

Financial assets

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Defining assets

Basic definition of every financial assets

- 1 Every asset is a *legal contract* between two counterparties.
- 2 Every asset has a *defined maturity*.
- 3 Any asset is described as a “defined cashflow” expected at a “defined maturity”.

Thus, every asset can be described as a series of (expected(cashflow), cashflow-maturity) pairs.

- Cashflows: what amount and type of income is received. Cashflows can be either fixed or random, positive or negative.
- Cashflow-maturity: at what point in time is the cashflow expected.

Financial assets as sets of (cashflow, maturity) pairs

Based on the asset-maturity, and features of its cashflow, financial assets fall into the following broad categories:

- Assets with fixed (deterministic) cashflows and fixed maturities: loans, bonds
- Assets with fixed cashflows and uncertain maturities: insurance products
- Assets with uncertain cashflows and fixed maturities: derivatives
- Assets with uncertain cashflows and uncertain maturities: equity

Approaches to pricing

- The “law of one price”.
- We identify a core set of securities.
All other securities are created as some combination of these.
- Models of pricing assets are based on the above. This leads to two types:
 - 1 Equilibrium models: models based on the utility functions of economic agents, mean–variance analysis.
 - 2 Arbitrage.

Pricing by financial markets

- **Arbitrage:** identical assets have to have identical prices. If not, there is a violation of the principle of no–arbitrage, where profits can be made with certainty. Markets abhor violations of no–arbitrage!
- **Comparison pricing:** A non–traded asset (e.g, the land on which IGIDR sits) can be priced based on the price of an asset which has similar cashflows, and that is traded in the market.
- **Risk premium:** If an asset has systematically higher risk than another, it has to have a higher return.

Types of financial risk

Financial assets are state-contingent claims: at time $t = 0$, there is always a probability of a non-positive payoff at time $t = 1$.

Each asset has an expected payoff.

Uncertainty about the expected payoff is the *risk* of a financial asset.

In finance, this risk is captured as fluctuations in the observed value of the asset at every point in time, and is broken down into the following components:

- Systemic market risk
- Liquidity risk
- Credit risk
- Legal and institutional risk

The same two approaches can be used to measure risk as well:

- Equilibrium models – these have typically been a side-effect from the asset pricing models. The approach is that if a component of the risk can be separately measured/priced (like the equity premium, or the liquidity premium), then that risk component can be measured.
- More recently, we have financial markets to trade risk (like equity derivative and credit derivative markets). We use the prices from instruments in these these markets to directly measure risk.

Introducing the players in the financial arena

Financial sector participants

- 1 Individuals
- 2 Firms
- 3 State

Each grapple with the financial question of how to manage their cashflow through time, and in possible future states.

The financial questions for an individual

The individual's problem: they face a stream of earnings and consumption through their lifetime which are not "matched". In addition, both earnings and consumption are also risky.

How does the individual smooth consumption?

By deferring consumption. Finance provides a framework for doing this optimally.

Questions for an individual:

- What are the financial instruments through which the consumption stream can be smoothed?
- What are the "fair values of these instruments"?
- How do we measure the risk of the earnings and consumption streams?
- What are the risk–return trade–offs of using alternative instruments?

A firm is an economic organisation where a team of people coordinate their skills in order to produce goods and services. Typically, the firm has a startup sequence of:

- A set of people have an idea for a good/service.
- They put up some capital to start a firm to implement the idea. This is the *equity* of the firm.
- Now, they can take loans which is the *debt* of the firm.
- At this point, we have a firm with a total value of the sum of the equity and the debt.

In the real-world, there are three main implementations of a firm:

- 1 *Proprietorship* (e.g. most shopkeepers)
- 2 *Partnership* (e.g. most audit, law firms)
- 3 Most large-scale economic activity is organised as *limited liability* firms. Securities issuance is only done by limited liability firms.
- 4 In some countries, there are *limited liability partnerships* (e.g. most hedge funds).

- *X* owns the firm.
- *X* hires people on some contractual terms.
- *X* puts his own capital to work in the firm.
- *The profit, loss, debt of the firm is synonymous with the personal accounts of X.*
- If the firm goes bankrupt with debt of Rs.1 million, the personal assets of *X* will be liquidated by creditors seeking to get repaid.

What is good about proprietorship

- Lack of agency conflicts – X makes decisions, X reaps the benefits, interests are aligned.
- The proprietorship allows for multi-person teams which is better than working alone.
- Lack of overheads – legal, accounting, agency costs.
- Easy to start, easy to close down - high vitality even in India.
- Proprietorships dominate in some kinds of businesses - e.g. most shops, garages, restaurants in India.

What is wrong with proprietorship

- The capital is limited to wealth of one person.
- X generally ends up with a highly undiversified portfolio. It is typical for the bulk of the wealth of X to be hidden in this one firm.
- This makes X unwilling to engage in particularly risky activities. An economy dominated by proprietorships will have a very high cost of risk capital.
- Owner's wealth is locked up - is not liquid. He cannot take the money and walk away.

The partnership

- To augment the amount of capital in a firm, we can have a “partnership” where a set of people come together to create a firm.
- If the firm goes bankrupt with debt of Rs.1 million, the personal assets of the partners will be liquidated in proportion, by creditors seeking to get repaid.
- Hence the legal model that has generally been adopted is that *every partner has veto powers on every decision of the firm*. Complete consensus is essential.

What is right about partnerships

- The stock of capital that a partnership can muster exceeds that of a proprietorship.
- It can be arranged that one person spreads his wealth over 10 partnerships, thus getting diversification.
- Most tax regimes correctly recognise the partnership as a “pass-through” – only partners are individually taxed, partnerships are exempt.
- Partners have wealth at stake, and will generally work harder for a partnership when compared with employees in a proprietorship.
- Partnerships are the dominant form of organisation for lawyers, chartered accountants, hedge funds, etc.

What is wrong with partnerships

- When the partnership goes bankrupt (for any reason), the creditors move into the assets of *all* partners. This makes investors think twice about putting money into a partnership.
- It is impossible for partnerships to attract anonymous capital. If you didn't watch the company closely, you would never invest in it.
- Partnerships often become incapable of rapid decision making because of the need for consensus.
- Partners are not as well motivated for the success of the firm as proprietors – the free rider problem.
- Partnerships are illiquid – partners cannot easily leave the firm. Wealth is blocked.

Innovations in the structure of firms because of problems of the spice trade

- Meat would not survive into winter without spices. Rotten meat would be inedible unless cooked in spices.
- When Constantinople fell to the Muslims in 1453, Europe was in a desperate search for spices. Vasco da Gama found the sea route to India in 1498.
- In the 16th century, more than half the ships that set sail did not return. But those that did, gave a profit of 20×
- Outfitting a ship required substantial capital.
- Standard formats - proprietorship or partnership - were found to be inconvenient.

A great solution – the limited liability firm

- In England and in Holland, the monarchs allowed the new concept of the “limited liability firm”.
- Investors pooled money to create the firm. The firm could take up debt. *But the liability of the investors was limited to the money they had put into the firm to create it.*
- That is - if the ship did not come back, then the creditors would not repossess the homes of the investors.

Is this vulnerable to the owner's cheating?

- Early writings were very negative on this score.
- Limited liability firms were viewed as crooks who would take loans or trade credit and not be trusted to repay.
- The government came into the picture by putting a regulatory regime which constrains the behaviour of shareholders of the limited liability firm.

Defining the limited liability firm

- The firm starts with equity capital E .
- The firm takes on debt D .
- The shareholders hire managers who form assets $V_0 = E + D$. E.g. V_0 is used to buy a ship and set sail.
- Some time later, the firm is worth V_T .
- If $V_T > D$ then we can close down the firm by paying off the bond holders D and the shareholders get $V_T - D$.
- But if the firm is bankrupt then the bondholders get V_T (which is $< D$) and the shareholders get nothing.
- Even if things go bad – nobody comes after the personal assets of shareholders.

What is right about the limited liability firm

- It is possible to be an investor with peace of mind. You put Rs.1000 into HLL. If things go well, you have the upside. If things go badly, the worst that can happen is your investment vanishes.
- So the limited liability firm makes it possible to harness vast pools of decentralised capital, where investors do not care about closely monitoring the firm.
- These investors can now be well-diversified. This reduces the cost of capital in the economy.
- These shares can be listed and traded on exchanges! The liquidity on shares eliminates the liquidity premium that is required when investing in a partnership or a proprietorship.
- Limited liability firms can put together vast quantities of capital and deploy them into production, in a fashion that alternative forms of organisation simply cannot match.

What is wrong with the limited liability firm

- Vast pool of shareholders lack incentives to monitor the firm and make sure that it works in their interest. Agency conflicts – managers use the firm for their personal ends.
- Most tax regimes tax the firm *and* tax investors. This means that the limited liability form of organisation of teams is penalised by double-taxation. For example, in India, Chidambaram removed this double taxation (1998) and Sinha brought it back (Feb 2002).

Dealing with the agency conflict

- Three-tier governance structure –
 - 1 Shareholders elect board of directors - to actively work with the firm, and monitor managers closely.
 - 2 The board hires a management team, sets salaries, etc.
 - 3 The managers run the company.
- Close supervision of the board of directors is intended to be a substitute for shareholders who lack incentives for close monitoring.
- Managers owning some shares helps align the goals of managers and the goals of owners.

Financial questions about the firm

- How is a firm to be valued?
- How the price of the bond of a firm (a corporate bond) indicate its credit risk? What is the credit premium of a corporate bond? What is the term structure of credit premia?
- How is the price of a bond of a firm related to it's equity share price?
- Questions about agency conflicts fall under the field of “corporate finance”.

Financial questions facing governments

Government financing is done through taxes and by raising money from bond issues.

- The structure of govt. bonds (what cashflows, what maturity, how many types).
- The structure of the govt. bond market: how are these bonds traded? who trades them?
- Important output of a govt. bond market: prices reveal interest rates in the country.
 - What are the interest rates at different maturities in a country?
 - What factors cause the *spread*: difference between the interest rates at the short-term and at the long-term?
 - What is the behaviour of interest rate risk?
 - What instruments should exist to hedge interest rate risk?

Financial assets as legal contracts with defined maturity • (cashflow,maturity) elements of a financial asset • “law of one price” • equilibrium models of asset pricing • arbitrage rules of asset pricing • financial risk • systemic risk • liquidity risk • credit risk • legal risk • users of financial markets – individuals, firms, government • debt-equity in a firm • “agency-conflicts” in a firm • proprietorship • partnership • limited liability partnerships • limited liability firm • government bonds • economic interest rates • interest rate spread • interest rate risk

The End

End of Presentation