Econ 340

Lecture 14
Pegging the Exchange Rate

News: Oct 28 – Nov 3

- China-US deal signing delayed by Chile APEC cancellation -- WSJ: 10/30 | Canvas | NYT: 10/30 | Canvas | FT: 10/30 | Canvas | WP: 10/30 | Canvas
  - Civil unrest in Chile forced it to cancel a meeting of APEC -- Asia Pacific Economic Cooperation -- scheduled for November 15-17 in Santiago. The unrest is unrelated to trade or APEC, but security concerns prompted the cancellation.
  - US and China had planned on Presidents Trump and Xi meeting there to sign their "Phase One" trade deal. Though that deal is not yet complete, it is expected to include increased US agricultural exports to China and US delaying increased tariffs on China's exports to US. It might also include on agreements on intellectual property and currencies.
  - APEC is searching for an alternative venue to hold the meeting, but it may not find one and will have to cancel the meeting. And the US and China are looking for an alternative opportunity to sign their agreement.
- US wins WTO dispute against India -- FT: 10/31 | Canvas
  - The US had filed a complaint in March 2018 against India for providing $7 billion in annual export subsidies to its companies. A WTO panel has now ruled that these subsidies were indeed illegal under WTO rules.
  - India had argued that these subsidies were legal under exemptions for developing countries, but the WTO panel rejected that argument. India must end the subsidies within six months or the WTO may permit the US to retaliate with tariffs on India's exports.
  - India will likely appeal this decision, but in December the WTO Appellate Body will lack a quorum for making decisions, due to US refusal to approve appointments.
- Incoming ECB President calls on Germany and Netherlands to increase spending -- FT: 10/30 | Canvas
  - Christine Lagarde, incoming president of the European Central Bank and former head of the International Monetary Fund, spoke on French radio and called on Eurozone countries that have government budget surpluses, Germany and Netherlands, to use that "room for manoeuvre" to increase spending in order to stimulate their and their neighbors' economies.
  - The eurozone countries share a currency, but they do not have any mechanism for fiscal cooperation or common budgetary policy. As a result, when some countries experience macroeconomic weakness, they rely on only monetary policy to help them out, and with today's low or negative interest rates, monetary policy can do little.
  - It is customary for ECB presidents not to name individual countries, but Lagarde's comments occurred before she was to take the helm of the ECB on Friday.

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Lecture 14 Outline: Pegging the Exchange Rate

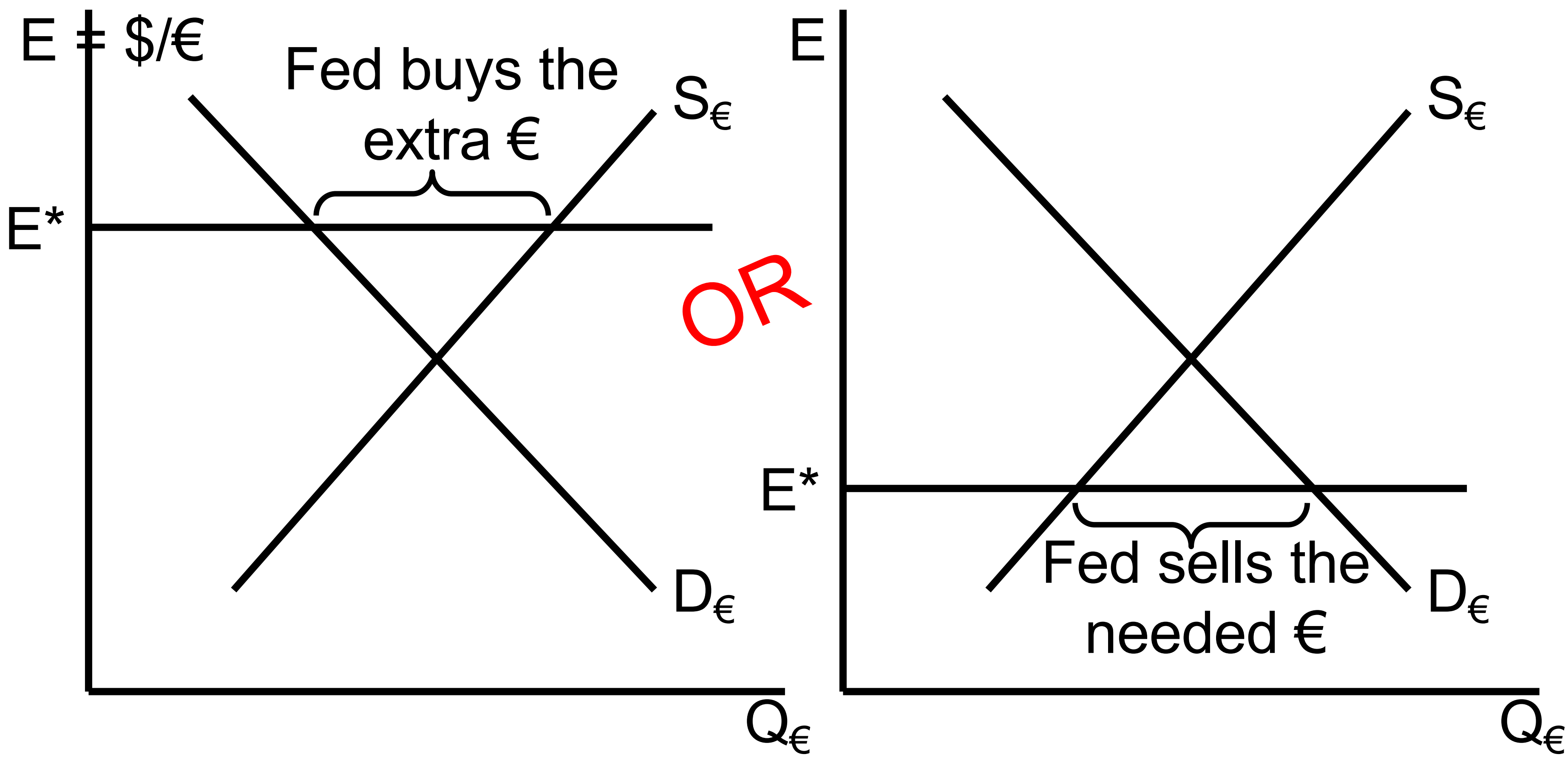
- How It's Done
  - Market Intervention
  - Bands of Fluctuation
  - Hybrids of Pegged and Floating
  - The Gold Standard
- Who Pegs?
- Mechanics of Intervention
  - Reserves
  - Money Supply
  - Sterilization
- Effects of Pegging
- Chinese Currency Manipulation

How It's Done

- What "Pegging" Means
  - To "fix" the exchange rate by intervening in the market
  - It does not mean just fixing it by law – making it illegal to exchange the currency at other than the official rate
    - Countries do that too, but that is not pegging, and it does not entirely work: gives rise to "black market"
  - "Intervention" means
    - Buying or selling foreign currency, so as to
    - Make up the difference between the market's supply and demand
    - Normally done by the central bank of the pegging country

How It's Done

- Example: If the Fed were to peg the $ to the € at rate E* (Note: it does <u>not</u> do this!)



How It's Done

- What "Pegging" Means
  - In practice, pegs are never exact
  - Central banks
    - Set a "par value" (= "central value")
    - Intervene only if rate moves some distance (e.g., 1%) above or below this par value
    - This range of movement is called an "exchange rate band"
  - We will ignore this complication in drawing the market, and pretend that they peg the rate exactly

How It's Done

- Hybrids of Pegged and Freely Floating Exchange Rates
  - Managed Float
    - Intervene to influence the rate
    - But do not announce a target rate or par value
    - And do not necessarily keep the rate constant
  - "Dirty Float" = same as Managed Float

How It's Done

- Hybrids of Pegged and Freely Floating Exchange Rates
  - "Leaning Against the Wind"
    - Particular form of managed float that
      - Does <u>not</u> try to alter the <u>level</u> of the exchange rate, but
      - <u>Does</u> try to slow its rate of change
    - Purpose: to dampen fluctuations

How It's Done

- Hybrids of Pegged and Freely Floating Exchange Rates
  - Crawling Peg
    - A pegged rate with a par value that moves
      - Slowly

      and
      - Predictably
    - Example: Country might announce that the par value will appreciate by 0.01% each week as long as central bank is buying foreign exchange, and vice versa

Note: All of these hybrids still <u>do</u> require intervention in the exchange market

How It's Done

- The Gold Standard
  - Common in 19th century, but ended 1914.
  - Countries
    - Defined their currencies in terms of gold
    - Stood ready to buy and sell gold at their official rate
  - Result was like pegged exchange rates, except that the pegging was to gold.
  - "Rules" of the Gold Standard
    - Fix price of gold in terms of your own currency
    - Keep money supply equal gold supply (or proportional to it)
    - Be ready to redeem currency in terms of gold and allow gold (and thus money) to flow internationally
  - Implication of the gold standard: Changes in money supply (gold) equilibrate the markets

Clicker Question

If the US were to peg the US dollar to the euro at an exchange rate where the \$/€ rate is <u>higher</u> than will clear the market, the Fed would have to

✓ a) Buy euros and sell dollars
b) Sell euros and buy dollars
c) Buy both euros and dollars
d) Sell both euros and dollars
e) None of the above

Clicker Question

Under the Gold Standard, suppose that the dollar price of gold was $35/oz and the pound price of gold was £7/oz. What would be the price of the pound in terms of dollars?

a) $1/£
b) $5/£
c) $7/£
d) $35/£
e) $245/£

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Who Pegs?

- US?
  - No
  - But we did have a pegged exchange rate until 1973
    - (Strictly speaking, it was other countries that pegged to us, not us to them)
    - In fact, from the late 1940s until 1973, virtually <u>all</u> countries pegged to the US dollar (exceptions were Canada, which sometimes floated, and several former colonies that pegged to the British pound or French franc)

Who Pegs?

- Europe?
  - No: the euro floats freely
  - Before the euro, but after 1973,
    - Countries did not peg to currencies outside Europe
    - But they often did try to peg to each other
  - Denmark now pegs to the euro
  - Other EU countries outside the euro (UK, Sweden) and countries outside the EU (Switzerland, Norway) all have floating exchange rates

Who Pegs?

- Other Developed Countries?
  - No: Canada, Japan, Australia, New Zealand, S. Korea all have floating rates

Who Pegs?

- Developing Countries?
  - They are mixed
  - A sample (from IMF, 2008):
    - Argentina: pegged (to US dollar)
    - Brazil: float
    - Bulgaria: currency board (pegged to euro)
    - China pegged to dollar until summer 05, and July 08 to July 2010; now sometimes says it pegs to basket of currencies
    - Costa Rica: crawling peg
    - India: managed float
    - Egypt: managed float
    - Nepal: pegged (to India's rupee)

Clicker Question

Which of the following countries peg their currencies?

a) Sweden
b) Brazil
✓ c) Nepal
d) All of the above
e) None of the above

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Mechanics of Intervention

- Always: Buy or sell foreign currency in exchange for domestic currency
- This has two effects, if nothing else is done:
  1. Changes the level of <u>reserves</u> of foreign currency
  2. Changes the level of the country's own domestic <u>money supply</u> in circulation

Mechanics of Intervention

- Change in Central Bank’s Reserves of Foreign Currency
  - What they buy is added to reserves
  - What they sell is subtracted from reserves

Mechanics of Intervention

- Change in Country's Domestic Money Supply
  - When US Central Bank (CB) buys € with $, those $ go <u>into</u> circulation
    - This adds to the US money supply
    - (Actually, it adds even more, due to "money multiplier" you learned about in Econ 102)
  - When CB sells € for $, those $ come <u>out of</u> circulation
    - Reducing the money supply
    - Similar to Gold Standard

Mechanics of Intervention

- Sterilization
  - However, Central Bank has the option of preventing this change in the money supply by “sterilization”
  - Sterilization = Use of offsetting open market operations to keep the money supply unchanged
  - Example: To sterilize a $1 m. <u>purchase</u> of foreign currency, CB would <u>sell</u> $1 m.-worth of bonds
    - This takes the $1 m. back out of circulation
  - Sterilization is a policy choice
    - Central Bank can do it, or not, as it sees fit
    - Some central banks have said they lack the tools to sterilize
    - Most, if they intervene in the exchange market, <u>do</u> sterilize, thus preventing gold-standard-like adjustment

Clicker Question

Sterilization of exchange-market transactions by a central bank means to prevent those transactions from changing

a) The level of its reserves
✓ b) The level of its domestic money supply
c) The level of the foreign money supply
d) The spot exchange rate
e) The forward exchange rate

Clicker Question

When a central bank is trying to maintain an over-valued currency by buying its own currency on the foreign exchange market, sterilization of that transaction means for it to

a) Buy foreign currency

b) Sell foreign currency

✓ c) Buy domestic bonds

d) Sell domestic bonds

e) Devalue

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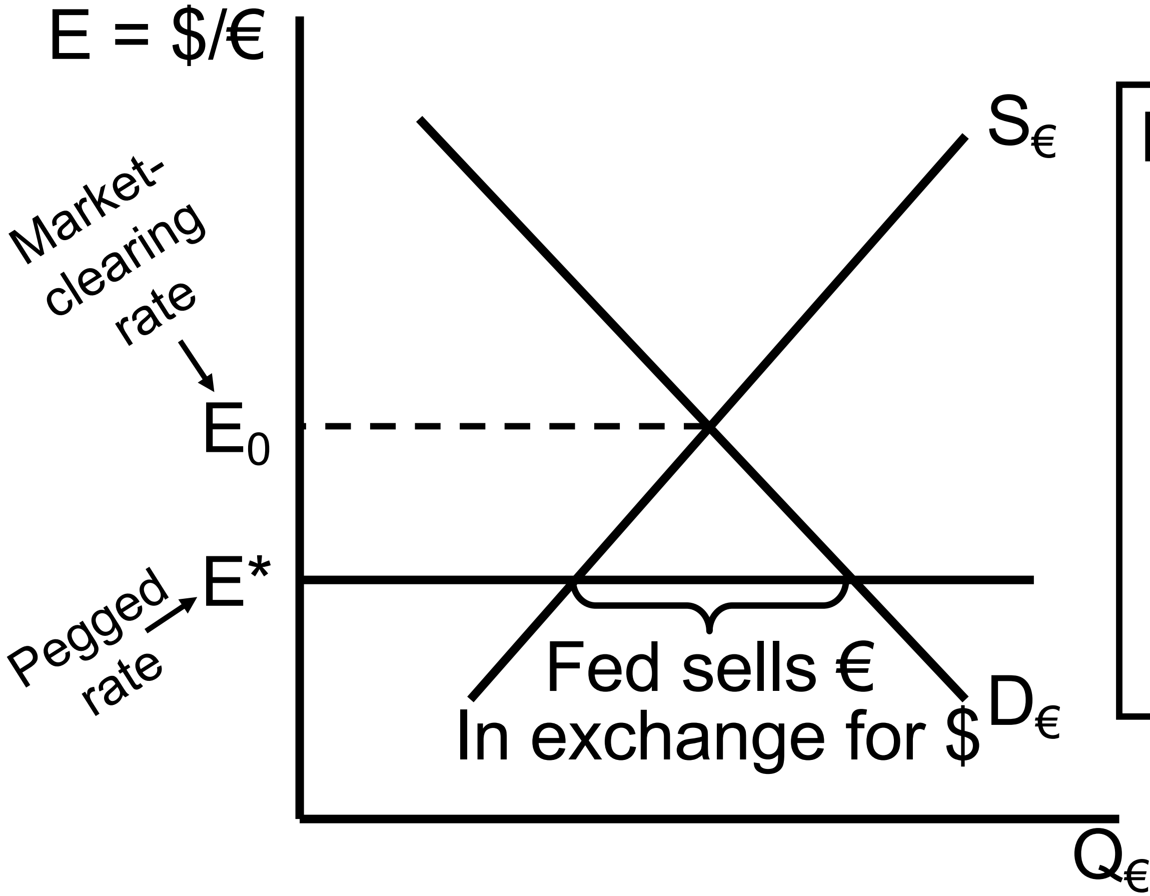
Effects of Pegging

- Case I: Dollar Over-valued
  - In this case (unlike PPP), "overvalued" means the dollar is being pegged at a rate that is above (i.e., appreciated relative to) the market-clearing rate
    - Which means that the actual exchange rate, E, the price of foreign currency, is <u>below</u> the market-clearing rate, E_0
  - At the overvalued exchange rate, there is excess demand for foreign currency, which CB must provide by selling out of reserves. Thus reserves fall.
  - If it does <u>not</u> sterilize, then the money supply also shrinks
  - If it <u>does</u> sterilize, then it buys bonds

Effects of Pegging

- Peg if $ Overvalued



Effects of Pegging if $ Overvalued:

- Reserves (of €) fall
- If not sterilized,
  - Money supply (of $) falls
- If sterilized
  - Fed buys bonds

Effects of Pegging

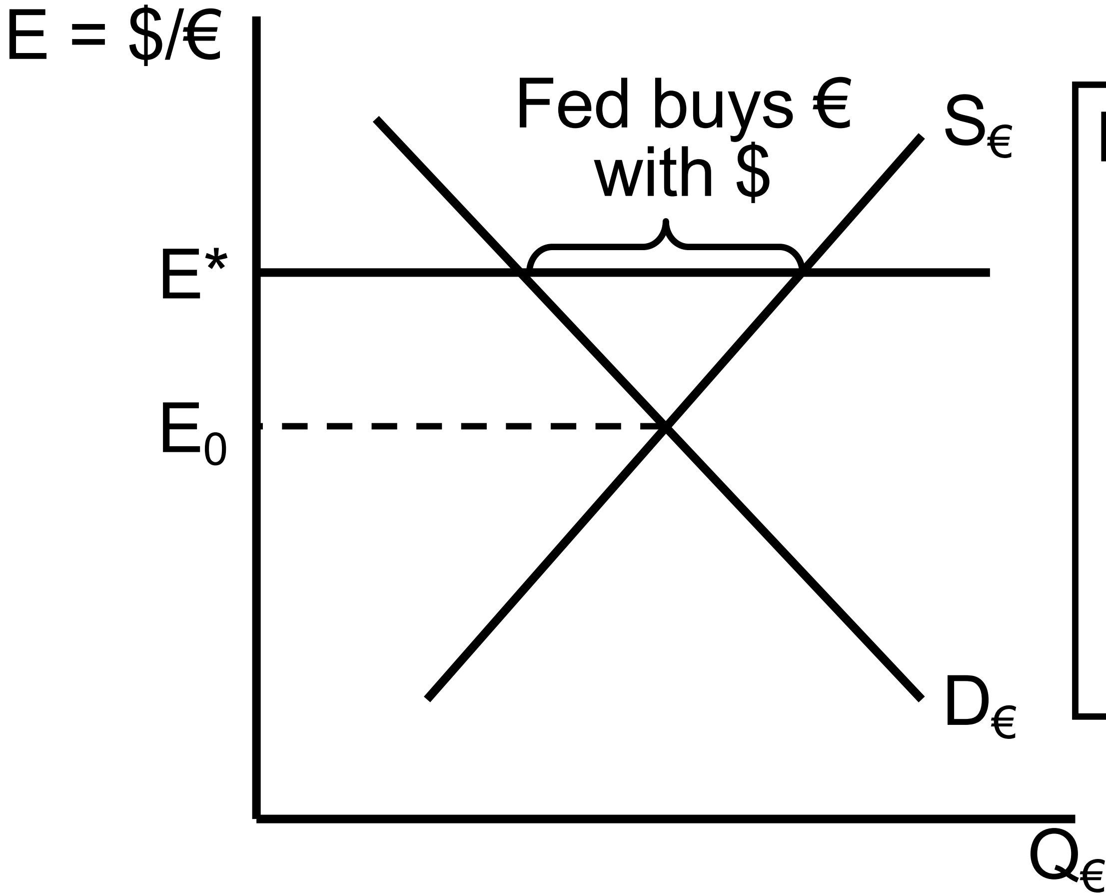
- Further implication of an overvalued peg
  - If it continues, central bank must eventually run out of reserves
  - This, as we'll see, causes a Crisis
    - Exchange-rate crisis, or
    - Financial crisis

Effects of Pegging

- Case II: Dollar Under-valued
  - In this case, “undervalued” means the dollar is being pegged at a rate that is below (i.e., depreciated relative to) the market-clearing rate
    - Which means that E, the price of foreign currency, is above the market-clearing rate, E_0
  - At undervalued rate, there is excess supply of foreign currency, which CB must take out of the market by buying and adding to reserves
  - If it does not sterilize, then the money supply grows
  - If it does sterilize, then it sells bonds

Effects of Pegging

- Peg if \$ Undervalued



Effects of Pegging if \$ Undervalued:

- Reserves (of €) rise
- if not sterilized,
  - Money supply (of \$) rises
- If sterilized,
  - Fed sells bonds

Effects of Pegging

- Further implication of an undervalued peg
  - Nothing critically important
  - If it continues, Central Bank piles up more and more reserves, but there is no limit on its ability to do that
  - Result: <u>No</u> crisis
  - However, if it does not sterilize, then money supply grows too, and this may cause inflation

Effects of Pegging

- Note the asymmetry:
  - Overvalued peg leads to crisis
  - Undervalued peg does not

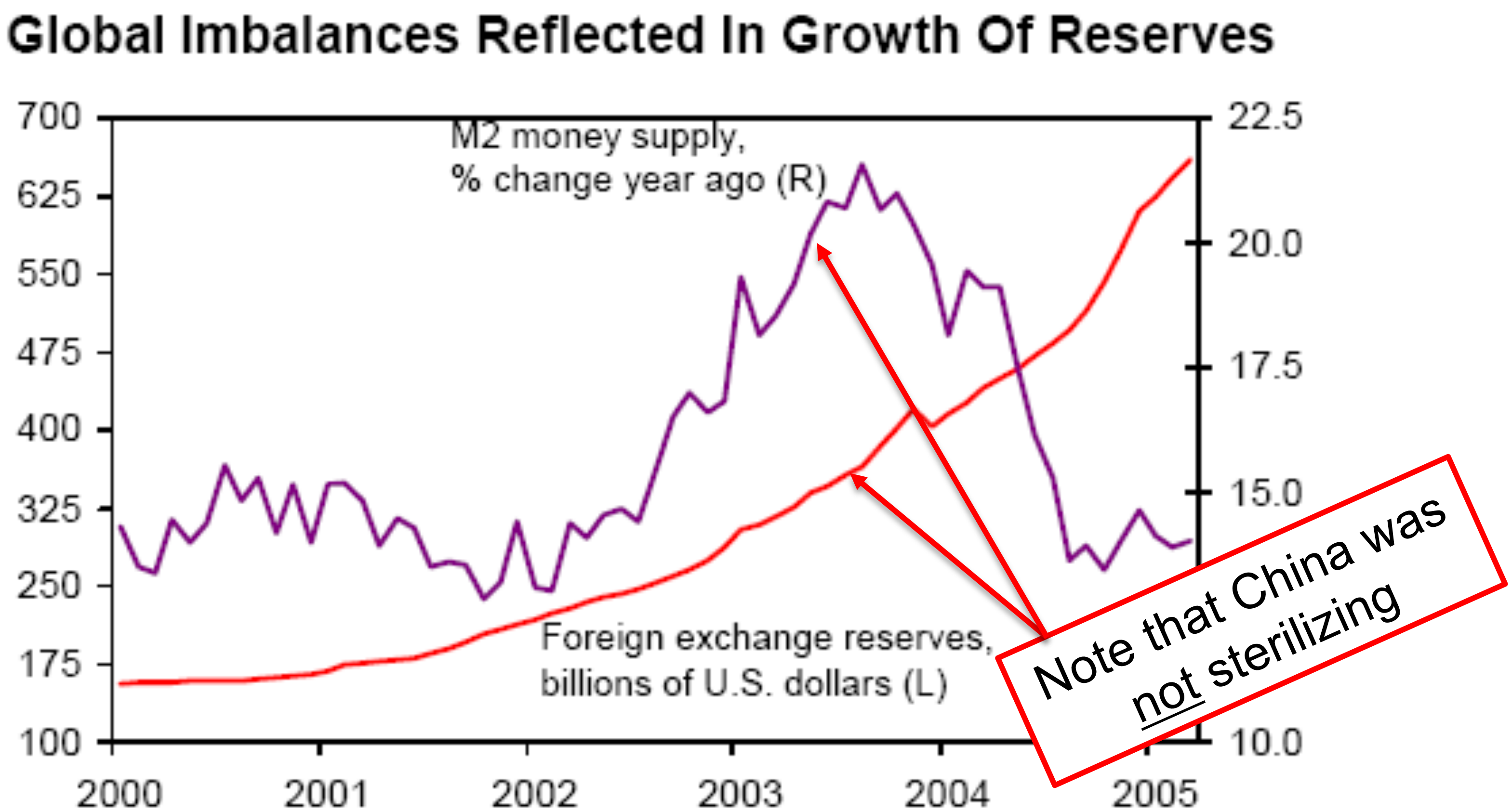
Clicker Question

Which of the following leads to crisis, and why?

a) An undervalued peg, because the world avoids the currency
b) An overvalued peg, because it discourages exports
c) An undervalued peg, because pegging causes inflation
✓ d) An overvalued peg, because pegging exhausts reserves
e) A floating exchange rate, because it can form a bubble

Effects of Pegging

- Example of Undervalued Peg: China



Source PNC Financial Services Group

Effects of Pegging

- A Special Case: The US Dollar
  - Most countries that peg their currencies, peg them to the US dollar
  - That means that their reserves are dollar-denominated assets, mostly US gov't bonds
  - If they keep their currencies <u>under</u>valued, then that means the dollar is <u>over</u>valued
    - But the overvalued dollar need not lead to crisis
    - Others want, need, or at least <u>choose</u>, to hold our dollars

Effects of Pegging

- A Special Case: The US Dollar (see Ferguson)
  - Most of US foreign borrowing is being met by foreign central banks
  - That means they are holding reserves, a result of buying dollars to
    - Keep their currency down
    - Keep the US dollar up
    - Or just to have dollars available in case of crisis
  - We benefit from the high dollar: we can buy cheap goods and services
  - But we borrow in dollars in order to do it
    - If others were to stop lending, then the dollar would fall and so would the value of our debt, which <u>they</u> hold!
    - Thus it is "their problem," not ours!

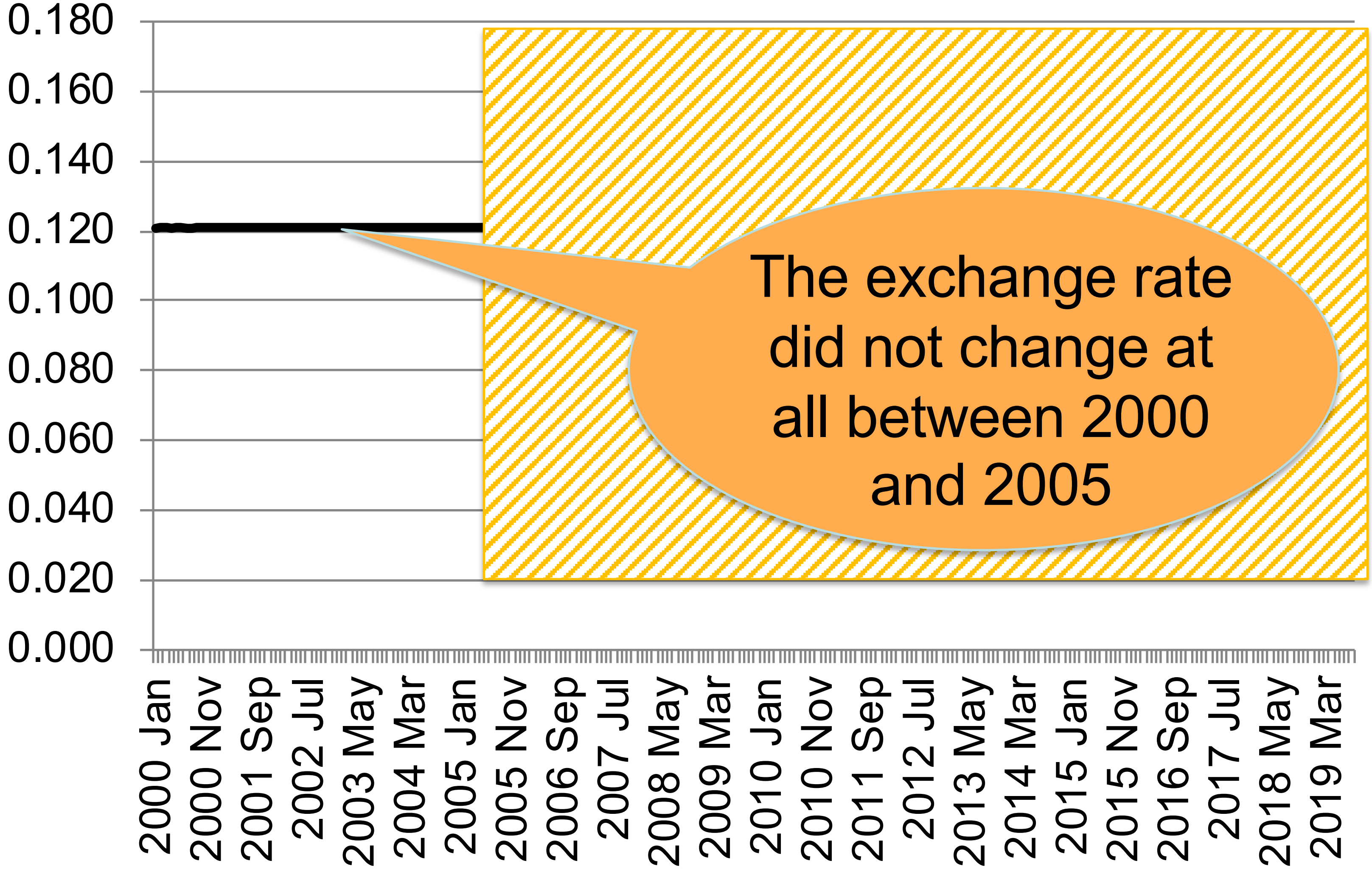
Effects of Pegging

- A Special Case: The US Dollar vs Chinese Renminbi (see Levy)
  - Many US policymakers disagree: Thus US has pressured China to appreciate the yuan
    - Why? To make it easier to sell US goods
    - Congress threatens trade barriers against China
      - Might have once been legal under Section 421, special "China safeguard" negotiated with China's WTO accession, but that has now expired.
      - Instead Trump is using tariffs on China for other reasons

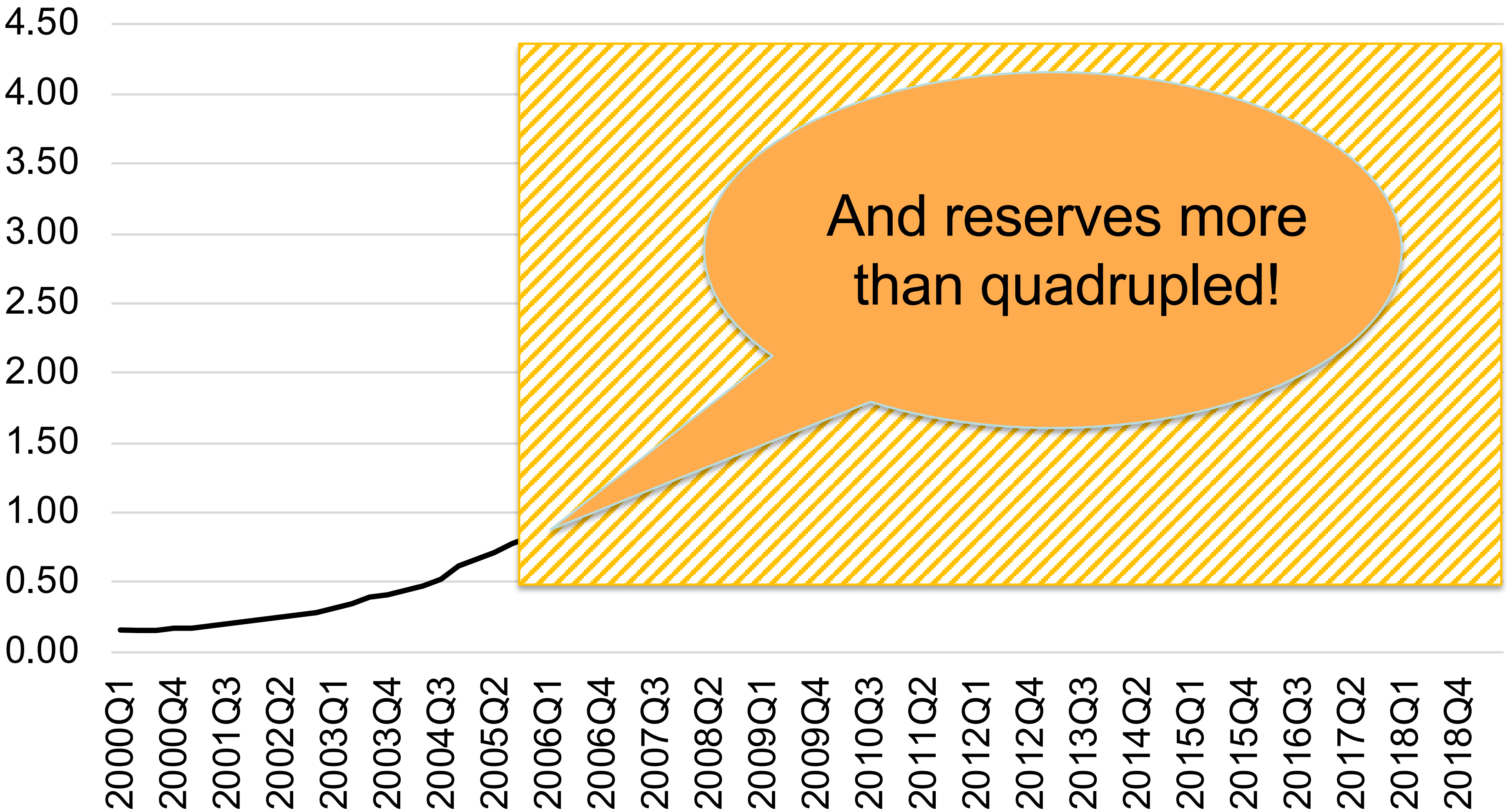
Effects of Pegging

- A Special Case: The US Dollar vs Chinese Renminbi (see Levy)
  - Levy argues
    - Tariffs against China won't work
      - We'll just switch to importing from other low-cost countries
      - US trade deficit (due to our low saving) will be unchanged
    - To really have an effect and send a message, we should: Reduce government spending!

China's Exchange Rate, US$/Yuan, 2000-2019



China's Reserves, $ trillions, 2000-2019



Effects of Pegging

- A Special Case: The US Dollar vs Chinese Renminbi
  - It is clear from the two graphs that
    - China was pegging their currency to the US dollar in 2000-2005
    - To do so they were buying dollars and thus accumulating almost $1 trillion of reserves

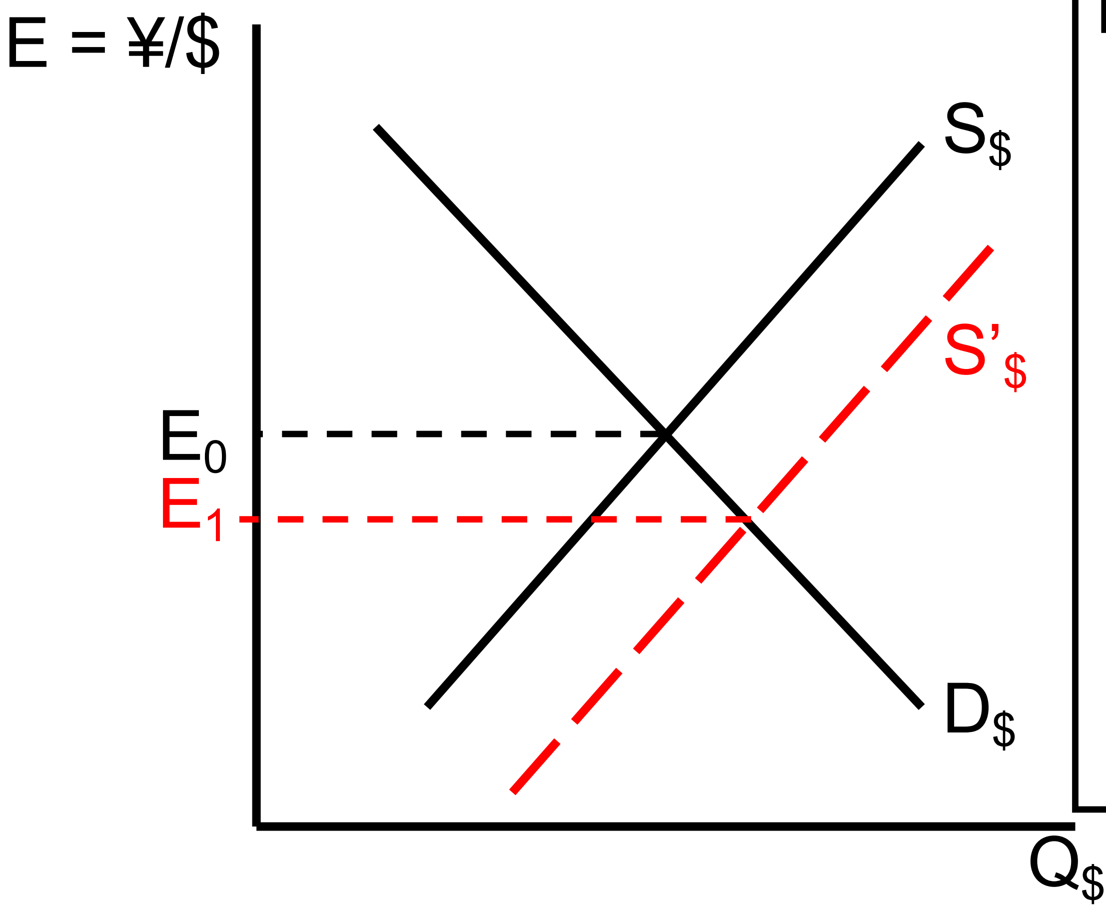
Effects of Pegging

- Example: To see the effects on US of China pegging versus floating,
  - Consider the Chinese foreign exchange market (for $)
  - Suppose the US economy expands, increasing US imports from China.
  - What will happen if
    - The renminbi floats?

    Or, instead, if
    - The renminbi is pegged to the US dollar?
  - We'll look at <u>China's</u> market for foreign exchange, where their foreign currency is the dollar

Effects of US Expansion on China if Renminbi is Floating

- US expansion if renminbi is floating

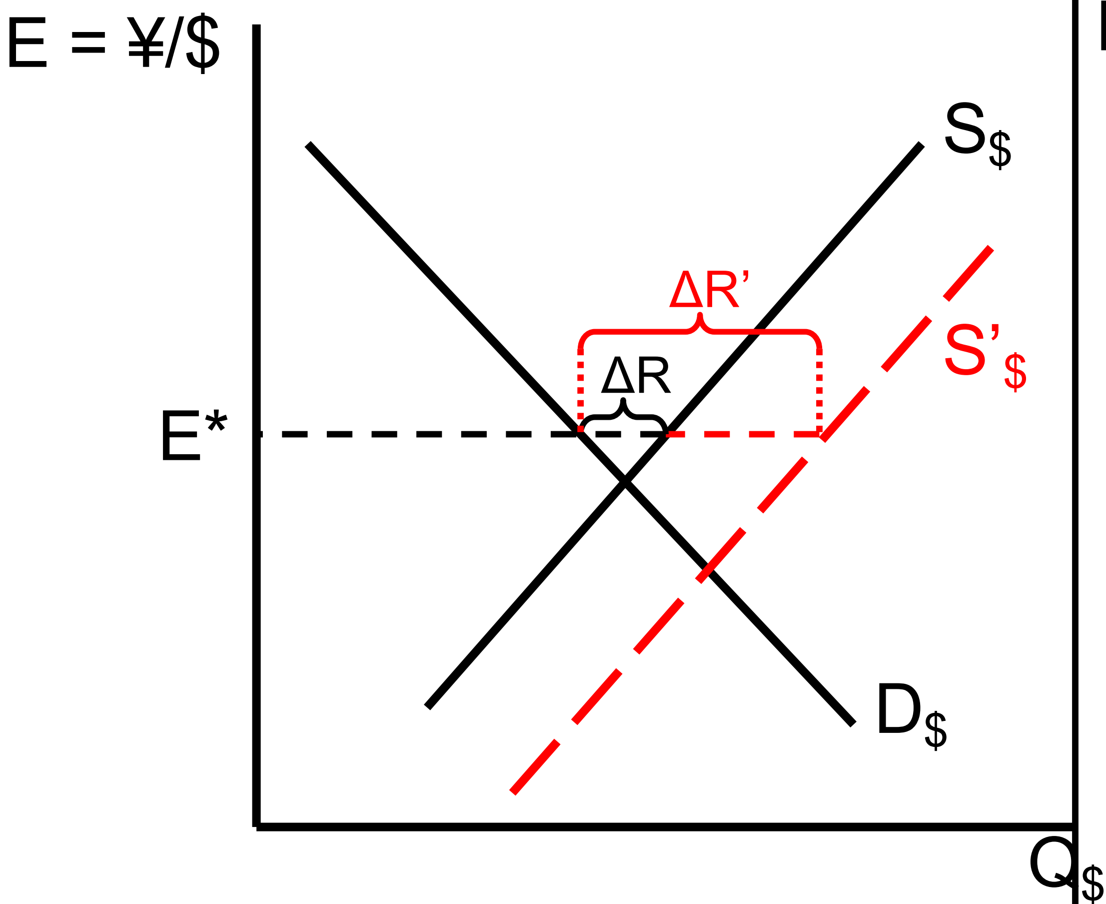


Effects of US expansion:

- $S_\$$ shifts right (more US imports from China)
- Yuan appreciates (¥/$ falls)
- No change in China's reserves or money supply
- Rising ¥ reduces US imports and increases US exports

Effects of US Expansion on China if Renminbi is Pegged

- US expansion if renminbi is pegged



Effects of US expansion:

- $S_\$$ shifts right (more US imports from China)
- Yuan stays constant (no further effect on US trade)
- People's Bank of China buys more $
  - Reserves rise faster
  - Money supply expands faster if not sterilized
- May cause inflation in China

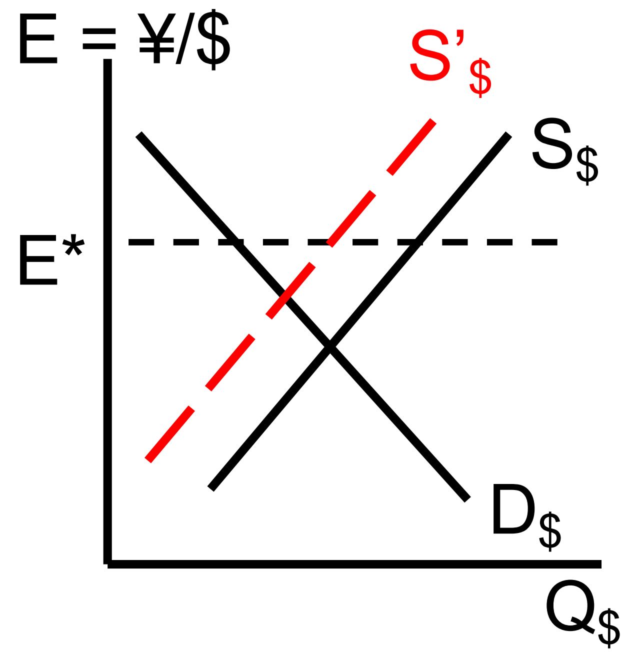
Effects of Pegging

- Implication of Example:
  - Something always changes in the exchange market when changes occur for trade, capital flows, or other transactions
    - Exchange rate changes if floating
    - Reserves (and maybe money supply) change if pegged

Clicker Question

In the graph, China is pegging its currency, ¥, to the dollar, \$, at the rate E*. The supply curve for foreign exchange shifts left, as shown. What could have caused this?

a) Capital inflow into China
b) Expectation of ¥ appreciation
✓ c) Reduced Chinese exports
d) Chinese currency manipulation
e) Increased interest paid on Chinese assets abroad

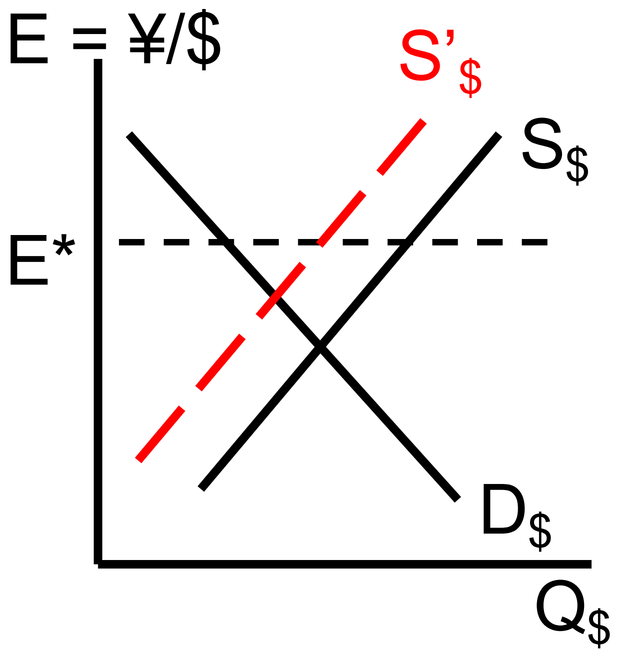


China's exports are source of supply of foreign exchange, which is reduced.

Clicker Question

Same graph and situation, and China's Central Bank, CB, is sterilizing. What happens?

a) CB increases its purchases of dollars
b) CB decreases its sales of dollars
c) CB increases its purchases of bonds
✓ d) CB decreases its sales of bonds
e) CB does nothing, as exchange rate does not change



To maintain the peg, CB must buy \$. To sterilize it must therefore sell bonds. Shift of $S_\$$ causes it to do less of each.

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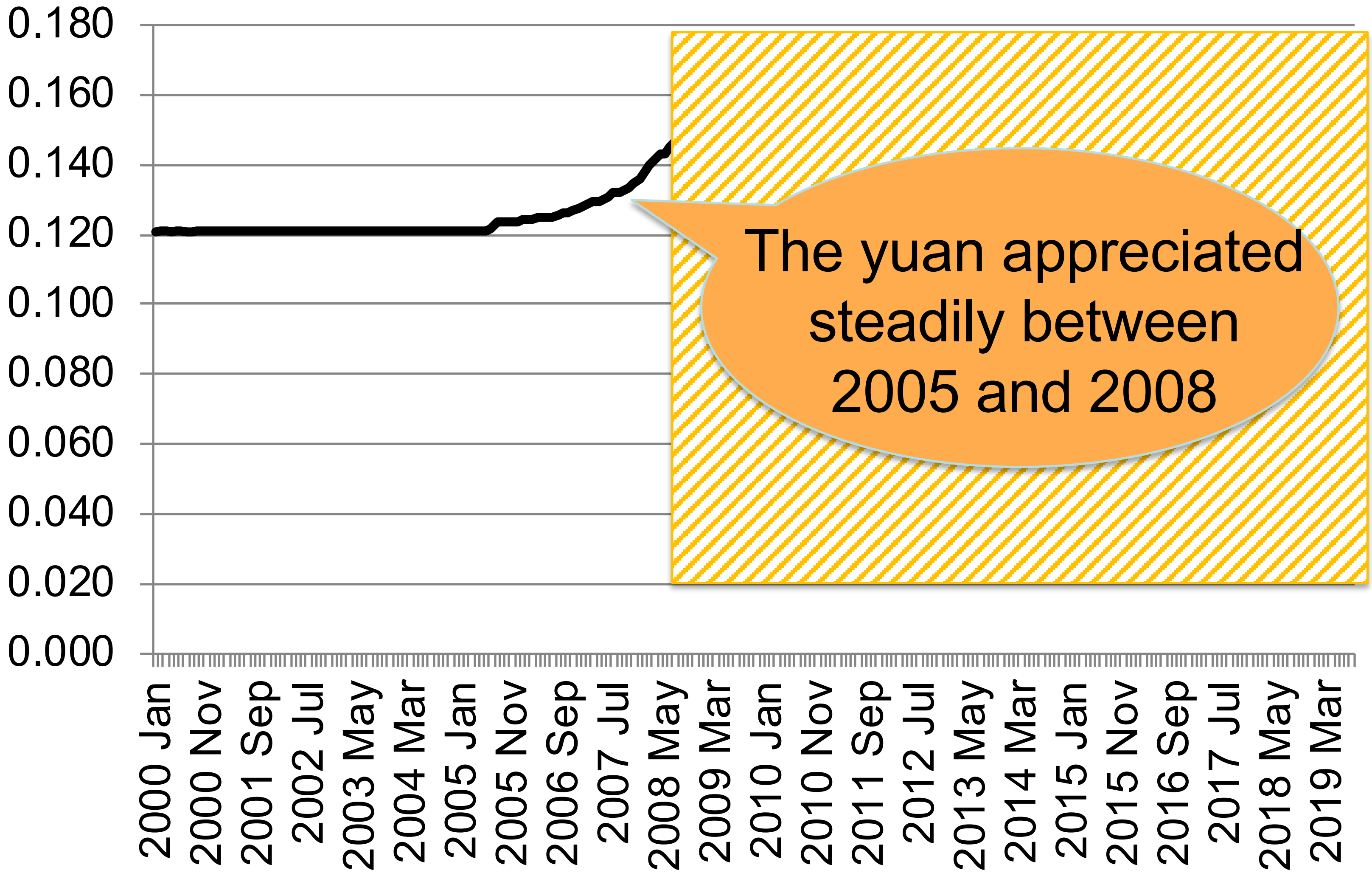
Chinese Currency Manipulation

- We saw in the graphs above that China was intervening in 2000-2005 to keep the value of its currency down
- This led policy makers in the US to complain, and in 2005 China let its currency rise

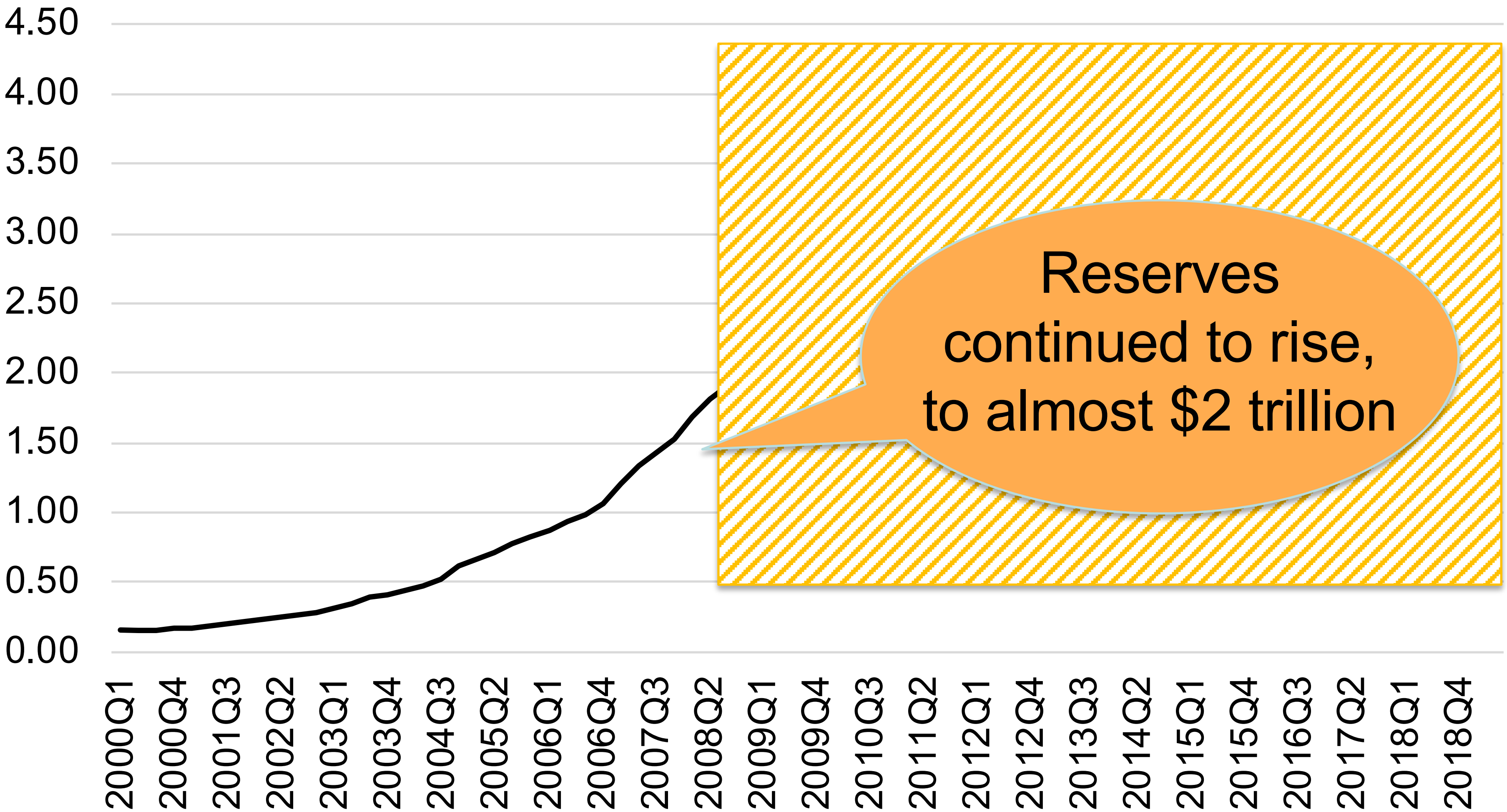
China's Exchange Rate, US$/Yuan, 2000-2019



Chinese Currency Manipulation

- But China's reserves continued to rise, indicating that it was still buying dollars.

China's Reserves, $ trillions, 2000-2019



Chinese Currency Manipulation

- The financial crisis of 2008 slowed down both
  - The appreciation of the renminbi, and
  - The growth of reserves

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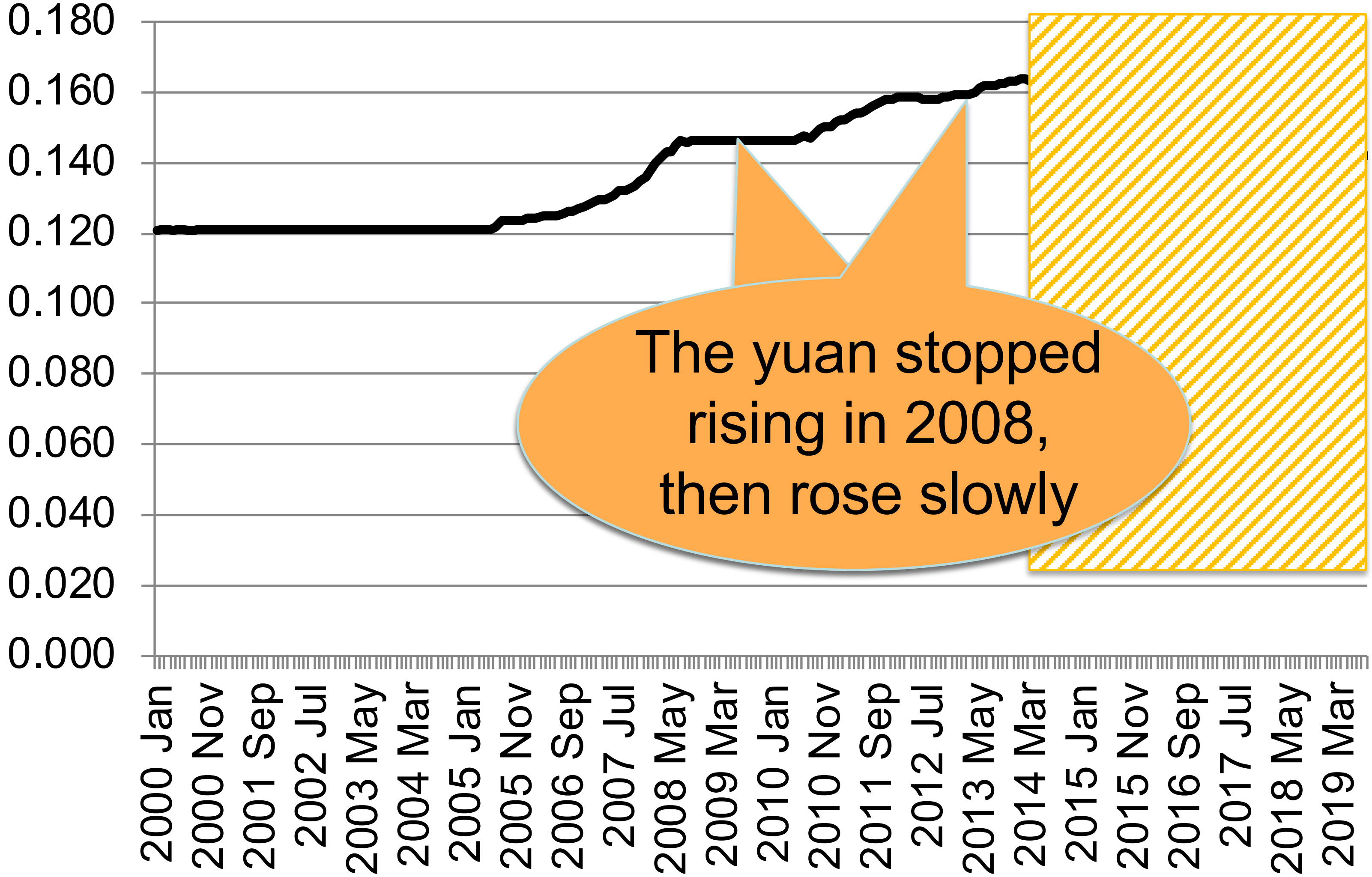
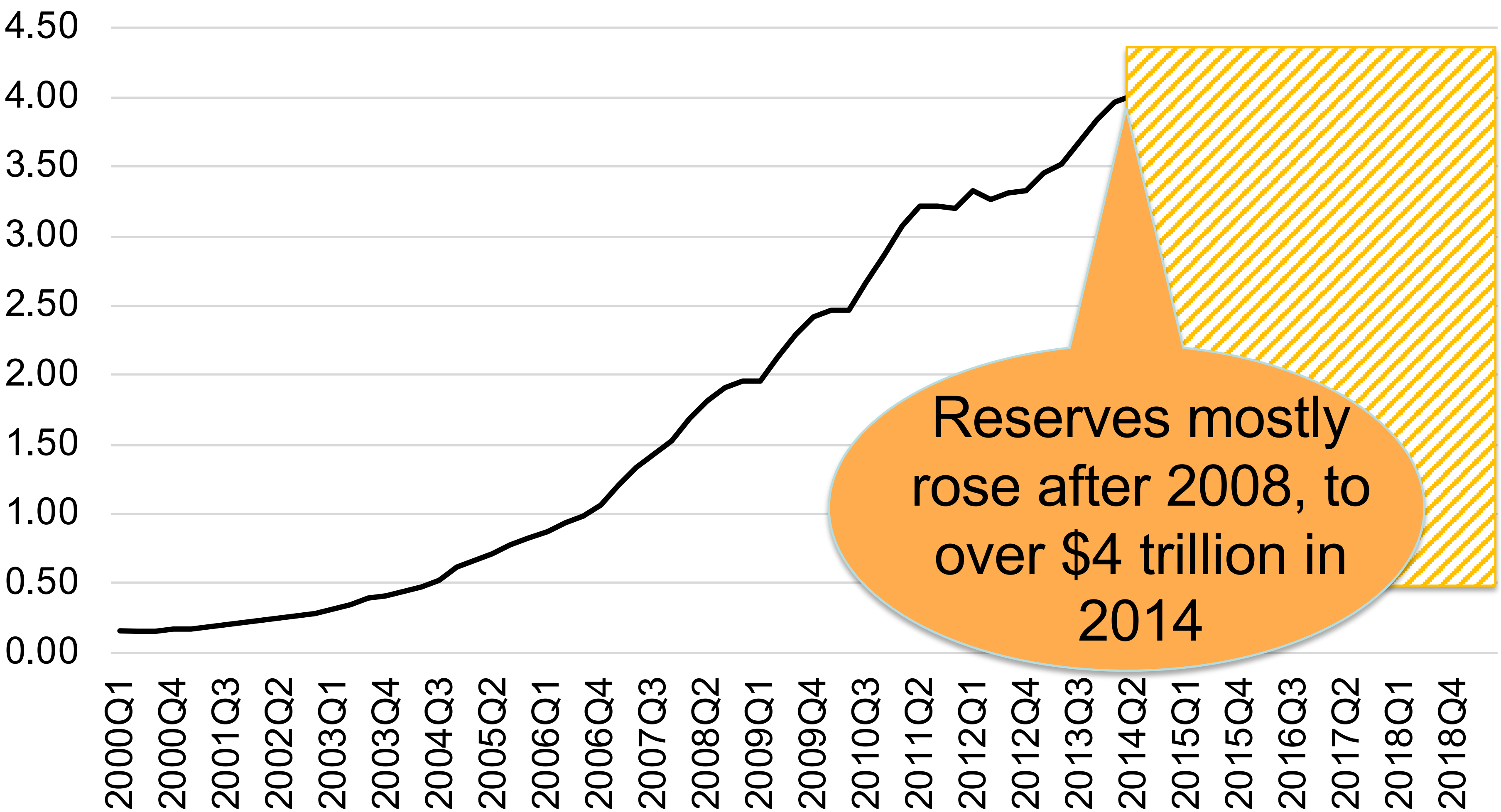


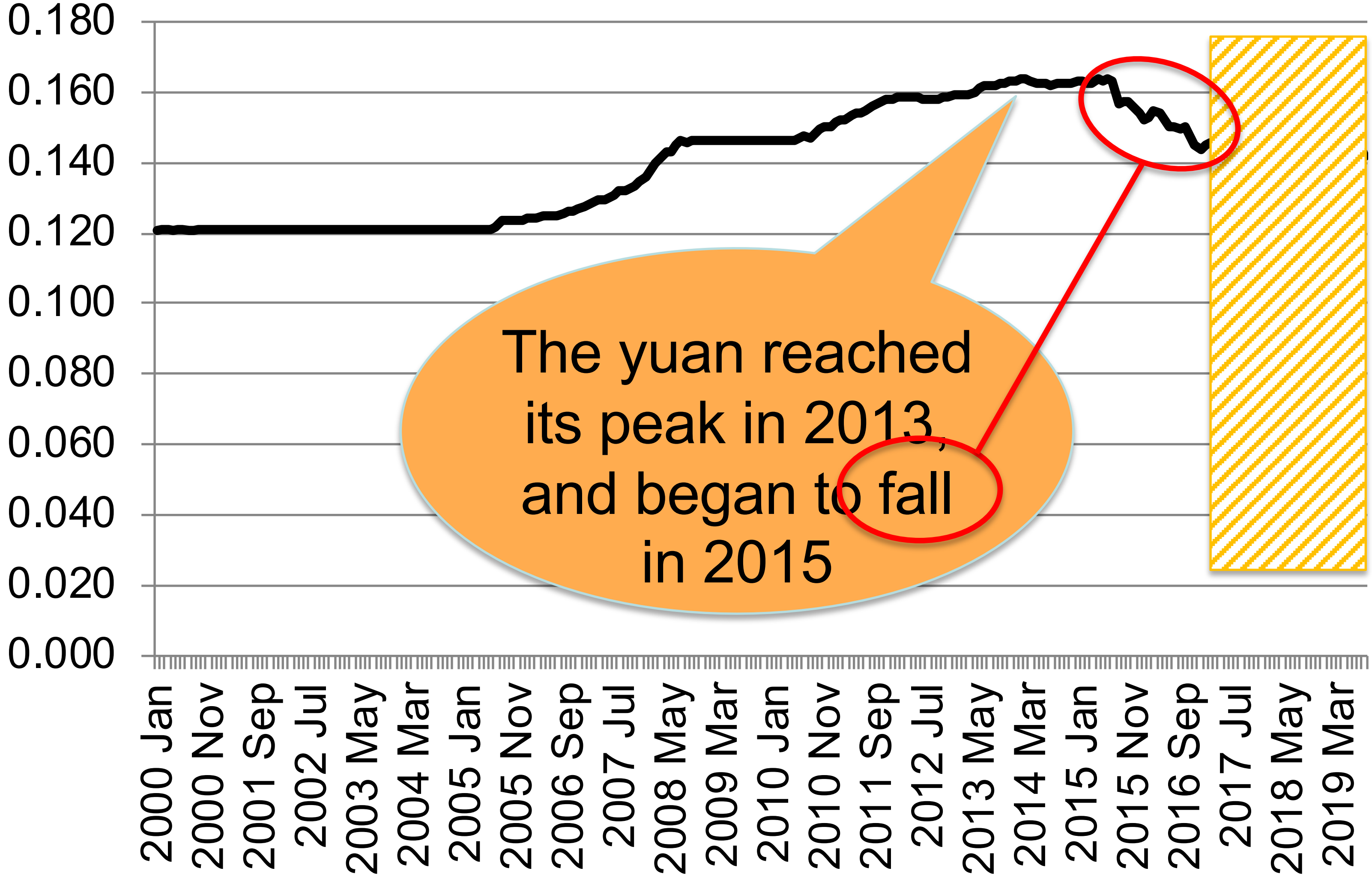
China's Reserves, $ trillions, 2000-2019



Chinese Currency Manipulation

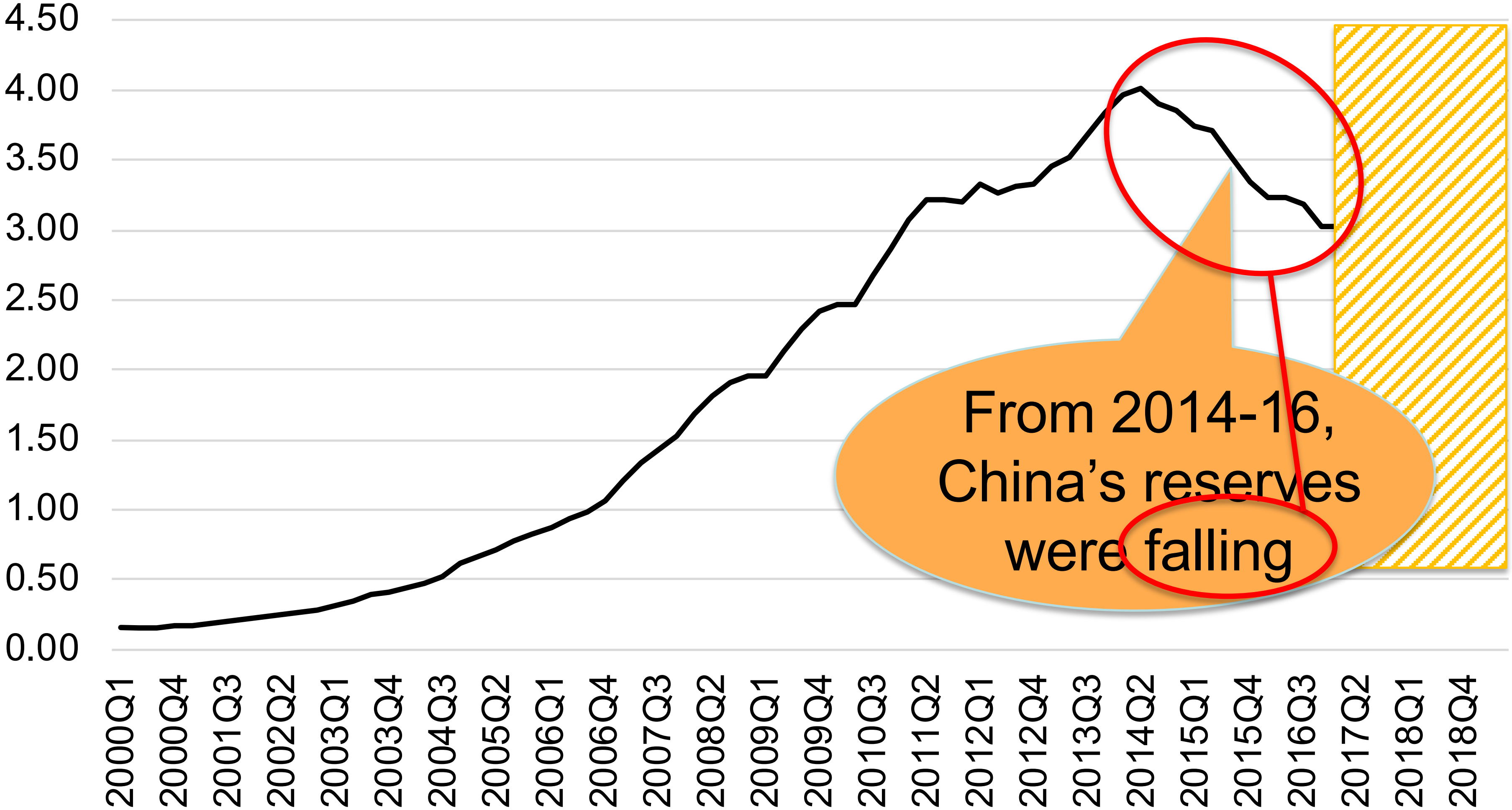
- The financial crisis of 2008
  - Slowed down the appreciation of the renminbi, off and on
  - But reserves continued to grow rapidly in most periods until 2014
  - China's purchases of US dollars were still holding down the yuan's value, or slowing its rise
- But all that changed in 2014

China's Exchange Rate, US$/Yuan, 2000-2019



US$/Yuan 2016-17

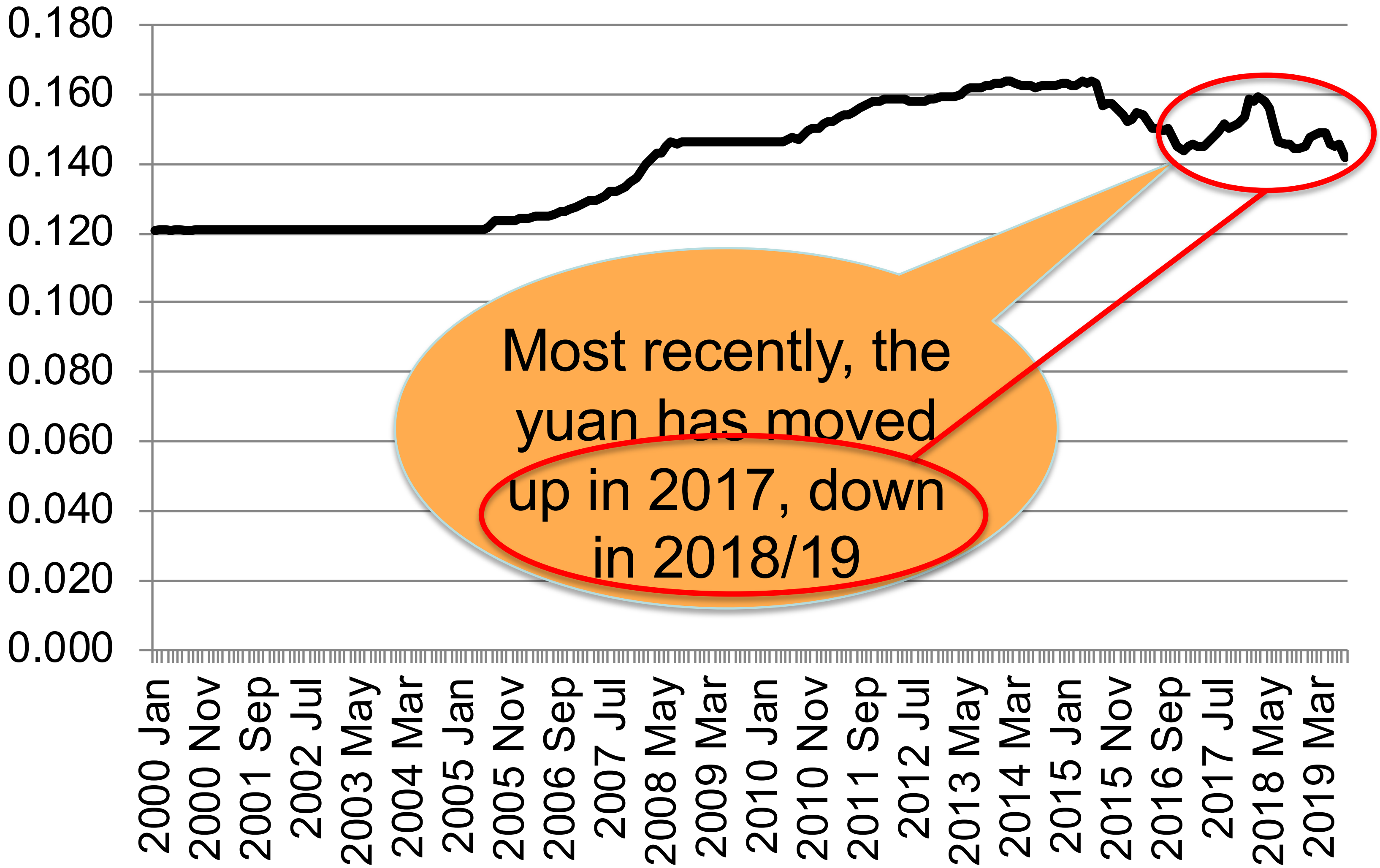
China's Reserves, $ trillions, 2000-2019



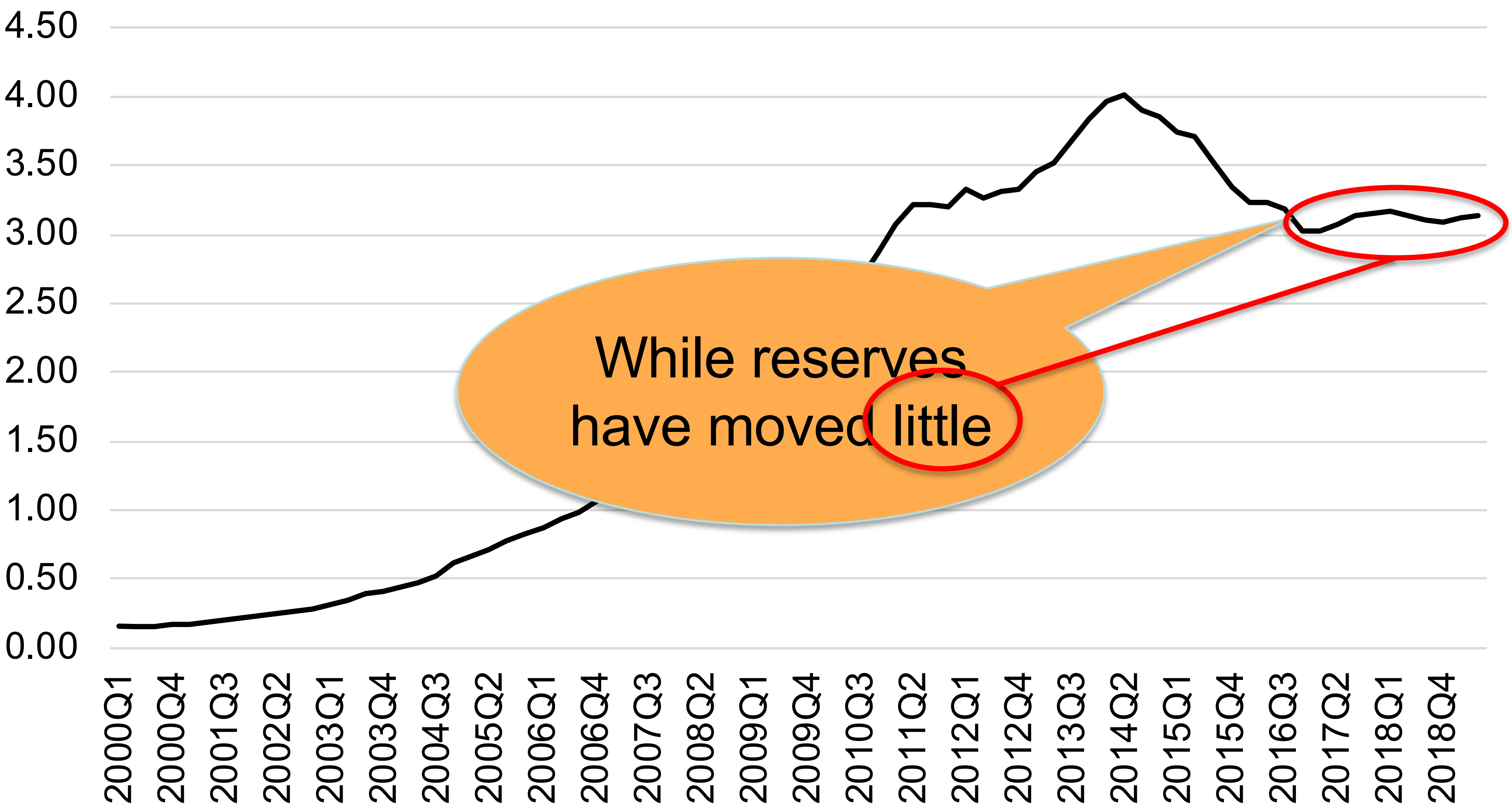
Chinese Currency Manipulation

- Conclusion:
  - China did intervene extensively 2000-2014,
    - Sometimes to keep the yuan from moving,
    - Other times to slow its rise
  - But since 2014, until 2017,
    - Although the yuan was falling in value until 2017,
    - This was in spite of Chinese intervention, not because of it
    - They sold close to $1 trillion of reserves, slowing its fall (over $1 trillion as of March 2017)

China's Exchange Rate, US$/Yuan, 2000-2018



China's Reserves, $ trillions, 2000-2019

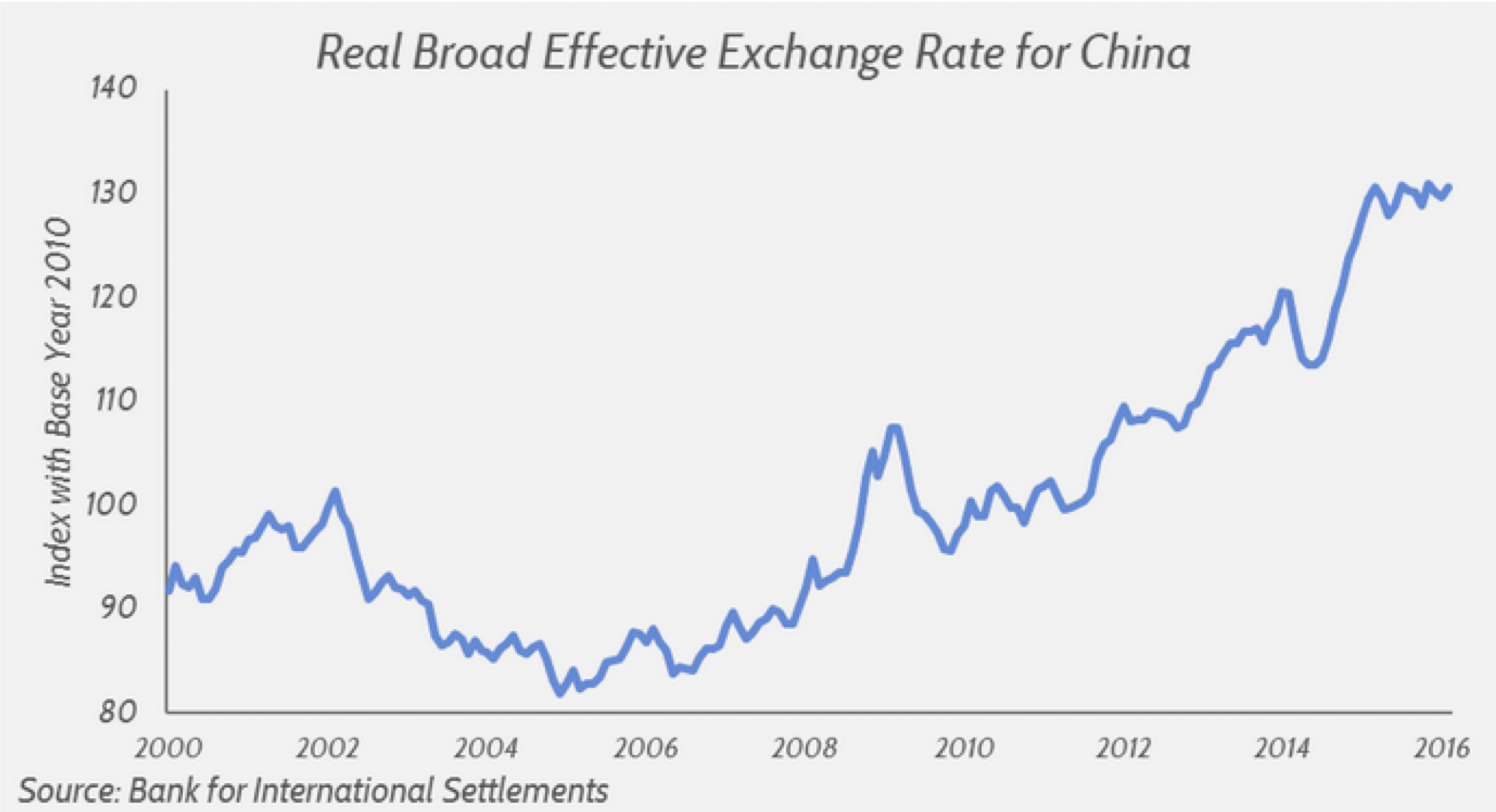


US$/Yuan 2017-18

US$/Yuan 2018-19

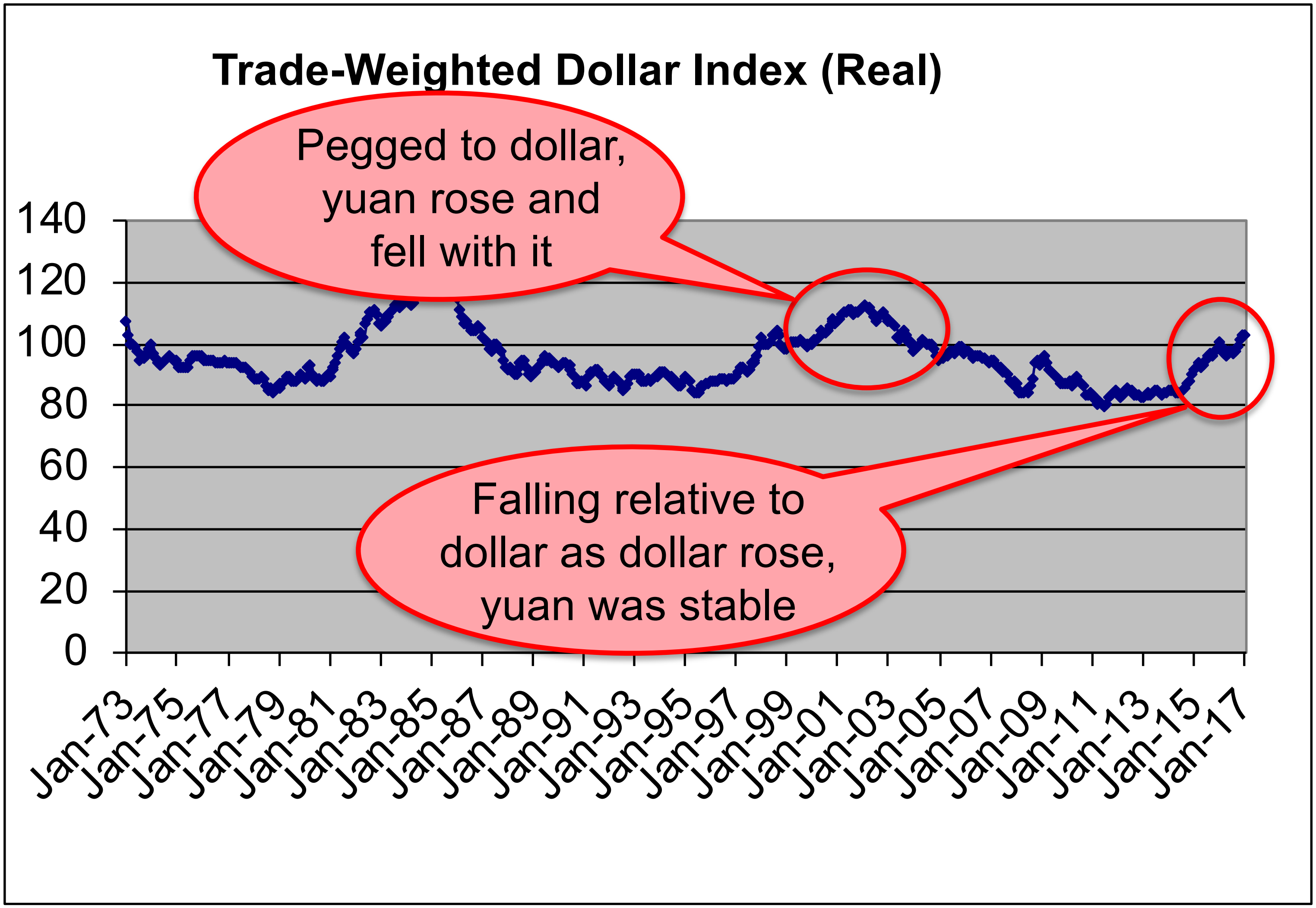
Chinese Currency Manipulation

- See Varas
  - Varas notes that China fixed its exchange rate from 1995 to 2005, consistent with the graph above
  - But she also shows the following graph, which shows the value of the yuan
    - Moving first up, then down, in 2000-2005
    - Then rising steadily ever since, except for
      - A big drop after the 2008 crisis
      - And a smaller drop in 2015


Real Broad Effective Exchange Rate for China
Index with Base Year 2010
140
130
120
110
100
90
80
2000
2002
2004
2006
2008
2010
2012
2014
2016
Source: Bank for International Settlements

Chinese Currency Manipulation

- Why does Varas disagree with my graphs?
  - Hers is the "Real Broad Effective Exchange Rate"
  - Since the renminbi was pegged to the US dollar 2000-2005, it rose and fell with the dollar relative to other currencies
    - See the Graph of the Trade-Weighted Dollar from the last lecture



Source: Federal Reserve, "Broad Index" based on a large group of currencies, monthly data

Chinese Currency Manipulation

- Conclusion from both Varas and these graphs:
  - China did manage its exchange rate and limited its appreciation until fairly recently
  - During 2014-16, however, China acted to raise its currency's value, not to lower it
  - And since 2016, it has hardly intervened at all
  - It has not, throughout this time span, ever acted deliberately to depreciate the yuan
  - Therefore China has <u>not</u> been a currency manipulator
    - More on this in a week.

Clicker Question

How do we conclude that China was not manipulating its currency during 2015-16 to give an advantage to its exports?

✓ a) Its international reserves were falling
b) Its international reserves were rising
c) Its currency value was falling
d) Its currency value was rising
e) Such manipulation is not possible

Next Time

- International Macroeconomics
  - Macro Effects ON the Exchange Market
  - Macro Effects OF the Exchange Market
  - Macro Effects THROUGH the Exchange Market