
Open Economy Macroeconomics

Exchange Rates, Interest Rates and Macro Policy

Outline

1. Exchange Rates
 2. Purchasing Power Parity
 3. Uncovered Interest Parity
 4. Monetary and Fiscal Policy in Open Economies
- Textbook Readings: Ch. 18 & Ch. 19 pp. 676-681

How Economies Are Connected?

- **Goods** flow between nations

- USA send corn to China
 - China sends flat screen TVs to USA

- **Services** flow between nations

- USA processes European transactions via Mastercard
 - India fields questions on iPad usage via call centers

- **Financial assets** flow between nations

- China's central bank (PBoC) bought billions of U.S. Treasuries
 - U.S. companies invest billions of dollars building factories in China



Balance of Payments

- Records all transactions with foreign economic agents over a period of time
- 3 main types of transactions:
 - Exports and imports of **G&S** → Current Account (CA)
 - Sale and purchase of **financial assets** → Financial Account (FA)
 - Certain **transfers of wealth** (small) → Capital Account (KA)
- Balance of payments (BoP) has to balance:

$$\text{BoP} = \text{CA} + \text{FA} + \text{KA} = 0$$

Why Does the BoP Has to Balance?

- CA captures transactions of G&S → Think EX – IM
 - Related to net exports (or the trade balance), but is not the same
 - Recall how do we go from GDP to GNP?
 - NFIA (Net Factor Income from Abroad) = FP from ROW – FP to ROW
 - To obtain GNP, we add NFIA to GDP
 - $CA = NX + NFIA$
- FA captures how that is financed → Think Inflows – Outflows
 - A measure of international lending and borrowing
 - International financial flows

Why Does the BoP Has to Balance? Example

- US people buy \$475b worth of Chinese goods every year
- Chinese people buy \$115b worth of US goods every year
- What does China do with the rest \$360b?
- China receives \$360b of US assets
 - PBoC buys T-bonds,
 - Chinese elites buy US stocks and Seattle real state

CA Deficit/Surplus → FA Surplus/Deficit

- A **CA deficit** must be offset by an **FA surplus** (e.g. US)
 - In September 2017, US bought \$43b more G&S than sold to ROW
 - Therefore, ROW purchases of US assets must have been \$43b higher than US purchases of ROW assets
 - ❖ US invests in factories in China and buys European stocks
 - ❖ ROW buys US Treasuries, shares of US companies, houses in Florida
- A **CA surplus** must be offset by an **FA deficit** (e.g. China)

Saving and Investment in an Open Economy

- In a closed economy, we saw that:

$$S = I$$

- In an open economy we have (CA identity):

$$CA = S - I \quad \text{or} \quad I = S - CA$$

- What does the CA identity say?

Net Foreign Asset Position

- BoP records a **flow** (not a stock)
- Net foreign asset (NFA) position is a **stock**
 - Value of US-owned foreign assets - Value of foreign-owned US assets
 - Also called Net International Investment (NII) position or External Wealth
 - A CA deficit reduces NFA position and vice versa
 - $NFA < 0 \rightarrow$ Debtor country
- US is a **net debtor** to the world, China is a **net lender** to the world

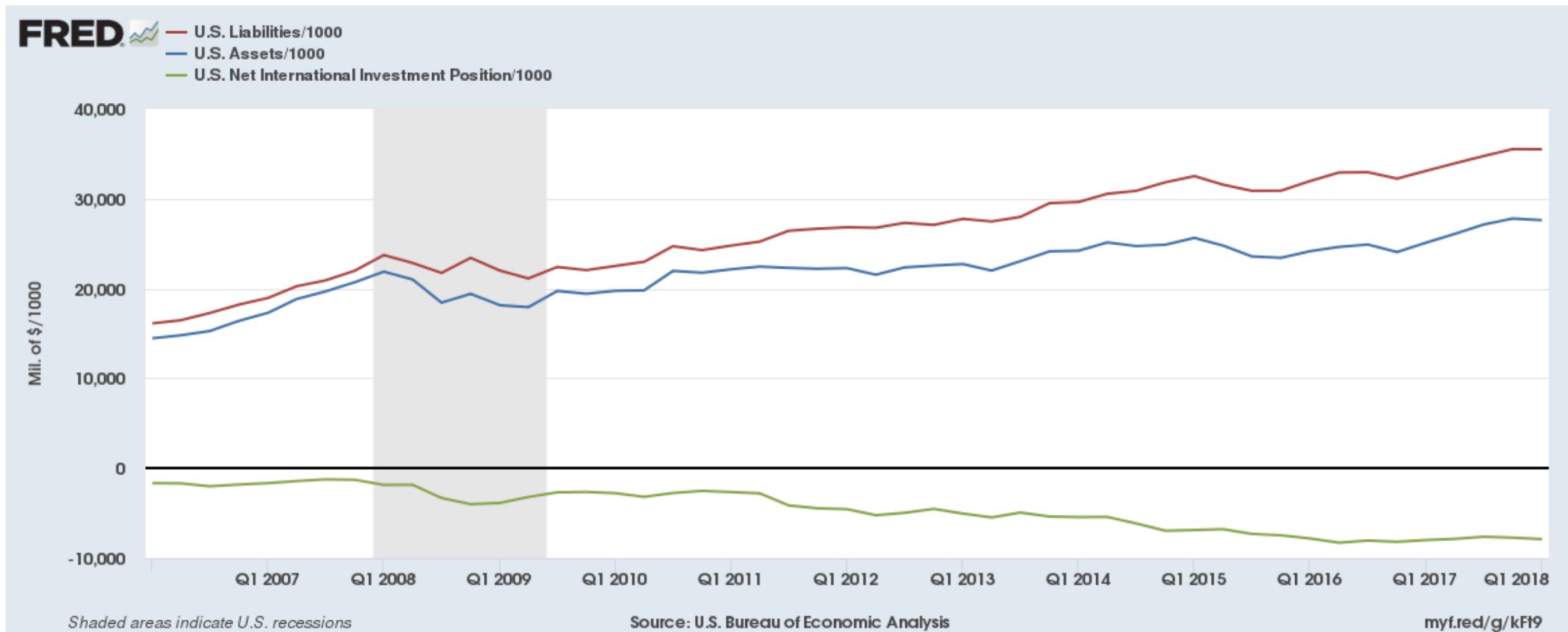
The World is Much More “Inter-Owned”

- US consistently has CA deficits → Net debtor position has grown
- However, US also owns a large sum of ROW assets
- Net debtor position is small relative to gross assets and liabilities

■ Surge in gross flows

	2000	2017
U.S. net debtor status (\$ trillions)	-1.3	-8.1
U.S. net debtor status (share of GDP)	-0.10	-0.43
U.S. owned foreign assets (\$ trillions)	6.2	26.1
U.S. owned foreign assets (share of GDP)	0.49	1.36
Foreign owned U.S. assets (\$ trillions)	-7.6	-34.4
Foreign owned U.S. assets (share of GDP)	-0.61	-1.80

U.S. As A Net Debtor



NFA Position: Return on Assets

- Despite the US **net debtor** status, it collects more on its assets than what it pays on its liabilities
 - **Income received** in US investments abroad:
\$783bn in 2015 on \$25tr → US Return of Assets: 3.1%
 - **Income paid** of foreign owned US assets:
\$600.5b in 2015 on \$33tr → ROW Return of Assets: 1.8%
- Why does the US have a much better ROA?
 - US owns factories around the world
 - Foreigners own US Treasury securities

Exchange Rates

- When selling a good, a service or a financial asset, foreigners will often want to be paid in their own currency
- **Nominal exchange rate:** Value of one currency in terms of another
- They matter because they affect the **relative prices** in different markets:
 - Labor → Employment
 - Goods → International trade
 - Financial assets → International finance

Notation

- Exchange rates can be **expressed in two ways**
 - **Example:** If one US dollar can purchase 100 Japanese yen, then the exchange rate is $\text{¥}100 = \$1$; or alternatively $\text{¥}1 = \$0.01$
- Our **notation:**
$$E_{\text{¥}/\$} = 100 \quad \text{or} \quad E_{\$/\text{¥}} = 0.01$$
- **Warning:** Convention in the market uses the opposite notation
 - **Example:** Our $E_{\text{¥}/\$}$ is quoted as E_{USDJPY} in the market

Exchange Rate Quotations

August 14, 2015

Currency (XYZ)	Units of Foreign Currency per USD (How many XYZ can be purchased with \$1 or how many XYZ are needed to buy \$1)	USD per Unit of Foreign Currency (How many dollars can be purchased with 1 XYZ or how many dollars are needed to buy 1 XYZ)
Japanese yen	124.32	0.008
Chinese renminbi (or yuan)	6.39	0.156
British pound	0.64	1.56
Euro (used by 19 countries)	0.90	1.11

Using Exchange Rates

- Assume the value of euros **in terms of dollars** is $E_{\$/\text{€}} = 1.25$

- A foreigner has €40, how many dollars can she buy?

$$€40 \times E_{\$/\text{€}} = €40 \times 1.25 = \$50$$

- If you have \$65, how many euros can you buy?

$$\$65 \times \frac{1}{E_{\$/\text{€}}} = \$65 \times E_{\text{€}/\$} = \$65 \times 0.8 = €52$$

- If you want to buy €100, how many dollars do you need?

$$\$?? \times 0.8 = €100 \rightarrow \$125$$

Exchange Rates: Volatile Relative Prices of Currencies

	Euro (Euro area)	Yen (Japan)	Renminbi (China)	Ruble (Russia)
Q4:2006	1.32\$/€	120Y/\$	7.8R/\$	26.3RB/\$
Q4:2012	1.32\$/€	85Y/\$	6.3R/\$	30.3RB/\$
Q4:2016	1.07\$/€	109Y/\$	6.9R/\$	64.8RB/\$

Appreciation and Depreciation

- Currency **appreciates** when it **increases** in value relative to another
 - Currency **depreciates** when it **decreases** in value relative to another
 - Sometimes ‘stronger’ and ‘weaker’ is used
-
- **Example:**
 - If the exchange rate changes from ¥ 100 = \$1 to ¥ 120 = \$1, which currency **appreciated**?
 - If the exchange rate changes from ¥ 1 = \$ 0.010 to ¥ 1 = \$ 0.015, which currency **depreciated**?

What Happen to the US Dollar 2001-2008?



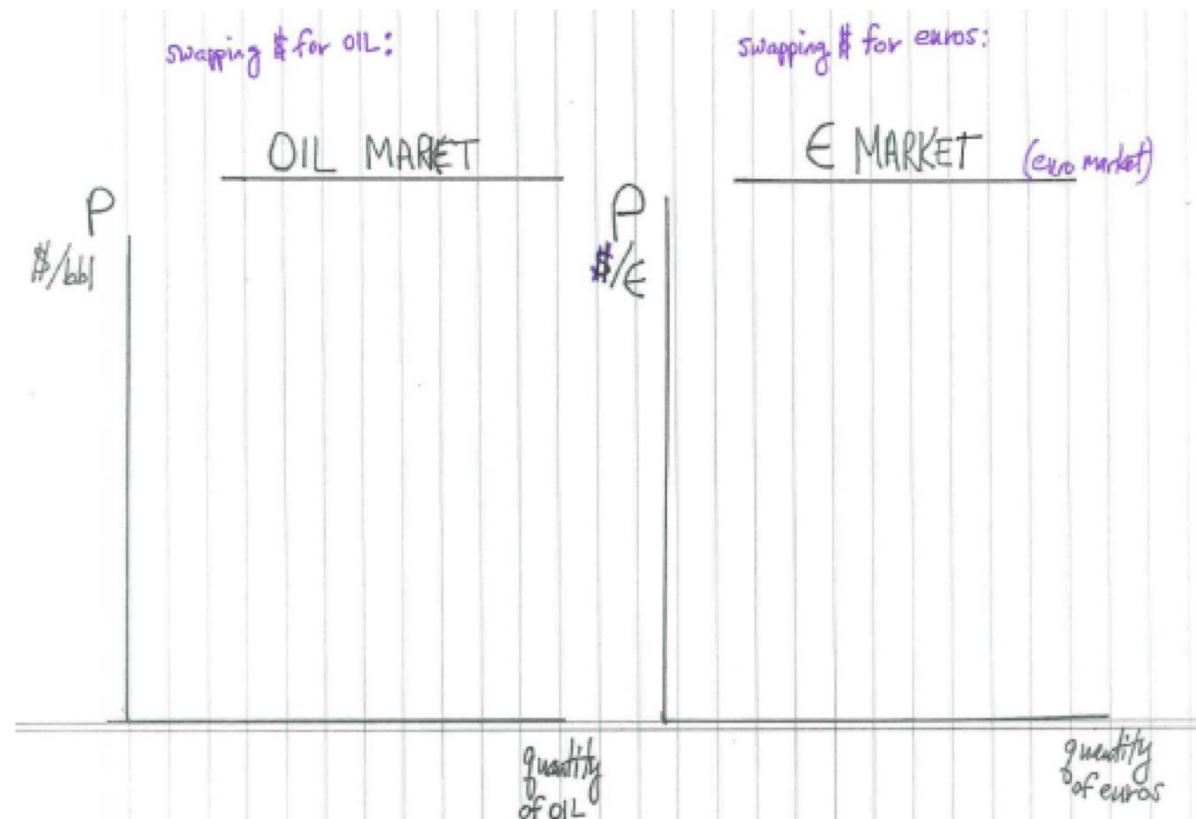
Is a Strong Dollar Better than a Weak Dollar?

- The words “strong” and “weak” can **mislead** people to believe that an appreciating currency is always better for the economy
- There is no simple connection between the strength of a country’s currency and the strength of its economy
- **Swings in exchange rates** create **both winners and losers**

With a depreciation of the dollar	EX are cheaper IM are expensive	$NX \uparrow$
With an appreciation of the dollar	EX are expensive IM are cheaper	$NX \downarrow$

The Market for Euros

- We can think about exchange rates using supply/demand curves
- The market for euros is just like any other market

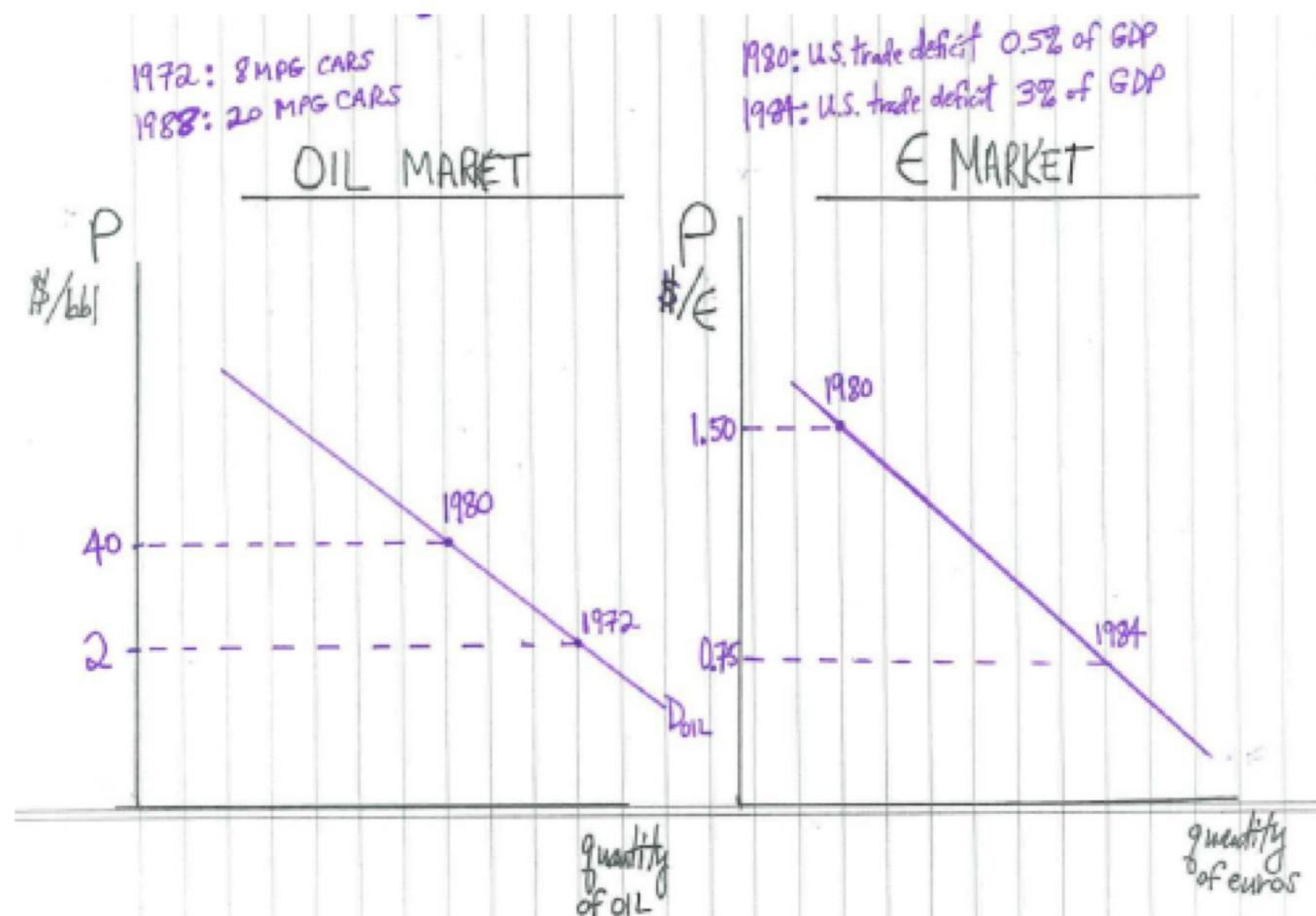


Downward Sloping Demand for Currency

- 1972-1980 surge in oil prices

- Sharp reduction in demand

- 1980-1984 price of European currencies plunged
 - Surge in buying of those currencies
 - Facilitated buying of European goods by US citizens

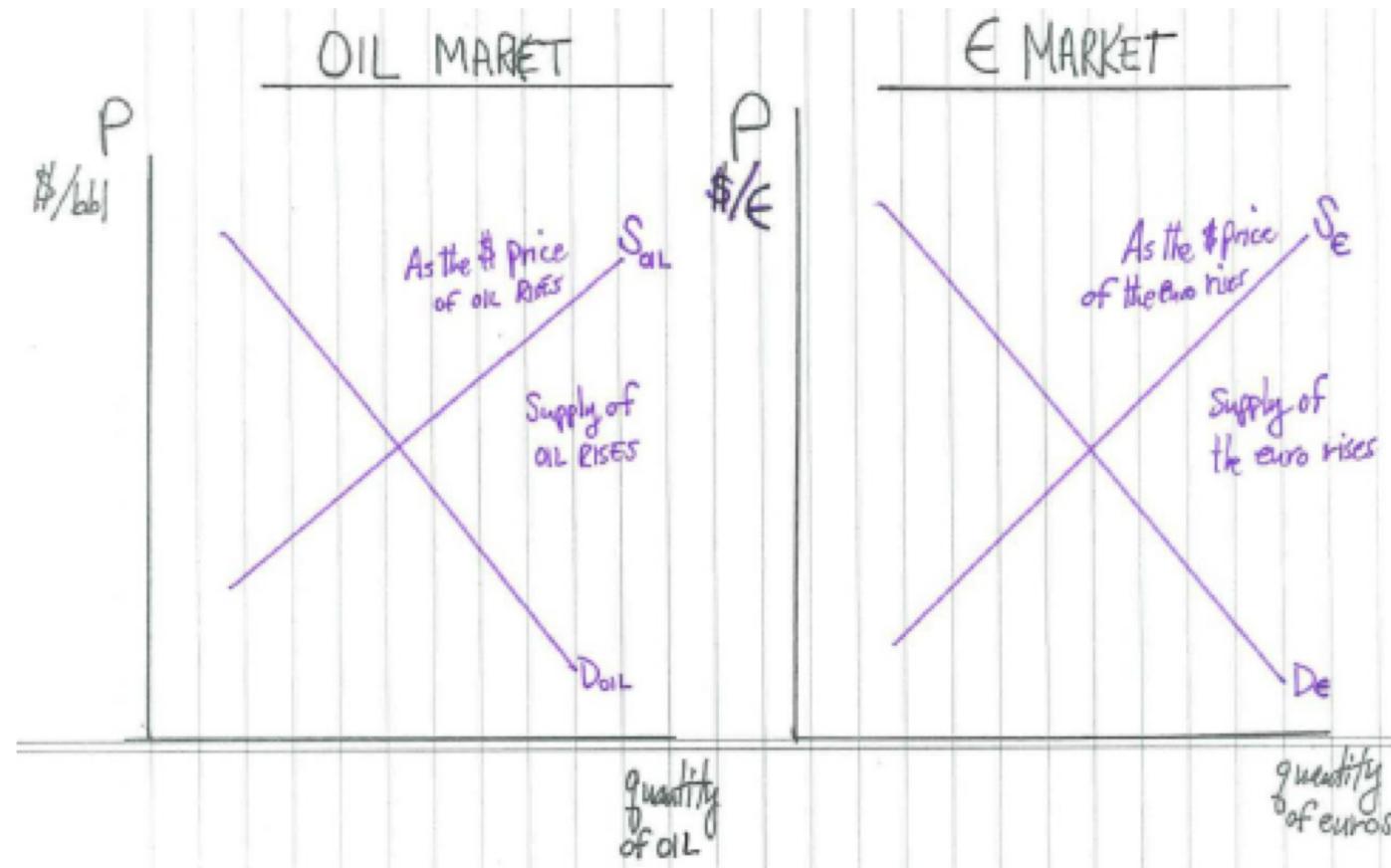


Upward Sloping Supply for Currency

- If oil price leaps (e.g. \$100), output soars
- If the price of the euro soars, it means that you get more dollars per euro
 - The **purchasing power** of the € **jumps**
 - You swap your euros for dollars to buy **cheap US goods**

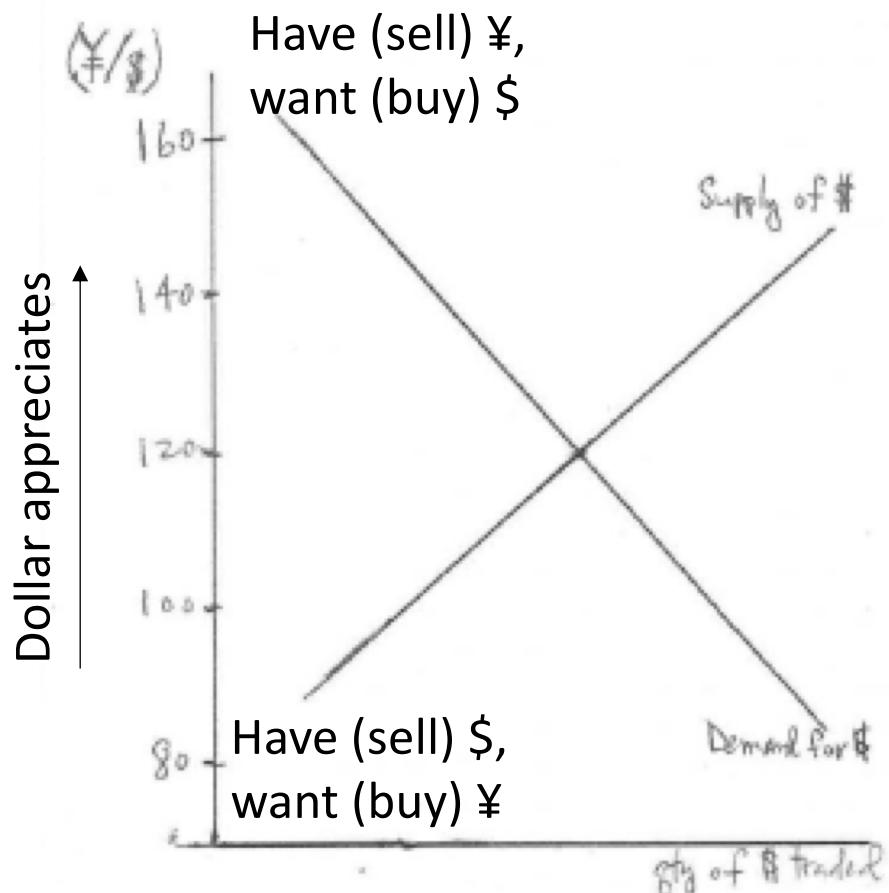
Equilibrium in the Market for Euros

- Market exchange rate is determined by the interaction of demand and supply

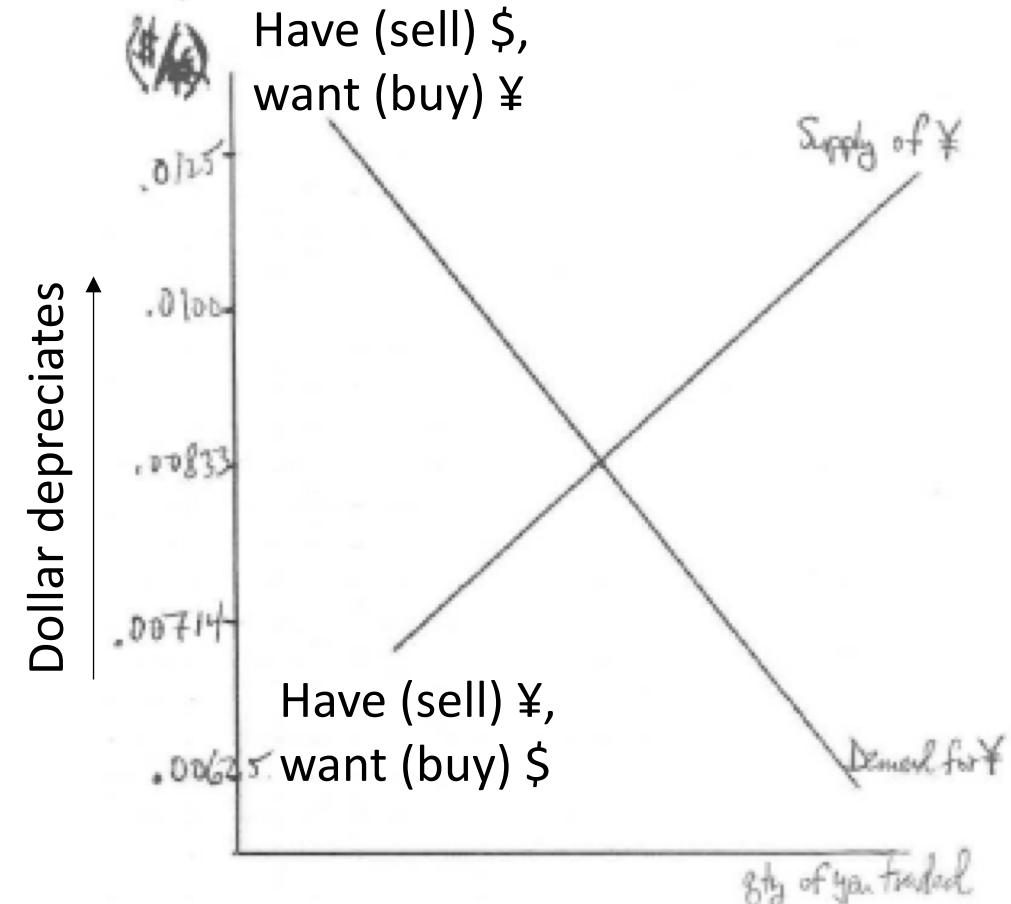


Forex Markets

Market for Dollars



Market for Yen

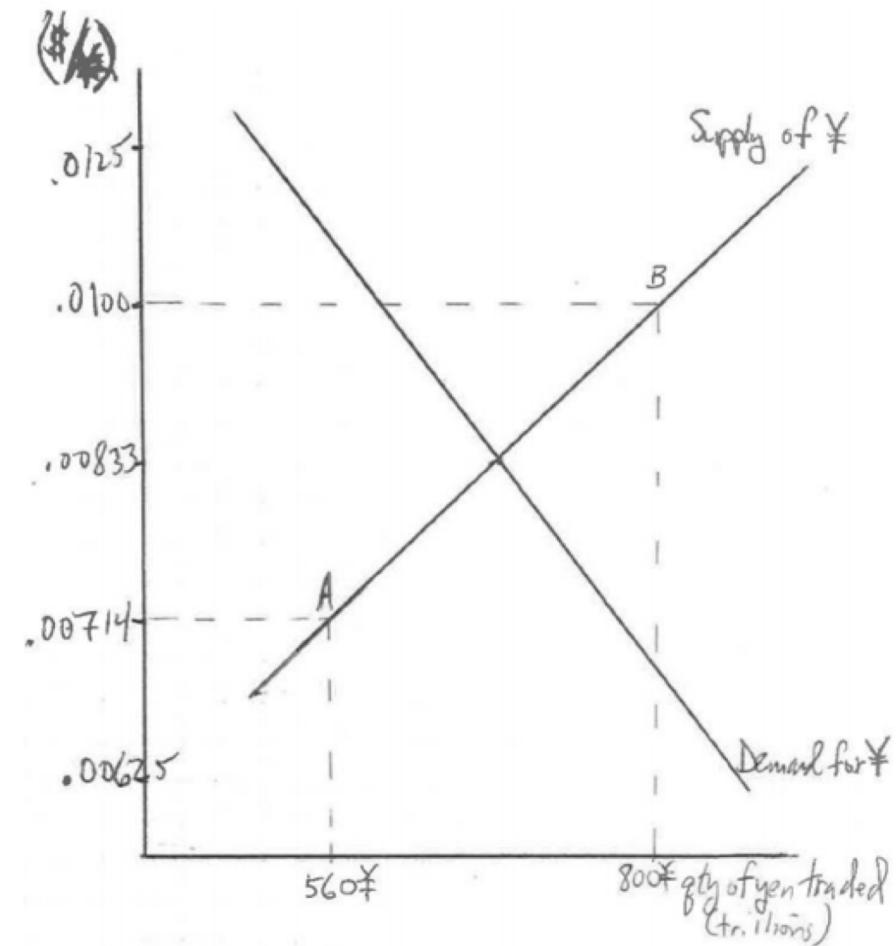
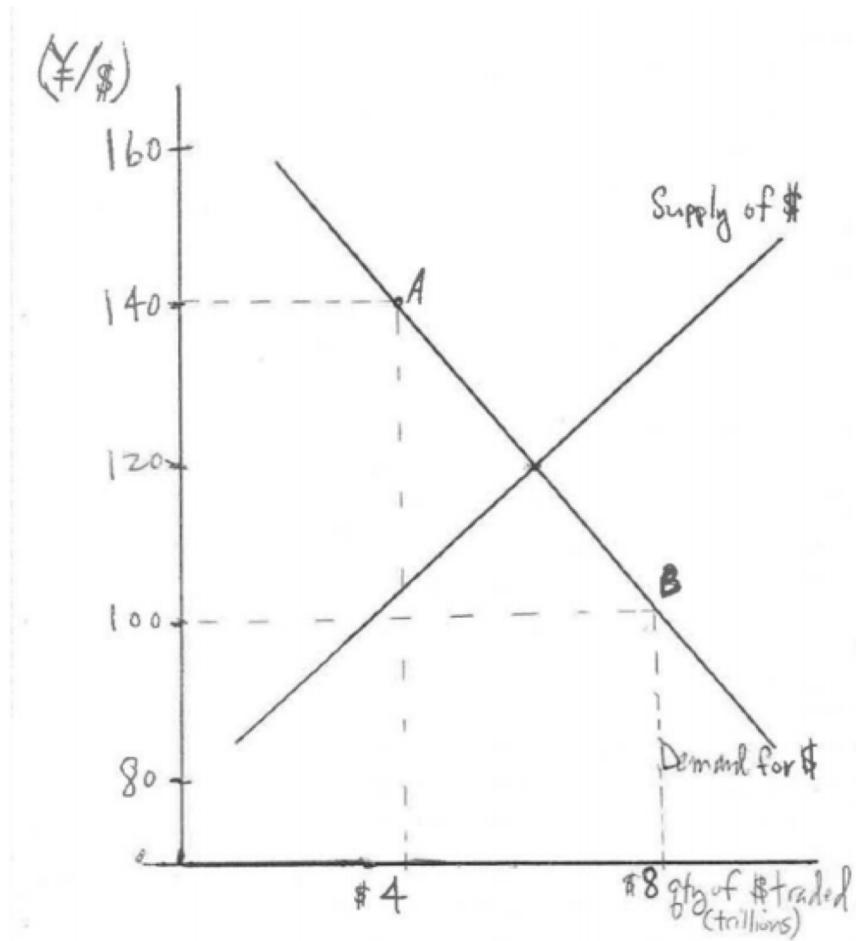


Supply and Demand in Forex: Two Sides of Same Coin

yen per dollar	dollar per yen	dollars traded (dollar demand)	yen traded (yen supply)
160	0.0063	2	320
140	0.0071	4	560
120	0.0083	6	720
100	0.0100	8	800
80	0.0125	10	800

Forex Markets

- Demand curve in USD market **equals** supply curve in Yen market



Who Demands a Currency?

- Demand for dollars (= Supply of yen) composed by:
 - Foreign firms and HH that want to buy **G&S** produced in the US
 - Foreign firms and HH that want to buy **financial assets** issued in the US
 - Currency traders: If they **believe** that the value of the \$ in the future will be greater (¥140) than its value today (¥120), they will buy dollars
Example: ¥120M in t → \$1M in t → ¥140M in t+1
- Similar for the demand for yen (= Supply of dollar)

Shifts of Curves in Forex Market

- Shifts in demand and supply curves cause the equilibrium exchange rate to change
- 3 main factors cause the curves in the forex market to change:
 - Changes in demand for **US-produced G&S** vs **foreign-produced G&S**
 - Changes in desire to buy **US financial assets** vs **foreign financial assets**
 - Changes in **expectations** of currency traders about the likely future value of currencies

Example: Shifts in Demand for \$ (= Supply of ¥)

- Demand for \$ (= Supply of ¥) shift to the

Right when:

- Expansion in Japan,
- Interest rates in the US rise, or
- Speculators expect the future value of the dollar to be higher than its current value

Left when:

- Recession in Japan,
- Interest rates in the US fall, or
- Speculators expect the future value of the dollar to be lower than its current value

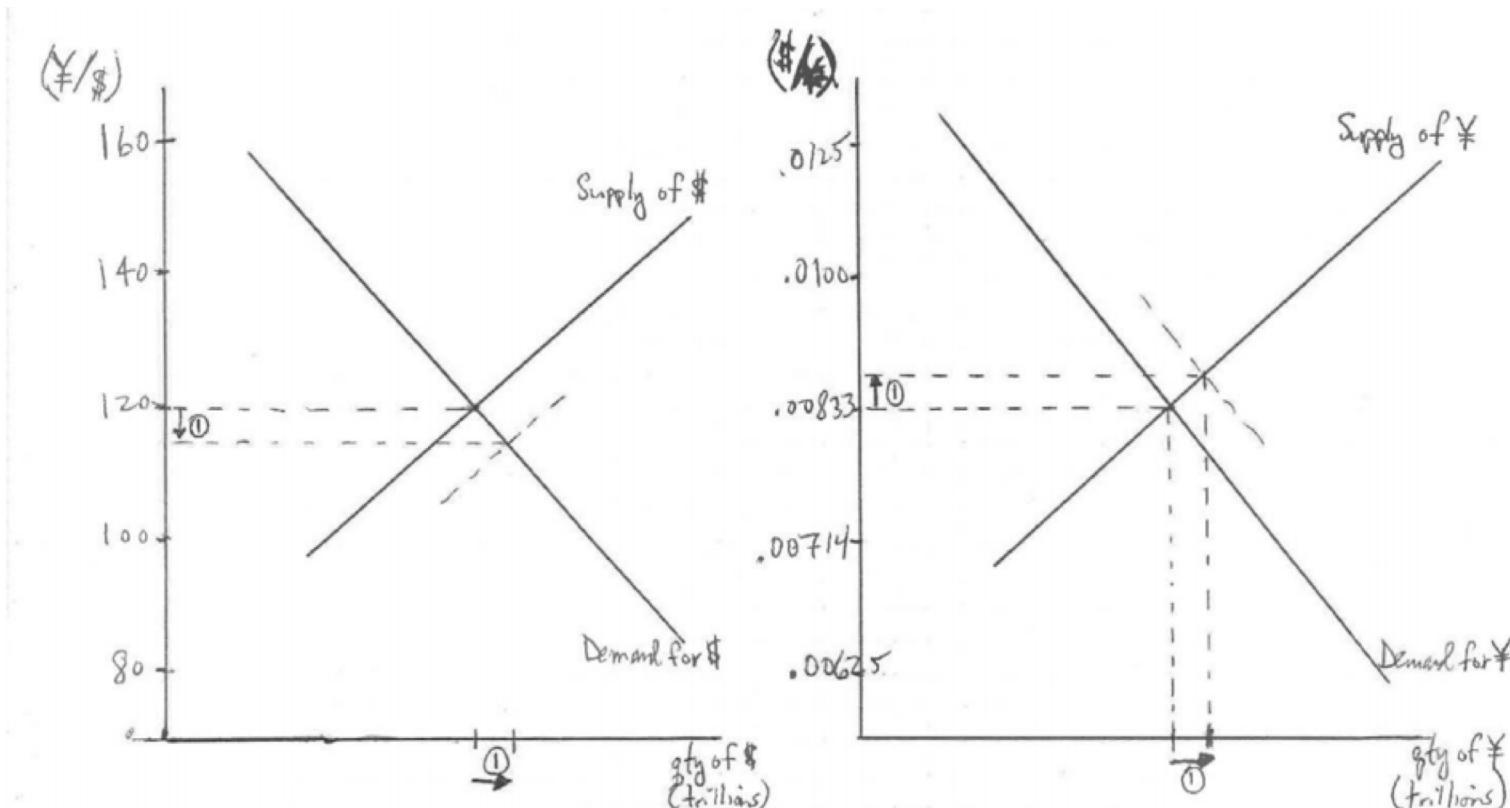
- Similar for shifts in the demand for ¥ (= supply of \$)

Shifts in Demand and Supply in Forex Market

- There can be shifts in **both** the demand and supply curves for one currency
- Whether the exchange rate increases or decreases depends on the **direction** and **size** of the shifts in both curves

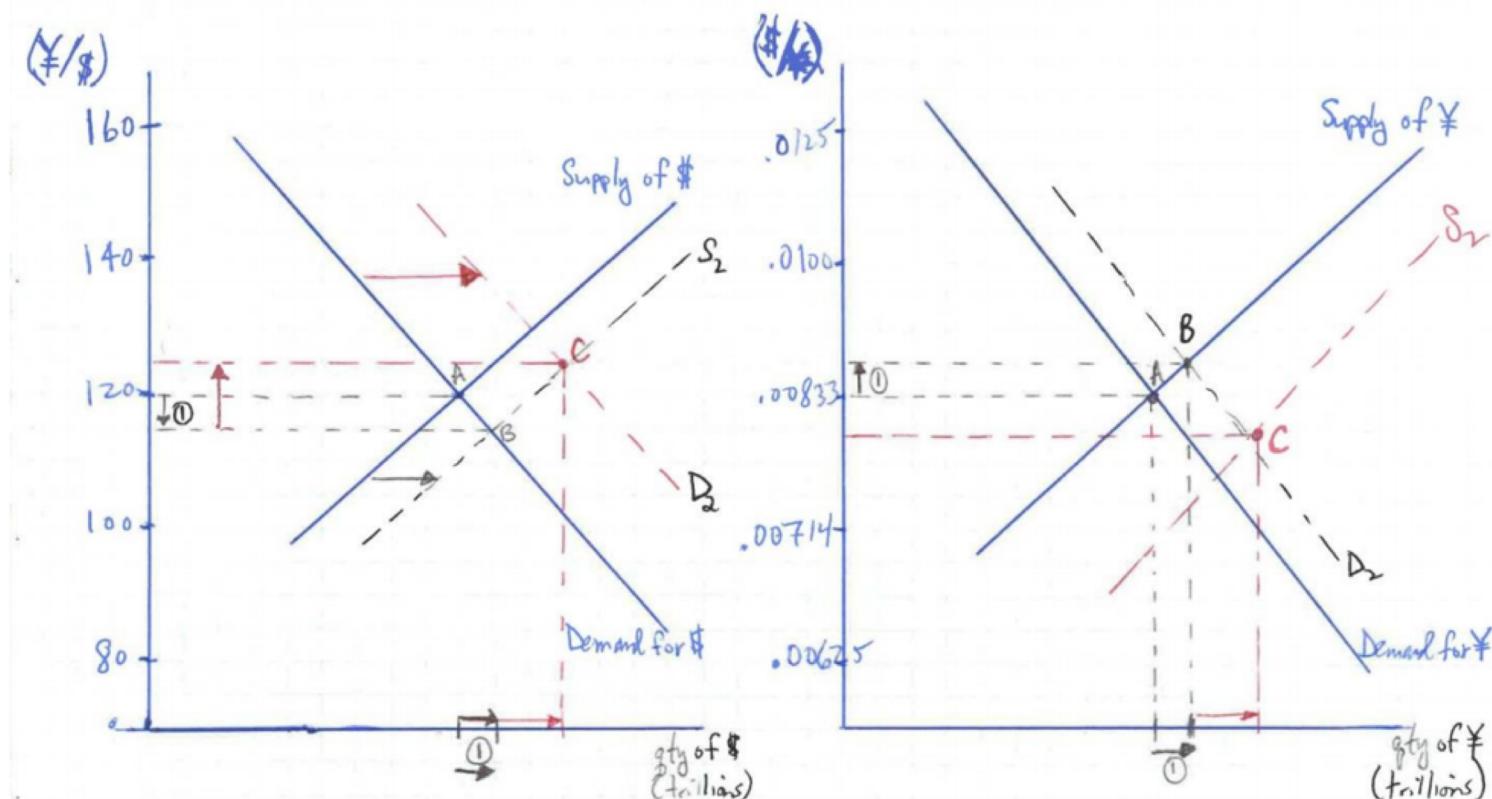
Example: Boom in the US

- **Effect 1:** US demand goes up for all goods, including Japanese goods → Increased demand for ¥



Example: Boom in the US

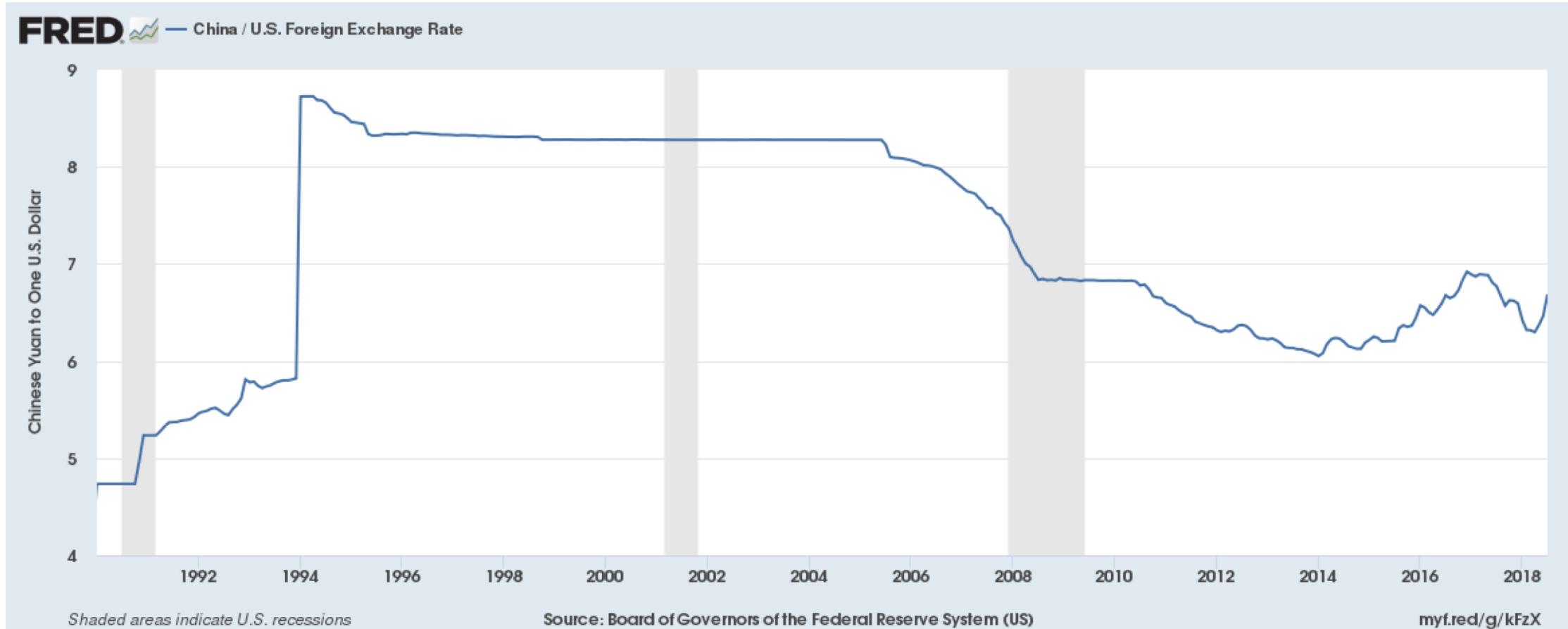
- **Effect 2:** With strong US economy, US interest rates will rise and so Japanese demand for US assets → Increased demand for \$



Central Bank's Role in the Forex Market

- With a **closed economy** perspective, we said central banks focus on one of two targets
 - Target the money supply and use the quantity equation
 - Target an interest rate, think in a loanable funds model and use Taylor rule
- In an **open economy**, CBs can use monetary policy to guide their exchange rate
 - **Example:** China kept the renminbi at RM8.3/\$ for 10 years

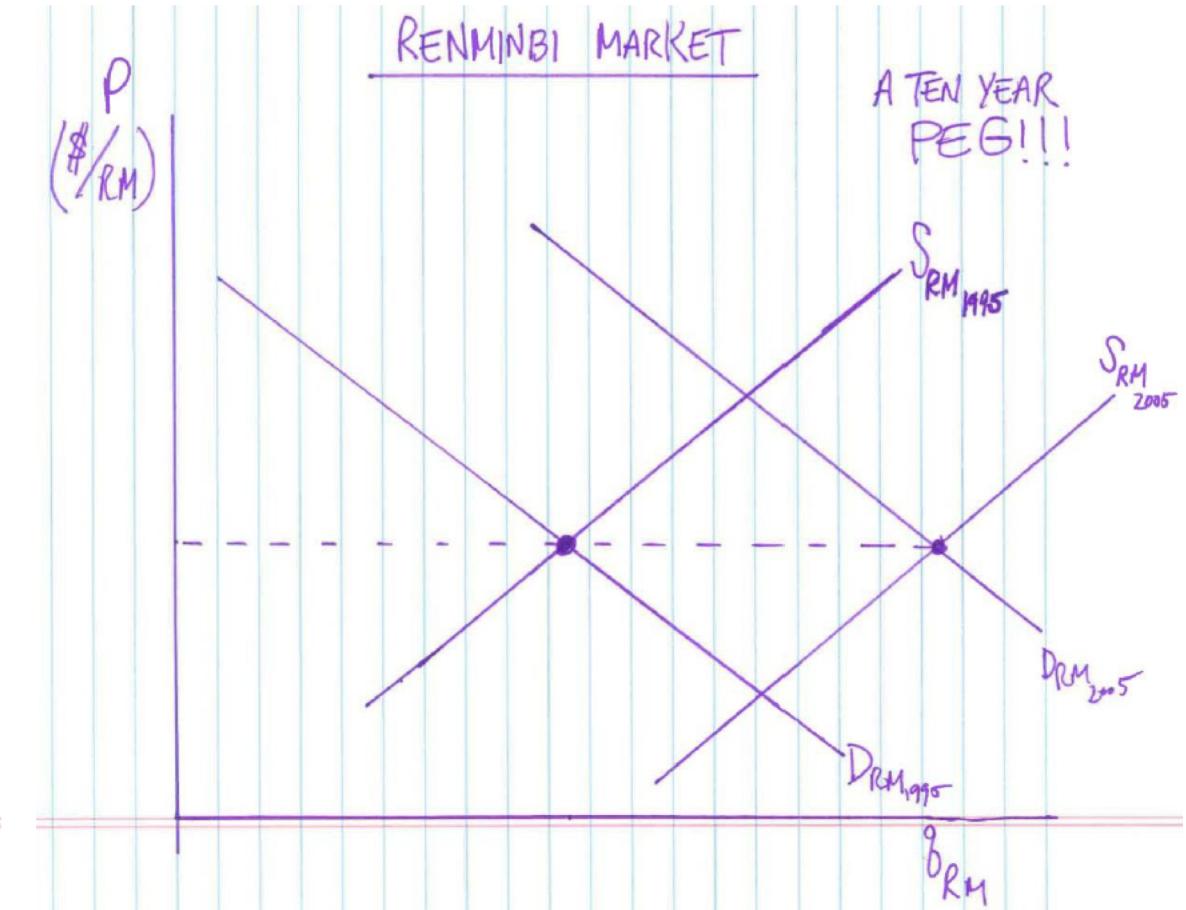
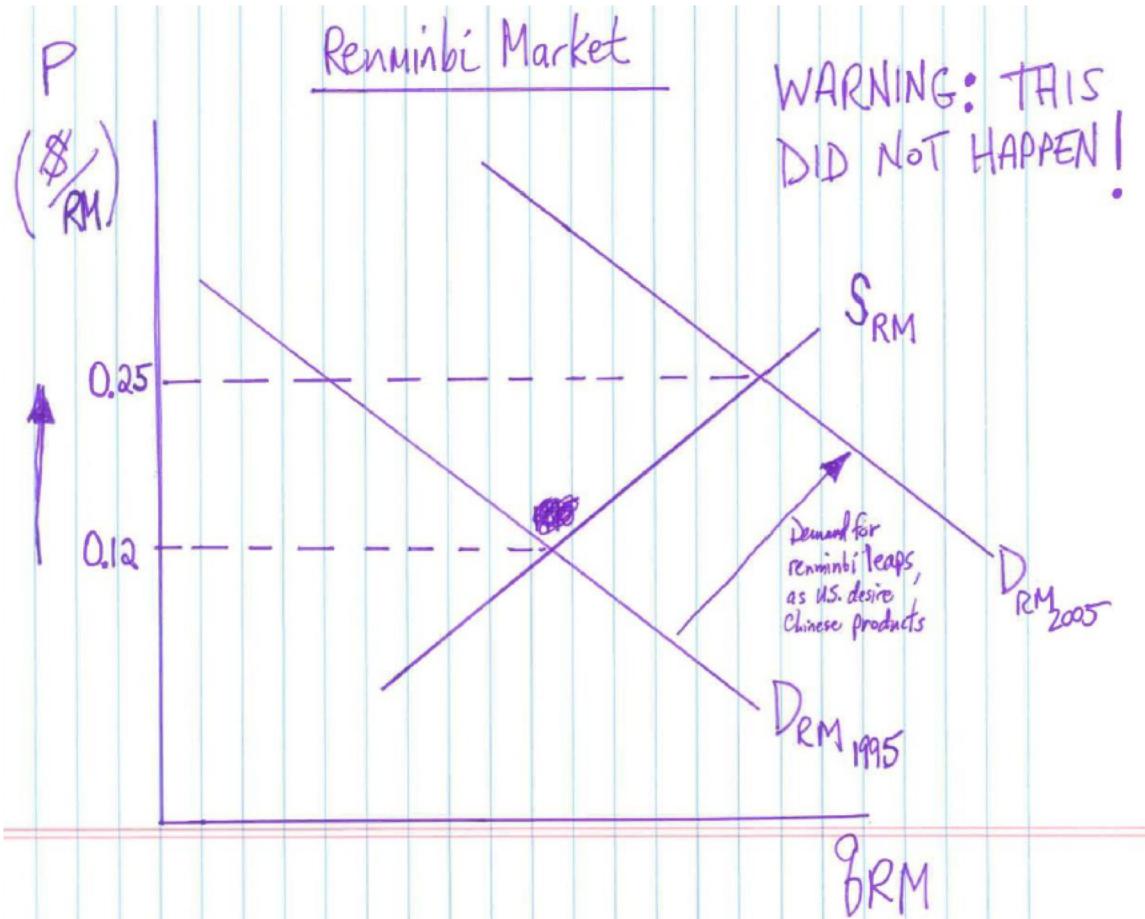
RM/\$ Exchange Rate



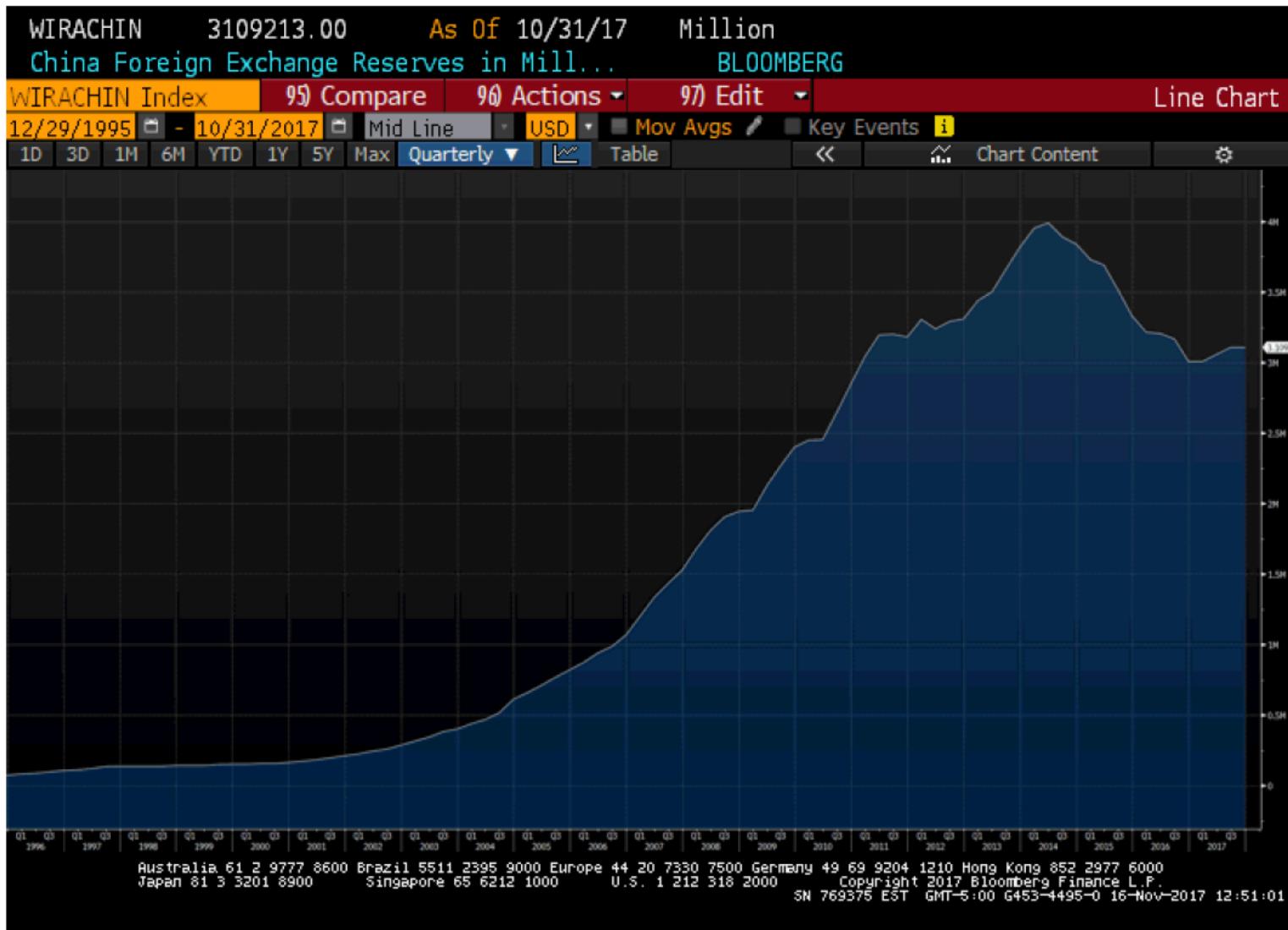
US-China Trade and Exchange Rate

- US bought zillion TVs and PBoC bought trillions of T-bonds
- US demand for China's goods soared
 - 1995-2005: US trade deficit with China climbed from \$20bn to \$200bn
- US demand for Chinese renminbi soared
 - Value of renminbi vs \$ should have been soared
 - A dime for a RM ($0.12\$/RM = 8.3RM/\$$) in 1995 could have been a quarter for a RM in 2005
- How did the RM stay steady vs \$ while the US trade deficit with China soared?

Monetary Policy and Exchange Rates



What Did the PBoC Do with All Those Dollars?



Exchange Rate Regimes

- Not all countries fix their exchange rates
- **Exchange rate regimes:** How countries manage their exchange rates
- Two general categories:
 - **Fixed** exchange-rate regimes
 - **Floating** exchange-rate regimes

Real Exchange Rate

- Relative prices of two countries' goods are determined by:
 - **Relative price levels** in the two countries
 - **Nominal exchange rate** between the two countries' currencies
- These two factors are combined to obtain the real exchange rate
- **Real exchange rate:** Price of domestic goods in terms of foreign goods

Real Exchange Rate: Formula

- Corrects the nominal exchange rate for differences in prices of G&S between countries
 - Useful to evaluate real change in **value of a currency's purchasing power**
- **Definition:**

$$q = E \times (P^{\epsilon}/P^{\$})$$

$q_{US/EU}$ – real exchange rate

$E_{\$/\epsilon}$ – nominal exchange rate

P^{ϵ} – average price level in the euro area

$P^{\$}$ – average price level in the US

Real Exchange Rate: Example

- Assume you need €100 to buy a broad basket of G&S in euro area
- Assume that if you exchange your €100 for \$, you can buy **25% more** of the same basket of G&S in the US
- Then the RER between the US and the Eurozone is
$$q_{US/EU} = 1.25$$
- RER says **how many units** of the basket you can buy in the US per unit of basket in the euro area
 - $q_{US/EU} > 1 \rightarrow$ G&S are **more expensive in the Eurozone** than in the US

Nominal vs Real Exchange Rate

- Difference between nominal and real exchange rate?
- Real exchange rate, q , is the relative price of (baskets of) **goods**
- Nominal exchange rate, E , is the relative price of **currencies**

Purchasing Power Parity Theory

- **Purchasing Power Parity (PPP)** : In the long run, goods should have about the same price everywhere when expressed in terms of a given currency
- Implication for nominal exchange rates?
 - What nominal exchange rate allows the two currencies to have the **same purchasing power**

Purchasing Power Parity Theory

- Example:
 - In country A, I spend **\$100,000** per year in house, car, food, drinks
 - In country B, I spend **¥500,000** per year in house, car, food, drinks
 - What exchange rate gives me the same purchasing power?
- PPP implies $q = 1$

$$1 = E \times (P^{\epsilon}/P^{\$})$$

$$E_{\$/\epsilon} = P^{\$}/P^{\epsilon}$$

The Big Mac Index

- *The Economist* magazine compares Big Mac prices across countries
- We compare hamburger prices and infer the currency value that makes them equal

Price of a Big Mac	
	Local Currency Price (as of 7/17)
US	\$5.30
China	RM19.30

- What RM/\$ exchange rate equalizes the cost of a burger?

$$E_{RM/\$} = RM19.3/\$5.3 = RM3.64/\$$$

Undervalued and Overvalued Currencies

- According to the Big Mac index, $E_{RM/\$}$ should be RM3.64 = 1\$
- If the current market exchange rate were RM6.6 = \$1, what does the Big Mac index says about the RM? Is it undervalued or overvalued?
- To go from RM6.6 = \$1 to RM3.64 = 1\$, **RM would need to appreciate** → Today's value (RM6.6 = \$1) is **undervalued** relative to RM3.64 = 1\$

PPP: Application

- IMF provides a summary table of economic performances

	Real GDP 2001	Real GDP 2016	annualized growth
	(trillions of \$)		rate
United States	12.7	16.7	1.9%
Germany	2.7	3.6	2.0%
China	7.2	19.0	6.7%
India	2.8	7.8	7.1%
Russia	1.5	3.4	5.4%

Application

- From table: China **\$19 tr** vs US \$16.7 tr
- China's economy uses yuan or renminbi, how did we get Chinese GDP in US dollars?
- What is the 2016 value for Chinese real GDP in renminbi?
 - RM66.5 tr
- What if we **use the forex market's exchange rate RM/\$** to convert China's real GDP from RM into \$?

$$RM66.5 \text{ tr} \times \left(\frac{\$1}{RM6.6} \right) = \$10 \text{ tr}$$

Application

- IMF did not use market exchange rates
 - Not be the best guide to equate countries' real GDP levels
 - IMF evaluates purchasing power of currencies
 - IMF looks at the prices of thousands of G&S to calculate PPP
- Instead of using market exchange rates, we can use the implied PPP exchange rate obtained using the Big Mac index

$$RM66.5 \text{ tr} \times \left(\frac{\$1}{RM3.4} \right) = \$18.3 \text{ tr}$$

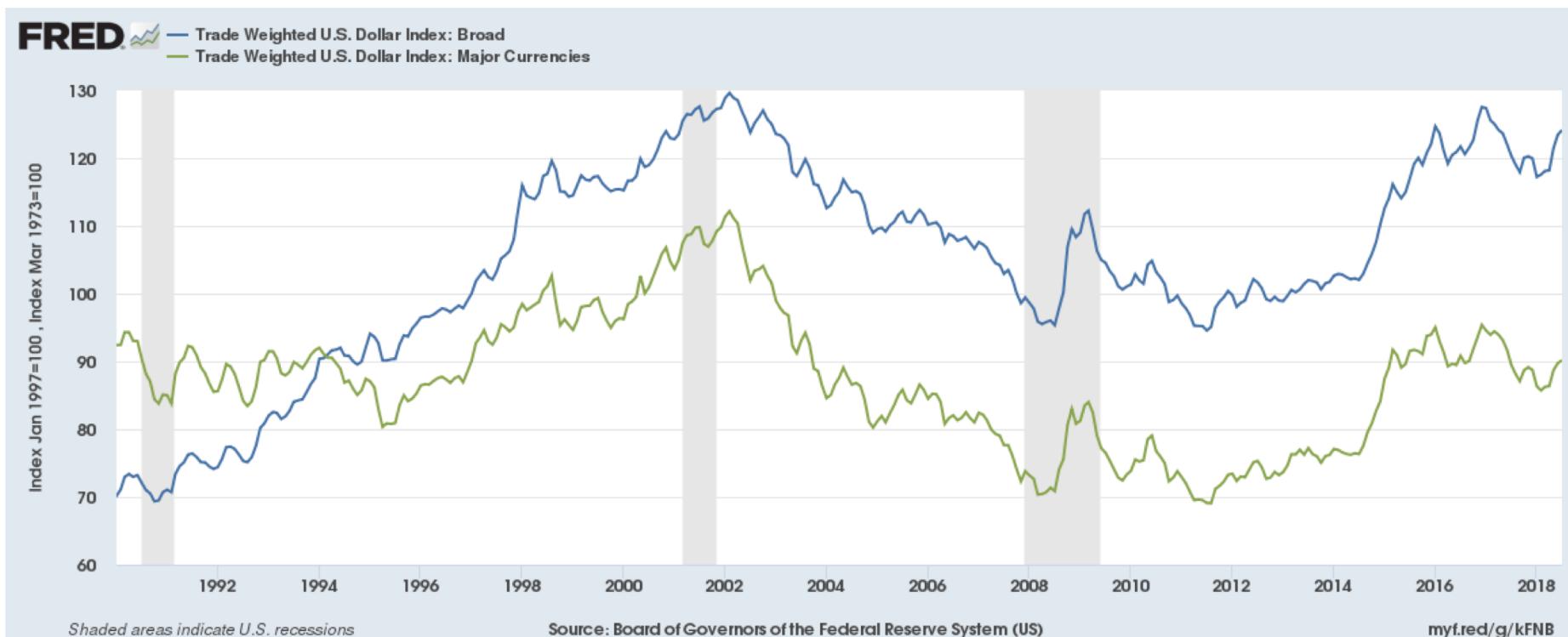
- The PPP-adjusted exchange rate gets us close to the **\$19 tr**

Is PPP Supported in the Data?

- In practice, PPP **does not hold exactly**
 - Not all products can be traded internationally
 - Products and consumer preferences are different across countries
 - There are barriers to trade
- PPP applies **in the long run on average** between countries that have a *similar* level of development
 - **Example:** US and UK
 - However, deviations are relatively persistent

Effective Exchange Rate

- An exchange rate is between **two** currencies
- We can create an index (weighted by trade) to see whether a currency appreciates or depreciates against **many** currencies



Exchange Rates and Interest Rates

- What is the relationship between interest rates and the exchange rate?
- Bonds **denominated in different currencies** yield different interest rates
- **Arbitrage**: All bonds should have the **same expected dollar return**
 - Interest rate differential between bonds in two countries should equal the expected change in the exchange rate

International Bond Investment

- $E_{\$/\epsilon}$ - Current dollar per foreign currency (say euro) exchange rate
 - E' - Exchange rate ($\$/\epsilon$) in one year
 - i_ϵ - Foreign interest rate for one year
 - $i_\$$ - Dollar interest rate for one year
-
- Let's start with \$1. You have two options to invest it:
 1. You can invest your \$1 at the dollar interest rate $i_\$$
 2. You can invest it at the foreign interest rate i_ϵ after you exchange your dollar for foreign currency using $E \rightarrow$ After receiving your interests, you exchange your money back into \$ using E'

1 dollar
today



$1/E$ euro
today

$(1+i_{\epsilon})E'/E$ dollar
in one year



$(1+i_{\epsilon})/E$ euro
in one year

- If you invest in the foreign bond:

1 dollar
today



$(1 + i_€) \frac{E'}{E}$ dollars
in one year

- If you invest in the US bond:

1 dollar
today



$(1 + i_{\$})$ dollars in
one year

Uncovered Interest Parity

- Global investors should expect foreign currency bonds to have approximately the same dollar return as dollar bonds
 - What would happen otherwise?
- UIP says all bonds should have the same **expected** dollar return

$$1 + i_{\$} = (1 + i_{\epsilon}) \frac{E^e}{E}$$

E^e – Exchange rate **expected in one year**

- **Uncovered** because the exchange rate risk ($E' \neq E^e$) is not hedged

What Does UIP Say?

$$1 + i_{\$} = (1 + i_{\epsilon}) \frac{E^e}{E}$$

Gross US deposit
dollar return

Gross euro deposit
(expected) **dollar return**

UIP: Approximate Formula

$$1 + i_{\$} = (1 + i_{\epsilon}) \frac{E^e}{E}$$

$$i_{\$} \approx i_{\epsilon} + \frac{\Delta E^e}{E}$$

$$i_{\epsilon} - i_{\$} = - \frac{\Delta E^e}{E}$$

What Does the Approximate Formula Say?

$$i_{\epsilon} - i_{\$} = - \frac{\Delta E^e}{E}$$

- **Note:** Since $E = E_{\$/\epsilon}$, $E^e \downarrow$ means that ϵ is expected to depreciate
- A foreign currency that is expected to depreciate must yield a higher interest rate than the dollar
- A foreign currency that yields a high interest rate is likely to depreciate
 - The opposite would be too good to be true

What Does the Data Say About UIP?

$$i_{\epsilon} - i_{\$} = - \frac{\Delta E^e}{E}$$

- **Implication:** The interest rate differential should be a good predictor of currency depreciation against the dollar
- Approximately true for survey data on **market expectations**
- Not so good when use **realized** exchange rates

Currency Bets

- Two kinds of ‘currency bets’ involving exchange rates and interest rates
- Carry trade
- “Shorting a currency”

Carry Trade

- Carry trade: **Borrow in a low-interest rate currency and invest in a high-interest rate currency**
 - If UIP is true, do you think carry trades can be profitable?



Risks in Carry Trade

- Borrow ¥1M at 1% and invest in Australian bond at 6%
- If no change in the ¥/A\$ exchange rate:
 - 5% return on ¥1M = ¥50,000
- If A\$ depreciates by 20%:
 - Lose = ¥160,000

Shorting a Currency

- Speculating **against** a currency: **Borrow at high interest rate** to bet on the devaluation of the currency
 - Famous example: Soros' speculation against the pound in 1992-1993
- Soros' fund borrowed **£10bn** at 15% and invested it in DM at 5%
 - Estimated cost of £2.7m per year
- The pound devalue by 10% making the DM investment worth **£11bn**
 - £1bn profit in one day

Comparing PPP and UIP

- Exchange rates are complicated because they determine the *relative* prices of objects traded **in different markets**
- **PPP** links exchange rates to the equilibrium in the market for **G&S**
- **UIP** links exchange rates to the equilibrium in the market for **financial assets**, especially bonds

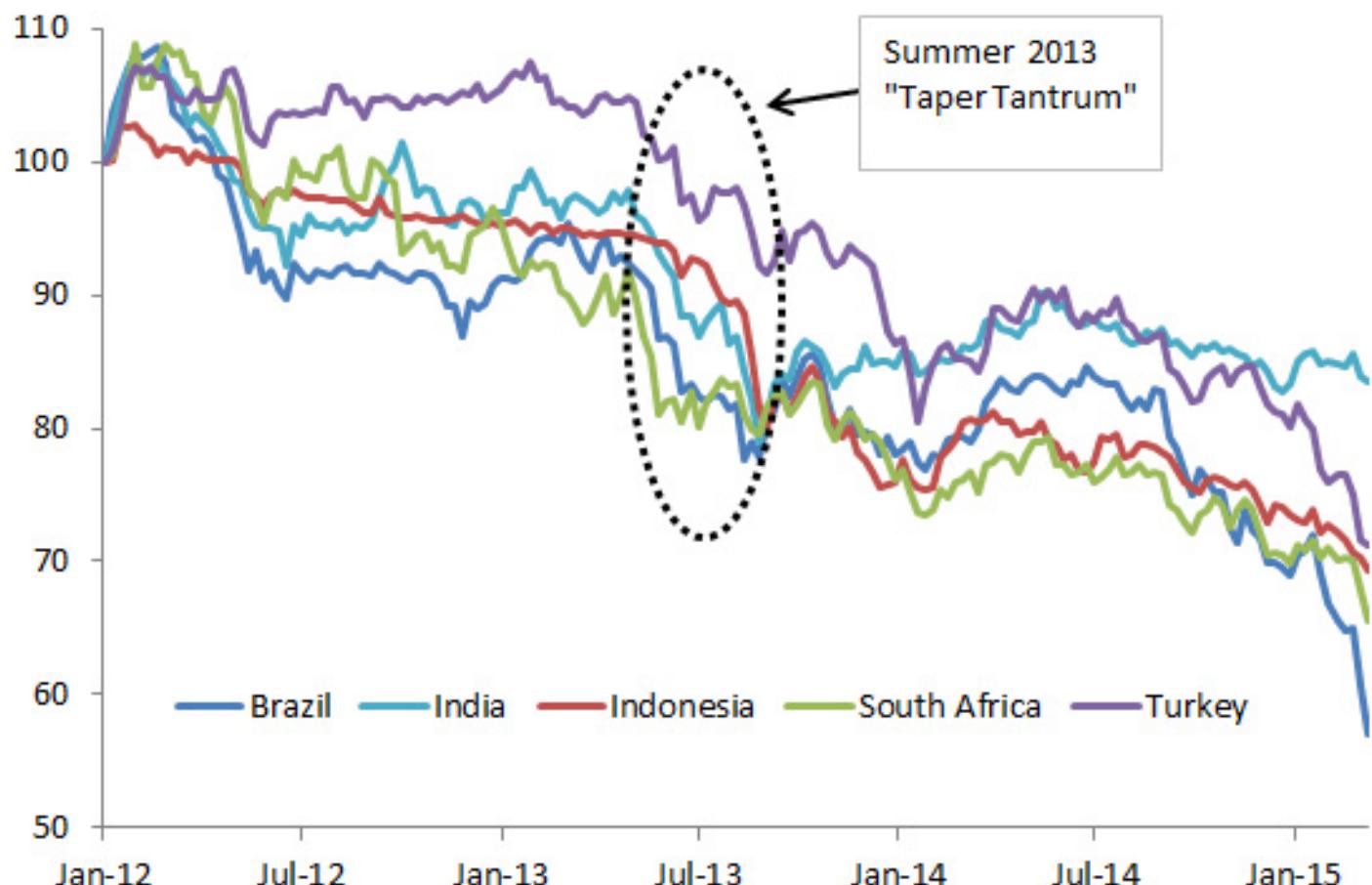
UIP and Monetary Policy

- “Dollar surges as March Fed rate hike comes into view” FT, 02/07/2017



Figure 2 Sustained depreciation of national currencies to US dollar

index: Jan 2012=100



Source: Bloomberg

piie.com

Source: <https://piie.com/blogs/realtime-economic-issues-watch/taper-tantrum-revisited>

Monetary Policy, Interest Rates and Exchange Rates

- Market commentary about exchange rates mostly about central bank actions
 - Interest rates
- A higher interest rate leads to a stronger currency
- What is the nexus between exchange rates, interest rates and news?

Comparative Statics

- Looking for the impact of one variable on another, ***other things equal***
 - What does this mean?
 - Take all the other variables of the model **as given**

UIP:

$$1 + i_{\$} = (1 + i_{\epsilon}) \frac{E^e}{E}$$

- What is the impact of an increase in euro interest rate i_{ϵ} on the exchange rate $E_{\$/\epsilon}$ taking $i_{\$}$ and E^e **as given** (unchanged)?

Effect of i_{ϵ} on the US Dollar (Other things equal)

- Assume i_{ϵ} increases by 1% (other things equal)
- By how much does the dollar appreciate or depreciate against the euro?
- Increasing the euro interest rate depreciates the dollar (other things equal)
- Intuition?
 - Lower demand for US bonds relative to euro bonds (other things equal)
 - US dollar depreciates by 1%

Effect of i_{ϵ} on the US Dollar: Subtle Points

$$1 + i_{\$} = (1 + i_{\epsilon}) \frac{E^e}{E}$$

- Today's euro appreciation generates an **expected depreciation** of the euro over time which offsets the higher euro interest rate
- The “other things equal” assumption is not always appropriate
 - For example, what if expected US inflation and $i_{\$}$ increase at the same time?

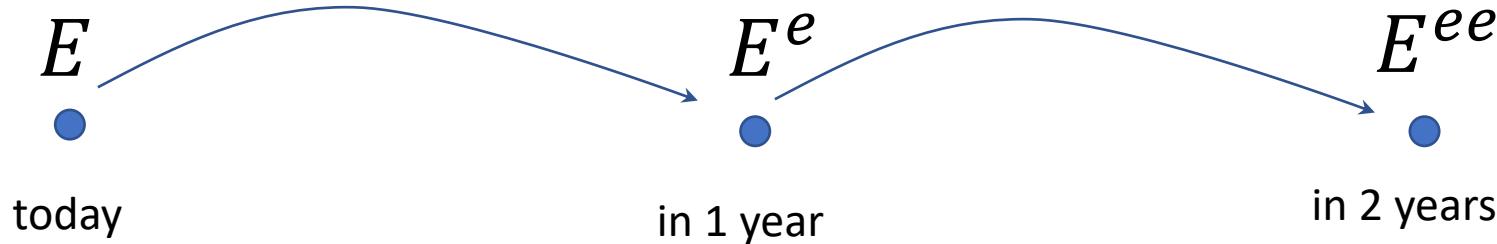
Exchange Rates and Expectations

- Like any asset price, exchange rates are **forward looking** and **influenced by expectations**
- UIP can help us to understand why
- Assume that we suddenly learn that the ECB is going to raise its interest rate i_{ϵ} by 1% in **one year**: What is the impact on the exchange rate $E_{\$/\epsilon}$ **today**?

Iterated Expectations

- Assume rational and forward-looking investors

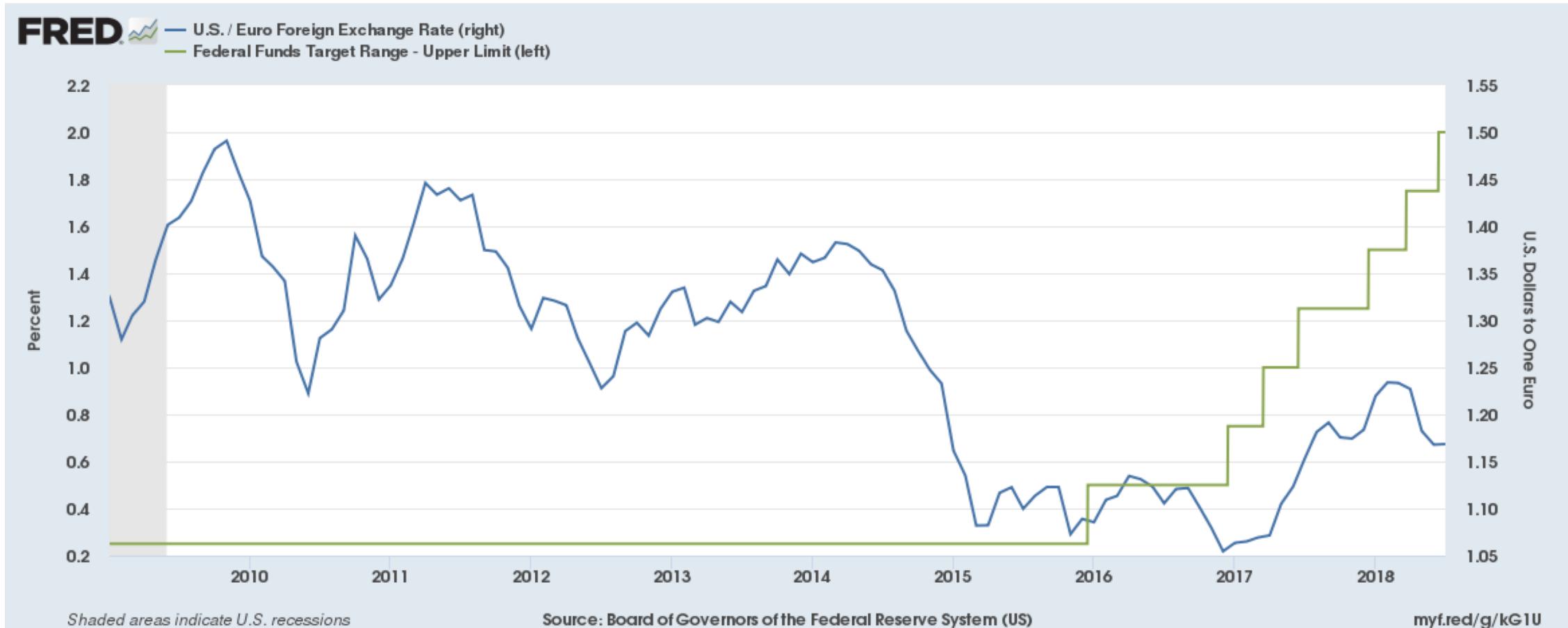
$$E = \frac{1 + i_{\epsilon}}{1 + i_{\$}} E^e \longrightarrow E^e = \frac{1 + i_{\epsilon}^e}{1 + i_{\$}^e} E^{ee}$$



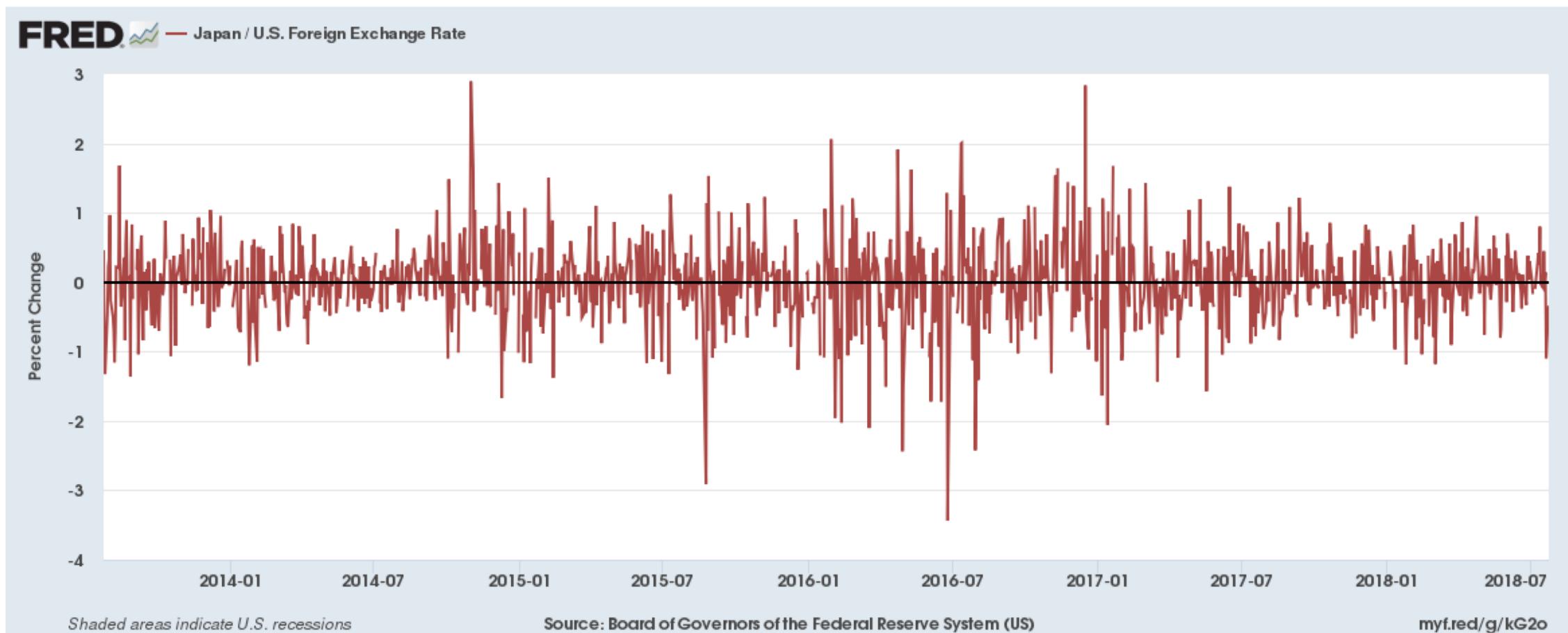
Effects of News on Exchange Rates

- Importance of “news”
 - Exchange rate is **moved by changes in expectations** (“news”) about future monetary policy
 - Same as for any price in financial asset markets
- **Implication 1:** Changes in exchange rates are not necessarily correlated with **observed** changes in economic fundamentals
- **Implication 2:** Exchange rates are volatile

Implication 1: FFR vs Exchange Rate



Implication 2: Exchange Rate Volatility



News Announcements

- One way of identifying **impact of change in expectations** on exchange rates is to **measure “news” at high frequency** (intra-day data)
 - Policy announcements
 - Data release
 - Etc.
- **Example: Brexit**
 - Vote June 23, 2016
 - If $E_{\$/\text{£}} \rightarrow$ what does $E \downarrow$ mean?

Effect of Brexit on \$/£ Exchange Rate

USD per 1 GBP

20 Jun 2016 18:15 UTC - 27 Jun 2016 18:15 UTC
GBP/USD close: 1.31784 low: 1.31468 high: 1.50056



Exchange Rate Trading

- Currency forecasters spend a lot of time **speculating** about what central banks will do in the future
 - “Fed watching”
- Changes in market views about future monetary policy is a **primary driver** of short-run fluctuations in exchange rates
- Two key factors:
 - News about the state of the economy, and
 - How central banks will respond to these developments
- Importance of central bank **communication**

June 16, 2017

Nikkei **22588.83** -0.55% ▼ Hang Seng **28695.88** -0.38% ▼ U.S. 10 Yr -2/32 Yield **2.963%** ▼ Crude Oil **68.92** 0.33% ▲ Yen **111.13** 0.08% ▲

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Dollar Falls on Weak Data, Political Uncertainty



Investors take profits on housing figures, concerns about economy



WSJ Dollar Index

Macroeconomic Policy in an Open Economy

- **Aggregate Expenditure** model can be extended to an open economy
- In a **closed economy**, we had a consumption function and a investment was a function of the real interest rate
- In an **open economy**, in addition we will have factors affecting NX

Key Drivers of Net Exports

- P^{US} Relative to P^{ROW}
 - If $\pi^{US} < \pi^{ROW}$, prices of U.S. products increase more slowly than prices of products of other countries → NX will rise
- Growth Rate of GDP^{US} Relative to the Growth Rates of GDP^{ROW}
 - When incomes in the US rise **more slowly** than incomes in other countries → NX will rise
- Exchange Rate Between the Dollar and Other Currencies
 - As the value of the **U.S. dollar rises**, the foreign currency price of U.S. products sold in other countries rises, and the dollar price of foreign products sold in the United States falls → NX will fall

Monetary and Fiscal Policy in an Open Economy

- By affecting domestic GDP, **fiscal policy** will also affect NX
 - If your income increases, you will demand both more domestic and foreign goods
- **Monetary policy** will influence the economy through two channels
 - Investment and spending
 - Effect on the exchange rate
- Both policies will not only affect GDP but also NX
 - Manage internal and external **imbalances**