

# Open Economy Macroeconomics

## Part I:

Exchange rates, nominal and real  
open economy monetary policy.

November 21<sup>ST</sup>, 2019

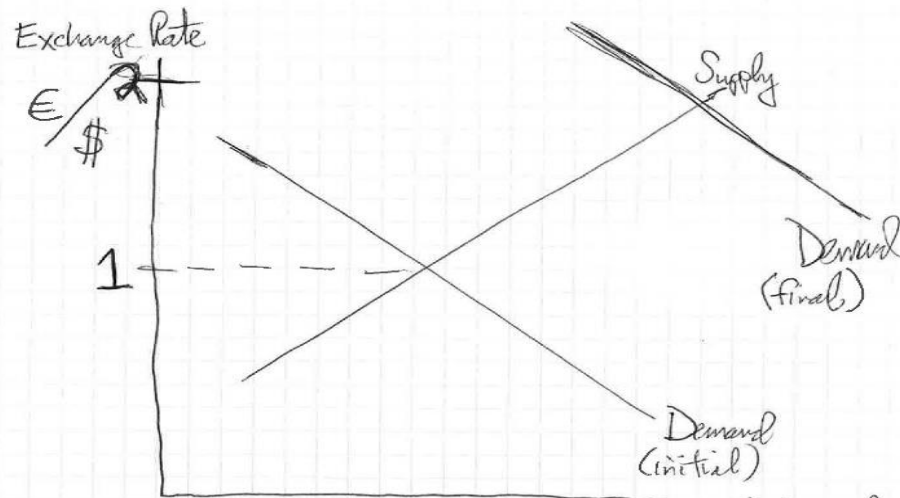
# What generates demand for another nation's currency?

- People buy other currencies in order to buy **other nation's goods.** (cars, computers, corn...)
- People buy other currencies in order to buy **other nation's services.** (credit card processing, tourist travel)
- People buy other currencies in order to buy **other nation's financial assets.** (stocks, bonds...)
- People buy other currencies in order to buy **other nation's physical assets.** (real estate, land golf courses...)

When currency values shift, when the price of one currency falls in terms of another currency, it changes the relative prices of goods or assets, in the two nation's represented by the currencies in question.

- Two nations, Alpha and Beta, have no history of economic interaction.
- They choose to make goods trading legal.
- They set an initial exchange rate:  $\$1 = 1\text{€}$
- They permit currency trading, and allow the exchange rate to seek its own level.
- Cars are the only goods traded.
- Alpha cars are wonderful: they last 10 years
- Beta cars are poorly made: they last 5 years.  $y$

Beta citizens buy dollars, to buy Alpha cars. Thus the demand for dollars goes up.



	Initial	FINAL	Quantity of \$ traded
Dollar Price of:	<del>10,000</del>	<del>10,000</del>	
Alpha Car	\$10,000	\$10,000	
Beta CAR	\$10,000	\$5,000	

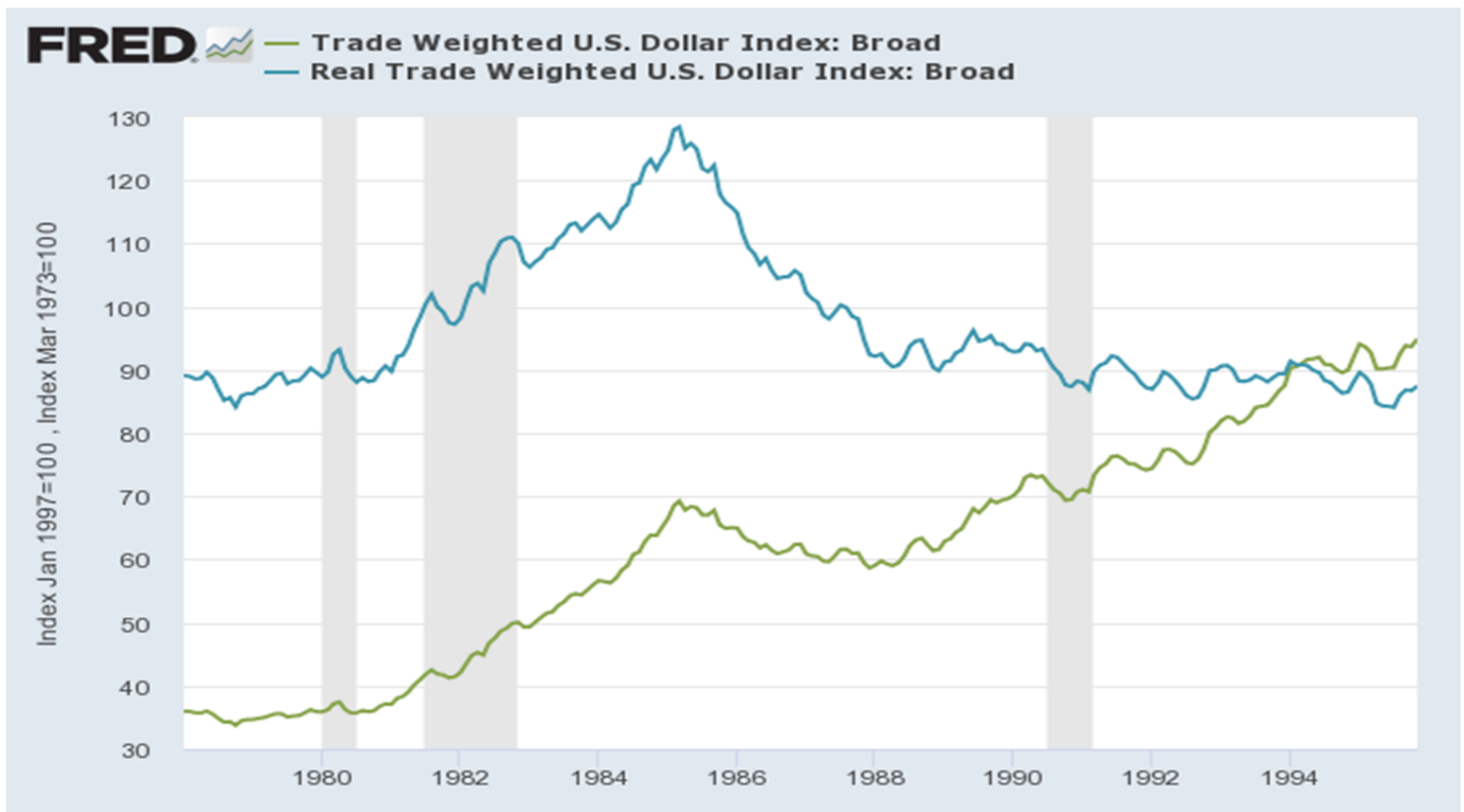
Clearly exchange rates are a key part of global economic dynamics.

- We can create a **TRADE WEIGHTED DOLLAR**
- LIST THE TOP 50 TRADING PARTNERS
- ASSIGN A WEIGHT, BASED ON \$ VALUE OF ITS EXPORTS TO THE USA,
- This index gives us a weighted average **\$ change** VERSUS THE 50 OTHER NATIONS' CURRENCIES.

Here are two TW\$ indices, weighted by the amount of trade we do with each nation in the index.

One is **nominal**, the other is **real**:

(note: we are looking at the period from the mid 1970s to the mid-1990s)



Note: The nominal \$ index rose by 93%  
The real \$ index rose by only 5%

	December 1979	December 1989	Percent change
Trade weighted Dollar index	35.9	69.4	93%
Real trade weighted Dollar index	89.6	94.1	5%

USA vs. Brazil: the dollar rose by 44%.

However, Brazilian prices rose much faster than U.S. prices.

So the \$'s purchasing power in Brazil did not rise as rapidly as implied by the gain for the nominal \$ exchange rate.

(Note: the Brazilian currency is called the "REAL".)

	USA	BRAZILIAN	\$/REAL	\$/REAL
	CPI	CPI	EXCHANGE	REAL
			RATE	EXCHANGE RATE
1996	100	100	1	1.00
2000	110	136.0	0.6	0.68
	10%	36%	44%	32%



We need to evaluate the real change in the value of a currency's purchasing power

- What is the real exchange rate (RER)
- The RER between two currencies is the product of the nominal exchange rate (the dollar cost of a euro, for example) and the ratio of prices between the two countries:

$$\text{RER} = e \times (P^*/P)$$

example:

$e$   $\equiv$  the nominal dollar-euro exchange rate

$P^*$   $\equiv$  the average price of a good in the euro area

$P$   $\equiv$  the average price of the good in the United States.

USA vs. Europe: the dollar rose by 24%.

In addition European prices did not rise as fast as those in Europe.

So the \$'s purchasing power in Europe rose for two reasons.

	<b>USA</b>	<b>EURO AREA</b>	<b>\$/EURO</b>	<b>\$/euro</b>
	<b>CPI</b>	<b>CPI</b>	<b>EXCHANGE</b>	<b>REAL</b>
			<b>RATE</b>	<b>EXCHANGE RATE</b>
<b>1990</b>	<b>102</b>	<b>100</b>	<b>1.23</b>	<b>1.21</b>
<b>2000</b>	<b>137</b>	<b>128.0</b>	<b>0.93</b>	<b>0.87</b>
	<b>34%</b>	<b>28%</b>	<b>24%</b>	<b>28%</b>

## Central banks: Also a key player.

They can use monetary policy to guide their exchange rate:  
(China kept the renminbi at 8.3 per \$ for 10 years)



When thinking about 'Open Economies'  
we must return to thinking about monetary policy:

- What do central banks do?
- They usually buy and sell treasury bills.
- Why? We said, from a closed economy perspective, central banks focus on one of two targets:

They can use the quantity equation and target money:

$$MV = PY$$

They can think of a loanable funds model and target interest rates:

$$ff = \pi + 0.5 X(\pi - \pi^*) + (U^* - U) + r^*$$

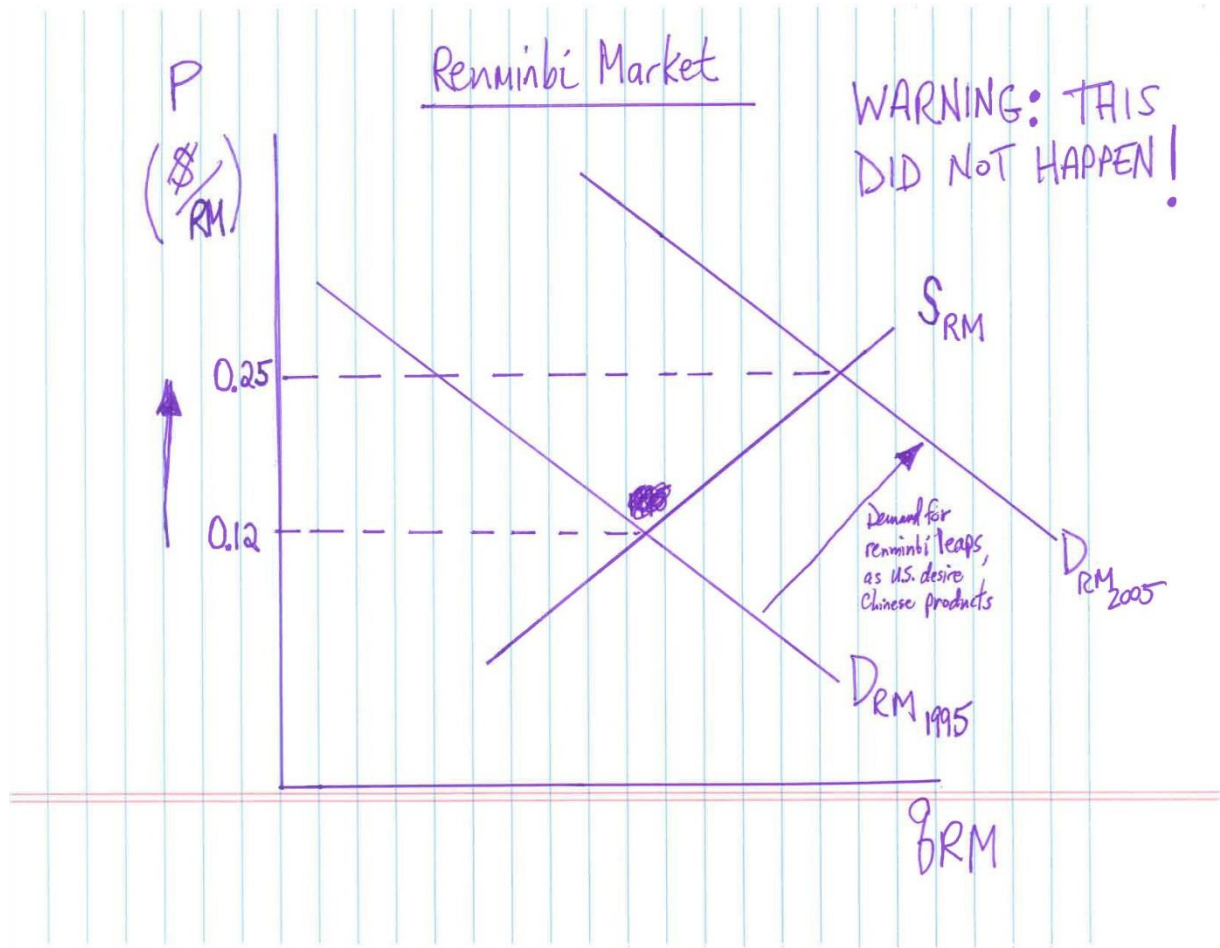
How did the renminbi stay steady vs the dollar  
as the U.S. trade deficit with China soared?

- China pegged their currency:
- We bought a gazillion TVs
- China's central bank bought trillions of T-bonds

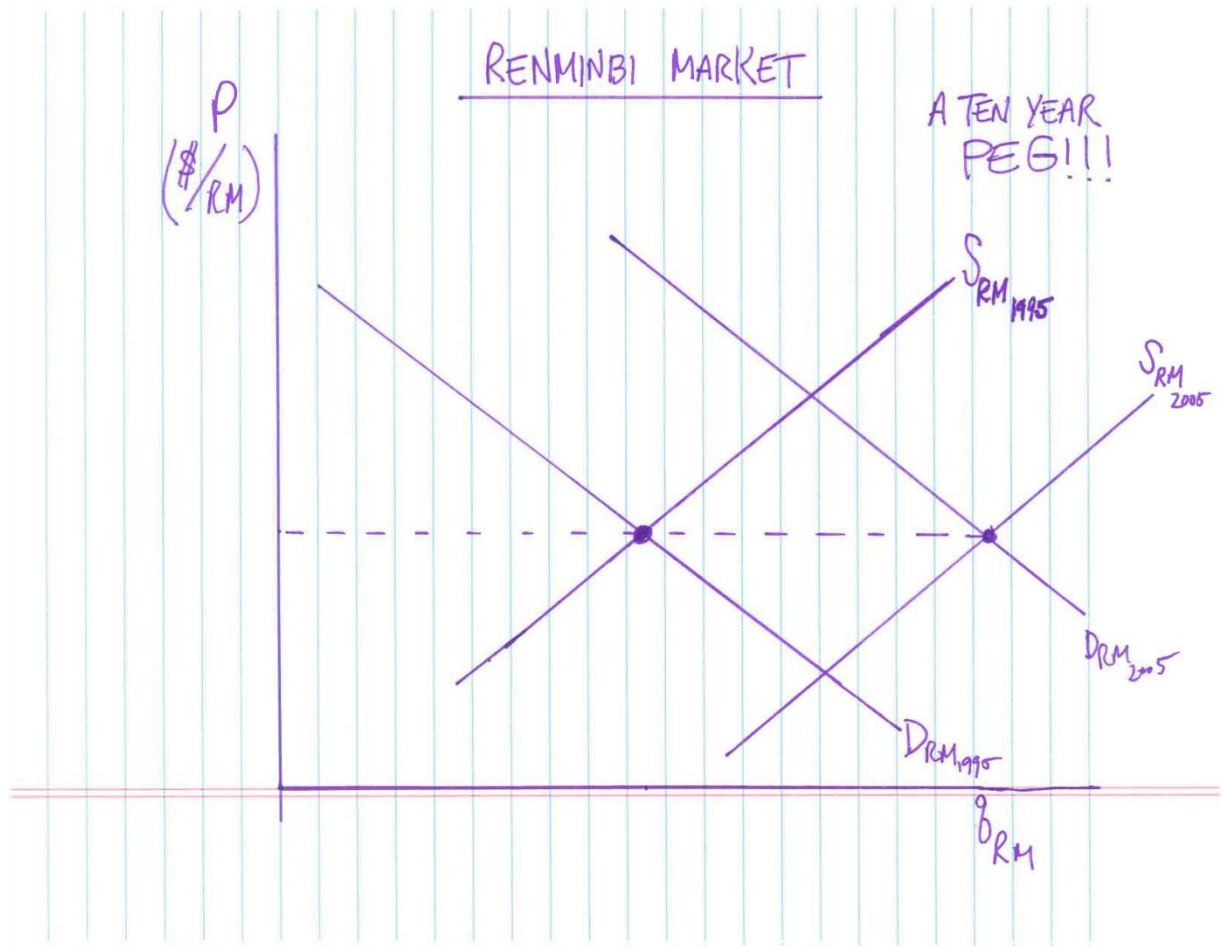
# We can use our supply and demand model:

- U.S. demand for Chinese goods soared.
- U.S. deficit with China climbs from \$20 billion to \$350 billion, 1995 to 2015.
- U.S. demand for Chinese renminbi, needed to buy Chinese goods soared.

U.S. Demand for RM soars: the RM should soar vs \$  
A dime for a RM in 1995, a Quarter for a RM in 2005  
( $0.12\$/\text{RM} = 8.3\text{RM}/\text{\$}$ )

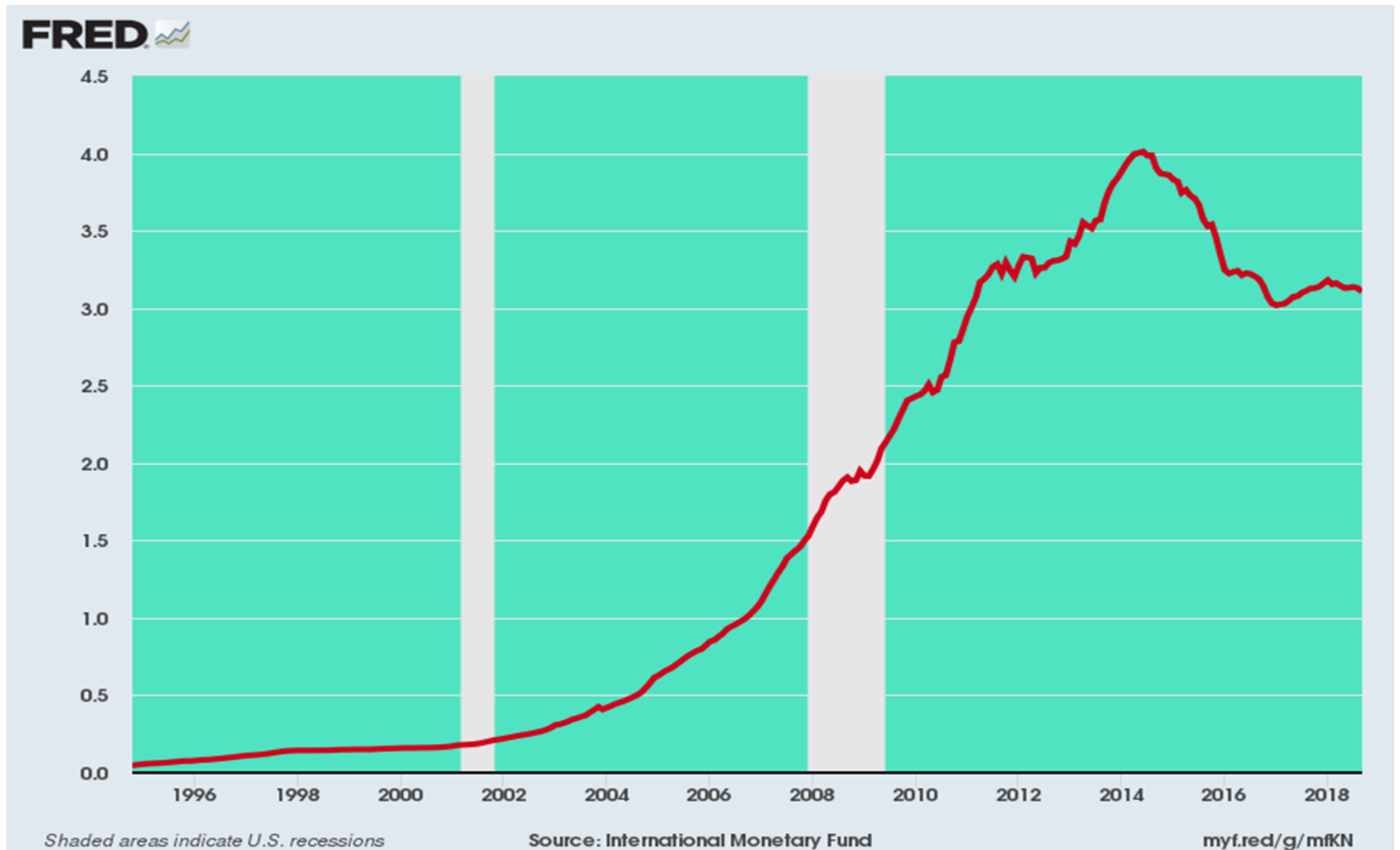


U.S. Demands RM. But P.B.o.C. Supplies Needed RM. They do so to keep RM/\$ STEADY





# China Foreign Exchange Reserves: (\$trillions)



# In 2008-2009 the world plunged into a deep recession...

- Some argued that the USA needed to use super easy monetary policy to get the dollar to fall.
- Why was that a nutty suggestion?
- (Hint: can everyone pursue that strategy?)

# The Euro in Crazy Brief historical context:

- World War I: 1914-1918
- Treaty of Versailles: Crippling War Reparations  
(*The Economic Consequences of the Peace*, J.M. Keynes)
- World War II: 1939-1945  
(Europe, once again, devastated by War)
- Post-War Europe, 1950s onward, motivated by striking economic alliances to limit the risks of another war.

The United State of Europe  
17 nations using one currency,  
under the control of one central bank

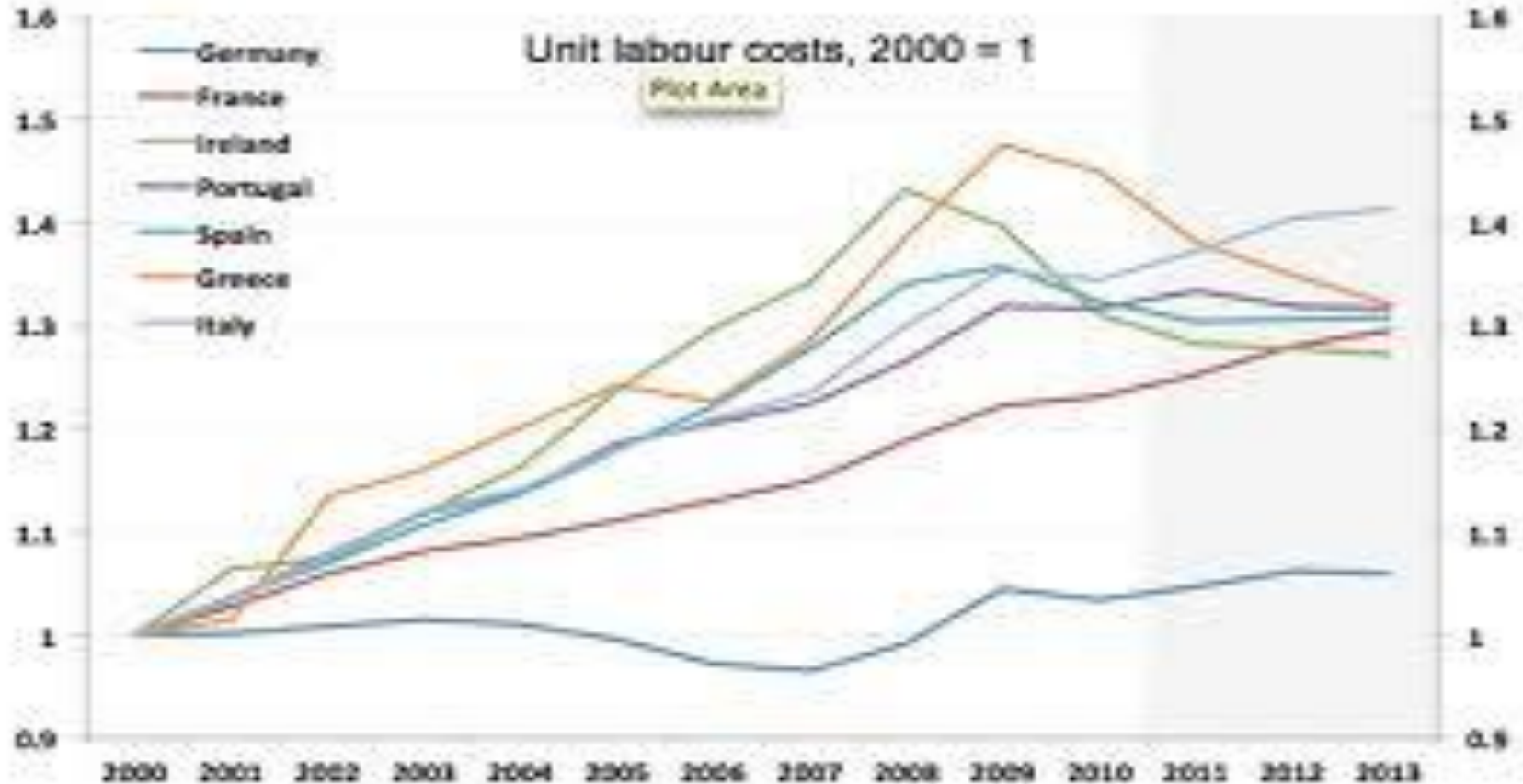
- France wanted a return to geo-political relevance, convinced Germany that:

‘In unity there is strength’

Rest-of-Europe envied low borrowing costs that Germany had secured via its tough stance on inflation.

- Germany, paranoid about inflation, insisted ECB must operate on Bundesbank principles

# The Problem? Germany has a long history of super competitiveness



# Unit Labor Costs?

- Labor works to produce stuff, OUTPUT.
- How much stuff do they produce each hour?  
Productivity=Output per hour
- How much did an hour's worth of stuff cost?  
Hourly Wage rate
- Changes in Unit labor costs roughly:  
 $\Delta$  hourly wage rates –  $\Delta$  output per hour

# Germany vs. Italy: A stylized depiction

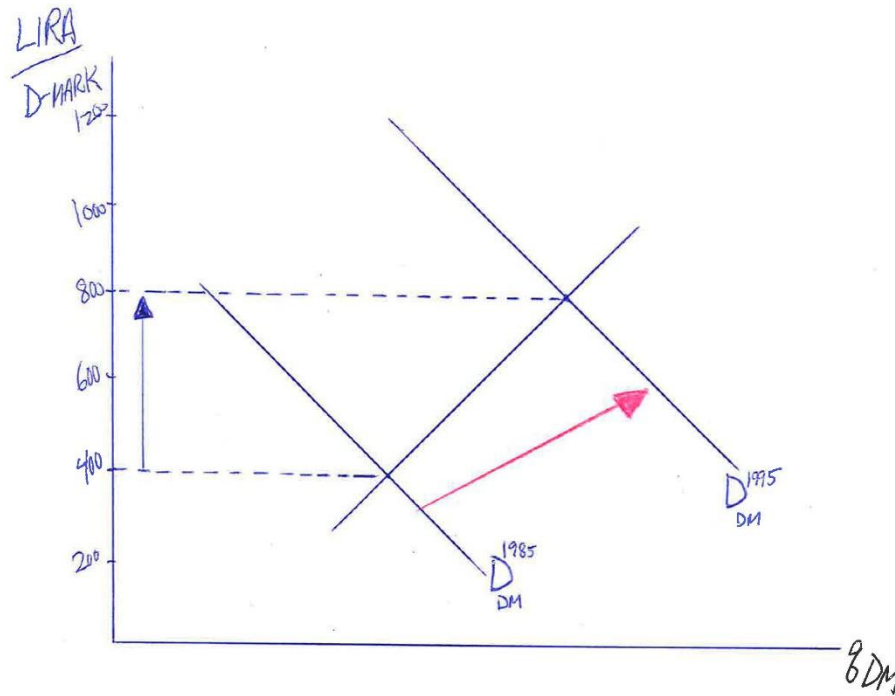
	annual		
	growth rate	1985	1995
<b>German Labor Productivity (output per hour)</b>	<b>2.0%</b>	<b>100</b>	<b>122</b>
<b>German hourly wage rates (D-marks per hour)</b>	<b>2.0%</b>	<b>10</b>	<b>12</b>
<b>German unit labor costs (D-marks per unit of output)</b>		<b>0.10</b>	<b>0.10</b>
	annual		
	growth rate	1985	1995
<b>Italian Labor Productivity (output per hour)</b>	<b>1.0%</b>	<b>100</b>	<b>110</b>
<b>Italian hourly wage rates (Lira per hour)</b>	<b>3.5%</b>	<b>10</b>	<b>14</b>
<b>Italian unit labor costs (Lira per unit of output)</b>		<b>0.100</b>	<b>0.128</b>

Suppose Italy's Lira Is Stable versus Germany's D-Mark?  
Then Italy's labor costs jump versus Germany's

		1985	1995
German unit labor costs (D-marks per unit of output)		0.10	0.10
Italian unit labor costs (Lira per unit of output)		0.10	0.13
Italian Lira per D-mark		1	1
Italian unit labor costs (D-mark per unit of output)		0.100	0.128



Italians demand more German goods and buy D-marks.  
If the Italian Central Bank ignores these flows, the lira falls versus the d-mark.



# Germany: The China of Europe

- Germany, via euro, fixes its exchange rate in Europe.
  - (just like China's fixed rate versus the USA)
- German banks lend gobs of money to the PIIGS (Portugal, Italy, Ireland, Greece, Spain):
  - (just like PBoC buying U.S. treasuries)

The underlying problem remains.  
German labor costs fall over time  
versus southern European labor costs

- What is the ECB mandate? 2% inflation
- How do you deliver 2% average for Europe, and permit, Germany's prices and prices in southern nations?

We need inflation above 2% in Germany and below 2% in the south

- 5 years of 0% inflation in Italy and Spain
- 5 years of 4% inflation in Germany
- After 5 years, prices now are equal, and you did it, while still following the ECB mandate.

# BUT GERMANY Refuses to embrace a period of higher than 2% INFLATION!

- Primus Inter Pares:

IF THE ECB FEARS GERMANY AND GIVES THEM 2% INFLATION TWO OTHER THINGS MUST BE TRUE:

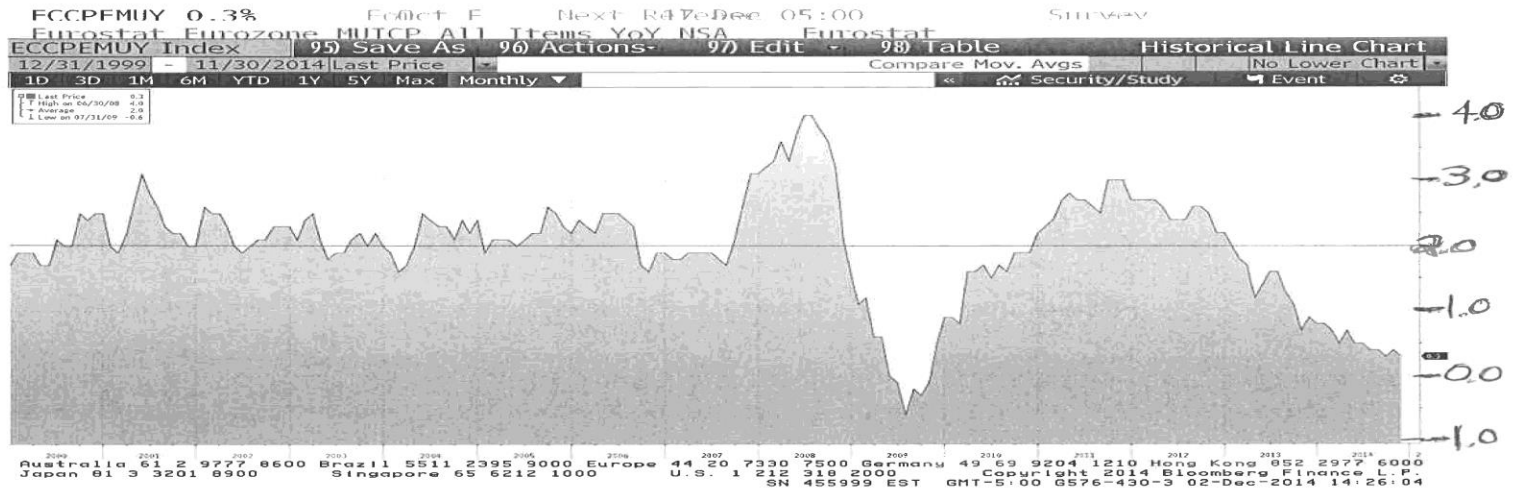
– REST OF EUROPE MUST SUFFER DEFLATION, IF THEY WANT TO GET LABOR COSTS EQUAL

– OVERALL INFLATION IN EUROPE WILL BE BELOW TARGET

# THIS MEANS EXTENDED WEAKNESS AND BELOW TARGET INFLATION

- WE KNOW THAT WAGES ARE VERY HARD TO GET BELOW ZERO
- THAT MEANS ITALY AND SPAIN AND OTHER WEAK SISTERS FACE EXTENDED WEAK PERIODS.
- IT ALSO MEANS BELOW TARGET EUROPEAN INFLATION

# EURO AREA INFLATION: Below 2% target



# Imagine using a dual mandate: Spain vs Germany?

- Germany, the Taylor Rule:

$$\text{short rates} = 1\% + 0.5 * (1-2) + (5-5) + 2 = 2.5\%$$

- Spain, the Taylor Rule:

$$\text{short rates} = 1\% + 0.5 * (1-2) + (8-18) + 2 = -6.5\%$$

OPTIMAL CURRENCY AREA?

I GO WHERE THE JOBS ARE!



Ezra Vogel: *'Deng Xiaoping and the Transformation of China'*

- ***“Perhaps no one in the twentieth century had a greater long-term impact on world history than Deng Xiaoping”***
- He confronted the damage wrought by Mao’s Cultural Revolution, pushed for modernization.
- He opened trade with the west, lifting many hundreds of millions of Chinese out of poverty.

# Mao Zedong Late Legacy:

- The Cultural Revolution: 1966-1976

- To Red Guard preserve 'true' Communist ideology:

- Although the bourgeoisie has been overthrown, it is still trying to use the old ideas, culture, customs, and habits of the exploiting classes to corrupt the masses, capture their minds, and stage a comeback. The proletariat must do just the opposite: It must meet head-on every challenge of the bourgeoisie [...] to change the outlook of society. Currently, our objective is to struggle against and crush those people in authority who are taking the capitalist road, to criticize and repudiate the reactionary bourgeois academic "authorities" and the ideology of the bourgeoisie and all other exploiting classes and to transform education, literature and art, and all other parts of the superstructure that do not correspond to the socialist economic base, so as to facilitate the consolidation and development of the socialist system.

- The result?

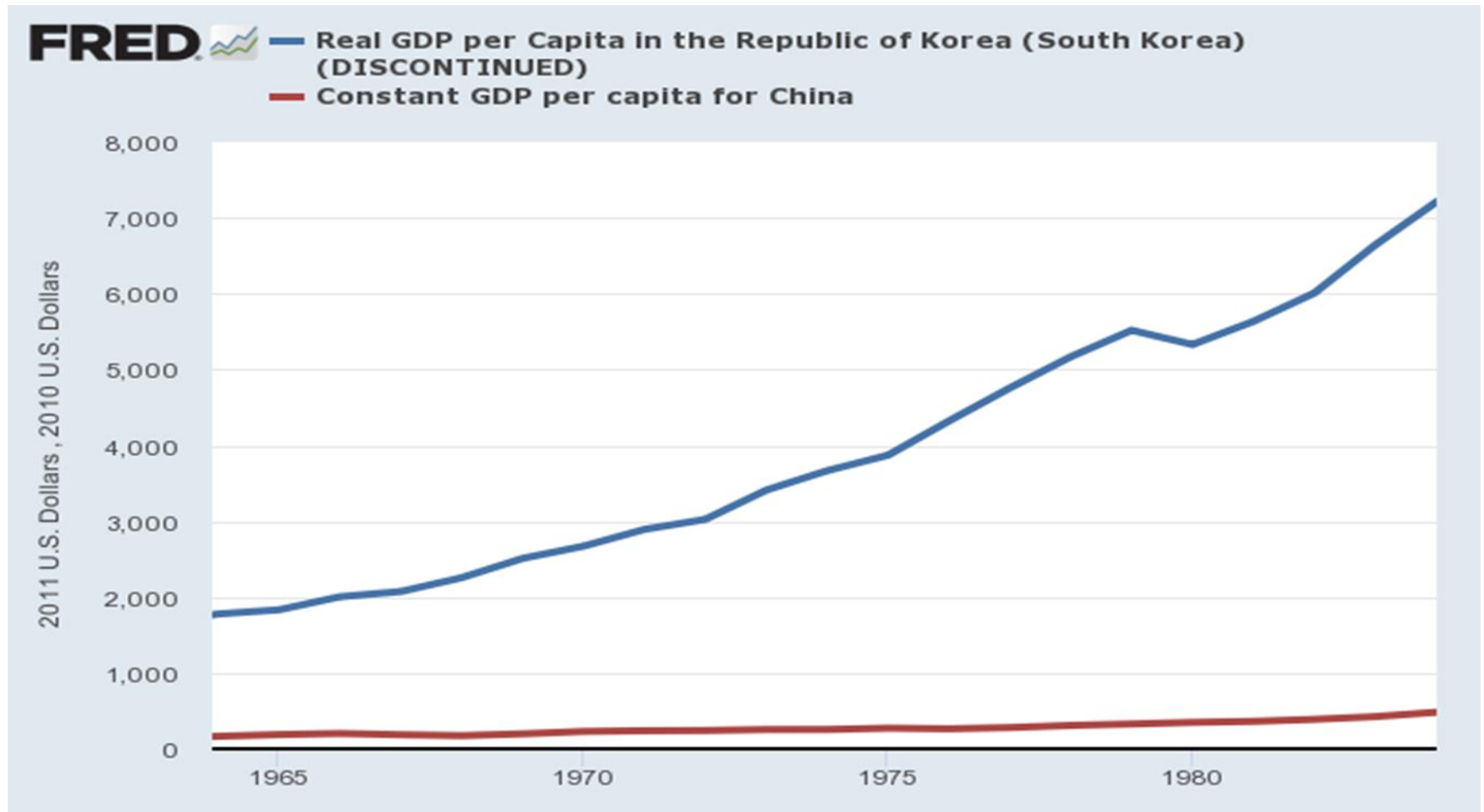
- Millions of people were persecuted. A large segment of the population was forcibly displaced, most notably the transfer of professionals and urban youth to work in the fields in the rural regions. Cultural and religious sites were ransacked.

We can imagine Deng Xiaoping confronting rapid progress for many Asian neighbors:

1964: Per capita output in **Korea is 11 times larger than in China.**

1964 through 1984: Per capita real GDP grows 7%/yr. in Korea, 5%/yr. in China.

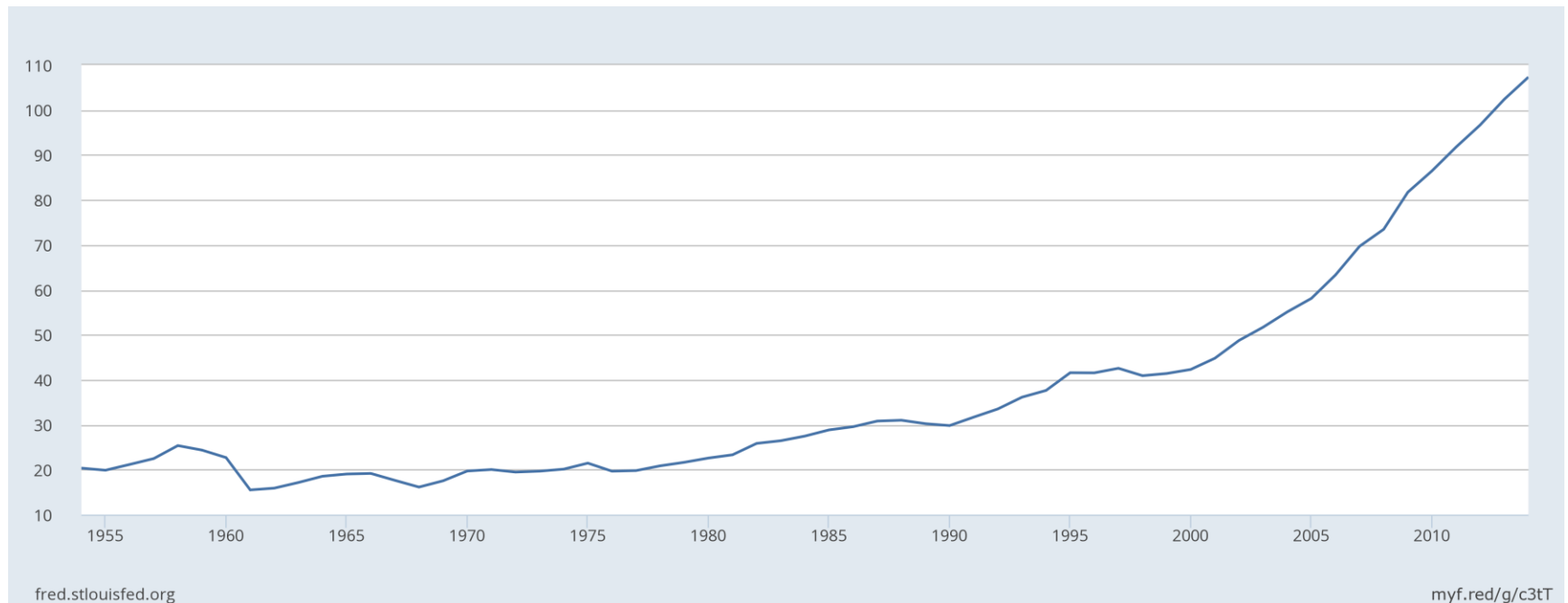
1984: Per capita output in **Korea is 15 times larger than in China.**



# China Real GDP Growth

## A Thirty Year Unprecedented Boom\*

\*(China real GDP, PPP\$, as percent of USA real GDP)



# A two step export onslaught: first the USA, then Europe

china exports	\$ billions	per year				
	1998	2000	2002	2004	2006	2008
to USA	63	84	116	168	252	294
to Europe	42	46	48	102	192	288

**The Great Recession.** China faced plunging demand for its exports. It responded with a massive stimulus, building roads, bridges, office buildings and housing.

- In 2000, investment was 35% of China GDP
- In 2007, investment was 41% of China GDP
- In 2009, investment was 48% of China GDP
- In 2016, investment was 47% of China GDP

# The result: Sustained, strong growth, but wildly imbalanced:

<b>China versus</b>	<b>USA: GDP</b>	<b>Components</b>
	<b>China</b>	<b>U.S.A.</b>
net exports G&S	4%	-4%
investment	49%	15%
govt	13%	20%
consumption	34%	69%
	100%	100%
	<b>China</b>	<b>U.S.A.</b>
exports G&S	31%	13%
imports G&S	27%	17%
health, total	5%	18%
public health	3%	8%

Investment booms don't slow, they bust, and levels decline.  
investment, in many cases was wasted.  
That means the LEVEL MUST FALL NOT THE GROWTH RATE.

				<u>real GDP</u>	<u>index</u>	<u>levels</u>						
	projected											
	growth rate	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
gross investment	-3.0%	49	48	46	45	43	42	41	40	38	37	36
net exports		4	4	3	3	2	2	1	1	1	0	-1
household consumption	11%	34	38	42	46	52	57	64	71	78	87	97
government	7%	13	14	15	16	17	18	20	21	22	24	26
total		100	103	106	110	114	120	125	132	140	148	157
total GDP growth rate			3%	3%	4%	4%	5%	4%	6%	6%	6%	6%



