



INTERNATIONAL FINANCIAL MARKETS Part III: Praticum

SECTION A: FINANCIAL SYSTEM

Functions of a financial system

- Transfer of resources through time
- Transfer of resources across regions
- Allocation of resources
 - Best and most profitable investment project
 - Life cycle consumption smoothing
- Monitoring on resource utilization
- Risk allocation
- Supporting payment system
- Supporting monetary policy

Financial Flows

- $Y-C = S$
- $(S-RI) = SF = (\Delta AF - \Delta PF)$

$$(DY-C)+(RE-RI)+(G-T)+(IMP-EXP) = 0$$

$$(EXP-IMP) = (\Delta EAF - \Delta EPF)$$

Trade, exchange rates, budget balances and interest rates

May 22nd 2008

 From *The Economist* print edition

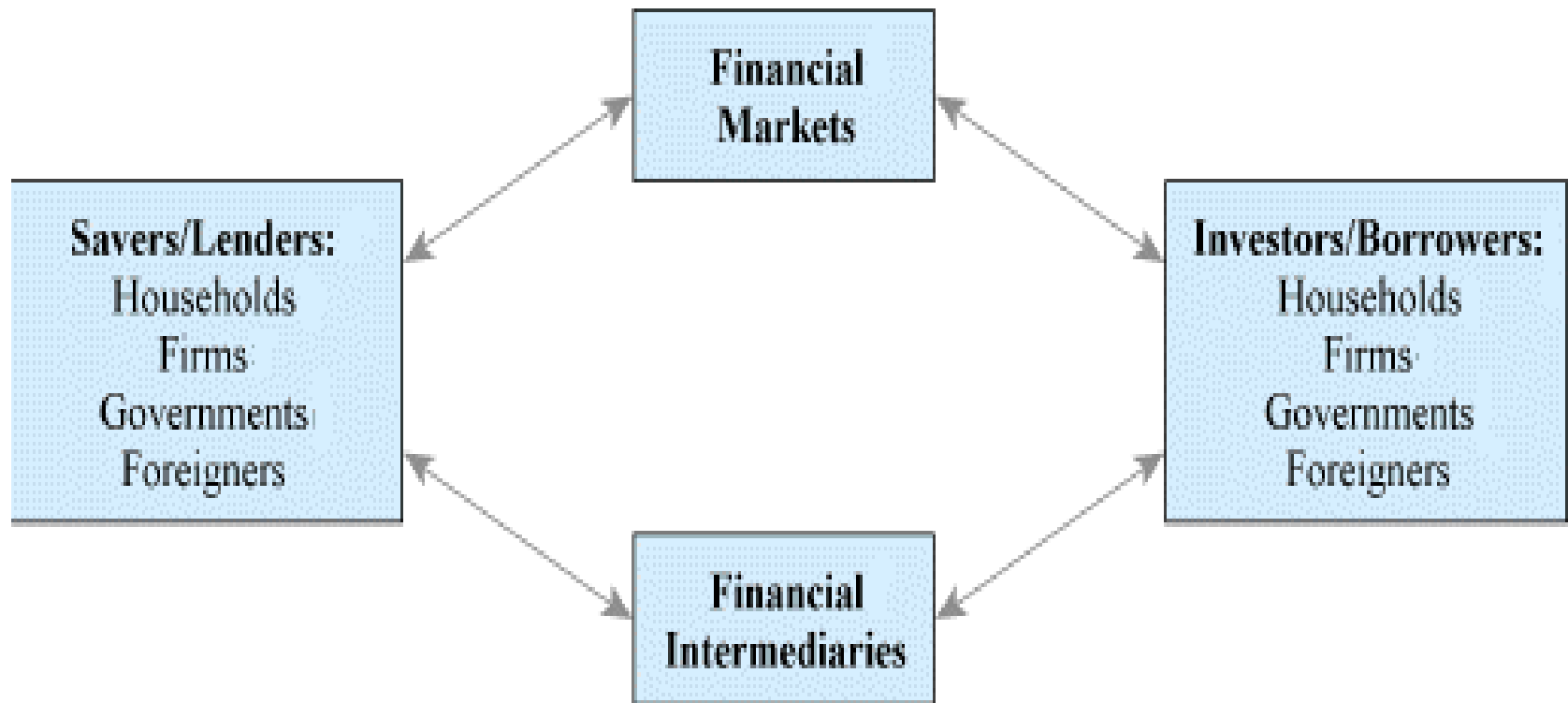
Trade, exchange rates, budget balances and interest rates

| | Trade balance* latest 12 months, \$bn | Current-account balance | | Currency units, per \$ | | Budget balance % of GDP 2008† | Interest rates, % | |
|----------------|---|---------------------------|-------------------|------------------------|----------|--|-------------------|--------------------------------|
| | | latest 12 months, \$bn | % of GDP 2008† | May 21st | year ago | | 3-month latest | 10-year gov't bonds, latest |
| United States | -823.8 Mar | -738.6 Q4 | -4.6 | - | - | -2.4 | 2.00 | 3.82 |
| Japan | +102.8 Mar | +216.6 Mar | +4.7 | 103 | 121 | -2.9 | 0.75 | 1.61 |
| China | +256.5 Apr | +249.9 2006 | +10.5 | 6.96 | 7.65 | 0.5 | 4.49 | 4.41 |
| Britain | -179.7 Mar | -115.4 Q4 | -4.0 | 0.51 | 0.50 | -3.2 | 5.84 | 4.87 |
| Canada | +46.2 Mar | +12.5 Q4 | -0.1 | 0.98 | 1.08 | 0.4 | 2.61 | 3.69 |
| Euro area | +14.1 Mar | +25.3 Feb | -0.1 | 0.63 | 0.74 | -0.8 | 4.86 | 4.26 |
| Austria | +1.0 Feb | +12.2 Q4 | +3.0 | 0.63 | 0.74 | -0.4 | 4.86 | 4.42 |
| Belgium | +14.3 Feb | +2.7 Dec | +2.1 | 0.63 | 0.74 | -0.4 | 4.93 | 4.55 |
| France | -59.3 Mar | -35.7 Mar | -1.7 | 0.63 | 0.74 | -2.9 | 4.86 | 4.44 |
| Germany | +273.9 Mar | +264.5 Mar | +6.2 | 0.63 | 0.74 | 1.1 | 4.86 | 4.26 |
| Greece | -59.4 Feb | -45.2 Mar | -12.0 | 0.63 | 0.74 | -2.6 | 4.86 | 4.71 |
| Italy | -12.9 Mar | -57.0 Mar | -2.5 | 0.63 | 0.74 | -2.6 | 4.86 | 4.74 |
| Netherlands | +57.3 Mar | +50.7 Q4 | +6.3 | 0.63 | 0.74 | 0.6 | 4.86 | 4.44 |
| Spain | -147.1 Mar | -150.3 Feb | -9.2 | 0.63 | 0.74 | -0.7 | 4.86 | 4.49 |
| Czech Republic | +4.4 Mar | -4.7 Mar | -2.9 | 16.0 | 21.0 | -2.5 | 4.15 | 4.72 |
| Denmark | +4.1 Mar | +4.1 Mar | +0.9 | 4.73 | 5.52 | 3.6 | 5.40 | 4.50 |
| Hungary | +0.2 Mar | -6.9 Q4 | -5.9 | 155 | 184 | -4.2 | 8.57 | 8.25 |
| Norway | +66.9 Apr | +64.1 Q4 | +16.8 | 5.00 | 6.01 | 17.5 | 6.54 | 4.70 |
| Poland | -14.7 Mar | -18.6 Mar | -3.8 | 2.16 | 2.80 | -2.1 | 6.44 | 6.18 |
| Russia | +152.9 Mar | +92.4 Q1 | +5.4 | 23.6 | 25.9 | 2.5 | 10.50 | 6.54 |
| Sweden | +19.3 Mar | +38.1 Q4 | +7.2 | 5.91 | 6.82 | 2.4 | 4.01 | 4.20 |
| Switzerland | +12.5 Mar | +71.1 Q4 | +14.9 | 1.03 | 1.23 | 0.9 | 2.78 | 3.01 |
| Turkey | -66.8 Mar | -40.4 Mar | -6.5 | 1.24 | 1.32 | -2.9 | 17.61 | 6.66† |

Trade, exchange rates, budget balances and interest rates

| | Trade balance | | Current-account balance | | Currency units, per \$ | | Budget balance | Interest rates | | |
|-----------------------|------------------------|-----|-------------------------|-----|------------------------|----------|----------------|----------------|-------------------|----------------------|
| | latest 12 months, \$bn | | latest 12 months, \$bn | | % of GDP | | % of GDP | 3-month | 10-year gov't | |
| | | | | | Apr 2nd | year ago | 2014† | latest | bonds, latest | |
| United States | -702.0 | Jan | -379.3 | Q4 | -2.1 | - | -2.9 | 0.23 | 2.80 | |
| China | +224.9 | Feb | +188.6 | Q4 | +1.7 | 6.21 | 6.20 | -2.2 | 5.50 | 4.18 ^{\$\$} |
| Japan | -95.3 | Jan | +23.0 | Jan | +0.5 | 104 | 93.5 | -8.1 | 0.14 | 0.63 |
| Britain | -172.5 | Jan | -111.7 | Q4 | -3.3 | 0.60 | 0.66 | -5.4 | 0.53 | 2.79 |
| Canada | -6.6 | Jan | -58.9 | Q4 | -2.8 | 1.10 | 1.02 | -2.6 | 1.20 | 2.55 |
| Euro area | +209.6 | Jan | +298.0 | Jan | +2.3 | 0.73 | 0.78 | -2.5 | 0.31 | 1.62 |
| Austria | -6.0 | Dec | +11.2 | Q4 | +3.1 | 0.73 | 0.78 | -1.9 | 0.31 | 1.86 |
| Belgium | +19.4 | Jan | -8.0 | Dec | -0.8 | 0.73 | 0.78 | -2.5 | 0.31 | 2.21 |
| France | -83.2 | Jan | -45.3 | Jan | -1.6 | 0.73 | 0.78 | -4.2 | 0.31 | 2.14 |
| Germany | +264.9 | Jan | +281.9 | Jan | +6.8 | 0.73 | 0.78 | +0.5 | 0.31 | 1.62 |
| Greece | -23.5 | Jan | +1.6 | Jan | +1.6 | 0.73 | 0.78 | -2.5 | 0.31 | 6.19 |
| Italy | +43.2 | Jan | +19.7 | Jan | +1.0 | 0.73 | 0.78 | -3.3 | 0.31 | 3.31 |
| Netherlands | +65.6 | Jan | +83.1 | Q4 | +9.9 | 0.73 | 0.78 | -3.0 | 0.31 | 1.80 |
| Spain | -20.5 | Jan | +10.0 | Jan | +1.4 | 0.73 | 0.78 | -5.8 | 0.31 | 3.18 |
| Czech Republic | +18.5 | Jan | -2.9 | Q4 | -1.2 | 19.9 | 20.2 | -2.9 | 0.37 | 2.15 |
| Denmark | +12.8 | Jan | +24.4 | Jan | +6.2 | 5.42 | 5.81 | -1.8 | 0.31 | 1.67 |
| Hungary | +9.6 | Jan | +3.9 | Q4 | +1.9 | 223 | 235 | -3.0 | 2.67 | 5.58 |
| Norway | +64.1 | Feb | +54.5 | Q4 | +12.5 | 5.97 | 5.81 | +12.0 | 1.73 | 2.87 |
| Poland | -2.3 | Jan | -6.4 | Jan | -1.8 | 3.03 | 3.26 | -3.5 | 2.51 | 4.26 |
| Russia | +182.1 | Jan | +32.8 | Q4 | +0.9 | 35.4 | 31.2 | -0.4 | 8.87 | 8.90 |
| Sweden | +7.8 | Feb | +34.6 | Q4 | +6.0 | 6.48 | 6.47 | -2.0 | 0.92 | 2.14 |
| Switzerland | +27.2 | Feb | +84.4 | Q4 | +11.3 | 0.89 | 0.95 | +0.5 | 0.02 | 0.95 |
| Turkey | -97.5 | Feb | -64.0 | Jan | -6.0 | 2.13 | 1.80 | -2.7 | 12.2 | 10.3 |
| Australia | +22.4 | Feb | -44.2 | Q4 | -2.9 | 1.08 | 0.96 | -1.9 | 2.66 | 4.17 |
| Hong Kong | -66.4 | Feb | +5.6 | Q4 | +2.6 | 7.76 | 7.76 | +1.4 | 0.37 | 2.39 |
| India | -139.8 | Feb | -49.2 | Q4 | -2.8 | 59.8 | 54.3 | -5.3 | 8.89 | 8.96 |
| Indonesia | -3.4 | Feb | -28.5 | Q4 | -3.8 | 11,293 | 9,737 | -2.3 | 8.13 | na |
| Malaysia | +23.1 | Jan | +11.7 | Q4 | +5.3 | 3.27 | 3.09 | -4.1 | 3.33 | 4.14 |
| Pakistan | -19.8 | Feb | -4.0 | Q4 | -2.1 | 98.1 | 98.3 | -6.3 | 10.2 | 12.9 ⁺⁺⁺ |
| Singapore | +40.3 | Feb | +54.4 | Q4 | +19.5 | 1.26 | 1.24 | +0.7 | 0.32 | 2.50 |
| South Korea | +44.4 | Mar | +83.6 | Feb | +4.4 | 1,057 | 1,118 | +0.5 | 2.65 | 3.56 |
| Taiwan | +10.6 | Feb | +57.4 | Q4 | +11.1 | 30.3 | 29.9 | -2.1 | 0.94 | 1.62 |
| Thailand | -15.1 | Feb | -2.8 | Q4 | +2.6 | 32.4 | 29.4 | -2.2 | 1.83 | 3.76 |
| Argentina | +8.3 | Feb | -4.3 | Q4 | -0.2 | 8.00 | 5.12 | -2.4 | 21.5 [†] | na |
| Brazil | +1.6 | Mar | 92.5 | Feb | 2.6 | 2.27 | 2.02 | 4.0 | 10.0 | 12.7 |

The financial system






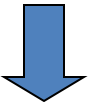

How should we think of a financial system?

- Institutional perspective
 - banks
 - insurance companies
 - mutual funds
 -
- Functional perspective
 - transfer resources across time & regions
 - manage uncertainty and control risk
 - settling payments for goods & services
 - provide information about key macro variable
 - monitoring how firms employ resources

Functions are stable; institutions change over time (innovation)

The Financial System

- Suppliers of capital
 - households with saving
 - firms with cash
- Intermediaries (dealer)
 - commercial banks
 - savings & loans
 - insurance companies
- Users of capital
 - firms (RE<investment)
 - Households / Government

- Suppliers of capital
 - Institutional investors**
 - mutual funds
 - pension funds
- Markets (with brokers)
 - Government/corporate bond
 - Equity
 - Asset backed securities
 - [Derivatives]
- Users of capital

Why financial intermediaries (FI) ?

- **Uncertainty**
 - reducing the cost of searching the best counterparts
- **Imperfect information**
 - avoid/mitigate adverse selection
 - avoid/mitigate moral hazard (opportunistic behavior)
- **Limited contracting capacity**
 - limited enforceability of legal contracts
 - transactions not perfectly divisible
 - limited foresight of all future possible states of the world

FI & uncertainty

- No duplication of the cost of search and evaluation of the uncertainty
 - cross-sectional reusability of information produced
 - reusability through time of the information produced
 - confidentiality issue
- Gains from division of labor
 - economies of scale
 - learning by doing
- Their function is valuable:
 - quality of the object of search is not readily observable
 - information is a reusable goods

FI and imperfect information

- Screen potential borrowers using a properly designed menu of contracts
- Reducing the signaling cost for the borrower
- Delegated monitoring (- cost; + efficient)
- Lower cost & more efficient auditing

FI & limited contracting capacity

- Overcome the divisibility problem allowing the desired degree of diversification
- Offer their reputation as a substitute of limited legal protection
- Establishing long term relationship they can:
 - implement strategic contracting when legal contracting fails
 - adjust legal & strategic contract at low cost should the need arise

Activities of FI - I

- Monetary function
 - checking account services, credit cards,...
- Asset servicing
 - collecting, tracking & remitting payments on mortgages, bonds and equities,...
 - safekeeping, custody
 - FI bear only business risk, earning fees
- Brokerage activities
 - placement, stockbroking, financial advising, certification
 - FI bear only business risk and earn fees

Activities of FI - II

- Qualitative asset transformation (QAT)
 - act as a principal between final lenders & borrowers
 - the attributes of the financial asset of the former are different from those of the financial liabilities of the latter

- Attributes transformed
 - duration = term to maturity
 - divisibility = unit size
 - liquidity = how easy to cash in on demand
 - credit risk = how uncertain the debt servicing
 - numeraire = currency of denomination

More on QAT

- Duration
 - assets held have longer duration than liabilities
- Divisibility
 - assets held have larger unit size than liabilities
- Liquidity
 - assets held are more illiquid than liabilities
- Credit risk
 - assets held are riskier than liabilities

QAT: risk & reward for FI

- Reward given by: earnings on assets - cost of liabilities
- Besides business & operational risk they are exposed to financial risks due their balance sheet mismatches:
 - Interest rate risk (adverse change in interest rate)
 - market risk (adverse change in asset market price)
 - currency risk (adverse change in foreign currency value)
 - liquidity risk (bank runs)
 - inventory risks (because of different unit size)
 - credit (insolvency) risk
 - country risk
- QAT FI are both information producers & risk managers

From stylized facts to the real thing

- Distinction between brokerage activities & QAT is not always clear-cut
 - managing mutual funds
- Sometimes they are performed in combination
 - placement of securities with a firm commitment clause
 - aval
- The same intermediary may perform both
 - banks active in the deposit-loan market & in stockbroking

Types of FI

- Depository institutions (DI)
 - (Commercial) Banks - Thrifts - Credit unions
- Nondepository intermediaries (NDI)
 - Investment banks
 - Mutual fund investment companies
 - Pension funds
 - Private equity firm
 - Finance companies
- DI performs monetary functions offering deposit that can be withdrawn on demand
 - distinction is becoming less & less clear-cut

Depository institutions

- The distinction among types of DI was based on:
 - diversity of assets: wider variety of assets for CBs
 - role in payment system: CBs were more important
 - ownership structure: CUs & some thrifts were mutual (cooperatively owned)
- These differences are disappearing:
 - all DI diversify extensively their assets;
 - all DI offer checking and cash management services;
 - the corporate structure becomes dominant among DI
- From now a single term for all of them: *banks*

Types of banking systems

- Two opposite models
 - specialized banking: banks may engage only in QAT activities (deposit taking & granting loans)
 - universal banking: banks may engage both in QAT and brokerage activities (so called *investment banking*)
- USA: from specialized to universal banking and (back) with separation bank-commerce
- Japan: specialized banking (no separation bank-commerce)
- European Union: universal banking (no separation b-c)

Specialized or universal banking?

- In the universal banking system:
 - economies of scope in producing financial services are fully exploited
 - mixing banking & commerce may help reducing information asymmetry
 - investment decision are more far sighted
- In the specialized banking system:
 - DI are prevented from assuming too much risk
 - there is less risk of conflict of interests

Great Recession (2008-2012): before and after

- Before
 - Move towards universal banking
 - Too much (economic and liquidity) risk taken by depositary institutions
 - «too big to fail» and «unacceptable systemic risk»
 - Development of the shadow banking
 - Too much (liquidity) risk outside depositary institutions
- After
 - Both trends are reversed

Stability of banking system

- Regulation on market structure
 - barriers to entry
 - restrictions on allowed activities
 - idea 1: prevent excessive risk taking limiting competition
 - idea 2: prevent excessive risk taking limiting moral hazard
- Regulation on manager's freedom
 - capital requirements (maximum risk exposure is a function of bank's equity capital)
 - portfolio restriction (limit on large credit exposure, on equity holdings in industrial firms,...)
 - idea: risk taking activities should be costly to shareholders
- Supervision

Types of regulations

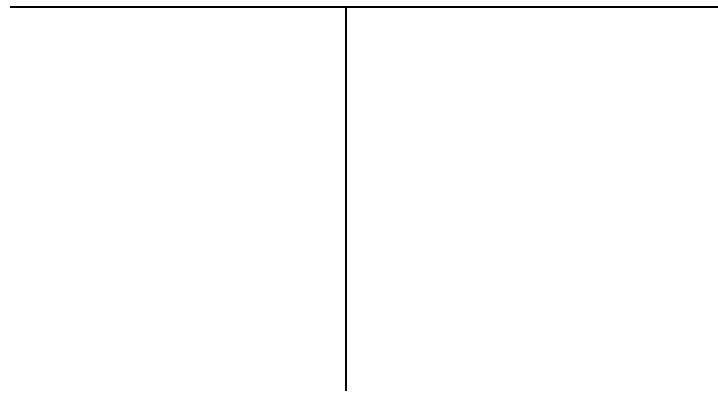
- Safety & soundness
- Monetary policy
- Credit allocation
- Consumer protection
- Investor protection
- Antitrust
- International harmonization

Two tier banking system

- Government institutions
 - central bank
 - lending of last resort
 - setting the monetary policy
 - supervisory agency
 - sometimes central bank is the supervisory agency
 - sometimes there are more regulatory agencies
- Firms operating with the public via market trades
 - banks (state owned, privately owned, mutuals,...)

Banking & money creation

- Central bank creates monetary base (not money)



- Given the monetary base, the quantity of money depends on the deposit taking & lending activity of the banks (multiplication process)

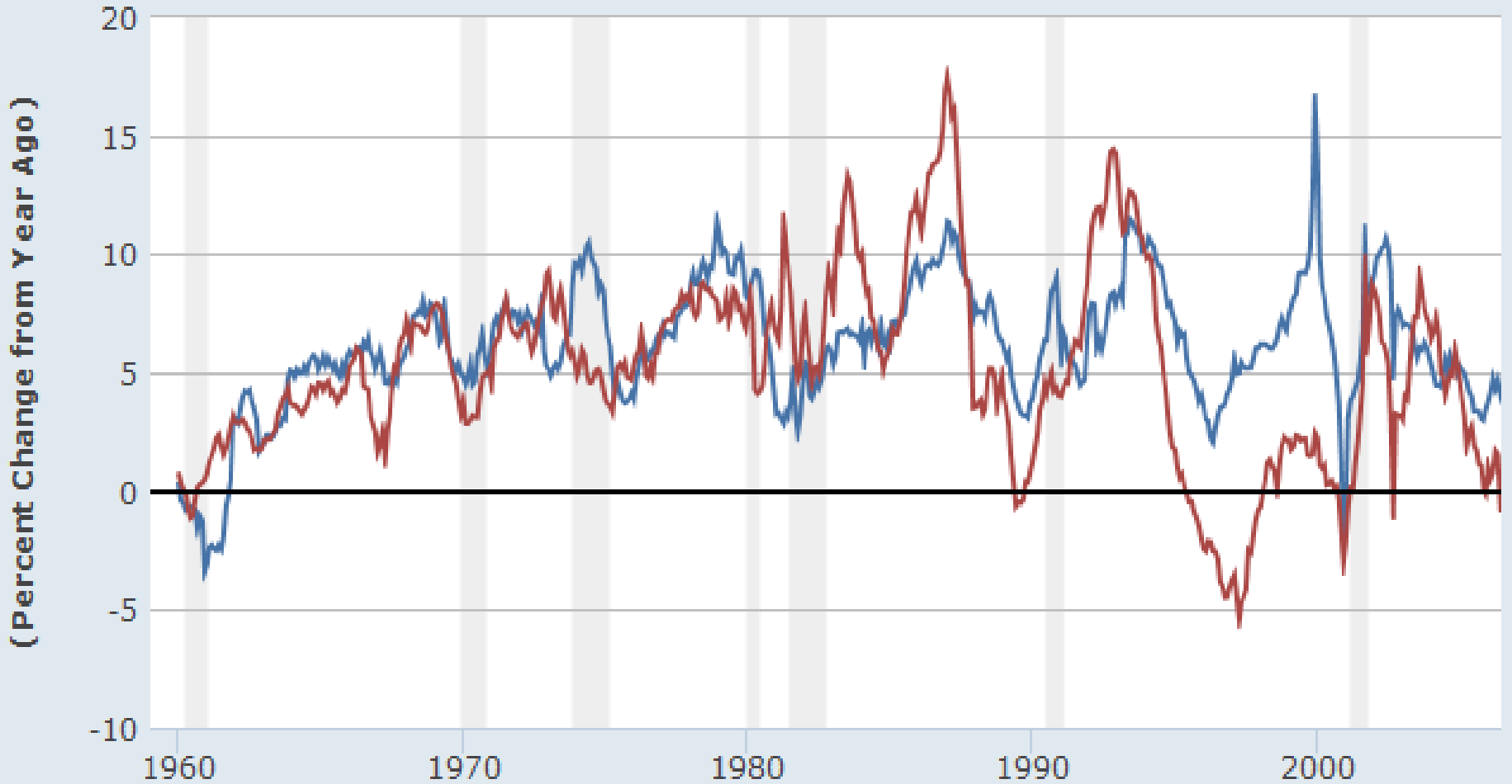
Money multiplier & velocity

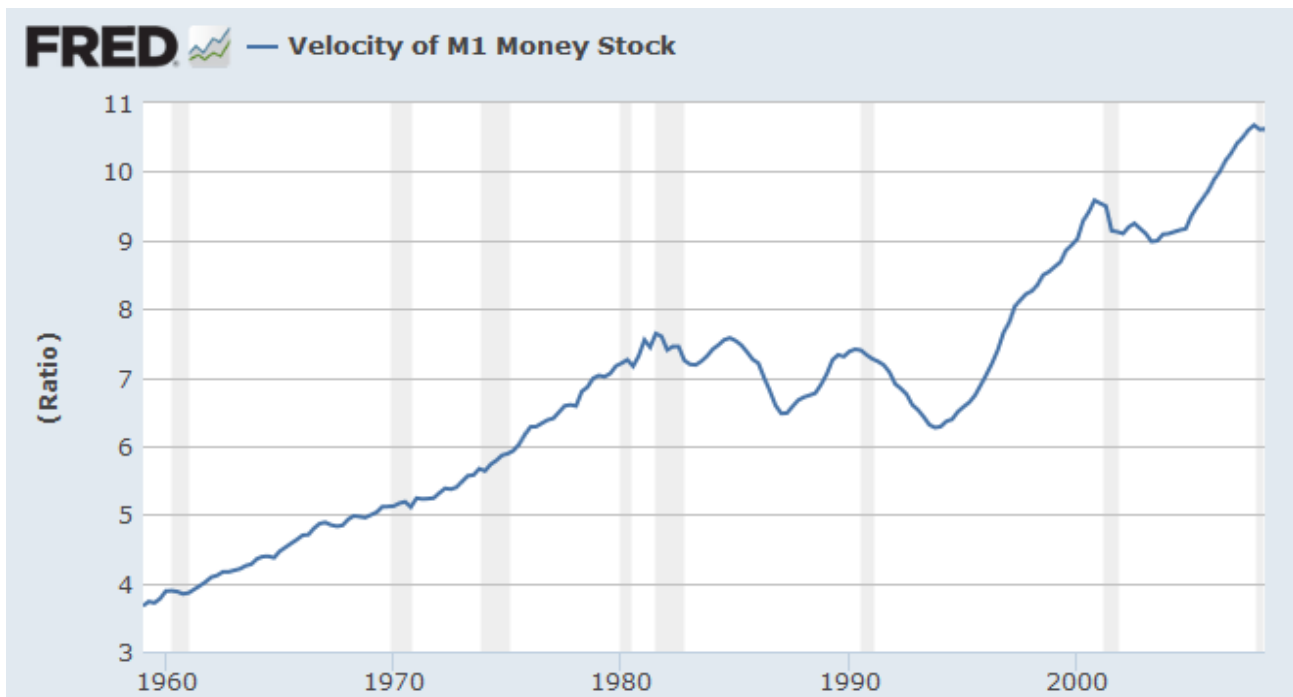
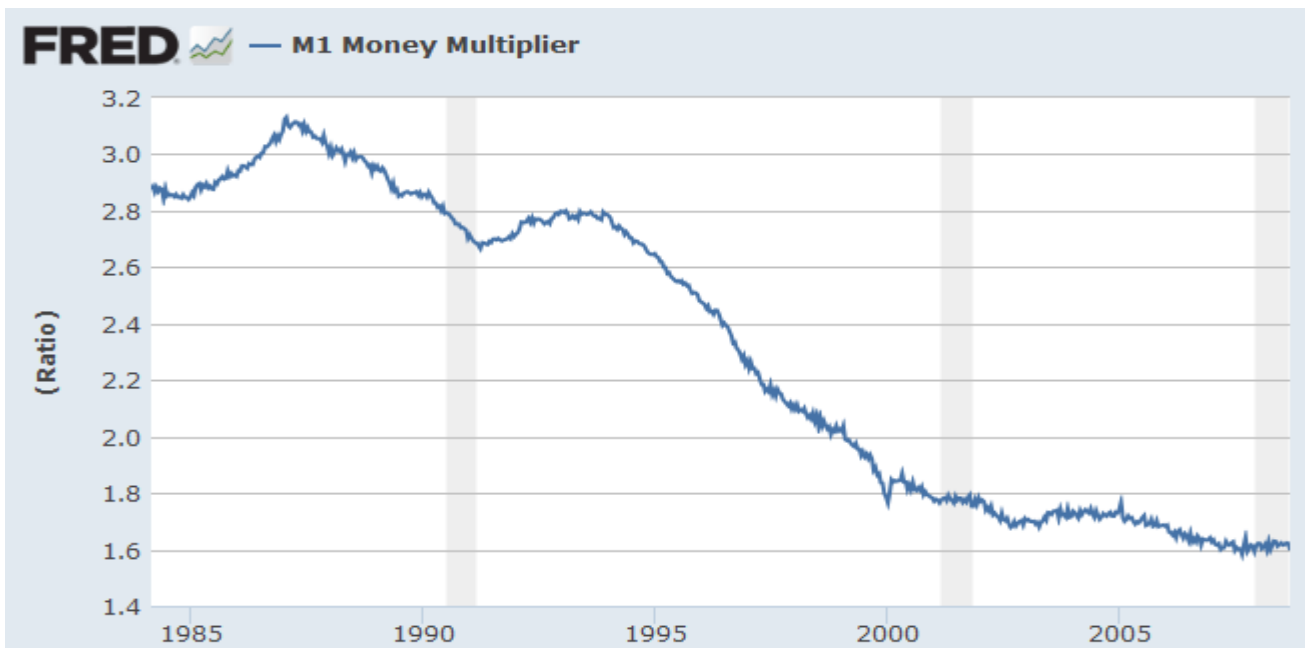
- $MM = [(1+c)/(c+r)]$
- Money multiplier depends on:
 - currency holdings by the public (-)
 - reserve holdings by the banks (-)
- Money velocity
 - Frequency at which one unit of money is used to make purchases in one period of time


FRED

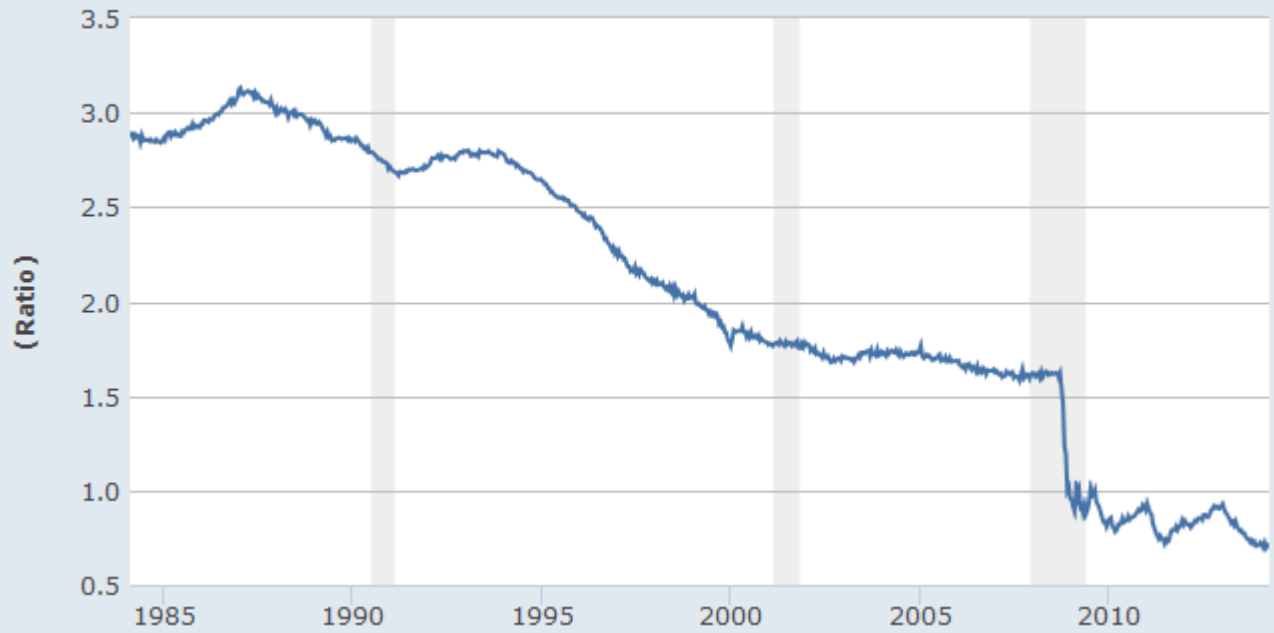



— Monetary Base; Total
— M1 for United States

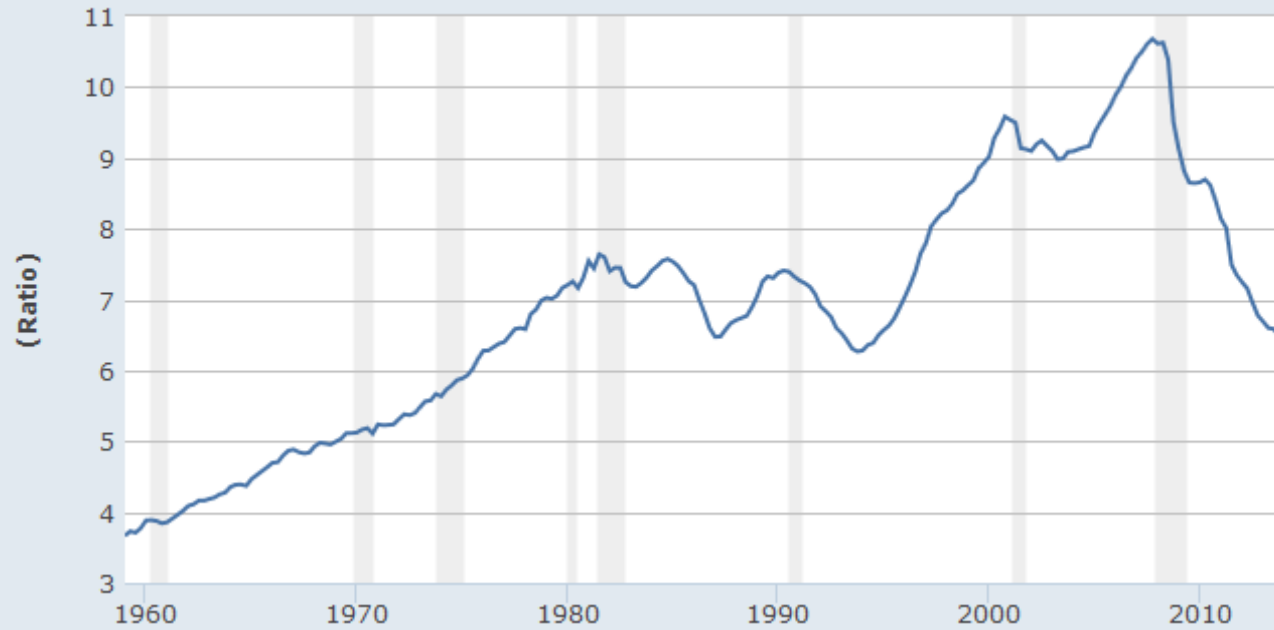




FRED  — M1 Money Multiplier



FRED  — Velocity of M1 Money Stock



SECTION B:

Lending

Bank loans as inside debt

- Inside debt
 - contract in which creditor has access to information about the borrower not otherwise publicly available
- Outside debt
 - publicly traded debt in which the creditor depends only on publicly available information
- Bank lending is inside debt:
 - bank may have representation on borrower's BofD
 - bank may count on borrower's history as a depositor
 - send good signal about borrower to other creditors

Bank lending

- C&I loans
 - Transaction loan
 - Working capital loans
 - Term loans
- Consumer loans
 - mortgages
 - Other
 - recourse vs. non recourse
- They all are highly customized (& often illiquid) financial claims against the borrower's future cash flow

Decomposing lending functions

- Origination
 - solicitation of customer's business / loan application
 - credit analysis + loan contract design (with pricing)
- Funding (loan extension)
 - all at once
 - during a drawdown period (bank's commitment)
 - revolving
- Servicing
 - Bookkeeping & collection of loan payments
- Risk processing
 - default risk control (monitoring, diversification, workouts)
 - interest rate risk control

Credit analysis

- **Goal**
 - determine borrower’s ability & willingness to repay the loan to uncover the likelihood of default
- **Object:**
 - borrower’s reputation (its past record)
 - borrower’s economic prospect
 - value of the collateral (if offered)
- **Style**
 - asset based lending
 - cash flow lending

Factors considered in credit analysis (five Cs)

- **Capacity** (legal & financial)
 - check corporate charter & by-laws of the corporation to determine who has the authority to borrow
 - evaluate future cash flow
- **Character**
 - better reputation, lower incentive to default
- **Capital**
 - lessens the incentive for borrower opportunistic behavior
 - reduces borrower's appetite for risk (moral hazard)
- **Conditions**
 - sources for debt repayment: income, sale of assets, borrowing from other sources, issue of new stock

Collateral

- Inside
 - assets owned by the borrower on which the bank become the primary claimant
 - if loans is unsecured bank would still have a claim on them, but not a first claim
- Outside
 - assets which the bank would never have a claim on, unless designed as collateral
- Benefit of security lending
 - protection against the automatic stay in bankruptcy
 - signaling
 - protection from moral hazard

Credit information

- Internal sources
 - interview with the applicant
 - bank's own records
- External sources
 - borrower's financial statements
 - credit information brokers
 - other banks (through a Central Bureau of Credit Risk)

Loan covenants - 1

- Clauses designed to prohibit the borrower from taking actions that could adversely affect the likelihood of repayment
- Affirmative covenants
 - periodical communication of financial statement
 - minimum level of working capital
 - maintain a management acceptable to the bank
- Negative covenants
 - negative pledge: do not pledge assets to other lenders
 - prohibitions against sale of assets or mergers

Loan covenants - 2

- Restrictive clauses
 - limits on dividends, salaries, bonus, advance to employees
 - limits on purchases of fixed assets
- Default provisions
 - intended to make the loan immediately due if:
 - no timely payments
 - inaccurate statements in loan application
 - violation of covenants
 - entry of a judgment in excess of a specified amount
 - change of management or majority ownership

Loan pricing

- Interest
- Non interest fee on the loan
 - closing fees
 - loan servicing fees
 - commitment fees
- Fees charged for services purchased due to the lending relationship
 - cash management services
 - trust services

Interest

- Bank loan interest rates are set in relation to a benchmark (reference) rate:
 - prime rate: rate applied to most creditworthy customers
 - interbank rate: market rate applied to interbank deposit
- Some loans are indexed to the reference rate
 - prime / interbank rate plus
 - prime “times” (very rare now)
- The interest rate applied is not the expected rate of return on the loan for the bank (default risk)

Interest rate & rate of return on bank loans

- Loan amount = 100 \$
- Interest rate = 10%
- Default probability = 5%

- Expected (gross) rate of return =
= $([110 * 0.95 + 0 * 0.05] / 100) - 1 = 4.5\%$
- Maximize rate of return = Max interest rate?

Double effect of loan rate on loan return

- Positive effect
 - higher interest rate means higher repayment should the borrower serve its debt properly (we don't know ex-ante if he will)
- Negative effect
 - higher interest rate means ex ante a lower probability of a proper service of the debt
- The net effect is not known a priori
 - lowering the interest rate the bank may increase the return on the loan

Why higher rate may mean lower return?

- Banks can't discriminate each borrowers credit standing
- Banks partition borrowers in different risk classes whose average risks are known (high, medium, low)
- Banks charges the same interest, set on group average risk, to all borrowers in the same group
- *Adverse selection* & *moral hazard*
 - A higher rate force the safer borrowers within the risk class to drop out the pool of applicants.
 - A higher rate may push borrowers with some latitude in their investment decision to choose riskier projects
 - In both cases, the average risk of the group may increase more than the interest rate applied

Rationing

- It may be optimal for banks charge below market clearing interest rates
- Credit rationing
 - Given the bank loan interest rate, the quantity demanded is greater than the quantity supplied
 - It is not due to a market failure or to a bank bad management
 - It is due to the fact that interest rate affects the quality of the object of the trade (credit)

SECTION C: FOREIGN EXCHANGE MARKET

Overview of the Forex Market

- Foreign exchange basics - Terminology, Types of contracts
- Dimensions of the foreign exchange market
 - » BIS surveys of daily turnover by location, contract, currency, traders
- The traditional / classic FX market
 - » Organizational structure
 - » A typical day in the FX market
 - » Foreign exchange trading risks and control measures
- Innovations in foreign exchange trading
 - » Interbank Trading – Automated brokerage, clearing and settlement
 - » Corporate Trading – Web-based multi-bank, B2B systems
- The relationship among spot rates, forward rates and money market interest rates

Role of FX Markets

- Member nations of the International Monetary Fund
 - » 184 in 2002, up from 156 in 1991
 - » With few exceptions, each nation issues its own national money (why?) and controls its value (why?)
 - » Exceptions: EMU (17 nations, one money); Panama (US\$); former French colonies (French franc).

- In commodity trade between US and Japan
 - » US (Japanese) exporters do not usually accept yen (US\$)

- Main roles of the FX market
 - » Medium of exchange - facilitate trade in goods and services
 - » Medium of exchange - facilitate purchase/sale of securities
 - » Medium to redenominate and manage currency risk in asset stock or liability positions

FX Contracts – 1

- **Spot contract**
 - » An exchange of two currencies for “immediate delivery”
 - » A binding commitment
 - » Quoting conventions:
 - Direct terms (American terms): US\$/foreign currency
 - Indirect terms (European terms): foreign currency/US\$

- **Foreign exchange swap**
 - » simultaneous borrowing and lending of short-term bank balances in two currencies, for example
 - Bank A borrows \$10 million from Bank B for 1-month
 - Bank B borrows \$10 million worth of £ from Bank A for 1-month
 - » Used to “construct” forward contracts and manage risks

FX Contracts – 2

- Forward contract
 - » Agreement made today for obligatory exchange at specified time in future: 1, 2, 3, 6, 12 months from today
 - » No exchange of funds on agreement day, or at any time until settlement date
 - » Example:
 - On 3/23/01 buy £1,000,000 1-month forward at \$1.60/ £
 - On settlement date 4/23/01 when spot pound is \$1.55:
 - Take delivery of £1,000,000, pay out \$1,600,000
 - “Cash settle”, pay \$50,000 to cancel obligation
 - » Quoting conventions
 - Outright
 - % premium or discount relative to spot

FX Vocabulary: Appreciation vs. Depreciation

Because every exchange rate involves two currencies

- » Appreciation of the US\$ against £ \Leftrightarrow Depreciation of £ against US\$
- » Depreciation of the US\$ against £ \Leftrightarrow Appreciation of £ against US\$

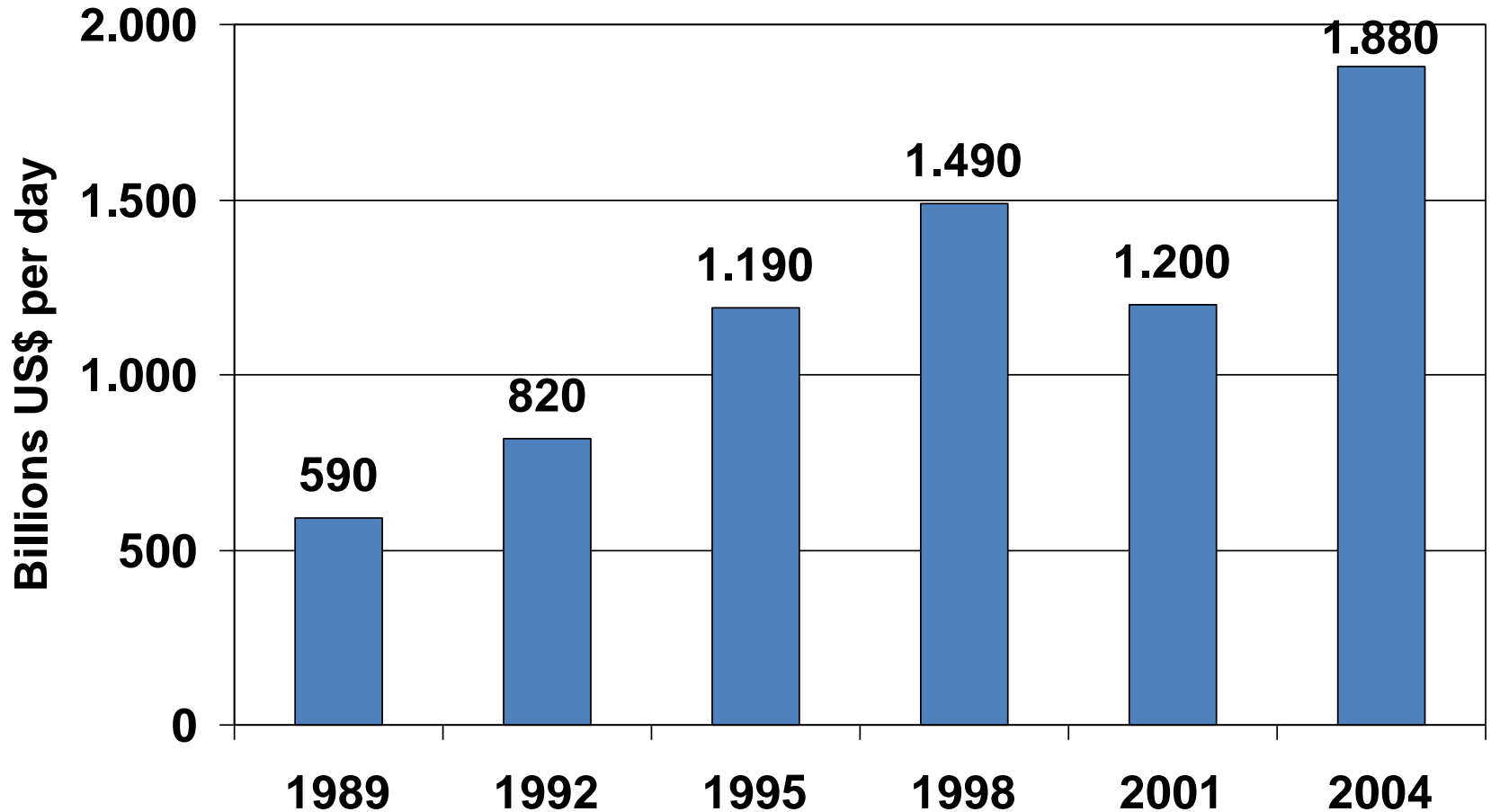
Examples

- » Change from 1.50 \$/£ to 1.75 \$/£ \Rightarrow Appreciation of £ against US\$
- » Change from 1.50 \$/£ to 1.25 \$/£ \Rightarrow Depreciation of £ against US\$

Exact percentage measures depend on the base rate

- » x% depreciation of the Mexican peso \Rightarrow x% more pesos to buy \$1
 - from 4 MP/\$ to 8 MP/\$ \Rightarrow 100% depreciation of the peso
- » y% appreciation of the US\$ \Rightarrow y% fewer dollar to buy 1 peso
 - from \$0.25/MP to \$0.125/MP \Rightarrow 50% appreciation of the US\$

FX Market Size



All survey data based on Bank for International Settlements, "Triennial Central Bank Survey Foreign Exchange and Derivatives Market Activity in 2004," Basle Switzerland, September 2004.

Ups and Downs in FX Turnover

20% drop in 2001

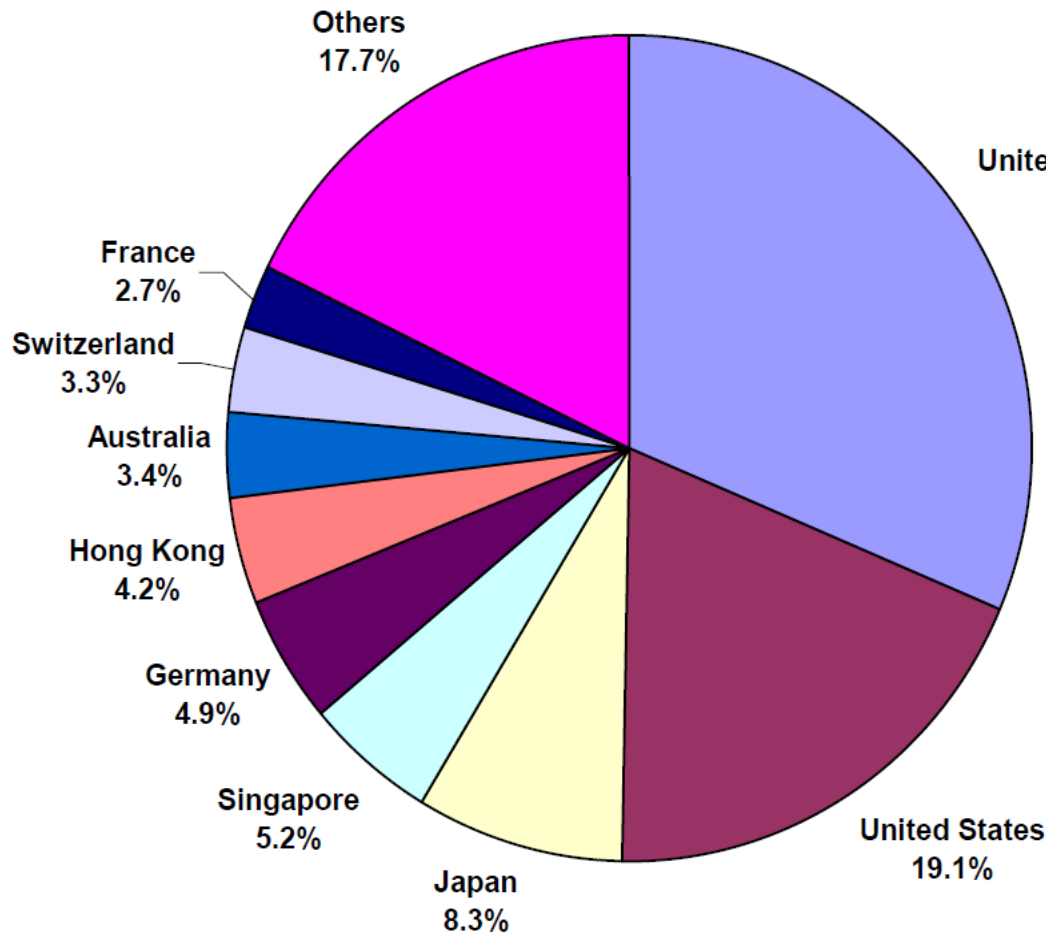
1. Introduction of the €
 - » Eliminates cross-trades in EMS legacy currencies
2. Bank consolidation
 - » Eliminates trades among banks (e.g. JP Morgan and Chase), once with separate trading desks
3. Electronic trading platforms
 - » Reduces the need for active trading among interbank dealers

50% rise in 2004

1. FX gains status as an asset class
 - » Encouraged by down or flat equity markets
2. Growth of hedge funds and commodity trading advisors
 - » Again, searching for returns
3. More active role for asset managers
 - » Directional bets

Daily Volume of FX Trading by Location

percentage market share



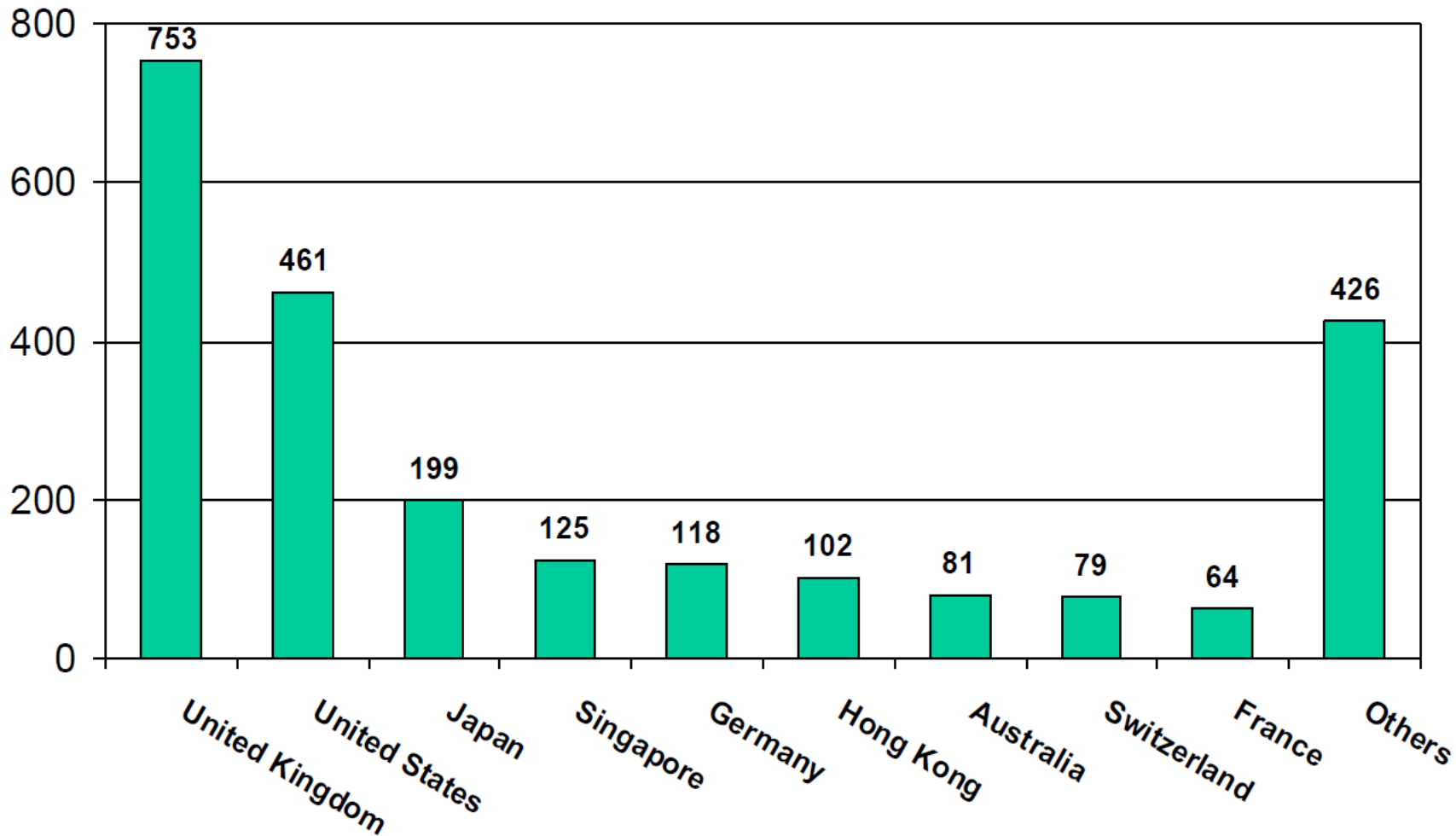
Based on April 2004 BIS survey of trading in 52 countries.

Preliminary estimate of global FX trading:

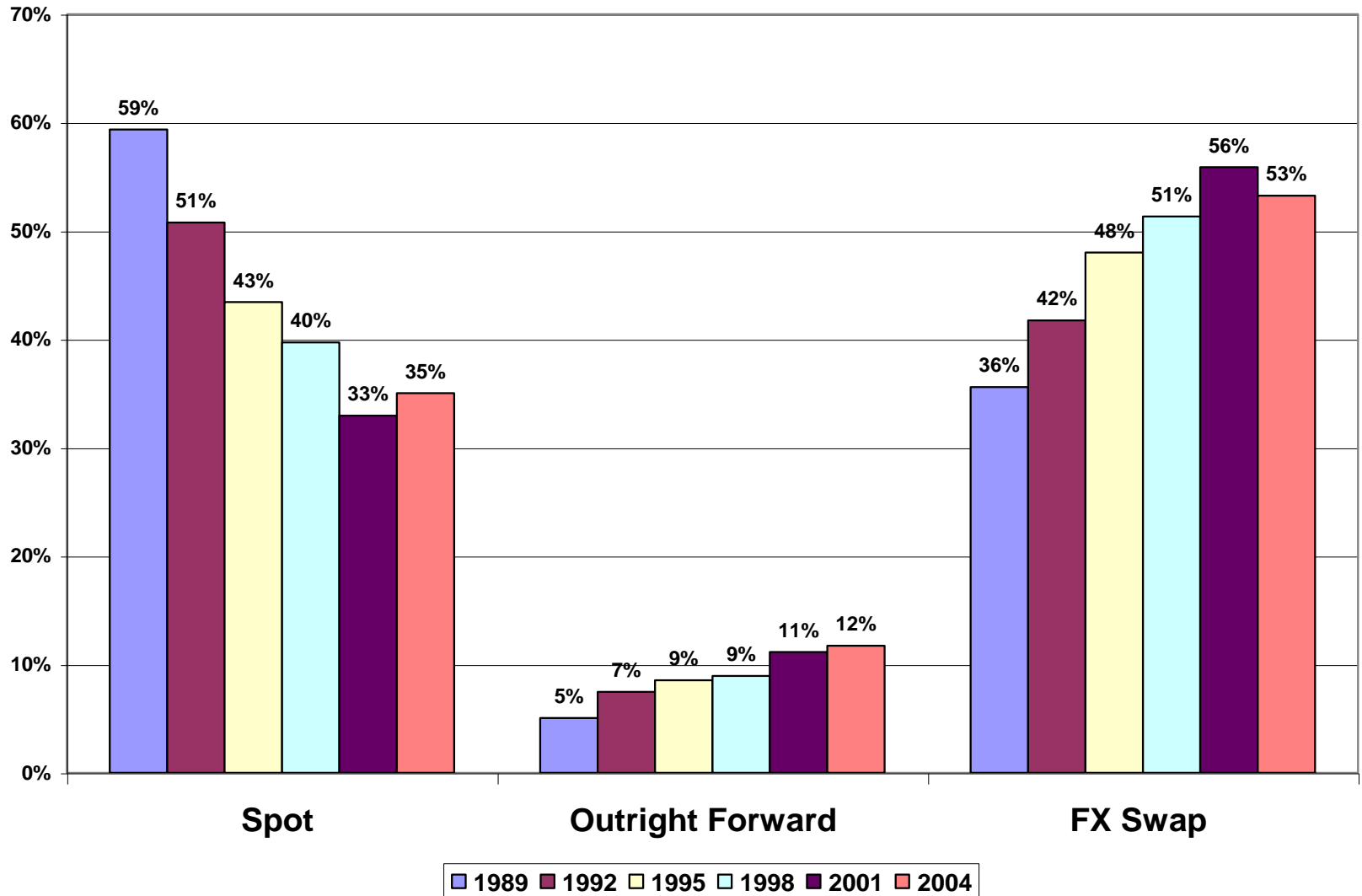
\$1.9 trillion/day

Daily Volume of FX Trading by Location

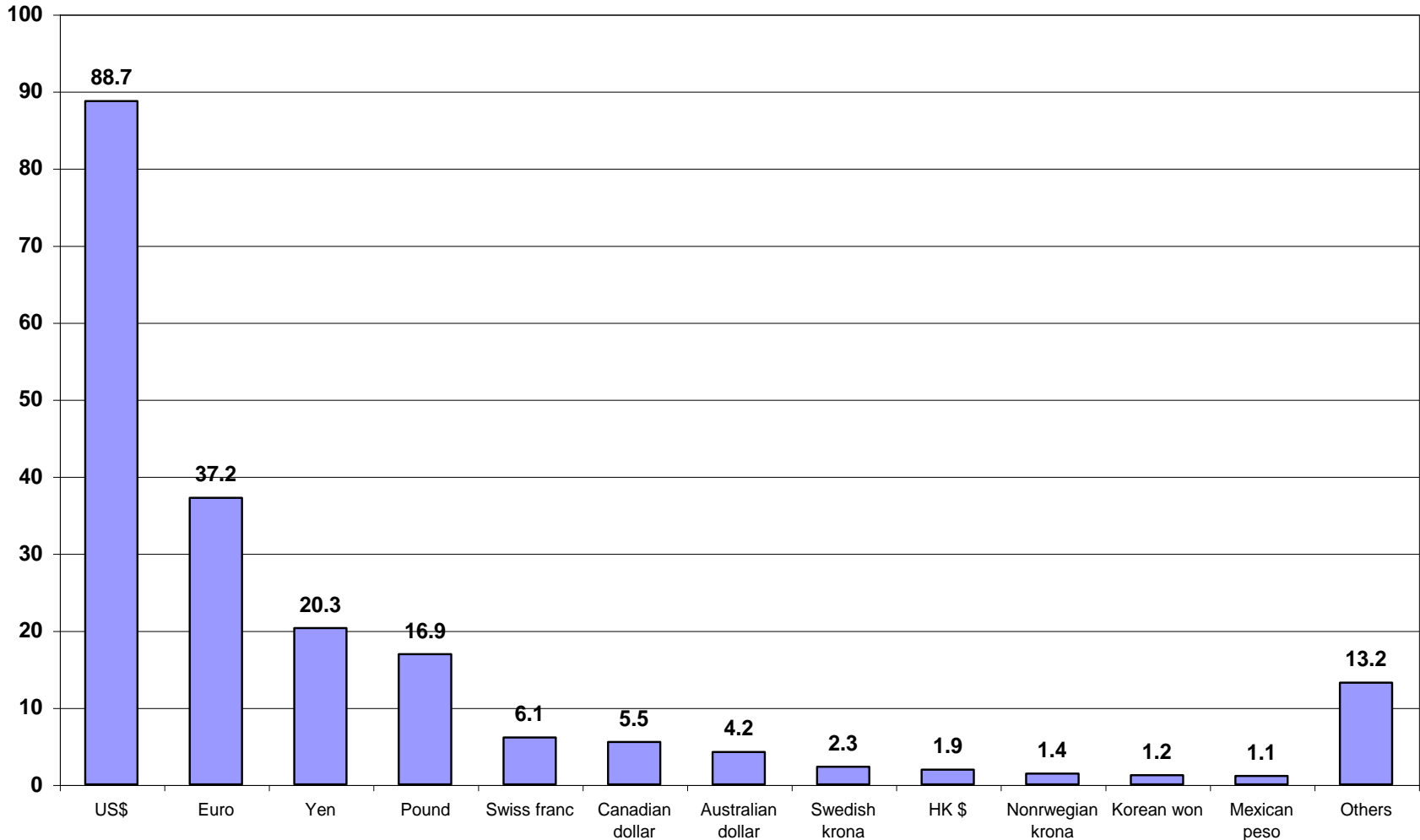
Average for April 2004, in billions of US\$



Share of Trading by Contract Type

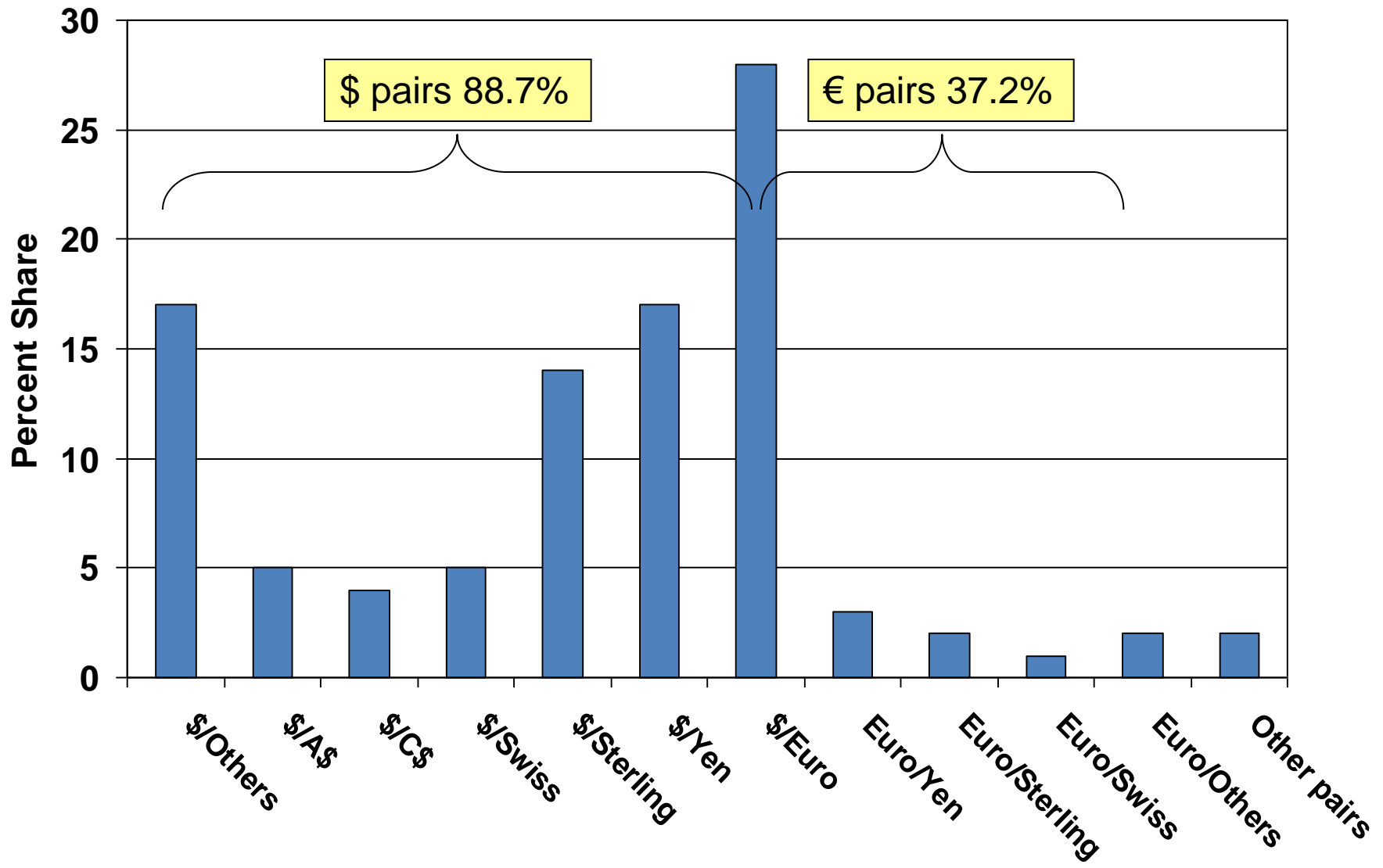


Trading by Currency (BIS Survey 2004)



Note: Percentage shares sum to 200% because two currencies are involved in each transaction

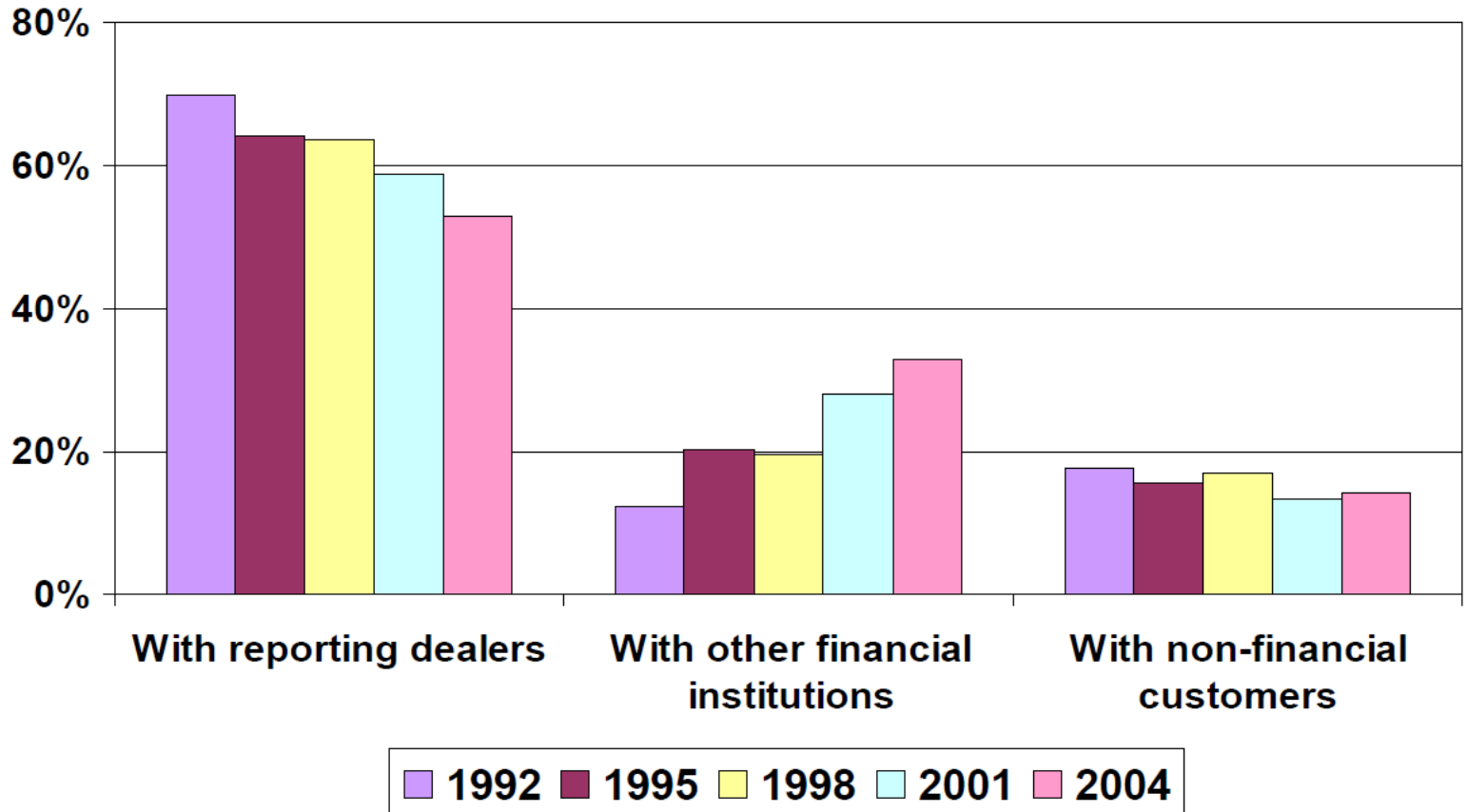
Turnover by Currency Pair



The US\$ as a vehicle currency

- US\$ involved in 91% + of all FX transactions (2001 survey)
- Transactions that do not use US\$:
 - » DM/¥, DM/£, DM/other European before EMU and euro (€)
- US\$ used as intermediary or “vehicle currency” (why?)
 - » Yen /Mex Peso rate: $\text{¥/peso} = \text{¥/US\$} \times \text{US\$/peso}$ (1)
 - » $11 \text{ ¥/peso} = 110 \text{ ¥/US\$} \times 0.10 \text{ US\$/peso}$
- Triangular Parity: name given to equation (1) and equilibrium relation among any 3 currencies
- Triangular arbitrage: transactions to take advantage of deviations from triangular parity
 - » If (1) does not hold ($10.5 \text{ ¥/peso} \neq 110 \text{ ¥/\$} \times 0.10 \text{ \$/peso}$)
 - ⇒ buy low, sell high to earn risk-free profit (before transaction costs)

Market Turnover by Counterparty

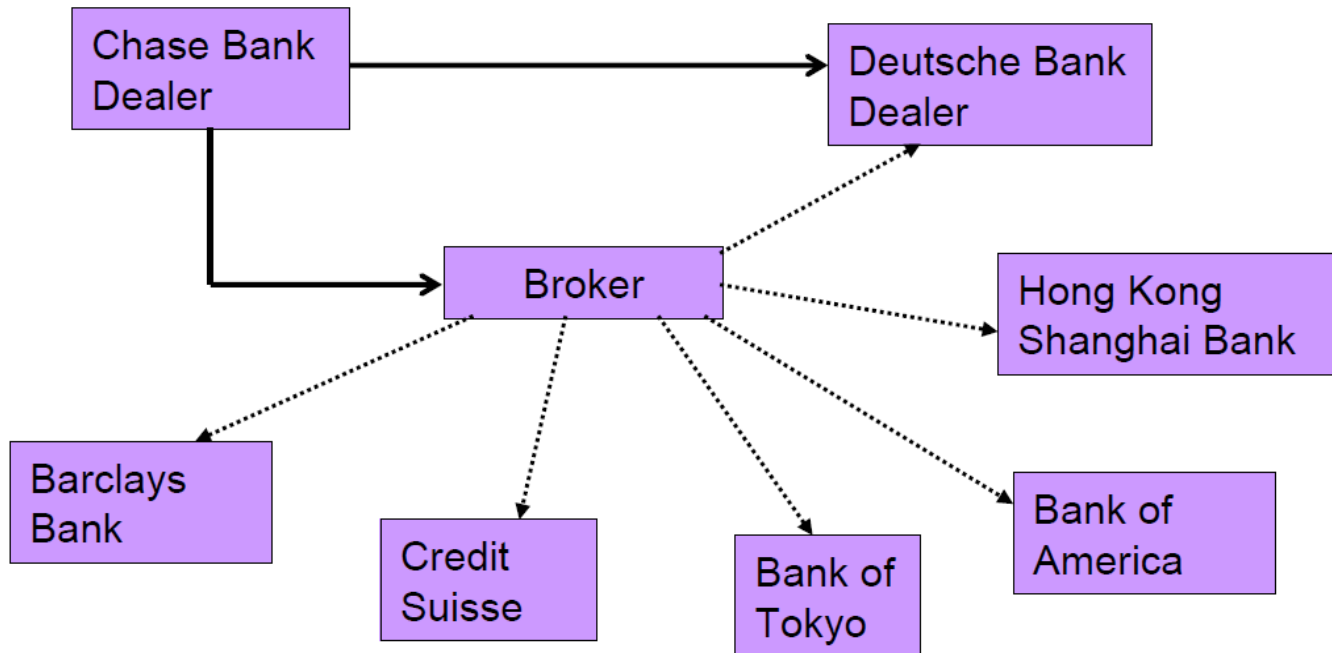


The Classic FX Market

- Organizational Structure - *Interbank Trading*
 - Traders / Market-Makers are geographically dispersed
 - Linked by:
 - (a) Voice brokers;
 - (b) Direct dealing through telephone conversations
 - Quotations distributed over proprietary systems
 - Price Quotations typically "for indications", not true transaction prices
 - Automated electronic bilateral dealing

Structure of the Foreign Exchange Market

The Interbank FX Market



FX vs. Stock Exchange

- **FX**

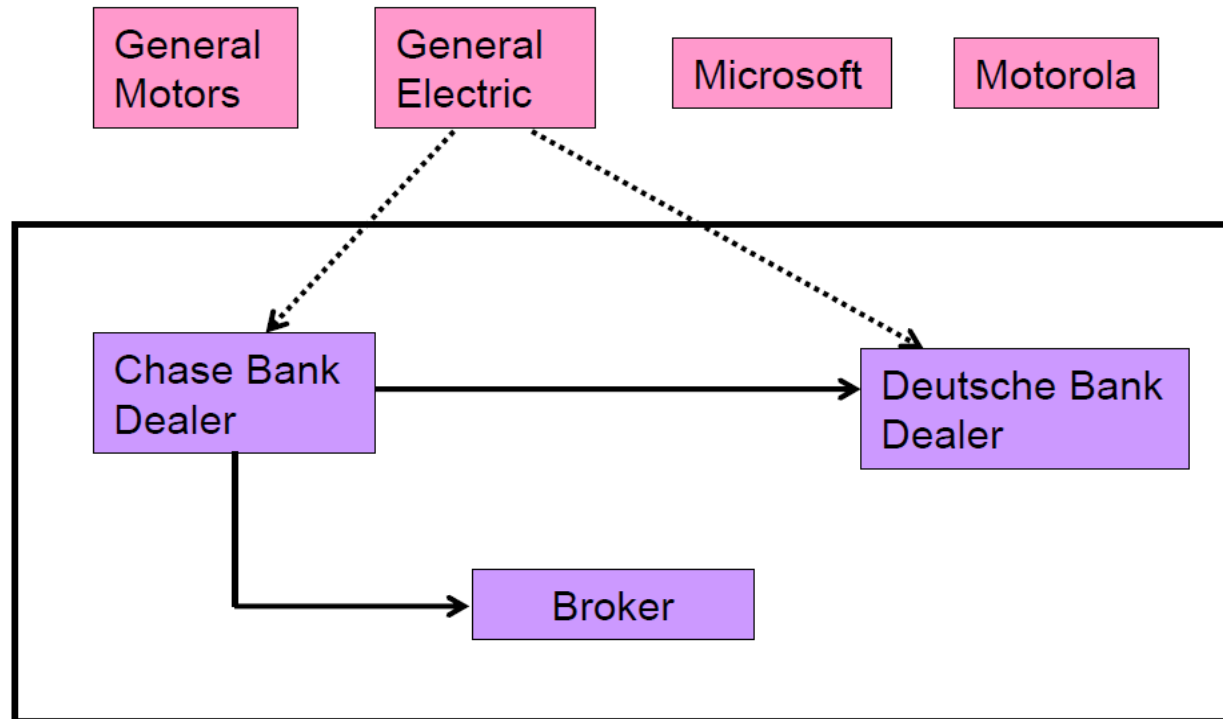
- Geographically dispersed
- Broker / Dealer
- 24 – Hour
- Customized
- Price dispersion
- Risk dispersion

- **SE**

- Dispersed traders but centralized order matching
- Order Book
- Set trading hours
- Standardized
- Uniform prices
- Uniform delivery & counterparty risk

Structure of the Foreign Exchange Market

The Corporate (Retail) and Interbank FX Market



A trading day in FX

- The Bid-Ask spread (measure of the cost of liquidity services)
 - » Varies throughout the day
 - » Increases as volatility in the spot rate increases
 - » Decreases when more dealers are in the market

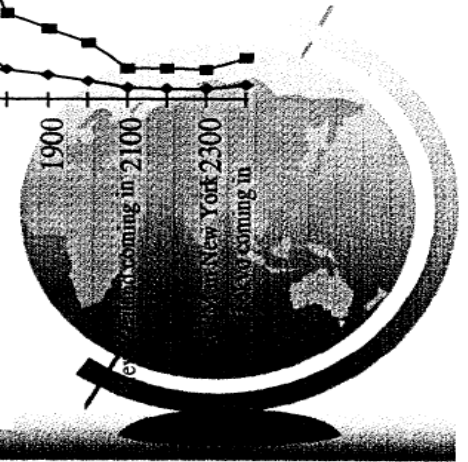
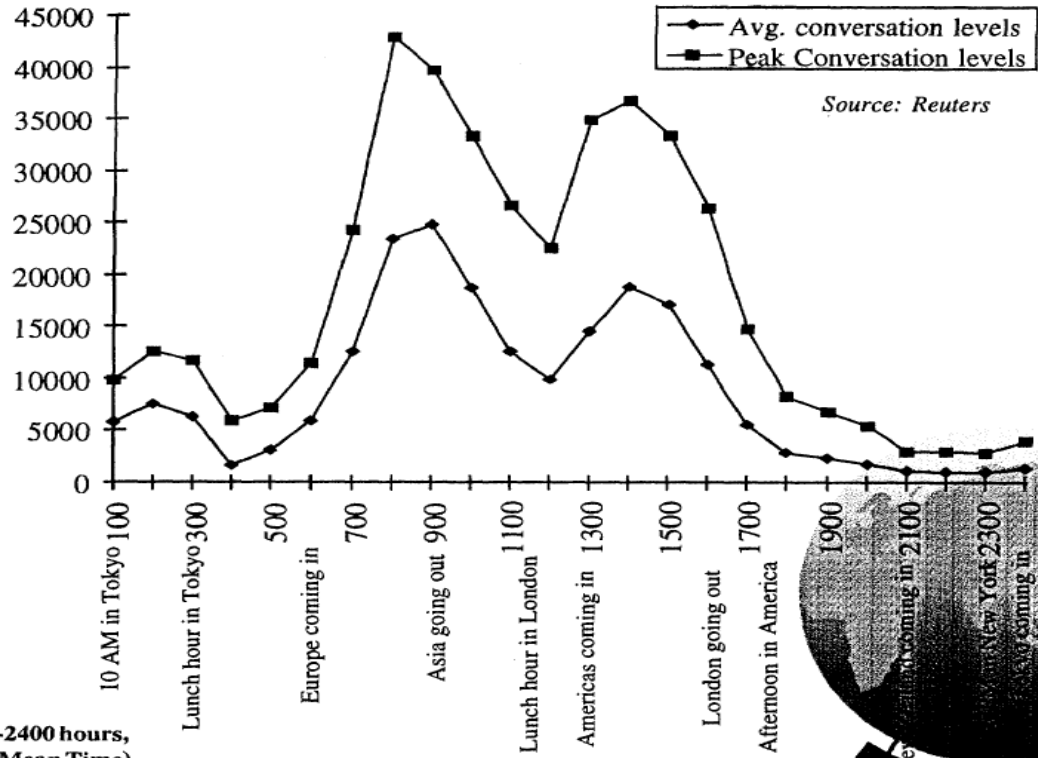
- Holding other factors constant
 - » Spreads fall when more large dealers are in the market
 - » Spreads rise when more small dealers are in the market

- The bid-ask spread tends to be **higher**
 - » At the start of a trading day (as traders get a “feel” for the market)
 - » At the end of the trading day (inventory adjustment to square book)
 - » Fridays at closing, Mondays on opening, last day of the month, holidays in relevant economies
 - All possibly related to fewer dealers in the market at these times

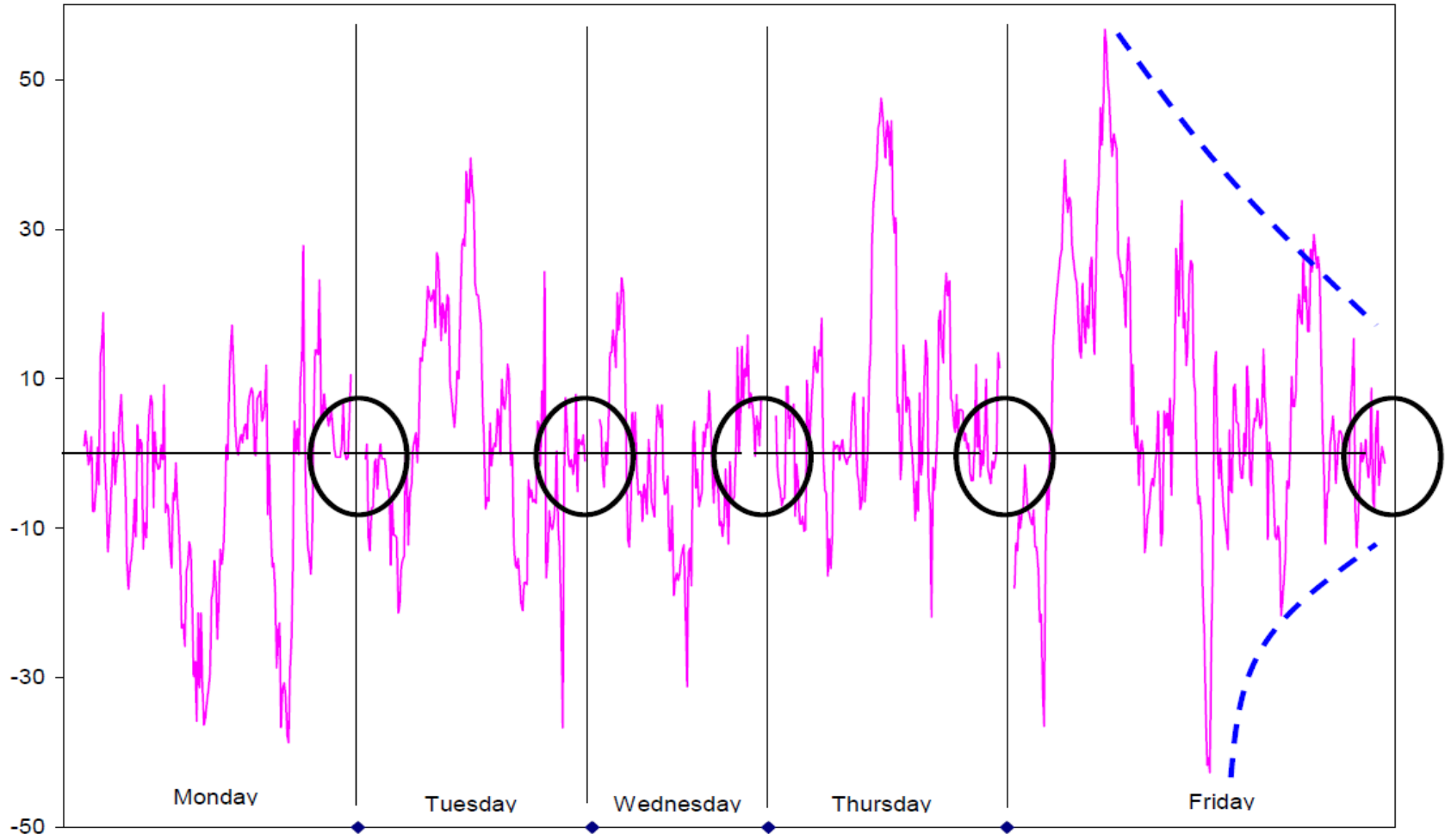
The Circadian Rhythms of the FX Market

Electronic conversations per hour (Mon-Fri, 1992-93)

Time (0100-2400 hours, Greenwich Mean Time)

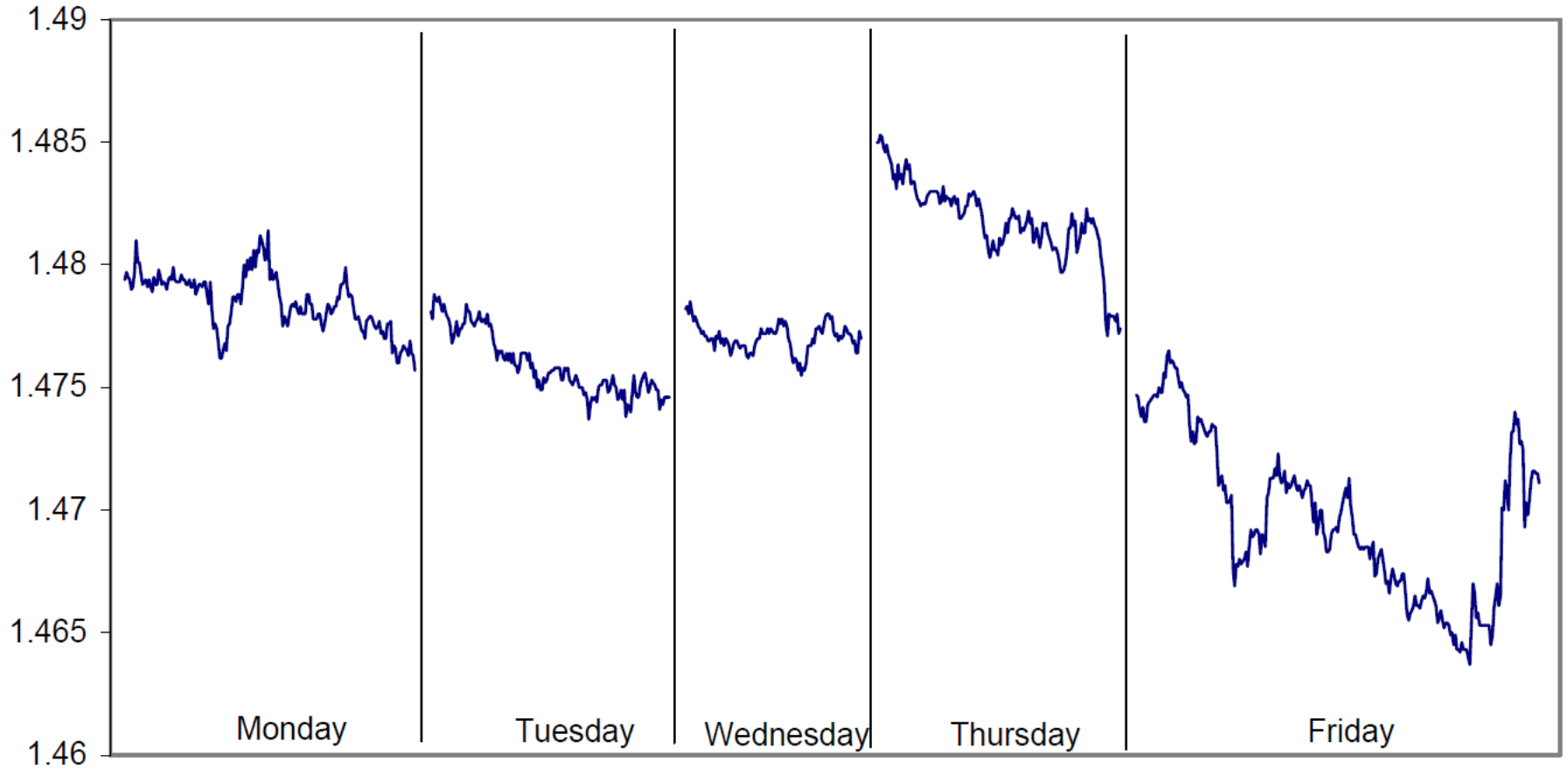


**Net Trading Positions, August 3 - August 7, 1992
for DM/US\$ Spot Trader (in US\$ Millions)**



Transactions in Chronological Order, by Day of the Week

Transaction Prices: DM/US\$ on August 3 - August 7, 1992



Transactions in Chronological Order, by Day of the Week

FX market makers behavior

- Quoting Behavior

- » Little evidence of "quote shading" as a tool for inventory control in interbank trades
- » *Quote shading*: Raising quotes when dealer is below the desired inventory level and lowering quotes when above the desired inventory level.
- » Dealer does not want to give away information about his position to other interbank dealers

- Inventory Controls

- » Dealer regains desired inventory level *quickly* (within 5-6 minutes) by actively initiating (outgoing) trades at other dealers quotes.
- » Interbank FX market lacks *transparency*
 - Other dealers in the interbank market are unaware of a dealer's (bilateral) customer trades, until after the dealer has rebalanced her inventory

More on FX market makers

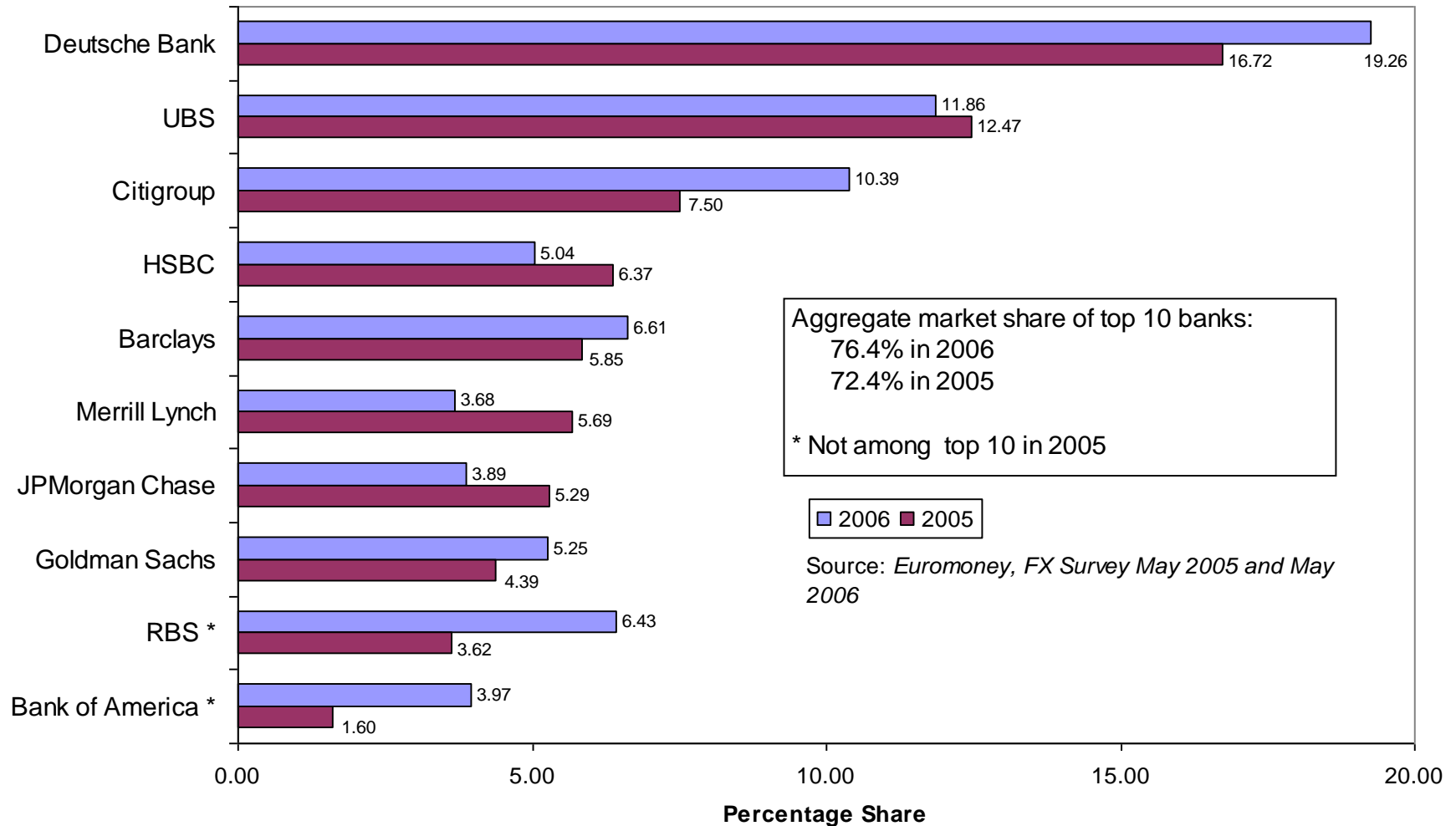
- Sources of FX Dealer Profits
 - » Conventional wisdom - Dealer's profits come from speculative positions
 - » Study findings
 - Most profits from customer trades.
 - Profits are positively and significantly related to (daily) fx volatility.

- Classification of Dealers Trades
 - » Conventional Wisdom - Dealer's engage in speculation
 - » Study findings
 - Only a small percentage of dealer trades are speculative in nature
 - The large volume of interbank transactions is related to rebalancing of dealer positions to obtain desired inventory levels (Hot-Potato Trading)

Concentration in the FX Market

Market Share of Top 10 Dealers, 2005 & 2006

Concentration in the Foreign Exchange Market
Market Share of Top 10 Dealers, 2006 and 2005



FX Trading Risk and Control Measures

| Type of Risk | Caused by | Controlled by |
|-------------------------------------|---|--|
| 1. Exchange Rate Risk | Unexpected spot rate changes | Limiting open currency positions Trader limits Daytime limits Overnight limits Overall currency limits |
| 2. Interest Rate Risk | Unexpected forward rate changes | Limiting open forward positions Forward maturity limits Maturity limits Gap limits |
| 3. Credit Risks a. Rate Risk | Default on foreign exchange contract (e.g. because of bankruptcy) | Customer trading limits Customer maturity limits Portfolio diversification |
| 3. Credit Risks b. Delivery Risk | Default on foreign exchange contract affect our bank has effected delivery of funds (e.g. because of time zone differences) | Matching delivery time zones Spreading delivery time dates Pre-payment Keep central banks open longer Establish new <i>pmt v. pmt</i> banks (Continuous Linked Settlement Bank) |
| 4. Country Risk | Unexpected exchange controls or taxes | Country limits Portfolio diversification |

To summarize...

- The global volume of FX trading is huge
 - » London is the largest center.
 - » The US\$ plays a part in more transactions than any other currency
 - » FX swap is the most popular contract

- In the traditional / classic FX market
 - » Interbank trades rely on direct dealing/ brokers to link dispersed dealers
 - » Dealing, or market making, is fast paced, but dealers control their inventory positions carefully over the day
 - » Dealing spreads (bid, ask) vary through the day

- Innovations in the FX market
 - » Infrastructure to reduce delivery risks in interbank trading
 - » Web-based systems promote transparency and competition