Andreas Krause

Adverse selection and financing choices

- We now will see how capital structure decisions can convey information about the value of companies.
- We will assume that companies have better information about the value of their company than investor and that the decision how to finance an investment can convey this information.

Information asymmetry

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→ We assume that there is an information asymmetry between the company and its investors.

- It is reasonable to assume that companies have better information about its value than outside investors, that is equity holders that are not managers. The same would be true of any lender, such as a bank. Companies have this better information because they have access to assessments of the market, their customers, suppliers, and competitors that is generally not available to other parties.
- Given the lack of information by outside investors, they would not be able to assess the value of equity accurately.
- A high equity value will generally not be properly reflected in the price, thus the price of equity will be below its value.
- A low equity value will generally not be properly reflected in the price, thus the price of equity will be above its value.
- We will see how the decision whether to finance a new investment by debt or equity can reveal the true value of the company.

→ The company will choose the for them optimal source of funding for an additional investment and through this choice reveal the information they hold, which would then be reflected in the price of the equity.

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Company types

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- → For simplicity we will assume that there are only two types of company.
- ▶ We assume that the company has a value which is either high or low.
- ▶
    - The company knows its value,.
    - but outside investors do not know which of the two values to assign to the company
- ▶ We further assume that the company can make an investment and the outcome of this investment is known to everyone. This assumption to allows us to focus of the uncertainty about the value of the company arising the other investments they have conducted previously.
- ▶ The new investment needs to raise additional funds; these funds can be either debt or equity.
- → We will now consider both of these financing options in turn.

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Investors providing equity

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→ We first consider the company choosing equity to finance their new investment.

- The company will raise outside equity and investors will agree to this only if it is profitable to them.
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    - The new equity investors obtain a fraction λ of the company, which included then obtaining a fraction of the existing value. That is because as equity holders they are on equal footing with existing shareholders and gain access to the value of the whole company.
    - They will also obtain their fraction of the new investment, again on equal footing with existing shareholders.
- Investors do not know the value of the company, so they will make inferences about its value and we assume that they know the high value to be realised with probability p and the low value with probability $1 - p$.
- For investors to provide the required equity, the amount of equity provided must be less than the value the investor obtains.
- [⇒] This then gives the minimum fraction of the company new investors must be offered in return for their investment.
- If we assume that markets are competitive, then investors will not be offered more than necessary such that the relationship is fulfilled with equality.

→ Having considered the incentives of the new investor providing the funding, we now will look at the incentives of the existing shareholders to accept such funding.

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- $E \leq \lambda \left(V \qquad \right)$

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Companies raising equity funds

→ It does not only need to be profitable for investors to provide additional funding, it also needs to be profitable for existing shareholders to accept such funding.

- - If accepting the new funding the company retains their fraction of the new company.
  - The existing shareholders we assume know the value of the company.
  - In addition they will also obtain their share of the value generated by the new investment.
- *Formula*
- [] We can now insert for λ and obtain the value to the existing shareholders as given in the *formula*.
- In contrast, when deciding to forego the investment, the company does not need to raise additional funds and will obtain the value of the company, which is they know.
- Additional funding to make the investment will only be raised if this generates a higher value for the existing shareholders.
- [⇒] We can solve this condition for the probability of the value of the company to be high. We have dome so by inserting the definition for V, which also contains this parameter.

→ This threshold on the probability of outside investors believing the company to be of high value depends on the actual value of the company, V_H and V_L. We will investigate this point further now.

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- $\hat{\Pi}_C^i = (1-\lambda)\left(V_i + \hat{V}\right)$
  $= \frac{V+\hat{V}-E}{V+\hat{V}}\left(V_i + \hat{V}\right)$

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Companies raising equity funds

- Existing company owners retain their fraction of the company, whose value they know, in addition to the value generated by the new investment
- $$\hat{\Pi}_C^i = (1-\lambda)\left(V_i + \hat{V}\right) = \frac{V+\hat{V}-E}{V+\hat{V}}\left(V_i + \hat{V}\right)$$
- If not making the investment, the existing owners obtain $\Pi_C^i = V_i$

→ It does not only need to be profitable for investors to provide additional funding, it also needs to be profitable for existing shareholders to accept such funding.

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  - If accepting the new funding the company retains their fraction of the new company.
  - The existing shareholders we assume know the value of the company.
  - In addition they will also obtain their share of the value generated by the new investment.
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- [] We can now insert for λ and obtain the value to the existing shareholders as given in the *formula*.
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Comparing company decisions

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→ We can now compare the decisions of low-value and high-value companies.

- We can easily see that if the condition is fulfilled for a company with high value, it will be fulfilled for a company with low value as the condition is less binding.
- [⇒] If the company is raising equity, there is no information revealed as both companies would take the same action. Assuming that the existence of an investment opportunity is common knowledge, then if a company raises equity, it may be of high value or low value; which it is cannot be said as long as $p > p_L^*$.
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→ We can now investigate how the use of debt might help to reveal information on the company type better.

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Company obtaining a loan

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→ We can now look at the incentives for the company to obtain a loan to finance the additional investment.

- Rather than using equity, the company can raise the same amount of funds through a loan instead.
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  - When raising a loan, the existing shareholders will retain the company fully and thus obtain the current value of the company, which is known, and the value of the future investment.
  - As they have obtained a loan, this loan needs to be repaid from the existing value of the company.
- *Formula*
- The company would prefer obtaining a loan to raising additional equity if the value generated from it is larger.
- [⇒] We can solve this condition for the probability of the value of the company to be high. We have dome so by inserting the definition for V, which also contains this parameter.
- We see that $p_H^{**} > p_L^{**}$ and hence if the low-value company prefers a loan to raising equity, so will the high-value company as the conditions is less strict.

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Distinguishing company types

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→ We can now establish how outside investors can determine the type of company by observing its financing decision.

- - We can see that with high adverse selection, all companies will choose loans to finance the additional investment.
  - Adverse selection is highest if the probability of the company being of high value is low. This is because the high value is where outside investors would be better off than with the current information they hold as the value would be higher. If this probability is low, then for both company types the use of loans is optimal and hence investors could not distinguish between company types. Therefore, high adverse selection does not allow to identify the company type.
- - We can also see that with low adverse selection, all companies will choose equity to finance the additional investment.
  - If the probability of the company being of high value is high, thus adverse selection low, both companies choose equity to finance the additional investment and their type cannot be distinguished.
- - For a medium level of adverse selection, we will observe that high-value companies choose loans
  - but low-value companies choose equity.
  - Thus if the probability of the company being high-value is of an intermediate value, the choice of finance will be different for low-value and high-value companies.
- In cases of medium adverse selection, the capital structure decision, to raise loans or equity for the additional investment, reveals their type; it is a high-value company if loans are chosen and a low-value company is equity is chosen.
- Of course, when announcing the choice of finance, this information should instantly be reflected in the price of the company.

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Distinguishing company types

- If adverse selection is high all companies will choose loans

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