



International Economics

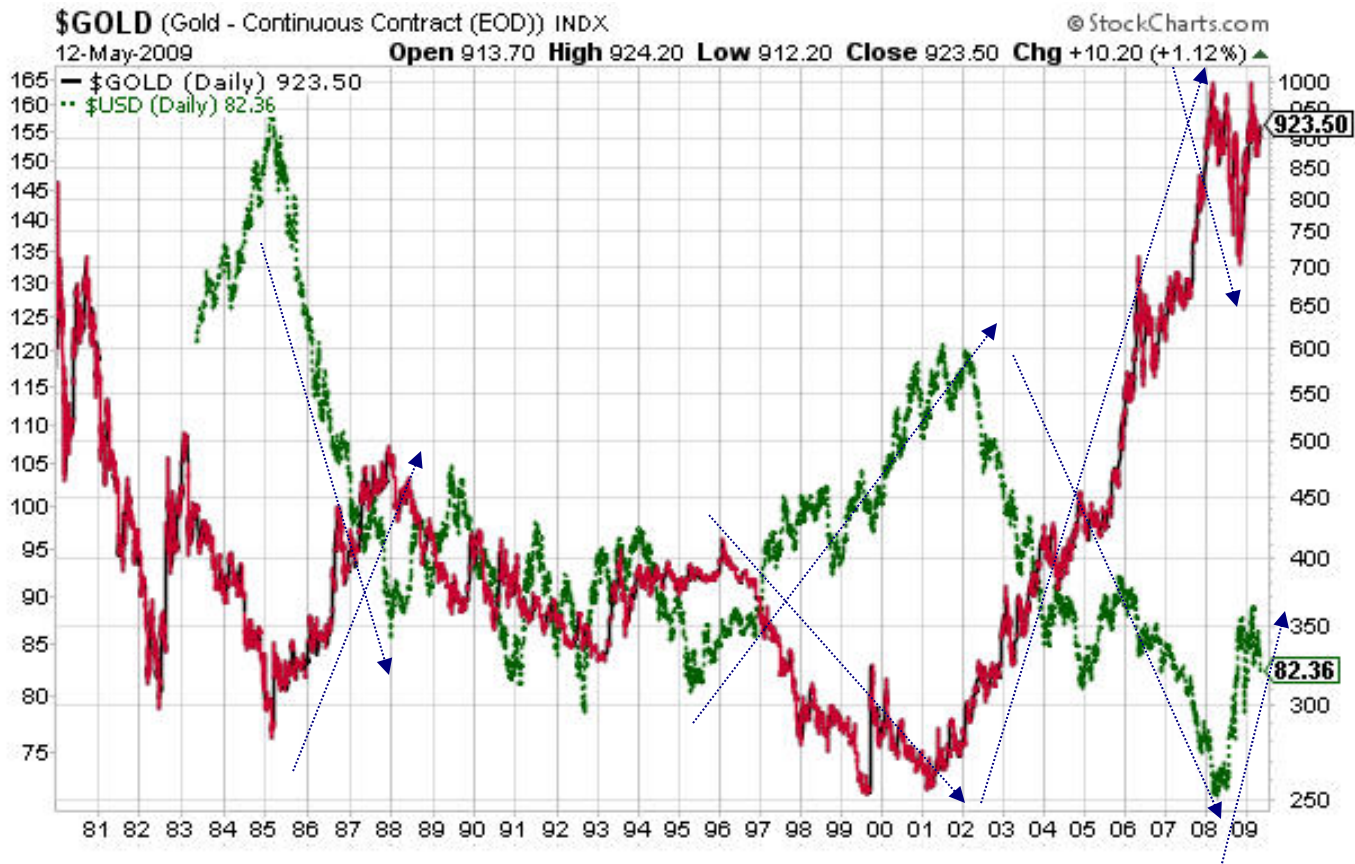
Fall 2011

Exchange Rate and Macro Policies

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Oct. 4, 2011

Afternoon Coffee

Dollar and Gold, 1981-2009



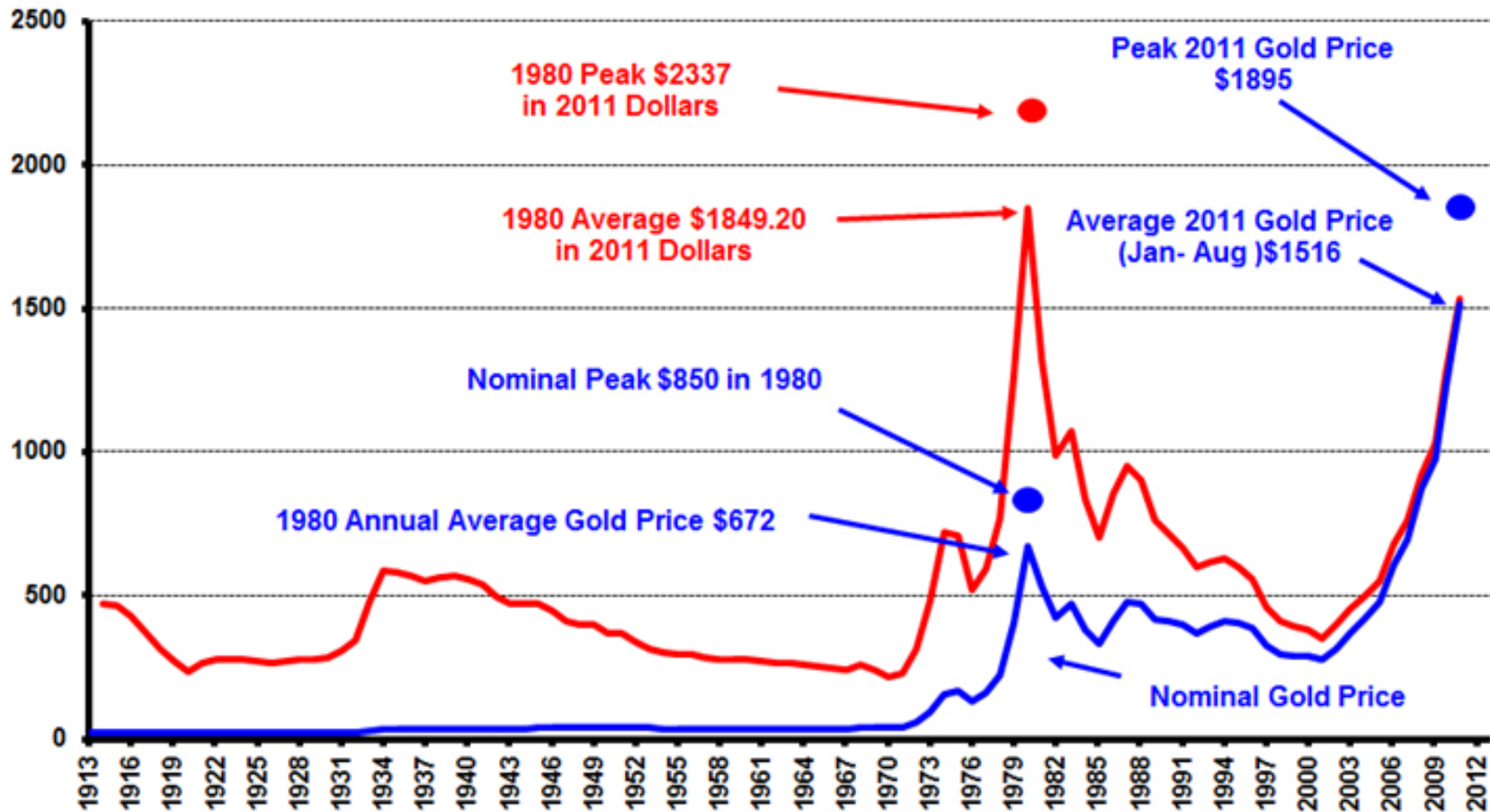
Gold Price Since Collapse of Dollar Standard (or Bretton Woods System) in 1971-3



*note: gold prices are in nominal US dollar

Gold Price, 1914- current

Inflation Adjusted, in Aug. 2011 US Dollar



Output and Exchange Rates in the short run



Bob Mundell

- **Mundell-Fleming model**
- Essentially, an open-economy version of IS-LM



Summary of Where We Are

- We have learned:

Interest rate parity condition in **FX market**:

$$R = R^* + (E^e - E)/E \quad (1)$$

Equilibrium in the **money market**:

$$M^s/P = L(R, Y) \quad (2)$$

- But so far we have assumed output Y , as given.
- With Y given, we have established a link between money market and FX (or asset) market, i.e., the link between interest rate R , and exchange rate E , both in the short run and long run.
- Now, we need to figure out how output Y is related to exchange rate E – essentially we will establish a link to the real economy through the exchange rate – the so-called open-economy macro.



Preview of the Linkage

- First, we know current account, CA, is one of the four components of output,

$$Y = C + I + G + CA.$$

And at the same time, exchange rate is closely connected to current account, as exchange rate affects relative price of exports vs. imports.

- Second, output affects interest rate through equation:

$$M^s/P = L(R, Y)$$

and interest rate further affects exchange rate through interest rate parity condition, $R = R^* + (E^e - E)/E$

Derivation of DD Schedule

- Consumption is a function of disposable income, Y^d , and $Y^d = Y - T$, so consumption is a function of $(Y - T)$, or **$C = C(Y - T)$**
- Current account is affected by two main factors: real exchange rate and disposable income, so we write:

$$\mathbf{CA = CA(Ex P^*/P, Y - T)},$$

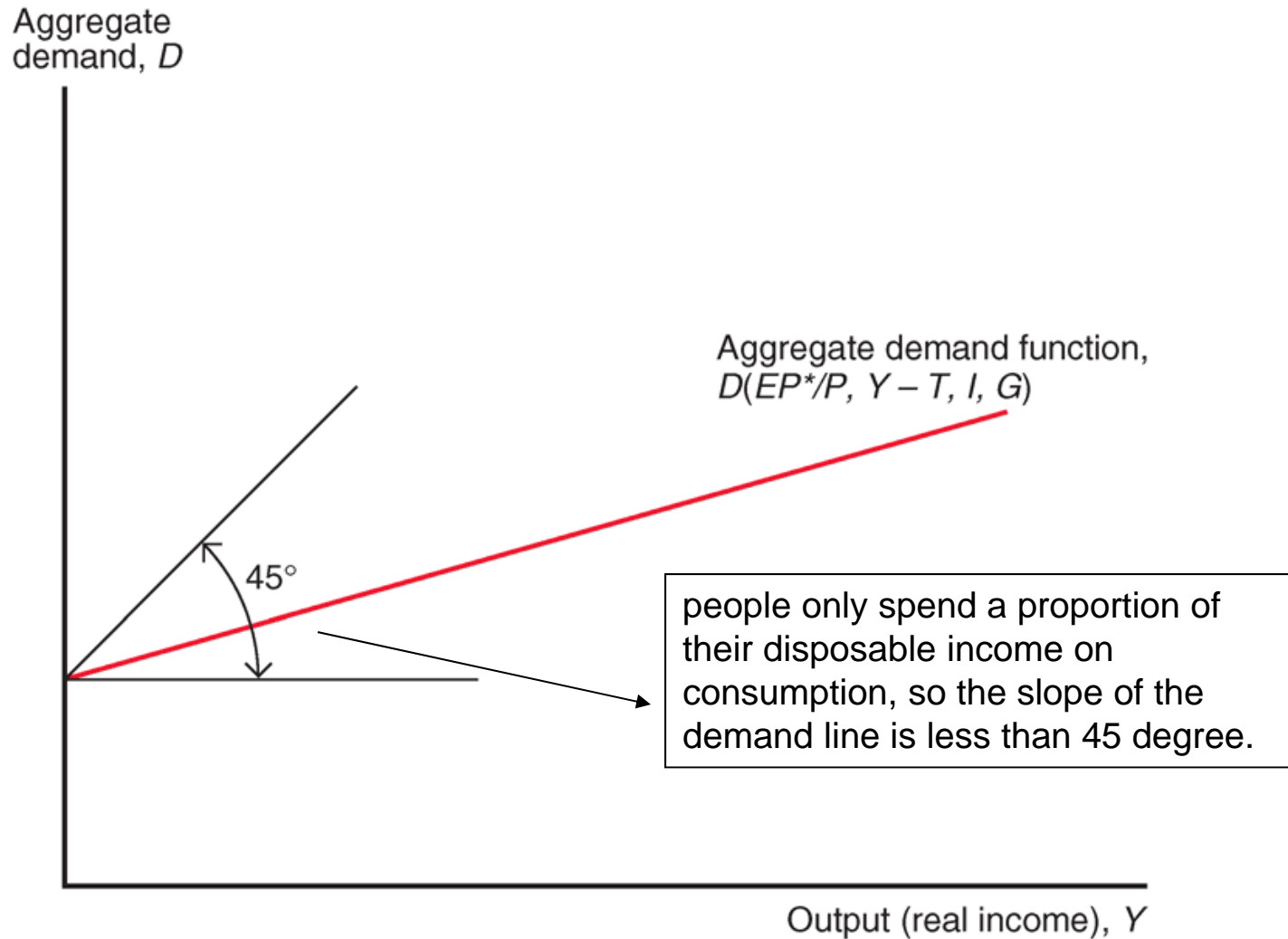
recall $Ex P^*/P$ is real exchange rate, $q_{/*}$.

- Then the aggregate demand function D is:

$$\mathbf{D = C(Y - T) + I + G + CA(Ex P^*/P, Y - T)}$$

or simply, $\mathbf{D = D(Ex P^*/P, Y - T, I, G)}$

Aggregate Demand and Output



Factors Determining the Current Account

$$CA = EX - IM = CA(Ex P^*/P, Y-T)$$

A rise of real exchange rate could mean the following:

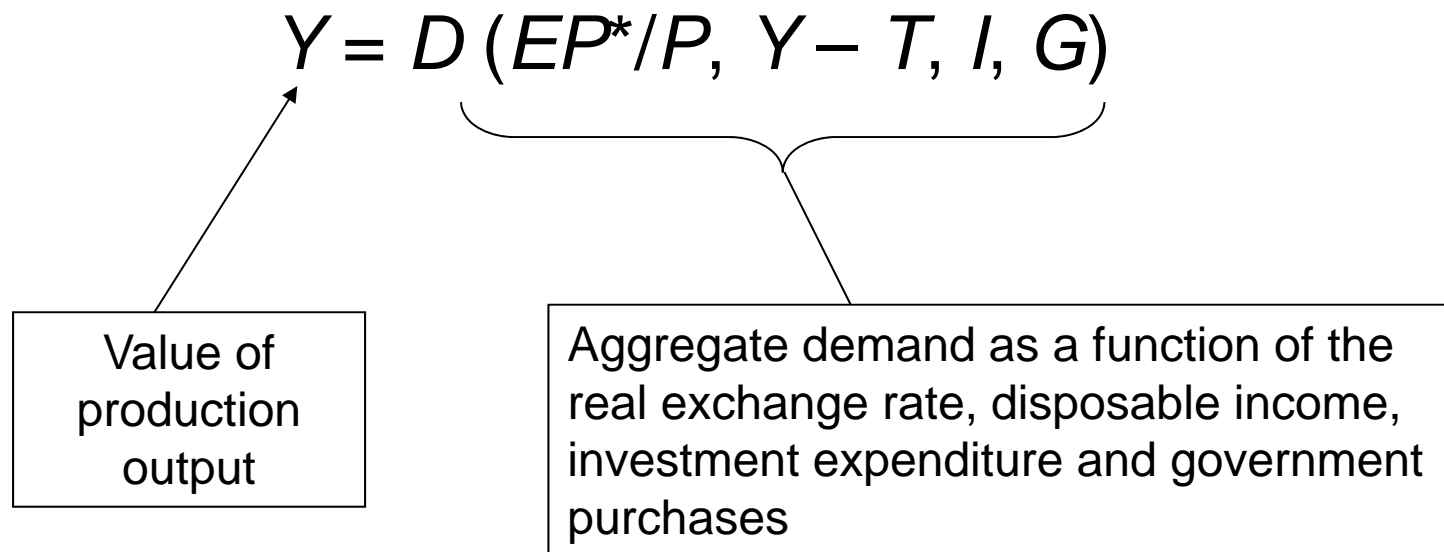
- lower price for domestic goods, which induces foreign consumers to demand more, thus export rises;
- or higher foreign prices, which means domestic goods become more competitive, thus export rises;
- or depreciation of nominal exchange rate (or depreciation of home currency), which also benefits exports.

→ So regardless what is the real cause, a rise of real exchange rate will increase home country's exports, thus current account improves. Similarly, a decline of real exchange rate will deteriorate current account.

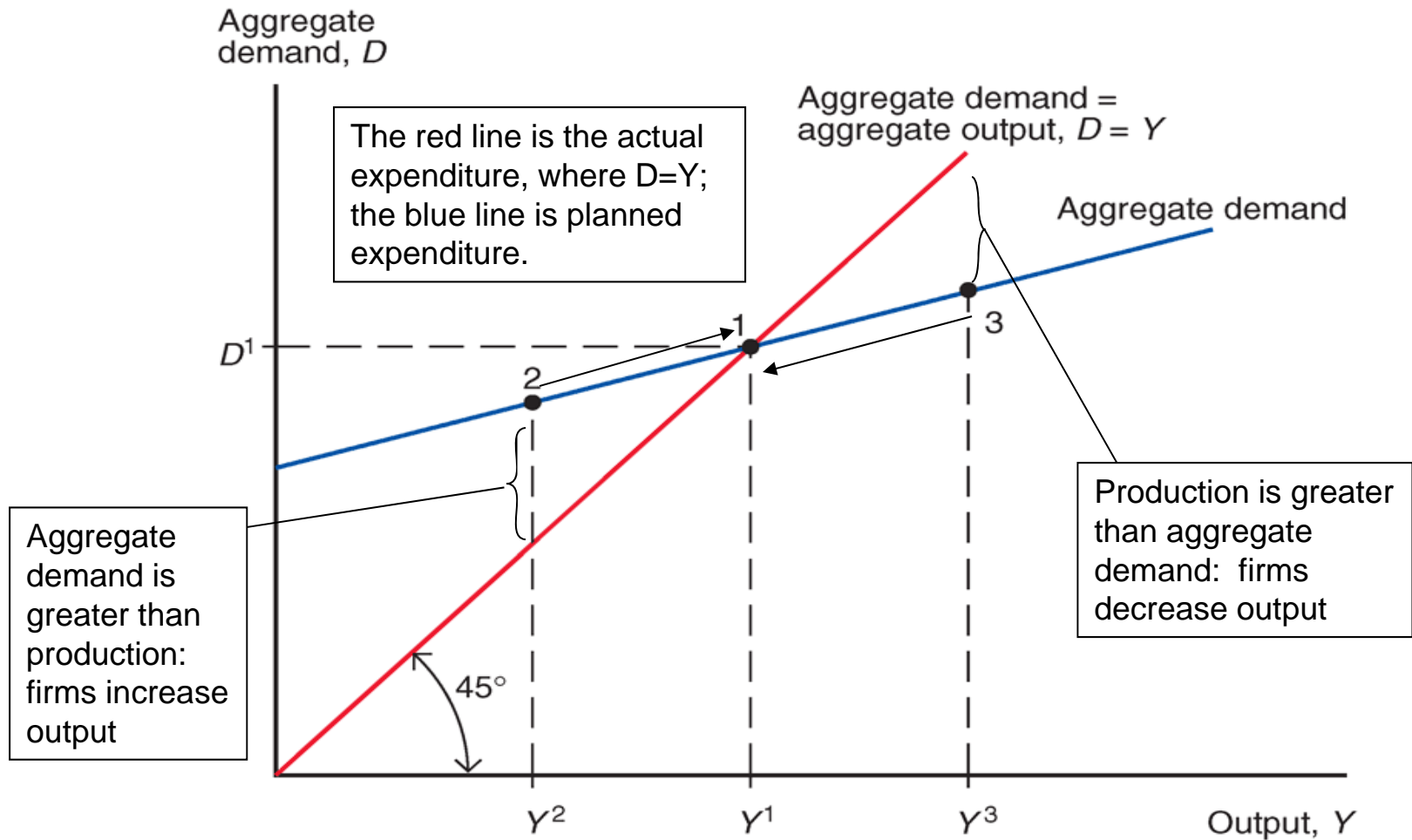
Change	Effect on current account, CA
Real exchange rate, $EP^*/P \uparrow$	CA \uparrow
Real exchange rate, $EP^*/P \downarrow$	CA \downarrow
Disposable income, $Y^d \uparrow$	CA \downarrow
Disposable income, $Y^d \downarrow$	CA \uparrow

Short-Run Equilibrium

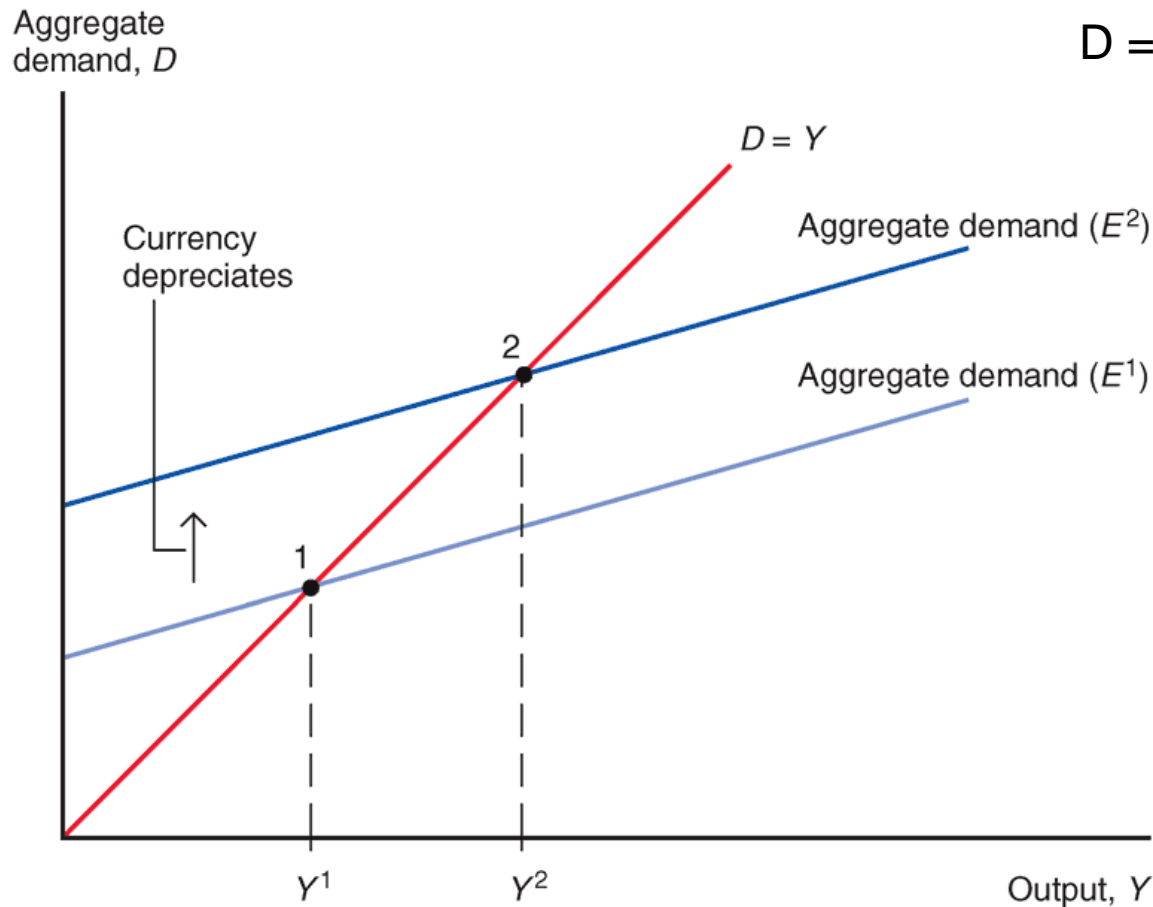
- Equilibrium is achieved when the value of output Y equals the value of aggregate demand D .



Equilibrium Output in the Short Run



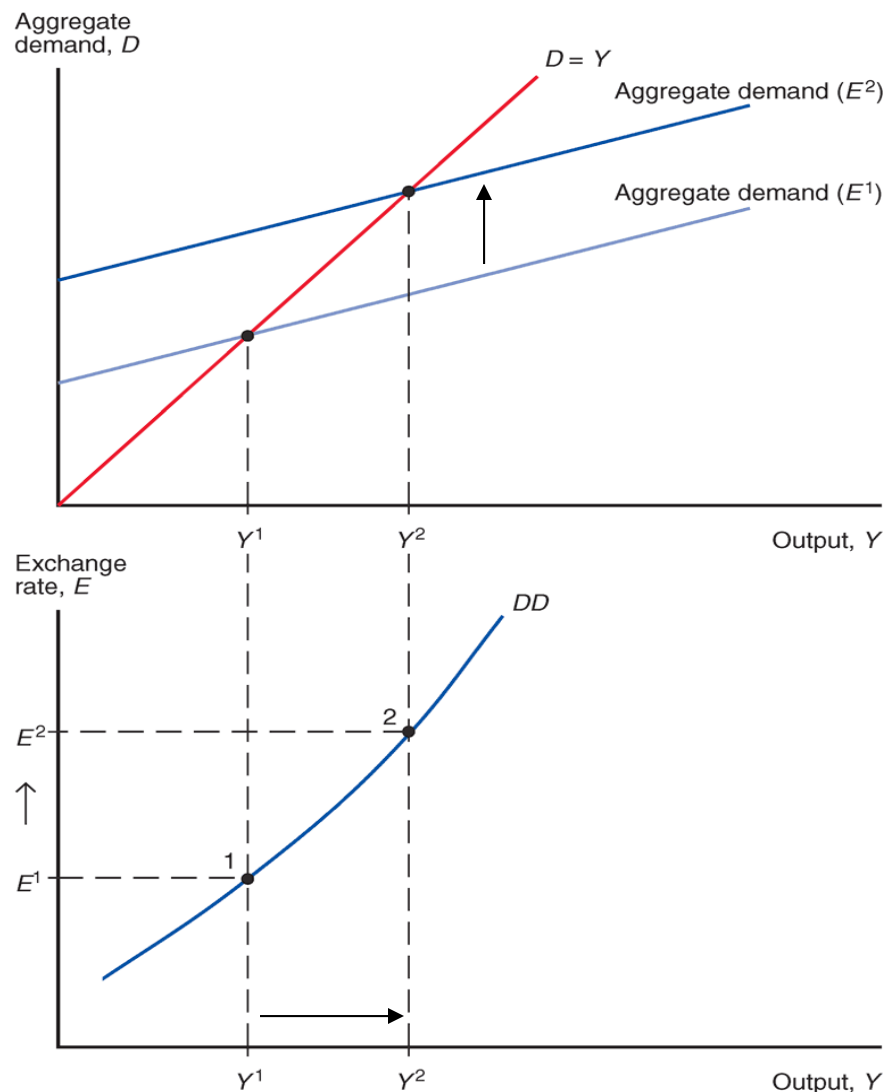
Output and Currency Depreciation



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

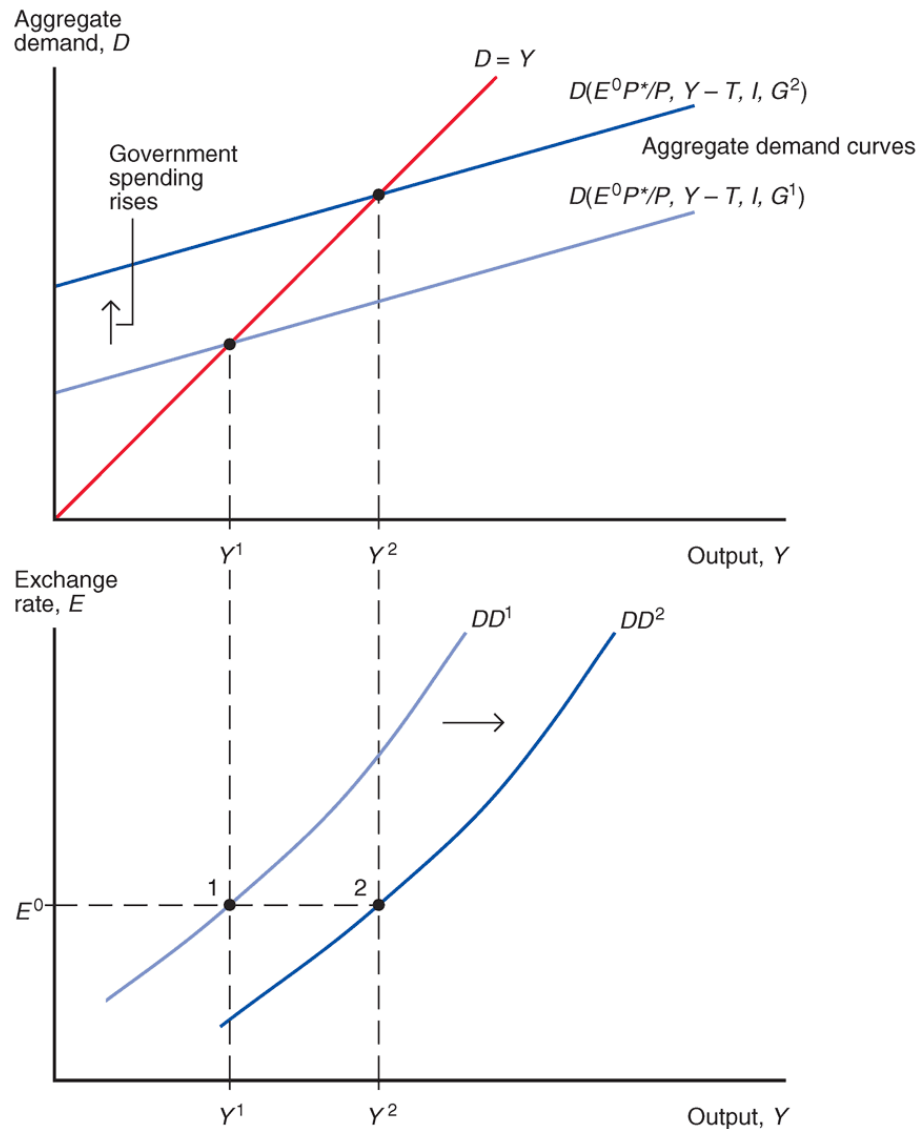
1. An depreciation of home currency means $E \uparrow$, which equals an increase of EP^*/P , with P^* and P fixed.
2. E (or EP^*/P) $\uparrow \rightarrow CA \uparrow$
3. $CA \uparrow \rightarrow D$ (of net exports) \uparrow

Derivation of DD Schedule (cont.)



- An increase of exchange rate (or a depreciation of home currency) leads to higher aggregate demand, i.e., AD shifts upward
- This results in higher equilibrium output, as shown in the lower part of the graph
- DD curve establishes a **positive relationship between real exchange rate and output in real economy** (to differentiate from asset market or financial market).

Example: Shift of DD Schedule



- An increase of government demand will shift AD curve upward.
- At every given level of exchange rate, AD is higher, which shifts DD curve outward.
- So an increase of government demand leads to an increase of output.
- Side note (*optional*): but recent empirical evidence showed this may not be true.



Derivation of AA Schedule

Interest parity condition:

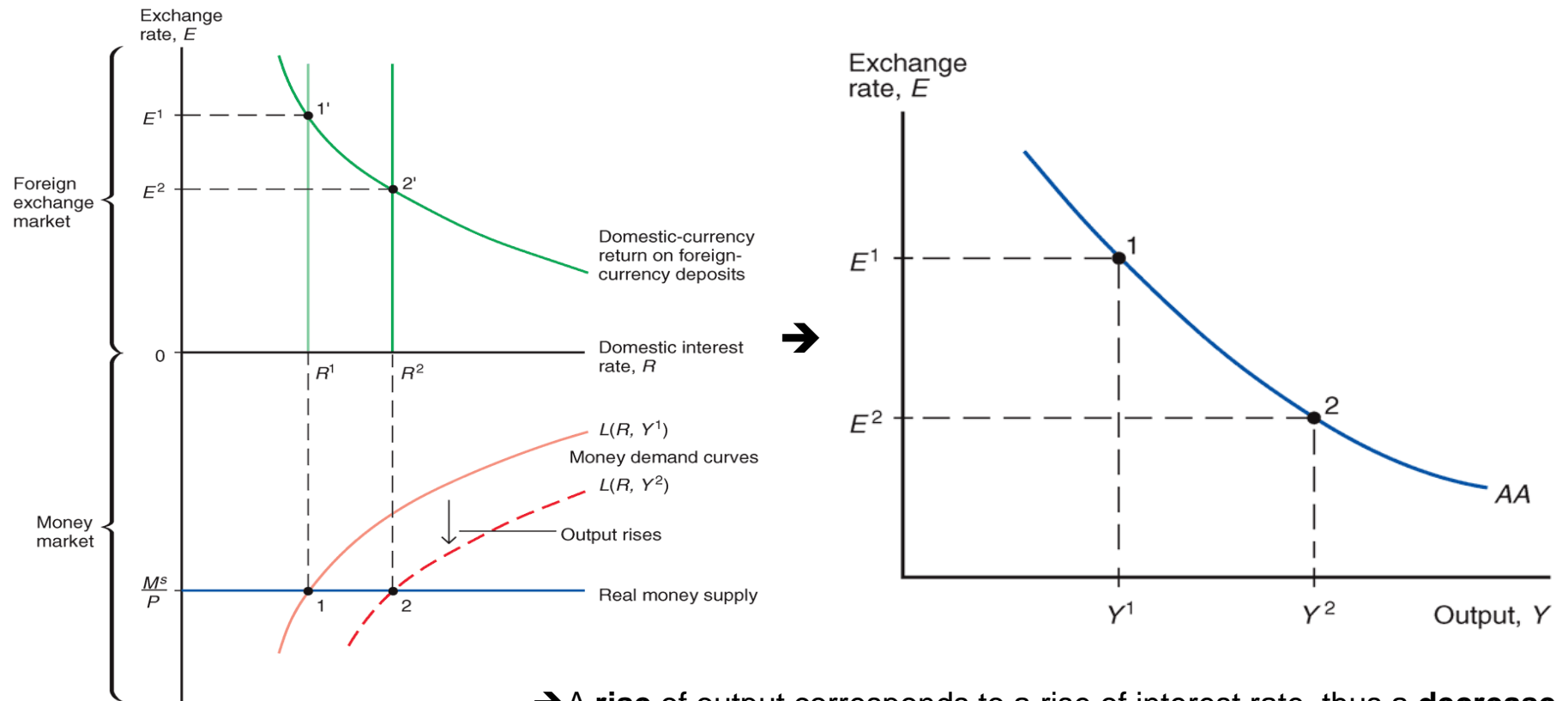
$$R = R^* + (E^e - E)/E \quad (1)$$

money market equilibrium condition:

$$M^s/P = L(R, Y) \quad (2)$$

- An increase of output Y leads to an increase of required transaction amount in the economy, and money demand increases.
- With money supply fixed and price is slow to adjust in the short run, to restore money market equilibrium, interest rate R has to rise.
- Thus, an increase of output pushes up interest rate in the short run.
- Further, according to equation (1), higher interest rate R leads to appreciation of home currency, or lower exchange rate.
- Thus, we conclude that output and exchange rate are negatively correlated in asset markets (money and FX markets) → AA schedule.

Derivation of AA Schedule (cont.)



→ A rise of output corresponds to a rise of interest rate, thus a **decrease** of exchange rate, or an appreciation of the home currency.

→ The movement between output and exchange rate are **negatively correlated**.



Factors that may shift AA schedule

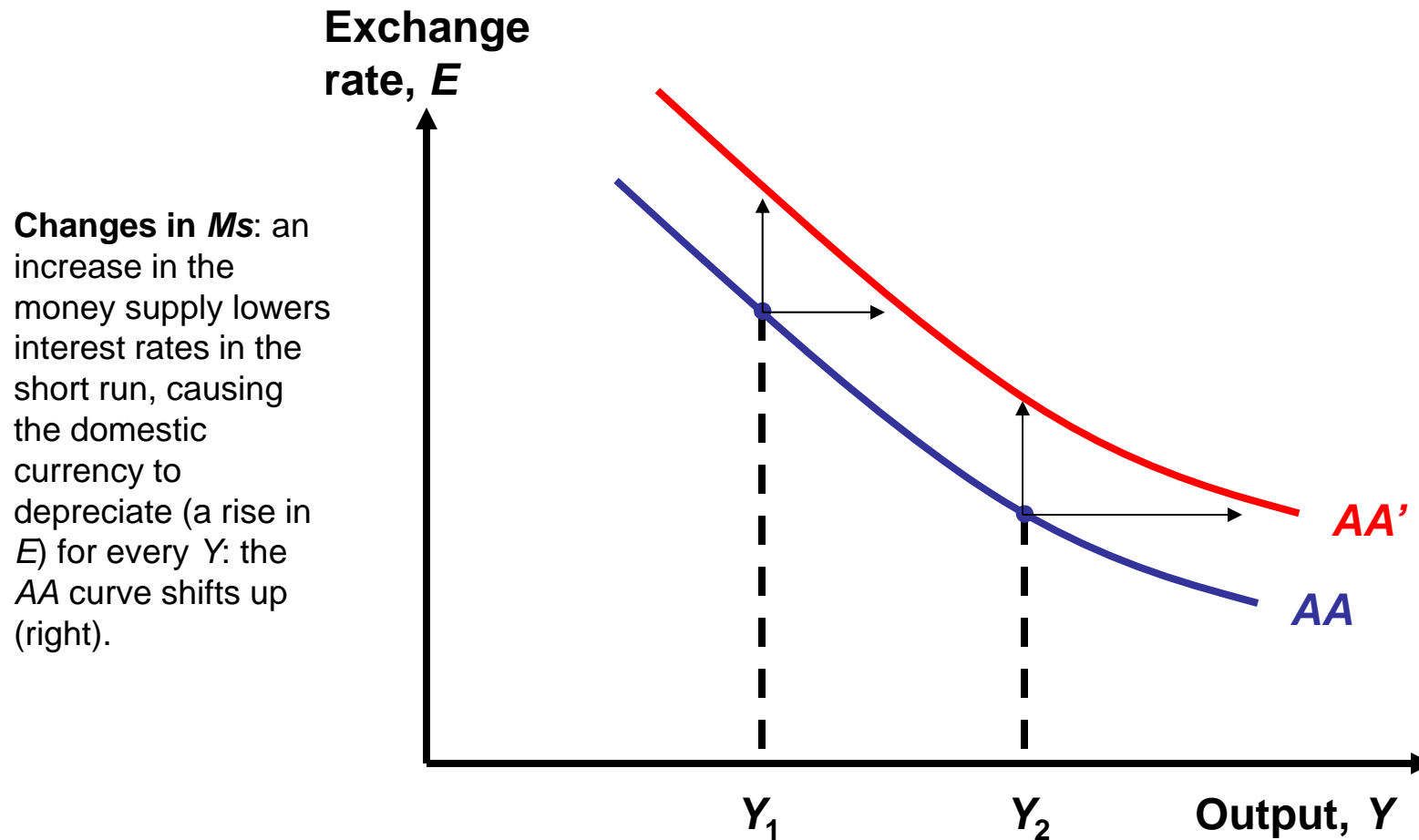
$$R = R^* + (E^e - E)/E \quad (1)$$

$$M^s/P = L(R, Y) \quad (2)$$

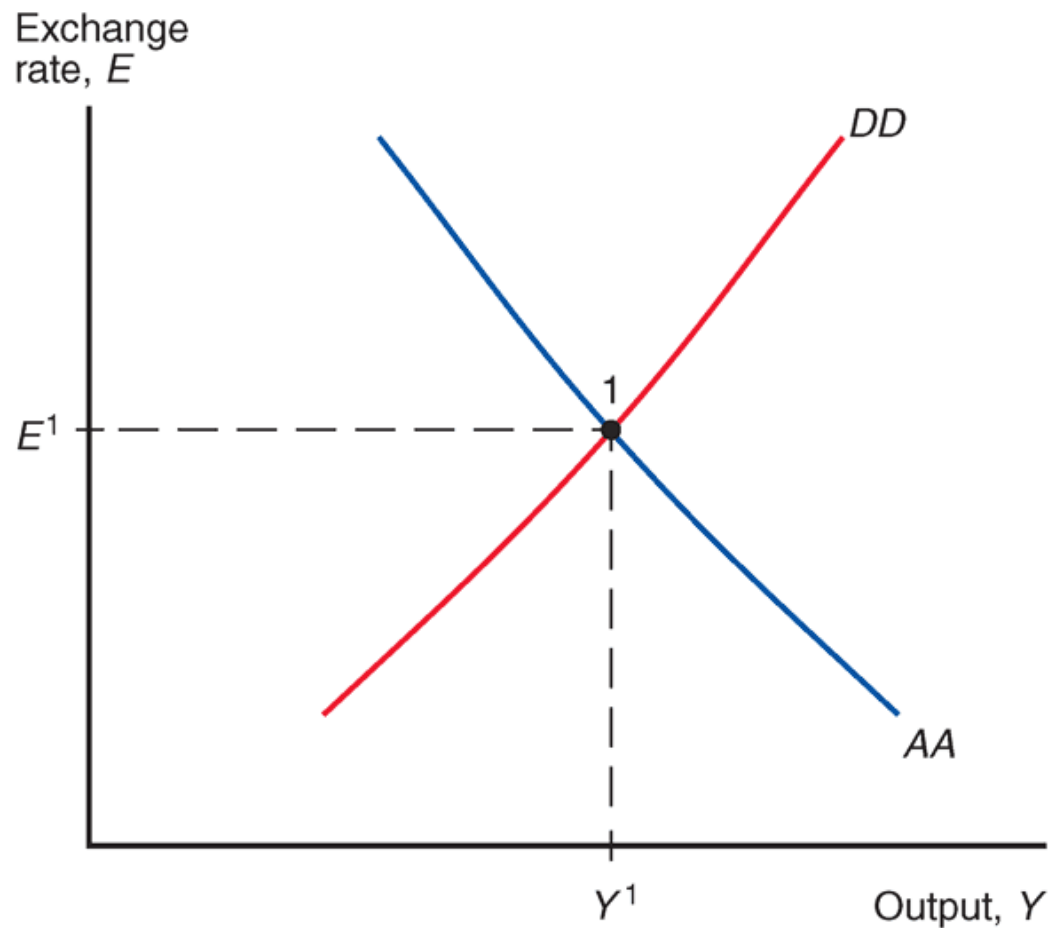
Any factors in the above two equations (**except for E and Y**):

- Money supply
- Interest rate, both home and foreign
- Any factors that may affect money demand
- Expectation of exchange rate

Example: Shifting the AA Curve

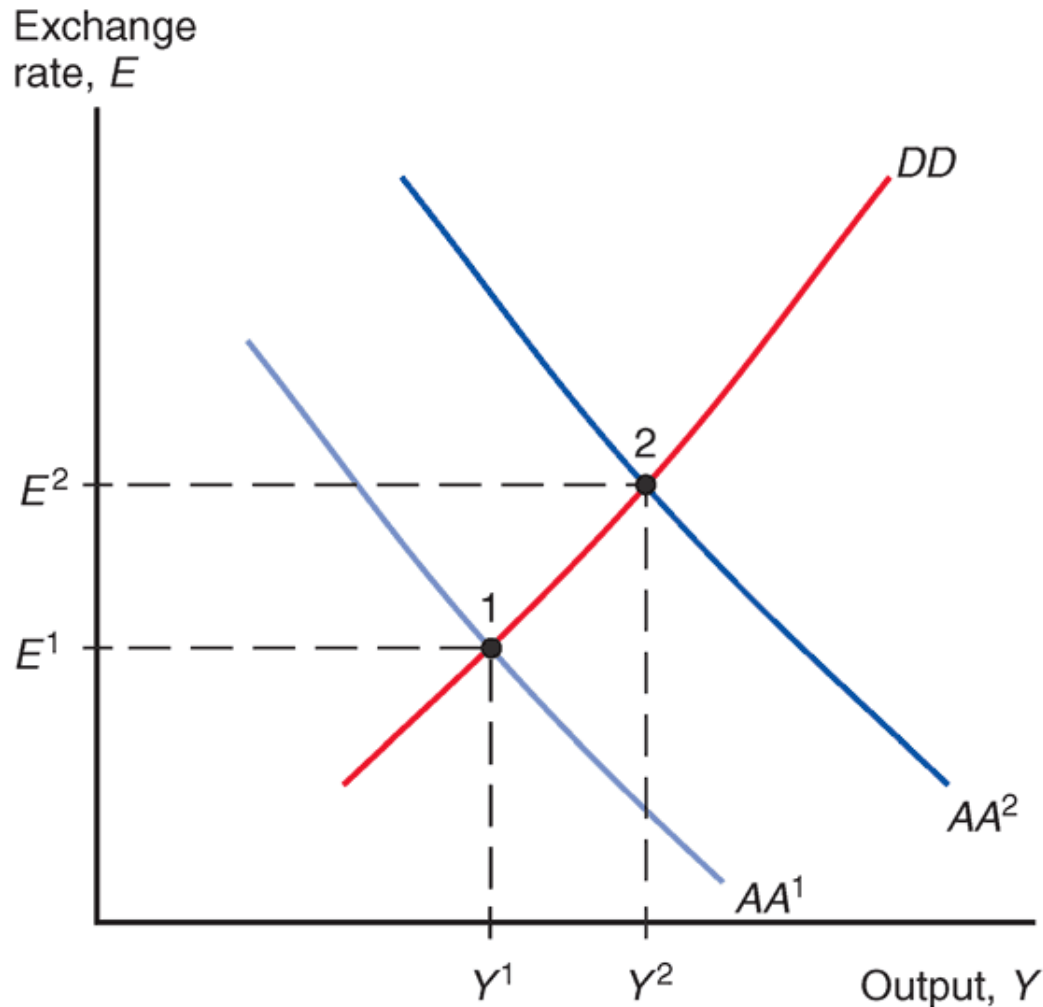


Short-Run Equilibrium: DD-AA



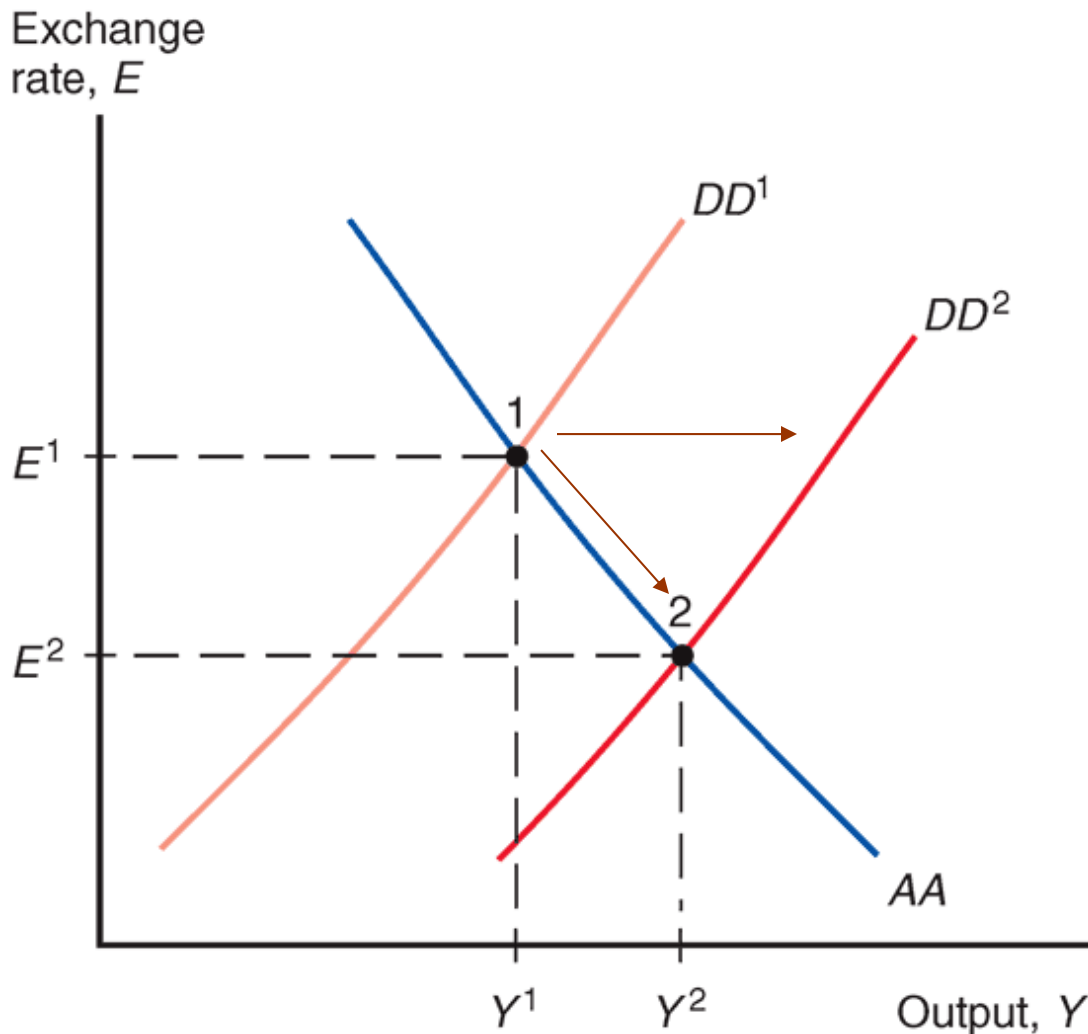
- The intersection of DD and AA schedules signal the equilibria of both real economy and asset market.
- It provides us with a framework to analyze short-run effect of fiscal policy and monetary policy in an open economy.

Effect of A Temporary Increase of Money Supply



- An increase of money supply leads to a depreciation of home currency and it shifts out AA curve
- At new equilibrium point 2, output increases from Y^1 to Y^2 .
- **So in short** - an increase of money supply leads to depreciation of exchange rate and increase of output.

Effect of A Temporary Fiscal Expansion



- A fiscal expansion equals to an increase of government spending G .
- This shifts out DD curve from DD^1 to DD^2 .
- As output increase from Y^1 to Y^2 , money demand increases, which pushes up interest rate R .
- An increase of interest rate leads to appreciation of home currency, resulting in decrease of exchange rate from E^1 to E^2 .
- **So in short**, a temporary fiscal expansion leads to appreciation of home currency and increase of output.



Application: Policies to maintain full employment

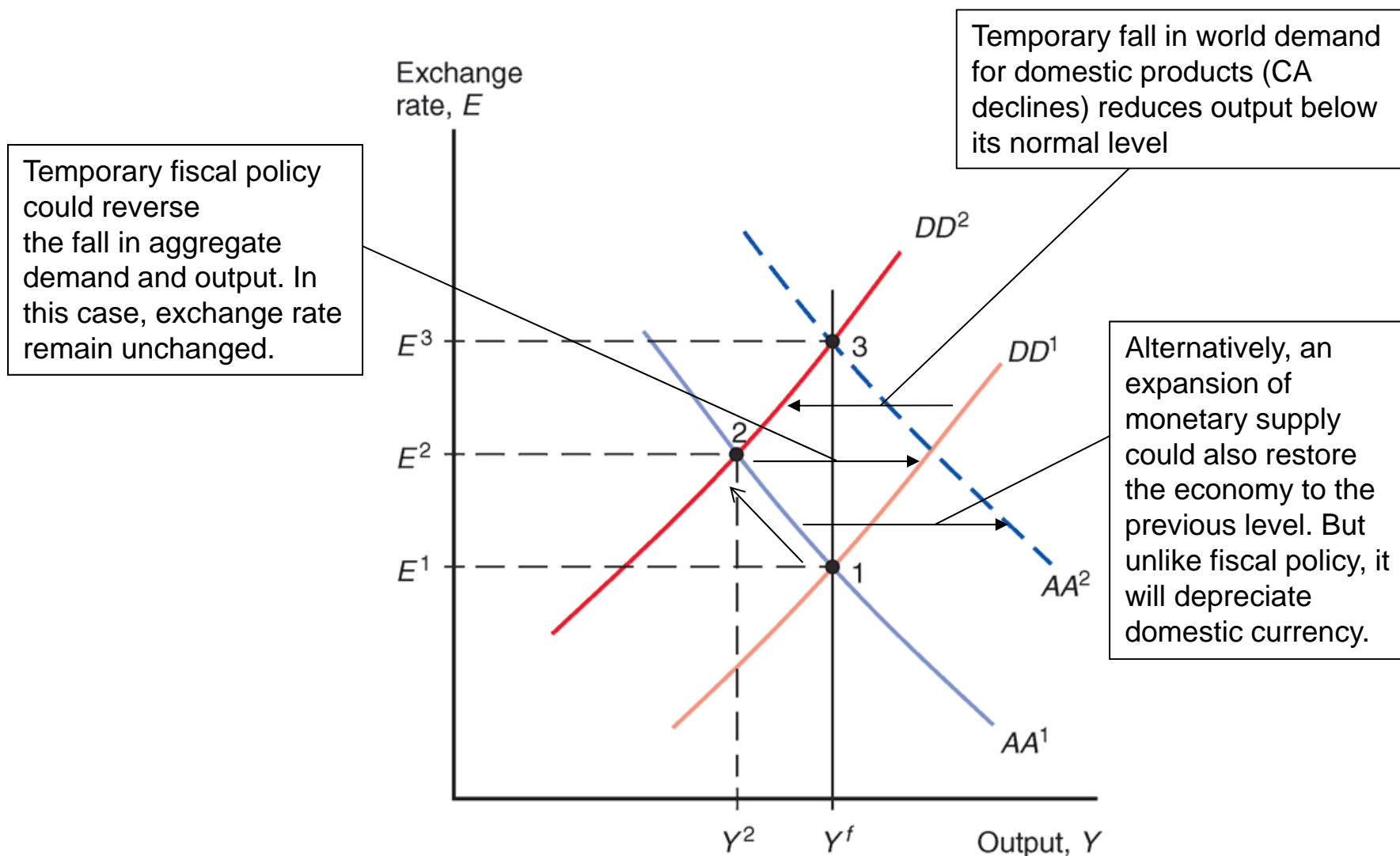
■ Case 1:

The fall of world demand for domestic products reduces aggregate demand and increases unemployment at home.

How to use monetary/fiscal policies to get the economy back on track to full employment?

This case is very similar to the situation of those export-oriented economies during the recent *Great Recession*.

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





Application: Policies to maintain full employment

■ Case 2:

A temporary increase of money demand pushes up interest rate and leads to appreciation of domestic currency, making export goods relatively more expensive and reducing current account surplus, thus decreasing aggregate demand for domestic products.

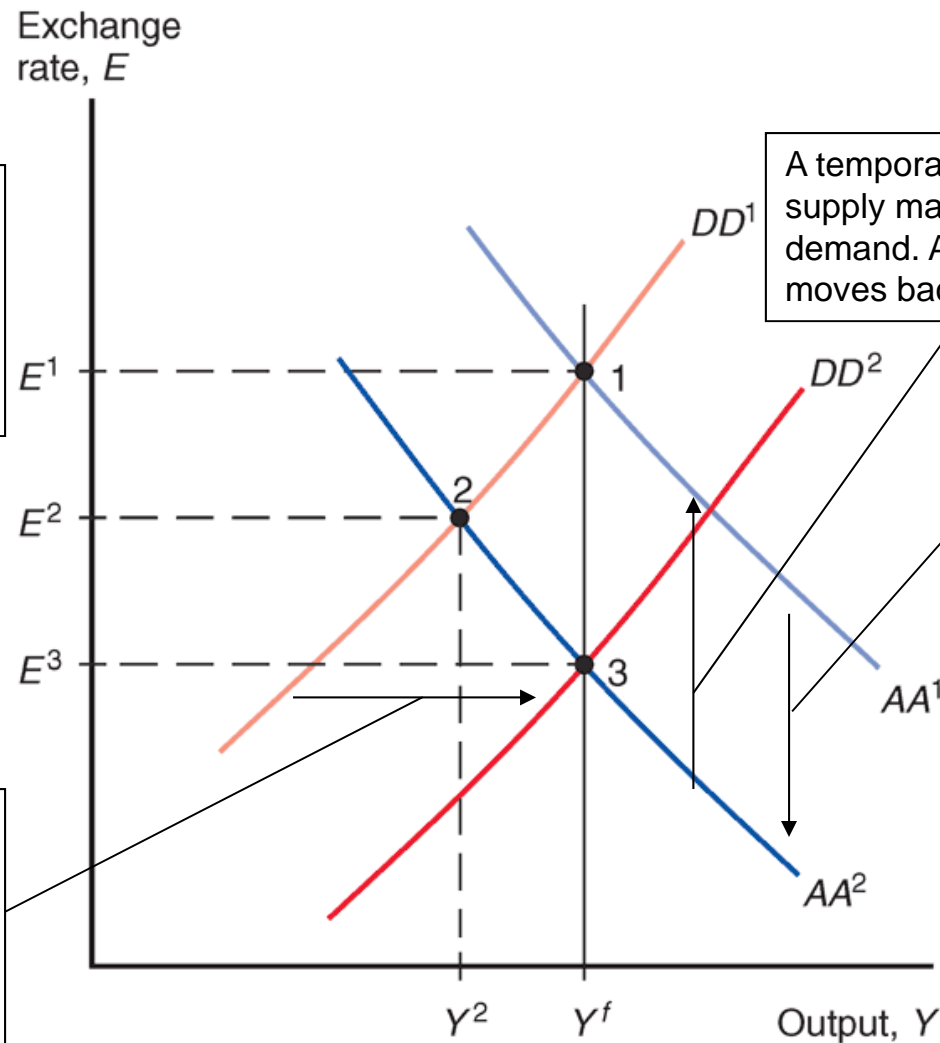
How to use monetary/fiscal policies to get the economy back to full employment level?

This situation is similar to what we have witnessed during the peak of the recent financial panic in 2008 – a sharp appreciation of US dollar due to “flight to quality”, which hurt US exports, and blocked the export channel of nascent US recovery.

Policies to Maintain Full Employment After a Money Demand Increase

→ If the **policy objective** is to stimulate US exports, then monetary policy should be preferred.

Alternatively, temporary expansion of fiscal policy could increase aggregate demand and output, but results in currency appreciation.



A temporary increase of money supply matches the rising money demand. And exchange rate moves back to the previous level.

An increase in money demand leads to an appreciation of the domestic currency



So how to choose: fiscal or monetary policy?

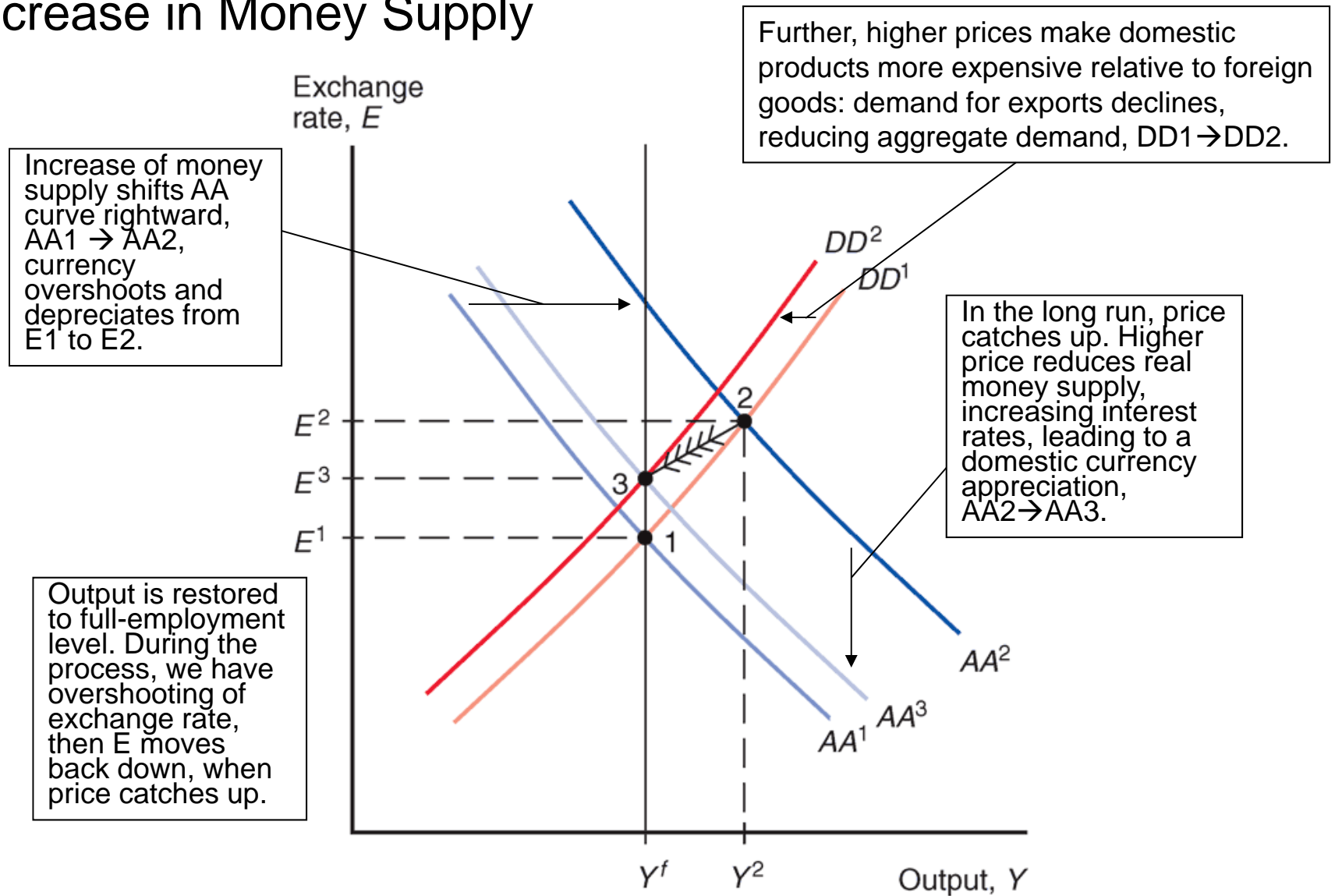
- Largely depends on what policy makers want to achieve
 - Fiscal and monetary policies have different impact on exchange rate;
 - In case 2 above, if it's the goal of US government to use lower US dollar to stimulate exports, then monetary policy is better than fiscal policy
- Also, there are differences in the swiftness of the two policy actions:
 - Fiscal policies normally have quicker effect but it's harder (or takes longer time) to be approved by politicians
 - In contrast, monetary policy can be quickly implemented but it has long lagging effect on the economy (usually takes more than a year for the monetary policy to have real impact)



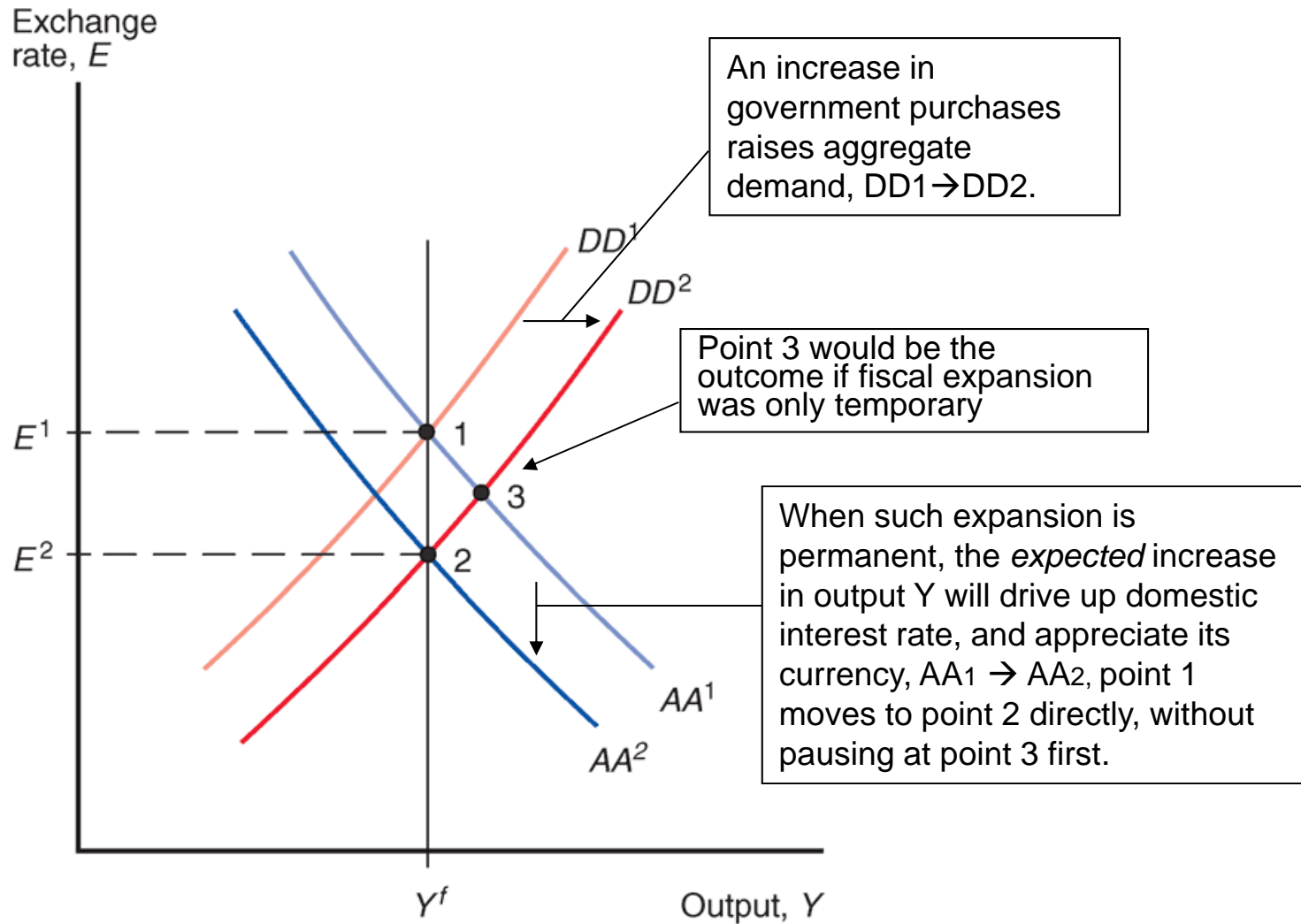
When policy shifts are permanent

- When policy changes are permanent, it will change people's long-run expectations
- Although actual long-run price changes come much later, the impact from modified expectations starts to kick in much sooner
- Permanent change in monetary policy resembles the same mechanism in *Dornbusch overshooting model* – a marriage of sticky price and rational expectations
- Permanent change in fiscal policy is also similar – again reflecting rational expectations

Long-Run Adjustment to a Permanent Increase in Money Supply



Effects of a Permanent Fiscal Expansion





For the next class...

- Please refer to course website for required readings