Foundations of the Financial System

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Questions to begin with

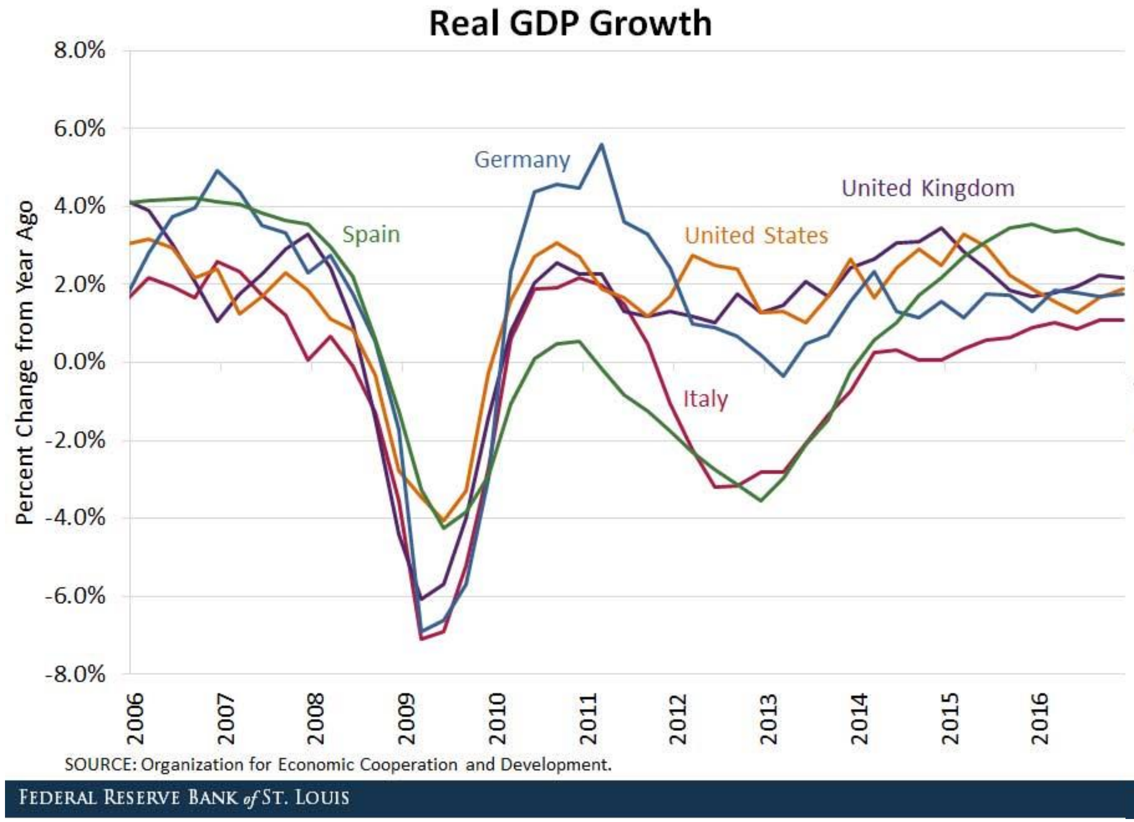
- When were you born?
- What's the most impressive economic event in your mind?
- Why do you take this course?

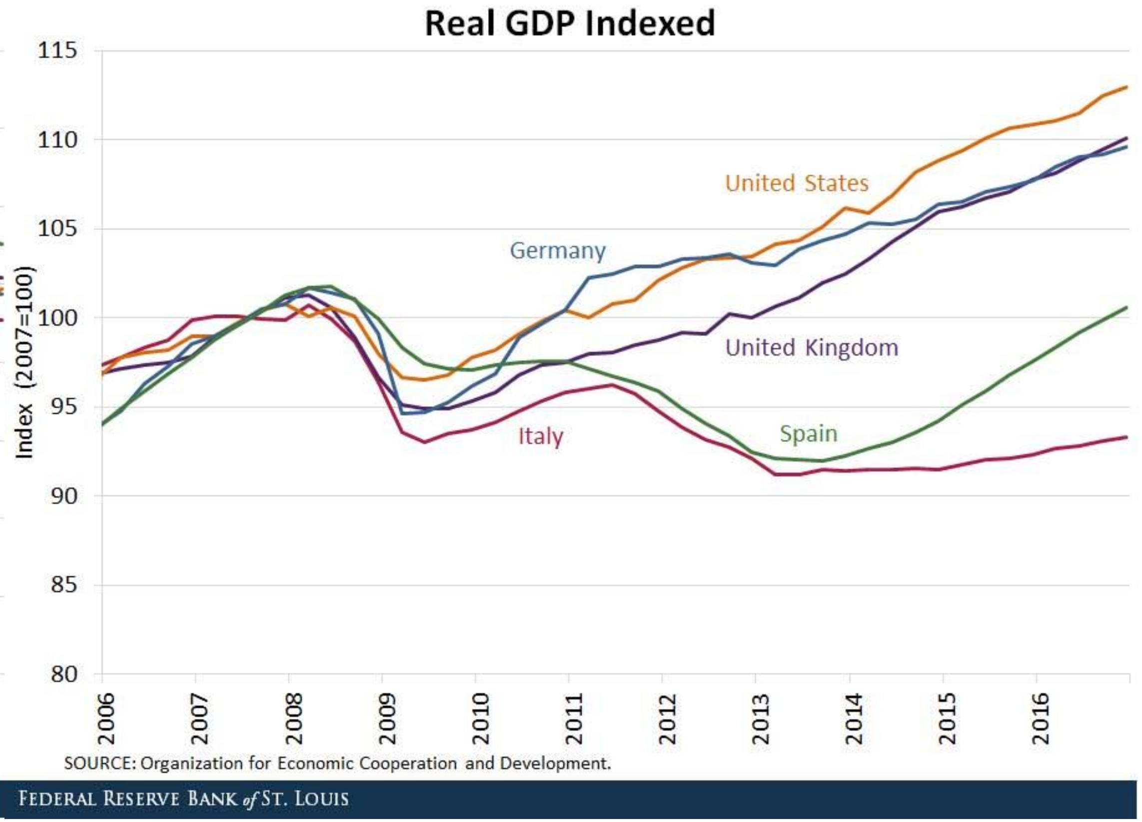
Welcome to the exciting and daunting world of finance,
and the financial system

Going back to 2008, The Global Financial Crisis …

Source: *Inside Job,* 2011 Oscar Best Documentary

… and The Great Recession

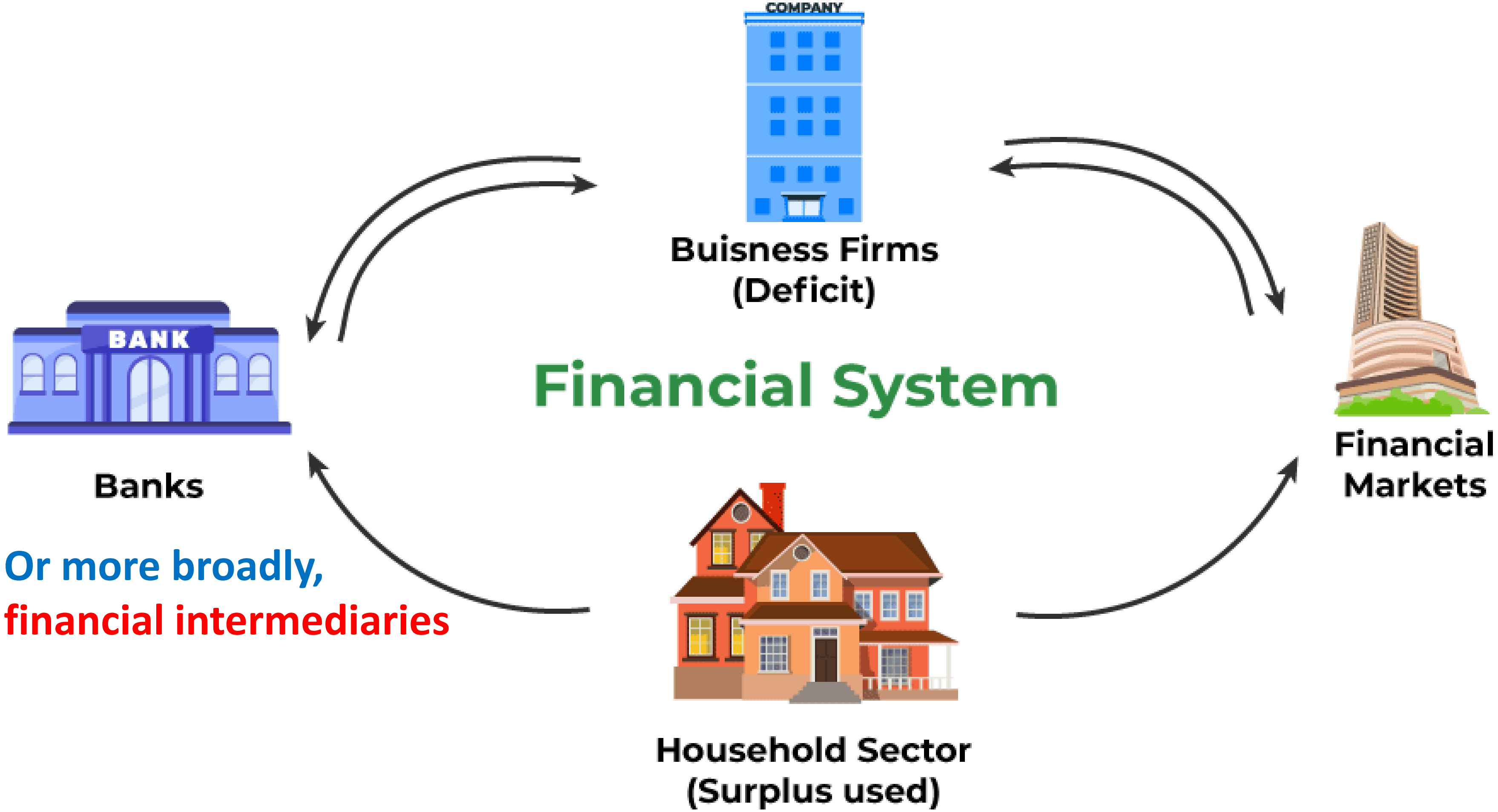




- Finance is the key to understand the world

What is *Finance*? Some related concepts

What is *Financial System*? An overview



Or more broadly,
financial intermediaries

Part I: Nature of Finance

Down to the earth: fundamentals of economics

"Economics is the science which studies human behavior as a relationship between ends and scarce means which have alternative uses."

Lionel Robbins

An Essay on the Nature and Significance of Economic Science

1935, p. 15

Economics is about economic agents and transactions

- Economic agents: households, firms, governments
- Economic transactions: allocating scarce resources for agents

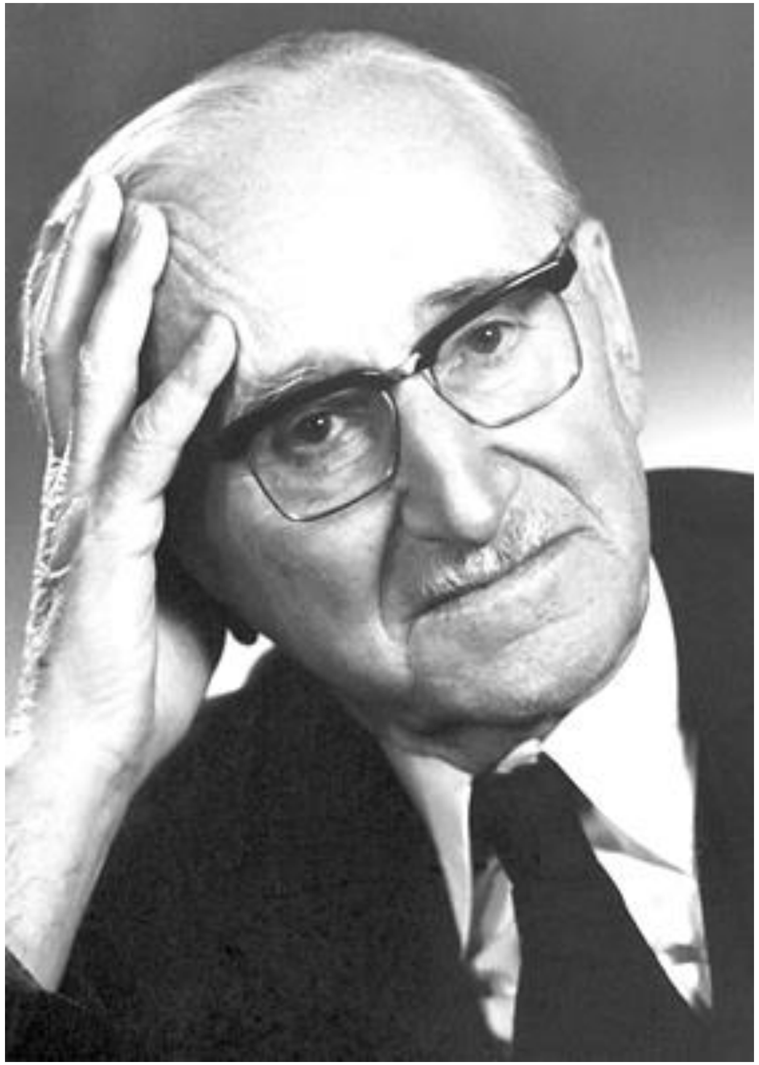
⇒ Market transactions and price systems predominate

  - Adam Smith: invisible hands (markets) lead to efficient results
    - ✓ Also called the *Fundamental Theorems of Welfare Economics*
  - Friedrich von Hayek: efficient use of information in markets
  - "The most significant fact about this [price] system is the economy of knowledge with which it operates, or how little the individual participants need to know in order to be able to take the right action … by a kind of symbol, only the most essential information is passed on, and passed on only to those concerned."
    - ✓ "The Use of Knowledge in Society," 1945, *A.E.R.*

Market transactions are costly

- Ronald Coase: "The Problem of Social Cost," 1960, *J. Law E.*
  - "In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on."
  - Refined by Dahlman: "search and information costs, bargaining and decision costs, policing and enforcement costs"
- All in once: matching, contracting, implementation

Nobel Prize: Hayek 1974 and Coase 1991



The nature of Finance

- Finance is about resource allocations over time and risks
- As a kind of economic activities
  - Saving and investment
    - ✓ Save resources for future use by investing in securities
  - Hedging and insurance
    - ✓ Hedge risks for future uncertainty by insuring with securities
- As a sector of the service industry
  - Financial service industry: serve the financial needs of clients
    - ✓ Saving, investing, hedging, pricing, etc.
    - ✓ Pricing for the future and risks: *the* basis of proper evaluations

Three canonical scenarios of finance: households

- A married couple working for 5 years
  - How much to save and in what form?
    - ✓ Bank deposits (daily liquidity) + money market funds/certificate deposits (short-term liquidity & safe returns) + wealth management products (medium/long-term saving & higher returns)
  - How much insurance to purchase?
    - ✓ Life insurance (long-term health risks) + life annuity (retirement saving & fixed returns)
  - How much mortgage to incur once buying an apartment?
    - ✓ Commercial mortgage (amount/maturity) + government sponsored mortgage (extra restrictions)

Three canonical scenarios of finance: firms

- A start-up firm
  - Self-accumulation of net-worth + bank financing (inclusive finance) + venture capital/private equity financing
- A mature firm
  - Bank financing (credit lines & bank loans, trade credits) + corporate bond financing
  - Equity financing (initial public offering (IPO) of selling stocks & seasoned offering (SEO) of selling additional stocks)
- Merge & Acquisition (MA) financing: raise funds to buy firms

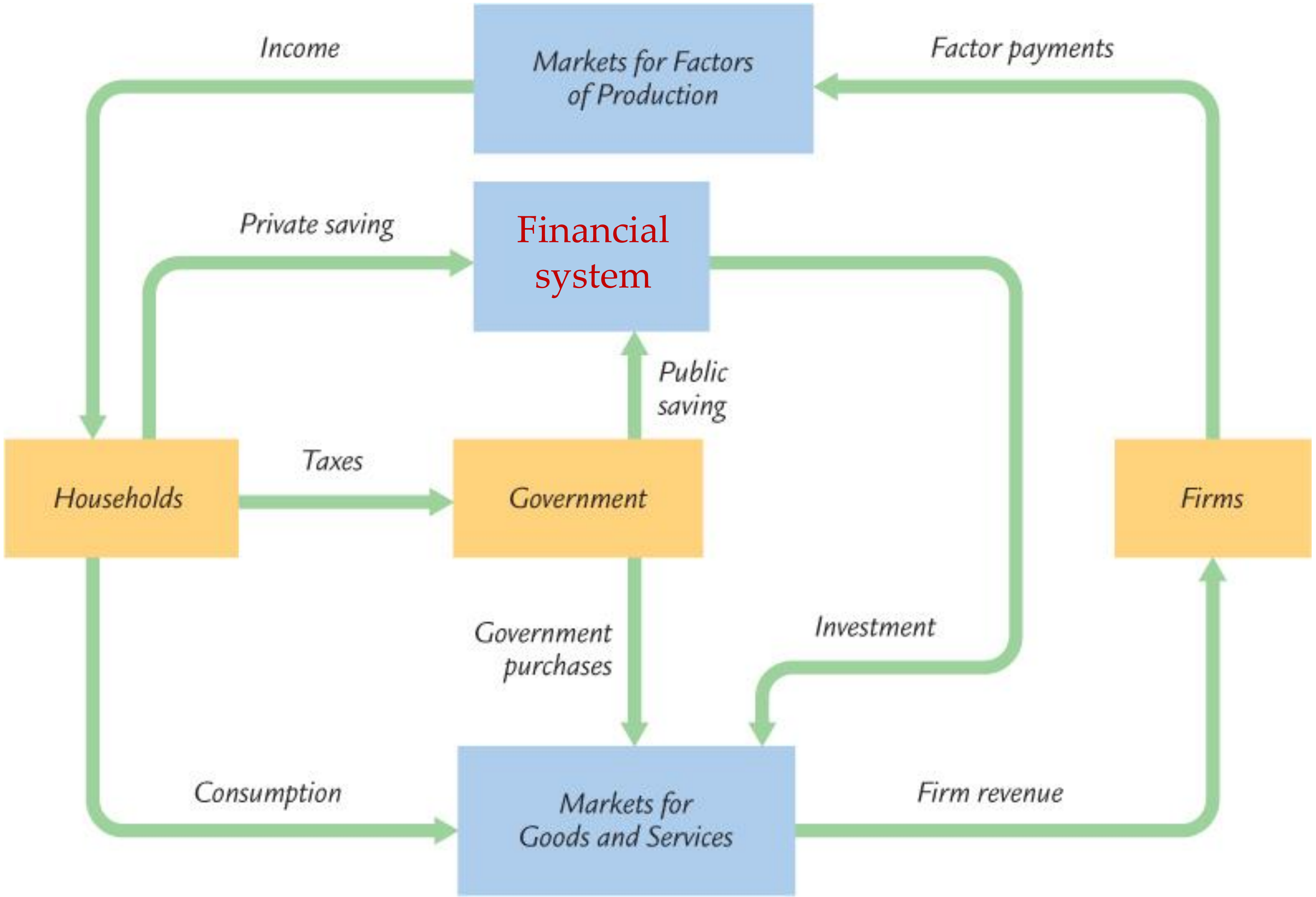
Three canonical scenarios of finance: governments

- Deficit financing: government revenues being short of expenditures
  - Issuing debt securities: bonds (long-term), notes (short-term)
  - Bank financing: loans
- Central versus local governments
  - Central government debt: treasury bonds etc.
  - Local government debt: municipal bonds etc.
- Domestic versus foreign currency
  - Sovereign debt: central government borrowing from foreign creditors

Financial system: demand and supply

- Demand of finance
  - Agents: households, non-financial firms, governments
  - Finance service: saving, hedging, pricing, information
- Supply of finance
  - 2 forms of financial service as economic organizations: intermediation and markets
    - ✓ Financial intermediaries: firms specialized in financial service
    - ✓ Financial markets: platforms for financial transactions
- Financial system: a system of institutions and markets where demand for and supply of financial service meet each other

Financial system in the whole economy



Products of finance: financial contracts, or securities

- Financial system provides financial service via *engineering* financial contracts, or equivalently securities
- A financial contract specifies: (i) two parties involved in the financial transaction; (ii) *promised* terms of the transaction, i.e., resources being exchanged; and (iii) implementations of the transaction, particularly the procedure to be followed if the promises are missed, e.g., default by one party
  - Financial transaction is always *intertemporal*, therefore it must be a **promise** in nature

Typical structure of financial contracts

- Resources in a financial transaction: cash flows
  - Current versus future, denominated in monetary unit
- Contracting parties and cash flows
  - At least two, debtor and creditor
    - ✓ Debtor is financing now, and will pay off in the future
    - ✓ Creditor is investing now, and will be paid off in the future
  - Cash flows: from creditor to debtor now, and reverse in the future
- Contracting rights
  - Debtor has the rights of receiving cash flows now, and creditor has the rights of receiving cash flows in the future
  - Rights and obligations are protected by the legal institutions

Types of financial contracts

- Equity, or stock (more often)
  - Shareholders of a firm purchase a equity claim in exchange for future dividend payments, voting rights, etc.
  - Two types of equity claims: common stock, preferred stock
    - ✓ The former has voting rights, the latter does not
- Debt: loans, deposits, bonds, etc.
  - Lenders hold a debt claim from a borrower in exchange for future payments of principal and interests
    - ✓ In contrast to equity, cash flows of debt are pre-determined
- Derivatives: options, futures, swaps, etc.
  - Cash flows depend on some base securities like stock, etc.

Financial system: a functional perspective by Robert Merton

1. A payments system for the exchange of goods and services
2. A mechanism for the pooling of funds to undertake large-scale indivisible enterprise; saving mobilization
3. A way to transfer economic resources through time and across geographic regions and industries; resource allocation
4. A way to manage uncertainty and control risk; hedging risk
5. Price information that helps coordinate decentralized decision-making in various sectors of the economy; pricing
6. A way to deal with the asymmetric-information and incentive problems when one party to a financial transaction has information that the other party does not; governance

A modern classic: Merton (1995) *Financial Management*

A Functional Perspective of Financial Intermediation

Robert C. Merton

Robert C. Merton is George F. Baker Professor of Business Administration at the Graduate School of Business, Harvard University, Boston, MA.

New financial product designs, improved computer and telecommunications technology, and advances in the theory of finance have led to dramatic and rapid changes in the structure of global financial markets and institutions. This paper offers a functional perspective as the conceptual framework for analyzing the dynamics of institutional changes in financial intermediation and uses a series of examples to illustrate the range of institutional change that is likely to occur. These examples are used to frame the managerial issues surrounding the production process for intermediaries and to discuss the regulatory process for those intermediaries.

All in one formula (the only one): the present value equation

- Finance is all about valuations over time (no time, no risk/uncertainty)
- In particular, evaluation, hence comparison, of cash flows across time periods, $\{CF_t : t = 0, \dots, T\}$
- Fundamental formula in finance: the **present value equation**

$$PV = CF_0 + \frac{CF_1}{1+r} + \frac{CF_2}{(1+r)^2} + \cdots + \frac{CF_T}{(1+r)^T}$$

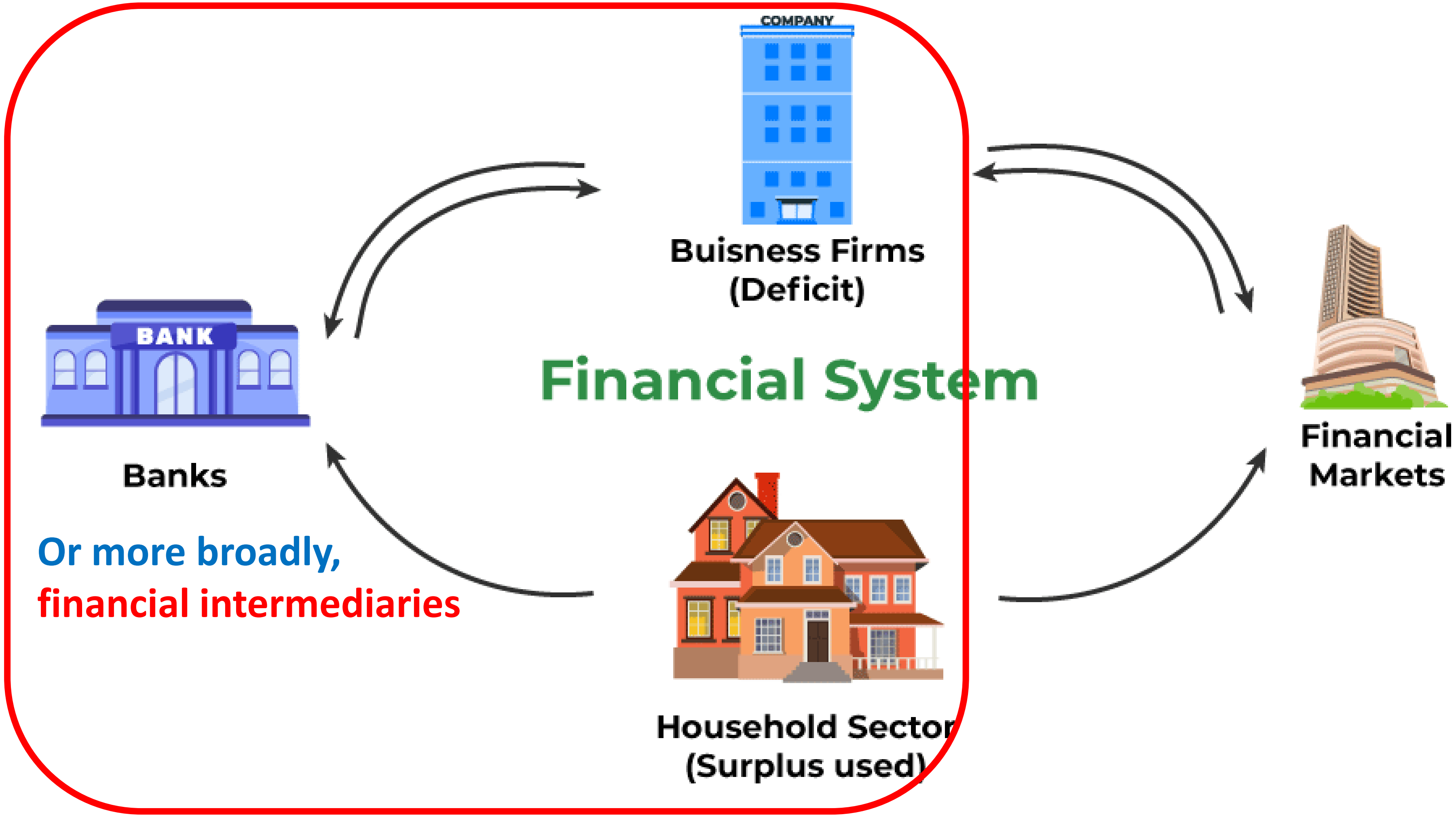
- PV is the present value of cash flows, r is the discount rate, or equivalently, market interest rate/return/yield

Some perspectives on finance and real economy

- Joseph A. Schumpeter: a positive influence of the development of a country' s financial sector on the level and the rate of growth of its per capita income
  - 1911, A Theory of Economic Development
- Joan Robinson: where enterprise leads, finance follows
  - 1952, The Rate of Interest and Other Essays
- Current consensus: finance as a lubricant, essential no doubt, but not a substitute for the machine
  - Rajan and Zingales (1998) "Financial Dependence and Growth," *A.E.R.*

Part II: Financial Intermediation

Financial intermediaries in the financial system



Or more broadly,
financial intermediaries

Types of financial intermediaries

1. Commercial banks, FinTech companies
2. Investment banks
3. Security firms, brokerage houses, trading firms
4. Trust companies
5. Insurance companies
6. Mutual funds and hedge funds
7. Venture capital firms and private equity firms
8. Credit rating agencies, accounting firms and law firms

Leading financial intermediaries in China

CICC 中金公司
中信证券 CITIC SECURITIES
中信建投证券 CHINA SECURITIES
华泰证券 HUATAI SECURITIES
国泰君安证券 GUOTAI JUNAN SECURITIES

citibank
Morgan Stanley
UBS
Capital One
STIFEL

SOCIETE GENERALE
中国银行 BANK OF CHINA
中国建设银行 China Construction Bank
ICBC 中国工商银行
中国证监会 CHINA SECURITIES REGULATORY COMMISSION

Tencent 腾讯
ByteDance
美团
網易 NETEASE
HUAWEI

广发证券 GF SECURITIES
E Fund
KPMG
pwc
EY Building a better working world

What's special about financial intermediaries?

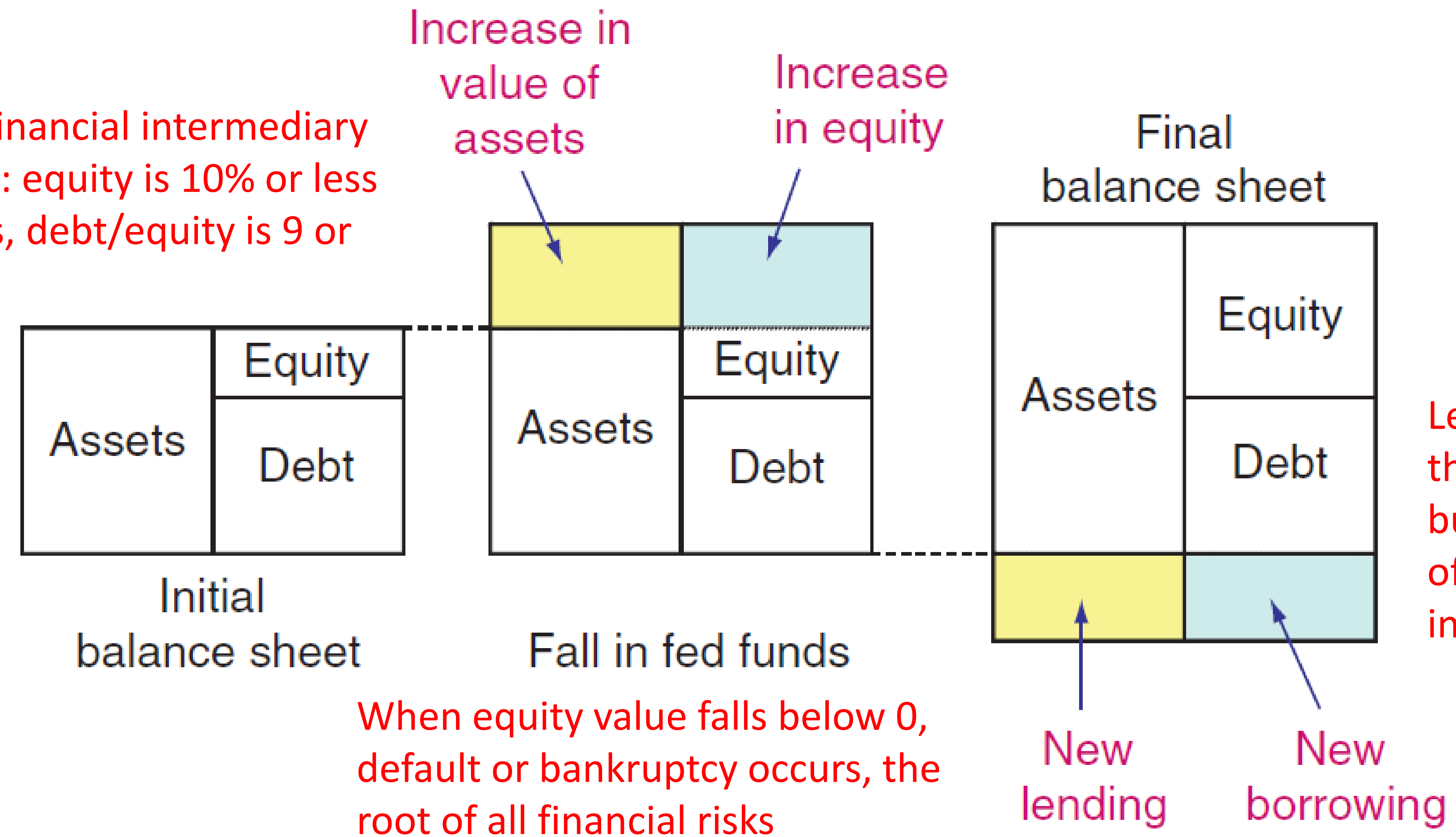
- Classic question following Coase: what's the nature of the firm as an economic organization?
  - First as a undergraduate thesis, later published in 1937, *Economica*
- Short answer: specific combinations of labor, capital, and organizational forms
  - Labor: professional skills, human capitals
  - Capital: financial infrastructure
  - Organizational forms: delegated investment with agnostic creditors, i.e., "other people's money"
    - ✓ Agency problems prevails: heads I (intermediary) win, and tails you (creditors) lose

Financial services provided by intermediaries

- Delegated monitors
  - Specialize in monitoring asset performance/investment, e.g., banks monitoring firm capital investment projects, mutual funds monitoring investment portfolios
- Information producers
  - Investment banks, credit rating agencies, accounting firms, etc.
- Consumption smoothers
  - Insurance companies, banks providing mortgages for home financing
- Liquidity providers
  - Bank credit lines and demand deposit, security firms providing market liquidity
- Commitment mechanisms
  - High leverage (debt/equity ratio) incentivize intermediaries to exert high efforts

Balance sheet and leverage of a financial intermediary

Typical financial intermediary leverage: equity is 10% or less of assets, debt/equity is 9 or higher

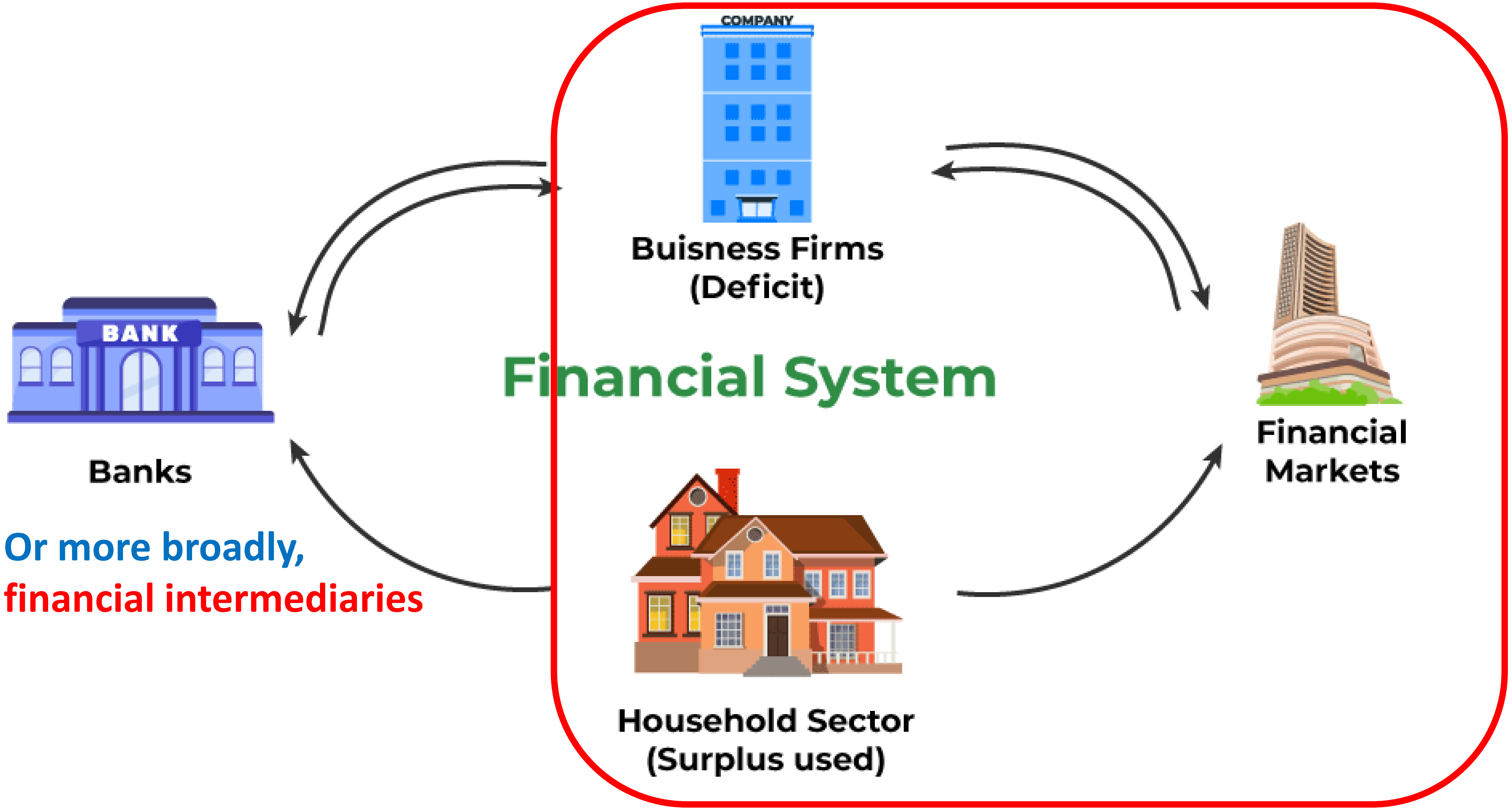


Leveraging up is the fundamental business mode of financial industry

When equity value falls below 0, default or bankruptcy occurs, the root of all financial risks

Part III: Financial Markets

Financial markets in the financial system



Or more broadly,
financial intermediaries

Types of financial markets

- Classification by securities
  - Stock markets
  - Bond markets
  - Derivative markets
- Classification by trading mechanisms
  - Security exchanges and centralized trading
    - ✓ Most stock markets are exchange markets
  - Over-the-counter (OTC) markets and decentralized trading
    - ✓ Most bond and derivative markets are OTC markets
    - ✓ Market makers: typically big intermediaries ready to absorb or supply market liquidity, i.e., buying or selling securities

Primary markets and secondary markets

- Primary markets
  - Where a firm or a government unit issues securities to finance an amount of funds
    - ✓ For a stock IPO (initial public offering), a firm chooses an investment bank, or a group of investment banks, so called *underwriters*, to pitch its stocks across potential investors
    - ✓ For a bond IPO, almost the same
- Secondary markets
  - Once the securities are issued, they are traded in a second market
    - ✓ Typical security markets, Shanghai Stock Exchange, New York Stock Exchange, etc.

Stock Exchanges: New York, Amsterdam, Shanghai

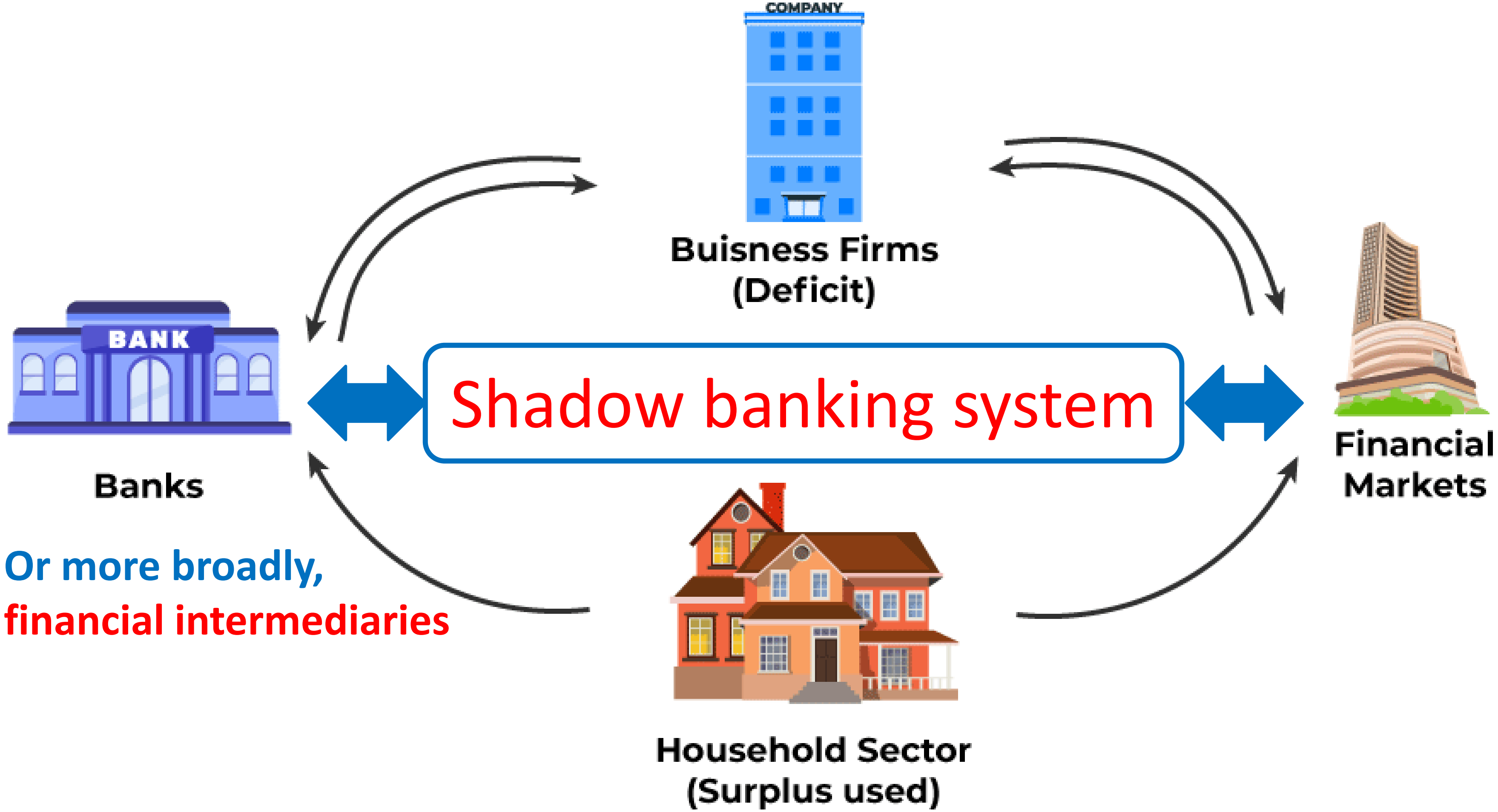
Price discovery and informational efficiency

- Market participants
  - Exchange markets: both individual and institutional investors
    - ✓ Small vs. big, agnostic vs. specialized, etc.
  - OTC markets: mainly institutional investors
- Asset pricing
  - Investors form expectations about future cash flows of a security, and make an evaluation; once the lowest buying valuation falls below the highest selling valuation, trades happen, and prices determined
- Efficient market hypothesis: prices contain information
  - Weak (past prices), semi-strong (public info.), strong (private info.)

Securitization

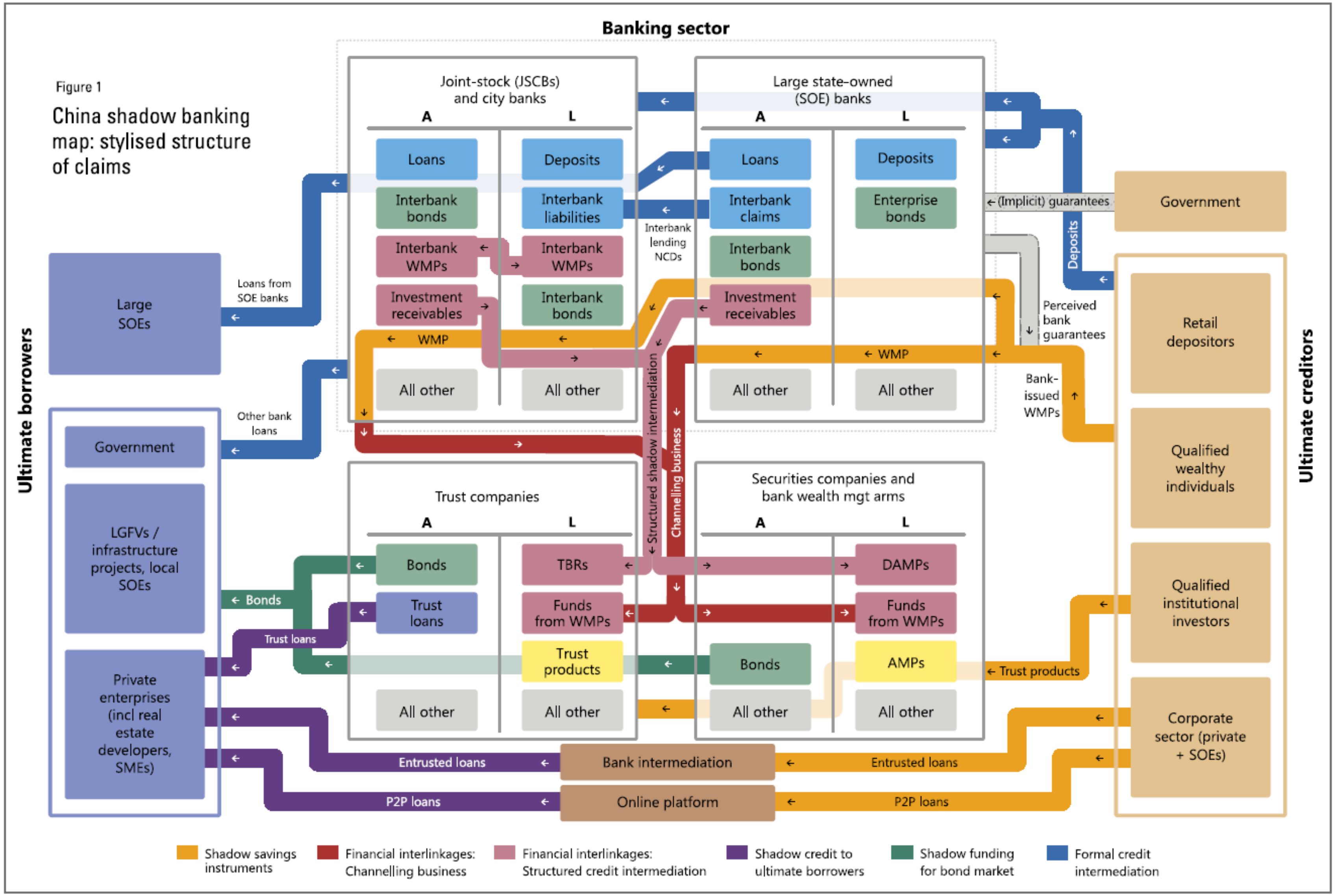
- One significant trend of financial development in the past 3 decades
  - Induced by technological progress in information processing
- Essence: pooling large number of securities together, collect their cash flows, and divide the total cash flows to create new securities (called “trenching”) to satisfy different demands by different investors
- Non-tradable assets (e.g., bank loans, mortgages) can be securitized and transformed into tradable assets
- Securitization bridges intermediaries and markets, and is the main business mode of shadow banking

Shadow banking: unregulated financial intermediary + markets

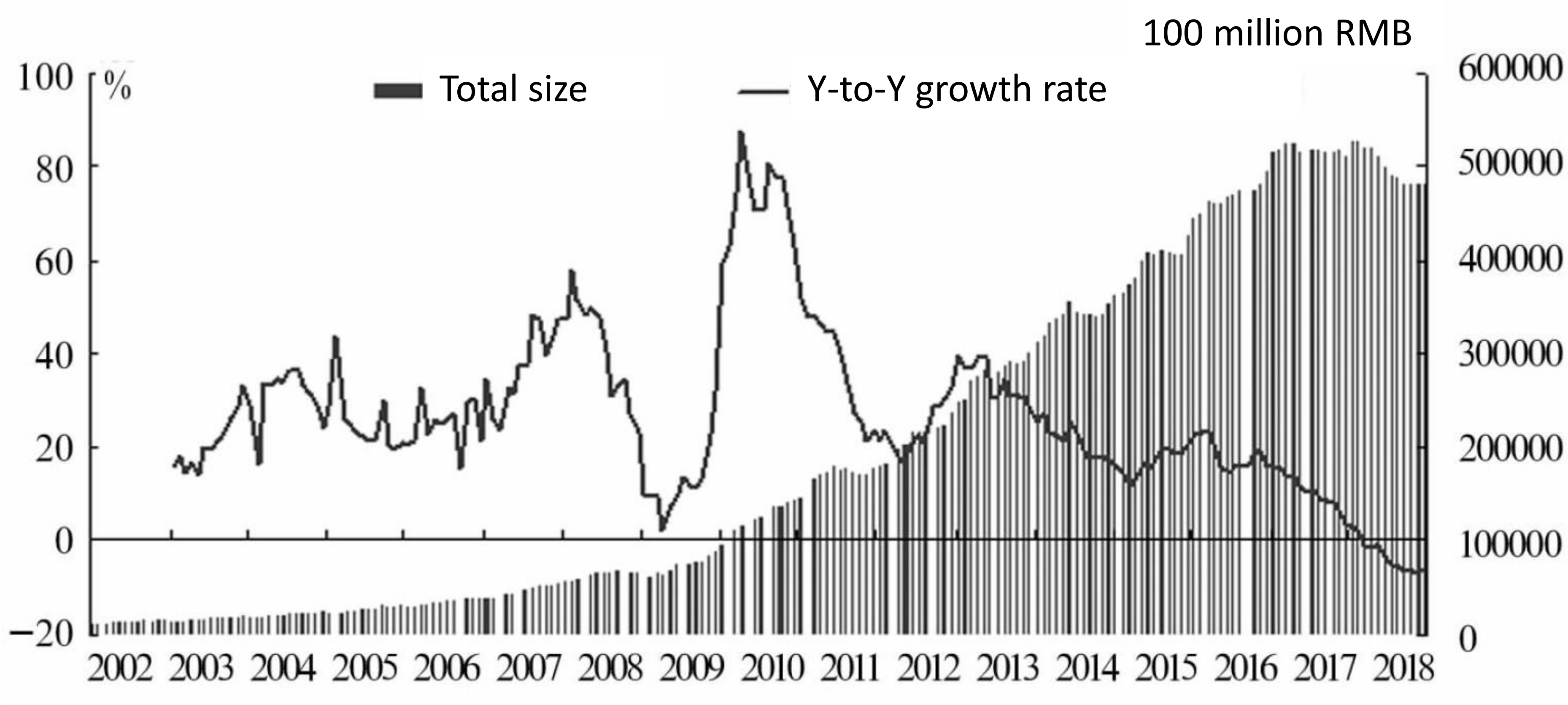


- The wild growth of shadow banking prior to 2007 is the root of the 2008 Global Financial Crisis

Shadow banking in China: BIS report 2018



Shadow banking in China: size and evolution

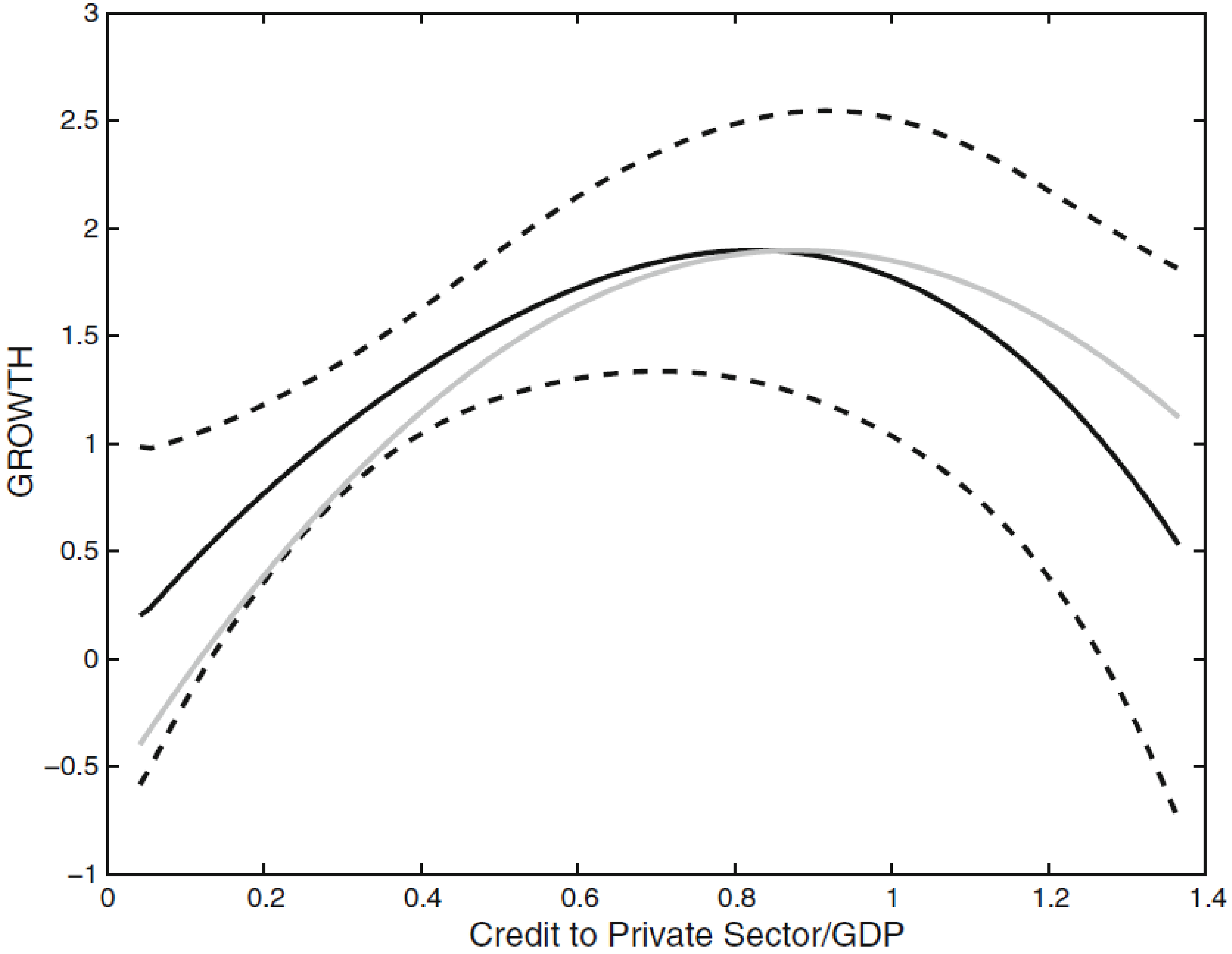


Part IV: Finance and the Good Society

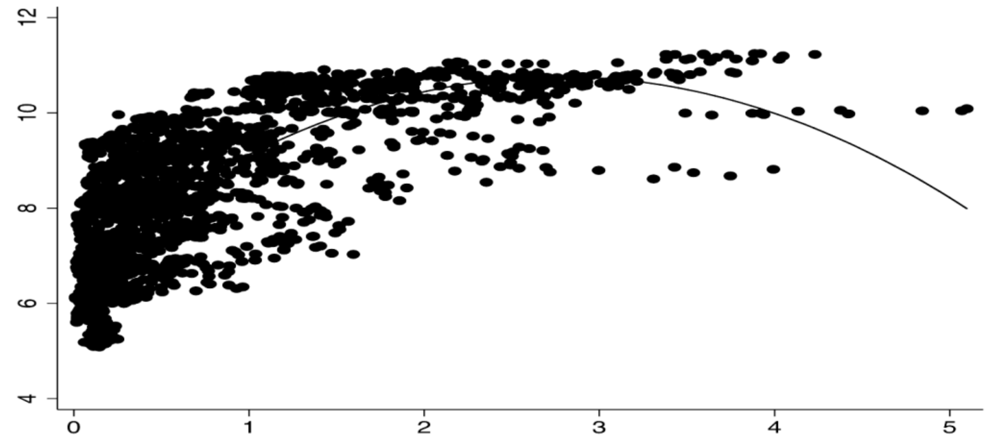
Inclusive finance: financial service for disadvantaged people

- Accessibility
  - Bank branching coverage
  - Micro finance: informal finance based on social network
  - Green finance: financial support to green investment
  - Digital finance, i.e., internet finance
    - ✓ E.g., Ant Group, a subsidiary of Alibaba Group
    - ✓ Webank, a subsidiary of Tencent Group
- Big data & FinTech
  - Better information: detailed information on investment projects, individuals, etc.
  - Better technology: big data analytic, machine learning based AI

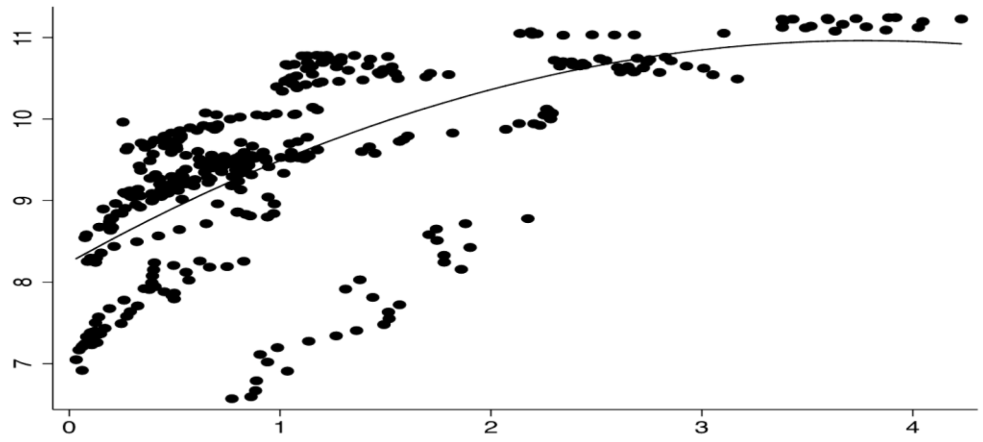
Too much finance: Arcand et al. (2015, *J.E.G.*)



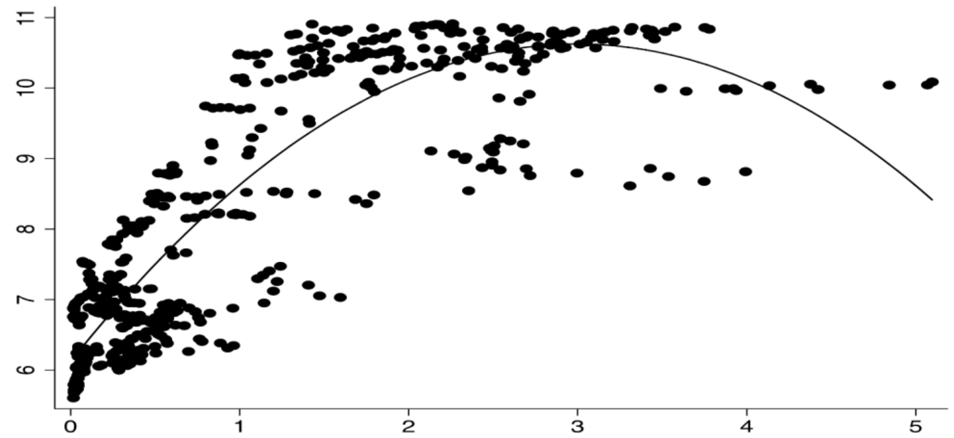
Inverted U shapes between finance and growth by legal origins



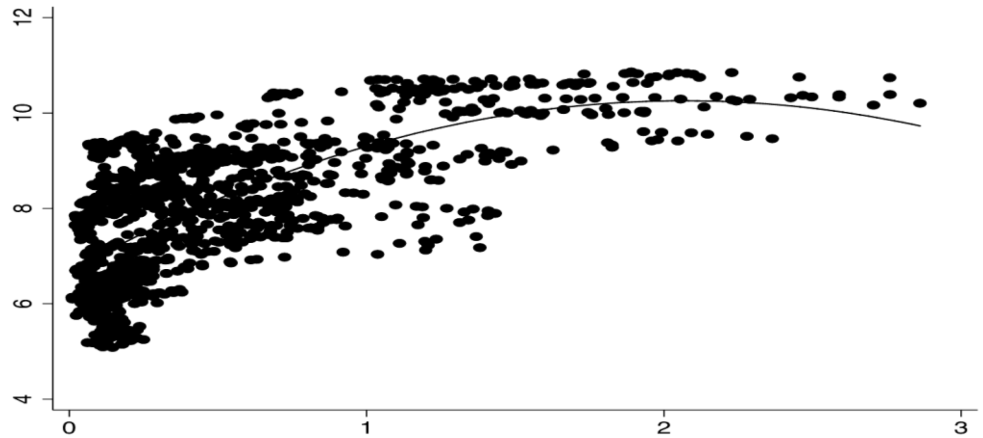
Full sample



German legal origin



British American legal original



French legal origin

Financial development: long-term view

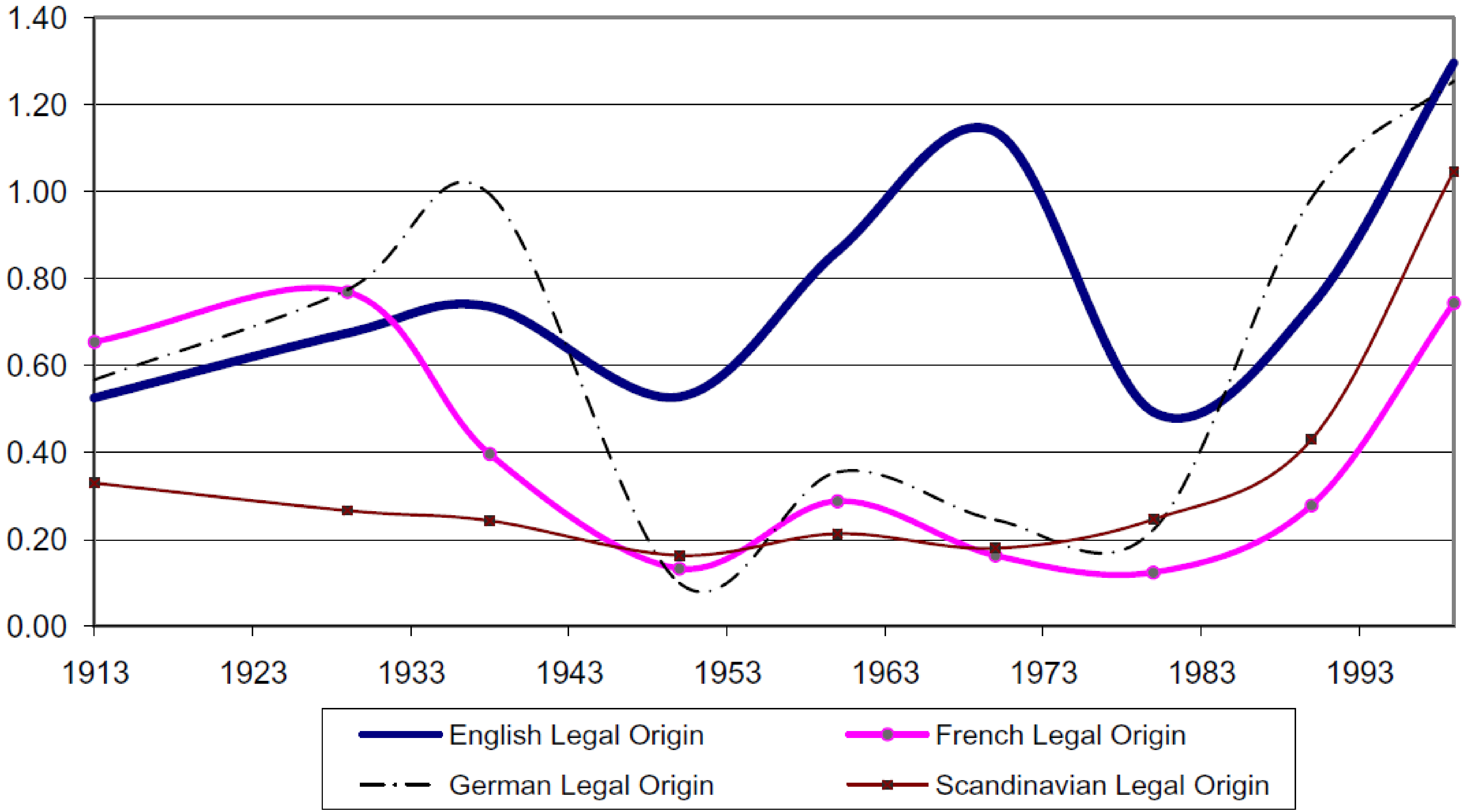
Year	Deposits to GDP			Stock market cap to GDP			No. of companies to population			Equity issues to GFCF		
	Whole	N	Constant sample ($N=20$)	Whole	N	Constant sample	Whole	N	Constant sample	Whole	N	Constant sample ($N=7$)
1913	0.38	22	0.40	0.57	22	0.40	28.68	22	24.00	0.12	12	0.13
1929	0.49	21	0.51	0.60	11	0.53	33.80	14	27.75	0.35	15	0.34
1938	0.45	21	0.46	0.58	13	0.57	30.12	13	27.69	0.13	12	0.10
1950	0.33	22	0.34	0.30	14	0.27	38.63	16	23.80	0.06	11	0.03
1960	0.31	22	0.33	0.47	18	0.44	31.85	19	22.38	0.07	16	0.05
1970	0.31	22	0.33	0.49	19	0.42	23.66	19	21.22	0.06	16	0.02
1980	0.34	22	0.35	0.26	22	0.25	26.70	21	23.71	0.03	18	0.03
1990	0.41	21	0.40	0.57	21	0.51	22.18	22	23.21	0.05	20	0.05
1999	0.46	21	0.45	1.02	23	1.08	26.30	22	24.46	0.13	20	0.18

The great reversals: the politics of financial development in the twentieth century ☆

Raghuram G. Rajan*, Luigi Zingales

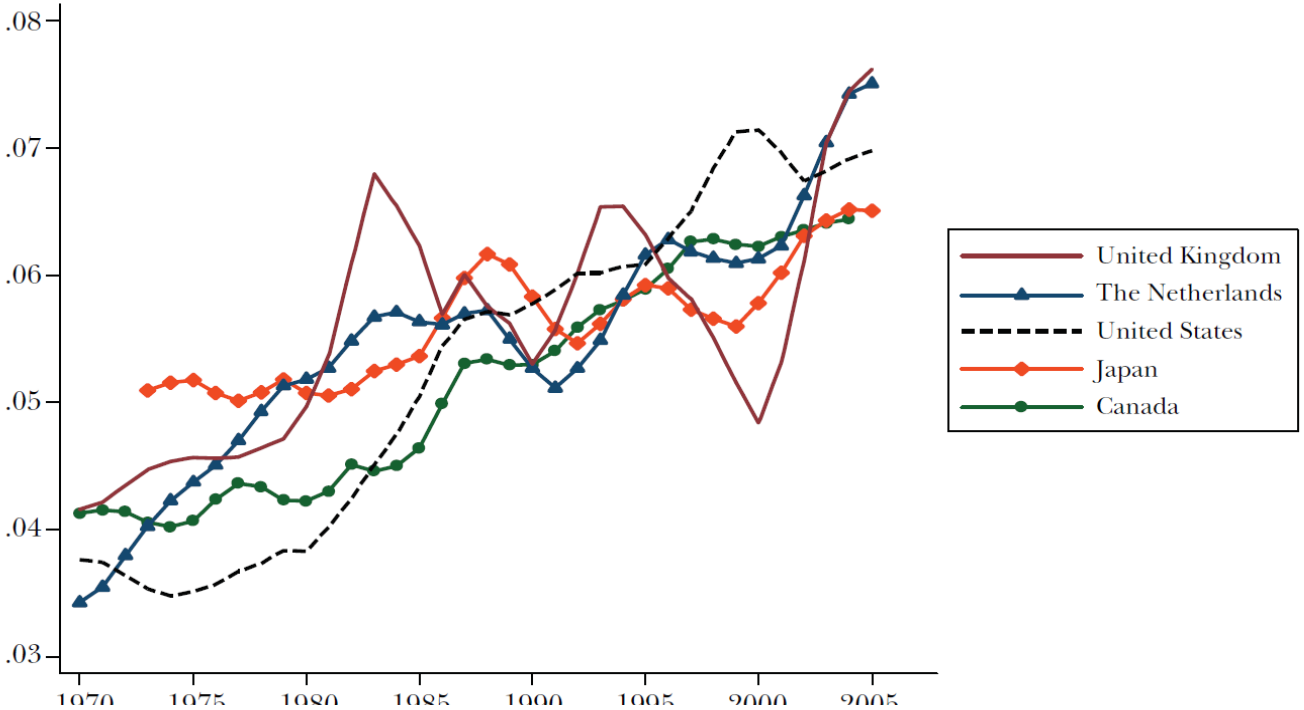
Journal of Financial Economics 69 (2003) 5–50

Long-term view: Stock market capitalization over GDP

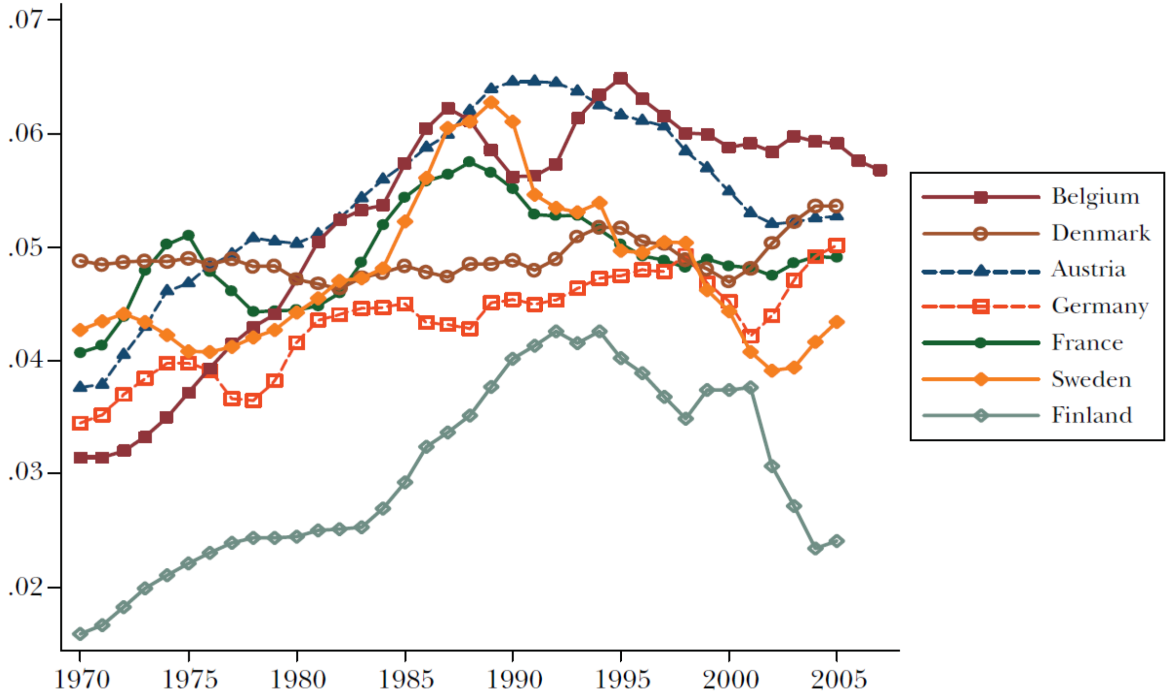


Financial development: total credit + stock market capitalization

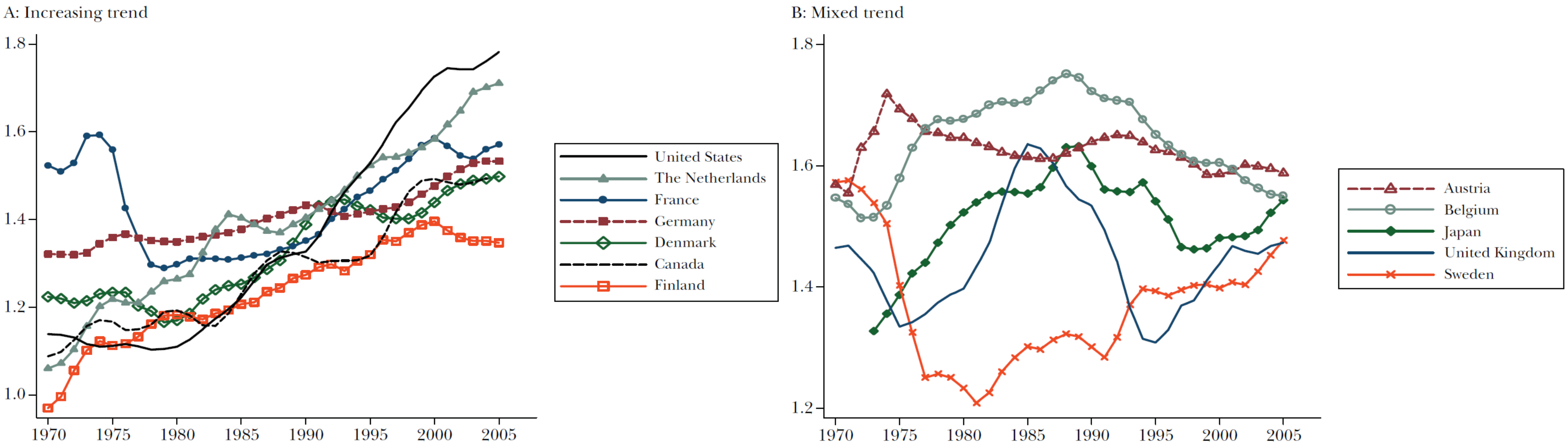
A: Increasing trend



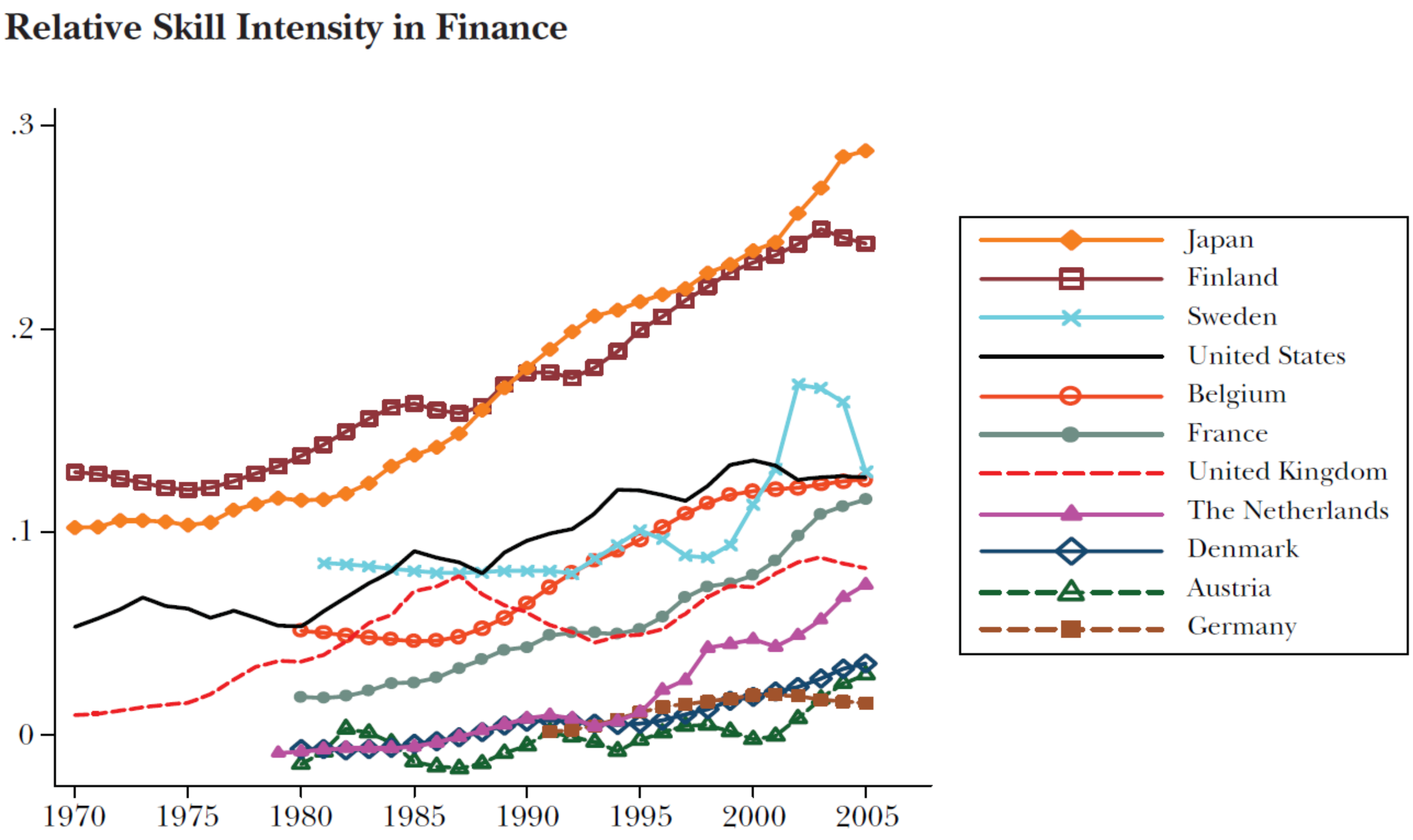
B: Weak increasing or mixed trend



Financial sector wage premium: too many talents in finance



More skills, better finance?



Happy Spring Festival and the Rabbit Year!