Andreas Krause

Signalling through raising debt

- Capital structure decisions, that is whether debt or equity is used to finance an investment, can also be used by the company to signal to investors what the company beliefs the qualities of an investment they are seeking to undertake is.
- We will focus on the company using debt to signal to investors that the investment is highly profitable..

Informed companies

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- Companies have access to internal assessments about their markets, customers, suppliers, and competitors that are usually more detailed than what outside investors can obtain; they will therefore be in a better position to assess the prospect of an investment.
- Without companies revealing sensitive information, it is different for investors to corroborate any information about the prospects of the investment the companies might provide.
- We will now see how companies can use debt to signal to outside investors their investment credibly.

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Uncertain investment outcomes

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→ We can now discuss the set-up of the investment the company seeks to conduct.

- We assume that the investment yield one of two outcomes, a high outcome or a low outcome.
  - *Formula*
- The company is informed about their investment and will know the outcome in advance.
  - Investors, in contrast, do not have this information and the company cannot credibly provide information about the outcome of the investment.
- The information about the outcomes will be public knowledge once the investment is completed; there is no uncertainty about the outcome and the value of the company after the investment.
- The company needs additional funds to conduct the investment and can use dept or equity.
- If the outcome of the investment is below the loan, then the company will default; thus there are no additional funds from which the company may repay the loan. It might be that the investment is set up as a legally separate subsidiary and no repayment of the loan by its parent company is necessary.

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Manager remuneration

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→ We can now see how the manager of the company making the decision on how to finance the investment is remunerated.

- We assume that managers are obtaining a salary that is dependent on the price of the stocks in the market, thus how the public perceive the value, not the true value. This might be the case if managers receive payments based on the share price, such as shares directly or stock options.
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  - Managers receive a fraction of the value of the investment the company makes as perceived by the market.
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- We will use a debt level D^* that is below the two possible outcomes of the investment.
  - *Formula*
- We propose that if the company takes on debt that is higher than this threshold, the investment outcome is inferred to being high.
- We propose that if the company takes on debt that is lower than this threshold, the investment outcome is inferred to being low.

→ We are now going to show that this inference outside investors make, is correct.

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Manager remuneration and debt levels

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→ We can now determine the remuneration the manager will receive after he has made his decision on the financing of the investment.

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  - If the debt they take on is lower, they will only receive the remuneration based on the lower value.
- The manager of a high value company will obtain the high value in the second time period, regardless of his initial choices as the value is revealed.
- *Formula*
- The remuneration in time period 1 is the same for a manager who has a low-value investment. If he chooses high debt, he receives the high remuneration in time period 1.
  - If he chooses low debt, he receives the high remuneration in time period 1.
- In the second time period it will be known that the value generated is low and the remuneration based on that information.
- If the high debt is taken on, it requires a repayment that exceeds the outcome of the investment and hence the loan cannot be repaid; therefore the manager will receive no remuneration in this period 2 in this case.
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→ We can now determine the optimal decision on the financing form by the manager.

Manager remuneration and debt levels

- Managers of high-value companies obtain the high remuneration in time period 1 if they take on high debt
- $\Pi_M^H = \begin{cases} \gamma V_H & \text{if} \quad V_H > D^* \end{cases}$

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- Managers of high-value companies obtain the high remuneration in time period 1 if they take on high debt and low remuneration if they take on low debt
- In time period 2 the type is revealed and they receive the high remuneration
- $\Pi_M^H = \begin{cases} \gamma V_H + \gamma V_H & \text{if} \quad V_H > D^* \\ \gamma V_L + \gamma V_H & \text{if} \quad V_H \leq D^* \end{cases}$

Manager remuneration and debt levels

→ We can now determine the remuneration the manager will receive after he has made his decision on the financing of the investment.

- Based on the assessment proposed above, the manager will receive the high remuneration in time period 1 only if investors infer its is going to be high-value, thus if the debt taken on is high.
- If the debt they take on is lower, they will only receive the remuneration based on the lower value.

- The manager of a high value company will obtain the high value in the second time period, regardless of his initial choices as the value is revealed.
- *Formula*
-
  - The remuneration in time period 1 is the same for a manager who has a low-value investment. If he chooses high debt, he receives the high remuneration in time period 1.
  - If he chooses low debt, he receives the high remuneration in time period 1.
- In the second time period it will be known that the value generated is low and the remuneration based on that information.
- If the high debt is taken on, it requires a repayment that exceeds the outcome of the investment and hence the loan cannot be repaid; therefore the manager will receive no remuneration in this period 2 in this case.
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Manager remuneration and debt levels

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- In time period 2 the type is revealed and they receive the high remuneration
- $\Pi_M^H = \begin{cases} \gamma V_H + \gamma V_H & \text{if} \quad V_H > D^* \\ \gamma V_L + \gamma V_H & \text{if} \quad V_H \leq D^* \end{cases}$
- Managers of low-value companies obtain the high remuneration in time period 1 if they take on high debt

- $\Pi_M^H = \begin{cases} \gamma V_H & \text{if} \quad V_H > D^* \end{cases}$

Manager remuneration and debt levels

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Manager remuneration and debt levels

- Managers of high-value companies obtain the high remuneration in time period 1 if they take on high debt and low remuneration if they take on low debt
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- Managers of low-value companies obtain the high remuneration in time period 1 if they take on high debt and low remuneration if they take on low debt
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- In time period 2 the type is revealed and they receive the low remuneration if they had low debt
- If the low-value company had taken on high debt, it would fail to repay its debt and the manager receives no remuneration
- $\Pi_M^H = \begin{cases} \gamma V_H + 0 & \text{if} \quad V_H > D^* \\ \gamma V_L + \gamma V_L & \text{if} \quad V_H \leq D^* \end{cases}$

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Manager choice of debt level

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- For the high-value investment, the manager chooses the financing form that generates the higher profits; thus he will be comparing the options with high and low debt levels, respectively.
- [⇒] The condition requires that the value of the high-value investment exceeds that of the low-value investment.
- [⇒] As this condition is always fulfilled, we see that high-value companies will always choose a high debt level.
- For the low-value investment, the manager chooses the financing form that generates the higher profits; thus he will be comparing the options with high and low debt levels, respectively.
- [⇒] The condition requires that the value of the high-value investment must not be more than twice the low-value investment for the company to choose a low debt level
- [⇒]
  - Low-value companies choose low debt levels,
  - provided the differences between the possible outcomes are not too big.

→ We this see that companies whose investment are high-value use high levels of debt, those with low-value investments choose low levels of debt.

Manager choice of debt level

- A manager of the high-value company would choose a high debt level if $\gamma V_H + \gamma V_H \geq \gamma V_L + \gamma V_H$

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$\Rightarrow$ A manager of low-value companies would take low debt levels if the differences between company types is not too big

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Separation of company types

Separation of company types

→ We can now summarise the key results from this model.

- We have seen that, provided differences between outcomes are not too large, companies will choose debt levels consistent with our initial inference.
- We have seen that high-value companies, thus those that have access to high-value investments, take on high levels of debt.
- We have seen that low-value companies, thus those that only have access to low-value investments, take on low levels of debt. The remainder of the investment would be financed using equity.
- We can thus distinguish the two company types by looking at the level of debt they take on to finance investments.

→ As managers can be expected to optimize their own remuneration, the information provided through their choice of debt level is credible; it would be costly for them in the sense that they would receive lower remuneration, to make a different choice.

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