

FLEXIBLE EXCHANGE RATES

Along with globalization has come a high degree of interdependence. Central to this is a flexible exchange rate system, where exchange rates are determined each business day by supply and demand for currencies.

Bilateral Exchange Rate: amount of one currency that exchanges for a unit of another

examples: \$2.00 per £1 (British Pound)

\$1 per ¥125 (Japanese Yen)

Exchange Rate Index: the value of a currency indexed (relative to) those of major trading partners

Example: US Dollar Index = 82.0

currencies can:

Appreciate: one unit of that currency buys *more* foreign currency

- if now \$1.90 per £1

appreciation \Rightarrow \$1.80 per £1

Depreciate: one unit of that currency buys *less* foreign currency

- in 1985: \$1.04 per £1 (almost dollar - pound parity)

- in 2007: \$2.00 per £1

Balance of Trade (Net Exports)

= Exports (from US) - Imports (to US)

Exports = f(exchange rate, *foreign* income)

Imports = f(exchange rate, US income)

Intuition: A strong economy will bring surpluses in key measures (federal budget AND balance of trade) \Rightarrow if US grows faster than its trading partners, US Balance of Trade *should* improve, resulting in a surplus, but imports are subtracted from this measure (\$ go overseas)

Reality: rapid US income $\uparrow \Rightarrow$ large \uparrow imports

Slower foreign income growth \Rightarrow small \uparrow exports

\Rightarrow ***larger deficit as imports grow relative to exports***

How to eliminate/reverse Balance of Trade Deficit:

- Need to stimulate exports BUT *we* can't manipulate *foreign* income
- Alter our exchange rate

DOLLAR DEPRECIATION CAN DO THIS (other things being equal)

ILLUSTRATION OF DOLLAR DEPRECIATION

- show effects of strong and weak \$ on exports/imports

IMPORTS: British Auto costing £10,000

- cost in US \$ depends on exchange rate

Strong \$: \$1.80 per £1 : £10,000 x $\frac{\$1.80}{\text{£1}}$ = **\$18,000**

Weak \$: \$2.00 per £1 : £10,000 x $\frac{\$2.00}{\text{£1}}$ = **\$20,000**

\$ Depreciation: ↑P imports ⇒ ↓Q^D imports
(other things being equal – like US income)

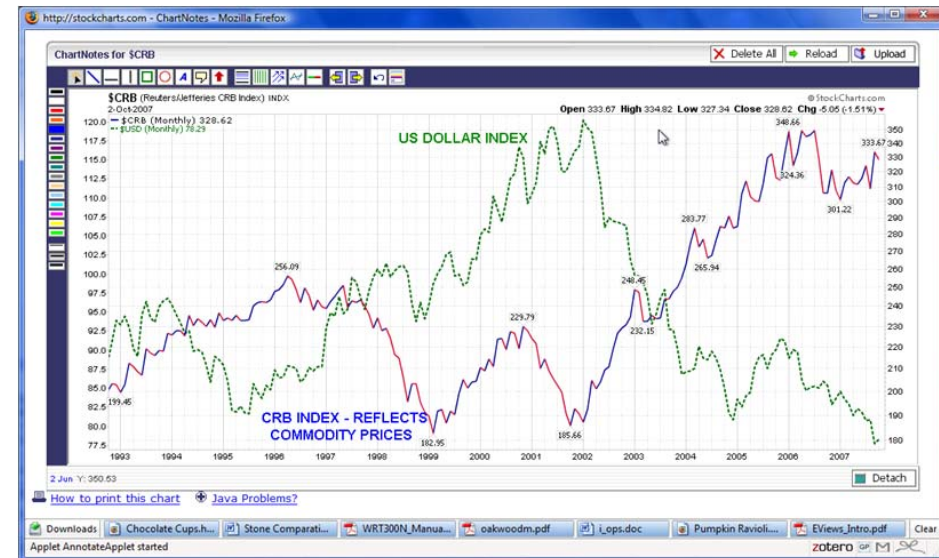
DOLLAR DEPRECIATION AFFECTS DOMESTIC INFLATION

\$ Depreciation tends to make US inflation worse

- Imports become more expensive, and
- US producers are more able to raise their prices

It also tends to raise global commodity prices (ex: oil, gold, silver, copper)

- Commodities are priced in US \$
- As the US \$ depreciates, commodities become less expensive in terms of appreciating currencies, raising their demand and pushing up their *dollar* prices



EXPORTS: US Personal Computer - cost \$1,000
- cost in Britain (£) depends on exchange rate

$$\text{strong \$: } \$1.80 \text{ per } \text{£}1 : \$1,000 \times \frac{\text{£}0.556}{\$1} = \text{£}556$$

(note: to get 0.556, divide 1.80 into 1)

$$\text{weak \$: } \$2.00 \text{ per } \text{£}1 : \$1,000 \times \frac{\text{£}0.5}{\$1} = \text{£}500$$

\$ Depreciation: $\downarrow P$ exports \Rightarrow $\uparrow Q^D$ exports
(other things being equal – like foreign income)
- *How much Q rises* is another question

Depreciation lowers the cost of US labor, given US wages (its foreign currency value falls)

Putting this together:

DOLLAR DEPRECIATION

$\uparrow P$ imports \Rightarrow $\downarrow Q^D$ imports

$\downarrow P$ exports \Rightarrow $\uparrow Q^D$ exports

IMPROVED BALANCE OF TRADE

- The dollar cost of land and companies in US becomes *less expensive* in terms of foreign currencies

Ex: \$10 mil building

If the Japanese Yen appreciates by 10% (so US \$ depreciates relative to Yen by 10%), is *as if* the dollar cost of building is now \$9 mil

1. Dollar depreciation makes foreign investment in the US *less expensive*
- This can be important at times of threats to import restrictions (like US in 1980s – car imports)
2. Multinational corporations make money from their overseas sales when they convert back to dollars in countries whose currencies have appreciated relative to the dollar
– **CURRENCY CONVERSION PROFIT**
3. This tends to help the stock prices of US multinationals, since as the \$ depreciates their profits rise due to currency conversion profit

APPLICATION: EFFECT OF LAGS ON THE BALANCE OF TRADE (the J-Curve)

Dollar depreciation will help to decrease a balance of trade deficit, other things being equal, as exports rise and imports fall

Initially, however, the balance of trade deficit will typically worsen. To see this, rewrite the balance of trade equation:

$$NX = P_x \cdot X - P_m \cdot M$$

where X is the number (volume) of goods exported, M is the number (volume) of goods imported, P_x is the dollar price of US exports, and P_m is the *dollar* price of imports into the US.

Note that $P_m = e \cdot P_f$, the exchange rate (e) times the *foreign* currency price of imports (P_f). Here, the exchange rate is \$/foreign currency (see British auto import example earlier).

The NX equation can be rewritten as:

$$X - \frac{e \cdot P_f}{P_x} \cdot M$$

In this equation, the coefficient of M is the **real exchange rate** (and e is the *nominal* exchange rate).

The real exchange rate expresses the prices of foreign goods relative to US prices, and is one measure of US international competitiveness.

- If the real exchange rate equals 1.0, US goods are as expensive as foreign goods, and there is **Purchasing Power Parity**.
- If the real exchange rate exceeds 1.0, foreign prices are higher than US prices, making US goods more globally competitive.

Q: How does dollar depreciation *initially* worsen the balance of trade deficit?

A: The volume of goods imported and exported changes *more slowly* than the (nominal) exchange rate. *As the dollar cost of foreign currency rises, the value of imports rises relative to the value of exports, worsening the trade deficit.*

Eventually, *after about 18 months*, the volume of exports and imports adjusts to the new prices, so exports rise and imports fall, and the trade balance improves. This is the J-Curve effect.

SUPPLY AND DEMAND FOR DOLLARS

The supply and demand for dollars is related to currency holdings by companies, speculators, central banks AND:

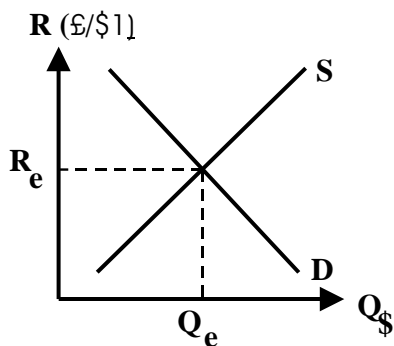
Supply of \$: related to *imports* into US

- To import, importers trade (supply) \$, demand foreign currency to pay for the foreign good

Demand for \$: related to *exports* from US

- Foreigners supply their currency and demand \$ to get the US goods (exports)

If the exchange rate is expressed as foreign currency per \$1, get downward-sloping demand and upward sloping supply relative to the quantity of dollars



Exercise: Using the import and export example earlier (British auto and US computer), explain why demand for \$ is downward sloping and supply for \$ is upward sloping

Starting with \$1.80 per £1 (or £0.556/\$1), the dollar depreciates to \$2.00 per £1 (or £0.5/\$1), we saw that: (1) Imports fall, and: (2) Exports rise.

DEMAND: Exports rise as their £ prices fall. The increase in exports raises the number of dollars demanded, so quantity of \$ demanded rises as the dollar depreciates (move down on R axis)

SUPPLY: Imports fall as their \$ prices rise. This decrease in imports lowers the number of dollars supplied, so quantity of \$ supplied falls as the dollar depreciates (move down on R axis)

APPLICATION: Relationship between exchange rate and domestic interest rates

Consider foreign investment in US of a \$1,000 CD @ 5% interest. At year's end, have \$1,050.

If US interest rates fall *relative to those in other countries* (ex: easy monetary policy), *less* investment income will be generated by the CD

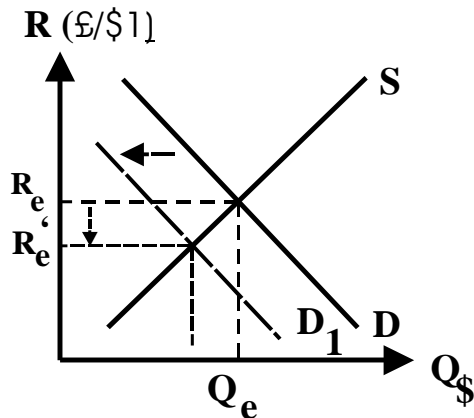
⇒ Investments in US - *less* attractive to foreigners

⇒ Foreigners will buy fewer US assets

⇒ ↓ D for bonds, CD's ⇒ ↓ D for \$

⇒ ↓ R_e (\$ depreciation)

RESULT: SMALLER CAPITAL INFLOW INTO US



APPLICATION: How to Stabilize a Country's Exchange Rate

To stabilize or raise its exchange rate, a country can raise interest rates BUT

- This will tend to slow domestic economic activity, possibly causing the risk of a recession

Interest Rates and Exchange Rates tend to move in the same direction (absent rising inflation)

APPLICATION: Relationship between exchange and inflation rates

If US inflation is high *relative to rates in countries we compete with*, either: (1) our exports rise in \$ price, making them less competitive; or (2) the *real* \$ value of investment in US suffers (compared to returns in other countries)

⇒ ↓ Exports + ↓ D for investments in US ⇒ ↓ D for \$

⇒ ↓ R_e (\$ depreciation)

Inflation and Exchange Rates tend to move in opposite directions

APPLICATION: Currency Risk of Investing in Foreign Countries

Currency Risk



A form of risk that arises from the change in price of one currency against another. Whenever investors or companies have assets or business operations across national borders, they face currency risk if their positions are not hedged.



For example if you are a U.S. investor and you have stocks in Canada, the return that you will realize is affected by both the change in the price of the stocks and the change of the Canadian dollar against the U.S. dollar. Suppose that you realized a return in the stocks of 15% but if the Canadian dollar depreciated 15% against the U.S. dollar, you would realize no gain.

Academic studies of currency risk suggest - although, without absolute certainty - that investors bearing currency risk are not compensated with higher potential returns, meaning it is essentially a needless risk to bear.

If the \$ depreciates (or is *expected* to depreciate), given interest & inflation rates, the *foreign currency value* of the \$1,000 @5% *falls*

⇒ Investment in US - relatively less attractive

So, when the \$ is expected to depreciate:

⇒ ↓ D for \$ (investors want less US investment)

⇒ ↑ S of \$ (some unload US investments)

⇒ ↓ R_e (\$ depreciation)

Demand for US stocks and bonds falls, lowering both stock and bond prices (which *raises* interest rates)

On days when US stock and bond prices both decline and the dollar's value falls, this is an indication that the "hot" money has left the US for other venues

Critical elements to focus on: imports and exports

Q1: Does your firm use imported inputs?

If so, these are more expensive ⇒ ↑ costs

Q2: Does your firm export?

If so, product cheaper to foreigners ⇒ ↑ revenue as the amount sold rises and get currency conversion profit.

Q3: Was your firm thinking of locating overseas?

If so, dollar depreciation may well preserve your job.

Application: Fed rate cuts in September 2007

The Fed controls a short-term interest rate (Fed funds rate). When they cut that short-term rate by 50 basis points in 9/07, long-term rates unexpectedly rose.

- Lower short-term rates generally depreciate a currency
- BUT the Fed's rate cut reduced the likelihood of a recession. Economic strength generally raises both interest rates and the exchange rate

Q: When do long-term interest rates rise and the US \$ depreciate?

A: When expected inflation rises. That was the bond market's interpretation of the likely effects of the greater-than-expected Fed rate cut.

Addendum #1: The Devil's Deal

Normally, the very large balance of trade deficit of the US would weaken the dollar ⇒ **dollar depreciation**

BUT

The central banks of Japan and China don't want that

Why?

They wouldn't be able to sell as many goods to the US, causing slower growth in *their* countries.

- To avoid this, they have purchased large amounts of US dollars and US Treasury Bonds (that help to finance our federal budget deficits)

Q: What have the effects of this been?

A1: When these foreign central banks buy US dollars and bonds, they trade their currencies for US dollars, which *strengthens the US dollar relative to their currencies* (keeping *their* currencies weaker than would have been)

- By itself, this helps the volume of their exports to the US

A2: The greater demand for US bonds by these central banks raises bond prices in the US, resulting in *lower interest rates* here

- Their bond purchases also tend to strengthen the US dollar, while the lower interest rates have the opposite effect (as would any easing by the US Federal Reserve)

A3: As this has allowed US interest rates to remain *lower* than they would otherwise have been, this has caused income in the US to be higher than it would have been

- Higher US income raises the demand for goods (imports) from China and Japan, offsetting the interest rate effect in A2 to some extent

A4: The artificially weak Yuan has provided incentives for US firms to construct factories and purchase equipment in China as the dollar cost is very attractive

- While total investment in equipment and software for the US GDP accounts has been very weak in late 2006 and 2007, the total amounts spend by US firms in these categories has been very large – it just hasn't been in the US (where it would have counted for GDP)

EXERCISE 1:

What if the Japanese and Chinese central banks stopped purchasing as many US dollars and Treasury Bonds? Outline the effects on the US, Japan, and China in terms of exchange rates, their balances of trade, interest rates, and economic growth

EXERCISE 2:

Outline the effects of China's central bank allowing the Chinese Yuan to float freely against the US dollar.

Addendum #2: Misplaced Gripes by Executives

When the US dollar was appreciating relative to other currencies several years ago, US manufacturing executives complained very vociferously about how this made US manufacturing exports non-competitive

- Their evidence: Exports were declining

Were they correct?

US Exports = f(exchange rate, foreign income)

Other things equal, dollar appreciation hurts US exports

Q: Were other things equal?

A: No. Part of the reason the US dollar was appreciating was that our economy was growing faster than those of our trading partners. So, not only was the exchange rate effect in force, but so too was the impact of declining foreign income.

Recall:

- As foreign income falls, US exports also fall (other things being equal)

So, the perceived impact of an appreciating dollar on US exports was overstated, since falling foreign income was also at work

⇒ Eventual dollar depreciation did not help exports as much as the executives had believed it would

Addendum #3: The Carry Trade

Currency Carry Trade



A strategy in which an investor sells a certain currency with a relatively low [interest rate](#) and uses the funds to purchase a different currency yielding a higher interest rate. A trader using this strategy attempts to capture the difference between the rates - which can often be substantial, depending on the amount of leverage the investor chooses to use.



Here's an example of a "yen carry trade": let's say a trader borrows 1,000 yen from a Japanese bank, converts the funds into U.S. dollars and buys a bond for the equivalent amount. Let's assume that the bond pays 4.5% and the Japanese interest rate is set at 0%. The trader stands to make a profit of 4.5% (4.5% - 0%), as long as the [exchange rate](#) between the countries does not change. Many professional traders use this trade because the gains can become very large when leverage is taken into consideration. If the trader in our example uses a common leverage factor of 10:1, then she can stand to make a profit of 45%.

The big risk in a carry trade is the uncertainty of exchange rates. Using the example above, if the U.S. dollar were to fall in value relative to the Japanese yen, then the trader would run the risk of losing money. Also, these transactions are generally done with a lot of leverage, so a small movement in exchange rates can result in huge losses unless hedged appropriately.

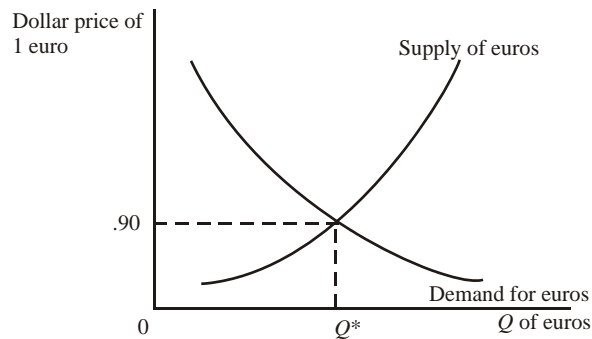
PRACTICE QUESTIONS

The relative prices of Japanese goods to Americans fall when the:

- A) yen appreciates.
- B) dollar appreciates.
- C) inflation rate in the United States is higher than the inflation rate in Japan, and there are flexible exchange rates.
- D) inflation rate in Japan is higher than the inflation rate in the United States and there are fixed exchange rates.

All of the following add to the demand for U.S. dollars *except*:

- A) long-term capital inflows.
- B) foreign travel by United States citizens.
- C) exports of commodities from the United States.
- D) travel by foreigners on United States airlines.



Refer to the above graph. If currency traders think the European economy will experience a recession and the U.S. economy will not, then this event will most likely cause the:

- A) euro to appreciate.
- B) euro to depreciate.
- C) U.S. dollar to depreciate.
- D) the supply of euros to decrease

If the exchange rate between the yen and the U.S. dollar is 100 yen = \$1, how much would a camera that costs 10,550 yen in Japan cost in the United States?

- A) \$10.55.
- B) \$15.50.
- C) \$105.50.
- D) \$1,055.
- E) \$1.05.

More German companies start to invest in the United States. This will lead to a(n)

- A) decrease in the demand for dollars and an increase in the demand for marks.
- B) increase in the supply of dollars and a decrease in the demand for marks.
- C) increase in the demand for dollars and a decrease in the supply of marks.
- D) increase in the demand for dollars and an increase in the supply of marks.

Why does the depreciation of a country's currency tend to increase its price level?

- A) Domestic buyers tend to substitute imports for domestic products.
- B) A currency depreciation makes a country's products less competitive in world markets, so exports fall.
- C) A currency depreciation makes imported inputs more expensive.
- D) A currency depreciation makes imported inputs less expensive.