Chinese Financial Markets and Institutions

Ruichang LU (卢瑞昌)

Department of Finance
Guanghua School of Management
Peking University

About me

Ruichang LU (卢瑞昌)

- Assistant professor in Finance
- Ph.D. in Finance (National University of Singapore)

- Research: Financial Intermediary, Bank Loan Pricing, Corporate Finance

- Teaching:
  - Finance I, International Financial Regulation (PG)
  - Financial markets and institutions (UG)

General Information

- Office: Room 462, Guanghua School of Management Building No. 2
- Phone: 6275-6253
- Email: ruichanglu@gsm.pku.edu.cn
- Web: www.ruichanglu.com
- Office Hour: By appointment

- Teaching assistant: 黄鑫铭
- Email: Xmhuang@pku.edu.cn
- Phone: 15117967781
- Office hour: TBD

- Slides would be available online 1 day after the class (starting from week 3). For week 1 and 2, please use cfmfi2016@163.com, password: passion

Course Assessment

- Class Participation (e.g., raising questions, discussions) - 10%;
- Case study - 15% (Group work)

- Quiz - 25%, March 28 (in class, 1.5H, NO make-up quiz)
- Final Examination - 50%, May 9 (in class, 2H, NO make-up exam)

Course Schedule

- April 4, no class (Qingming Festival)
- May 2, no class (Labor Day)

Some rules for class

Some rules for class

- There will be one grade per group, no matter how the workload is distributed among the group members
- NO make-up exam.
- If you skip the quiz, the weight (25%) would be added to final exam (from 50% to 75%).

Teaching Philosophy

- Introductory with theoretical thinking: so that students can get a big picture of whole financial markets and institutions.
- Application Oriented: with a focus on practical applications of principals in Finance
- Interaction: active learning and deep thinking

Course Outline

Text Book: Saunders, Anthony and Marcia Millon Cornett (2008), “Financial Markets & Institutions” 4th edition, McGraw Hill, ISBN-13: 978-0077262372

Reference:曹凤岐，贾春新（2014）,金融市场与金融机构, 北京大学出版社

1. Introduction
2. Stock Market (Case 1)
3. Bond Market (Case 2)
4. Banks (Case 3)
5. Foreign Exchange Market (Case 4)
6. Derivatives Market (Optional)

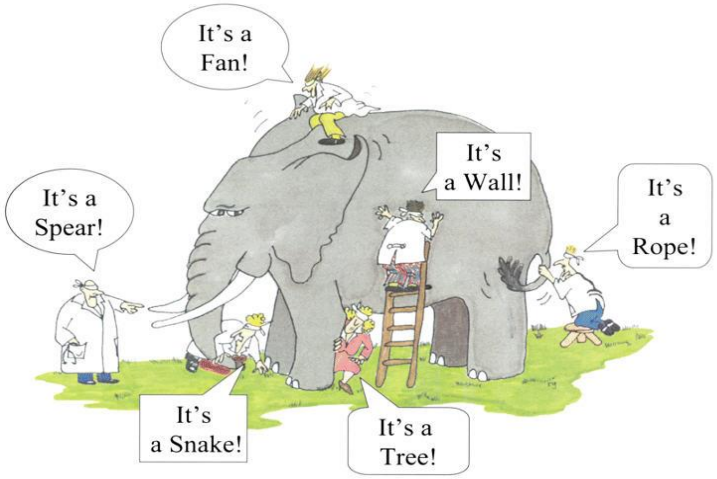
Is it relevant to us?

Stock market index

CNY/USD

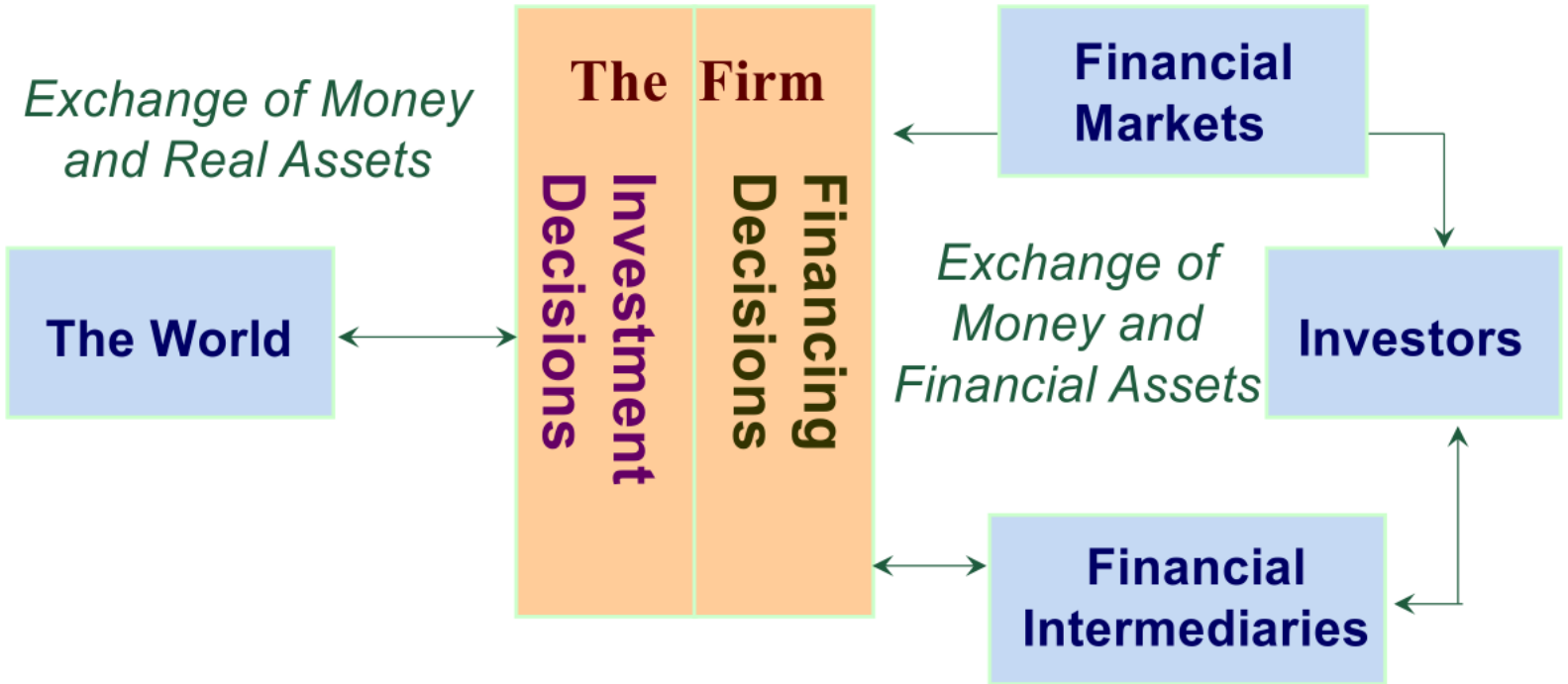

0:6.209 MA20:6.208 MA60:6.206 MA120:6.219
2015/06/09-2016/02/19(170日)
6.5956
6.5500
6.4800
6.4100
6.3400
6.2700
6.2000

What is Finance?

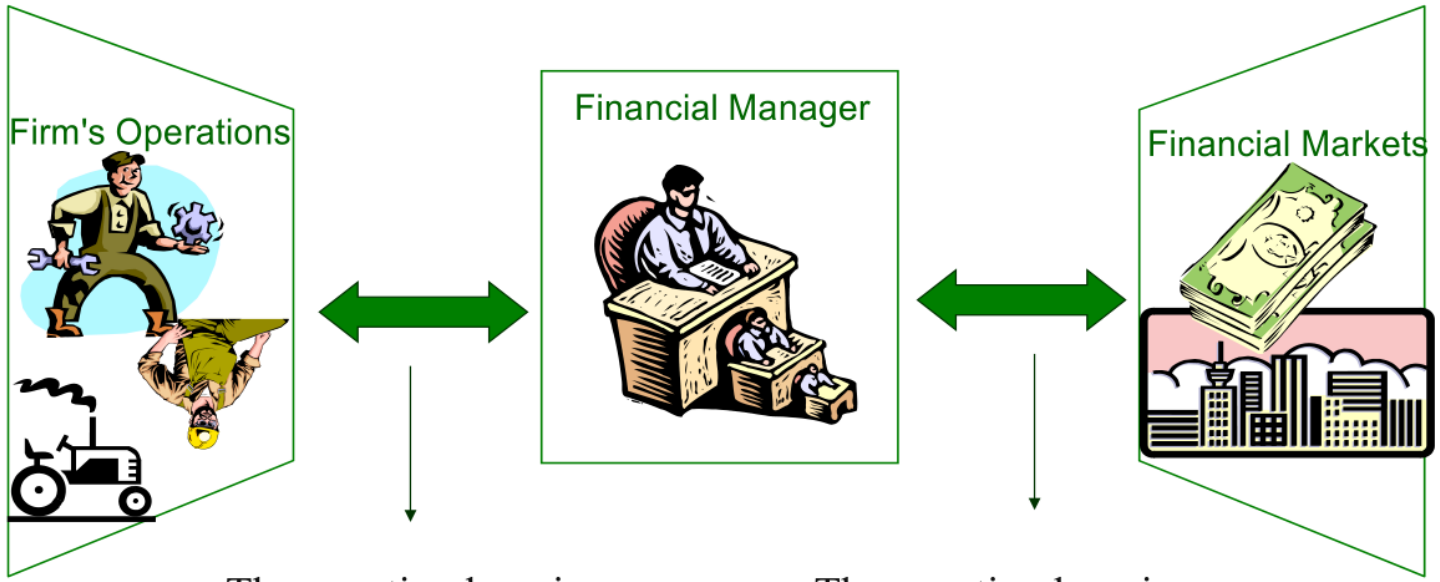


- What is Finance?
  - The Finance industry facilitates
    - "Borrowing" and "lending"
    - Financial risk hedging
    - Clearance and settlement
- Why is Finance needed?
- Is Finance an "unproductive" industry?
  - Manufacturing industry produces "real" goods
  - Finance industry does not produce anything
  - Is the finance industry simply an unproductive industry for gamblers?

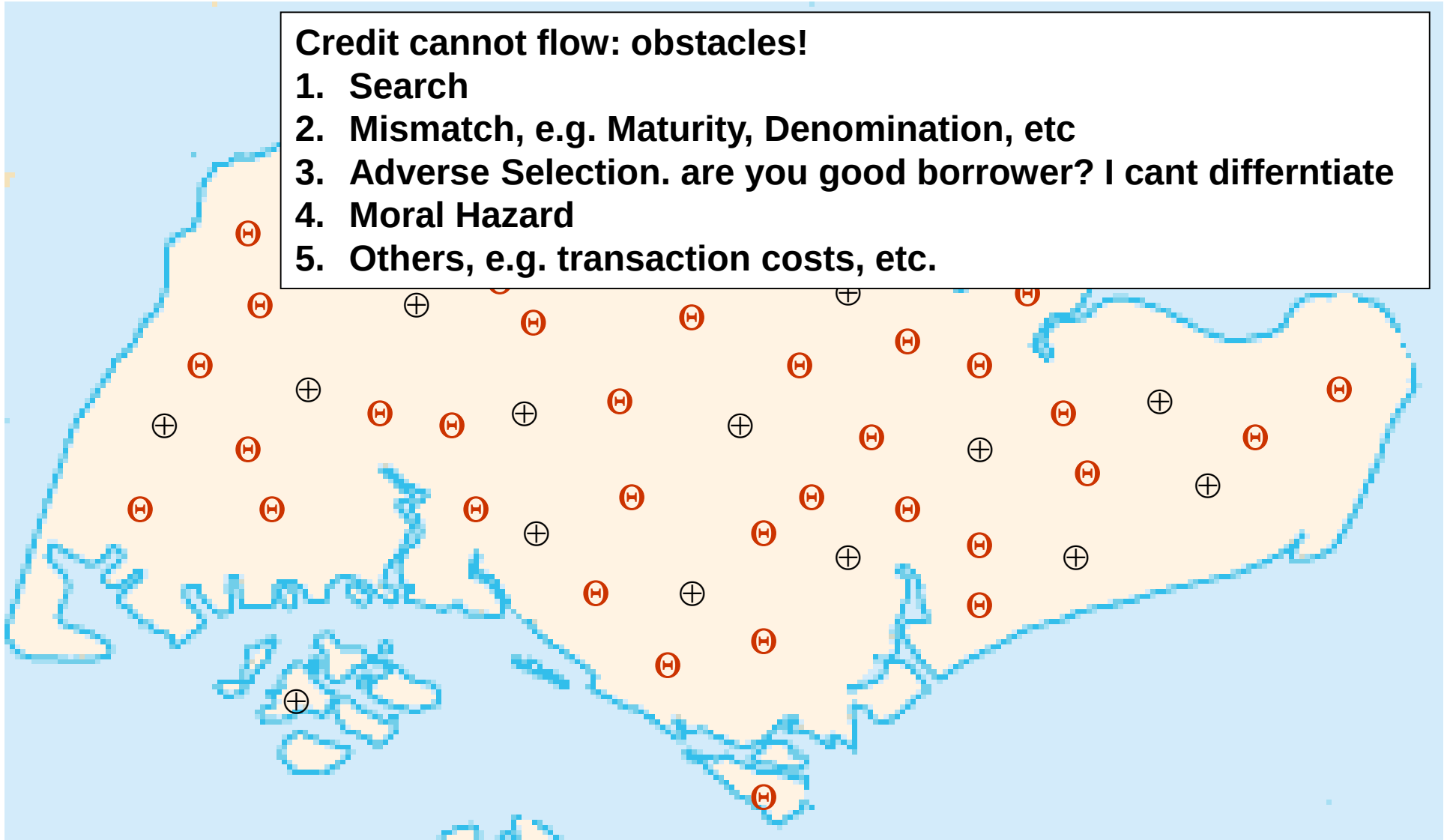
The Investment Vehicle Model



Investment Vehicle Model - The Flow of Cash in a Firm



What is a Financial System?



Obstacles to Credit Flow

1.Search

- **Place, time, certainty, effort**

2.Adverse Selection

- **Ex-ante in nature**
- **Type: good/bad borrower?**

3.Moral Hazard

- **Ex-post in nature**
- **Action: would not put in effort and make profit?**

4. Mismatch

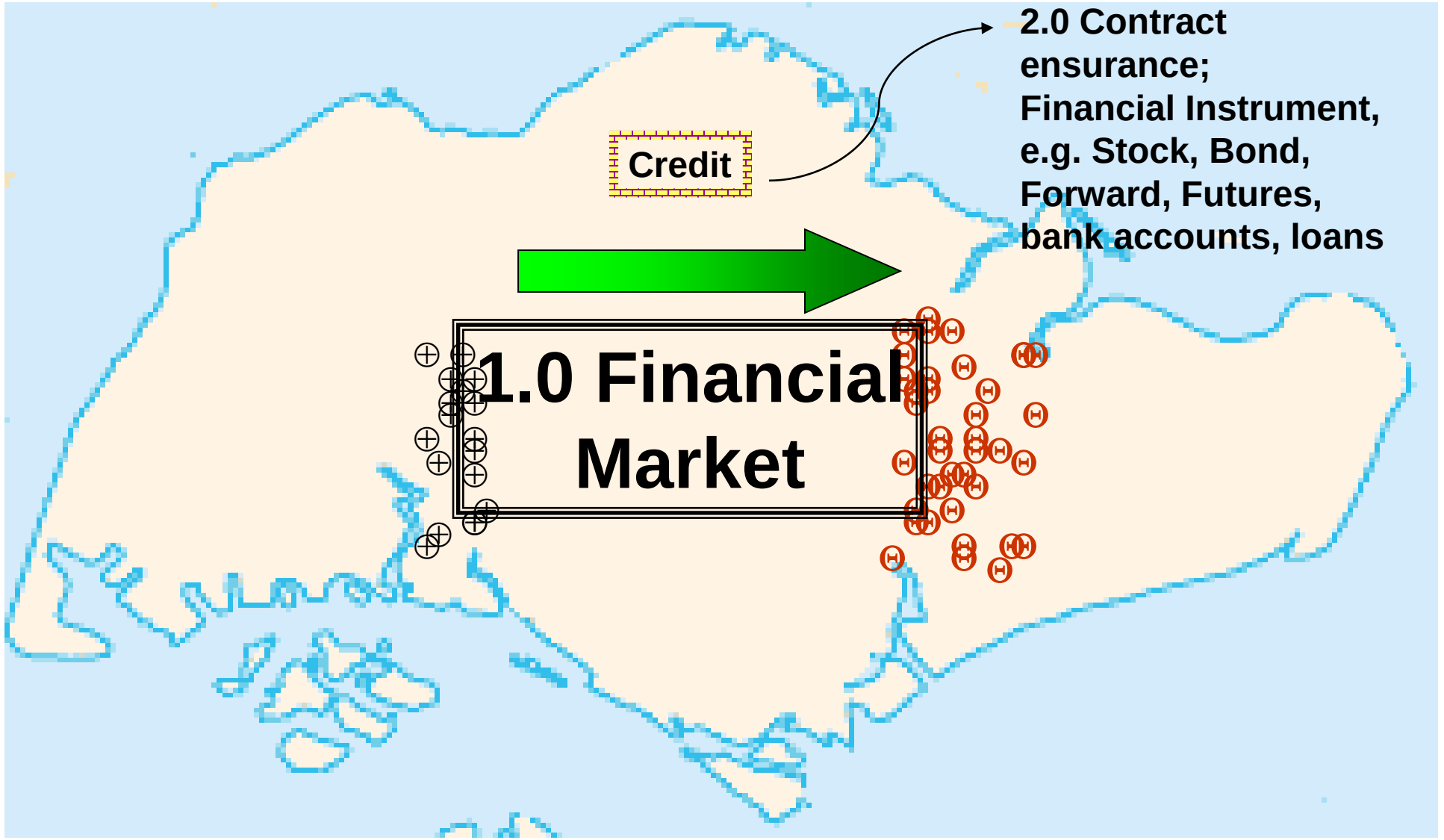
- **Maturity, Denomination, etc**

5. Others

- **tax, transaction costs, legal, etc**

When buyers and sellers have access to different information (asymmetric information), traders with better private information about the quality of a product will selectively participate in trades which benefit them the most (at the expense of the other trader).

moral hazard occurs when one person takes more risks because someone else bears the cost of those risks. A moral hazard may occur where the actions of one party may change to the detriment of another after a financial transaction has taken place.


2.0 Contract
ensurance;
Financial Instrument,
e.g. Stock, Bond,
Forward, Futures,
bank accounts, loans
Credit
1.0 Financial
Market

Roles of Financial Market

- Fin mkts are structures through which funds flow
- 3 economic functions:
  - **Price discovery process** - the interactions of buyers and sellers in a financial market **determine** the price of the traded asset required return/ interest rate
    - Require no gov intervention.
  - **Resale:** Provide a mechanism for an investor to sell a financial asset
  - **Reduce cost:** Reduces the search and information costs of transacting

Examples of Financial Markets

- Money market
- Bond market
- Mortgage market
- Stock market
- Futures market
- Derivative market

Types of Financial Markets

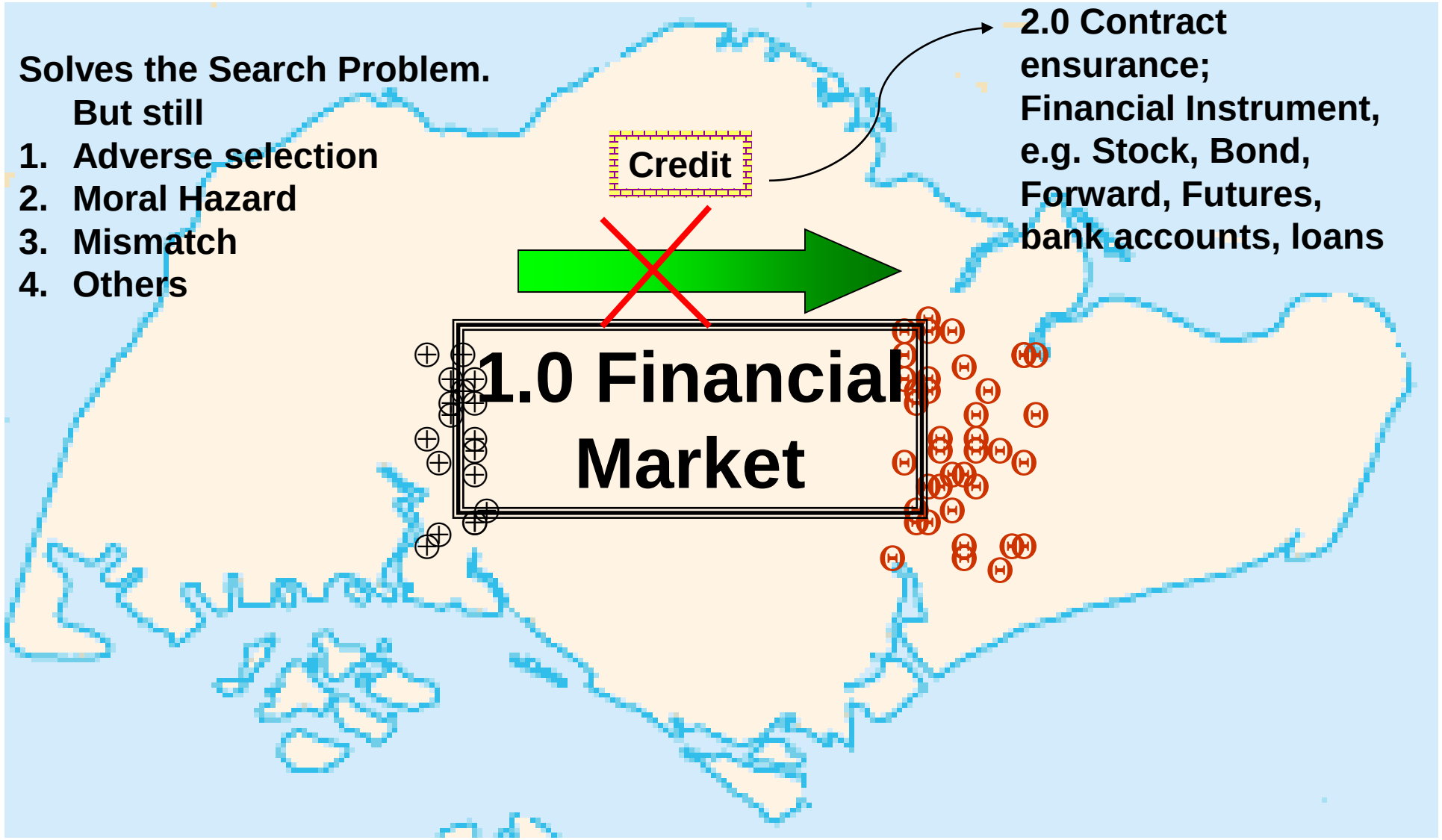
- Types:
  - Physical assets versus financial assets
    - E.g. Physical: gold, coffee, real estate
    - Financial: stock, bonds, derivatives
  - Spot versus futures markets
    - Spot = settled “now”
    - Futures = settled in the future

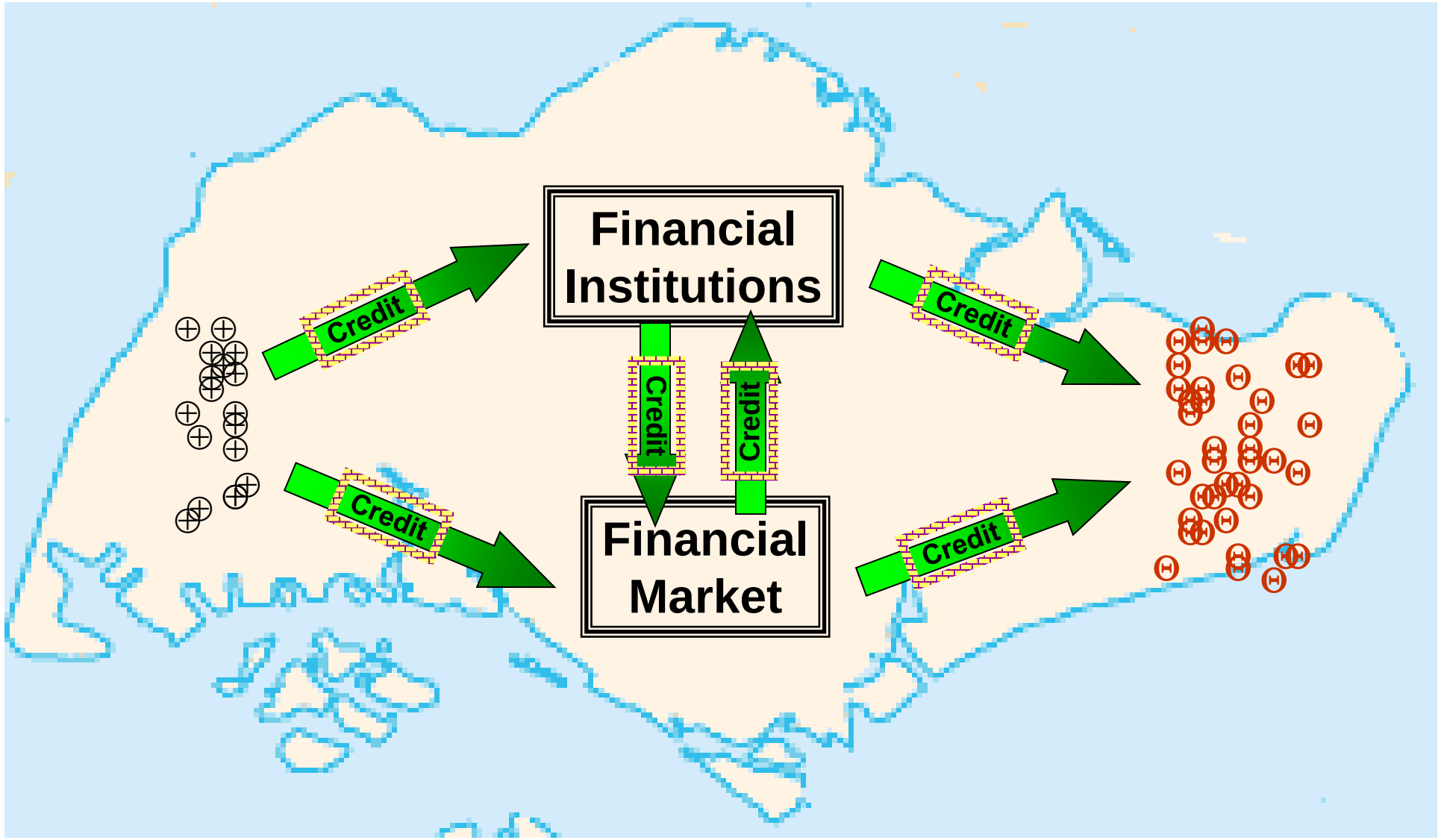
Types of Financial Markets

- Types:
  - Money versus capital markets
    - Money: maturity <= 1 year, e.g. CDs, US Treasury bills
    - Capital: maturity > 1 year, e.g. stocks and long term bonds
  - Primary versus secondary markets
    - Primary: Users of funds receives directly from issuers of funds, e.g. IPO
    - Secondary: Issuers of funds trade among themselves, e.g. stock market

Types of Financial Markets

- Types:
  - Private versus public markets
    - Private: direct contracting between 2 parties, e.g. bank loans, private equity, stock private placements
    - Public: standardized financial instruments sold/resold among the public


Solves the Search Problem.
But still
1. Adverse selection
2. Moral Hazard
3. Mismatch
4. Others
Credit
2.0 Contract
ensurance;
Financial Instrument,
e.g. Stock, Bond,
Forward, Futures,
bank accounts, loans
1.0 Financial
Market


Financial Institutions
Credit
Credit
Credit
Credit
Credit
Credit
Financial Market

Roles of Fin Institutions

- Transform financial assets and re-constitute them into different types of assets.
- Exchange financial assets on behalf of customers and for their own account.
- Creation [stocks are created by investment] and sale of financial assets.
- Provide investment advice to other market participants.
- Manage the portfolios of other market participants.
- Maturity Intermediation
  - transforms a longer-term asset into a shorter-term asset

Roles of Fin Institutions

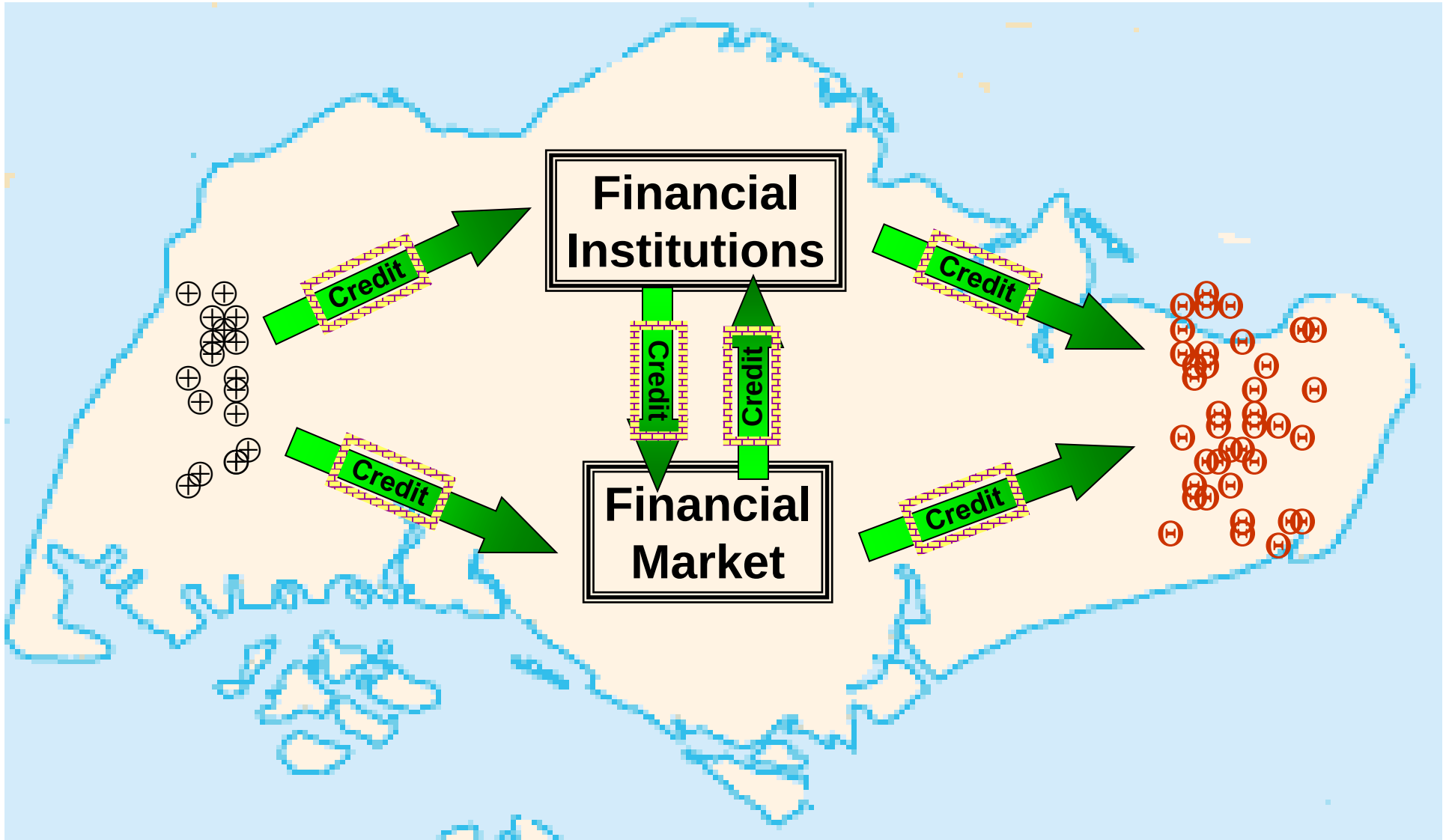
- Risk Reduction via Diversification
  - transforms more risky assets into less risky ones
- Reducing the Costs of Contracting and Information Processing
  - Cost of the acquisition and analysis of the information about the financial asset and its issuer
  - Cost of writing the loan contract
  - Cost of enforcing the contract terms
- Providing a Payment Mechanism
  - Credit cards, debit cards, electronic transfers

FIs Benefit Suppliers of Funds

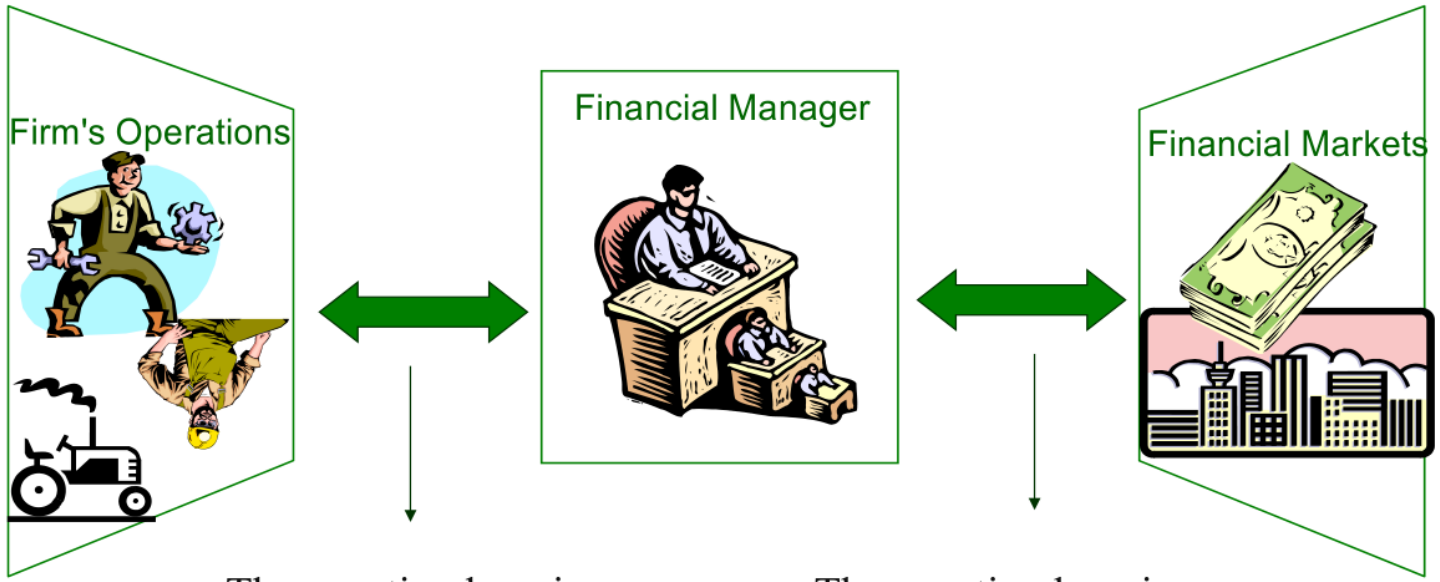
- Reduce monitoring costs (Why banks exist?)
- Increase liquidity and lower price risk
- Reduce transaction costs
- Provide maturity intermediation
- Provide denomination intermediation

FIs Benefit the Overall Economy

- Conduit through which central bank conducts monetary policy
- Provides efficient credit allocation
- Provide for intergenerational wealth transfers
- Provide payment services


Financial Institutions
Credit
Credit
Credit
Credit
Credit
Credit
Financial Market

Investment Vehicle Model - The Flow of Cash in a Firm



Refresh key concepts in Finance

- Time value
- Diversification (Risk and Return)
- Asymmetric information
  - Adverse selection
  - Moral hazard

What is the Time Value of Money?

- $1 received today is *preferred* to $1 received some time in the future. Why?
  - lost earnings: can invest the money to earn interest
  - loss of purchasing power: because of the presence of inflation
  - trade-off depends on the ***rate of return***

Basic Definitions: PV and FV

- **Present Value (PV)** – the value of something today. On a timeline t = 0. Present Value is also referred to as the ***market value*** of a cash flow to be received in the future.
  - Translating a value that comes at some point in the future to its value in the present is referred to as ***discounting***.
- **Future Value (FV)** – the value of a cash flow sometime in the future. On a timeline t > 0.
  - *Translating a value to the future is referred to as* ***compounding***.

Meaning Of Future And Present Values

- Keep in mind that all that present values and future values do is to put cash flows which come in at different times on a *COMPARABLE BASIS*!
- Once they are then in the "same units" we will be able to compare and make decisions on which pattern of cash flows are preferable.

Example: Compound Interest

- Suppose now you deposit your $100 into a Savings Deposit where interest earned at 5% on the **previous year's balance**:
- *Interest Earned Per Year =Prior Year Balance x 5%*

After 1 year:

Original invested amount

$FV_1 = PV + INT_1 = PV + PV\ (i)$

$= PV(1 + i) = \$100(1.05)$

$= \$105.00$

After 2 years (Displaying the Meaning of Compounding):

$FV_2 = PV(1 + i)^2 = PV(1 + 2i + i * i)$

$= PV(\text{Principal} + 2 \text{ years of Simple Interest} + \text{Interest on Interest})$

$= \$100(1.05)^2 = \$110.25$

In General, $FV_n = PV(1 + i)^n$

Financial Calculator Solution

Financial calculators solve this equation:

$$FV = PV\ (1 + i)^{n}$$

There are 4 variables. If 3 are known, the calculator will solve for the 4th.

Annual Percentage Rate (APR)

(Nominal Annual Rate or Quoted Rate or Stated Rate)

- This is the annual rate that is *quoted by law*
- By definition **APR = period rate * the number of periods per year**
- Consequently, to get the period rate we rearrange the APR equation:
  - Period rate = APR / number of periods per year
- Note that you should NEVER divide the *effective* rate by the number of periods per year – it will NOT give you the period rate

Effective Annual Rate (EAR)

- The effective annual rate of interest refers to the actual rate paid (or received) after taking into consideration any compounding that may occur *during* the year. If interest is compounded *more than once* a year, then the stated rate will be different than the effective rate. If interest is compounded (or applied) *exactly once a year*, then the effective annual rate will be equal to the stated rate
- If you want to compare two alternative investments with different compounding periods you need to compute the EAR and use that for comparison.

EAR General Formula

$$EAR = \left[1 + \frac{APR}{m}\right]^{m} - 1$$

- m = compounding frequency per year
- APR is the quoted or stated rate

Example: How do we find EAR for a nominal rate of 10%, compounded semiannually?

$$EAR = \left(1 + \frac{APR}{m}\right)^{m} - 1$$

$$= \left(1 + \frac{0.10}{2}\right)^{2} - 1$$

$$= (1.05)^{2} - 1.0$$

$$= 0.1025 = 10.25\%.$$

Question 1:

- You've just joined the Morgan Stanley. They've offered you two different salary arrangements. You can have $95,000 per year for the next two years, or you can have $70,000 per year for the next two years, along with a $45,000 signing bonus today. The bonus is paid immediately, and the salary is paid at the end of each year. If the interest rate is 10 percent compounded monthly, which do you prefer?

Answer 1

- Since we have an APR compounded monthly and an annual payment, we must first convert the interest rate to an EAR so that the compounding period is the same as the cash flows.
- $EAR = [1 + (0.10 / 12)]^{12} - 1 = 0.104713$ or 10.4713%

- $PVA_1 = \$95,000 \{[1 - (1 / 1.104713)^2] / 0.104713\} = \$163,839.09$

- $PVA_2 = \$45,000 + \$70,000\{[1 - (1/1.104713)^2] / 0.104713\} = \$165,723.54$

Question 2:

- One year ago, you deposited $30,000 into a retirement savings account at a fixed rate of 5.5 percent. Today, you could earn a fixed rate of 6.5 percent on a similar type account. However, your rate is fixed and cannot be adjusted. How much less could you have deposited last year if you could have earned a fixed rate of 6.5 percent and still have the same amount as you currently will when you retire 38 years from today?
  A. $2,118.42 less
  B. $3,333.33 less
  C. $5,417.09 less
  D. $7,274.12 less

Answer 2

Future value = $\$30{,}000 \times (1 + .055)^{38+1} = \$242{,}084.61$
Present value = $\$242{,}084.61 \times [1/(1 + .065)^{38+1}] = \$20{,}765.03$
Difference = \$30,000 - \$20,765.03 = \$9,234.97

Enter	39	5.5	-30,000		
	N	I/Y	PV	PMT	FV
Solve for					242,084.61

Enter	39	6.5			242,084.61
	N	I/Y	PV	PMT	FV
Solve for			-20,765.03		

Question 3:

- You need a 30-year, fixed-rate mortgage to buy a new home for $240,000. Your mortgage bank will lend you the money at a 6.35 percent APR for this 360-month loan. However, you can afford monthly payments of only $1,150, so you offer to pay off any remaining loan balance at the end of the loan in the form of a single balloon payment. How large will this balloon payment have to be for you to keep your monthly payments at $1,150?

Answer 3

- The amount of principal paid on the loan is the PV of the monthly payments you make. So, the present value of the $1,150 monthly payments is:
- PVA = $1,150[(1 − {1 / [1 + (0.0635/12)]^{360}}) / (0.0635/12)] = $184,817.42

- Balloon payment=(240000-184817.42)*((1+0.0635/12)^360)=368936.6

Diversification

- Diversification reduces risk
  - Expected portfolio return is the weighted average of the two expected returns
  - Portfolio standard deviation is *smaller* than the weighted average of the two standard deviations
- Question:
  - When will portfolio standard deviation equal the weighted average of the two standard deviations?
- As long as asset returns do *not* always move in the same direction ($\rho < 1$), we have room for lowering risk by diversification
  - Not all risks are systematic risks
  - Firms respond to systematic risk in different ways

Diversification and Number of Securities

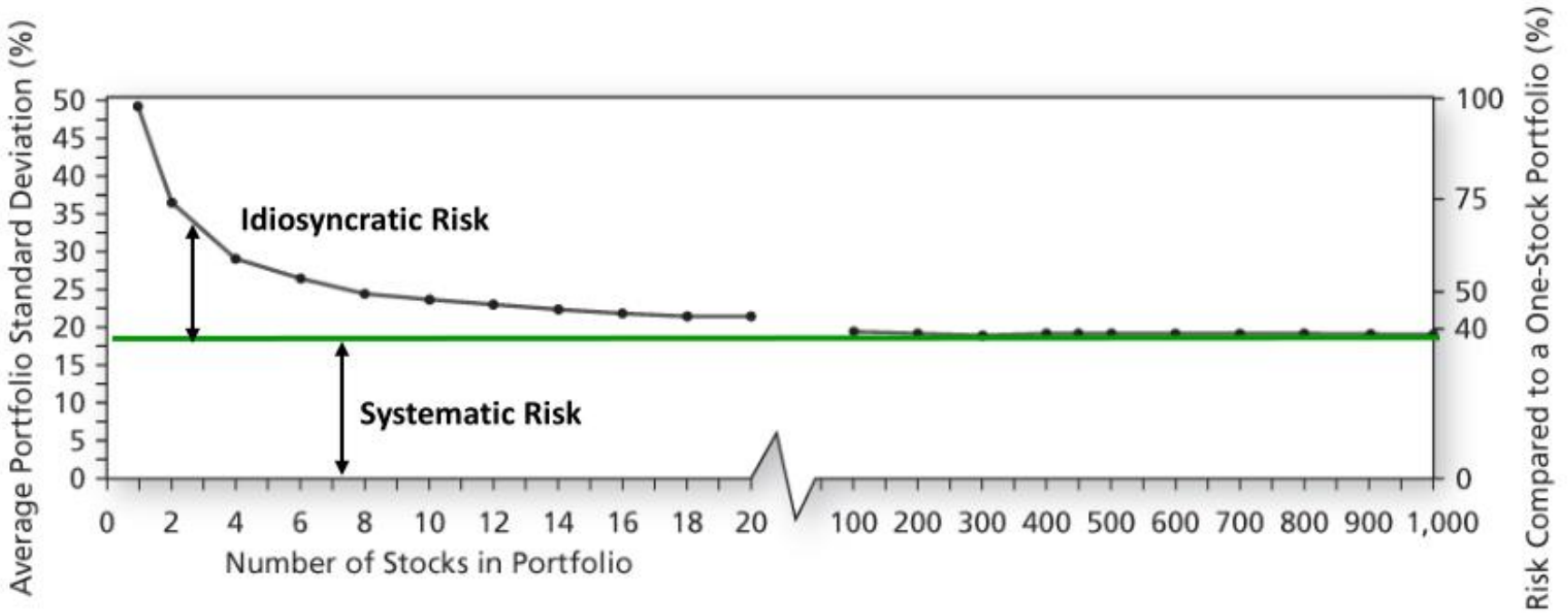


Figure 7.2 Portfolio diversification. The average standard deviation of returns of portfolios composed of only one stock was 49.2%. The average portfolio risk fell rapidly as the number of stocks included in the portfolio increased. In the limit, portfolio risk could be reduced to only 19.2%.

Source: From Meir Statman, "How Many Stocks Make a Diversified Portfolio?" *Journal of Financial and Quantitative Analysis* 22 (September 1987). Reprinted by permission.

- Portfolio risk decreases as diversification increases
- A general rule of thumb is that adequate diversification can be achieved by holding 15-30 stocks

How Many Stocks Do Individual Investors Hold?

Num of Stocks	1991	1992	1993	1994	1995	1996	1991–96
Panel A: Percentage of Portfolios							
1	33.02	29.71	27.88	27.06	26.75	25.50	28.20
2	20.55	19.60	18.65	17.91	17.99	17.37	18.59
3	13.51	13.59	13.14	13.03	12.50	12.01	12.90
4	8.86	9.20	9.50	9.46	9.36	9.30	9.22
5	6.11	6.55	6.87	6.87	6.70	6.59	6.57
6–10	12.36	14.49	15.56	16.26	16.81	17.40	15.36
11–15	3.28	3.93	4.80	5.18	5.30	6.13	4.72
Over 15	2.31	2.93	3.59	4.23	4.59	5.70	4.44
Panel B: Normalized Portfolio Variance							
2	0.645	0.612	0.601	0.589	0.570	0.563	0.597
3	0.508	0.470	0.459	0.443	0.417	0.407	0.451
4	0.441	0.397	0.385	0.366	0.337	0.329	0.376
5	0.396	0.347	0.338	0.322	0.293	0.278	0.329
6–10	0.355	0.300	0.291	0.267	0.234	0.218	0.278
11–15	0.309	0.246	0.239	0.217	0.182	0.163	0.226
Over 15	0.291	0.224	0.220	0.192	0.151	0.130	0.201

- Source: Goetzmann and Kumar, 2008, "Equity Portfolio Diversification," *Review of Finance*.
- A typical individual investor holds a portfolio with only four stocks; The level of under-diversification is greater among younger, low-income, less-educated, and less-sophisticated investors
- Under-diversified investors earn *lower* returns than well-diversified investors

Asymmetric Information

- Buyers/Sellers **not** equally informed about product
  - Can be difficult to determine credit worthiness, mainly for consumers and small businesses
  - Borrower knows more than lender about borrower's future performance
  - Borrowers may understate risk
- Asymmetric information is much less of a problem for large businesses—more publicly available information

Adverse Selection

- Related to information about a business **before** a bank makes a loan
- Small businesses tend to represent themselves as high quality
- **Banks know some are good and some are bad, how to decide**
  - Charge too high an interest, good credit companies look elsewhere—leaves just bad credit risk companies
  - Charge too low interest, have more losses to bad companies than profits on good companies
  - **Market failure**—Banker may decide not to lend money to any small businesses

Moral Hazard

- Occurs **after** the loan is made
- Taking risks works to owners' advantage, prompting owners to make riskier decisions than normal
  - Owner may "hit the jackpot", however, bank is not better off
  - From owner's perspective, a moderate loss is the same as a huge loss—limited liability

Minimizing Adverse Selection and Moral Hazard Risk

- The cure for information asymmetry is more information about potential fund receivers.
  - For lending to individuals, lenders can check the loan applicant's credit files and credit scores, their employment history, and with the permission of the borrowers, lenders can even verify their income with the Internal Revenue Service.
  - For lending to businesses, lenders can check any credit ratings issued by the credit rating agencies for businesses, such as Moody's, as well as credit reporting agencies for businesses, such as Dun & Bradstreet.
  - For individuals applying for insurance, insurers can consult credit reports, CLUE reports, and other databases. Medical records can be check for health and life insurance applicants.
- Requiring **collateral** can also reduce information asymmetry risks.

Minimizing Adverse Selection and Moral Hazard Risk

- Requiring a certain amount of **net worth** also reduces adverse selection because only those individuals or businesses with sufficient assets over liabilities will be considered for a loan.

- One method for **equity finance**, which is financing through the issuance of stock, is to require the managers to own a certain percentage of the company

- Another method for **debt finance** through the issuance of bonds is to require **restrictive covenants** that prevent the bond issuer from taking too many risks or to restrict the amount of debt that can be added.