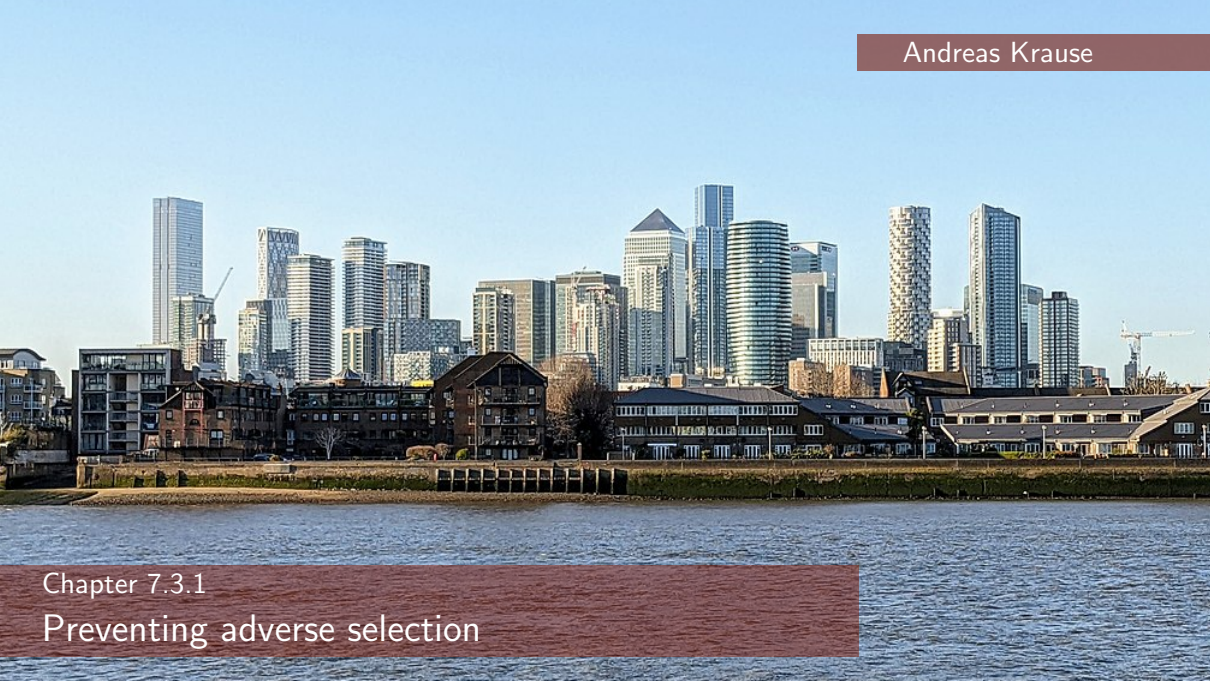
Andreas Krause



Chapter 7.3.1

Preventing adverse selection

- Investors might be well-informed about the value of securities offered or they might have much less precise information. In this case the uninformed investor will always lose when interacting with informed investors.
- These losses will have an impact on their willingness to participate in any offers. We will look at the implications of this adverse selection and how underpricing is a solution to keep the market open.

Uninformed investors making losses

Uninformed investors making losses

→ If investors have different information, adverse selection between informed and uninformed investors becomes a concern. It will be informed investors making profits at the expense of uniformed investors, who will be facing losses.

- If an issue is underpriced, then informed investors will realise this and their demand will be high, squeezing out uniformed investors who do not have this information and therefore do not increase their demand. Informed investors will obtain all or most of the issue.
- If an issue is overpriced, then informed investors will realise this and their demand will be nil, giving uniformed investors who do not have this information and therefore do reduce their demand, the full issue.

- If the issue is underpriced, uninformed investors will receive no or few securities, making no or small profits.
- If the issue is overpriced, uninformed investors will receive many securities, making large losses. Hence uninformed investors will on average make losses, while informed investors make profits.

- Informed investors making losses while uninformed investors make losses is a form of adverse selection.
- It is not only that uninformed investors make these losses on average, they know about this beforehand.

→ Hence adverse selection is a problem in that uniformed investors know they will make a loss and will hence not participate, which might mean that not all securities might be sold.

Uninformed investors making losses

- Informed investors will have high demand for securities that are underpriced

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Uninformed investors making losses

- Informed investors will have high demand for securities that are underpriced and no demand for those that are overpriced

Uninformed investors making losses

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Uninformed investors making losses

- Informed investors will have high demand for securities that are underpriced and no demand for those that are overpriced
- Uninformed investors will receive few securities that are underpriced

Uninformed investors making losses

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Uninformed investors making losses

- Informed investors will have high demand for securities that are underpriced and no demand for those that are overpriced
- Uninformed investors will receive few securities that are underpriced and a large allocation of those that are overpriced

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Uninformed investors making losses

- Informed investors will have high demand for securities that are underpriced and no demand for those that are overpriced
- Uninformed investors will receive few securities that are underpriced and a large allocation of those that are overpriced
- This causes adverse selection

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Uninformed investors making losses

- Informed investors will have high demand for securities that are underpriced and no demand for those that are overpriced
- Uninformed investors will receive few securities that are underpriced and a large allocation of those that are overpriced
- This causes adverse selection as uninformed investors know they will on average overpay

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Willingness to pay

Willingness to pay

→ We will now look at the maximal price an informed and an uninformed investor are willing to pay for the security.

- We assume that the security can have a high value or a low value, but which type the security is, is unknown to uninformed investors; only informed investors would know the true value. Uninformed investors know which value it is if it is high, but only know the probability that the value is high.
  - Similarly uninformed investors know the value of the security if it is low and the probability that the value is low.
- The demand by informed investors is limited as their wealth is restricted; they are not able to purchase all the securities.
- Informed investors know the value of the security and that is the maximal amount they are willing to pay.
- Uninformed investors only know the expected value of the security, and this value is the most they are willing to pay.

→ We thus know that informed investors are willing to pay up to the value of the security and uninformed investors its expected value. We can now determine the profits these investors are going to make.

Willingness to pay

- Securities have value V_H with probability π

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Willingness to pay

- Securities have value V_H with probability π and $V_L < V_H$ otherwise

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- Informed investors buy at most $\overline{Q}$ of the total Q securities

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- Informed investors buy at most $\overline{Q}$ of the total Q securities
- Informed investors are willing to pay V_i for a security
- Uninformed investors are willing to pay the expected value $\hat{S} = \pi V_H + (1 - \pi) V_L$ for a security

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Losses to uninformed investors

Losses to uninformed investors

→ With uninformed investors obtaining the entire issue if the true value of the securities is low, we can now determine the amount of losses they will be making.

- The expected value is of course higher than the low value of the security and hence uninformed investors will submit bids above this low value.
- If the low value is realised, informed investors will not have submitted any bids above V_L, hence uninformed investors will obtain the entire issue.

- The profits the uninformed investors make will be the difference between the price they paid, $\hat{S}$ if they compete for the issue and submit the highest possible bid. This is the profit for each security and they obtain this profits for each of the securities they receive, which will be the entire issue.

- *Formula*
- If we insert for the expected value, we can rewrite the profits (or losses) as in the *formula*.

- That the offer price will be $\hat{S}$ is the result of uninformed investors submitting bids at the expected value under the assumption that investors are competing for the securities.

→ We now have the losses of uninformed investors if the value of the security is low. We can now compare this with the profits of the value of the security is high.

Losses to uninformed investors

- As $\hat{S} > V_L$, uninformed investors submit higher bids

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Losses to uninformed investors

- As $\hat{S} > V_L$, uninformed investors submit higher bids and will obtain the entire issue if V_L is realised

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Profits to uninformed investors

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→ We can now look at the case that the high value is realised and determine the profits of the uninformed investors in this case.

- Informed traders can submit up to V_H, but uninformed investors will not submit bids above $\hat{S}$. the expected value of the security. Hence the bids by uninformed investors will be lower than those by informed investors.
  - This implies that informed investors will obtain all the securities they bid for, and uninformed investors only obtain those that informed investors cannot take.
- The profits the uninformed investors make will be the difference between the offer price S and the high value V_H. This is the profit for each security and they obtain this profits for each of the securities they receive, which will be the entire issue less the securities allocated to informed investors.
- *Formula*
- The offer price S can be any value below V_H, which is the maximum price informed investors are willing to pay. As uninformed investors are required to obtain an allocation, the offer price must be below $\hat{S}$.

→ We have now determined the profits and losses of uninformed investors and can now determine the offer price required to ensure uninformed investors are participating in the offer.

Profits to uninformed investors

- As $\hat{S} < V_H$, uninformed investors submit lower bids

Profits to uninformed investors

→ We can now look at the case that the high value is realised and determine the profits of the uninformed investors in this case.

- Informed traders can submit up to V_H, but uninformed investors will not submit bids above $\hat{S}$. the expected value of the security. Hence the bids by uninformed investors will be lower than those by informed investors.
  - This implies that informed investors will obtain all the securities they bid for, and uninformed investors only obtain those that informed investors cannot take.
- The profits the uninformed investors make will be the difference between the offer price S and the high value V_H. This is the profit for each security and they obtain this profits for each of the securities they receive, which will be the entire issue less the securities allocated to informed investors.
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- The offer price S can be any value below V_H, which is the maximum price informed investors are willing to pay. As uninformed investors are required to obtain an allocation, the offer price must be below $\hat{S}$.

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Effect of underpricing

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→ It is the underpricing that induces uninformed investors to participate in an offer as this ensures they are not making losses.

- A security which has a high value will attract high demand by informed investors and while uninformed investors are squeezed out of the market, those that remain to make up the remainder of the necessary demand to sell all securities, will allow these uninformed investors to make profits by underpricing the security.
- These profits are used to offset losses uninformed traders make by taking all securities that have a low value and are overpriced.

- Securities which are seen as having a low value, and hence low demand by informed investors, can still be sold as uninformed investors will buy them, even though the make a loss on the security. This loss is not known to them beforehand, however.
- As uninformed investors are allocated only a small amount in the case of high-value securities, the underpricing needs to be sufficient large to compensate for the overpricing, which applies to the whole offer, a much larger amount.

→ Underpricing prevent a market breakdown by allowing uninformed investors to demand securities and not make a loss.

Effect of underpricing

- Underpricing allows uninformed investors to make profits in high-demand issues

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- Underpricing allows uninformed investors to make profits in high-demand issues and offsets their losses in low-demand issues
- This inducement allows low-demand issues to be sold to uninformed investors at high prices

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- Securities which are seen as having a low value, and hence low demand by informed investors, can still be sold as uninformed investors will buy them, even though the make a loss on the security. This loss is not known to them beforehand, however.
- As uninformed investors are allocated only a small amount in the case of high-value securities, the underpricing needs to be sufficient large to compensate for the overpricing, which applies to the whole offer, a much larger amount.

→ Underpricing prevent a market breakdown by allowing uninformed investors to demand securities and not make a loss.

Effect of underpricing

- Underpricing allows uninformed investors to make profits in high-demand issues and offsets their losses in low-demand issues
- This inducement allows low-demand issues to be sold to uninformed investors at high prices
- The lower allocation for high-demand issues results in overall underpricing

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Cross-subsidization

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→ High-value securities are underpriced while low-value securities are underpriced. Of course a security can be only one or the other and any compensation of uninformed investors has to come from other security issues over time. We can thus compare the effect on securities by different issuers.

- It is not investment banks that pay to avoid the market breakdown, the underpricing only reduces the fee they obtain. While it is the role of the investment bank to ensure securities are sold, the mechanism with which this happens, does not impose direct costs on them.
- Issuers pay through the underpricing by obtaining less revenue than the expected value of their securities. The higher profits by informed investors are creamed off by them and the losses of uninformed investors covered by the underpricing, which in turn increases the profits of informed investors as well.
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  - The underpricing occurs to securities that have a high value, for which there is a high demand, and the issuers of such securities make a loss.
  - It is these securities that are unaffected by low demand, the high value securities, that are sold at a substantial discount.
- We can interpret this situation as a cross-subsidy of issuers with high-value (high demand) securities to those with low-value securities (low demand). We should therefore observe larger underpricing of high-demand securities than low-demand securities; something that can be found in actual markets.

→ Securities are more underpriced if they are g=facing a high demand and the issuer of such securities obtains a smaller offer price in order to ensure that other, less popular securities can be offered. While this is a cross-subsidy, it has to be noted that without this mechanism, high-demand securities could also not be sold as uninformed investors cannot distinguish between these types and hence the market would break down.

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