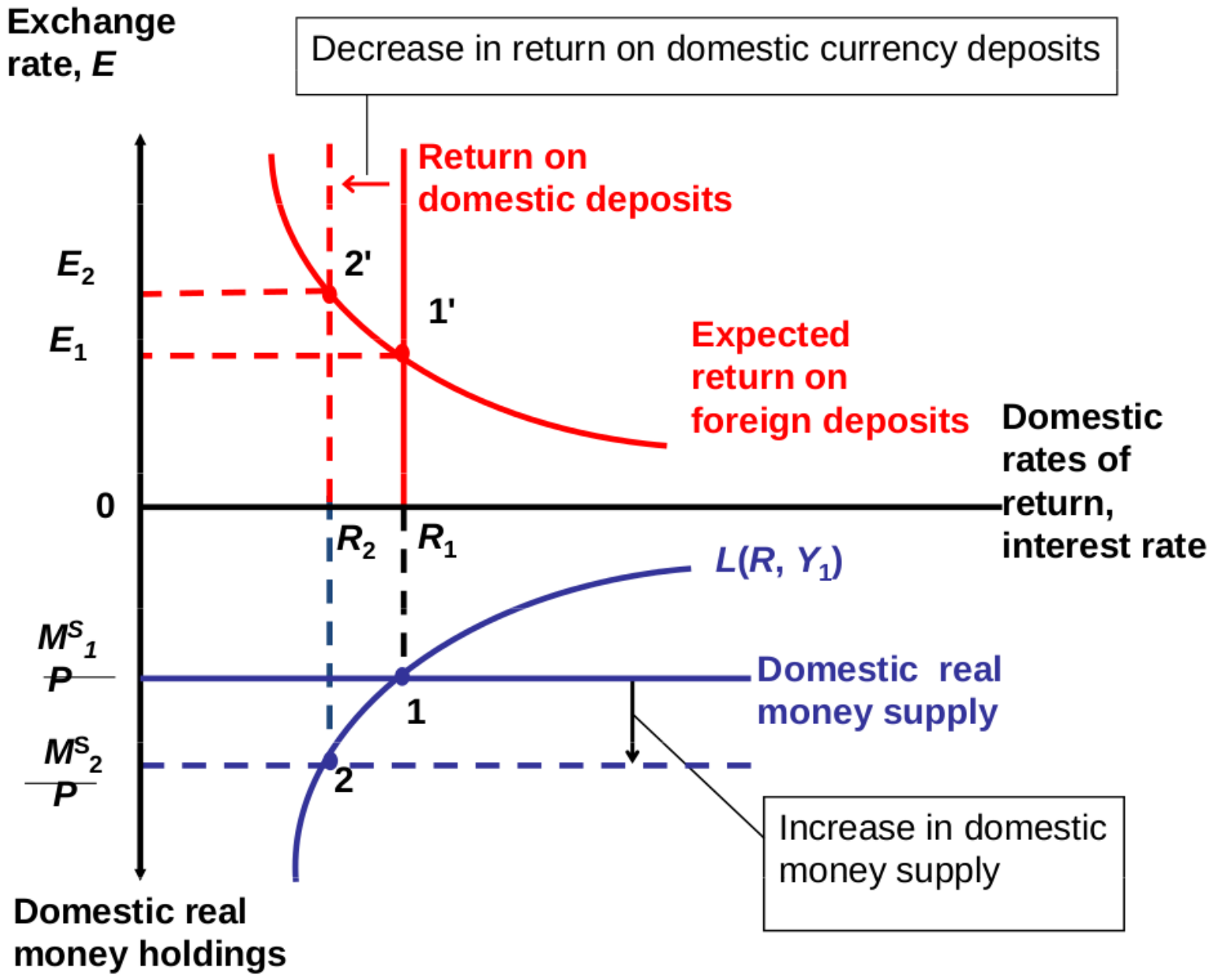


AA Schedule

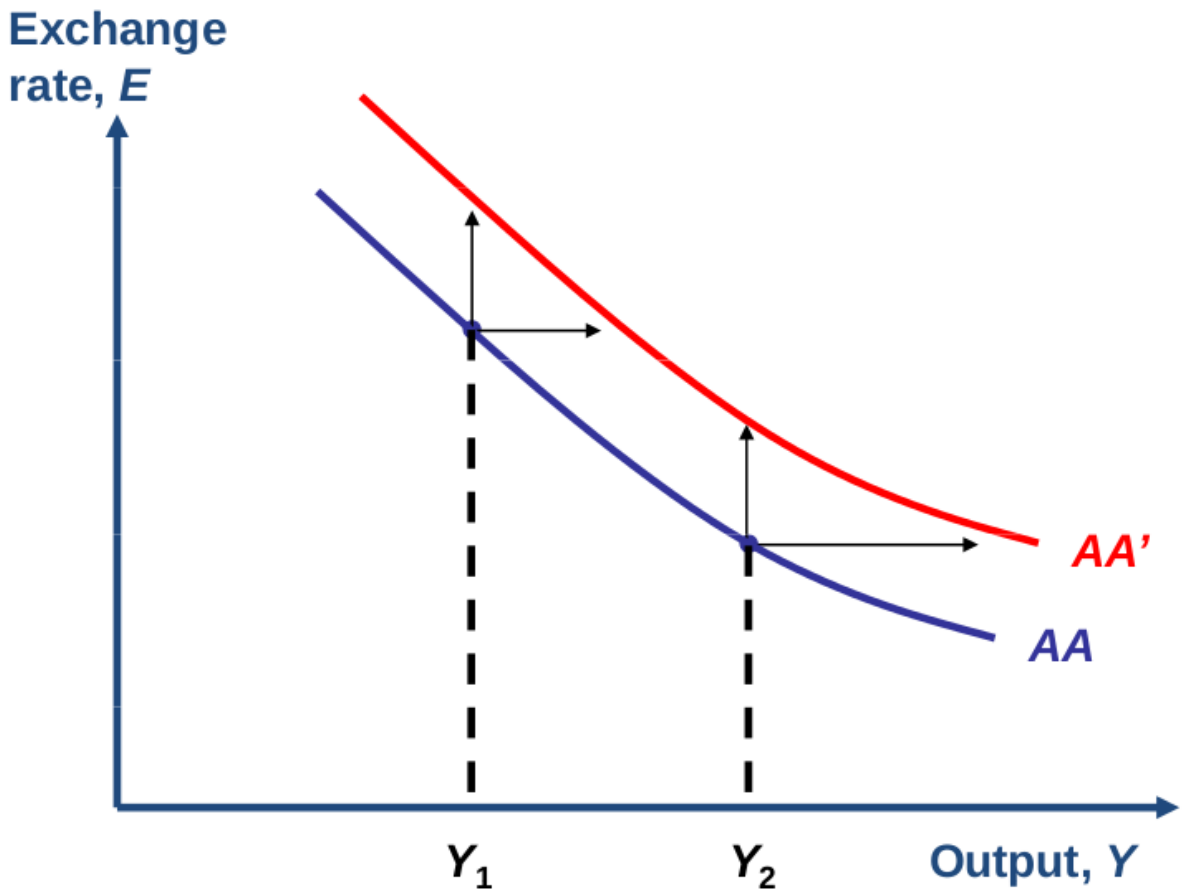
Money supply shift causes AA to shift:

- M^s: if $M^s \Uparrow \Rightarrow R \Downarrow \Rightarrow E \Uparrow$: AA shifts up.

The AA Schedule: Increase in money



The AA Schedule: Increase in money



AA Schedule

Other things causing AA to shift:

- P: if $P \Uparrow \Rightarrow \frac{M^s}{P} \Downarrow \Rightarrow R \Uparrow \Rightarrow E \Downarrow$: AA shifts down.
- $L(R, Y)$: if $L(R, Y) \Downarrow \Rightarrow$ more non-monetary assets $\Rightarrow E \Uparrow$: AA shifts up.
- R^*: if $R^* \Uparrow E \Uparrow$: AA shifts up.
- E^e: if $E^e \Uparrow \Rightarrow AA \Uparrow$

Pause

- Fix everything but Y and E
- We have set of equilibria in output market (Output supply equals aggregate demand)
- We have set of equilibria in asset market
- Now let us find the point where both the output and asset market are in equilibrium

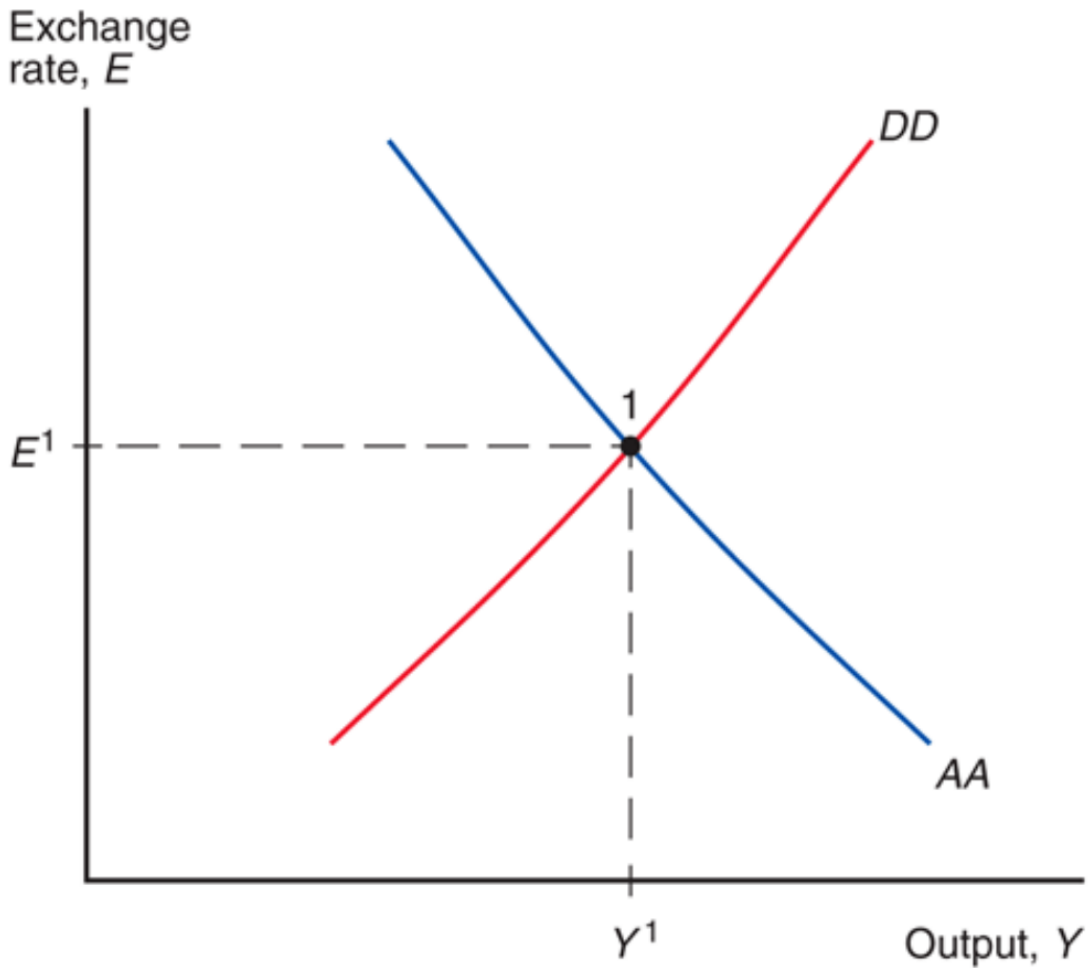
Short Run Equilibrium

A short run equilibrium means E and Y such that:

1. equilibrium in the output markets holds (DD): $D = Y$
2. equilibrium in the foreign exchange markets holds (AA):
   $$R = R^* + \frac{(E^e - E)}{E}$$
3. equilibrium in the money market holds: $M^s = M^d$

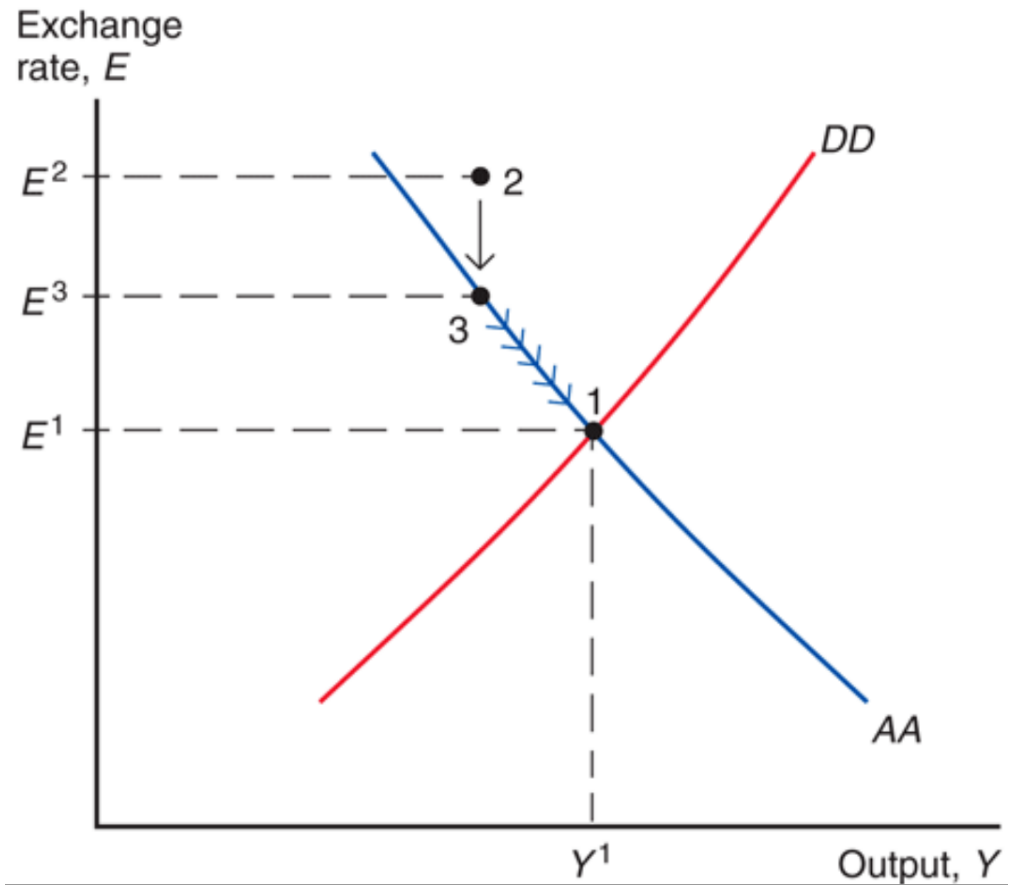
Short-Run Equilibrium: The Intersection of DD and AA

- Begining to think everything in undergrad econ is the same picture
- Just change the labels



How the Economy Reaches Its Short-Run Equilibrium

- Drop to 3 to maintain interet rate parity
- Travel to 1 as excess demand firms to increase production, which increases real money demand, which raises interest rate, which causes appreciation of currency



Pause

- Fix everything but Y and E
- We have set of equilibria in output market (Output supply equals aggregate demand)
- We have set of equilibria in asset market
- We have the point where both markets are in equilibrium
- If only Y and E are allowed to adjust in the short-run, our model is powerful
- We can analyze the effects of goverment policy (M and G)

Temporary Changes in Monetary and Fiscal Policy

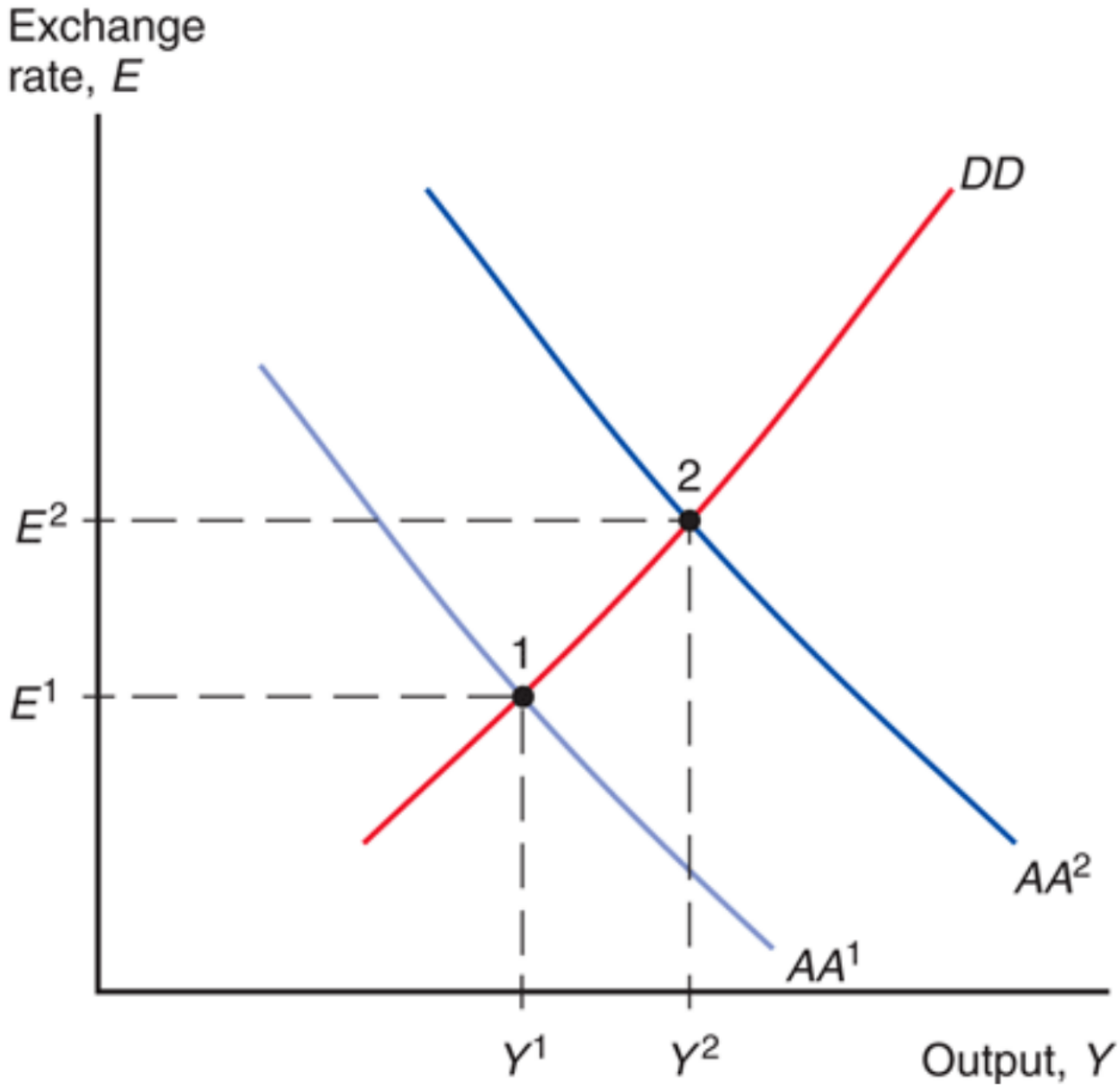
- **Monetary policy:** the central bank influences the supply of monetary assets (AA)
- **Fiscal policy:** governments influence the amount of government purchases and taxes (DD)

Suppose that the policies are going to be undone after a short period

Temporary Monetary Policy

- if $M^s \Uparrow \Rightarrow R \Downarrow E \Uparrow$
- AA shifts up

Temporary Changes in Monetary and Fiscal Policy

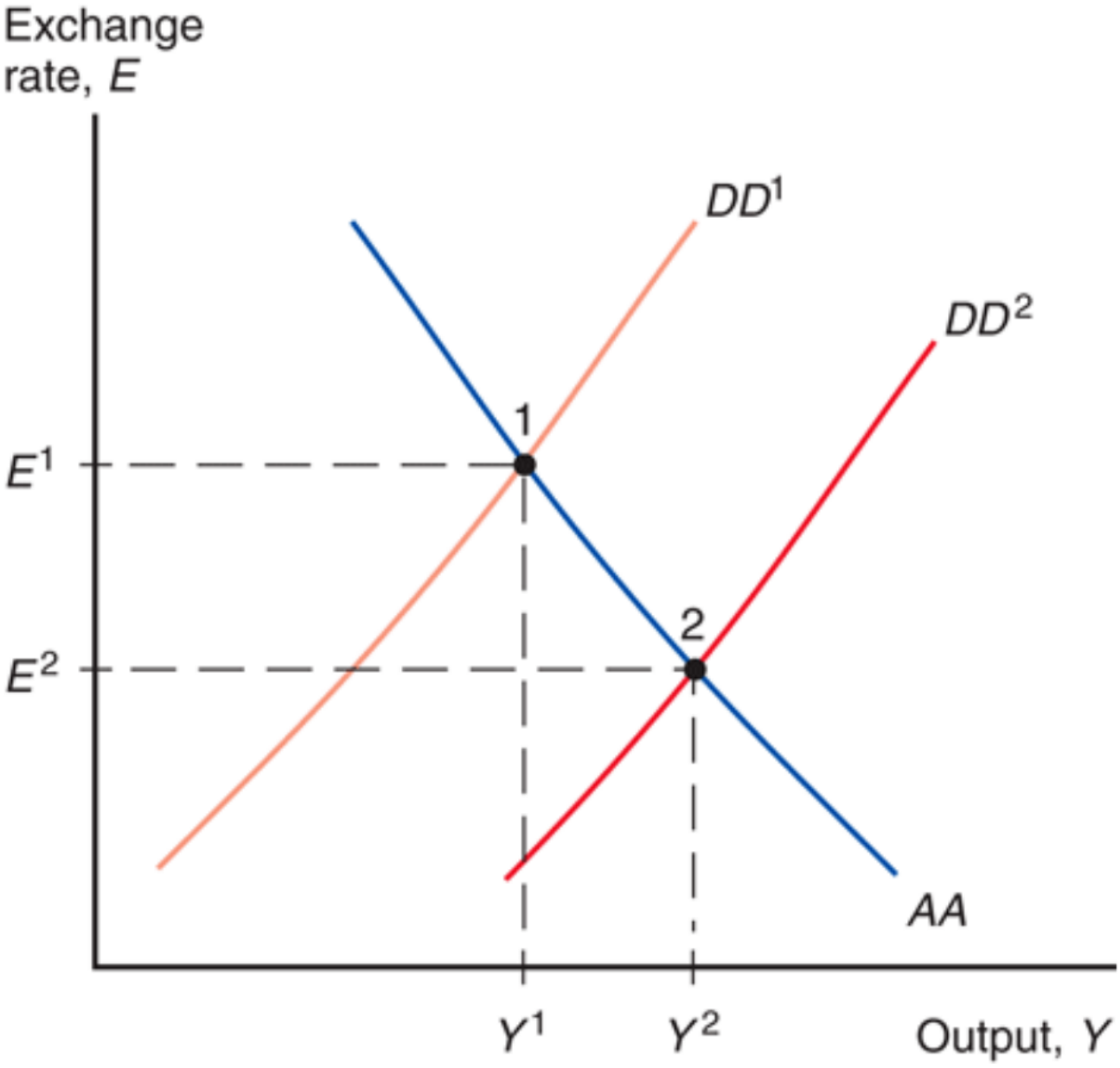


Temporary Fiscal Policy

Government decides to build a space shuttle

- if $G \Uparrow$ (or $T \Downarrow$) $\Rightarrow D \& Y \Uparrow$
- DD shifts down
- $Y \Uparrow \Rightarrow L(Y, R) \Uparrow \Rightarrow R \Uparrow$
- $E \Downarrow$

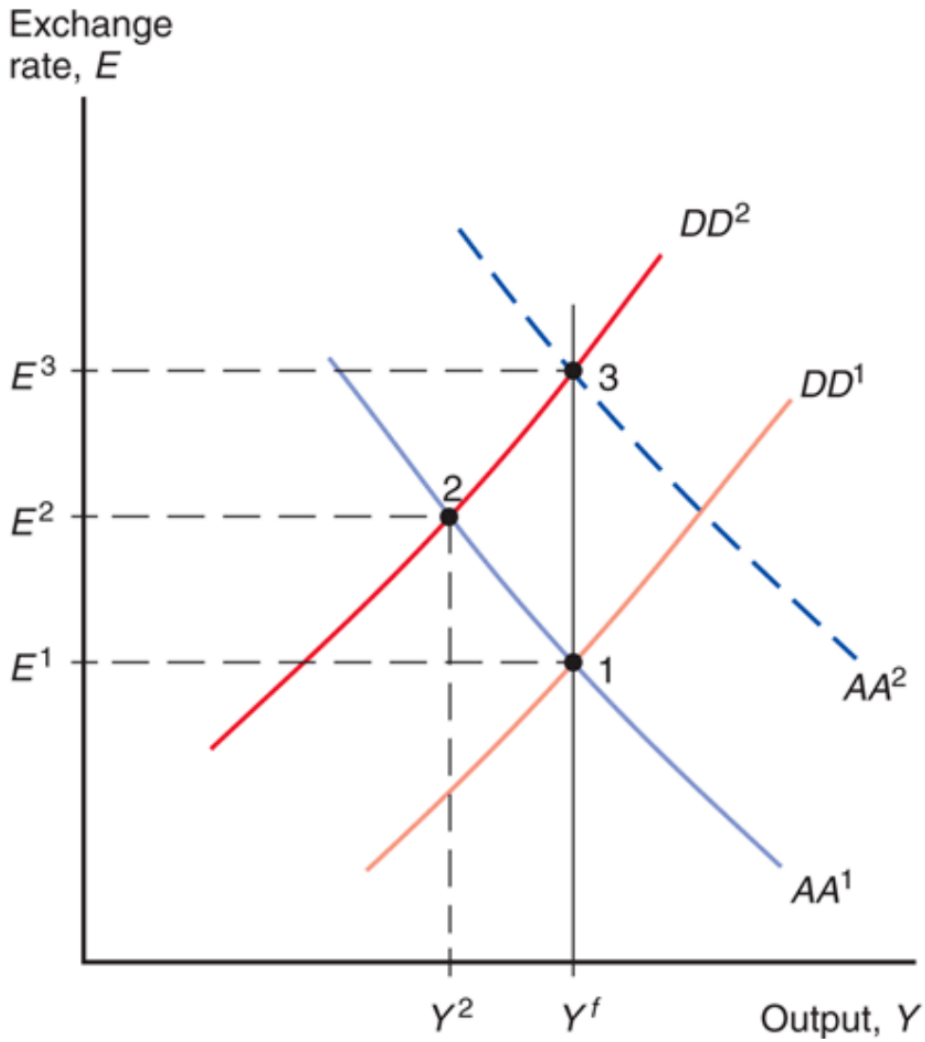
Effects of a Temporary Fiscal Expansion



Policies to Maintain Full Employment

- How might governments use these policy tools?
- Suppose there is a temporary shift of consumer taste away from domestic product
- This will shift DD up, resulting in unemployment (factors same, drop in Y)
- Central bank can increase money supply

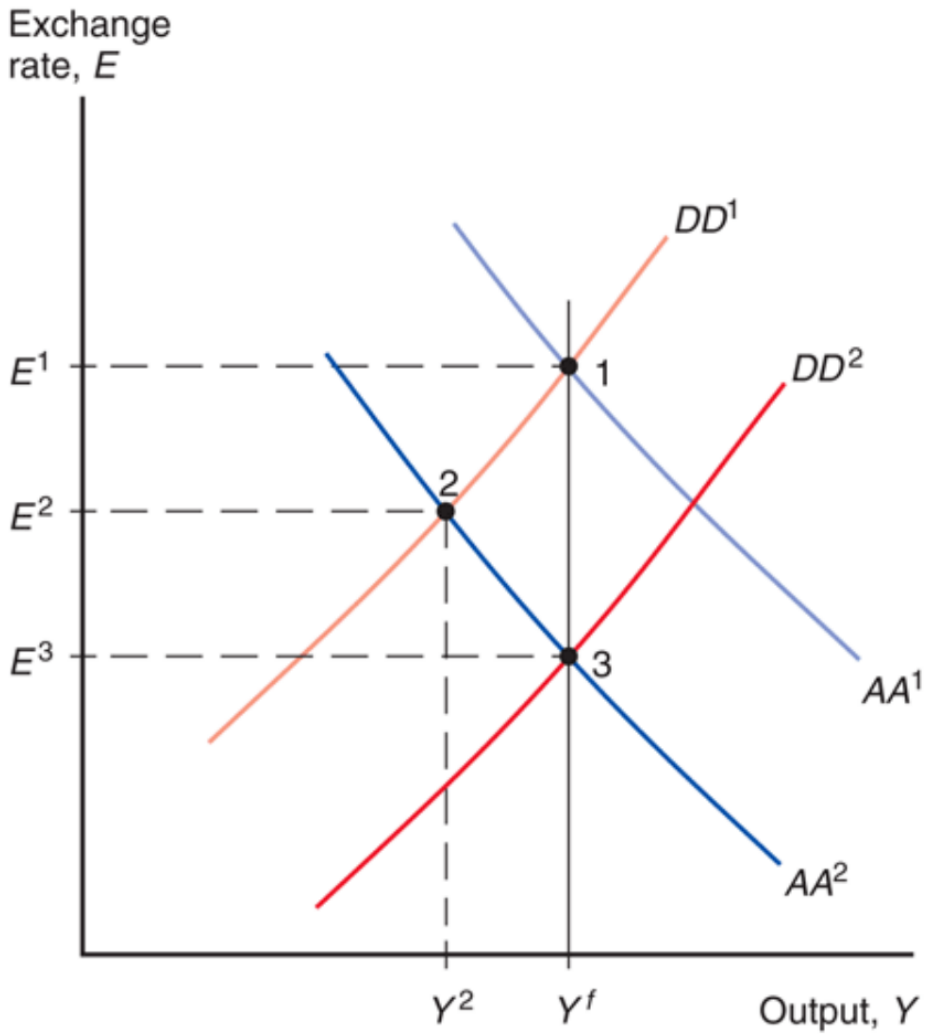
Maintaining Full Employment After a Temporary Fall in World Demand for Domestic Products



Policies to Maintain Full Employment

- How might governments use these policy tools?
- Suppose people suddenly demand more money
- This will shift AA down, resulting in unemployment
- Government can demand more stuff, raising DD

Policies to Maintain Full Employment After a Money Demand Increase



Policies to Maintain Full Employment

Policies to maintain full employment are difficult to implement:

- inflation bias
  - Government is expected print money to expand output and win an election
  - Workers anticipate inflation, ask for higher wages
  - Costs rise leading to less output and unemployment
  - Government needs monetary policy just to return to baseline output
- Difficult to tell if problem is in the asset or output market
  - Which tool?
- Policy lag
- Monetary policy much faster
  - Government may use it even when fiscal policy is more appropriate
- Ricardian equivalence

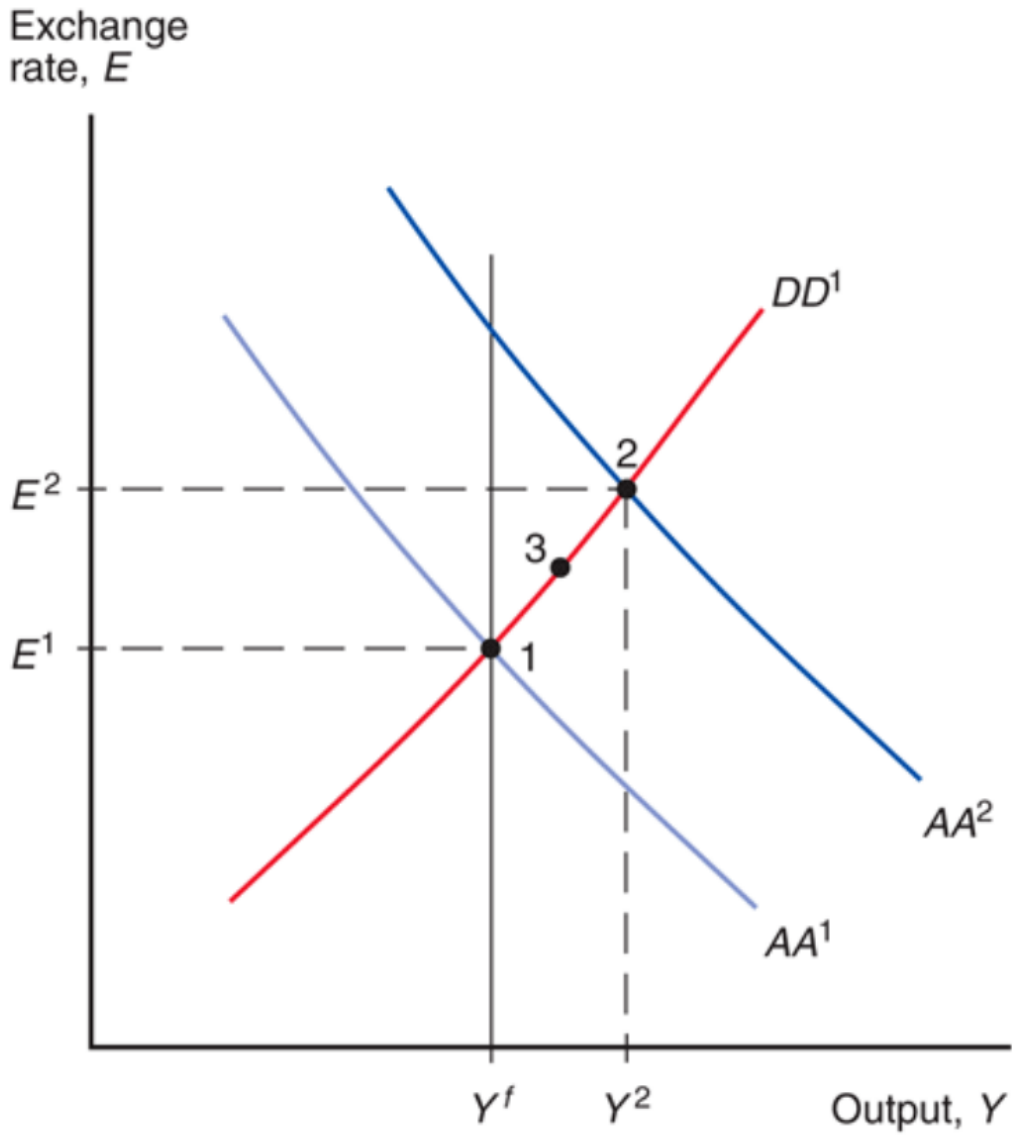
Pause

- We have seen how governments might use temporary policy instruments
- Next let us look at permanent policy changes
  - A permanent expansion of the money supply
  - A permanent increase in government demand

Permanent Changes in Monetary Policy

- Permanent money expansion: Short-Run
  - Short run: Lower interest rate $\rightarrow$ depreciation
  - Short run: Expected future depreciation $\rightarrow$ more depreciation
  - AA curve shifts up more than in the temporary monetary case

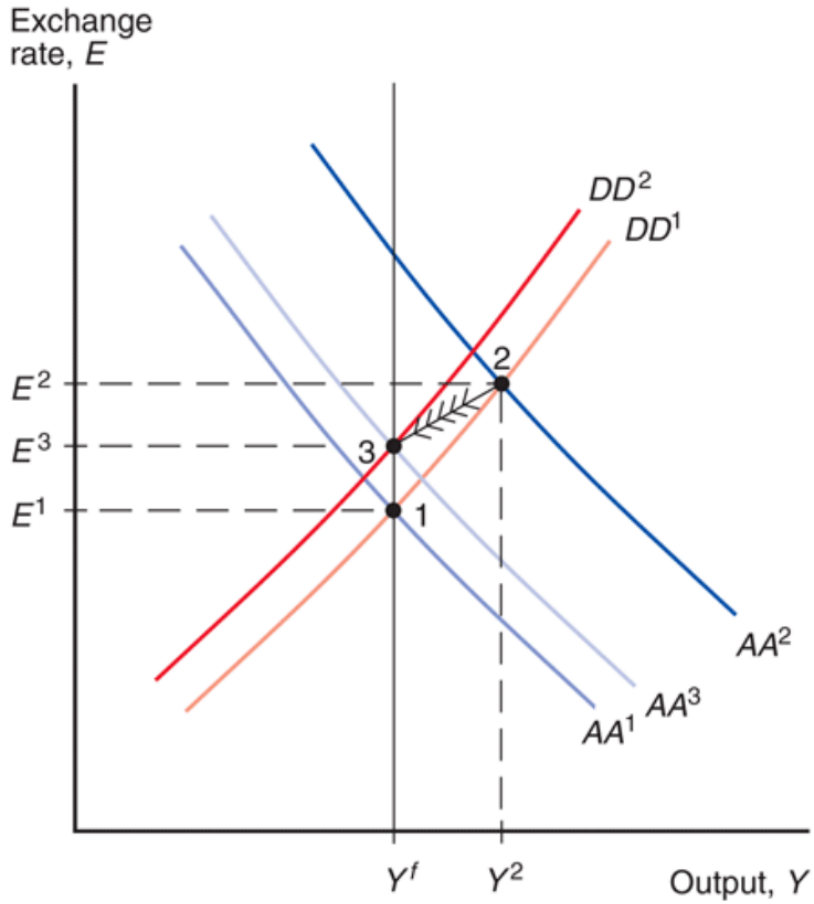
Short-Run Effects of a Permanent Increase in the Money Supply



Permanent Changes in Monetary Policy

- Permanent money expansion: Long-run
  - Long-run: factors are running overtime to meet production, rising costs, rising prices
  - Long-run: Rising prices encourage imports, shifting DD in
  - Long-run: Rising prices lower real money supply, shifting AA in
  - Reach equilibrium at long-run production level (full-employment)

Permanent Changes in Monetary Policy

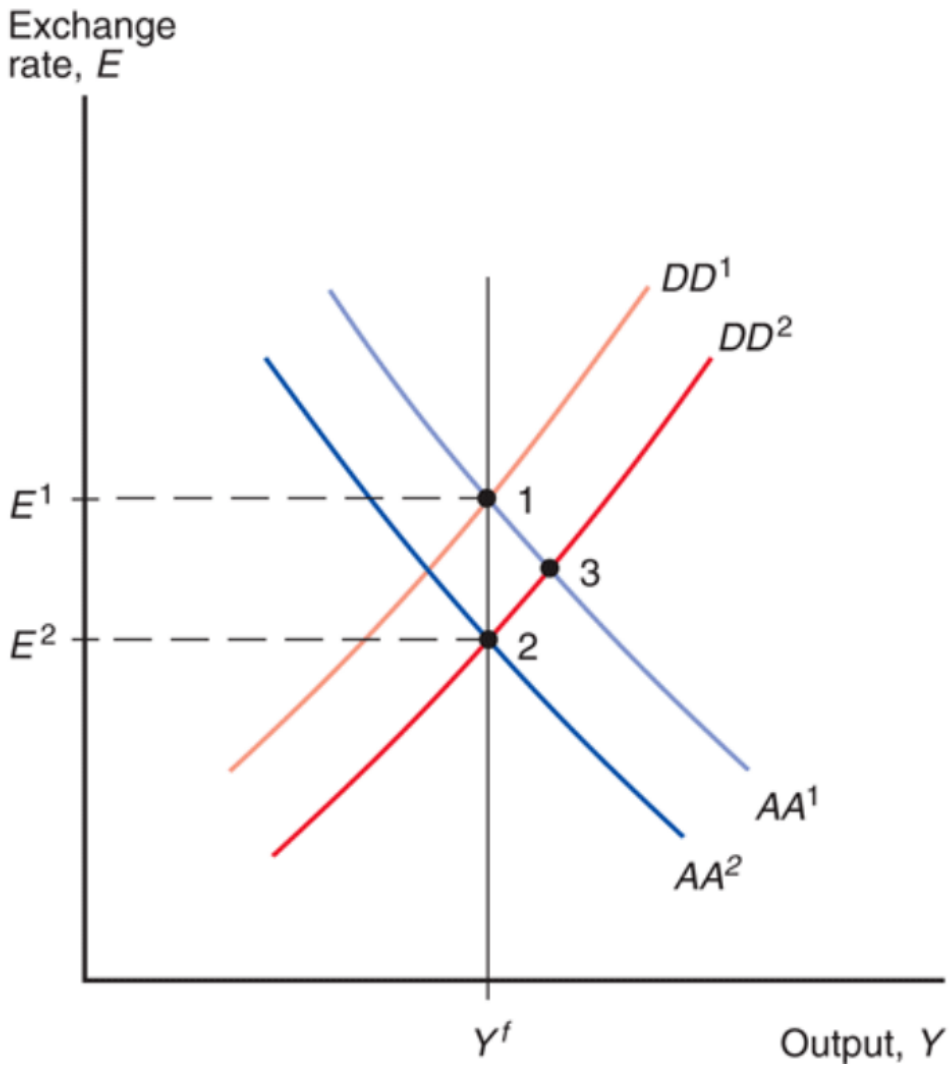


Effects of Permanent Changes in Fiscal Policy

If $G \Uparrow$ or $T \Downarrow$

- Two effects:
  1. Increase aggregate demand (shift out DD curve)
  2. Causes expectations of a future exchange rate appreciation (shift in AA)
- An permanent increase in government purchases is exactly offset by reduction in exports due to currency appreciation

Fig. 17-16: Effects of a Permanent Fiscal Expansion



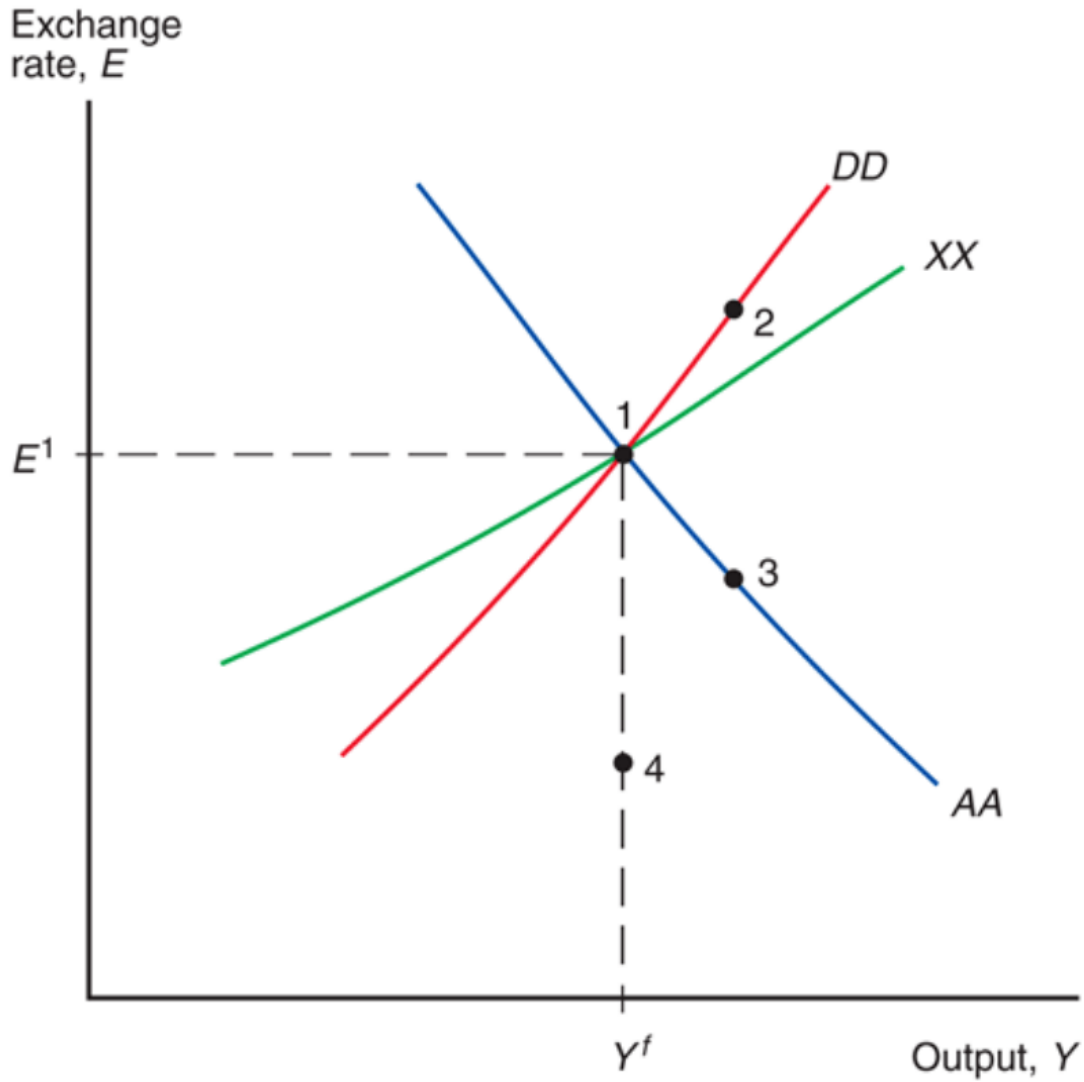
Pause

- Meat of the chapter finished
  - Short and long run effects of government policy on output
- Now some odds and ends
  - Government policy and the current account
  - Current account dynamics
  - Pass Through
  - The liquidity trap (Krugman!)

Macroeconomic Policies and the Current Account

- XX curve: combinations of output and exchange rates at which the current account is at some desired level.
  - if $Y \Uparrow \Rightarrow CA \Downarrow$ as imports rise
  - E must rise to maintain desired level of current account
- XX curve slopes upward but is flatter than the DD curve
  - As output increases, consumption only absorbs part
  - The rest needs to be absorbed by current account
  - In other words, E must rise enough so current account can increase!
  - XX curve: E rises enough so that current account is constant

How Macroeconomic Policies Affect the Current Account

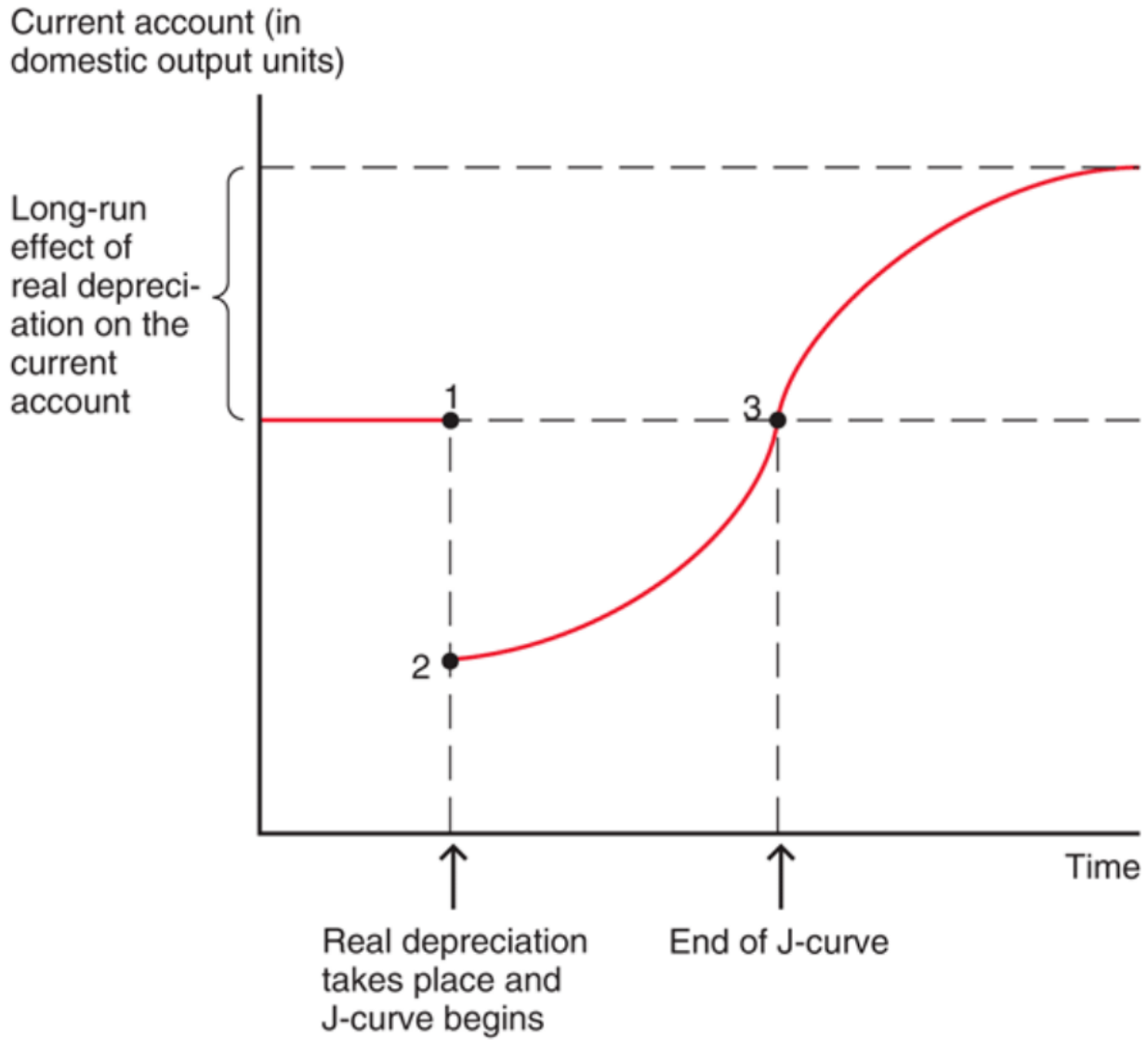


The J-Curve

- We have assumed depreciation increases current account in short-run
  - expands exports
  - decreases imports (volume) but makes each import more expensive (value)
- Empirically depreciation decreases current account in the short-run
- Reason: orders placed before shipments happen
- Depreciation is immediate
- Only immediate effect is the value effect on imports!

The J-Curve

- Current account adjustment follows a J-shaped curve



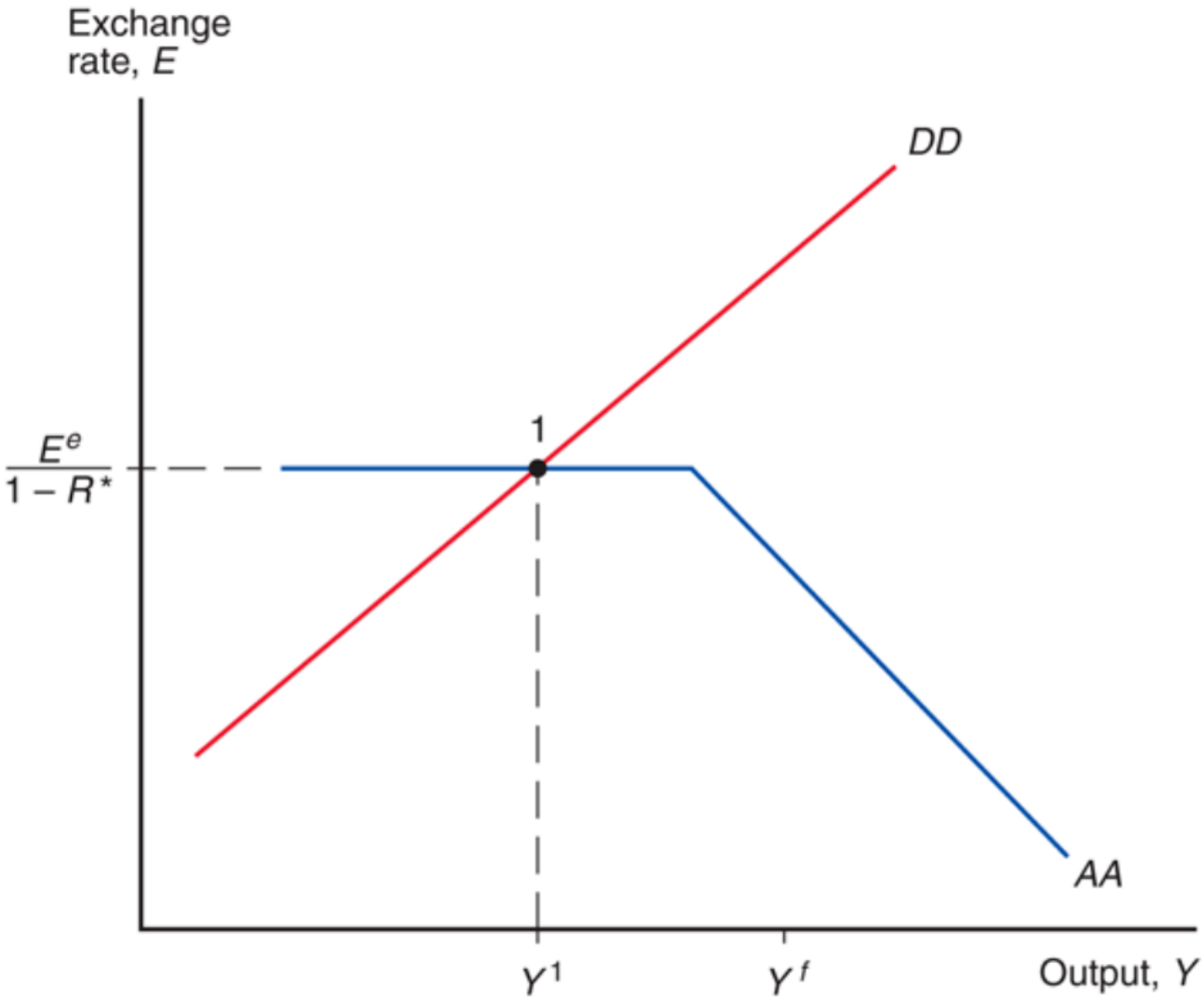
Pass-through

- Imperfect competition
  - Firms make money
  - When costs rise, who pays?
  - The amount of a cost rise passed-on to consumers is called pass-through
- Exchange rate pass-through
  - Are exchange rates changes passed on to consumers?
  - Literature still developing, but usually find almost nothing!
  - Means currency movements will not be reflected in current account

Liquidity trap

- Suppose interest rates on illiquid assets fall to zero (draw it)
- Increasing money supply cannot change the exchange rate (calculate it)
- Going to make a flat AA curve as in the next picture

Liquidity trap



Summary

- We saw how production and real exchange rate affect aggregate demand
- We derived the *DD* curve which give set of short-run output equilibrium exchange rates and outputs
- We derived the *AA* curve which is the set of short-run asset equilibrium exchange rates and outputs
- Short and long run effects of government policy on output

Next time

- Tuesday: Chpt. 18, Fixed exchange rates
- Thursday: Chapter 19, Chapter 21, History of World Financial System and The Eurozone