Exchange Rates and Currency Manipulation

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What is Currency Manipulation?

- Each year, the U.S. Treasury is required by law, semi-annually, to determine whether any country is “manipulating” its currency to achieve a trade advantage in international markets.
- In its latest report of October, 2016, the Treasury did not designate any country as a currency manipulator.
- However, this has been controversial in the case of China. Many feel that it should have been designated as such in the past (around 2005)
- Few economists would say that today.
- However, Trump has promised to designate China as a currency manipulator.

Outline

I. Basics of Exchange Rates and Trade
II. How Policy Affects Exchange Rates
III. Is the Market Rate the “Equilibrium” Exchange Rate?
IV. Exchange Rate Determination
V. Some Concepts of Equilibrium Exchange Rates
VI. Exchange Rates and the Trade Balance
VII. Exchange Rates and Prices
VIII. Conclusions – Is China a Currency Manipulator?

I. Some basics

- Let *E* stand for the exchange rate. *E* is the dollar price of foreign currency. For example, the U.S. dollar price of a euro is maybe $1.10
- Let *P** be the price of a foreign good. Suppose the price is set in foreign currency (euros.) Then the U.S. dollar price of the good is *EP**
- If the foreign currency is weaker (devalued, depreciated), *E* is lower. That means the dollar price of the currency is lower.
- That makes *EP** lower.
- If *E* falls and *P** does not change, foreign goods are cheaper when priced in U.S. dollars. This may be advantageous for exporters to the U.S.

I. Depreciation may Help Exporters

- In the previous example, a depreciation of the foreign currency may benefit exporters in that country, because (if they do not change *P**), their goods are cheaper in the U.S.
- Maybe *P** is set in dollars. A depreciation of the foreign currency, in that case, benefits foreign producers by allowing them to earn more foreign currency on each unit that they sell for *P** dollars.
- In either case (*P** set in U.S. dollars or in foreign currency), exporters in the foreign country benefit from a fall in *E*.
- That is true, as long as *P** does not rise when *E* falls.

I. Depreciation may Hurt Importers

- In the case we are looking at (a fall in the price of foreign currency, *E*), the foreign exporter benefits.
- But in the foreign country, the price of imports from the U.S. is *P/E*, where *P* is the U.S. dollar price of U.S. exports. (Almost all U.S. exports are priced in dollars, rather than in the foreign currency.)
- Importers must pay more in local currency to buy U.S. imports.
- In short, exporters in the foreign country benefit when their currency depreciates or is devalued, but importers are hurt.

I. What about in the U.S.?

- If foreign importers are buying less from the U.S., that hurts U.S. exporters.
- There are two cases for U.S. imports:
- If U.S. imports from abroad are priced in U.S. dollars, the change in *E* does not much affect our imports, unless *P** is changed.
- If U.S. imports from abroad are priced in foreign currency (which is fairly rare), the imports are cheaper for Americans. Americans may buy foreign goods instead of U.S. goods.

I. What is the Concern for the U.S.?

- A depreciation (or “devaluation” or “weakening”) of the foreign currency hurts U.S. exporters because it makes our exports more expensive abroad.
- It may also hurt U.S. firms competing with foreign imports. If the good is priced in foreign currency, the foreign depreciation makes their goods cheaper in U.S. dollars.
- Even if the imported good is priced in dollars, the foreign firm makes more profits when *E* falls, and may be tempted to lower the dollar price of the good to gain market share.

I. Prices Adjust Slowly

- There is an implicit assumption in everything I have said
- Goods prices adjust slowly, but exchange rates adjust quickly.
- That is apparent if you look around you. Exchange rates change every few seconds. Most goods prices (except for pure commodities) change very infrequently.
- Still, what I said applies to the “short run” or “medium run” before goods prices have adjusted substantially.
- Goods prices adjust slowly because firms and customers desire stability in pricing, and it is costly to change prices frequently.

II. How Does a Country Manipulate Currency?

- From what we have said already, a country can (in the short- or medium-run) help its exporters by depreciating its currency.
- It can depreciate the currency by using monetary policy.
- “Printing money” will make the currency worth less.
- In normal times, this amounts to the central bank easing the monetary stance by lowering interest rates.
- In current times when many countries have lowered interest rates to zero, printing money means “quantitative easing” – expanding the money supply by buying the country’s own government bonds.
- This is called “unsterilized” currency market intervention.

II. Sterilized Intervention

- Most countries do not consider the exchange rate to be directly a target of monetary policy.
- Instead, they use “sterilized intervention” in foreign currency markets
- Sterilized intervention does not change the stance of monetary policy
- A central bank may try to depreciate its currency by buying foreign bonds, but simultaneously selling domestic bonds, so the money supply is unchanged.
- Does this make its currency weaker?
- Maybe. But empirical studies show this usually only works if the country is small, or if there are strict controls on private capital flows

II. Most use Sterilized Intervention

- Countries that actively try to manage their currency value use sterilized intervention.
- This means that we are talking about smaller countries or countries with strict capital controls (such as China.)
- Larger countries do not tend to use stelilized intervention. However, they may use unsterilized intervention, which means that the exchange rate is a target of monetary policy.
- Switzerland and Singapore are prime examples of the latter.
- Many say (or accuse) the U.S. of using the exchange rate as a goal of monetary policy during the period of quantitative easing.

II. Buying Foreign vs. Domestic Bonds

- Unsterilized intervention affects the exchange rate, in essence, by changing the money supply
- Many economists believe that in countries with highly open capital markets, such as Singapore, Switzerland, or the U.S., the effects of increasing the money supply by buying foreign currency or by buying domestic bonds are the same.
- Singapore and Switzerland have increased their foreign exchange reserves by unsterilized intervention.
- But the U.S. does not intervene in foreign currency markets directly.

Foreign Currency Reserves: Major Holders				
	Latest	Average Monthly Change		
	Reserves $ billions	2014	H1 2015	Since June 2015
Global	11,446	-0.5	-34.8	n.a.
China	3,557	1.8	-24.9	-68.2
Japan	1,188	-0.2	-2.3	1.0
Saudi Arabia	660	0.7	-9.9	-3.2
Switzerland	555	0.9	9.3	0.8
Taiwan	425	0.2	0.4	1.7
Brazil	359	0.5	0.9	-0.9
Korea	358	1.5	1.9	-3.4
India	328	2.2	5.9	-1.1
Russia	308	-10.7	-4.2	2.6
Singapore	248	-1.3	-0.6	-1.4

III. When is a Country a "Currency Manipulator"?

- When the country uses sterilized or unsterilized intervention to drive the exchange rate away from its "equilibrium" rate.
- But what is its equilibrium rate?
- That is the main point of this talk. There are many different notions.
- My view is that the "reasonable" definition will make it very hard to determine whether a country really is manipulating its currency.
- There are several definitions of the "equilibrium rate".

III. From Whose Perspective?

- We want to determine what rate is the optimal, or efficient, exchange rate.
- But from which country's perspective?
- Both the U.S. and Germany, for example, may prefer that their currency be relatively weak in order to advantage their exporters.
- We cannot have, simultaneously, a weak dollar relative to the euro and a weak euro relative to the dollar.
- From here on, I will talk about things in terms of a neutral decision-maker concerned about each country's welfare equally.
- Not necessarily how Trump would approach this.

III. Is the Free Market Rate Optimal?

- Milton Friedman famously argued in the late 1940s that freely floating exchange rates were optimal.
- One of his main arguments is that exchange rates adjust quickly when they are freely floating, but goods prices do not. So it is best to let them float freely.
- In his day, foreign exchange was traded only to pay for exports and imports.
- Today, 99.9+% of foreign exchange trade is in capital markets.
- The nominal exchange rate may not settle at an “efficient” level, or one that substitutes for goods price adjustment.

IV. Digression on Exchange Rate Determination

- A key feature of nominal exchange rates under floating exchange rates is that they appear to be “disconnected” from changes in current economic fundamentals.
- Many have concluded on the basis of this that the profession has been unsuccessful at modeling exchange rates.
- Exchange rates are driven by two things that are not measured well:
  1. News about future “traditional” fundamentals such as monetary policy or the things that affect monetary policy.
  2. Changes in the risk premium or liquidity premium for short term assets.

IV. Exchange Rates as Asset Prices

- Exchange rates are much like equities. It is not the current dividend (fundamental) that drives the price of equities.
- It is the change in expectations about the future, and changes in perceived riskiness or risk aversion of investors
- Exchange rates are more volatile when there is news.
- There is also greater “disconnect” with the current fundamental.
- Empirical studies have measured how exchange rates react to the news embedded in announcements of economics statistics.

IV. News about Monetary Policy

- Not surprisingly, news that the Federal Reserve has raised its target interest rate above expectations leads to a dollar appreciation within five minutes of the announcement.
- But also, any U.S. news that might be interpreted as the economy being stronger than expected, or inflationary pressures greater than expected, also leads to a dollar appreciation.
- On the other hand, news of greater than expected activity in Germany or other countries leads to an immediate dollar depreciation.

IV. News in Inflation-Targeting Countries

- Studies find that news of higher than expected inflation tends to appreciate the currency in all countries.
- However, the effect is stronger and more statistically significant in the inflation-targeting countries.
- Moreover, the effect was small and insignificant in two countries (the U.K. and Norway) before they adopted inflation-targeting but became large and significant when the policy regime changed.

IV. Forecasting Exchange Rates

- Few studies find evidence of short-run power to “beat” a random walk.
- Forecasts at long horizons for a single exchange rate have a mixed record. Some find evidence that a random walk can be beaten, some do not. Cheung et. al. (2005) implicitly suggest that the apparent success of some models is the result of collective data mining.
- There seems to be stronger evidence of predictability at long horizons when the forecasting equation is estimated using a panel of exchange rates.

IV. Are Exchange Rates Forecastable?

- Is out-of-sample forecasting power a valid way to test exchange rate models? Engel and West (2005) show that even if the model is true, under some circumstances, exchange rates cannot be forecast.
- If models cannot be used to forecast changes in the exchange rate, how can we validate them, especially when news about the future is important?
- Engel and West (2005) propose that if exchange rates are determined by news, then exchange rates should be useful in forecasting economic variables
- Notice that this turns the forecasting question on its head: Instead of asking whether the exchange rate can be forecast by the fundamentals, we ask whether the fundamentals can be forecast by the exchange rate.

IV. Is There a Safe Haven Effect?

- We often hear reference to a currency being strong because the country is a “safe haven”. What does that mean?
- If a country is a safe place to invest, that ought to be reflected in the price of the country’s assets, but not necessarily in the exchange rate.
- For example, the country may have high stock prices. But should some world shock raise American stock prices more for Americans than for German holders of American stocks? That would be the implication of a theory that says the demand for U.S. assets influences the real exchange rate.

IV. Is There a Foreign Exchange Risk Premium?

- The conventional explanation is that it represents exchange-rate risk. But this seems implausible as a source of the "safe haven" hypothesis. It would argue that Europeans or Asians demand US dollars during risky times because they want to avoid foreign exchange risk. But there is no foreign exchange risk if they hold their own currencies!
- It is of course possible to concoct a story where there is less foreign exchange risk for holding dollars than for holding one's own currency. That is, the dollar is safer than your safe asset – it negatively correlates with consumption, for example. But this seems implausible.

IV. Disaster Risk?

- Another approach, which is more plausible, is to say that “safe haven” really refers not to risk per se, but to disaster probability. For example, investors hold Swiss francs during risky times because there is a very low probability of a disastrous depreciation. This is not necessarily risk, because even a risk-neutral investor would want to take into account this possibility.
- And then, disaster probability could be combined with the fact that marginal utilities may be high during times of disaster to yield a story of disaster risk.
- I will suggest another possibility.

IV. Liquidity Premium

- Incorporating a liquidity return seems like a natural candidate for the "safe haven" effect. Certainly recently the demand for short term dollar assets, valued for their liquidity (usable as collateral, e.g.) seems to have had a role in driving the exchange rate.
- This can also account for the large reaction of exchange rates to changes in interest rates.
- When the Fed raises the interest rate, liquid assets are more valuable on the margin. Dollar assets earn an invisible liquidity return.
- This can account for the excess volatility when interest rates rise. The dollar is stronger both because of persistent interest rate increases and because of higher liquidity value.

IV. Market Exchange Rates

- The conclusion here is that exchange rates can move because of news about future monetary policy, or because of liquidity effects.
- But because nominal wages and prices adjust sluggishly, the news and safe haven shocks can have large effects on international relative prices.
- So how do we determine the “equilibrium” exchange rate?

V. The "Ideal" Exchange Rate

- My view is that the equilibrium or ideal exchange rate would be the one that, given existing market distortions, delivers the allocation of resources that is most nearly optimal.
- This already sounds like it will be hard to nail down!
- What distortions lead the free market rate to be non-optimal?
- "Sticky" goods prices
- Capital markets that are not fully developed or in which adjustment is slow.
- Possibly craziness in foreign exchange markets: Overreaction to news, fads and bubbles.

V. What is “Efficient” or “Optimal”?

- By one criterion, the exchange rate is efficient when its level does not help or hurt the competitiveness of any firms.
- Competitiveness should be determined by productivity and true resource costs.
- Note that this is hard to determine. An undervalued (weak, depreciated, devalued, cheap) currency may make goods prices of exports low, but also make labor costs appear low.
- Some sort of economic model and econometric expertise is needed to determine what the “true” (not influenced by exchange rates) competitiveness of a firm is.

V. Other Goals of Exchange Rate Policy

- We live in an imperfect world. Many distortions to the market.
- Capital markets are not efficient. Debt may not be sustainable, for example.
- Suppose some country has a large, unsustainable amount of debt to the rest of the world, either private or public.
- It may be desirable to promote a cheap currency in order to boost the economy, and make it easier to pay the debt.
- (However, if the debt is denominated in dollars, a cheaper foreign currency will increase the foreign currency cost of the debt, making it harder to pay back!)

V. Current Account Imbalances

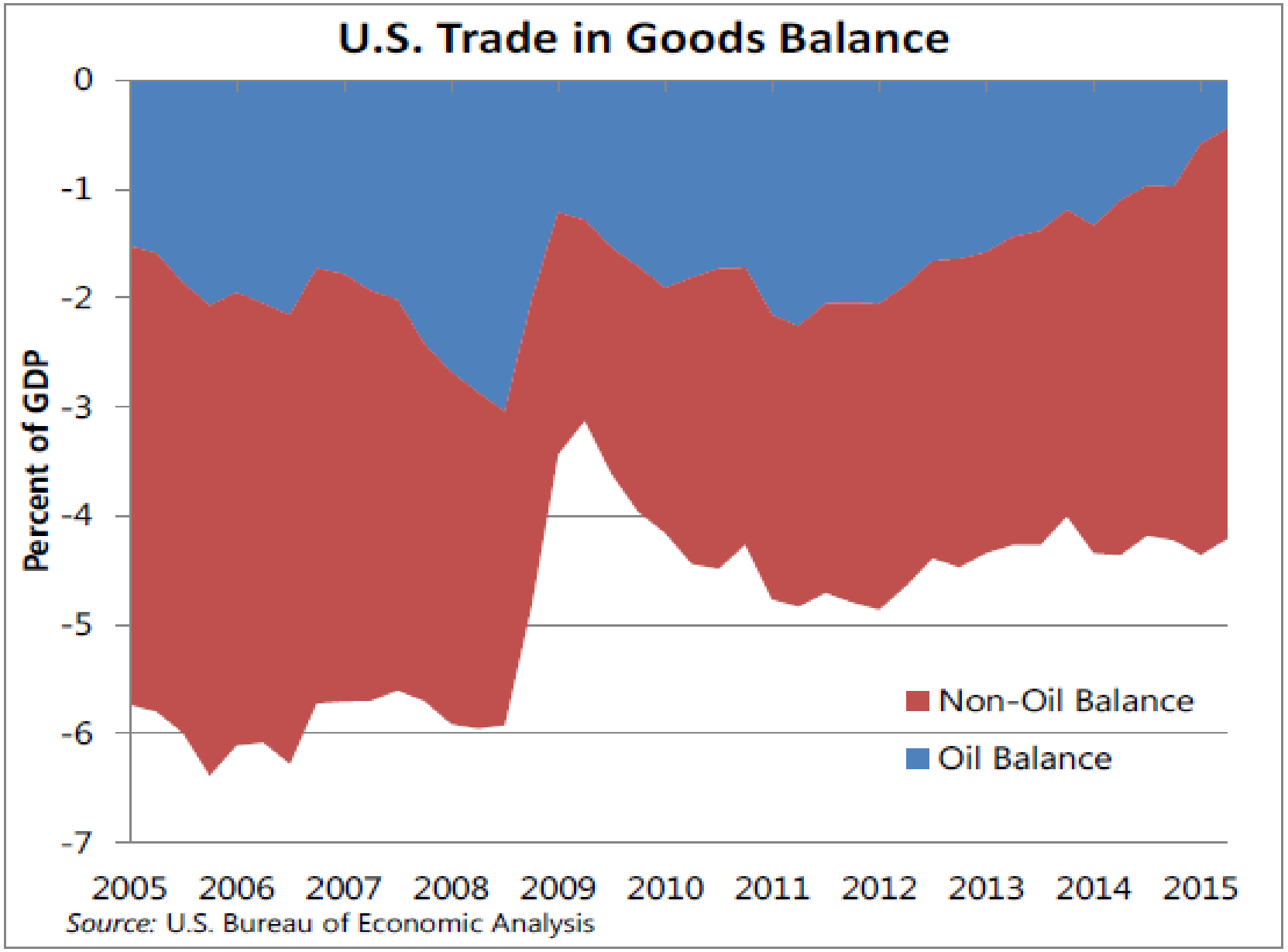
- Much of the policy focus is on whether currency values lead to trade imbalances. Some definitions and terms:
- The current account balance is the value of the country's total exports of goods and services, less the value of imports, plus the net earnings on foreign investments
- If a country runs a current account deficit, it must run a financial account surplus. That means that it is a net seller of assets to the rest of the world.
- Colloquially, a country that runs a current account deficit is borrowing from the rest of the world.

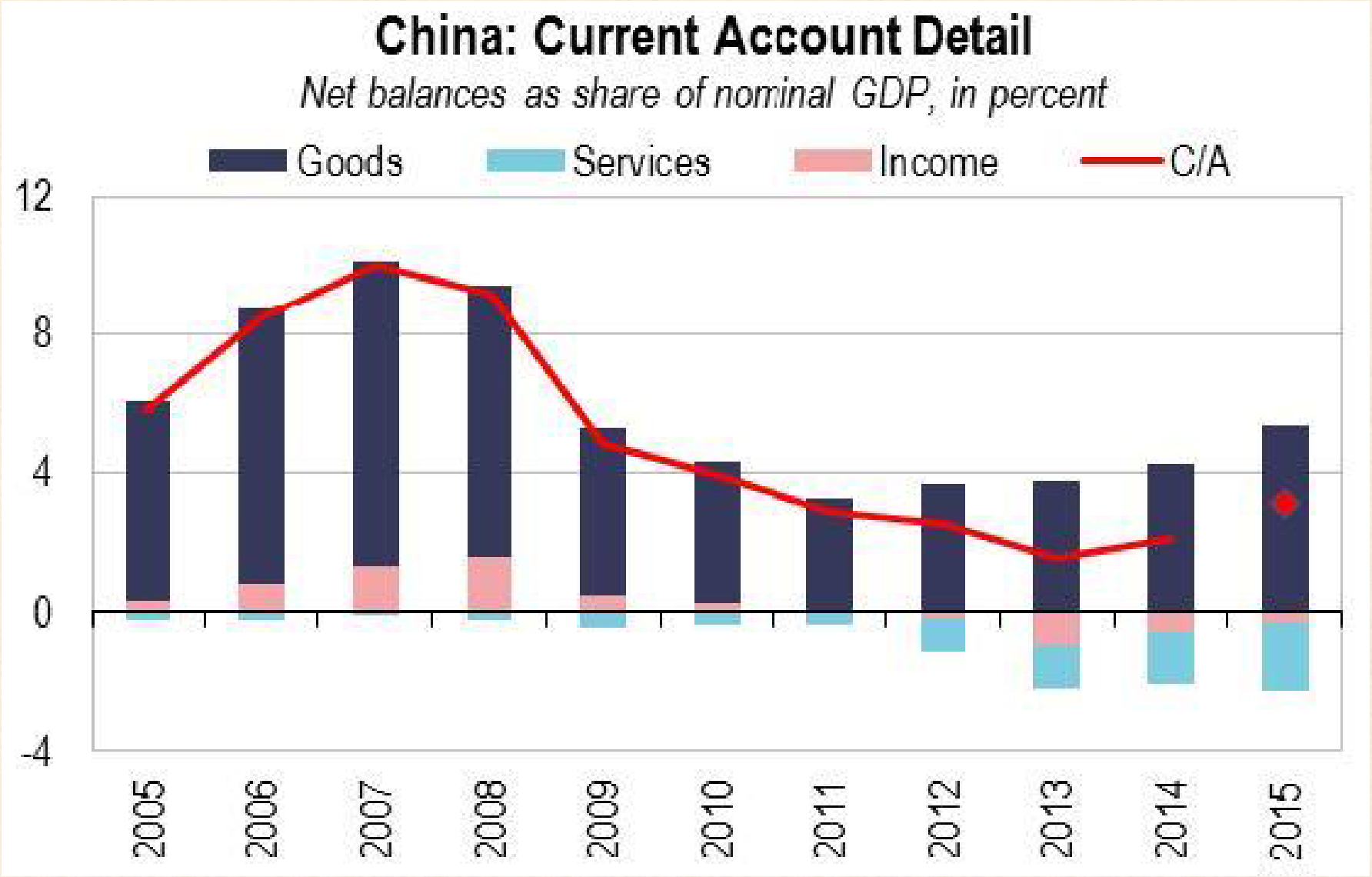
V. Bilateral Current Account Imbalances

- Even in a “balanced” world, bilateral (one country relative to another) current account balances may not be equal.
- China might import intermediate goods from Japan and Korea, and export final goods to the U.S. The U.S. may import final goods from China and export raw materials or scientific goods to Japan and Korea. Japan and Korea may import raw materials and scientific goods from the U.S. and export intermediate goods to China.
- Therefore, even in an efficient equilibrium, there may be large bilateral imbalances.

V. General Current Account Imbalances

- Overall a country may efficiently have a current account deficit
- If it is growing, it may make sense to borrow against future income.
- Young countries may efficiently lend to older countries
- In the case of the U.S., a capital account surplus may make sense. Why? It means we are selling more of our assets abroad than we are buying of foreign assets.
- But that may make sense in a world in which there is a great demand for safe and liquid dollar assets.
- In a sense, the U.S. is exporting the fruits of its sound financial system, instead of exporting goods and services.


U.S. Trade in Goods Balance
0
-1
-2
-3
-4
-5
-6
-7
Percent of GDP
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Non-Oil Balance
Oil Balance
Source: U.S. Bureau of Economic Analysis


China: Current Account Detail
Net balances as share of nominal GDP, in percent
Goods
Services
Income
C/A
12
8
4
0
-4
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

VI. Exchange Rates and Trade Balances

- However, it is possible that a country's current account balance is not an "equilibrium" balance. It could be a larger deficit than is efficient.
- But how does the currency value affect this?
- It is true that a weak currency favors a country's exporters and makes imports more expensive (thus favoring local import-competing firms)
- But how large is this effect?
- The empirical evidence suggests it is quite small, at least in the short and medium run.
- In the longer run, relative prices are determined by firm price setting and not so much by the exchange rate.

VI. Why Doesn't the Exchange Rate Matter Much?

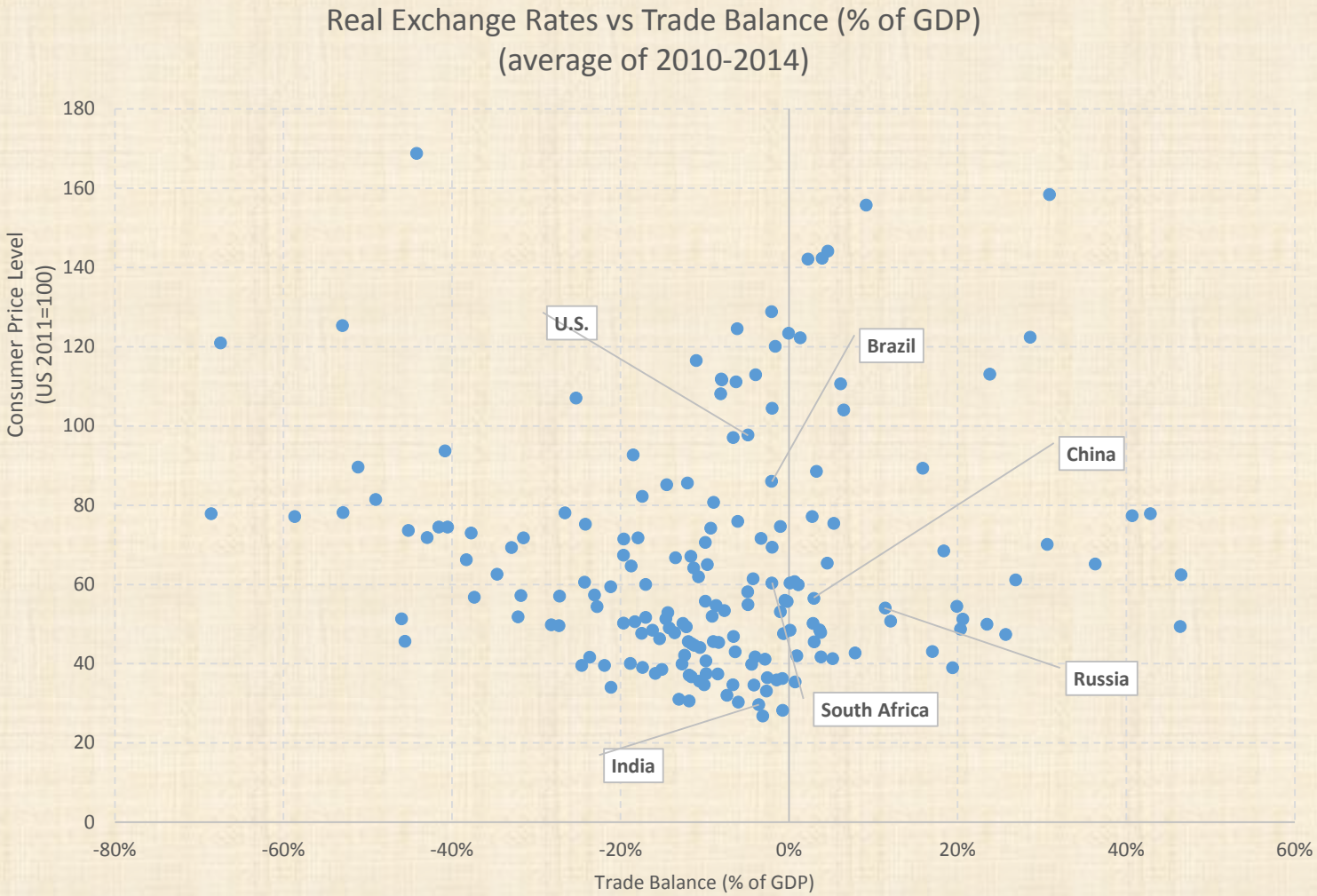
- Exporting firms seem to care about market share, because that determines their long run sustainability in an export market.
- Ultimately, they will set prices so as to maintain market share, no matter the temporary fluctuations of the exchange rate.
- Often that means they simply set a price for export in the importer's currency, so that the price does not change as the exchange rate changes.
- A strong currency temporarily weakens exporter profits, but they are willing to accept this in order to maintain market share. It is better to suffer a temporary profit hit than to lose market share.

VI. Exporters are also Importers

- In addition, recent research has found that large exporters tend to be large importers (of intermediate goods) as well.
- A weak currency may raise the firms revenue in export markets, but it will also raise the price of its imported intermediate goods.
- As a result, a depreciated currency confers a surprisingly small boost to exporting firms.
- It is likely that temporary trade deficits are caused by other factors.
- The biggest one is that countries that are in a business cycle expansion tend to import more and run CA deficits.

VI. Does CA Balance Signal Undervaluation?

- The next graph shows that there is little relation between the real value of a country's currency and its trade balance.
- Booming countries tend to have (i) strong currencies, and (ii) current account deficits.
- But this does not mean that the strong currency leads to the CA deficit.
- The CA deficit arises because current and future income is strong, leading the country to import more.
- But the strong growth strengthens the currency both for monetary policy reasons and risk considerations.


Real Exchange Rates vs Trade Balance (% of GDP)
(average of 2010-2014)
Consumer Price Level
(US 2011=100)
180
160
140
120
100
80
60
40
20
0
-80%
-60%
-40%
-20%
0%
20%
40%
60%
Trade Balance (% of GDP)
U.S.
Brazil
China
Russia
South Africa
India

VI. Currency Manipulation and Trade Balance

- Many would like to “blame” large trade imbalances on currency manipulation. But…
- There are many causes of trade imbalances
- Exchange rates actually seem to have only a small effect on trade balances in the short-run to medium-run.
- The effect of exchange rates on trade balances is difficult to detect. It is easy to confuse the effects of third factors, such as strong income growth that leads both to trade deficits and an appreciated currency.
- It seems likely that changes in exchange-rate policy of China and other countries may have only small effects on the U.S. trade balance

VII. Price Misalignment

- From Econ Principles, we know that identical consumers should pay the same price for a good (adjusting for differences in costs of delivering the good to the particular consumer.)
- Firms may charge different prices to consumers – it may be optimal for the firm to "price discriminate". But this is not efficient from a world welfare point of view.
- Transportation costs account for some.
- But sticky nominal prices, combined with exchange rate fluctuations account for most of the "misalignment"

VII. Sticky Prices and Price Misalignment

- How do sticky prices lead to price misalignment?
- Suppose a firm has set a price P^* in foreign currency for sale in the foreign country. Its price in dollars is given by EP^*
- A U.S. competitor sets its price at P in dollars. Maybe the true resource costs of the U.S. and foreign goods are the same, so efficiently we should have $EP^* = P$
- Trump and friends worry that the foreign government manipulates the currency so that E is low. Because P^* and P adjust slowly, this may make $EP^* < P$, conferring an advantage to foreign exporters.

VII. How to Determine if *E* was Manipulated?

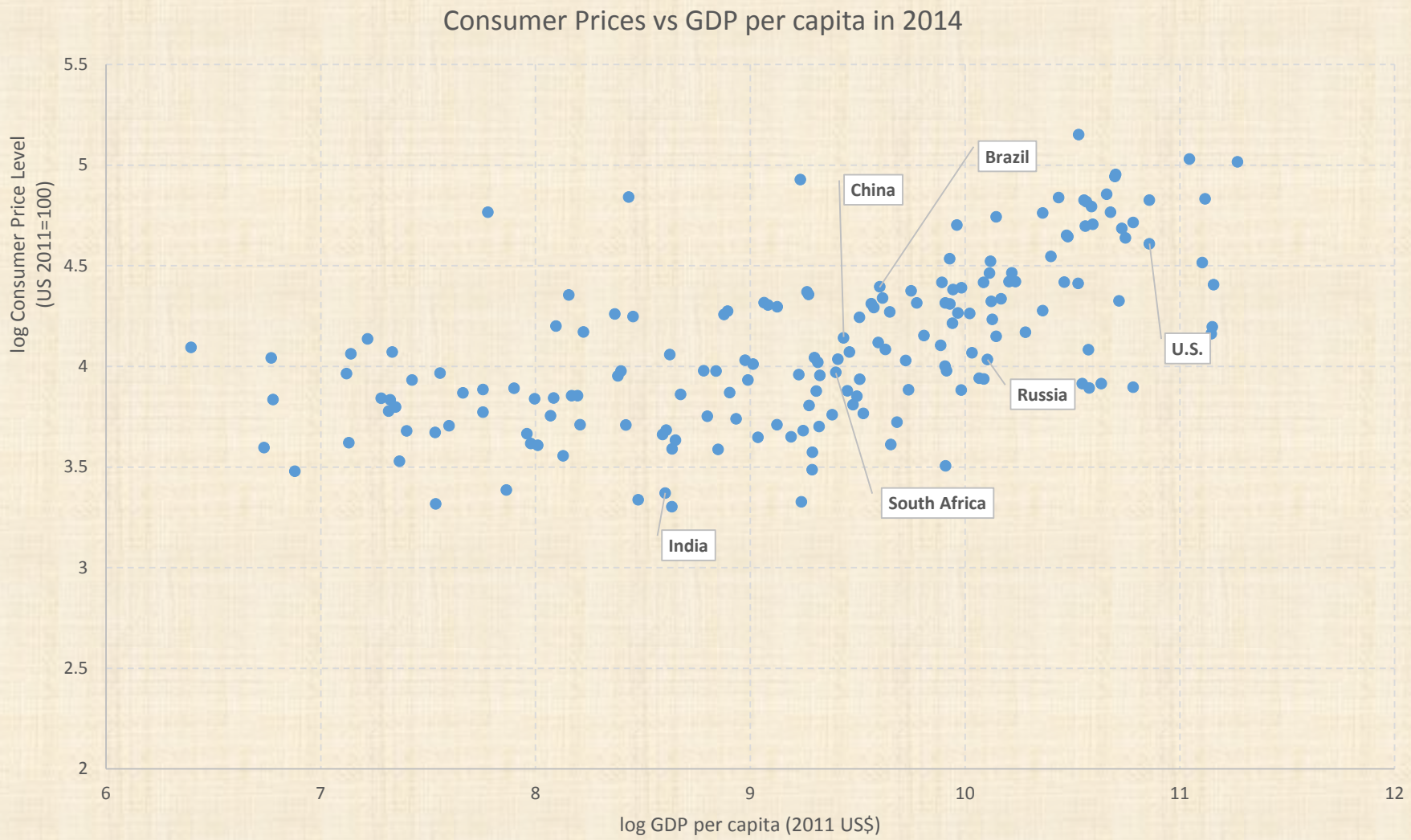
- We can't just use the criterion that the currency was manipulated if the price of foreign goods in dollars is lower than U.S. competitor's
- Foreign producers like China have lower costs because of cheap labor
- Although the labor could appear cheap if *E* was undervalued!

VII. Can We Just Compare Prices?

- If a BMW in the U.S. costs *P* and it costs *P** in Germany, can we say the currency is misaligned unless $P/P^* = E$? ($P = EP^*$)
- Not so easy. For some goods, we may see $P/P^* < E$, but for others we may see $P/P^* > E$.
- Transport costs and price discrimination by firms, rather than currency manipulation, may lead to price differences.
- Even more important, marketing and distribution costs differ between countries.
- Moreover, there is not sufficient data to compare prices of a large percentage of goods. Only recently have studies done so.

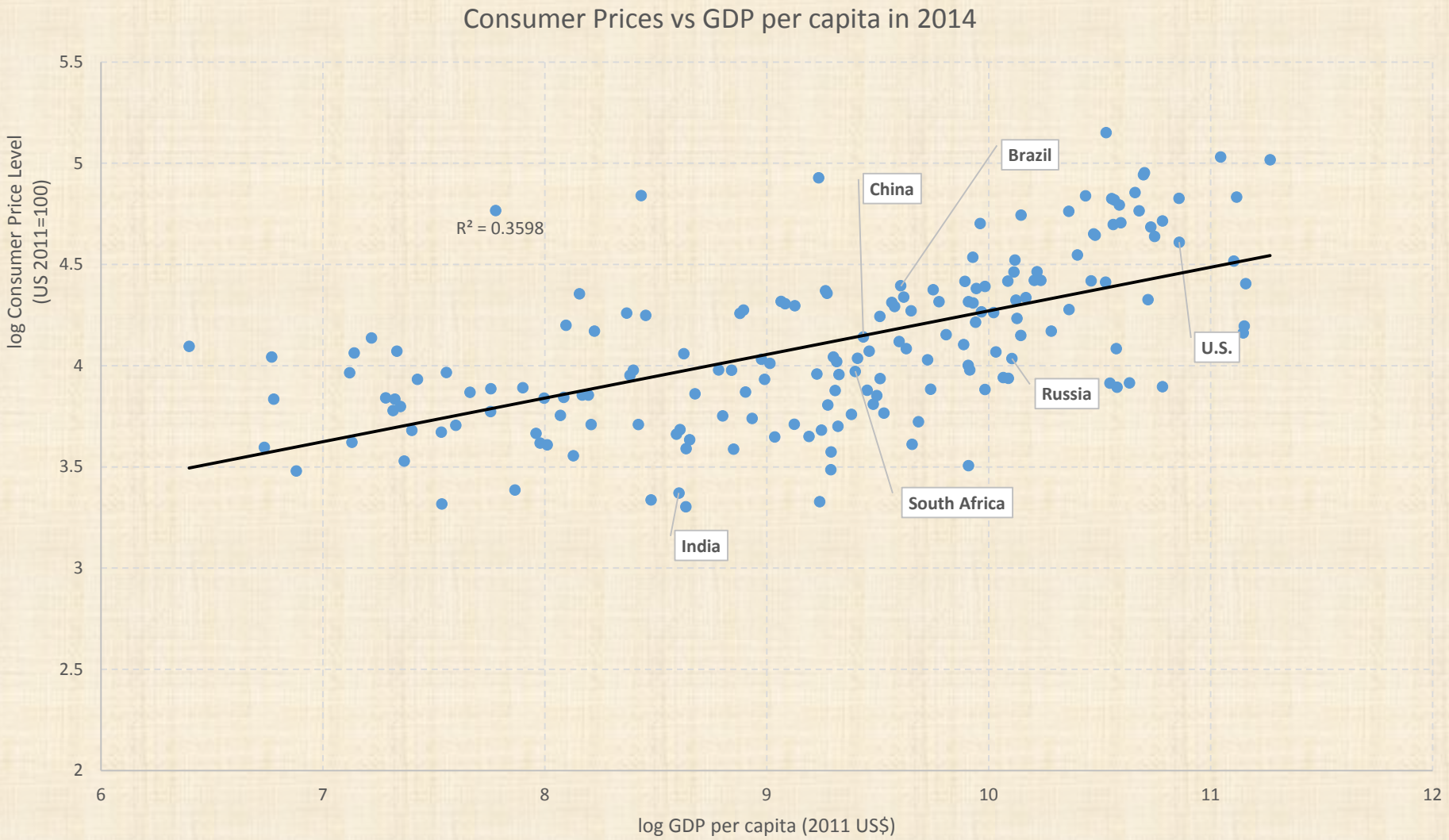
VII. Comparing Consumer Prices

- One overall measure of prices is the consumer price level.
- We can compare consumer prices across countries.
- We will see that the price of a consumption basket differs greatly across countries.
- This is not all entirely due to the effects of exchange rates on prices of goods that are traded.
- Many goods are not traded at all. Only indirectly would market forces push prices of nontraded goods toward equality across countries.
- Even traded goods prices include a large cost component that is non-traded, because of local distribution costs.


Consumer Prices vs GDP per capita in 2014
log Consumer Price Level (US 2011=100)
5.5
5
4.5
4
3.5
3
2.5
2
6
7
8
9
10
11
12
log GDP per capita (2011 US$)
Brazil
China
U.S.
Russia
South Africa
India

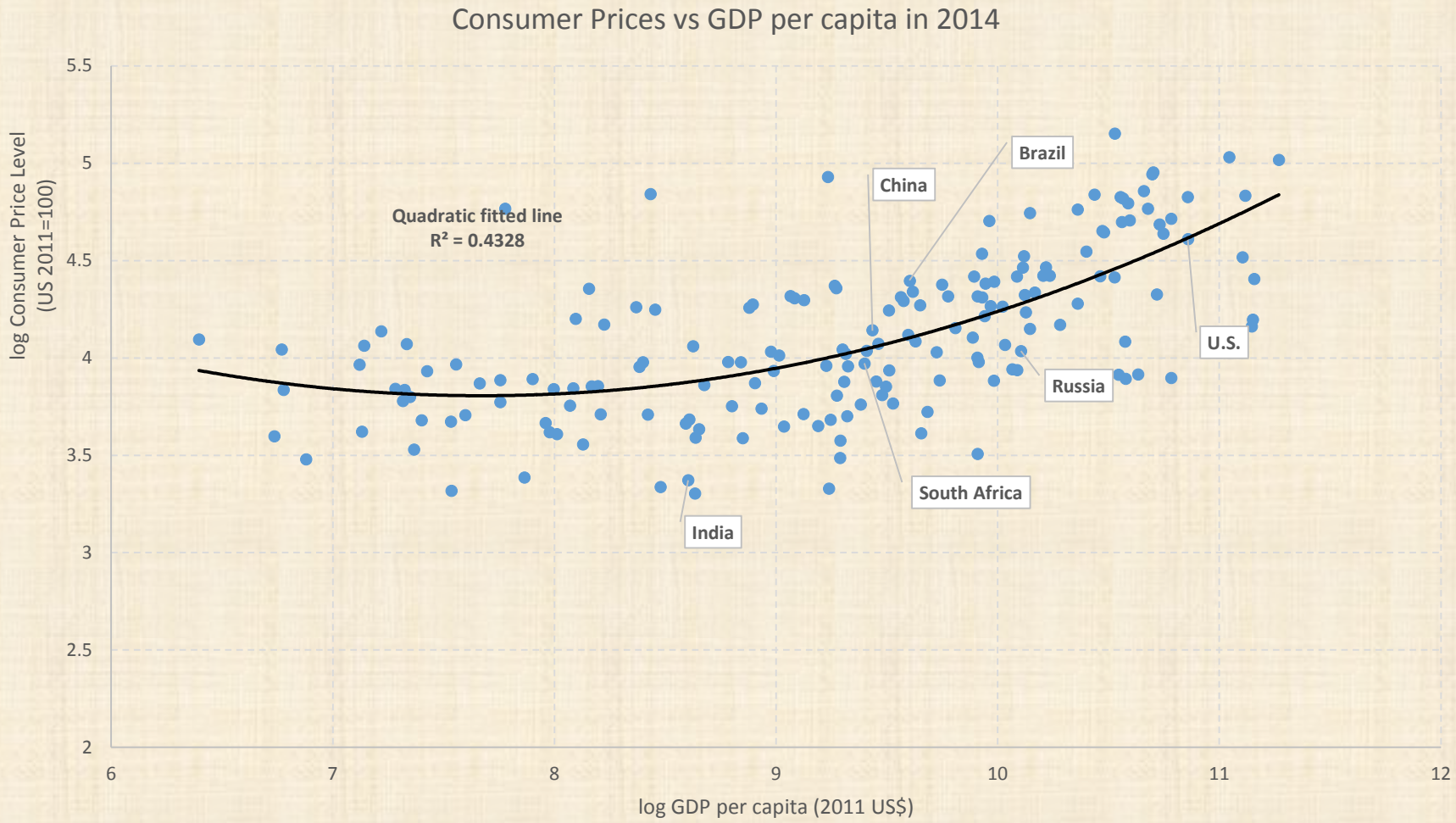
VII. Consumer Prices and Income

- In the previous slide, we see that richer countries tend to have higher prices. There are several possible reasons for this:
- Many services are not traded. High income countries tend to have high wages, which pushes up the cost of nontraded goods.
- Rich countries demand higher quality, higher priced goods.
- So we cannot judge whether a country is a currency manipulator just by looking at whether the consumer price level, in dollars, EP^* is less than the consumer price level in the U.S., given by P
- We should take into account the income level in the country


Consumer Prices vs GDP per capita in 2014
log Consumer Price Level (US 2011=100)
log GDP per capita (2011 US$)
R² = 0.3598
Brazil
China
U.S.
Russia
South Africa
India
5.5
5
4.5
4
3.5
3
2.5
2
6
7
8
9
10
11
12

VII. Linear and non-Linear Relationship

- In the previous slide, we see find the straight line that best fits the data. We see that China's price level is just about exactly right given its income.
- Russia and India have price levels that are somewhat lower than their income level would indicate, while the U.S. price level is higher than it should be for its income.
- However, these theories do not posit that there is necessarily a linear relationship between the log of the price level and the log of income per capita.
- The next slide fits a non-linear, quadratic curve. Note the U.S. and China both lie right on the line!

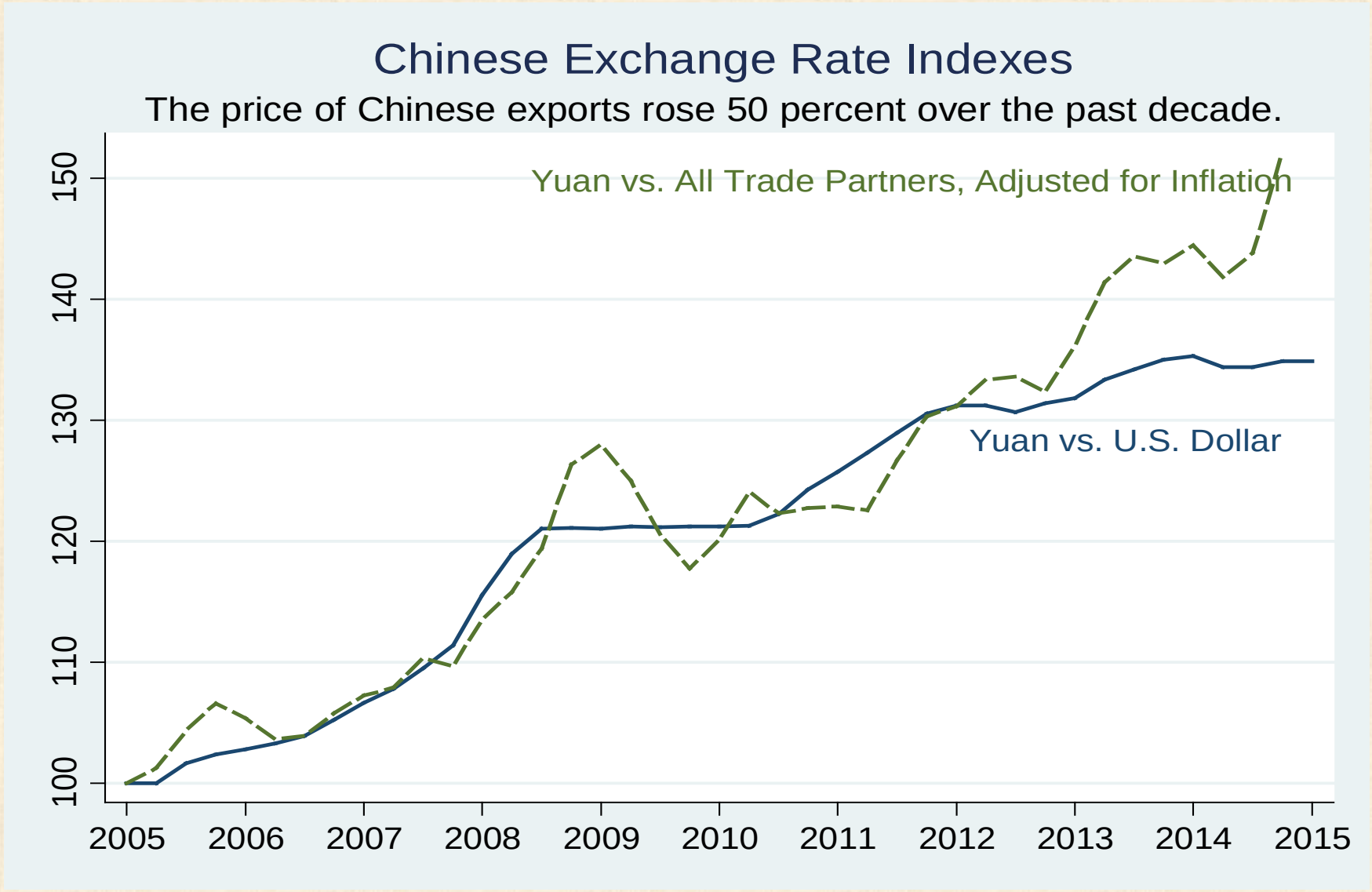

Consumer Prices vs GDP per capita in 2014
log Consumer Price Level (US 2011=100)
log GDP per capita (2011 US$)
Quadratic fitted line
R² = 0.4328
Brazil
China
Russia
U.S.
South Africa
India
5.5
5
4.5
4
3.5
3
2.5
2
6
7
8
9
10
11
12

VIII. It is Difficult to Draw Conclusions

- We can conclude that it is difficult to look at prices of exports or consumer prices and determine whether a currency is being manipulated.
- We have also previously argued that looking at trade balances is not necessarily informative, because the exchange rate has such a small effect on the trade balance in the short run, and the trade balance is driven by other factors.

What Can We Say About China?

- Many economists believed the Chinese renminbi was undervalued 10-12 years ago.
- But the price of Chinese exports has risen tremendously since that time.
- Writing the price as EP^*, the price has increased not only because of the appreciation of the renminbi (E has increased) but also because of an increase in P^*
- Chinese prices have risen because inflation has been higher than in the U.S., but also because China has switched to producing higher cost/higher quality goods.


Chinese Exchange Rate Indexes
The price of Chinese exports rose 50 percent over the past decade.
Yuan vs. All Trade Partners, Adjusted for Inflation
Yuan vs. U.S. Dollar
150
140
130
120
110
100
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

VIII. Is China "Manipulating" the Currency?

- It is difficult to determine whether a country's prices are too low. But China's consumer price level is in line with its income.
- Exchange rates have only small effects on trade balances. In any case, China's trade surplus has fallen greatly.
- The price of Chinese exports has risen more than 50% in the past decade.
- In the past year, China has been intervening in foreign exchange markets to push against market forces that are weakening the renminbi – the opposite of what Trump claims.