International Economics
Fall 2011
Exchange Rate Regimes

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Exchange Rate under Gold Standard

British £

15

… other
… currencies
…

US $ — 35

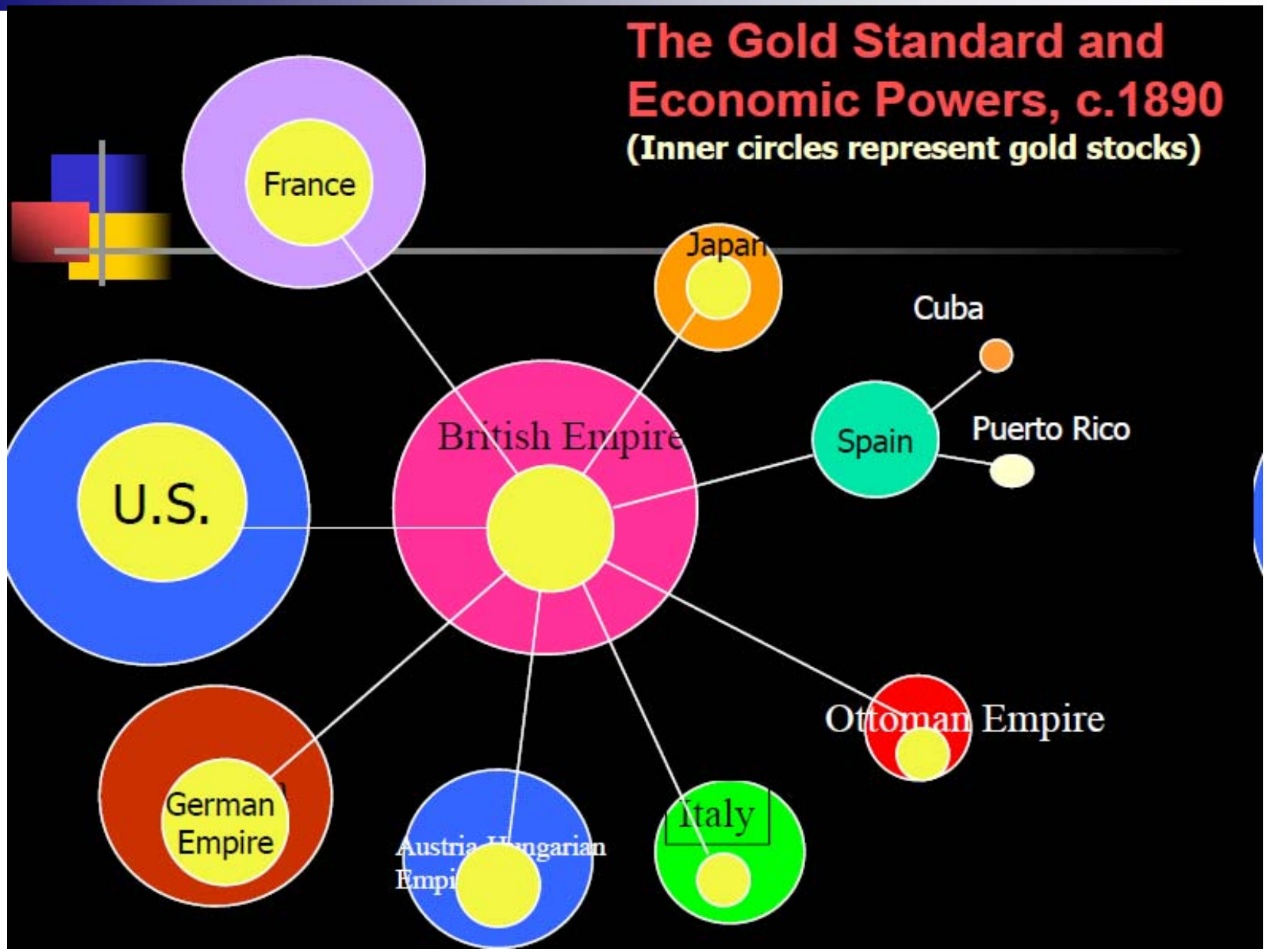
98 — French Franc, F

147

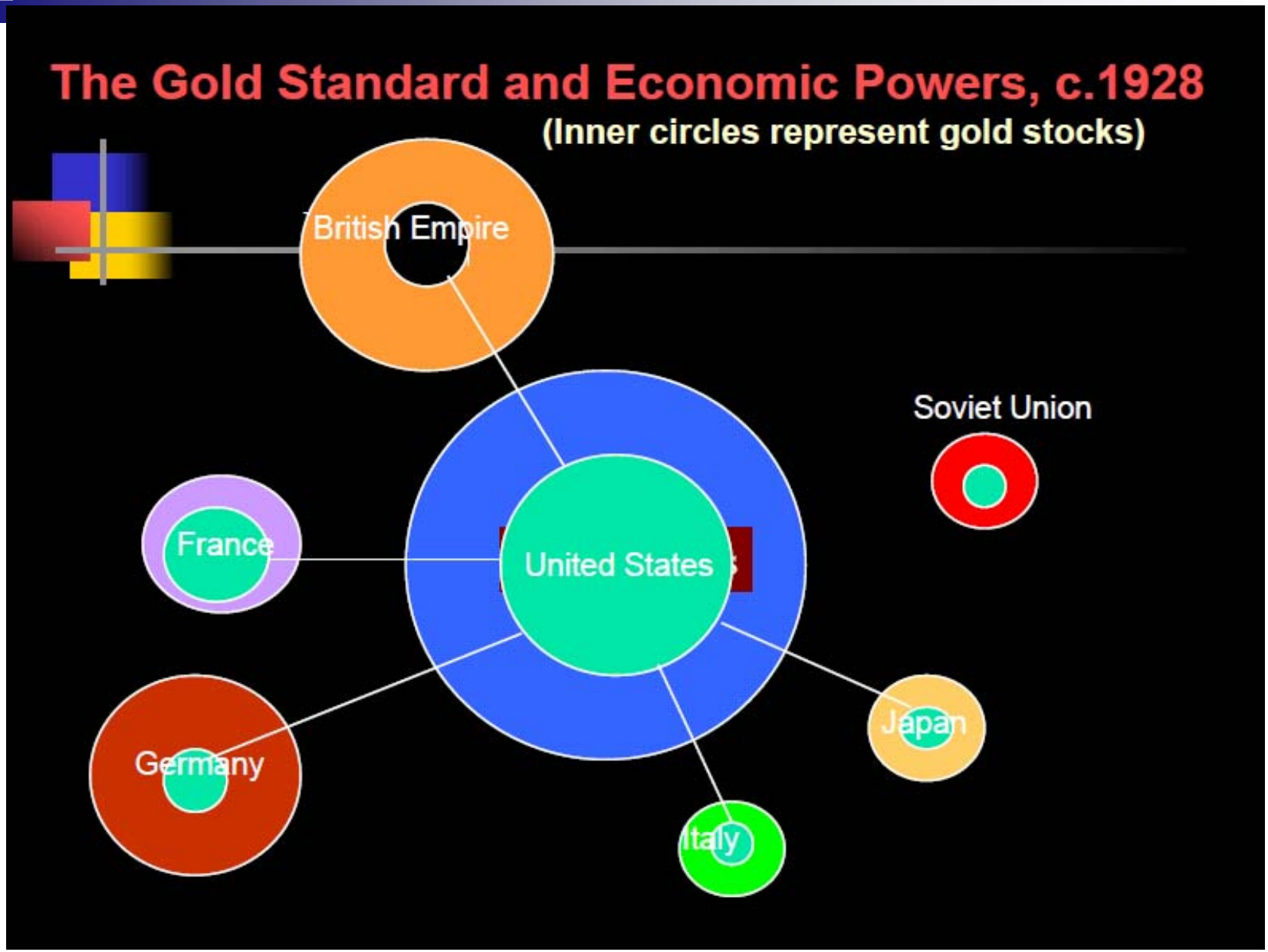
Deutsche Mark (DM)

35 means $35 can buy one ounce of gold. And it's mandatory, i.e., if you demand, banks must give you gold to exchange for your paper money.

Exchange rate between any pair of countries was fixed through their fix to the gold.



Source: Bob Mundell



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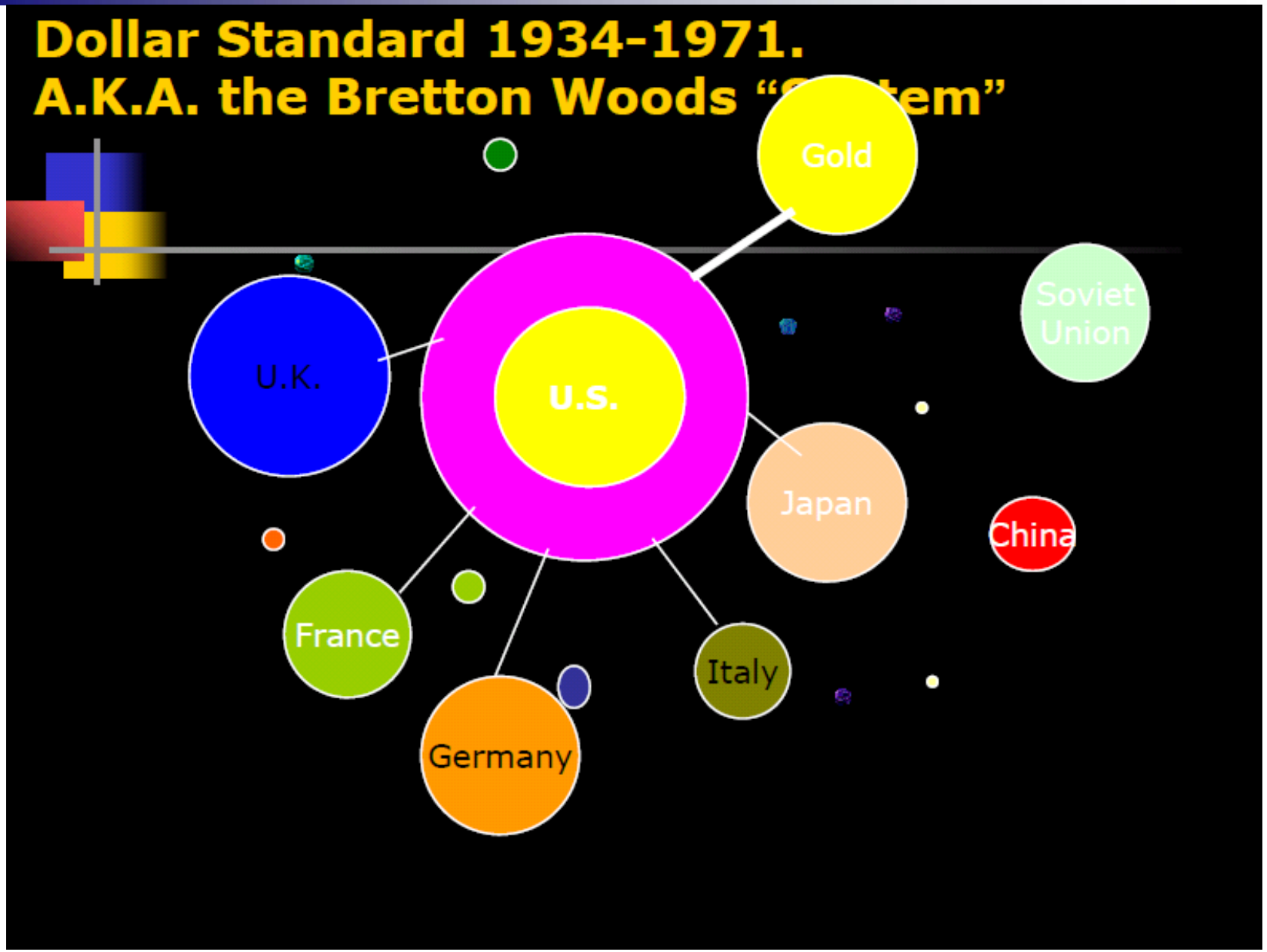


Source: Bob Mundell

Preview

- Fixed exchange rate
  - How it works
  - How monetary and fiscal policies work differently under fixed exchange rate regime
- Compare exchange rate regimes: flexible vs. fixed
- The Impossible Trinity

Central Banks and FX Market

- Many countries try to fix or “peg” their exchange rate to a currency by intervening in the foreign exchange markets. Examples include,
  - Chinese Yuan hard-pegged to the US dollar (between 1995 to 2005), and became soft-pegged after 2005
  - HK dollar pegs to the US dollar
  - Danish Krone pegs to euro

- Many with a flexible exchange rate regime but in fact practice a **managed floating exchange rate**.
  - The central bank “manages” the exchange rate from time to time by buying and selling currency and assets, especially when exchange rate moves sharply in one direction.

- So the first question to ask is: How do central banks intervene in the foreign exchange markets?

Introduction to Central Bank's Balance Sheet

- Assets, including
  - Foreign government bonds (official international reserves)
  - Gold (official international reserves)
  - Domestic government bonds
  - Loans to domestic banks (called discount loans in the US)
- Liabilities, including
  - Deposits of domestic banks
  - Currency in circulation

For example:

Central Bank Balance Sheet

Assets		**Liabilities**	
Foreign assets	$500 billion	Deposits held by other domestic banks	$1.5 trillion
Domestic assets	$2 trillion	Currency in circulation	$ 1 trillion

Central Bank Intervention and Money Supply

- A purchase of any asset by the central bank will be paid for with currency or a check written from the central bank,
  - both of which are denominated in domestic currency, so
  - both of which increase the supply of money in circulation
  - The transaction leads to equal increases of assets and liabilities on central bank's balance sheet
- Thus, as a rule, when the central bank buys domestic assets or foreign assets, the domestic money supply increases.

Central Bank Intervention and Money Supply

- A sale of any asset by the central bank will be paid for with currency or a check written to the central bank,
  - both of which are denominated in domestic currency
  - The central bank puts the currency into its vault or reduces the amount of deposits of banks
  - causing the supply of money in circulation to shrink.
  - The transaction leads to equal decreases of assets and liabilities.
- So as a rule, when the central bank sells domestic assets or foreign assets, the domestic money supply decreases.

An Example of the Fed's Balance Sheet

- Fed's balance sheet in September 2007

The Fed's Balance Sheet (09/27/2007)

Assets		**Liabilities**	
gold	$10 billion	money in circulation	$775 billion
securities holding	$835 billion	bank deposits	$40 billion
other assets	$45 billion	other liabilities	$75 billion
total assets	$890 billion	*total liabilities*	$890 billion

Source: http://www.federalreserve.gov/releases/h41/20070927/h41.pdf

An Example of the Fed's Balance Sheet

- Fed's balance sheet in September 2010

The Fed's Balance Sheet (09/29/2010)

Assets		**Liabilities**	
gold	$10 billion	money in circulation	$915 billion
securities holding	$2,000 billion	bank deposits	$1,250 billion
dollar swap to other central banks	$60 billion		
other assets	$230 billion	other liabilities	$135 billion
total assets	$2,300 billion	*total liabilities*	$2,300 billion

Source: http://www.federalreserve.gov/releases/h41/20100930/h41.pdf

An Example of the Fed's Balance Sheet

- Compared to Sept. 2007 (right before the Great Recession), the Fed's balance sheet has increased from $890 billion to $2.9 trillion (as of Sept. 29, 2011), or a 226% increase.
- Currency in circulation has increased from $775 billion to $1,034 billion (update on Sept. 29, 2011) – or a 33% increase.
- Bank reserves have increased from $40 billion to around $1.7 trillion, or 4,150% increase! – worse yet, banks hold these excess money on their balance sheets: they lend to neither small businesses nor consumers.

How Central Bank Fixes Exchange Rates

- To fix the exchange rate, central bank influences the quantities supplied and demanded of currency by trading domestic and foreign assets, so that the exchange rate (the price of foreign currency in terms of domestic currency) stays constant.
- According to the interest parity condition:

$$R = R^* + (E^e - E)/E$$

When the exchange rate is fixed at some level E_0 and if investors or market participants also believe central bank has the *ability* to keep it fixed, then the market expects no change in exchange rate, i.e., $E^e = E$, thus

$$R = R^*$$

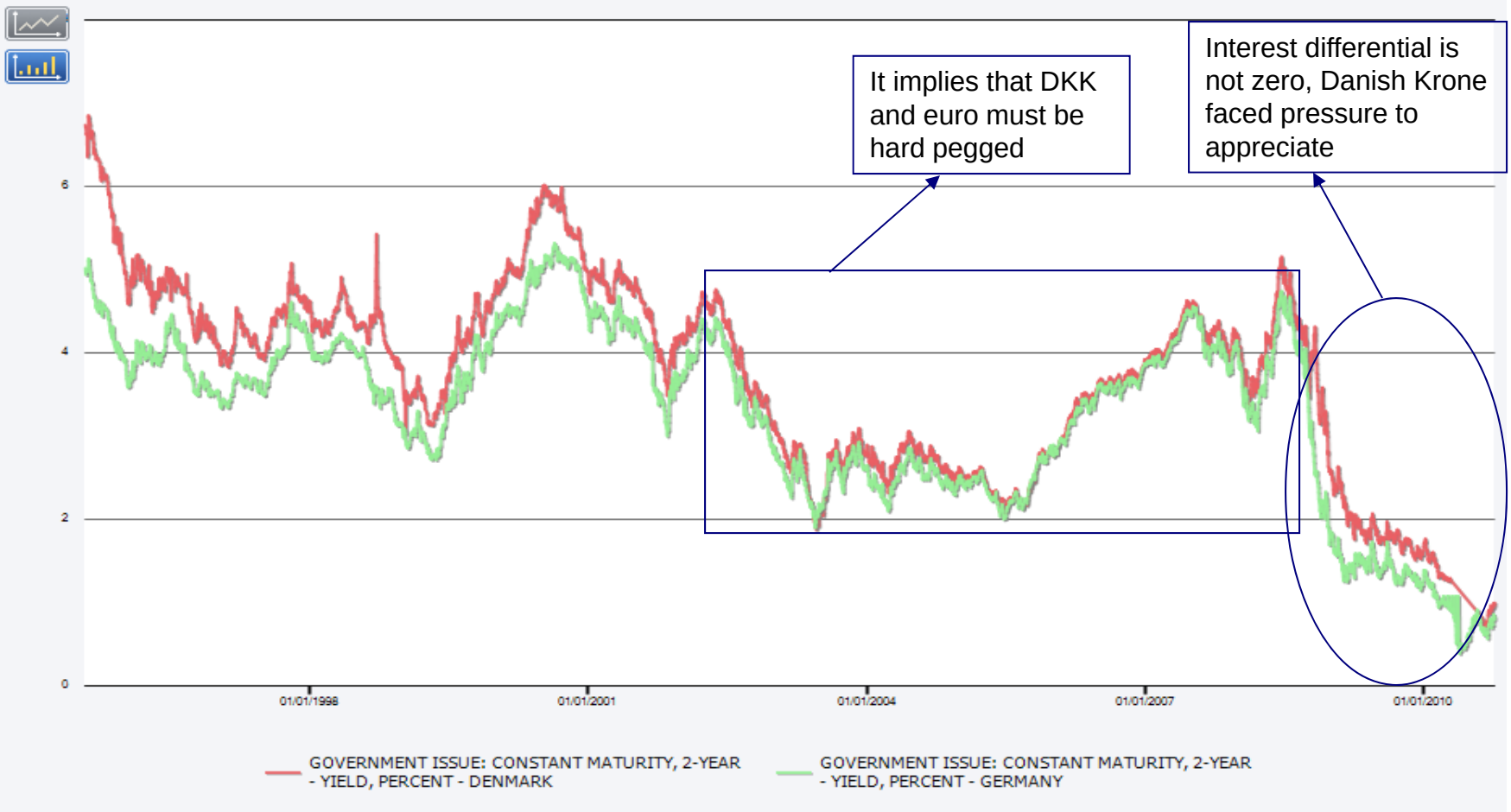
Fixed Exchange Rates

- So to fix the exchange rate, what the central bank essentially must do is to keep $R = R^*$.

- To achieve the goal, central bank adjusts the quantity of monetary assets in the money market until the domestic interest rate equals the foreign interest rate, given the level of average prices and real output:

$$M^s/P = L(R,Y) = L(R^*,Y)$$

Interest rates: Denmark vs. Germany



Fixed Exchange Rates (cont.)

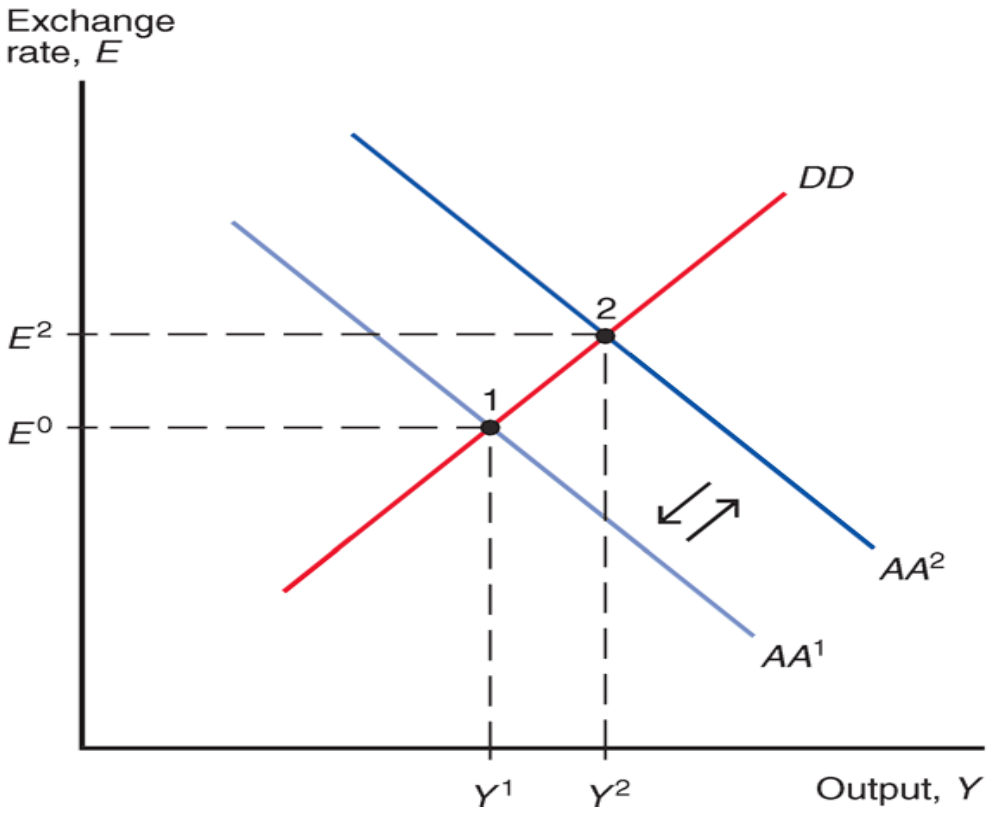
- **Suppose** that the central bank has fixed the exchange rate at E_0 but the **level of output rises**, raising the demand of real monetary assets.

- This will put upward pressure on interest rates and the value of the domestic currency. How should the central bank respond if it wants to fix exchange rates?

- In this case, the central bank can *buy* foreign assets in FX market,
  - thereby increasing the supply of local currency,
  - thus, removing the pressure of currency appreciation.

Monetary Policy under Fixed Exchange Rates

- When central bank equals domestic interest rates to foreign interest rates, it surrenders its own monetary policy to foreign country. Monetary policy is no longer independent.



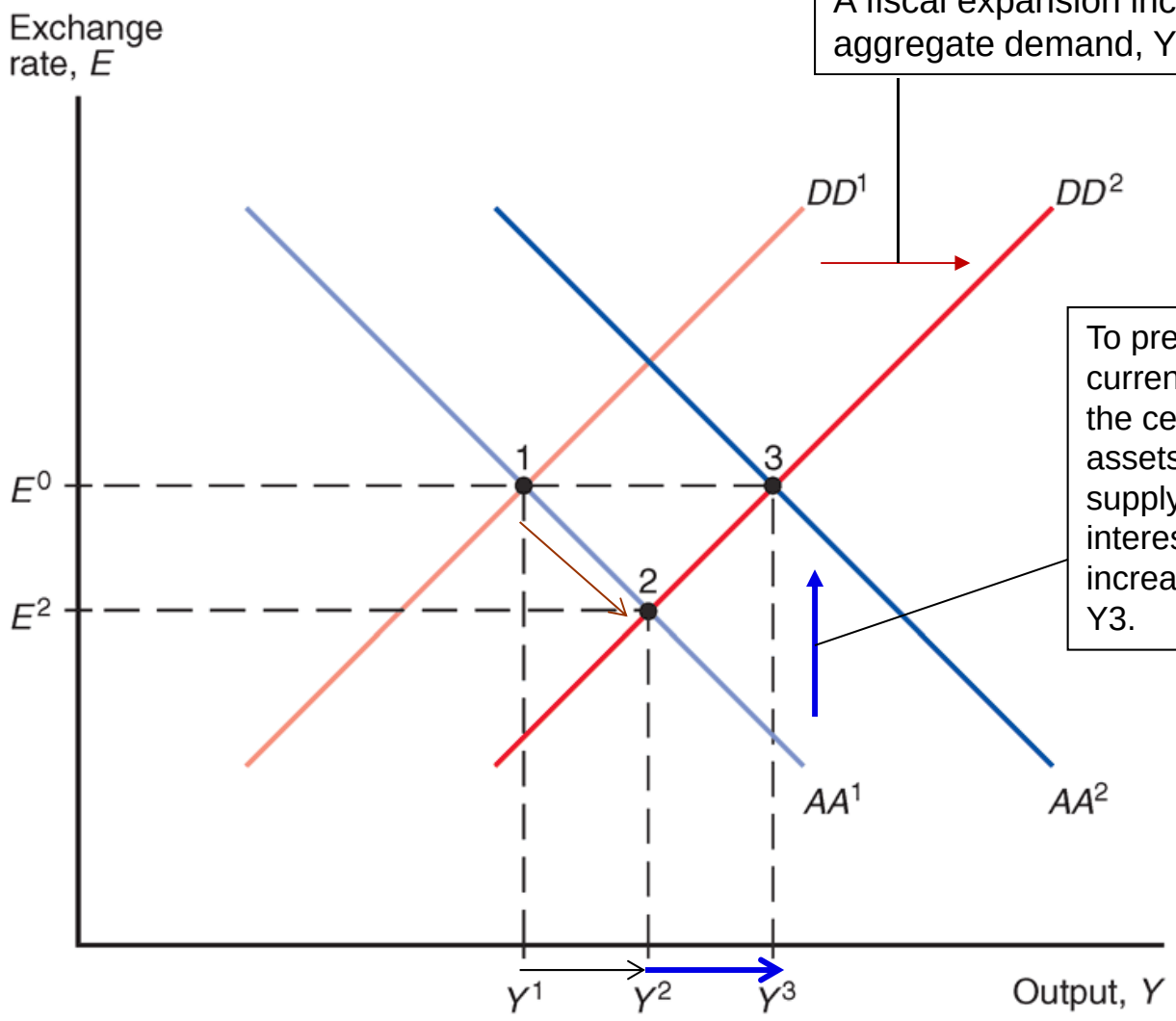
➔Monetary policy becomes ineffective under fixed exchange rate regime, because any change of money supply will shift AA curve, thus resulting in change in E, which is not allowed.

➔ What's more, since R=R*, the monetary policy in foreign country, to which the home currency is pegged, will affect home country's output and employment. In this sense, by fixing home currency to the foreign one, home country **lost its automy in monetary policy.**

Fiscal Policy under Fixed Exchange Rates

- Under fixed change rate, temporary changes in fiscal policy are more effective in influencing output and employment in the short run:
  - The rise in aggregate demand and output due to expansionary fiscal policy raises demand of real monetary assets, putting upward pressure on interest rates and on the value of the domestic currency.
  - To prevent an appreciation of the domestic currency, the central bank must buy assets, thereby increasing the money supply and decreasing interest rates, thus relieving the appreciation pressure.
  - Central bank's action to keep exchange rate fixed will magnify the effects of fiscal policy. To see why? See the following graph…

Fiscal Expansion under Fixed Exchange Rate



A fiscal expansion increases aggregate demand, Y1 → Y2.

To prevent the domestic currency from appreciating, the central bank buys foreign assets, increasing the money supply and decreasing interest rates. Output increases further from Y2 to Y3.

A Word on Greece's Options

- Monetary policy
  - Greece is part of Euro zone – a special kind of fixed exchange rate regime: the common currency area
  - Monetary policy is set by ECB. Greek central bank can't use monetary policy to stimulate its economy, unless it decides to leave Euro

- Fiscal policy
  - Greek government is heavily indebted. Further government spending will exacerbate fiscal problem. Thus, the room for further expansionary fiscal policy is very limited.
  - Investors demand high interest rate for Greek government debt, it could be so high that it may offset any benefits from extra government spending

A Word on Greece's Options

- What are the likely scenarios

1. Greece defaults on its debt and comes clean afterwards – but the default may trigger a domino effect: people may form expectations that other PIIGS may also default in the future. In particular, banks that hold Greek debt will suffer, market confidence will sank, which may lead to another round of financial crisis.

2. Greece chooses to leave Euro zone and resorts to money printing and inflation to pay down its debt - a big blow to the Euro and pan-European dream – strong resistance from France.

A Word on Greece's Options

- What are the likely scenarios

3. An European-wide government bailout, i.e., wealth transfer from stronger members to weaker ones. Probably the best solution in the short term, likely to restore market confidence very quickly. But the long-run implication is dire: it encourages profligate spending of peripheral countries and generates *moral hazard* problem – strong resistance from the strongest economy: Germany.

4. Debt restructuring – similar to insolvent firms in bankruptcy court, holders of Greek debt, including governmetns and banks, agree to accept a *haircut* on their debt claim. Banks will still suffer a loss, but they will be relatively better off than when Greece defaults. German voters would be more willing to accept. But the risk is similar to scenario 1, where investors/banks may expect the same thing to happen to other PIIGS, generating a domino effect.

Flexible (Floating) Exchange Rates

vs.

Fixed Exchange Rates

Arguments for Flexible Exchange Rates

1. Monetary policy autonomy
   - Floating exchange rate allows monetary policy to be used to pursue macroeconomic goals (stable growth, low inflation)
2. Flexible exchange rates may also prevent speculation in some cases
   - Fixed exchange rates are not sustainable if markets believe that the central bank does not have enough official international reserves.
3. Automatic stabilization
   - In contrast, fixed exchange rate loses the ability to auto-adjust external imbalance of national economy.
   - If the BOP imbalance gets too big, such as the case between Asian exporting countries and the United States, global macro stabilities will suffer→ the global imbalance

Example: The Self-adjusting Mechanism under Flexible Exchange Rates

- Let's use US $ as an example to illustrate how the free movement of ER will help balance an economy.
  - Initially, $ has a depreciation, then exports increase and output increases, and US current account improves;
  - Then, increase of output drives up money demand, with money supply fixed, US domestic interest rate has to rise;
  - The rise of interest rate helps restore money market equilibrium, but the higher interest rate will also attract foreign investors to invest in US market. Investors' buying $ or $-demoniated assets increases capital inflow and pushes up the value of dollar. US dollar now starts to appreciate;
  - The appreciation of $ drives up exports price and lowers the import price, and US current account starts to deterioriate, offseting the previous CA surplus.

➔ This self-adjustment mechanism of free floating exchange rate ensures trade surplus (or deficits) will never get too large.

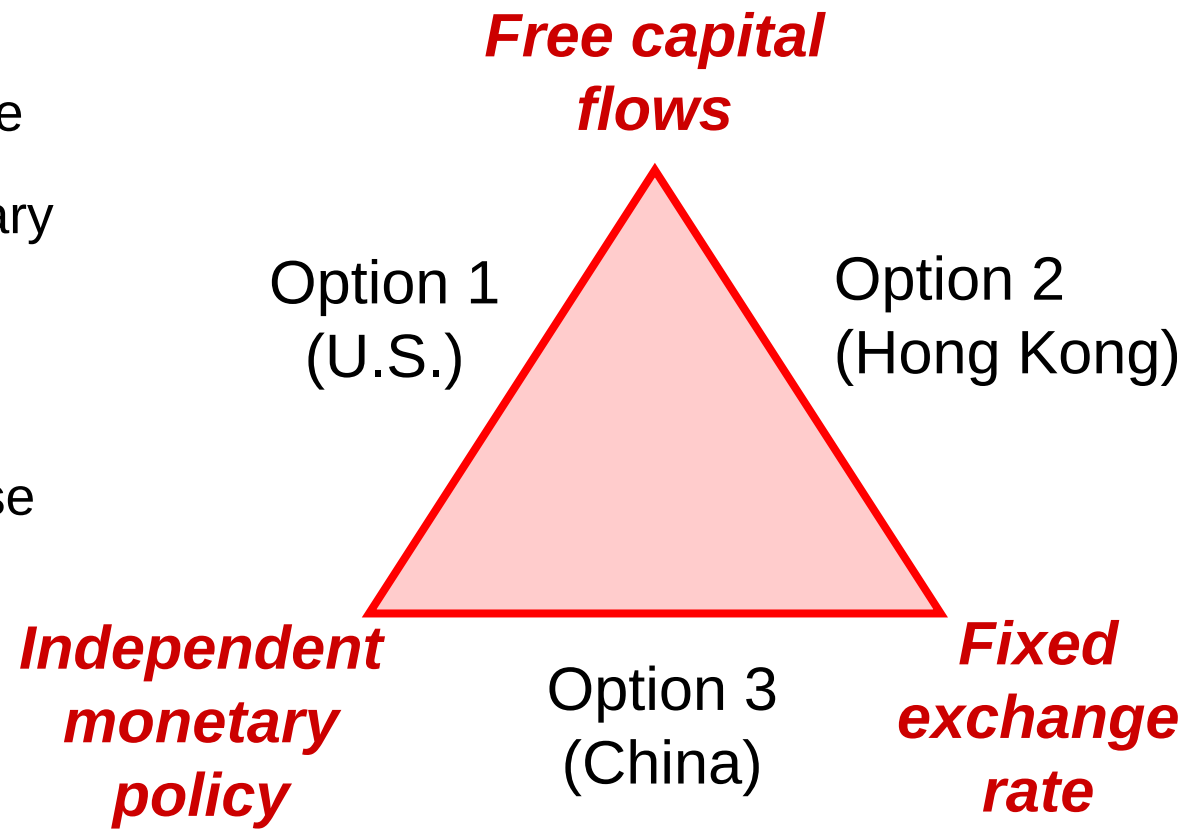
Arguments against Flexible Exchange Rates

1. Uncoordinated international macroeconomic policies
   - Flexible exchange rate tends to make international macro policies less coordinated across countries. Lack of policy coordination may increase *volatility* across national economies.
2. More speculations and higher volatility in the FX market
   - Also, with higher currency volatility or risk, international transactions, or trade in goods and services, will become more costly and difficult.
3. Fixed change rate may bring more discipline to monetary policy
   - Under flexible exchange rate, central banks lost their ability to control their own monetary policy. This may be a good thing, especially the central banks in developing countries, which are more prone to use inflationary monetary policies (or printing money) to solve their economic problems (such as budget deficits).

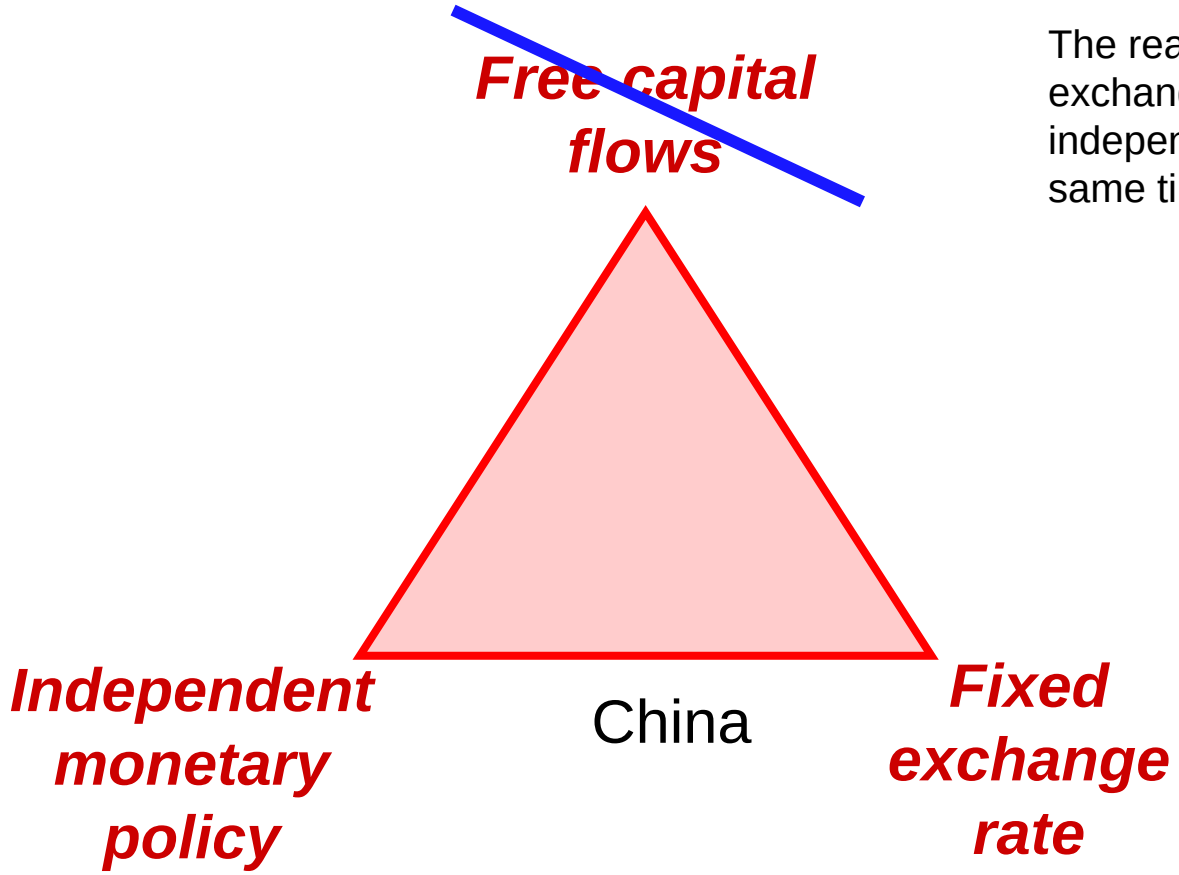
The Impossible Trinity

A nation cannot have free capital flows, independent monetary policy, and a fixed exchange rate simultaneously.

A nation must choose one side of the triangle and give up the opposite corner.



The Impossible Trinity



The reason for China to have fixed exchange rate (soft-pegging) and independent monetary policy at the same time is the following:

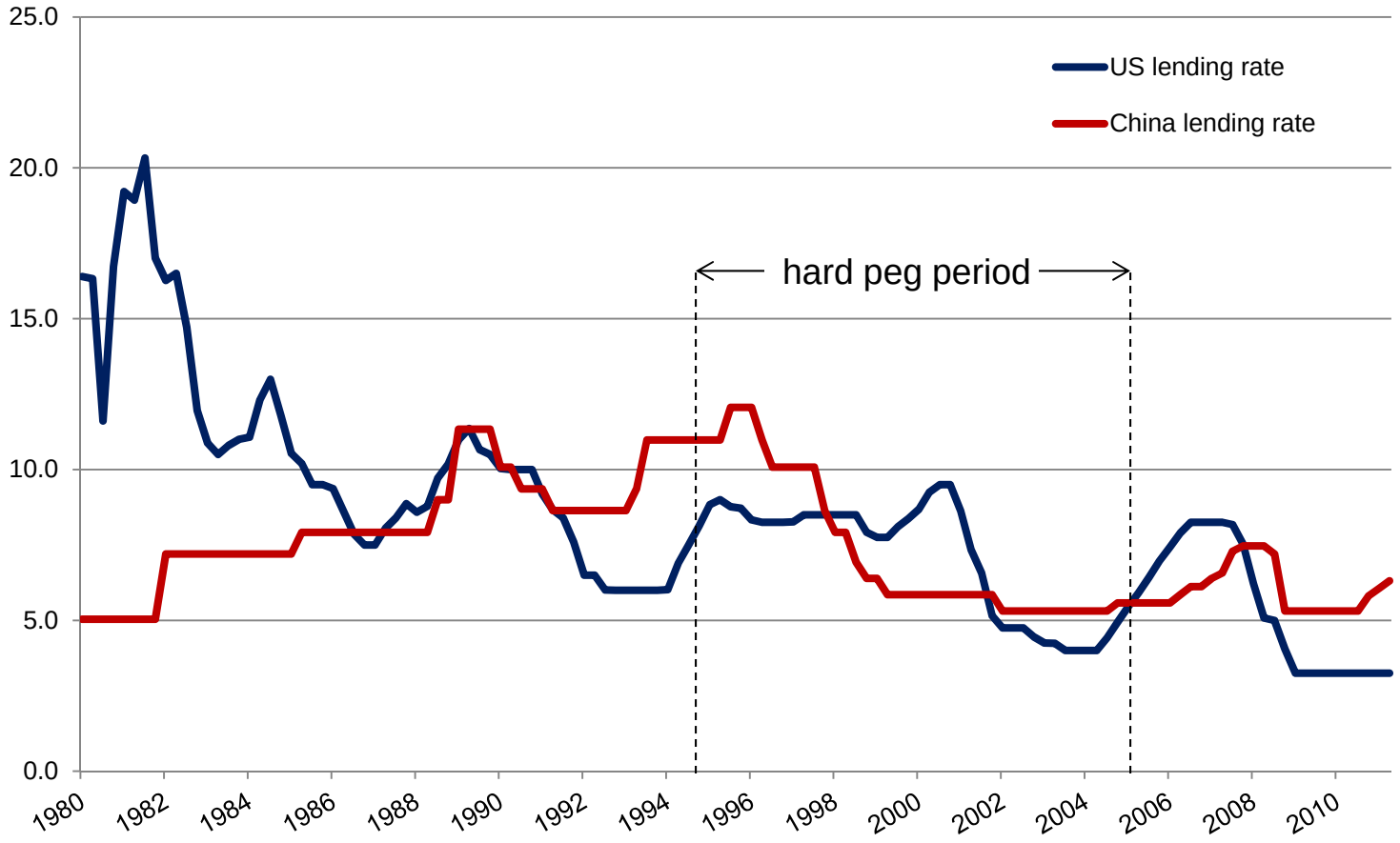
For example, when China's central bank raises interest rate above the US level, the interest differential becomes positive, giving incentives for carry trade.

Investors sell $ and buy Yuan, appreciate Chinese currency, violating the fixed exchange rate.

But if China blocks free capital flow from carry trade, then a rise of interest rate will not appreciate its currency – mission accomplished.

Interest Rate: US (*R**) vs. China (*R*)

1980-2011



A Sidenote

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