International Economics
Lecture 9
Exchange Rate Determination, Part III

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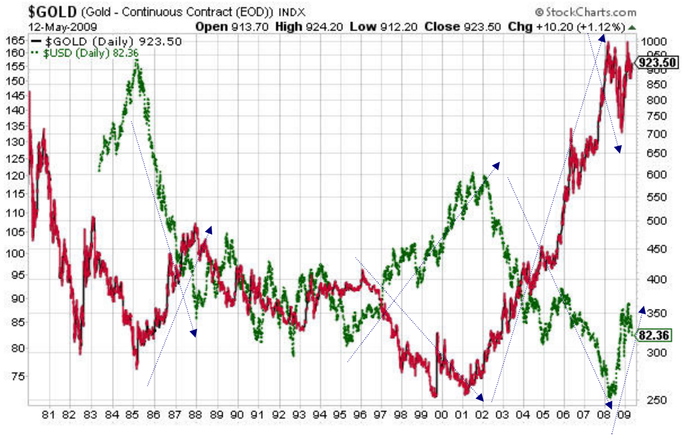
Afternoon Tea/What Happened:

Dollar and Gold, 1981-2009



Afternoon Tea/What's Happening:

Fed official calls for aggressive action

(October 5) Charles Evans, president of the Federal Reserve Bank of Chicago, called for the Fed to do more to charge up the economy, including a new program of U.S. Treasury bond purchases and possibly a declaration that it wants inflation to rise for a time beyond its informal 2% target.

"In the last several months I've stared at our unemployment forecast and come to the conclusion that it's just not coming down nearly as quickly as it should," Mr. Evans said in an interview with The Wall Street Journal Monday. "This is a **far grimmer** forecast than we ought to have," he added. As result, he said, **he favors "much more [monetary] accommodation** than we've put in place."

Dollar/Euro rate since mid September

dollar immediately moved down after the news…

Today's Plan

- Continue on "Output and Exchange Rates in the short run"
- Exchange rate regimes

Summary of where we are

- We have learned:
  Interest rate parity condition in FX market:
  $$R = R^* + (E^e - E)/E \qquad (1)$$
  Equilibrium in the money market:
  $$M^s/P = L(R, Y) \qquad (2)$$
- 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 the output Y and exchange rate E are connected.

Preview of the linkage

- First, we know current account, CA, is one of the four components of output, as in the following equation:

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

  Also as we have discussed before - exchange rate is closely related to current account, as exchange rate affects relative price of exports vs. imports – namely, currency appreciation increases imports relative to exports and currency depreciation increases exports relative to imports.

- Second, output affects interest rate through the 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 $Y^d = Y\text{-}T$, so consumption is a function of (Y-T), or **C = C(Y-T)**

- Current account is mainly affected by two factors: real exchange rate and disposable income, so we write:

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

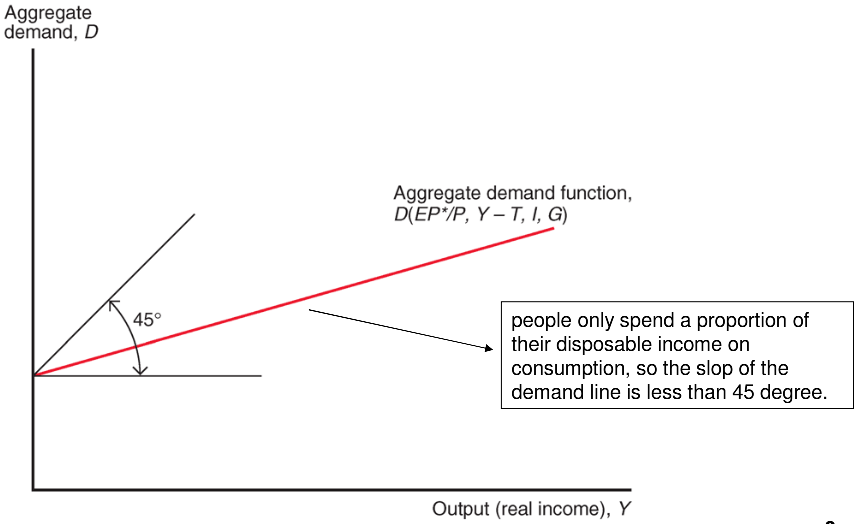
  recall EP*/P is real exchange rate, or $q_{/*}$.

- Then the aggregate demand function D can be written as:

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

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

Aggregate Demand and Output



Factors Determining the Current Account

CA = EX – IM = CA(EP*/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

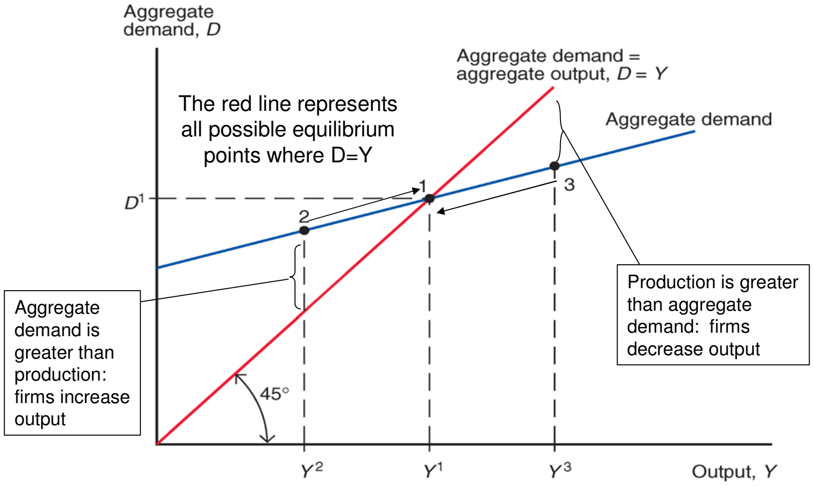
- Equilibrium is achieved when the value of output *Y* equals the value of aggregate demand *D.*

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

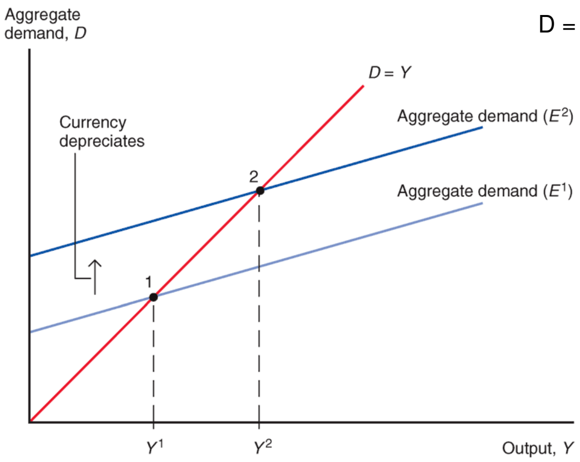
Value of production output

Aggregate demand as a function of the real exchange rate, disposable income, investment expenditure and government purchases

Equilibrium Output in the Short Run



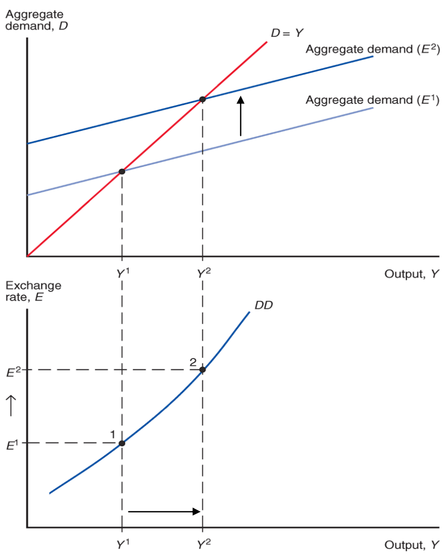
How output changes with a currency depreciation



D = D (EP*/P, Y – T, I, G)

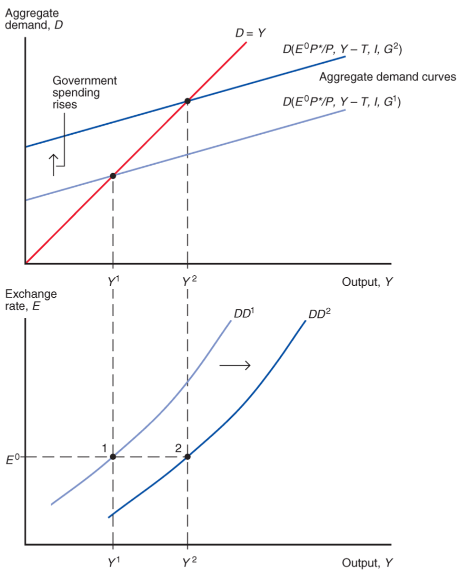
1. An depreciation of home currency means E ↑, which equals an increase in EP*/P, with P* and P fixed.
2. E (or EP*/P) ↑ → CA ↑
3. CA ↑ → D ↑

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 in the output market, 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 shifts 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.

Factors that may shift DD schedule

D = D(EP*/P, Y – T, I, G)

- Other scenarios, for example:
  - An increase in tax T
  - An increase in investment I
  - An decrease of foreign (import) price P*
  - An decrease of demand for domestic goods
  - any other factors, except for E and Y, that may affect the aggregate demand function D.

Derivation of AA Schedule

Interest parity condition:

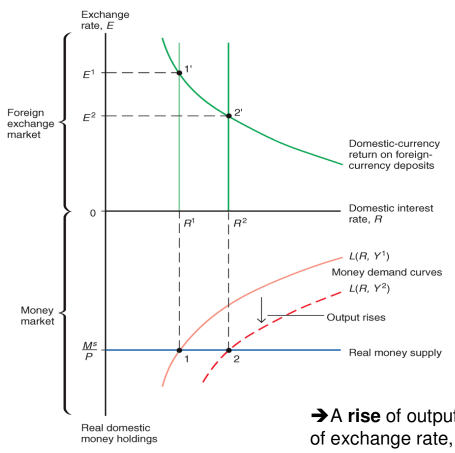
$R = R^* + (E^e - E)/E$ (1)

money market equilibrium condition:

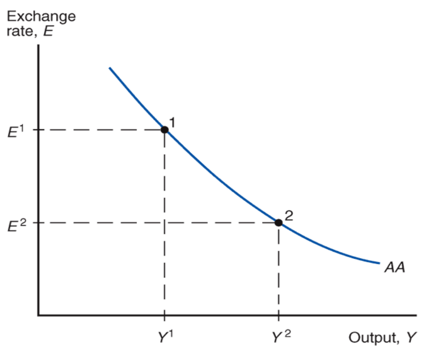
$M^s/P = L(R, Y)$ (2)

- 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 <u>negatively correlated</u> 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

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

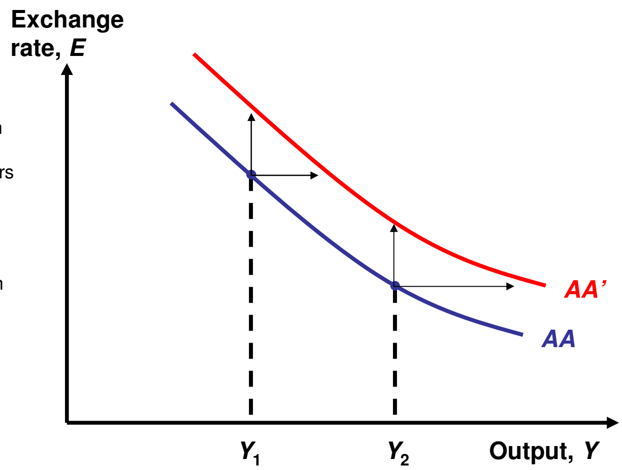
$$M^s/P = L(R, Y) \qquad (2)$$

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

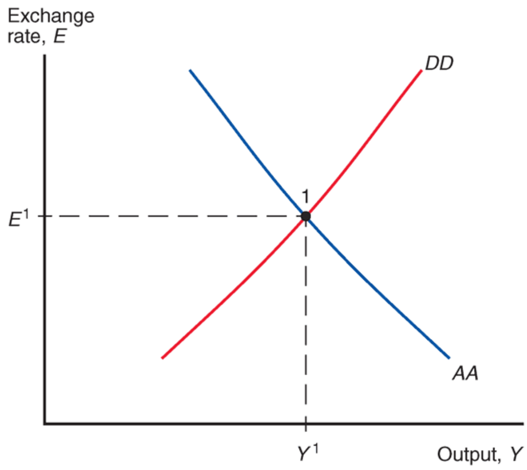
- Money supply
- Interest rate, both home and foreign
- Any factors that may affect money demand
- Expectation of exchange rate

Example: Shifting the *AA* Curve

Changes in *Ms*: an increase in the money supply lowers interest rates in the short run, causing the domestic currency to depreciate (a rise in *E*) for every *Y*: the *AA* curve shifts up (right).

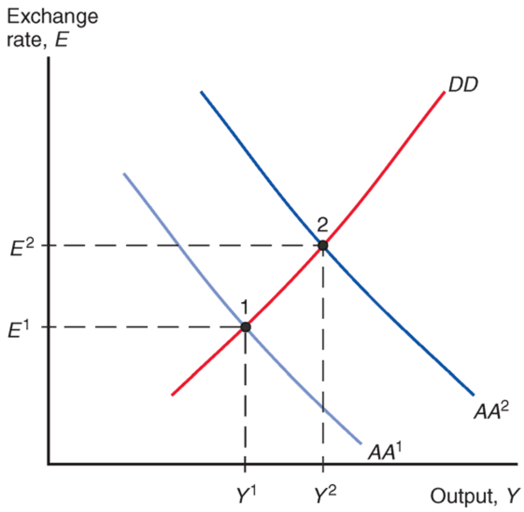


Short-Run Equilibrium: DD-AA



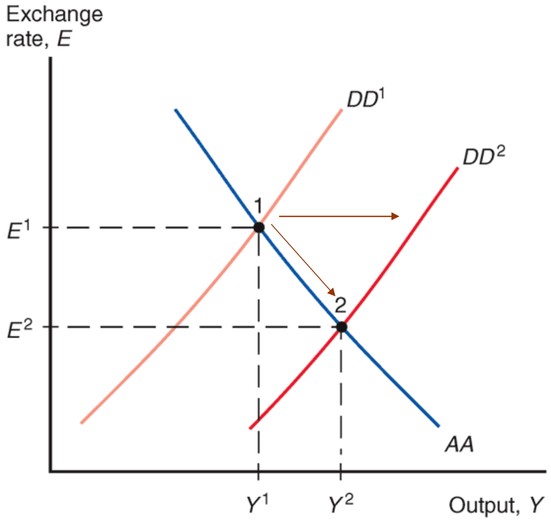
- The intersection of DD and AA schedules signal the equilibria of both real economy and asset market.
- It provides us with a framework to analyze short-run effect of fiscal policy and monetary policy in an open economy.

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 Y1 to Y2.
- **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 an increase of government spending G.
- This shifts out DD curve from DD1 to DD2.
- As output increase from Y1 to Y2, 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 E1 to E2.
- **So in short**, a temporary fiscal expansion leads to appreciation of home currency and increase of output.

Application: Policies to maintain full employment

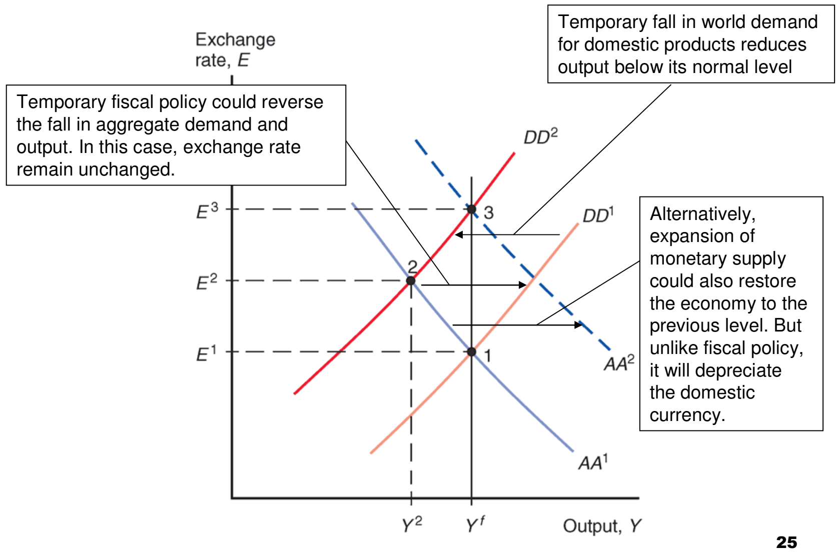
- Case 1:

  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

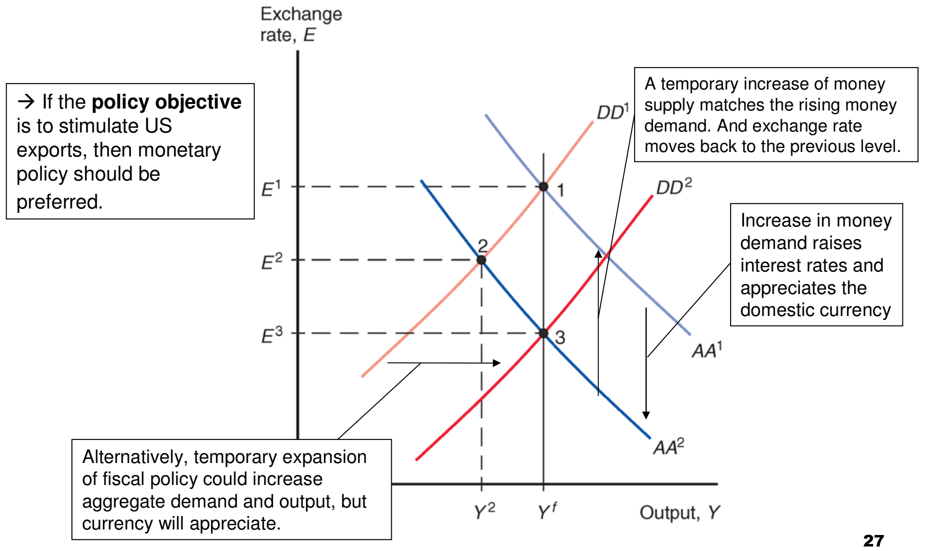
- Case 2:

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

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

  This is also similar to the situation where we have witnessed at the peak of the recent financial panic – a sharp appreciation of US dollar due to “flight to quality”, which hurt US exports, and slowed down the nascent US recovery.

Policies to Maintain Full Employment After a Money Demand Increase



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)