

# Exchange Rates

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The views expressed here are those of the author and not necessarily those of the Federal Reserve Bank of St. Louis or the Federal Reserve System.

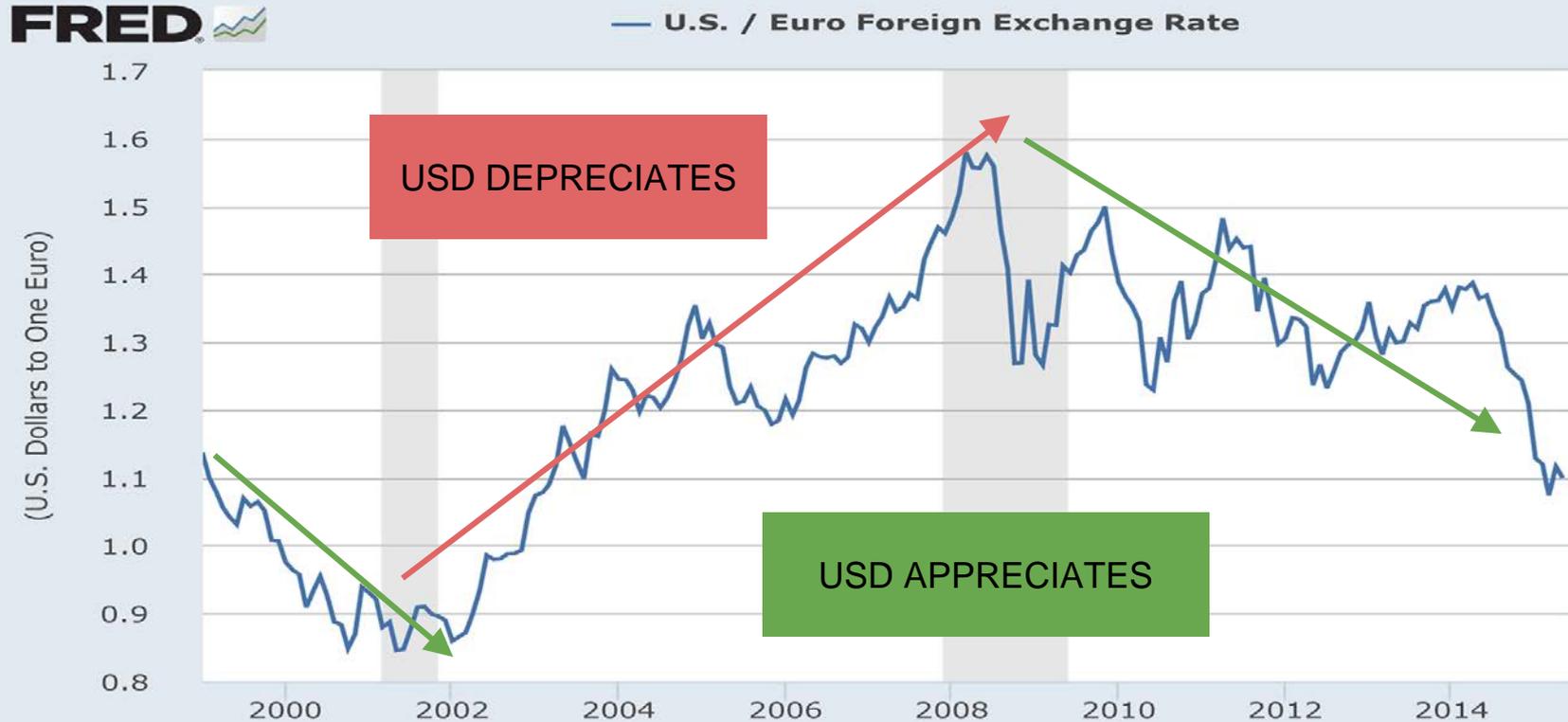
# What are Exchange Rates?

- Mr. A (from St. Louis) wants to buy a taxi ride in Paris
  - He must first buy Euros
  - The price at which he buys Euros is the USD-Euro exchange rate
- The Foreign Exchange Market is the market where currencies are traded

# What are Exchange Rates?

- Like any other price...
  - 1 coffee trades for 2 USD
  - 1 USD trades for  $\frac{1}{2}$  coffee
  
- When 1 Euro trades for 1.1 USD
  - That is the price of a Euro in USD
  - 1 USD trades for 0.91 Euro ( $1 / 1.1 = 0.91$ )
  - That is the price of a USD in Euro

# 2015-05-29: 1.0994 USD to 1 Euro



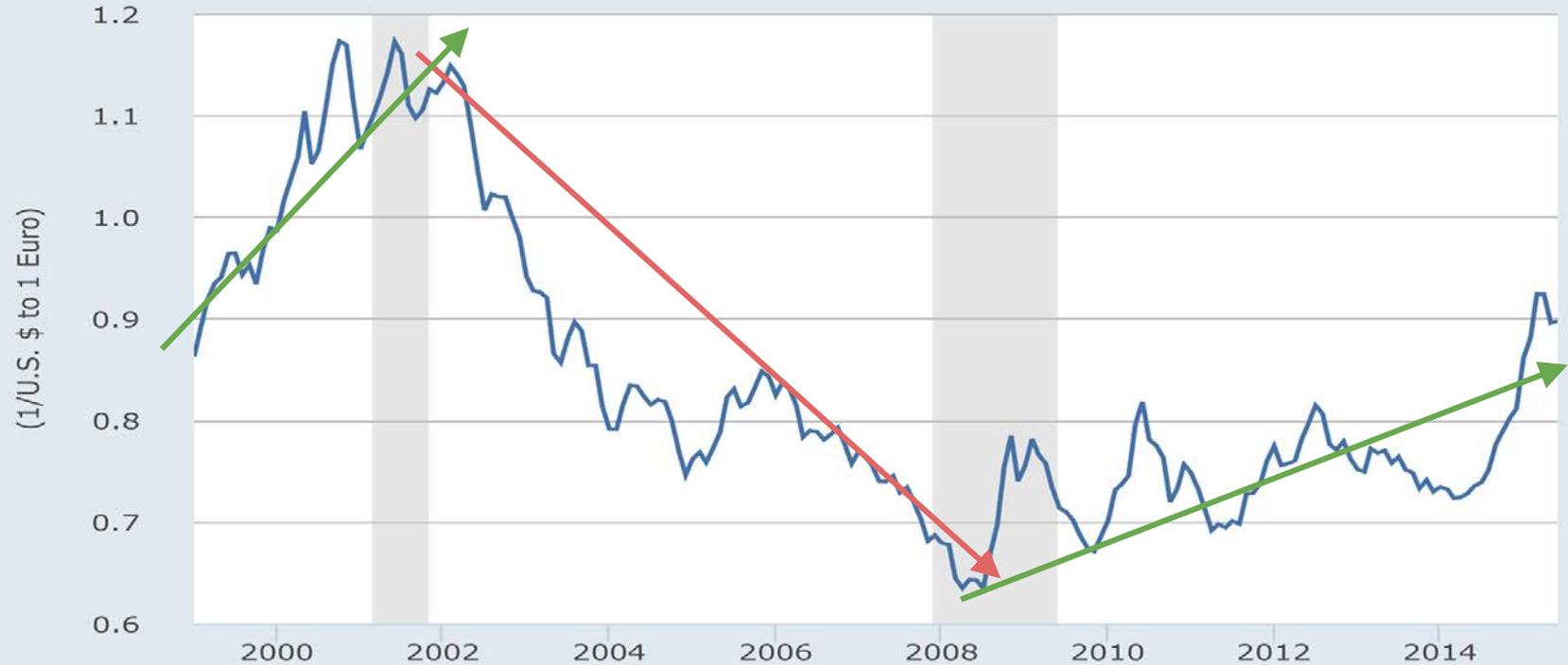
Source: Board of Governors of the Federal Reserve System (US)

Shaded areas indicate US recessions - 2015 research.stlouisfed.org

# Euro per USD

**FRED** 

— 1/U.S. / Euro Foreign Exchange Rate



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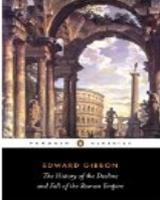
# The Demand for US Dollars

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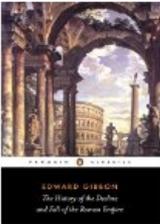
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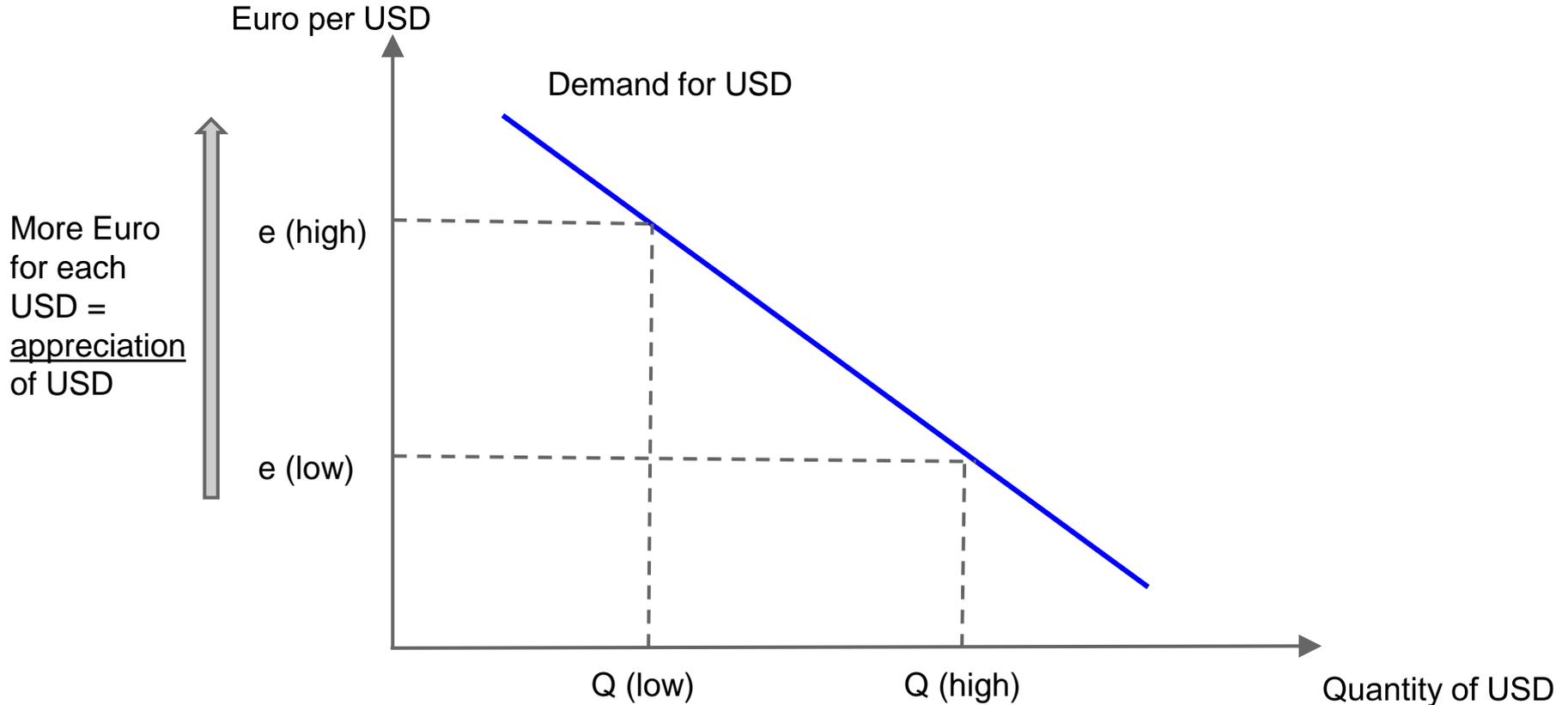
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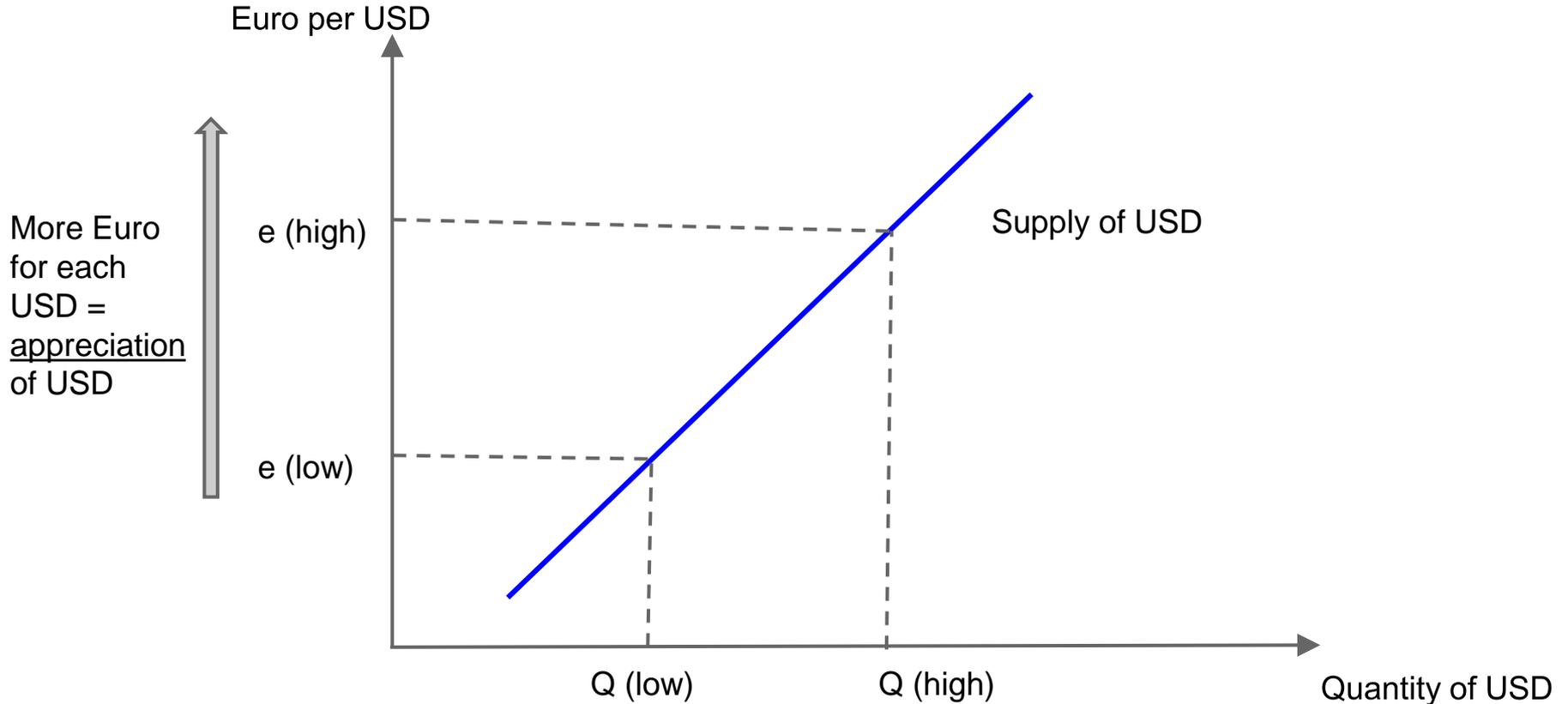
# The Demand for US Dollars

- “The History of the Decline and Fall of the Roman Empire” by E. Gibbon
  - 14 USD... call that book A(merica)
  - 17 Euros... call that book E(urope)
- 0.5 Euro per USD  $\Rightarrow$  A costs 7 Euros (14x0.5)
- 1 Euro per USD (USD appreciates)  $\Rightarrow$  A costs 14 Euros (14x1)
- As USD appreciates A becomes relatively more expensive
  - Purchases of A by European (exports) down
  - People demand less USD and more Euros

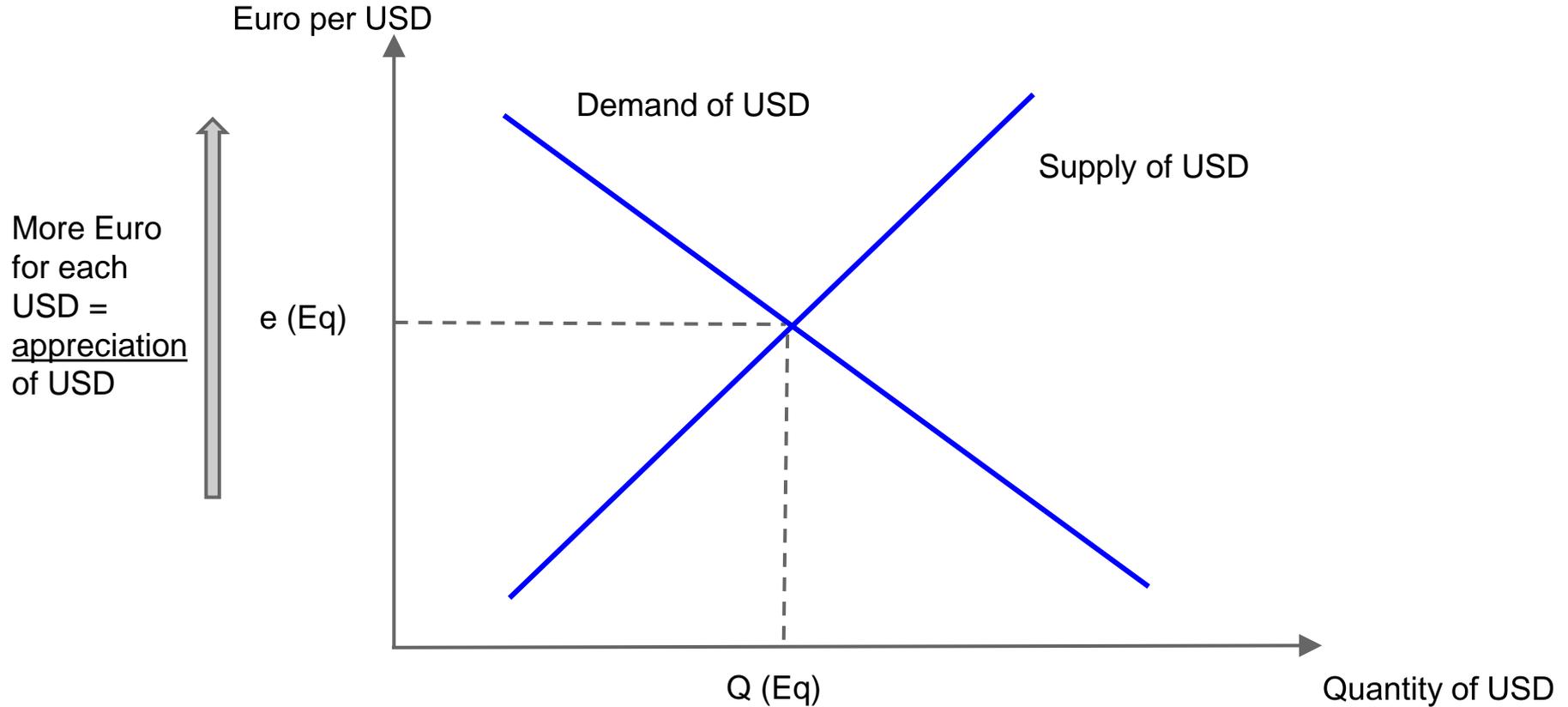
# The Foreign Exchange Market



# The Foreign Exchange Market



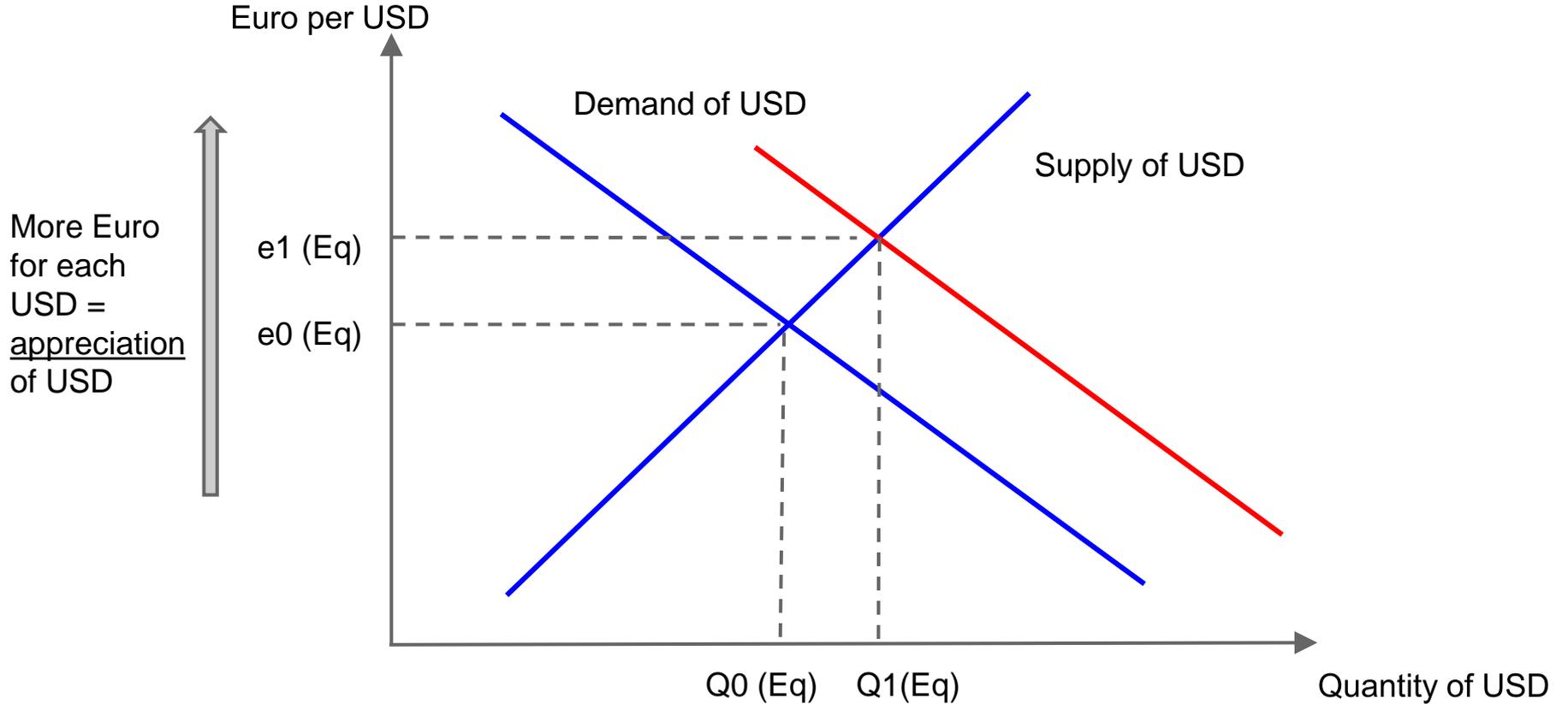
# Equilibrium of the Foreign Exchange Market



# Shifts in Supply and Demand

- Supply and demand for USD shift when
  - Demand for US goods and services by European changes
  - Demand for US assets by European changes
- If European investors decide to purchase more US assets
  - Demand for USD up
  - USD appreciates

# Increase in the Demand for USD



# Real Exchange Rates

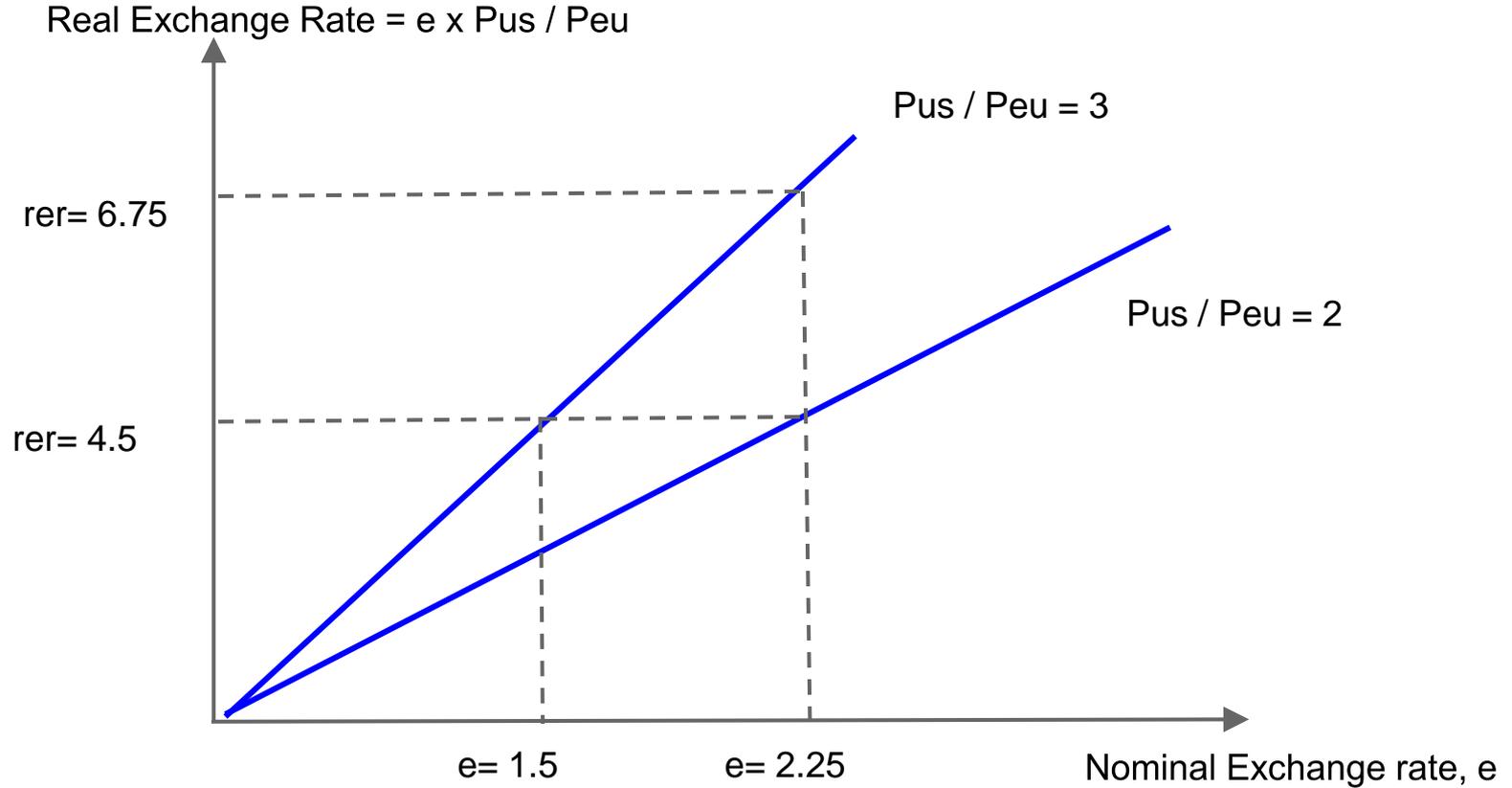
- So far, exchange rate is nominal: the rate at which currencies are traded
- Not very interesting
  - Currencies serve no purpose on their own
- More interesting: at what rates can goods be traded?
  - If I have 1 European good, can I
    - sell it for Euros
    - Buy Dollars
    - Buy the same good in the U.S., but how many?
  - Answer is the Real Exchange Rate

# Real Exchange Rates

- A look at the units of “things”
  - $e \sim \text{EUR} / \text{USD}$  (the EURO price of a US Dollar)
  - $P_{us} \sim \text{USD} / \text{USgood}$  (the US Dollar price of a US good)
  - $P_{eu} \sim \text{EUR} / \text{EUgood}$  (the Euro price of a EU good)
- We want  $rer \sim \text{EUgood} / \text{USgood}$  (the EU good price of a US good)

$$\underbrace{\frac{EUgood}{USgood}}_{rer} = \underbrace{\frac{EUR}{USD}}_e \underbrace{\frac{USD}{USgood}}_{P_{us}} \underbrace{\frac{EUgood}{EUR}}_{1/P_{eu}}$$

# Real Exchange Rates



# Real Exchange Rates and PPP

- PPP = Purchasing Power Parity
  - The Nominal Rate at which goods cost the same in two countries
  - e.g.
    - $P_{eu} = 3, P_{us}=2$  implies  $PPP = P_{eu}/P_{us} = 3/2$  (EUR per USD)
    - 1 US good buys 2 USD, which buy 3 EUR, which buy 1 EU good
  - Therefore PPP is the Nominal Exchange Rate such that the Real Exchange Rate is one

$$rer = e \frac{P_{us}}{P_{eu}} \Rightarrow 1 = \frac{P_{eu}}{\underbrace{P_{us}}_{PPP}} \frac{P_{us}}{P_{eu}}$$

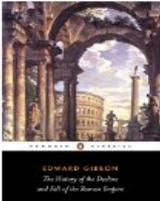
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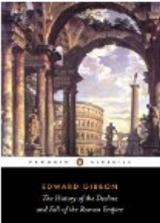
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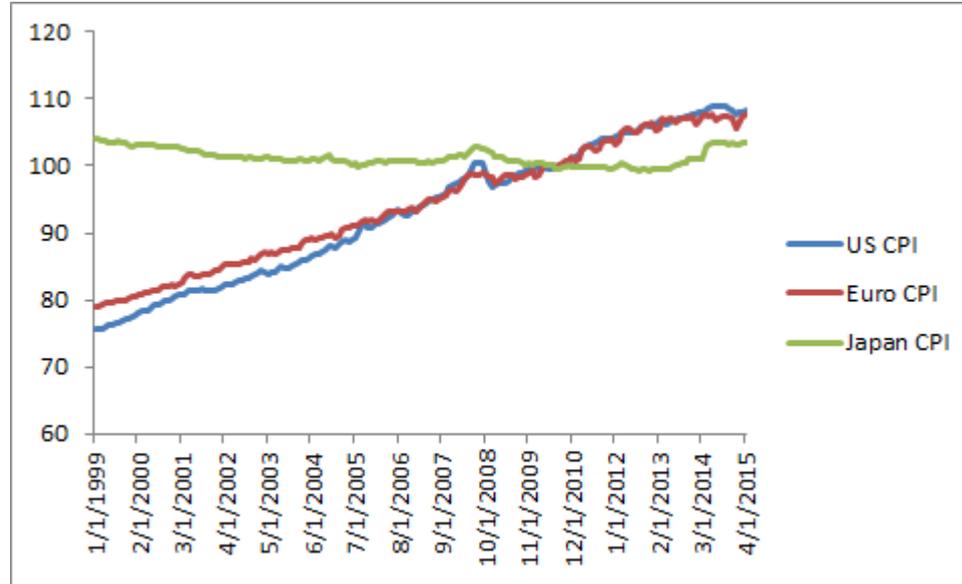
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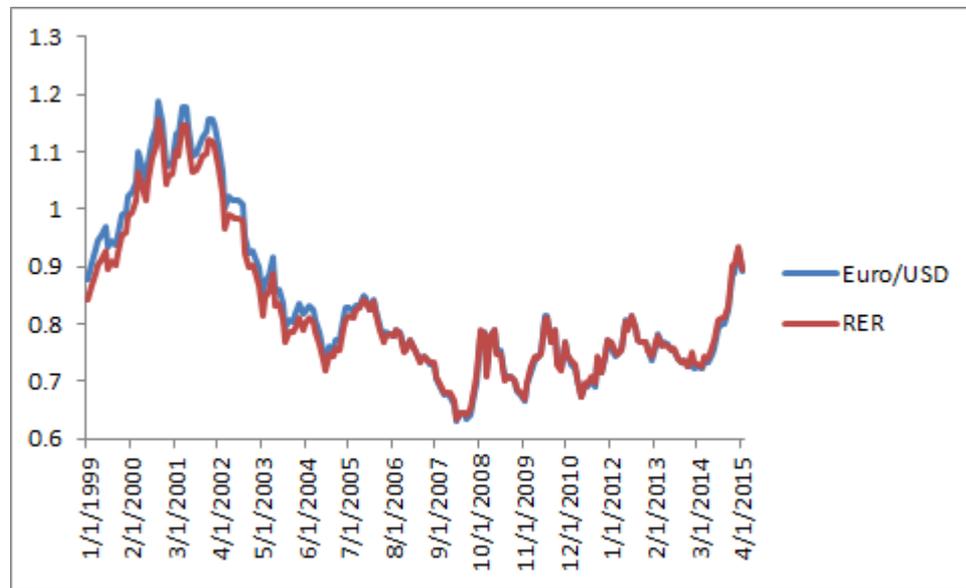
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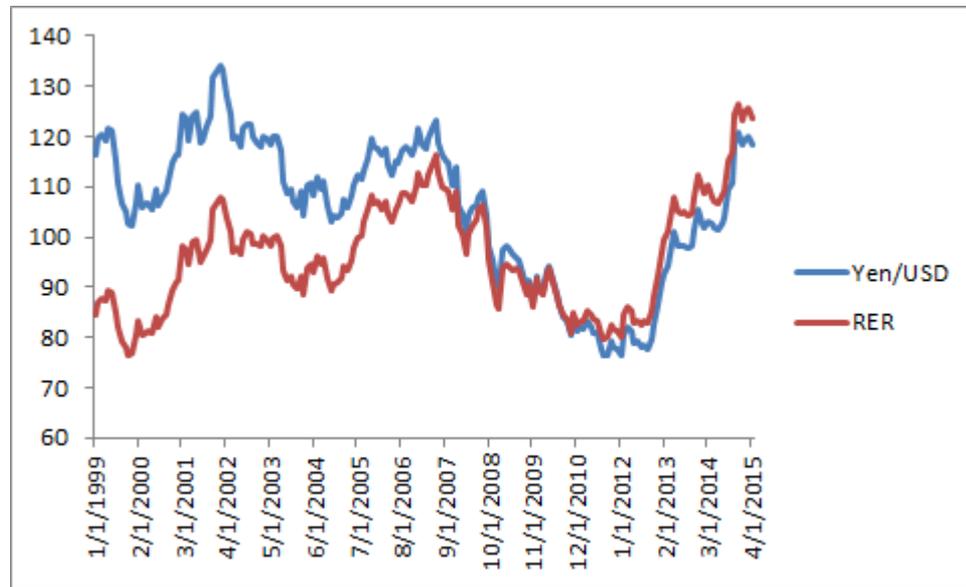
# Cons. Price Index in Europe, US and Japan



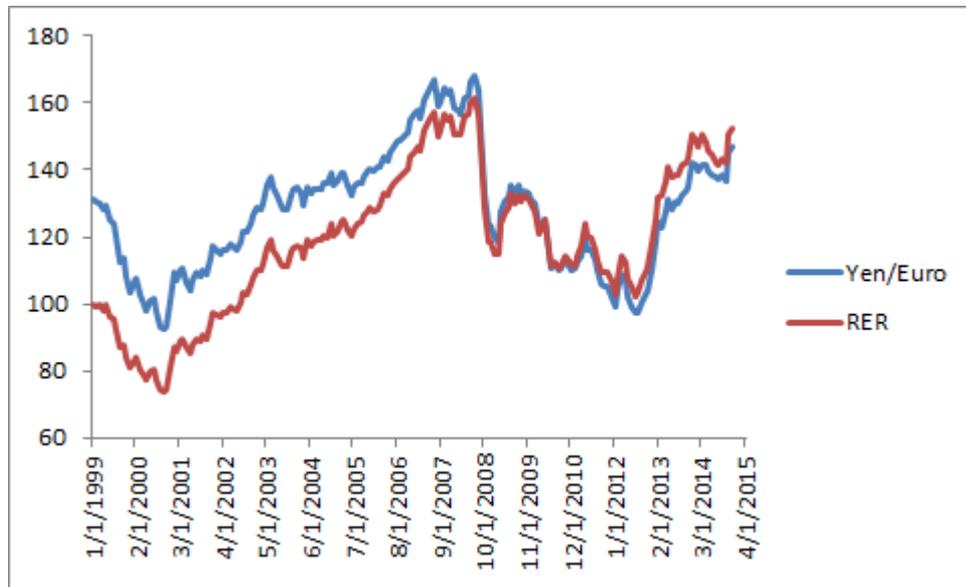
# Nominal and Real Exchange Rates: US v. EUR



# Nominal and Real Exchange Rates: US v. Japan



# Nominal and Real Exchange Rates: Eur v. Japan



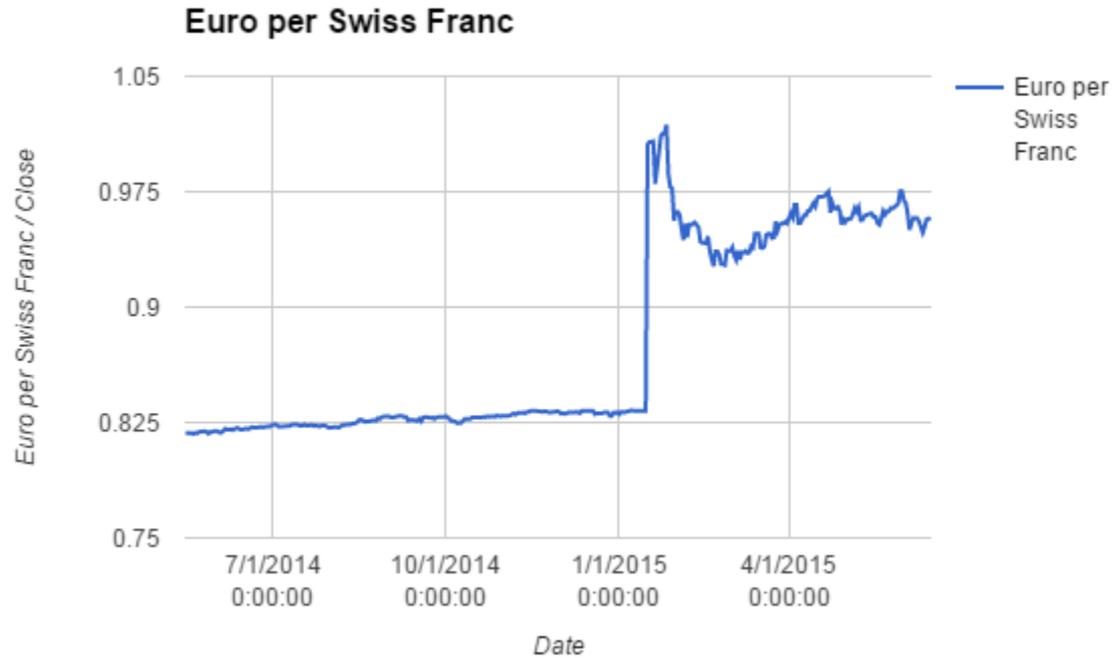
# Exchange Rate Policy

- Price of currency important for imports and exports
  - Government involved in controlling the exchange rate
- Fixed Exchange Rate Regimes
  - If rate “too low” government buys its currency on foreign exchange market
  - Needs to maintain Foreign Exchange Reserves
  - If rate “too high” government sells its currency on foreign exchange market and accumulates reserves

# Exchange Rate Policy: The Swiss Franc

- Mid-January 2015 the Swiss central bank abandoned the fixed exchange regime with the Euros
  - The regime was in place since 2011
  - Motivation: too much demand for the Franc  $\Rightarrow$  a high price hurt Swiss exports

# Euro per Swiss Franc



# US Dollar per Swiss Franc

