

Exchange rate systems

Michala Moravcová

Department of Finance, Masaryk University

International Finance

1. Alternative Exchange Rate Arrangements and Currency Risk

- Exchange rate systems around the world
 - Floating currencies
 - Determined by the market forces of supply and demand (i.e., U.S., Japan, European Union, Australia, and Sweden)
 - Managed floating
 - Countries whose Central Banks intervene enough that the IMF can't classify them as freely floating (i.e., Brazil, Columbia, India, Indonesia, Russia, and South Africa)
 - Fixed/pegged currencies
 - “Pegging” a currency to another or a basket of currencies (i.e., IMF's unit of account [SDR](#) (special drawing right and the Chinese yuan)
 - Often implemented using a currency board

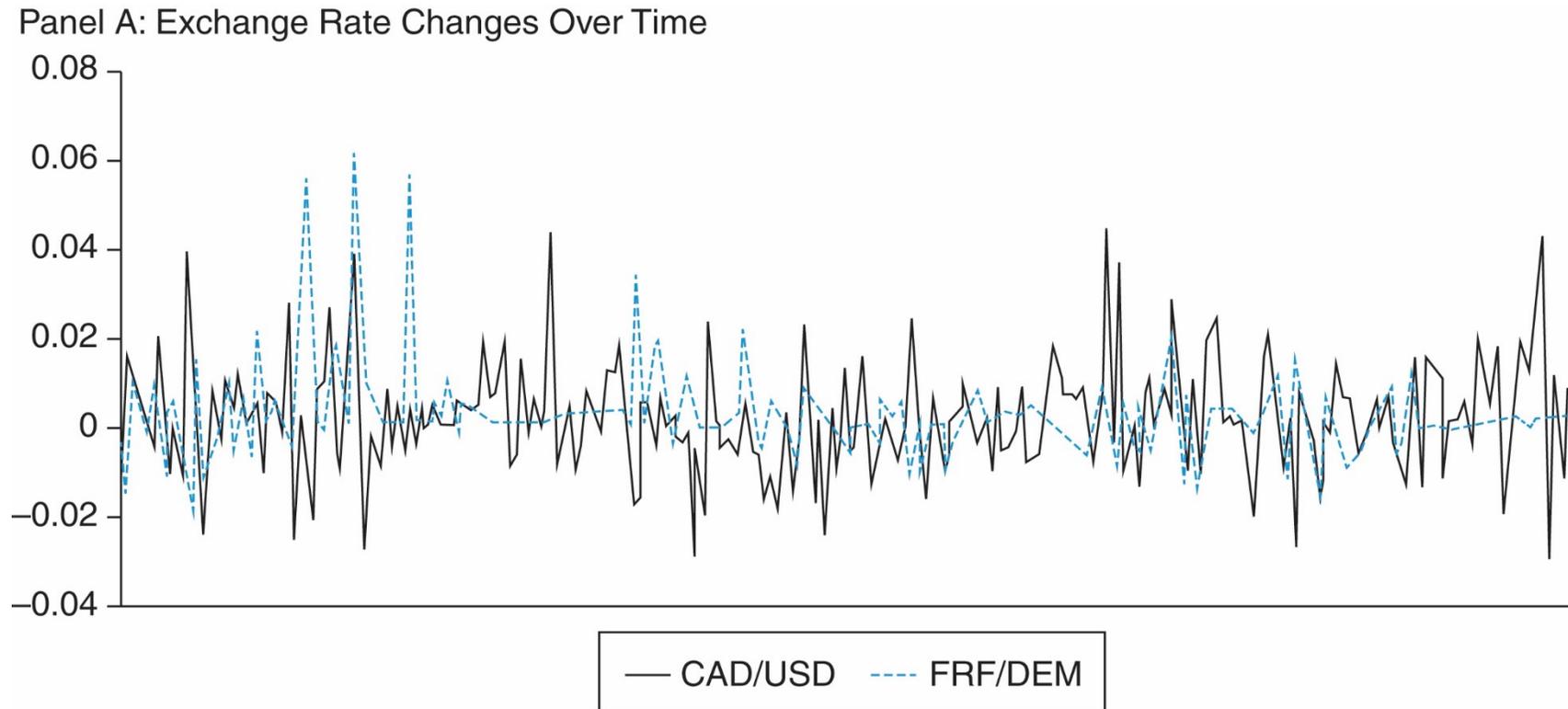
1. Alternative Exchange Rate Arrangements and Currency Risk

- Exchange rate systems around the world (cont.)
 - No separate legal tender
 - Adopt a currency (i.e., Ecuador, El Salvador, and Panama have adopted the U.S. dollar)
 - Target zone
 - Target zones try to limit exchange rate variability and achieve inflation convergence within the participating countries
 - Forex rate is kept within band
 - Crawling pegs
 - Changes are kept lower than preset limits that are adjusted regularly (with inflation) (par value adjusted frequently)

1. Alternative Exchange Rate Arrangements and Currency Risk

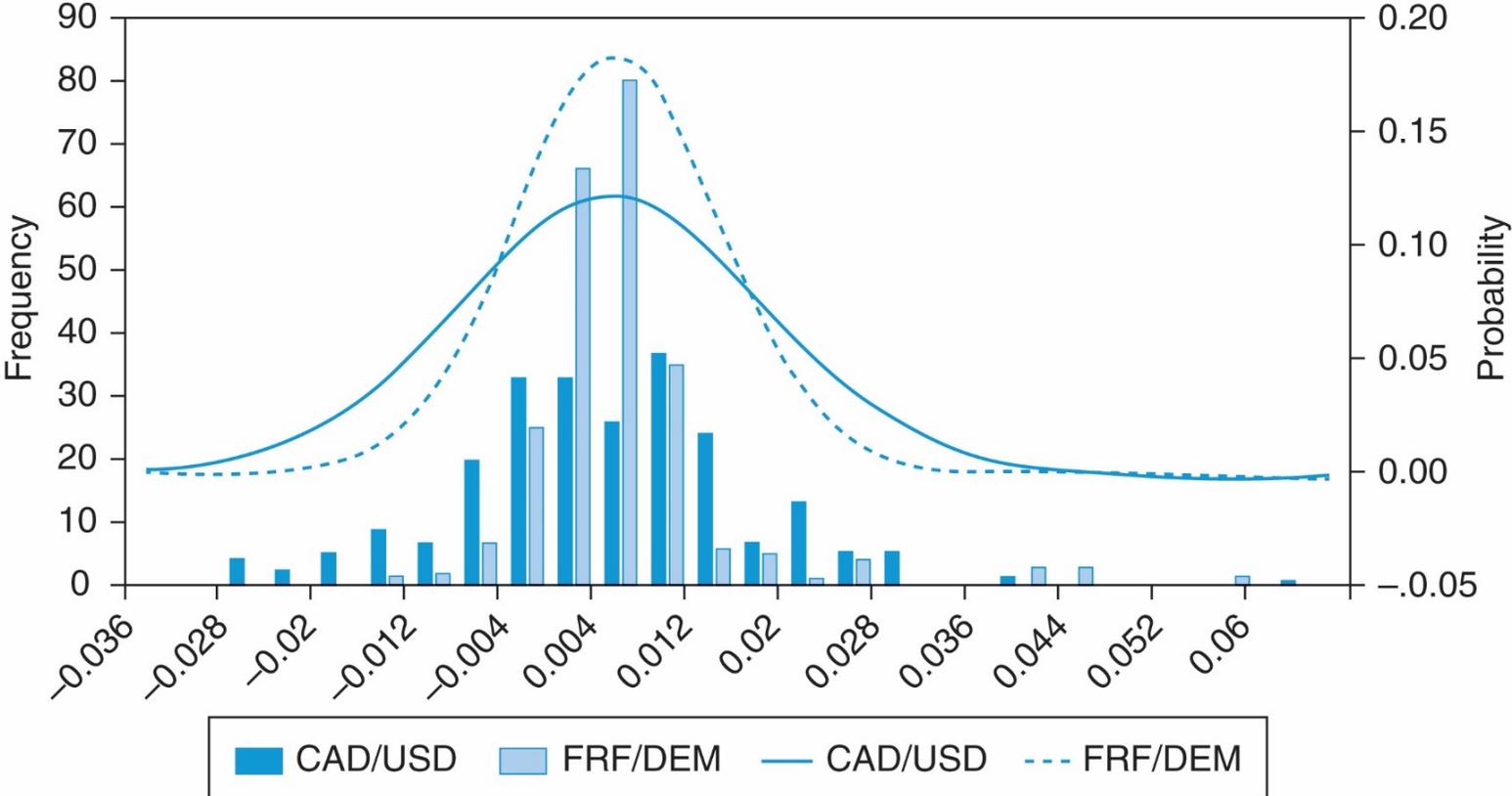
- Currency risks
 - Floating rate systems – movements generally symmetric
 - Target zones – less than floating but can be big due to devaluations/revaluations (by resetting the bands)
 - Pegged – latent volatility (If the peg holds for a long time, historical volatility appears to be zero, but this may not accurately reflect underlying tensions that may ultimately result in a devaluation of the currency).
 - Currency board/Monetary unions – currency boards frequently collapse
- Bottom line:
 - Currency risk of exchange rate regimes other than freely floating may not be summed up accurately through historic exchange rate volatility

Contrasting the FRF/DEM and CAD/USD Exchange Rates



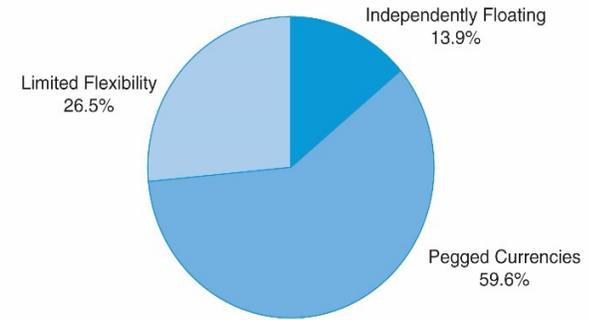
Contrasting the FRF/DEM and CAD/USD Exchange Rates (cont)

Panel B: Histogram of Log Changes

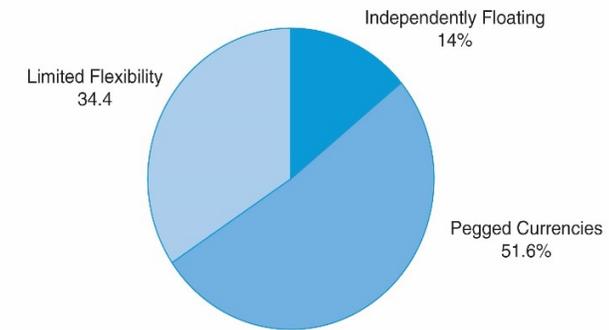


Exchange Rate Arrangements

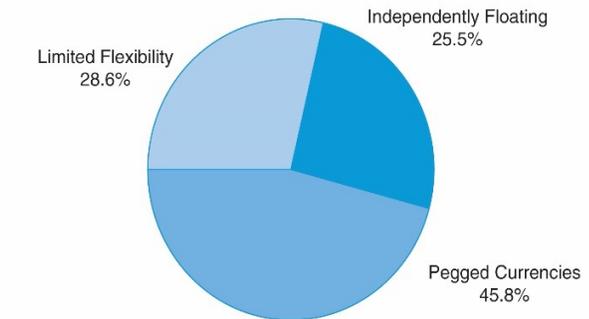
Panel A: March 1990, Total: 151



Panel B: April 2006, Total: 186



Panel C: April 2015, Total: 182



Legend: Limited Flexibility (light blue), Independently Floating (dark blue), Pegged Currencies (medium blue)

Central Banks

- To understand how exchange rate systems operate, you must first understand how central banks function.
 - The central bank's balance sheet

Exhibit 5.5 Central bank balance sheet

Assets	Liabilities
Official international reserves	Deposits of private financial institutions (Bank reserves)
Domestic credit <ul style="list-style-type: none">• Government bonds• Loans to domestic financial institutions	Currency in circulation
Other	Other

Influences money supply through open market operations

Sum of these two is called The "monetary base" or "base money"

2. Central Banks

- Domestic Credit

- Domestic Government Bonds - influence the money supply through open market operations.

If the Fed buys a U.S. Treasury bond, it pays by crediting the account of the bank selling the bond. Fed injects money into the system and vice versa. Open market operations are the main channel through which the Fed affects the money supply and Fed Fund rate.

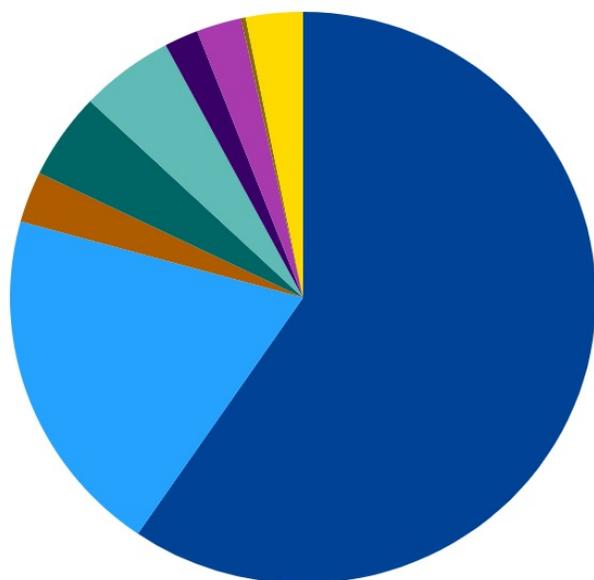
- Credit to the domestic financial sector - loans to domestic financial institutions.
- [Information about the Czech Central Bank open market operations.](#)

2. Central Banks

- Official Reserves
- Foreign exchange reserves (88%) (foreign currency–denominated assets (bonds, Treasury bills, and credit lines, not equities).
 - Usually dominated by USD assets but other currencies becoming more common
 - China has substantial reserves (\$3.192 trillion)
- Gold reserves (9%)
- IMF-related reserve assets (3%)

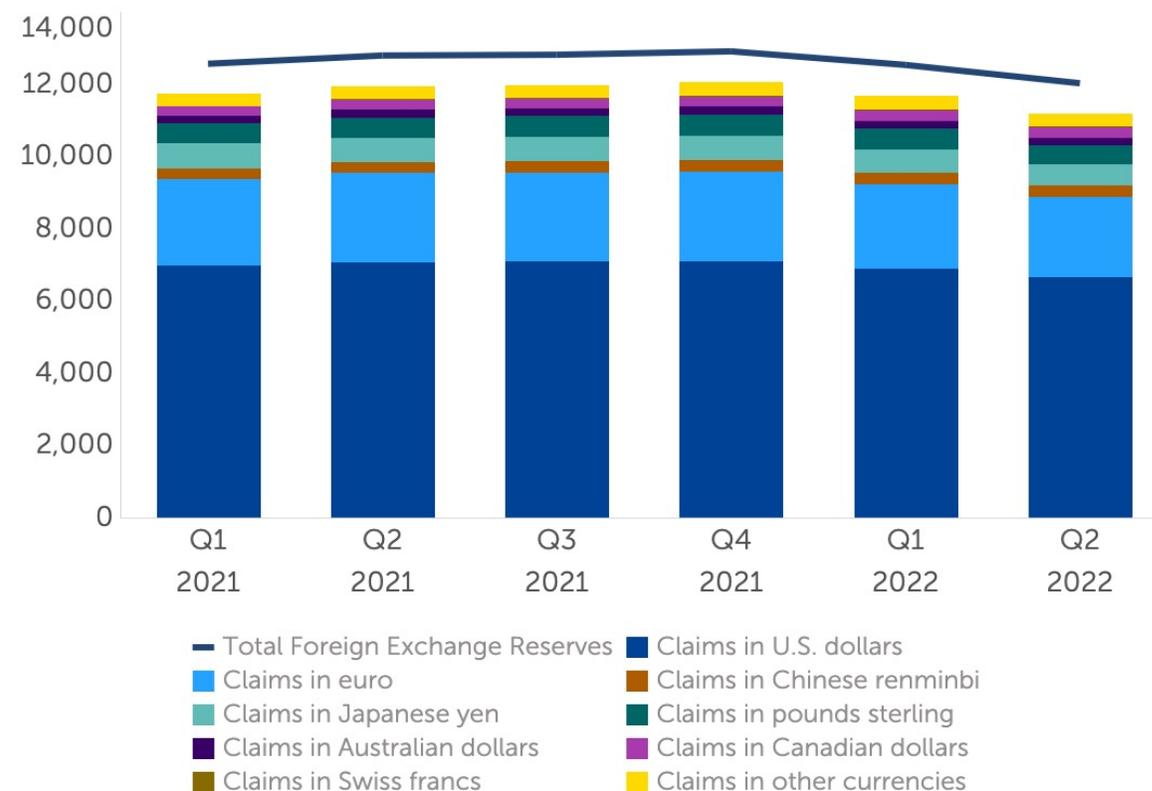
Foreign Exchange Reserves

World - Allocated Reserves by Currency for 2022Q2



- U.S. dollars
- Euro
- Chinese renminbi
- Pounds sterling
- Japanese yen
- Australian dollars
- Canadian dollars
- Swiss francs
- Other currencies

World - Official Foreign Exchange Reserves by Currency (US Dollars, Billions)



- Total Foreign Exchange Reserves
- Claims in U.S. dollars
- Claims in euro
- Claims in Chinese renminbi
- Claims in Japanese yen
- Claims in pounds sterling
- Claims in Australian dollars
- Claims in Canadian dollars
- Claims in Swiss francs
- Claims in other currencies

Source: IMF

2. Central Banks

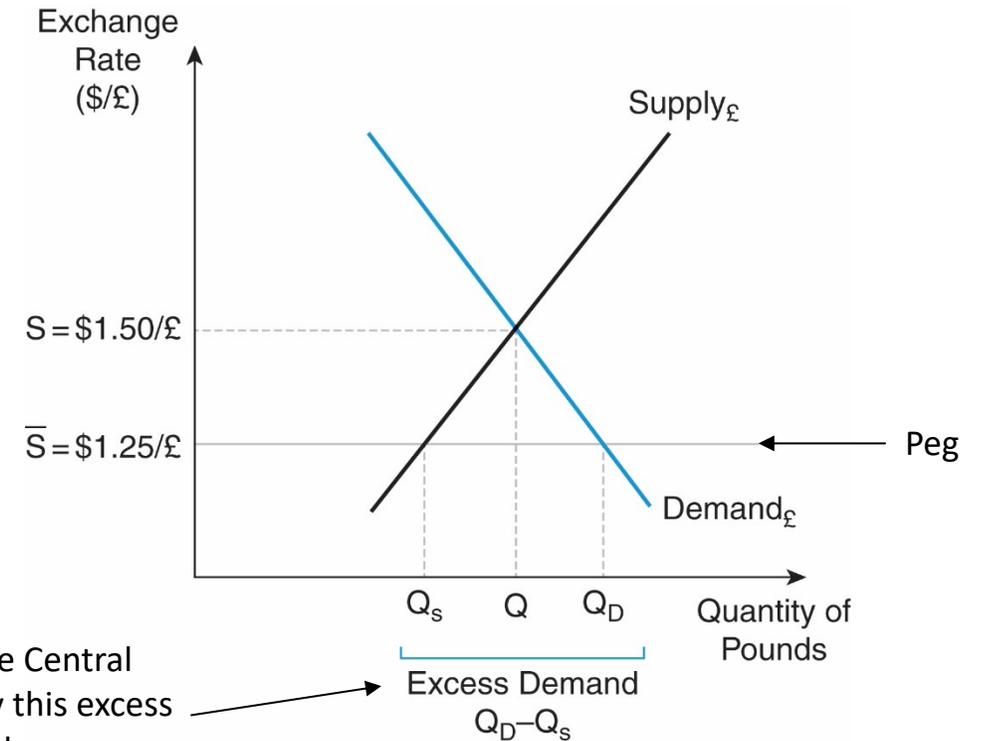
- Money creation and inflation
 - Seigniorage – the value of the real resources that the central bank obtains through the creation of base money
 - Setting money supply growth has implications on GDP growth, unemployment, etc. (demand for money ultimately depends on the amount of real transactions in the economy and how much money is needed to facilitate these transactions).
 - Theorized to have real economy effects in the short-run, but negligible in the long-run (money neutrality - long-run neutrality of money supply on the growth)

2. Central Banks

- The impossible trinity – only two of the following three are possible
 - Perfect capital mobility (no capital controls)
 - Fixed exchange rates
 - Domestic monetary autonomy
- Foreign Exchange Interventions
 - The rise in domestic currency supply = currency weaken and vice versa
 - Non-sterilized – increased money supply
 - Sterilized – no change in money supply
- Central Bank interventions in the FX market
 - International reserves increase – CB sells domestic currency, buys foreign currency assets, domestic currency depreciates (CNB)
 - International reserves decrease – CB buys domestic currency, sells foreign currency assets, domestic currency appreciates

5.2 Central Banks

- How do Central Banks peg a currency?
 - The equilibrium exchange rate is 1.50
 - Government wants to fix the value of the pound at 1.25 (undervalued pound, excessive demand)
 - BoE has to supply excessive demand for pounds
 - Increase FX reserves

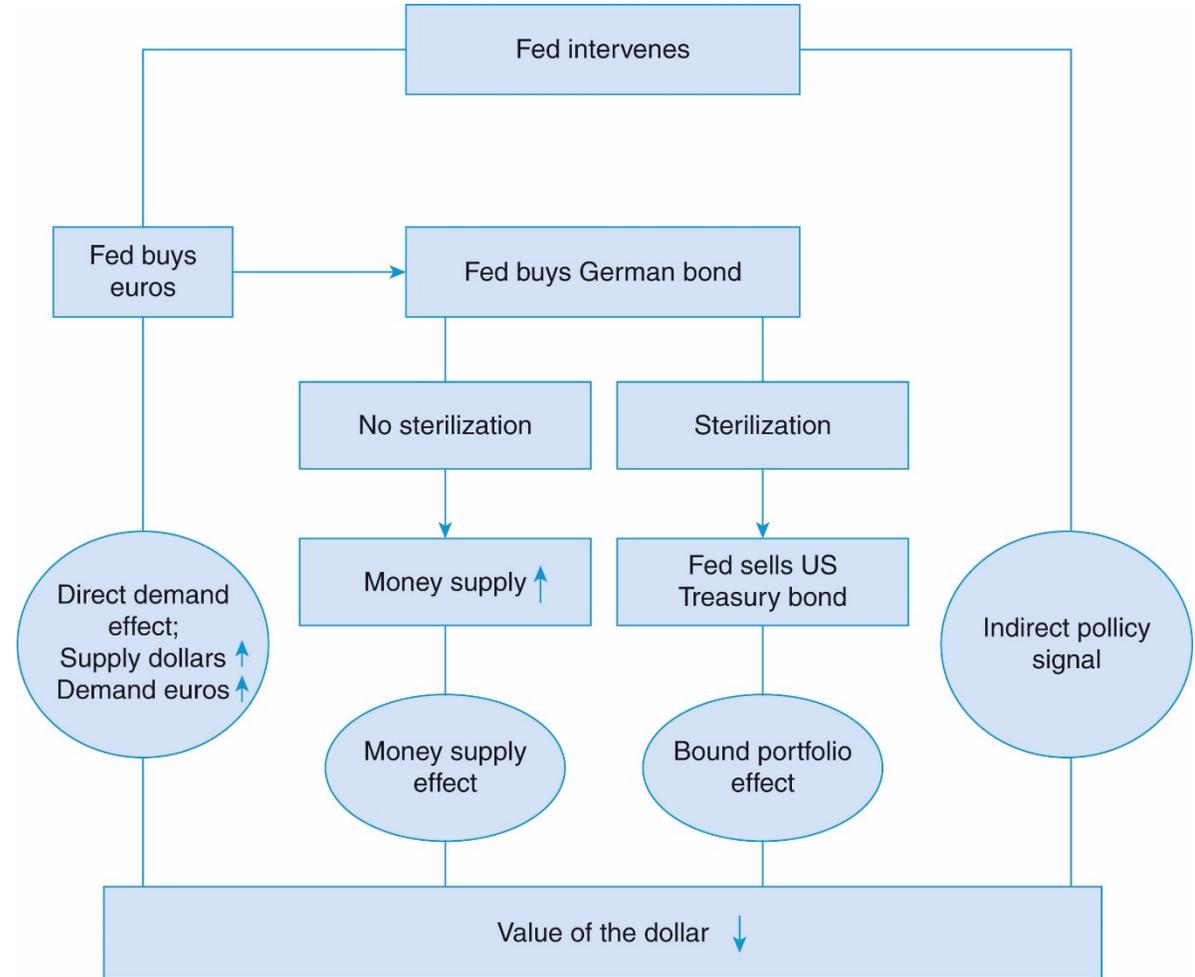


In order to peg, the Central Bank has to supply this excess demand – this is where reserves come in.

3. Flexible Exchange Rate Systems

- The effects of central bank interventions
 - Debate – increased volatility or calming of markets?
 - Direct effects of interventions – supply/demand of currency
 - Effect is argued negligible due to small amount (i.e., \$20 billion versus \$5 trillion overall trade in a day)
 - Changes in portfolio composition – bond portfolio effect
 - Indirect Effects of Interventions
 - CB can affect the FX rate by announcement policy
 - Affect the exchange rate through altering expectations and investment decisions

The Effects of Foreign Exchange Interventions



Fed Balance Sheet



Source: Federal Reserve

3. Flexible Exchange Rate Systems

- Empirical evidence on the effectiveness of intervention
 - Coordinated efforts are more effective than unilateral
 - Efforts consistent with market fundamentals more effective
 - However, not effective in the long-run
 - Overall, has not decreased exchange rate volatility
 - There is conflicting evidence on whether or not the intervention is profitable

4. Fixed Exchange Rate Systems

- The International Monetary System before 1971
 - The Gold Standard
 - WWI, hyperinflation (Germany) and the Interwar Period
 - Gold Standard was suspended by many
 - Interwar – some countries allowed float
 - The Bretton Woods System (1944)
 - Participating countries agreed to link their currency to \$ (which was pegged to gold)

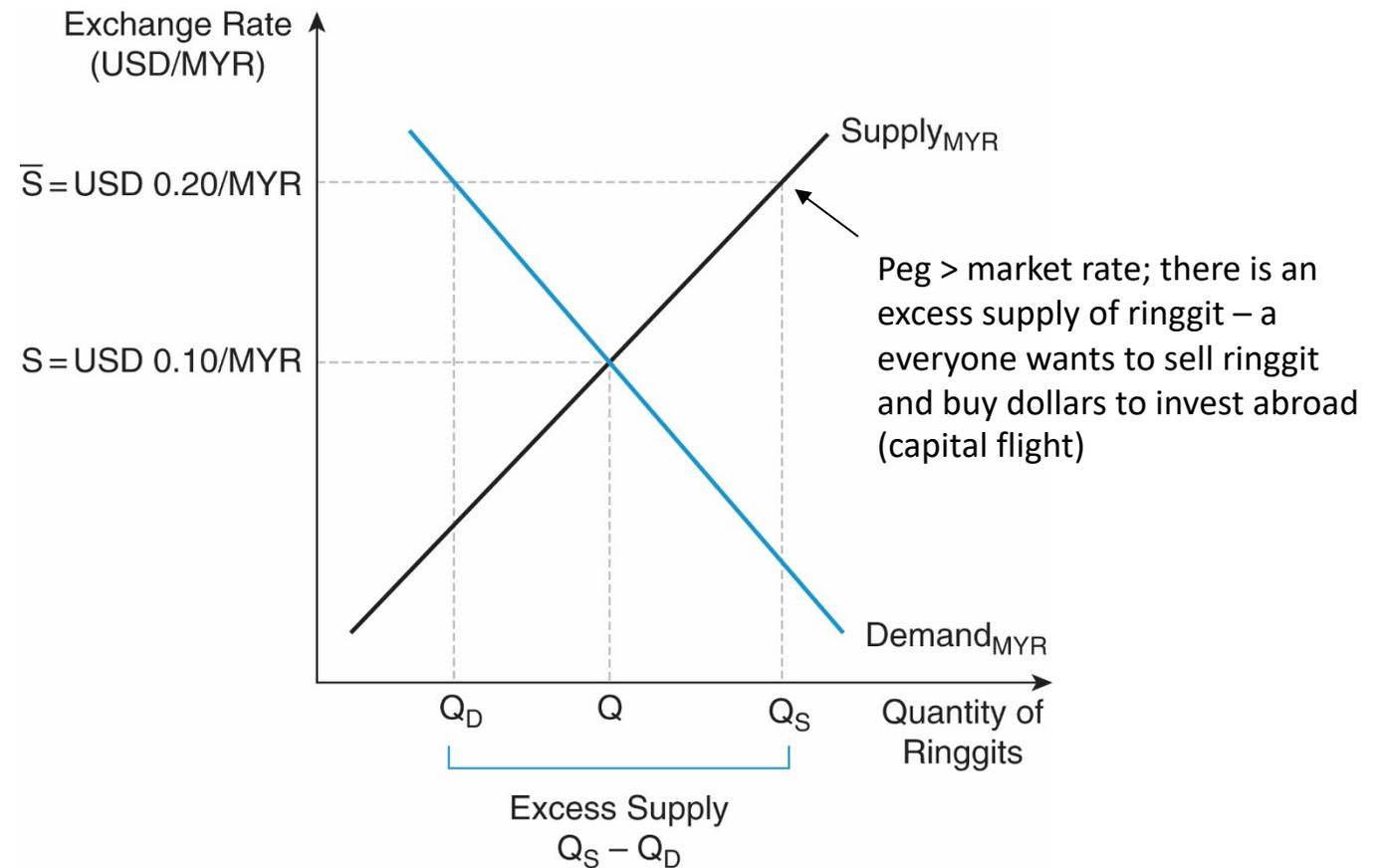
4. Fixed Exchange Rate Systems

- The International Monetary System before 1971 (cont.)
 - Individual incentives versus aggregate incentives
 - Potential problems with a “bank run” on gold in U.S. with no solution; not sustainable
 - Special Drawing Rights (1968)
 - An alternative reserve asset created by IMF with the same gold value as the dollar
 - Stayed pegged to gold until 1976, when it was then pegged to a basket of currencies
 - Due to incessant BOP deficits, U.S. abolished gold standard in 1971
 - 1973 Bretton Woods system collapsed and major currencies transitioned into freely-floating currencies

4. Fixed Exchange Rate Systems

- Pegged exchange rate systems in developing countries
 - Usually set at a level that overvalues the local currency
 - Situation not tenable indefinitely, foreign reserves will dwindle fast
 - Only way to sustain this system is to implement exchange controls
 - Private market usually responds with an illegal or parallel currency market

Pegging an Exchange Rate in a Developing Country



4. Fixed Exchange Rate Systems

- Why not simply float?
 - Economists do not agree – some believe that pegged forex regimes offers stability
 - Many economists believe, however, that pegged regimes are not ultimately sustainable – the average duration is only 4.67 years

4. Fixed Exchange Rate Systems

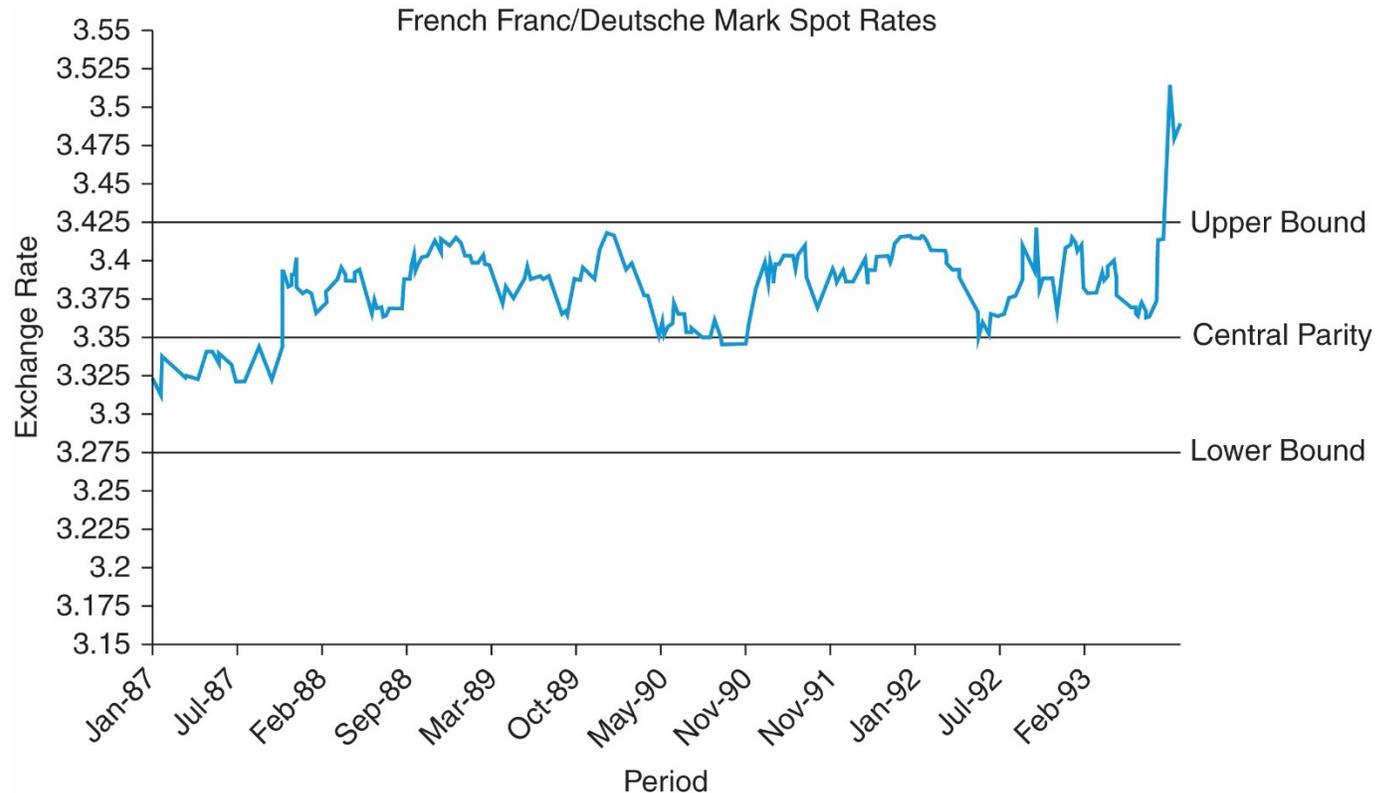
- Currency Boards
 - Have money-making capabilities
 - independent of government but the money is fully backed by a foreign reserve currency and fully convertible into the reserve currency at a fixed rate
 - Mentioned as a miracle cure for cutting inflation without high cost to the economy (e.g., Hong Kong)
 - Cannot monetize fiscal deficits; cannot rescue banks!
- Dollarization

5. Limited-Flexibility Systems: Target Zones and Crawling Pegs

- Target zones
 - Speculative attacks, and how to defend the target zone
 - Intervene through open market operations (i.e., buy / sell)
 - Raise interest rates (discourages speculation)
 - Limit foreign exchange transactions through capital controls
 - Lead-lag operations
 - Lag operation: postpones the inflow of foreign currency to increase the value of their receivable (which is stronger once the local currency is devalued)
 - Lead operation: domestic importers prepay for goods to beat an increase in cost when devaluation goes into effect
 - Puts pressure on central banks of small economies as foreign reserves are small relative to the volume of foreign trade
 - Crawling peg

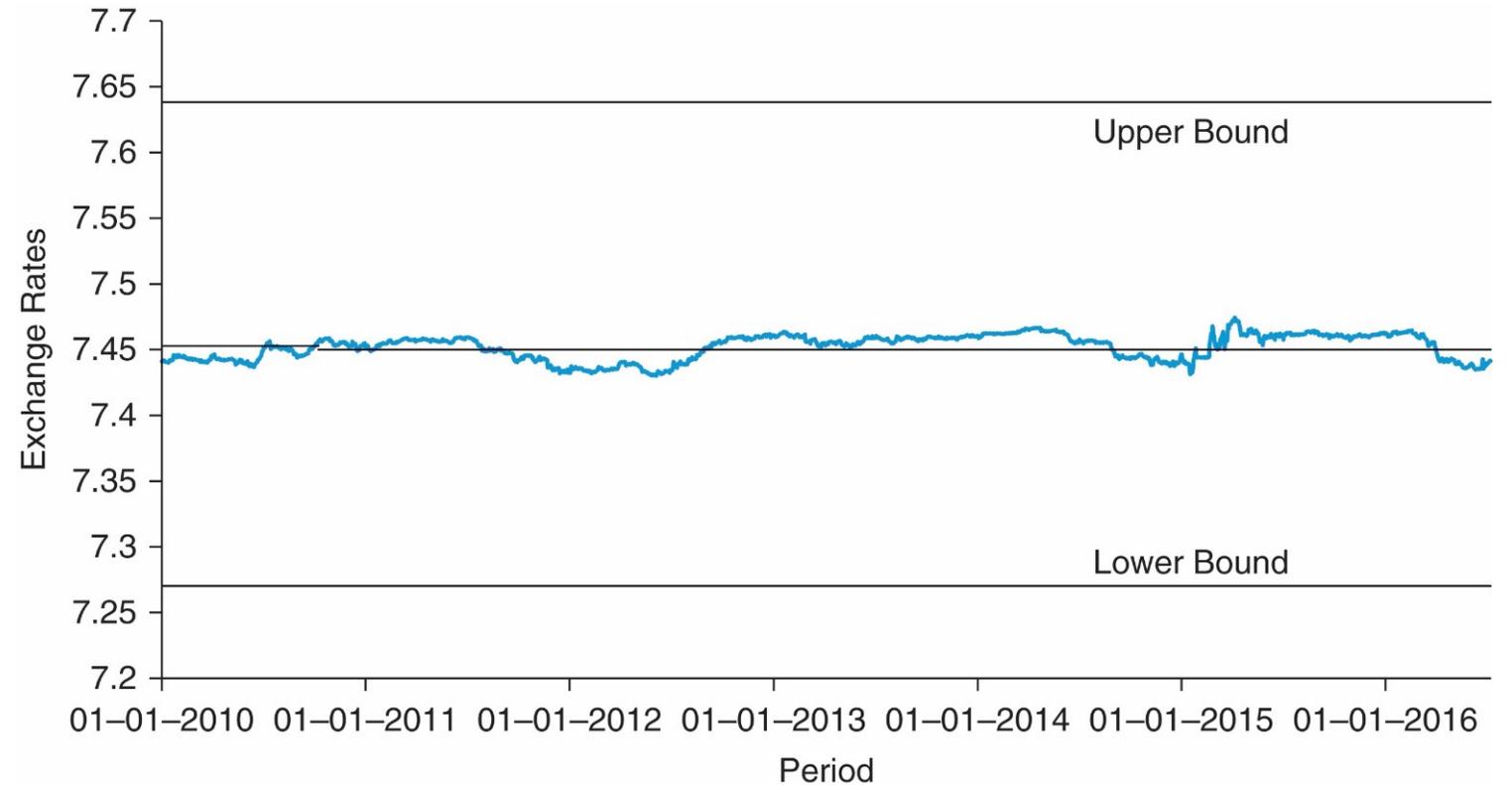
An Example of a Target Zone

- Specified a central parity of FRF3.3539/DEM.
- The exchange rate was allowed to fluctuate in a 2.25% band around this value.
- CB keeps the FX rate in the band
- CB creditability



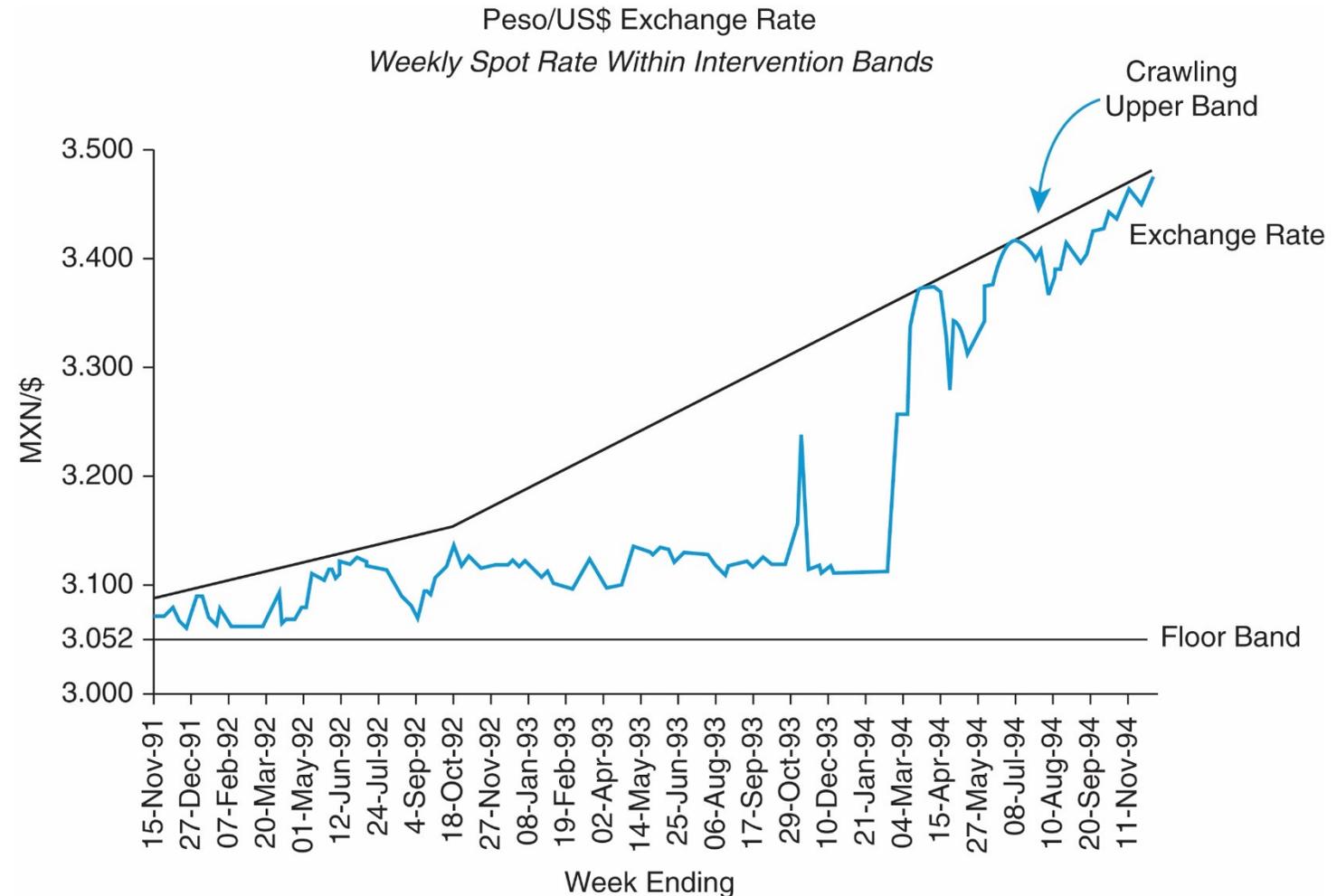
A Tight Target Zone

- EUR/|DKK
 - IMF classified as pegged currency



An Example of a Crawling Peg

- Frequently the bands have been allowed to move (“crawl”) over time.
- Crawl usually adjusts for the inflation differential between the domestic inflation and the inflation of the currency to which they are pegged so the domestic firms don't lose competitiveness



Questions:

- How can you quantify currency risk in a floating exchange rate system?
- Why might it be hard to quantify currency risk in a target zone system or a pegged exchange rate system?
- What is the effect of a foreign exchange intervention on the money supply? How can a central bank offset this effect and still hope to influence the exchange rate?
- What is the effect of a foreign exchange intervention on the money supply? How can a central bank offset this effect and still hope to influence the exchange rate?