



INTERNATIONAL FINANCIAL MANAGEMENT

THIRD EDITION

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Chapter 5

Exchange Rate Systems

5.1 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 SDR and the Chinese yuan)
 - Often implemented using a currency board

5.1 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
 - Forex rate is kept within band
 - Crawling pegs
 - Changes are kept lower than preset limits that are adjusted regularly (with inflation)

Exhibit 5.1 Exchange Rate Systems Around the World

Exhibit 5.1 Exchange rate systems around the world	
No separate legal tender	
Uses the US dollar	Ecuador, El Salvador, Marshall Islands, Micronesia, Palau, Panama, Timor-Leste, Zimbabwe
Uses the euro	European Monetary Union – Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovak Rep., Slovenia, Spain Kosovo, Montenegro, San Marino
Uses the Australian dollar	Kiribati, Tuvalu
Currency board	
Fixed to the US dollar	ECCU – Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines Djibouti, Hong Kong
Fixed to the euro	Bosnia and Herzegovina, Bulgaria
Fixed to the Singapore dollar	Brunei Darussalam
Conventional fixed rate	
Fixed to the US dollar	Aruba, Bahamas, Bahrain, Barbados, Belize, Curacao and Saint Martin, Eritrea, Iraq, Jordan, Oman, Qatar, Saudi Arabia, Turkmenistan, United Arab Emirates, Venezuela
Fixed to the euro	Cape Verde, Comoros, Denmark, São Tomé and Príncipe CFA Franc Zone: WAEMU – Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo; CEMAC – Cameroon, Central African Rep., Chad, Rep. of Congo, Equatorial Guinea, Gabon
Fixed to a composite currency	Fiji, Kuwait, Libya, Morocco, Samoa, Solomon Islands
Fixed in other way	Bhutan, Lesotho, Namibia, Nepal, Swaziland
Crawling pegs and other stabilization arrangements involving active intervention	
Versus the dollar	Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Bolivia, Cambodia, China, Costa Rica, Democratic Republic of Congo, Egypt, Ethiopia, Guatemala, Guinea, Guyana, Haiti, Honduras, Jamaica, Laos, Lebanon, Maldives, Nicaragua, Sri Lanka, Suriname, Tajikistan, Trinidad and Tobago, Uzbekistan
Versus the euro	Croatia, Macedonia, Switzerland
Versus composite	Algeria, Botswana, Iran, Libya, Singapore, Syria, Tonga, Vanuatu, Vietnam
Other	Kazakhstan, Kyrgyz Rep., Malaysia, Mauritania, Myanmar, Nigeria, Rwanda, Sudan, Vanuatu
Floating rates	
Managed floating	Afghanistan, Albania, Brazil, Columbia, Gambia, Georgia, Ghana, Hungary, Iceland, India, Indonesia, Israel, Kenya, Rep. of Korea, Madagascar, Malawi, Moldova, Mongolia, Mozambique, New Zealand, Paraguay, Peru, Philippines, Romania, Russia, Serbia, Seychelles, Sierra Leone, South Africa, Tanzania, Thailand, Turkey, Uganda, Ukraine, Uruguay, Zambia
Free floating	Australia, Canada, Chile, Japan, Mexico, Norway, Poland, Somalia, Sweden, United Kingdom, United States

5.1 Alternative Exchange Rate Arrangements and Currency Risk

- Special arrangements
 - Where a regional central bank controls the forex rate system for several countries
 - Euro
 - CFA franc zone
- Currency risks
 - Floating rate systems – movements generally symmetric
 - Target zones – less than floating but can be big due to devaluations/revaluations
 - Pegged – latent volatility
 - Currency board/Monetary unions – currency boards frequently collapse

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5.1 Alternative Exchange Rate Arrangements and Currency Risk

- Bottom line:
 - Currency risk of exchange rate regimes other than freely floating may not be summed up accurately through historic exchange rate volatility

Exhibit 5.2 Currency Risk in Alternative Exchange Rate Systems

Exhibit 5.2 Currency risk in alternative exchange rate systems

	Exchange rate volatility				
	Central bank objective	Historical	Latent	Inflation variability	Countries adhering to system
Pure floating	Domestic	–	–	–	0
Dirty float	Domestic and exchange rate	Large	None	Large	46
Target zone or crawling bands/pegs	Domestic and exchange rate	Small	Large	Small	47
Pegged exchange rates	Exchange rate	None	Large	Small	30
Currency board	Exchange rate	None	Small	Small	5
Dollarized	Domestic	None	Small	Small	13
Monetary union	Domestic	None	Very small	Small	19

Exhibit 5.3 Contrasting the FRF/DEM and CAD/USD Exchange Rates

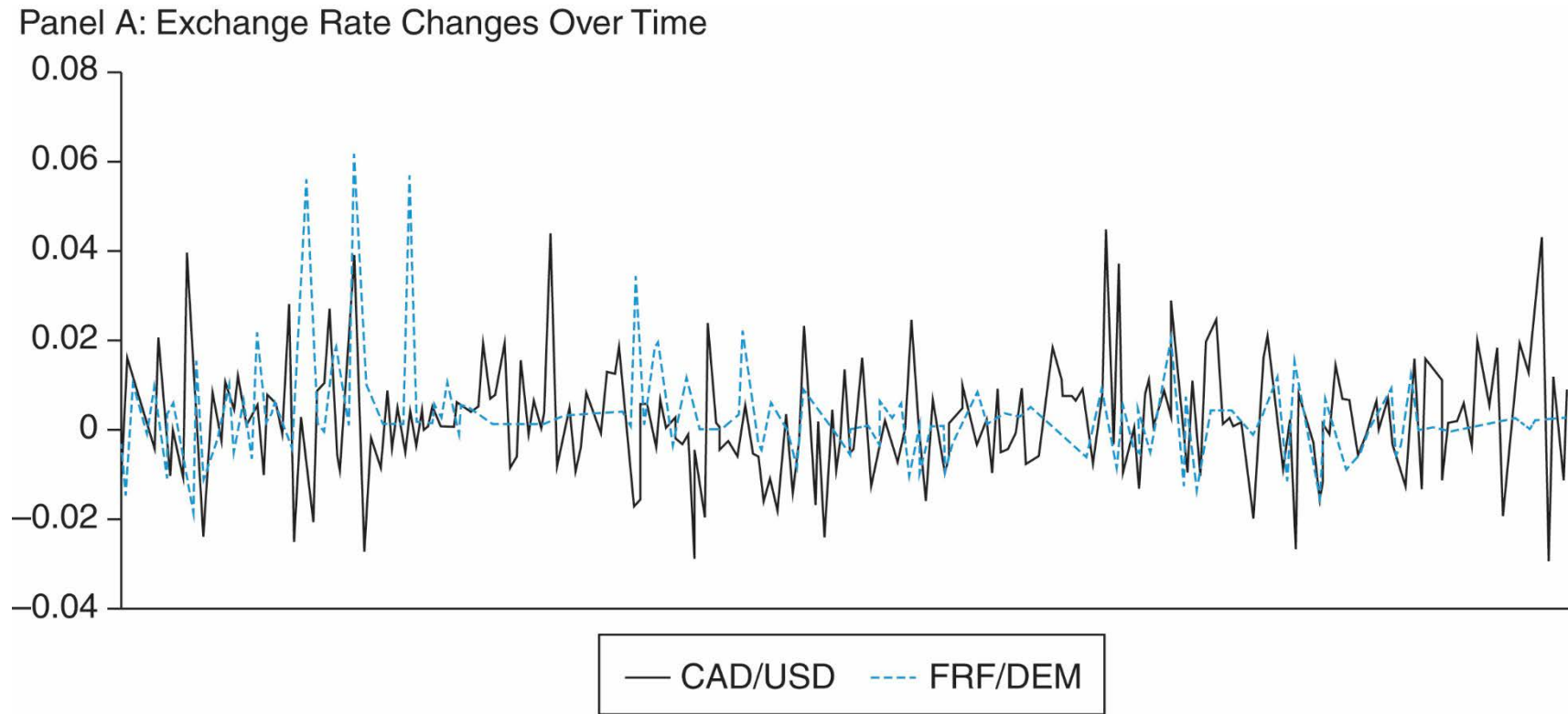


Exhibit 5.3 Contrasting the FRF/DEM and CAD/USD Exchange Rates (cont)

Panel B: Histogram of Log Changes

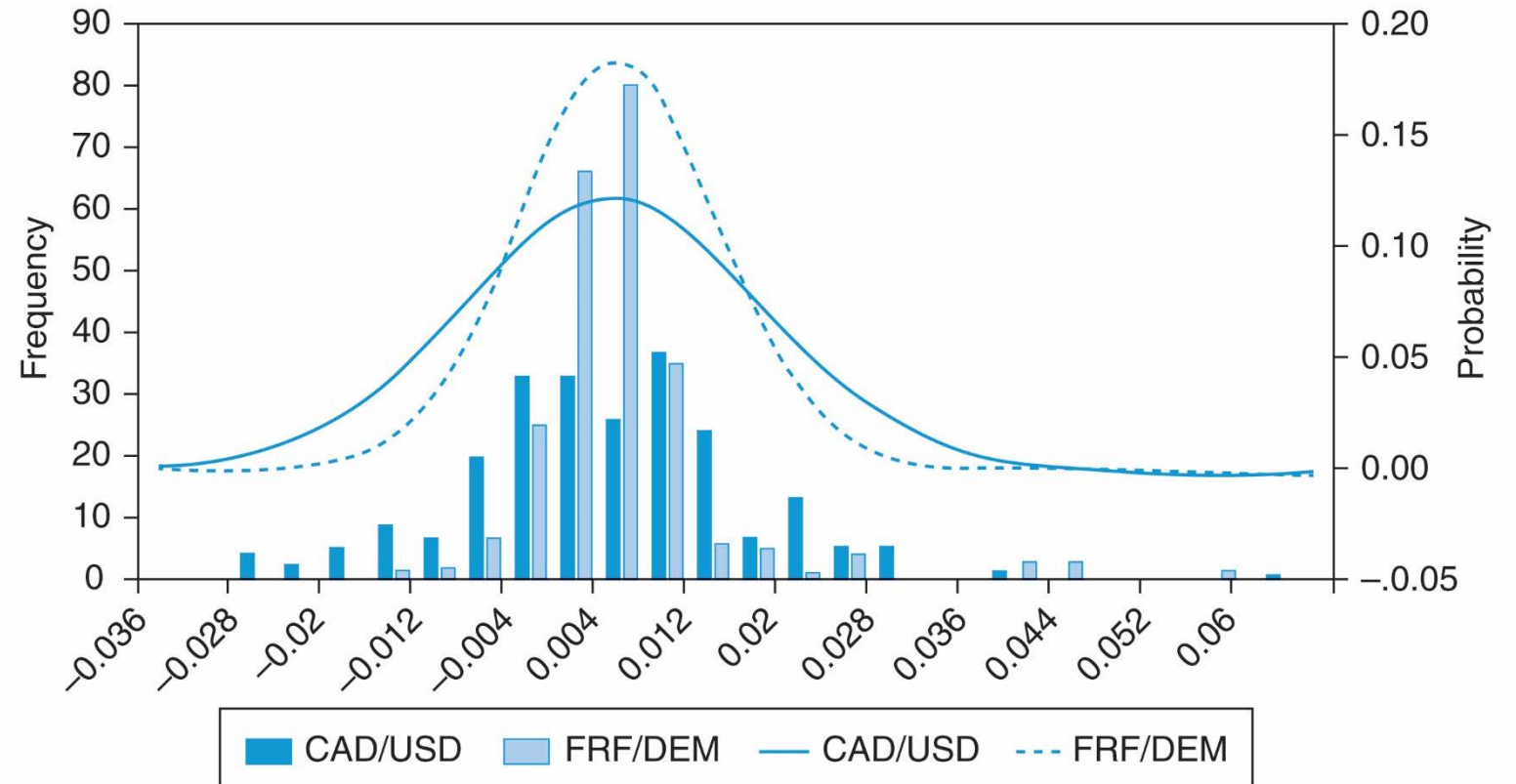
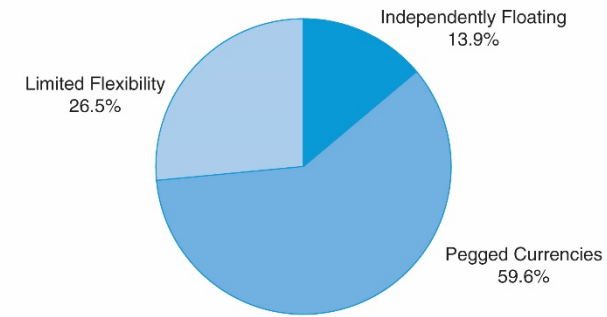
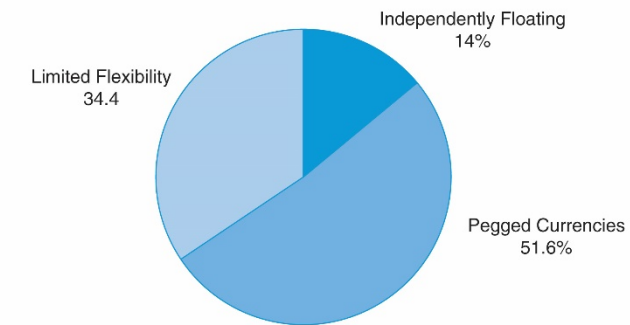


Exhibit 5.4 Exchange Rate Arrangements

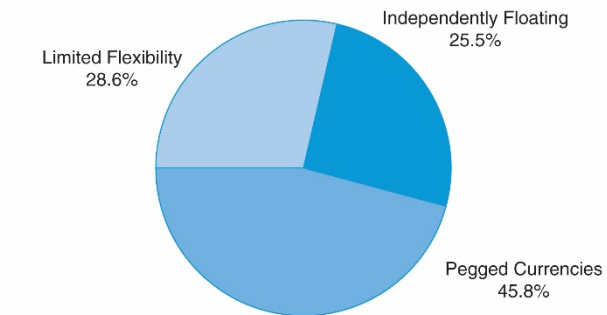
Panel A: March 1990, Total: 151



Panel B: April 2006, Total: 186



Panel C: April 2015, Total: 182



■ Limited Flexibility ■ Independently Floating ■ Pegged Currencies

5.2 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)

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 Other	Currency in circulation Other

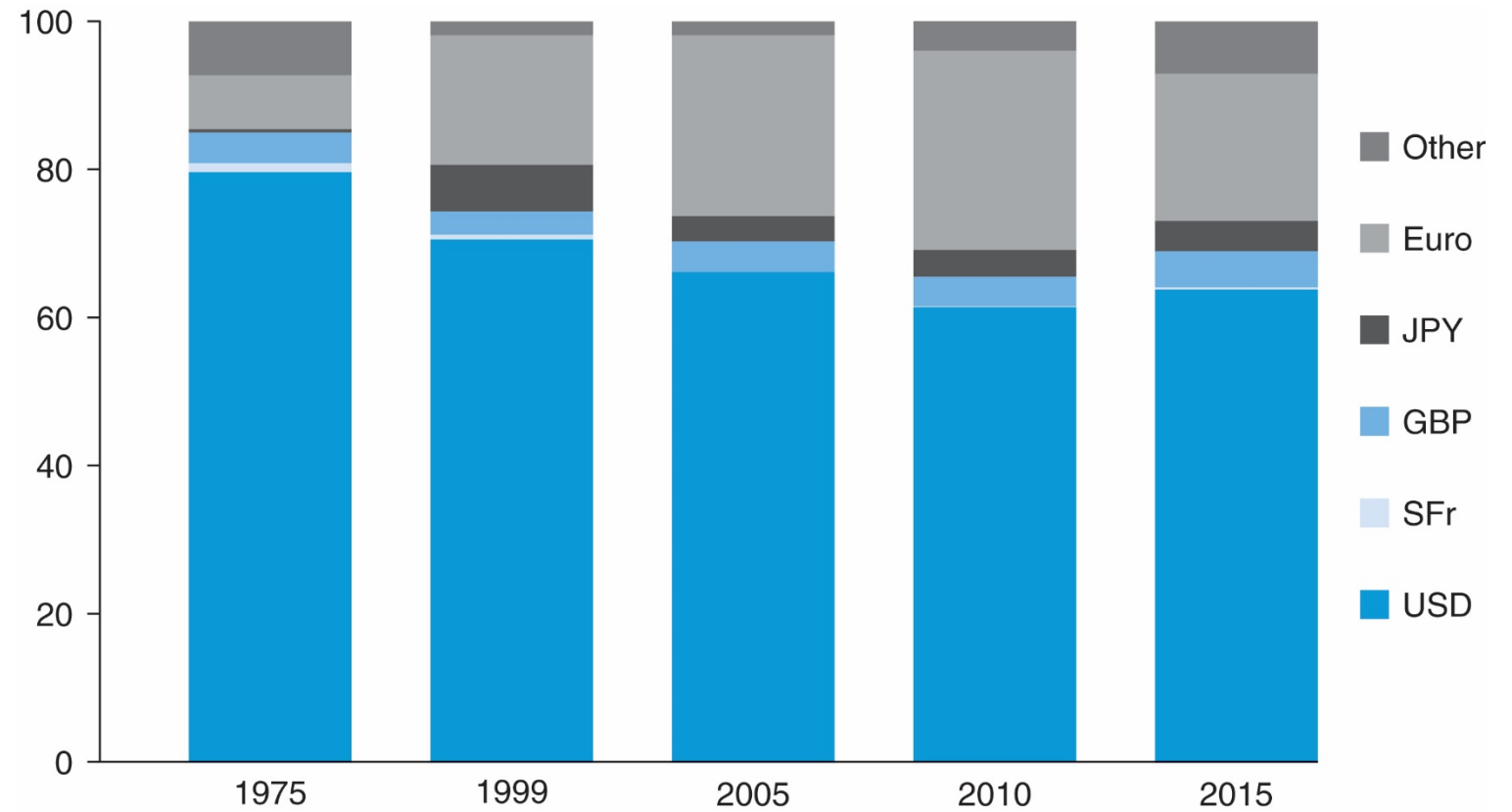
Influences money supply
through open market
operations

Sum of these two is called
The “monetary base” or
“base money”

5.2 Central Banks

- Official Reserves
 - Foreign exchange reserves (88%)
 - 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%)

Exhibit 5.6 Foreign Exchange Reserves



5.2 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
 - Non-sterilized – increased money supply
 - Sterilized – no change in money supply

Exhibit 5.7 Sterilized and Non-Sterilized Foreign Exchange Intervention

- Panel A
 - Fed buys ForEx from the bank
 - Asset for the bank
 - Asset and liability for the Fed
- Panel B
 - Sterilization of the original transaction by selling government bonds to financial intermediaries.

Exhibit 5.7 Sterilized and non-sterilized foreign exchange intervention

Panel A: A non-sterilized intervention

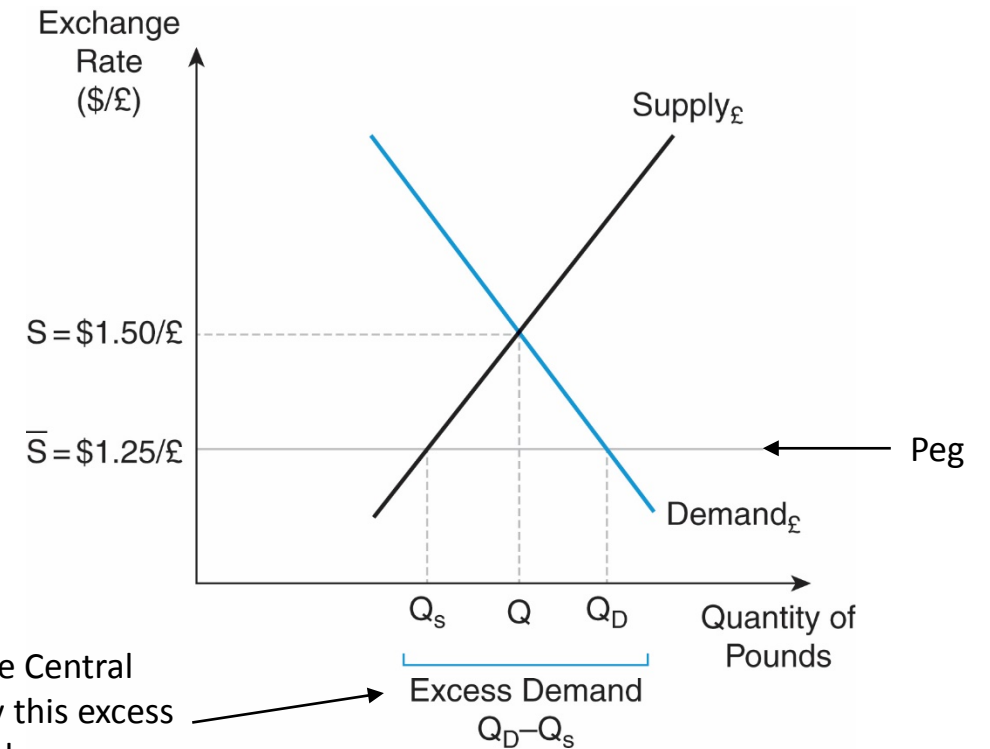
Central bank balance sheet				Financial intermediary balance sheet			
Assets		Liabilities		Assets		Liabilities	
International reserves	+50	Deposits of financial institutions	+50	Reserves at Federal Reserve	+50		
Domestic credit	0			Foreign currency interbank deposits	-50		
				Government bonds	0		

Panel B: A sterilized intervention

Central bank balance sheet				Financial intermediary balance sheet			
Assets		Liabilities		Assets		Liabilities	
International reserves	+50	Deposits of financial institutions	+50	Reserves at Federal Reserve	+50		
Domestic credit	-50		-50		-50		
	0		0	Foreign currency interbank deposits	-50		
				Government bonds	+50		
					0		

5.2 Central Banks

- How do Central Banks peg a currency?
 - Pegging the exchange rate (Exhibit 5.8)
 - Make a market in its currency



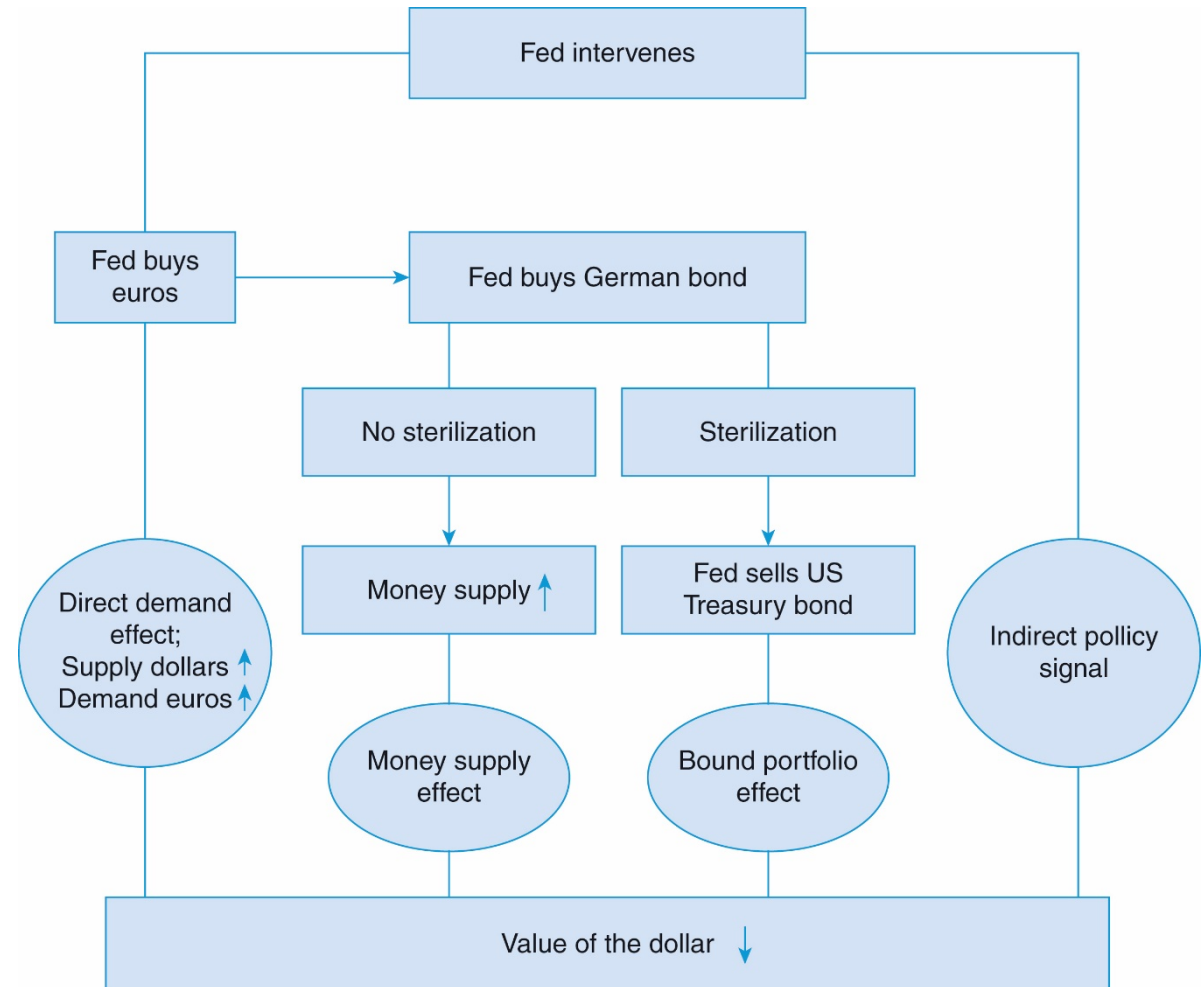
5.3 Flexible Exchange Rate Systems

- Intervention
 - Money supply / interest rates
 - Attempt to restrict capital movements
 - Tax/subsidize international trade to influence demand for foreign currency
- 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
 - Affect the exchange rate through altering expectations

5.3 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

Exhibit 5.9 The Effects of Foreign Exchange Interventions



5.4 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)

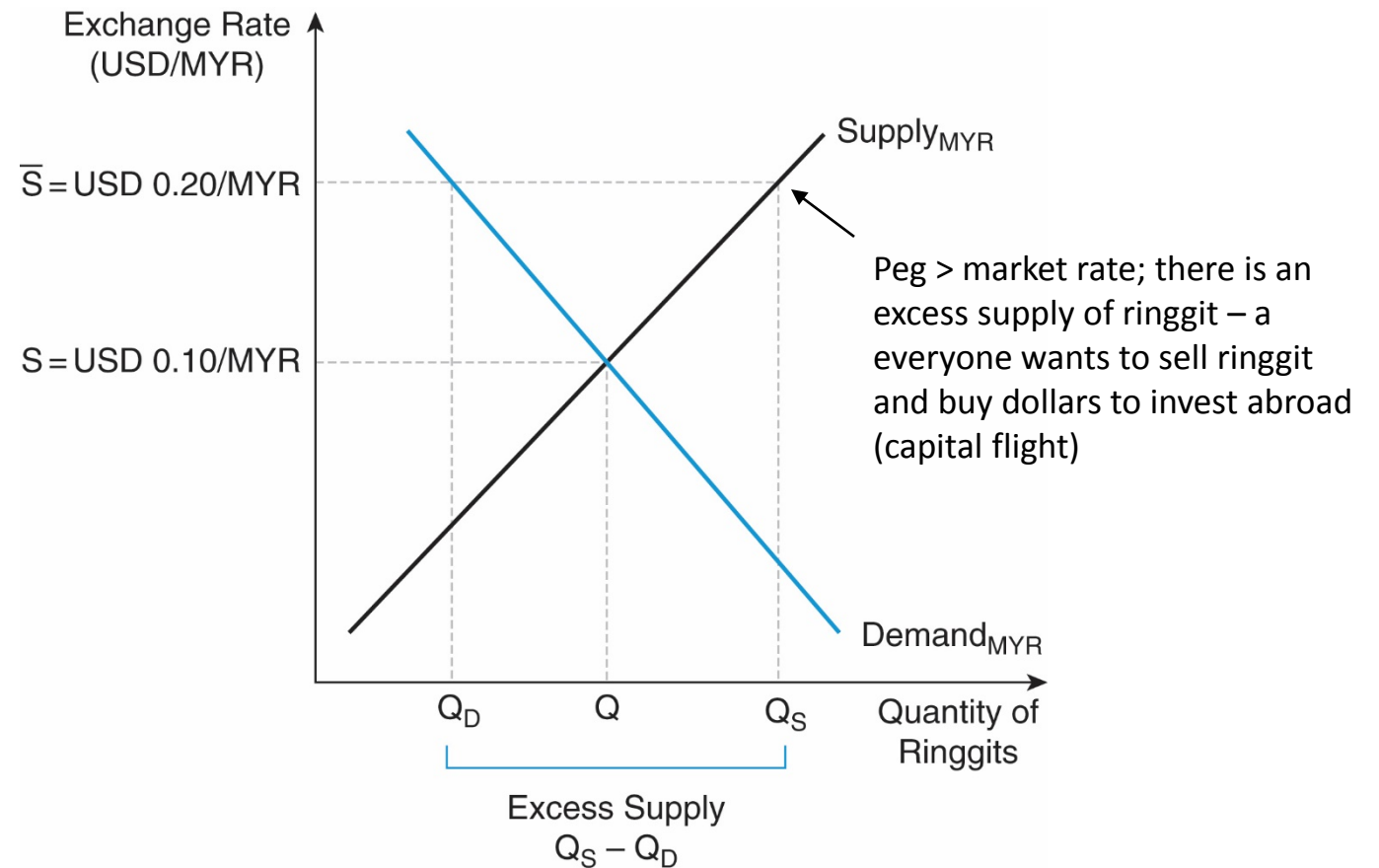
5.4 Fixed Exchange Rate Systems

- 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

5.4 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

Exhibit 5.10 Pegging an Exchange Rate in a Developing Country



5.4 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

Exhibit 5.11 The Balance Sheet of a Currency Board

Exhibit 5.11 The balance sheet of a currency board

Assets	Liabilities
International reserves	Currency in circulation Required reserves of financial institutions

5.5 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

Exhibit 5.12 An Example of a Target Zone

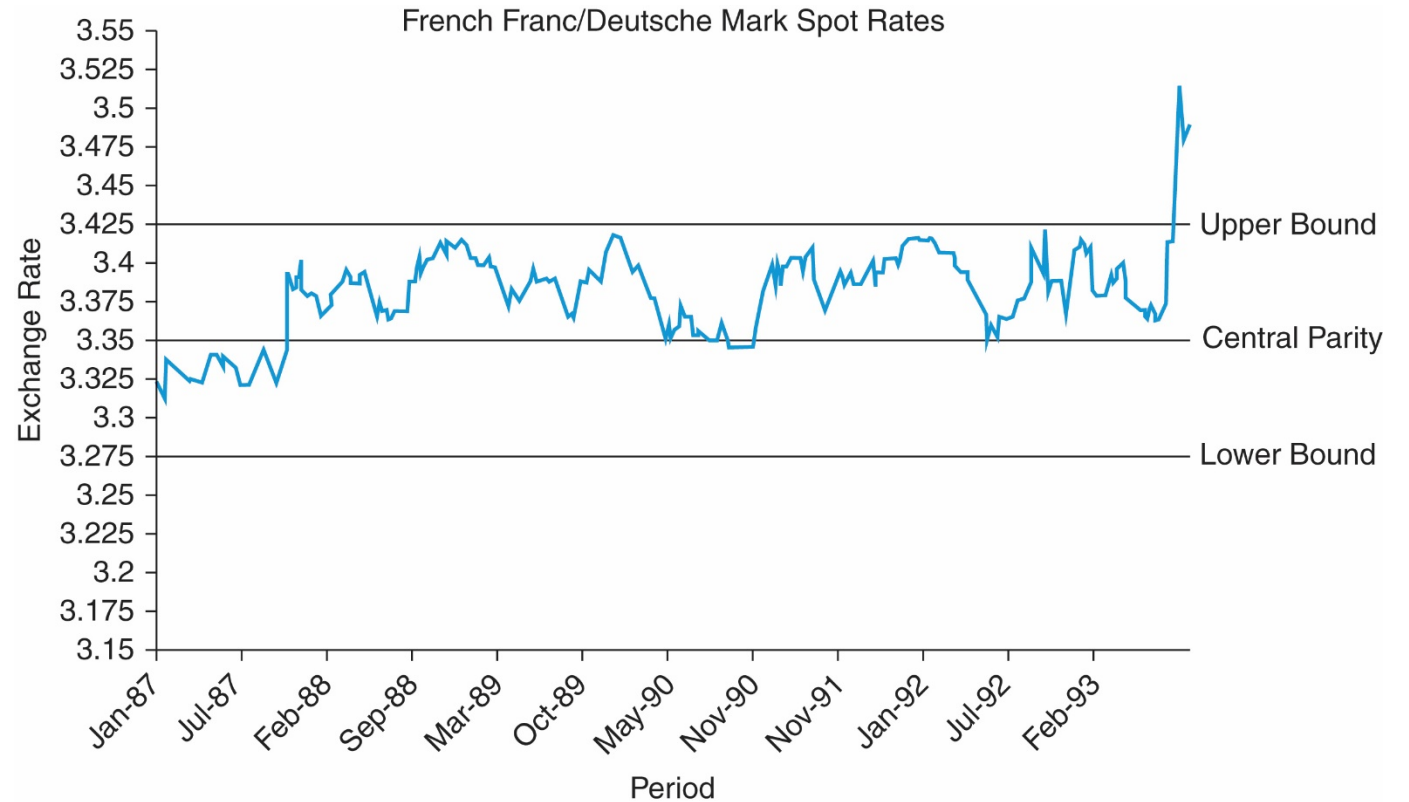


Exhibit 5.13 A Tight Target Zone

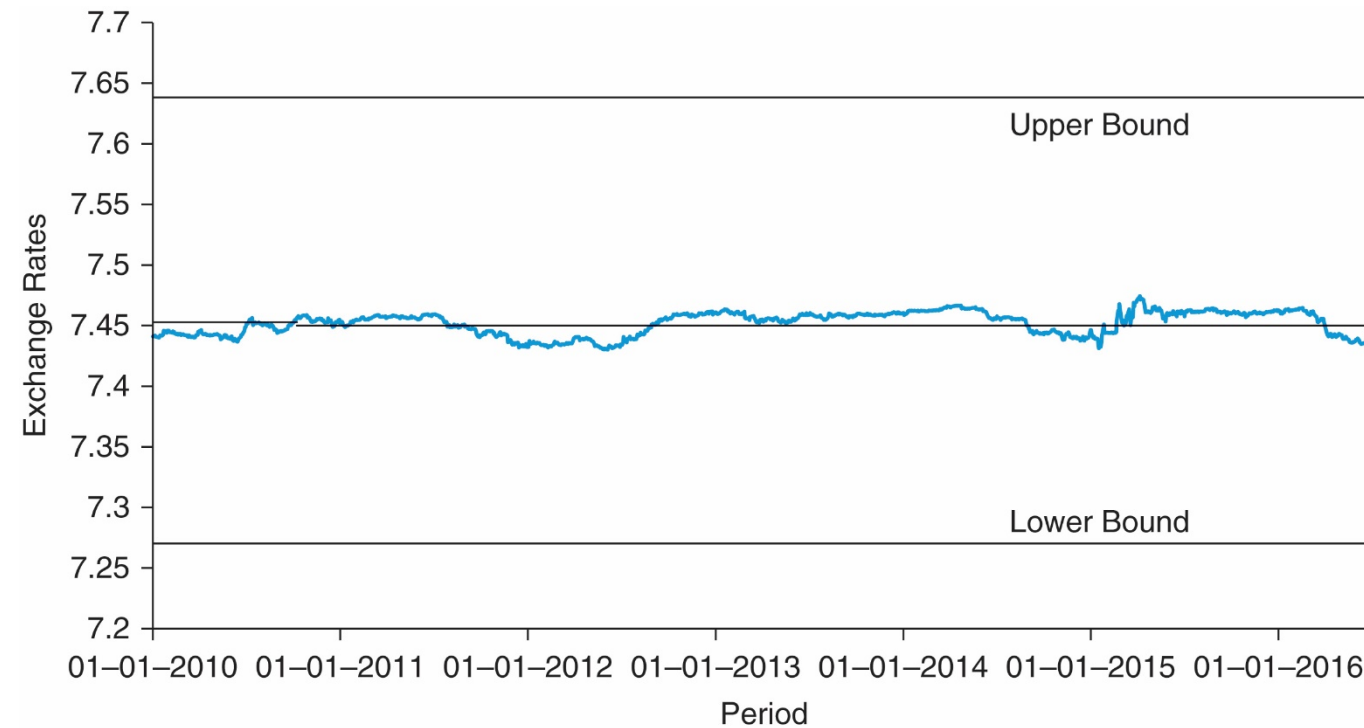
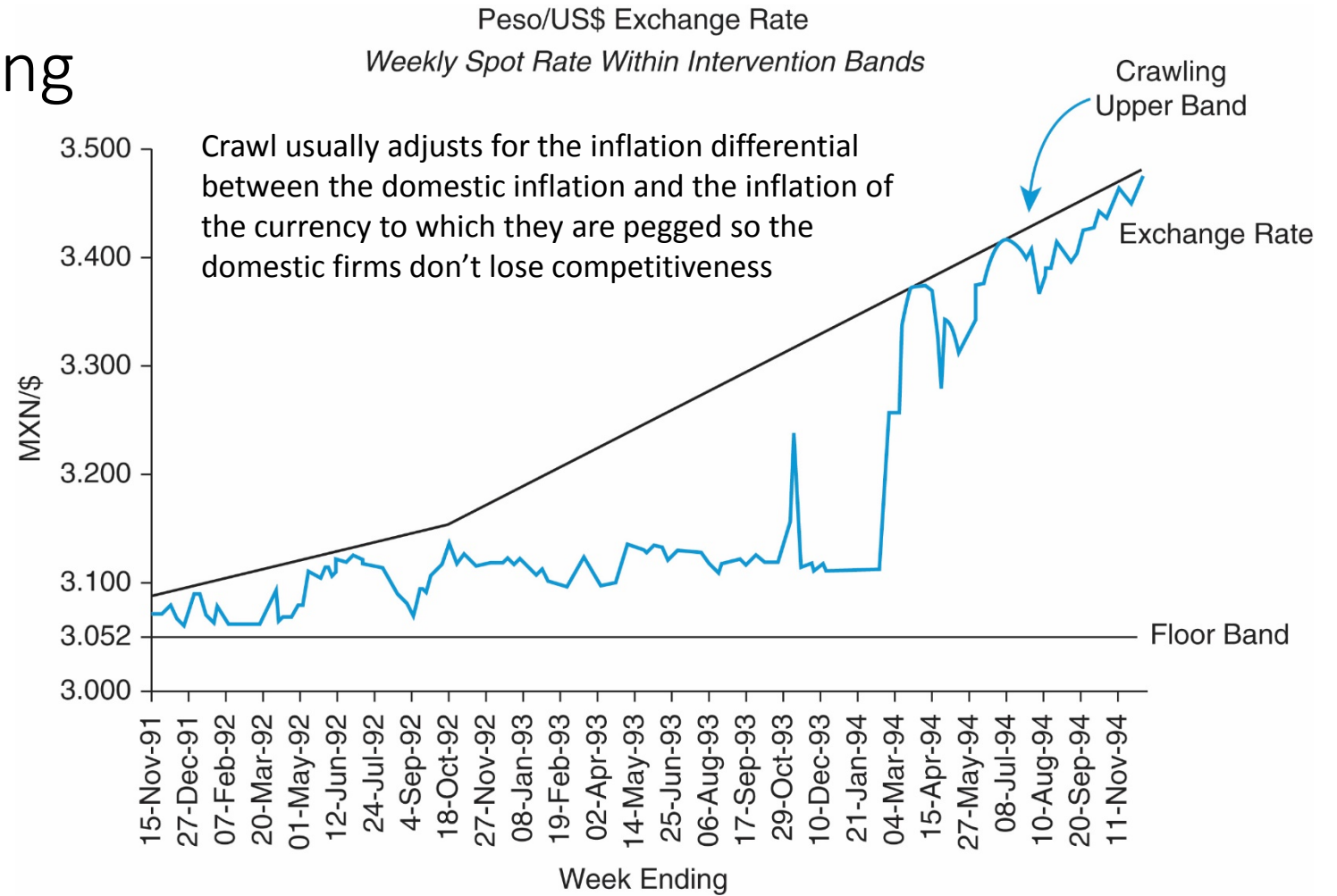


Exhibit 5.14 An Example of a Crawling Peg



5.6 How to See an Emu Fly: The Road to Monetary Integration in Europe

- The European Monetary System (EMS) – a target zone system; established in 1979
 - The ERM
 - Grid of bilateral fixed exchange rates called “central parities”; could deviate by 2.25%
 - Italy was allowed 6%
 - Intervention rules
 - Compulsory when margins were reached
 - Central bank of strong currency had to extend credit line to central bank of weak currency
 - Realignment rules – when parities could not be sustained at reasonable costs
 - ECUs, Euros and franken
 - The politics of naming the Euro

Exhibit 5.15

Composition of the ECU Basket

Exhibit 5.15 Composition of the ECU basket

Currency	Amounts of currencies included in the ECU basket ^a	ECU central rates ^b	Relative weight of each currency in the ECU basket (%)	
			9–21–89	10–22–98
Deutsche mark	0.6242	1.97738	30.09	31.57
French franc	1.332	6.63186	19.00	20.08
British pound	0.08784	0.653644	13.00	13.44
Italian lira	151.8	1,957.61	10.16	7.75
Dutch guilder	0.2198	2.22799	9.40	9.87
Belgian and Luxembourg franc	3.431	40.7844	7.89	8.41
Spanish peseta	6.885	168.22	5.31	4.09
Danish krone	0.1976	7.54257	2.45	2.62
Irish punt	0.008552	0.796244	1.10	1.07
Portuguese escudo	1.393	202.692	0.80	0.69
Greek drachma	1.44	357.00	0.80	0.41

5.6 How to See an Emu Fly: The Road to Monetary Integration in Europe

- Was the EMS Successful?
 - Day-to-day variability was down
 - Large revaluations did occur due to a currency crisis from 1992-1993
 - Inflation and interest differentials narrowed
 - Possibly due to conversion to “hard” currency policies
 - Asymmetric adjustments
 - Central role of Germany; others maintained stable rate of their currency around Germany
 - Promoted anti-inflationary policy since this would mean lower level of competitiveness

5.6 How to See an Emu Fly: The Road to Monetary Integration in Europe

- Maastricht Treaty and the Euro (1991)
 - Mapped out road to single currency
 - Inflation within 1.5% of 3 best performing states
 - Interest rate on long term govt bonds within 2% of long term interest rates of 3 best-performing countries
 - A budget deficit of < 3% of GDP
 - Govt debt < 60% of GDP
 - No devaluation within the ERM within past 2 years
 - Three Phases
 - Restrictions of movement on capital removed
 - European Monetary Institute (EMI) was created
 - EC supervision of fiscal policy and prohibition of monetary financing of budget deficits
 - European Central Bank replaced EMI

5.6 How to See an Emu Fly: The Road to Monetary Integration in Europe

- Pros and cons of a monetary union
 - “Optimum currency area” (Mundell, 1961)
 - One that balances the microeconomic benefits of perfect exchange rate certainty against the costs of macroeconomic adjustment problems
 - Potential pros
 - Enhanced price transparency, lower transaction costs, removes exchange rate uncertainty, enhanced competition
 - Could promote trade and economic growth

5.6 How to See an Emu Fly: The Road to Monetary Integration in Europe

- Pros and cons of a monetary union (cont.)
 - Potential cons
 - Loss of independent monetary policy (Bad if country is in a bad place and none of the other countries are)
 - Different U.S. regions in the 19th century (Rockoff, 2003)
 - Greece in global recession, 2010
 - Research does not agree on whether or not the EU is particularly well suited to be a monetary union
 - Verdict is still out