



Chapter 8.2

Obtaining future investment banking business

Outline

- Problem and model assumptions
- Competitive investment banks
- Optimizing companies
- Summary

- Financial analysts are supposed to assess the prospects of companies and the securities they have issued. Doing so should be based on their expertise and knowledge about the company.
- However, selling analysts reports is not very profitable as only few investors would be willing to pay for such reports and recovering costs is difficult.
- Analyst reports can also be used as a show-case for the ability of an investment bank to assess companies and hence to provide advice. In this case the analyst report is an advertising to attract future business from the company they cover or other, similar, companies.
- We will look at what implications it has for the quality of analyst reports if investment banks are seeking future business.

- We will look at how investment banks compete with other by providing analyst reports. This will induce a positive bias into the published report of financial analysts to be more attractive to companies.
- We will then see how companies optimize their provision of information to investors.

■ Problem and model assumptions

■ Competitive investment banks

■ Optimizing companies

■ Summary

- We will investigate how investment banks may bias their analyst reports in order to gain additional revenue from attracting investment banking business.

Accuracy and future business

- Financial analyst coverage is not a profitable business line of investment banks. They therefore use financial analysts to attract future business and we will look at what the implications are for the accuracy of forecasts.
- ▶ The role of financial analysts is to assess the future prospects of companies; based on these prospects they then provide a forecast about the performance of the security, usually their shares, in form of a target price some time in the future.
- ▶
 - If their forecast is accurate, this increases the reputation for their competence.
 - By providing accurate forecasts, investment banks might attract investors that seek to benefit from the expertise of their financial analysts, be through advice via their brokerage division or in asset management.
- ▶
 - We assume that the investment bank wants to obtain future business from the companies they are covering and use their coverage as a means to achieve this.
 - Companies prefer a positive coverage, so are more likely to provide this additional coverage if the analyst report attests the company good future prospects.
- ▶ We now assume that financial analyst seek to gain reputation for accuracy, but also value the future business their reports can bring. Hence they will provide a strategic forecast that takes these two aspects into account.
- We can now look at modelling this relationship between accuracy of forecasts and the attraction of future business.

Accuracy and future business

- ▶ Financial analysts provide **forecasts** about the future performance of the securities of companies, mostly shares

- Financial analyst coverage is not a profitable business line of investment banks. They therefore use financial analysts to attract future business and we will look at what the implications are for the accuracy of forecasts.
- ▶ The role of financial analysts is to assess the future prospects of companies; based on these prospects they then provide a forecast about the performance of the security, usually their shares, in form of a target price some time in the future.
- ▶
 - If their forecast is accurate, this increases the reputation for their competence.
 - By providing accurate forecasts, investment banks might attract investors that seek to benefit from the expertise of their financial analysts, be through advice via their brokerage division or in asset management.
- ▶
 - We assume that the investment bank wants to obtain future business from the companies they are covering and use their coverage as a means to achieve this.
 - Companies prefer a positive coverage, so are more likely to provide this additional coverage if the analyst report attests the company good future prospects.
- ▶ We now assume that financial analyst seek to gain reputation for accuracy, but also value the future business their reports can bring. Hence they will provide a strategic forecast that takes these two aspects into account.
- We can now look at modelling this relationship between accuracy of forecasts and the attraction of future business.

Accuracy and future business

- ▶ Financial analysts provide forecasts about the future performance of the securities of companies, mostly shares
- ▶ Precise forecasts increase **reputation** and income

- Financial analyst coverage is not a profitable business line of investment banks. They therefore use financial analysts to attract future business and we will look at what the implications are for the accuracy of forecasts.
- ▶ The role of financial analysts is to assess the future prospects of companies; based on these prospects they then provide a forecast about the performance of the security, usually their shares, in form of a target price some time in the future.
- ▶
 - If their forecast is accurate, this increases the reputation for their competence.
 - By providing accurate forecasts, investment banks might attract investors that seek to benefit from the expertise of their financial analysts, be through advice via their brokerage division or in asset management.
- ▶
 - We assume that the investment bank wants to obtain future business from the companies they are covering and use their coverage as a means to achieve this.
 - Companies prefer a positive coverage, so are more likely to provide this additional coverage if the analyst report attests the company good future prospects.
- ▶ We now assume that financial analyst seek to gain reputation for accuracy, but also value the future business their reports can bring. Hence they will provide a strategic forecast that takes these two aspects into account.
- We can now look at modelling this relationship between accuracy of forecasts and the attraction of future business.

Accuracy and future business

- ▶ Financial analysts provide forecasts about the future performance of the securities of companies, mostly shares
- ▶ Precise forecasts increase reputation and income as this can attract **investors** to the investment bank

- Financial analyst coverage is not a profitable business line of investment banks. They therefore use financial analysts to attract future business and we will look at what the implications are for the accuracy of forecasts.
- ▶ The role of financial analysts is to assess the future prospects of companies; based on these prospects they then provide a forecast about the performance of the security, usually their shares, in form of a target price some time in the future.
- ▶
 - If their forecast is accurate, this increases the reputation for their competence.
 - By providing accurate forecasts, investment banks might attract investors that seek to benefit from the expertise of their financial analysts, be through advice via their brokerage division or in asset management.
- ▶
 - We assume that the investment bank wants to obtain future business from the companies they are covering and use their coverage as a means to achieve this.
 - Companies prefer a positive coverage, so are more likely to provide this additional coverage if the analyst report attests the company good future prospects.
- ▶ We now assume that financial analyst seek to gain reputation for accuracy, but also value the future business their reports can bring. Hence they will provide a strategic forecast that takes these two aspects into account.
- We can now look at modelling this relationship between accuracy of forecasts and the attraction of future business.

Accuracy and future business

- ▶ Financial analysts provide forecasts about the future performance of the securities of companies, mostly shares
- ▶ Precise forecasts increase reputation and income as this can attract investors to the investment bank
- ▶ The investment bank will also seek **future business** from the company

- Financial analyst coverage is not a profitable business line of investment banks. They therefore use financial analysts to attract future business and we will look at what the implications are for the accuracy of forecasts.
- ▶ The role of financial analysts is to assess the future prospects of companies; based on these prospects they then provide a forecast about the performance of the security, usually their shares, in form of a target price some time in the future.
- ▶
 - If their forecast is accurate, this increases the reputation for their competence.
 - By providing accurate forecasts, investment banks might attract investors that seek to benefit from the expertise of their financial analysts, be through advice via their brokerage division or in asset management.
- ▶
 - We assume that the investment bank wants to obtain future business from the companies they are covering and use their coverage as a means to achieve this.
 - Companies prefer a positive coverage, so are more likely to provide this additional coverage if the analyst report attests the company good future prospects.
- ▶ We now assume that financial analyst seek to gain reputation for accuracy, but also value the future business their reports can bring. Hence they will provide a strategic forecast that takes these two aspects into account.
- We can now look at modelling this relationship between accuracy of forecasts and the attraction of future business.

Accuracy and future business

- ▶ Financial analysts provide forecasts about the future performance of the securities of companies, mostly shares
- ▶ Precise forecasts increase reputation and income as this can attract investors to the investment bank
- ▶ The investment bank will also seek future business from the company, the more **positive** the coverage the more likely they gain this business

- Financial analyst coverage is not a profitable business line of investment banks. They therefore use financial analysts to attract future business and we will look at what the implications are for the accuracy of forecasts.
- ▶ The role of financial analysts is to assess the future prospects of companies; based on these prospects they then provide a forecast about the performance of the security, usually their shares, in form of a target price some time in the future.
- ▶
 - If their forecast is accurate, this increases the reputation for their competence.
 - By providing accurate forecasts, investment banks might attract investors that seek to benefit from the expertise of their financial analysts, be through advice via their brokerage division or in asset management.
- ▶
 - We assume that the investment bank wants to obtain future business from the companies they are covering and use their coverage as a means to achieve this.
 - Companies prefer a positive coverage, so are more likely to provide this additional coverage if the analyst report attests the company good future prospects.
- ▶ We now assume that financial analyst seek to gain reputation for accuracy, but also value the future business their reports can bring. Hence they will provide a strategic forecast that takes these two aspects into account.
- We can now look at modelling this relationship between accuracy of forecasts and the attraction of future business.

Accuracy and future business

- ▶ Financial analysts provide forecasts about the future performance of the securities of companies, mostly shares
- ▶ Precise forecasts increase reputation and income as this can attract investors to the investment bank
- ▶ The investment bank will also seek future business from the company, the more positive the coverage the more likely they gain this business
- ▶ Financial analysts have to **balance** forecast accuracy and the attraction of companies

- Financial analyst coverage is not a profitable business line of investment banks. They therefore use financial analysts to attract future business and we will look at what the implications are for the accuracy of forecasts.
- ▶ The role of financial analysts is to assess the future prospects of companies; based on these prospects they then provide a forecast about the performance of the security, usually their shares, in form of a target price some time in the future.
- ▶
 - If their forecast is accurate, this increases the reputation for their competence.
 - By providing accurate forecasts, investment banks might attract investors that seek to benefit from the expertise of their financial analysts, be through advice via their brokerage division or in asset management.
- ▶
 - We assume that the investment bank wants to obtain future business from the companies they are covering and use their coverage as a means to achieve this.
 - Companies prefer a positive coverage, so are more likely to provide this additional coverage if the analyst report attests the company good future prospects.
- ▶ We now assume that financial analyst seek to gain reputation for accuracy, but also value the future business their reports can bring. Hence they will provide a strategic forecast that takes these two aspects into account.
- We can now look at modelling this relationship between accuracy of forecasts and the attraction of future business.

Accuracy and future business

- ▶ Financial analysts provide forecasts about the future performance of the securities of companies, mostly shares
- ▶ Precise forecasts increase reputation and income as this can attract investors to the investment bank
- ▶ The investment bank will also seek future business from the company, the more positive the coverage the more likely they gain this business
- ▶ Financial analysts have to balance forecast accuracy and the attraction of companies

- Financial analyst coverage is not a profitable business line of investment banks. They therefore use financial analysts to attract future business and we will look at what the implications are for the accuracy of forecasts.
- ▶ The role of financial analysts is to assess the future prospects of companies; based on these prospects they then provide a forecast about the performance of the security, usually their shares, in form of a target price some time in the future.
- ▶
 - If their forecast is accurate, this increases the reputation for their competence.
 - By providing accurate forecasts, investment banks might attract investors that seek to benefit from the expertise of their financial analysts, be through advice via their brokerage division or in asset management.
- ▶
 - We assume that the investment bank wants to obtain future business from the companies they are covering and use their coverage as a means to achieve this.
 - Companies prefer a positive coverage, so are more likely to provide this additional coverage if the analyst report attests the company good future prospects.
- ▶ We now assume that financial analyst seek to gain reputation for accuracy, but also value the future business their reports can bring. Hence they will provide a strategic forecast that takes these two aspects into account.
- We can now look at modelling this relationship between accuracy of forecasts and the attraction of future business.

Competing investment banks

Competing investment banks

- Investment banks compete for business from companies and can use financial analysts strategically to attract clients.
- ▶ Let us assume that a number of investment banks provide analyst reports about a company, thus investment banks are competing with each other for the business this company has to give in the future.
- ▶ Future business form the company probably consists mainly of mergers and acquisitions advice, but it might also be the use of financial innovations. The present value of this future business to the investment bank is assumed to be known.
- ▶ The financial analyst receives information about the future price of the shares of the company. This information is not perfect as it may have some error; we call this a signal. The signal consists of the price and the error term, but we can only observe the signal, not its components. Given the signal, the best forecast the analyst could provide is to follow the signal.
- ▶
 - Analysts will publish their forecast of the price, which might not be the price they would forecast using the signal. Thus the price forecast could be biased.
 - This bias is the difference between their published forecast and the forecast implied by the signal. Such a bias can be positive if the published forecast is higher than the forecast based on the signal, or negative if it is below.
- Analysts might not follow their signal in providing forecasts, but could act strategically and introduce a bias in their forecast on purpose. We will look at some implications of this bias.

Competing investment banks

- ▶ A company is covered by N investment banks

Competing investment banks

- Investment banks compete for business from companies and can use financial analysts strategically to attract clients.
- ▶ Let us assume that a number of investment banks provide analyst reports about a company, thus investment banks are competing with each other for the business this company has to give in the future.
- ▶ Future business form the company probably consists mainly of mergers and acquisitions advice, but it might also be the use of financial innovations. The present value of this future business to the investment bank is assumed to be known.
- ▶ The financial analyst receives information about the future price of the shares of the company. This information is not perfect as it may have some error; we call this a signal. The signal consists of the price and the error term, but we can only observe the signal, not its components. Given the signal, the best forecast the analyst could provide is to follow the signal.
- ▶
 - Analysts will publish their forecast of the price, which might not be the price they would forecast using the signal. Thus the price forecast could be biased.
 - This bias is the difference between their published forecast and the forecast implied by the signal. Such a bias can be positive if the published forecast is higher than the forecast based on the signal, or negative if it is below.
- Analysts might not follow their signal in providing forecasts, but could act strategically and introduce a bias in their forecast on purpose. We will look at some implications of this bias.

Competing investment banks

- ▶ A company is covered by N investment banks
- ▶ Future investment banking business from this company is worth V_B to the investment bank

Competing investment banks

- Investment banks compete for business from companies and can use financial analysts strategically to attract clients.
- ▶ Let us assume that a number of investment banks provide analyst reports about a company, thus investment banks are competing with each other for the business this company has to give in the future.
- ▶ Future business form the company probably consists mainly of mergers and acquisitions advice, but it might also be the use of financial innovations. The present value of this future business to the investment bank is assumed to be known.
- ▶ The financial analyst receives information about the future price of the shares of the company. This information is not perfect as it may have some error; we call this a signal. The signal consists of the price and the error term, but we can only observe the signal, not its components. Given the signal, the best forecast the analyst could provide is to follow the signal.
- ▶
 - Analysts will publish their forecast of the price, which might not be the price they would forecast using the signal. Thus the price forecast could be biased.
 - This bias is the difference between their published forecast and the forecast implied by the signal. Such a bias can be positive if the published forecast is higher than the forecast based on the signal, or negative if it is below.
- Analysts might not follow their signal in providing forecasts, but could act strategically and introduce a bias in their forecast on purpose. We will look at some implications of this bias.

Competing investment banks

- ▶ A company is covered by N investment banks
- ▶ Future investment banking business from this company is worth V_B to the investment bank
- ▶ Each financial analyst receives a **noisy signal** about the **true value**: $s_i = P + \varepsilon_i$

Competing investment banks

- Investment banks compete for business from companies and can use financial analysts strategically to attract clients.
- ▶ Let us assume that a number of investment banks provide analyst reports about a company, thus investment banks are competing with each other for the business this company has to give in the future.
- ▶ Future business form the company probably consists mainly of mergers and acquisitions advice, but it might also be the use of financial innovations. The present value of this future business to the investment bank is assumed to be known.
- ▶ The financial analyst receives information about the future price of the shares of the company. This information is not perfect as it may have some error; we call this a signal. The signal consists of the price and the error term, but we can only observe the signal, not its components. Given the signal, the best forecast the analyst could provide is to follow the signal.
- ▶
 - Analysts will publish their forecast of the price, which might not be the price they would forecast using the signal. Thus the price forecast could be biased.
 - This bias is the difference between their published forecast and the forecast implied by the signal. Such a bias can be positive if the published forecast is higher than the forecast based on the signal, or negative if it is below.
- Analysts might not follow their signal in providing forecasts, but could act strategically and introduce a bias in their forecast on purpose. We will look at some implications of this bias.

Competing investment banks

- ▶ A company is covered by N investment banks
- ▶ Future investment banking business from this company is worth V_B to the investment bank
- ▶ Each financial analyst receives a noisy signal about the true value: $s_i = P + \varepsilon_i$
- ▶ Analysts publish a **forecast** \hat{P}_i

Competing investment banks

- Investment banks compete for business from companies and can use financial analysts strategically to attract clients.
- ▶ Let us assume that a number of investment banks provide analyst reports about a company, thus investment banks are competing with each other for the business this company has to give in the future.
- ▶ Future business form the company probably consists mainly of mergers and acquisitions advice, but it might also be the use of financial innovations. The present value of this future business to the investment bank is assumed to be known.
- ▶ The financial analyst receives information about the future price of the shares of the company. This information is not perfect as it may have some error; we call this a signal. The signal consists of the price and the error term, but we can only observe the signal, not its components. Given the signal, the best forecast the analyst could provide is to follow the signal.
- ▶
 - Analysts will publish their forecast of the price, which might not be the price they would forecast using the signal. Thus the price forecast could be biased.
 - This bias is the difference between their published forecast and the forecast implied by the signal. Such a bias can be positive if the published forecast is higher than the forecast based on the signal, or negative if it is below.
- Analysts might not follow their signal in providing forecasts, but could act strategically and introduce a bias in their forecast on purpose. We will look at some implications of this bias.

Competing investment banks

- ▶ A company is covered by N investment banks
- ▶ Future investment banking business from this company is worth V_B to the investment bank
- ▶ Each financial analyst receives a noisy signal about the true value: $s_i = P + \varepsilon_i$
- ▶ Analysts publish a forecast \hat{P}_i which has a **bias** $b_i = E \left[\hat{P}_i - E[P|s_i] \right]$

Competing investment banks

- Investment banks compete for business from companies and can use financial analysts strategically to attract clients.
- ▶ Let us assume that a number of investment banks provide analyst reports about a company, thus investment banks are competing with each other for the business this company has to give in the future.
- ▶ Future business form the company probably consists mainly of mergers and acquisitions advice, but it might also be the use of financial innovations. The present value of this future business to the investment bank is assumed to be known.
- ▶ The financial analyst receives information about the future price of the shares of the company. This information is not perfect as it may have some error; we call this a signal. The signal consists of the price and the error term, but we can only observe the signal, not its components. Given the signal, the best forecast the analyst could provide is to follow the signal.
- ▶
 - Analysts will publish their forecast of the price, which might not be the price they would forecast using the signal. Thus the price forecast could be biased.
 - This bias is the difference between their published forecast and the forecast implied by the signal. Such a bias can be positive if the published forecast is higher than the forecast based on the signal, or negative if it is below.
- Analysts might not follow their signal in providing forecasts, but could act strategically and introduce a bias in their forecast on purpose. We will look at some implications of this bias.

Competing investment banks

- ▶ A company is covered by N investment banks
- ▶ Future investment banking business from this company is worth V_B to the investment bank
- ▶ Each financial analyst receives a noisy signal about the true value: $s_i = P + \varepsilon_i$
- ▶ Analysts publish a forecast \hat{P}_i which has a bias $b_i = E \left[\hat{P}_i - E[P|s_i] \right]$

Competing investment banks

- Investment banks compete for business from companies and can use financial analysts strategically to attract clients.
- ▶ Let us assume that a number of investment banks provide analyst reports about a company, thus investment banks are competing with each other for the business this company has to give in the future.
- ▶ Future business form the company probably consists mainly of mergers and acquisitions advice, but it might also be the use of financial innovations. The present value of this future business to the investment bank is assumed to be known.
- ▶ The financial analyst receives information about the future price of the shares of the company. This information is not perfect as it may have some error; we call this a signal. The signal consists of the price and the error term, but we can only observe the signal, not its components. Given the signal, the best forecast the analyst could provide is to follow the signal.
- ▶
 - Analysts will publish their forecast of the price, which might not be the price they would forecast using the signal. Thus the price forecast could be biased.
 - This bias is the difference between their published forecast and the forecast implied by the signal. Such a bias can be positive if the published forecast is higher than the forecast based on the signal, or negative if it is below.
- Analysts might not follow their signal in providing forecasts, but could act strategically and introduce a bias in their forecast on purpose. We will look at some implications of this bias.

Forecast error

- Forecasts are never perfect and there are errors as long as the information is not perfect. We can assess the resulting forecast error using statistical tools.
- ▶ The forecast error is the difference between the published forecast and the actual price that is realised. The forecast error is usually taken as the square of this difference, given the information (signal) the analyst had. We can express this term using the bias and the variance of the price itself.
- ▶ The variance of the price, given the signal, can be determined using Bayesian learning and we get this as a combination of the variance of the price without a signal, σ_P^2 and the uncertainty of the signal, σ_i^2 .
- ▶ This variance can now be inserted into the forecast error.
- We have now obtained an expression for the forecast error and will use this to determine the optimal bias an analyst would choose.

Forecast error

► Forecast error: $E \left[\left(\hat{P}_i - P \right)^2 \middle| s_i \right] = b_i^2 + Var [P | s_i]$

- Forecasts are never perfect and there are errors as long as the information is not perfect. We can assess the resulting forecast error using statistical tools.
- ▶ The forecast error is the difference between the published forecast and the actual price that is realised. The forecast error is usually taken as the square of this difference, given the information (signal) the analyst had. We can express this term using the bias and the variance of the price itself.
- ▶ The variance of the price, given the signal, can be determined using Bayesian learning and we get this as a combination of the variance of the price without a signal, σ_P^2 and the uncertainty of the signal, σ_i^2 .
- ▶ This variance can now be inserted into the forecast error.
- We have now obtained an expression for the forecast error and will use this to determine the optimal bias an analyst would choose.

Forecast error

- ▶ Forecast error: $E \left[\left(\hat{P}_i - P \right)^2 \middle| s_i \right] = b_i^2 + Var [P|s_i]$
- ▶ Bayesian learning gives $Var [P|s_i] = \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}$

- Forecasts are never perfect and there are errors as long as the information is not perfect. We can assess the resulting forecast error using statistical tools.
- ▶ The forecast error is the difference between the published forecast and the actual price that is realised. The forecast error is usually taken as the square of this difference, given the information (signal) the analyst had. We can express this term using the bias and the variance of the price itself.
- ▶ The variance of the price, given the signal, can be determined using Bayesian learning and we get this as a combination of the variance of the price without a signal, σ_P^2 and the uncertainty of the signal, σ_i^2 .
- ▶ This variance can now be inserted into the forecast error.
- We have now obtained an expression for the forecast error and will use this to determine the optimal bias an analyst would choose.

Forecast error

- ▶ Forecast error: $E \left[\left(\hat{P}_i - P \right)^2 \middle| s_i \right] = b_i^2 + Var [P|s_i]$
- ▶ Bayesian learning gives $Var [P|s_i] = \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}$
- ▶ This gives $E \left[\left(\hat{P}_i - P \right)^2 \middle| s_i \right] = b_i^2 + \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}$

- Forecasts are never perfect and there are errors as long as the information is not perfect. We can assess the resulting forecast error using statistical tools.
- ▶ The forecast error is the difference between the published forecast and the actual price that is realised. The forecast error is usually taken as the square of this difference, given the information (signal) the analyst had. We can express this term using the bias and the variance of the price itself.
- ▶ The variance of the price, given the signal, can be determined using Bayesian learning and we get this as a combination of the variance of the price without a signal, σ_P^2 and the uncertainty of the signal, σ_i^2 .
- ▶ This variance can now be inserted into the forecast error.
- We have now obtained an expression for the forecast error and will use this to determine the optimal bias an analyst would choose.

Forecast error

- ▶ Forecast error: $E \left[\left(\hat{P}_i - P \right)^2 \middle| s_i \right] = b_i^2 + Var [P|s_i]$
- ▶ Bayesian learning gives $Var [P|s_i] = \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}$
- ▶ This gives $E \left[\left(\hat{P}_i - P \right)^2 \middle| s_i \right] = b_i^2 + \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}$

- Forecasts are never perfect and there are errors as long as the information is not perfect. We can assess the resulting forecast error using statistical tools.
- ▶ The forecast error is the difference between the published forecast and the actual price that is realised. The forecast error is usually taken as the square of this difference, given the information (signal) the analyst had. We can express this term using the bias and the variance of the price itself.
- ▶ The variance of the price, given the signal, can be determined using Bayesian learning and we get this as a combination of the variance of the price without a signal, σ_P^2 and the uncertainty of the signal, σ_i^2 .
- ▶ This variance can now be inserted into the forecast error.
- We have now obtained an expression for the forecast error and will use this to determine the optimal bias an analyst would choose.

■ Problem and model assumptions

■ Competitive investment banks

■ Optimizing companies

■ Summary

- We can now determine the optimal bias that investment banks will choose to gain business from the company.

Investment bank profits

- We can now determine the profits of investment banks, taking into account the potential revenue from the company, but also losses from having forecast errors.
- ▶ As there are multiple investment banks competing for the business of the company by providing analyst reports, the company will choose amongst them and we assign this as a probability the a specific investment bank is chosen and obtains the entire revenue from the company.
- ▶ As accuracy of forecasts increases an investment banks reputation, we assume that the larger the forecast error, the smaller the benefits are to the investment bank. This might be due to lost revenue in brokerage or asset management.
- ▶ The expected revenue from the business of the company is thus reduced by the forecast error with some factor that accounts for the relative importance of these two aspects.
- ▶ *Formula*
- These profits can now be used to determine the optimal bias for investment banks.

Investment bank profits

- ▶ An investment bank obtains the **future business** V_B of the company with **probability** p_i

- We can now determine the profits of investment banks, taking into account the potential revenue from the company, but also losses from having forecast errors.
- ▶ As there are multiple investment banks competing for the business of the company by providing analyst reports, the company will choose amongst them and we assign this as a probability the a specific investment bank is chosen and obtains the entire revenue from the company.
- ▶ As accuracy of forecasts increases an investment banks reputation, we assume that the larger the forecast error, the smaller the benefits are to the investment bank. This might be due to lost revenue in brokerage or asset management.
- ▶ The expected revenue from the business of the company is thus reduced by the forecast error with some factor that accounts for the relative importance of these two aspects.
- ▶ *Formula*
- These profits can now be used to determine the optimal bias for investment banks.

Investment bank profits

- ▶ An investment bank obtains the **future business** V_B of the company with **probability** p_i
- ▶ Banks loose income from investors if the **forecast error** increases

- We can now determine the profits of investment banks, taking into account the potential revenue from the company, but also losses from having forecast errors.
- ▶ As there are multiple investment banks competing for the business of the company by providing analyst reports, the company will choose amongst them and we assign this as a probability the a specific investment bank is chosen and obtains the entire revenue from the company.
- ▶ As accuracy of forecasts increases an investment banks reputation, we assume that the larger the forecast error, the smaller the benefits are to the investment bank. This might be due to lost revenue in brokerage or asset management.
- ▶ The expected revenue from the business of the company is thus reduced by the forecast error with some factor that accounts for the relative importance of these two aspects.
- ▶ *Formula*
- These profits can now be used to determine the optimal bias for investment banks.

Investment bank profits

- ▶ An investment bank obtains the **future business** V_B of the company with **probability** p_i
- ▶ Banks loose income from investors if the **forecast error** increases
- ▶ The importance of investor income is α_B
- ▶ Profits: $\Pi_B^i = p_i V_B - \alpha_B E \left[\left(\hat{P}_i - P \right)^2 \middle| s_i \right]$

- We can now determine the profits of investment banks, taking into account the potential revenue from the company, but also losses from having forecast errors.
- ▶ As there are multiple investment banks competing for the business of the company by providing analyst reports, the company will choose amongst them and we assign this as a probability the a specific investment bank is chosen and obtains the entire revenue from the company.
- ▶ As accuracy of forecasts increases an investment banks reputation, we assume that the larger the forecast error, the smaller the benefits are to the investment bank. This might be due to lost revenue in brokerage or asset management.
- ▶ The expected revenue from the business of the company is thus reduced by the forecast error with some factor that accounts for the relative importance of these two aspects.
- ▶ *Formula*
- These profits can now be used to determine the optimal bias for investment banks.

Investment bank profits

- ▶ An investment bank obtains the future business V_B of the company with probability p_i
- ▶ Banks loose income from investors if the forecast error increases
- ▶ The importance of investor income is α_B
- ▶ Profits: $\Pi_B^i = p_i V_B - \alpha_B E \left[\left(\hat{P}_i - P \right)^2 \middle| s_i \right]$

- We can now determine the profits of investment banks, taking into account the potential revenue from the company, but also losses from having forecast errors.
- ▶ As there are multiple investment banks competing for the business of the company by providing analyst reports, the company will choose amongst them and we assign this as a probability the a specific investment bank is chosen and obtains the entire revenue from the company.
- ▶ As accuracy of forecasts increases an investment banks reputation, we assume that the larger the forecast error, the smaller the benefits are to the investment bank. This might be due to lost revenue in brokerage or asset management.
- ▶ The expected revenue from the business of the company is thus reduced by the forecast error with some factor that accounts for the relative importance of these two aspects.
- ▶ *Formula*
- These profits can now be used to determine the optimal bias for investment banks.

Competitive bias

- We can now use the profits of the investment bank to obtain the bias in their recommendations.
- ▶ If we assume that investment banks are competitive, then their profits are zero.
- ▶ We can use the requirement to have zero profits to determine the bias which is compatible with this condition by inserting for the forecast error.
- ▶ What we see is that the more important future business is relative to the forecast error, a lower α_B , the bias increases. This is obvious as the forecast error increases in the bias and the lower α_B requires a larger forecast bias to retain the zero profits.
- ▶ Reversely, the more important the income from investors making use of the analyst reports, the lower the bias will be.
- The optimal bias of the investment bank still depends on the probability that it obtains the future business from the company, p_i . We will therefore now investigate the decision of the company in allocating their future business to an investment bank.

Competitive bias

- ▶ If investment banks compete, then $\Pi_B^i = 0$

- We can now use the profits of the investment bank to obtain the bias in their recommendations.
- ▶ If we assume that investment banks are competitive, then their profits are zero.
- ▶ We can use the requirement to have zero profits to determine the bias which is compatible with this condition by inserting for the forecast error.
- ▶ What we see is that the more important future business is relative to the forecast error, a lower α_B , the bias increases. This is obvious as the forecast error increases in the bias and the lower α_B requires a larger forecast bias to retain the zero profits.
- ▶ Reversely, the more important the income from investors making use of the analyst reports, the lower the bias will be.
- The optimal bias of the investment bank still depends on the probability that it obtains the future business from the company, p_i . We will therefore now investigate the decision of the company in allocating their future business to an investment bank.

Competitive bias

- ▶ If investment banks compete, then $\Pi_B^i = 0$
- ▶ This gives a bias $b_i = \sqrt{\frac{p_i V_B}{\alpha_B} - \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}} > 0$

- We can now use the profits of the investment bank to obtain the bias in their recommendations.
- ▶ If we assume that investment banks are competitive, then their profits are zero.
- ▶ We can use the requirement to have zero profits to determine the bias which is compatible with this condition by inserting for the forecast error.
- ▶ What we see is that the more important future business is relative to the forecast error, a lower α_B , the bias increases. This is obvious as the forecast error increases in the bias and the lower α_B requires a larger forecast bias to retain the zero profits.
- ▶ Reversely, the more important the income from investors making use of the analyst reports, the lower the bias will be.
- The optimal bias of the investment bank still depends on the probability that it obtains the future business from the company, p_i . We will therefore now investigate the decision of the company in allocating their future business to an investment bank.

Competitive bias

- ▶ If investment banks compete, then $\Pi_B^i = 0$
- ▶ This gives a bias $b_i = \sqrt{\frac{p_i V_B}{\alpha_B} - \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}} > 0$
- ▶ The more important **future business** is, the higher the bias

- We can now use the profits of the investment bank to obtain the bias in their recommendations.
- ▶ If we assume that investment banks are competitive, then their profits are zero.
- ▶ We can use the requirement to have zero profits to determine the bias which is compatible with this condition by inserting for the forecast error.
- ▶ What we see is that the more important future business is relative to the forecast error, a lower α_B , the bias increases. This is obvious as the forecast error increases in the bias and the lower α_B requires a larger forecast bias to retain the zero profits.
- ▶ Reversely, the more important the income from investors making use of the analyst reports, the lower the bias will be.
- The optimal bias of the investment bank still depends on the probability that it obtains the future business from the company, p_i . We will therefore now investigate the decision of the company in allocating their future business to an investment bank.

Competitive bias

- ▶ If investment banks compete, then $\Pi_B^i = 0$
- ▶ This gives a bias $b_i = \sqrt{\frac{p_i V_B}{\alpha_B} - \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}} > 0$
- ▶ The more important future business is, the higher the bias
- ▶ The more important **investor income** is, the lower the bias

- We can now use the profits of the investment bank to obtain the bias in their recommendations.
- ▶ If we assume that investment banks are competitive, then their profits are zero.
- ▶ We can use the requirement to have zero profits to determine the bias which is compatible with this condition by inserting for the forecast error.
- ▶ What we see is that the more important future business is relative to the forecast error, a lower α_B , the bias increases. This is obvious as the forecast error increases in the bias and the lower α_B requires a larger forecast bias to retain the zero profits.
- ▶ Reversely, the more important the income from investors making use of the analyst reports, the lower the bias will be.
- The optimal bias of the investment bank still depends on the probability that it obtains the future business from the company, p_i . We will therefore now investigate the decision of the company in allocating their future business to an investment bank.

Competitive bias

- ▶ If investment banks compete, then $\Pi_B^i = 0$
- ▶ This gives a bias $b_i = \sqrt{\frac{p_i V_B}{\alpha_B} - \frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}}} > 0$
- ▶ The more important future business is, the higher the bias
- ▶ The more important investor income is, the lower the bias

- We can now use the profits of the investment bank to obtain the bias in their recommendations.
- ▶ If we assume that investment banks are competitive, then their profits are zero.
- ▶ We can use the requirement to have zero profits to determine the bias which is compatible with this condition by inserting for the forecast error.
- ▶ What we see is that the more important future business is relative to the forecast error, a lower α_B , the bias increases. This is obvious as the forecast error increases in the bias and the lower α_B requires a larger forecast bias to retain the zero profits.
- ▶ Reversely, the more important the income from investors making use of the analyst reports, the lower the bias will be.
- The optimal bias of the investment bank still depends on the probability that it obtains the future business from the company, p_i . We will therefore now investigate the decision of the company in allocating their future business to an investment bank.

■ Problem and model assumptions

■ Competitive investment banks

■ **Optimizing companies**

■ Summary

- Companies are not passively waiting for investment banks to show a positive bias in their forecasts to gain additional business.
- They make an active decision who to provide this future business to and also they decide how much information to provide.
- We will now see how this will affect the bias investment banks have in their forecasting of the stock price.

Company profits

- Companies benefit from a positive bias, but they face costs providing information to financial analysts.
- ▶
 - Companies prefer positive recommendations as this usually boosts the share price and thereby the payment to senior managers which are commonly linked to the share price; hence a positive bias is preferred by companies. With multiple investment banks providing their forecasts, the benefits arise from the average bias shown.
 - The relative weight assigned to the value of the bias is α_C .
- ▶ Companies need to provide information to the financial analyst. This information will increase the precision of signal financial analysts obtain, thus the variance σ_i^2 reduces. Providing such information is costly, in providing the information in the first place, but also as it might reveal information competitors might find useful. Hence there are costs for providing information to each of the financial analysts.
- ▶ *Formula*
- ▶
 - Company allocate their future business randomly to investment banks with probability p_i . The company will optimally choose this probability.
 - As it has to give their business to some investment banks, the sum of all probabilities will have to be 1.
- We can now determine the optimal allocation of business to investment banks and the optimal precision of information companies provide to each investment bank.

Company profits

- ▶ Companies prefer a positive **bias** and derive utility from the **average** bias

- Companies benefit from a positive bias, but they face costs providing information to financial analysts.
 - ▶
 - Companies prefer positive recommendations as this usually boosts the share price and thereby the payment to senior managers which are commonly linked to the share price; hence a positive bias is preferred by companies. With multiple investment banks providing their forecasts, the benefits arise from the average bias shown.
 - The relative weight assigned to the value of the bias is α_C .
 - ▶ Companies need to provide information to the financial analyst. This information will increase the precision of signal financial analysts obtain, thus the variance σ_i^2 reduces. Providing such information is costly, in providing the information in the first place, but also as it might reveal information competitors might find useful. Hence there are costs for providing information to each of the financial analysts.
 - ▶ *Formula*
 - ▶
 - Company allocate their future business randomly to investment banks with probability p_i . The company will optimally choose this probability.
 - As it has to give their business to some investment banks, the sum of all probabilities will have to be 1.
- We can now determine the optimal allocation of business to investment banks and the optimal precision of information companies provide to each investment bank.

Company profits

- ▶ Companies prefer a positive **bias** and derive utility from the **average** bias, giving it **importance** α_C

- Companies benefit from a positive bias, but they face costs providing information to financial analysts.
 - ▶
 - Companies prefer positive recommendations as this usually boosts the share price and thereby the payment to senior managers which are commonly linked to the share price; hence a positive bias is preferred by companies. With multiple investment banks providing their forecasts, the benefits arise from the average bias shown.
 - The relative weight assigned to the value of the bias is α_C .
 - ▶ Companies need to provide information to the financial analyst. This information will increase the precision of signal financial analysts obtain, thus the variance σ_i^2 reduces. Providing such information is costly, in providing the information in the first place, but also as it might reveal information competitors might find useful. Hence there are costs for providing information to each of the financial analysts.
 - ▶ *Formula*
 - ▶
 - Company allocate their future business randomly to investment banks with probability p_i . The company will optimally choose this probability.
 - As it has to give their business to some investment banks, the sum of all probabilities will have to be 1.
- We can now determine the optimal allocation of business to investment banks and the optimal precision of information companies provide to each investment bank.

Company profits

- ▶ Companies prefer a positive **bias** and derive utility from the **average** bias, giving it **importance** α_C
- ▶ **Costs** of providing information to financial is increasing in the precision of the signal
- ▶ $\Pi_C = \alpha_C \frac{1}{N} \sum_{i=1}^N b_i - \sum_{i=1}^N C_i$

- Companies benefit from a positive bias, but they face costs providing information to financial analysts.
 - ▶
 - Companies prefer positive recommendations as this usually boosts the share price and thereby the payment to senior managers which are commonly linked to the share price; hence a positive bias is preferred by companies. With multiple investment banks providing their forecasts, the benefits arise from the average bias shown.
 - The relative weight assigned to the value of the bias is α_C .
 - ▶ Companies need to provide information to the financial analyst. This information will increase the precision of signal financial analysts obtain, thus the variance σ_i^2 reduces. Providing such information is costly, in providing the information in the first place, but also as it might reveal information competitors might find useful. Hence there are costs for providing information to each of the financial analysts.
 - ▶ *Formula*
 - ▶
 - Company allocate their future business randomly to investment banks with probability p_i . The company will optimally choose this probability.
 - As it has to give their business to some investment banks, the sum of all probabilities will have to be 1.
- We can now determine the optimal allocation of business to investment banks and the optimal precision of information companies provide to each investment bank.

Company profits

- ▶ Companies prefer a positive bias and derive utility from the average bias, giving it importance α_C
- ▶ Costs of providing information to financial is increasing in the precision of the signal
- ▶ $\Pi_C = \alpha_C \frac{1}{N} \sum_{i=1}^N b_i - \sum_{i=1}^N C_i$
- ▶ Companies allocate the investment banking business to investment bank i with probability p_i

- Companies benefit from a positive bias, but they face costs providing information to financial analysts.
 - ▶
 - Companies prefer positive recommendations as this usually boosts the share price and thereby the payment to senior managers which are commonly linked to the share price; hence a positive bias is preferred by companies. With multiple investment banks providing their forecasts, the benefits arise from the average bias shown.
 - The relative weight assigned to the value of the bias is α_C .
 - ▶ Companies need to provide information to the financial analyst. This information will increase the precision of signal financial analysts obtain, thus the variance σ_i^2 reduces. Providing such information is costly, in providing the information in the first place, but also as it might reveal information competitors might find useful. Hence there are costs for providing information to each of the financial analysts.
 - ▶ *Formula*
 - ▶
 - Company allocate their future business randomly to investment banks with probability p_i . The company will optimally choose this probability.
 - As it has to give their business to some investment banks, the sum of all probabilities will have to be 1.
- We can now determine the optimal allocation of business to investment banks and the optimal precision of information companies provide to each investment bank.

Company profits

- ▶ Companies prefer a positive bias and derive utility from the average bias, giving it importance α_C
- ▶ Costs of providing information to financial is increasing in the precision of the signal
- ▶ $\Pi_C = \alpha_C \frac{1}{N} \sum_{i=1}^N b_i - \sum_{i=1}^N C_i$
- ▶ Companies allocate the investment banking business to investment bank i with probability p_i , such that $\sum_{i=1}^N p_i = 1$

- Companies benefit from a positive bias, but they face costs providing information to financial analysts.
 - ▶
 - Companies prefer positive recommendations as this usually boosts the share price and thereby the payment to senior managers which are commonly linked to the share price; hence a positive bias is preferred by companies. With multiple investment banks providing their forecasts, the benefits arise from the average bias shown.
 - The relative weight assigned to the value of the bias is α_C .
 - ▶ Companies need to provide information to the financial analyst. This information will increase the precision of signal financial analysts obtain, thus the variance σ_i^2 reduces. Providing such information is costly, in providing the information in the first place, but also as it might reveal information competitors might find useful. Hence there are costs for providing information to each of the financial analysts.
 - ▶ *Formula*
 - ▶
 - Company allocate their future business randomly to investment banks with probability p_i . The company will optimally choose this probability.
 - **As it has to give their business to some investment banks, the sum of all probabilities will have to be 1.**
- We can now determine the optimal allocation of business to investment banks and the optimal precision of information companies provide to each investment bank.

Company profits

- ▶ Companies prefer a positive bias and derive utility from the average bias, giving it importance α_C
- ▶ Costs of providing information to financial is increasing in the precision of the signal
- ▶ $\Pi_C = \alpha_C \frac{1}{N} \sum_{i=1}^N b_i - \sum_{i=1}^N C_i$
- ▶ Companies allocate the investment banking business to investment bank i with probability p_i , such that $\sum_{i=1}^N p_i = 1$

- Companies benefit from a positive bias, but they face costs providing information to financial analysts.
 - ▶
 - Companies prefer positive recommendations as this usually boosts the share price and thereby the payment to senior managers which are commonly linked to the share price; hence a positive bias is preferred by companies. With multiple investment banks providing their forecasts, the benefits arise from the average bias shown.
 - The relative weight assigned to the value of the bias is α_C .
 - ▶ Companies need to provide information to the financial analyst. This information will increase the precision of signal financial analysts obtain, thus the variance σ_i^2 reduces. Providing such information is costly, in providing the information in the first place, but also as it might reveal information competitors might find useful. Hence there are costs for providing information to each of the financial analysts.
 - ▶ *Formula*
 - ▶
 - Company allocate their future business randomly to investment banks with probability p_i . The company will optimally choose this probability.
 - As it has to give their business to some investment banks, the sum of all probabilities will have to be 1.
- We can now determine the optimal allocation of business to investment banks and the optimal precision of information companies provide to each investment bank.

Optimal bias

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
- ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business and **precision of information** they provide

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business and precision of information they provide
- ▶ Objective function: $\mathcal{L} = \Pi_C - \zeta \left(\sum_{i=1}^N p_i - 1 \right)$

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business and precision of information they provide
- ▶ Objective function: $\mathcal{L} = \Pi_C - \zeta \left(\sum_{i=1}^N p_i - 1 \right)$
- ▶ $\frac{\partial \mathcal{L}}{\partial p_i} = \frac{\alpha_C V_B}{2N b_i} - \zeta = 0$

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business and **precision of information** they provide
- ▶ Objective function: $\mathcal{L} = \Pi_C - \zeta \left(\sum_{i=1}^N p_i - 1 \right)$
- ▶ $\frac{\partial \mathcal{L}}{\partial p_i} = \frac{\alpha_C V_B}{2N b_i} - \zeta = 0$

$$\frac{\partial \mathcal{L}}{\partial \frac{1}{\sigma_i^2}} = \frac{\alpha_C}{2N b_i} \left(\frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}} \right)^2 - \frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} = 0$$

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business and precision of information they provide

- ▶ Objective function: $\mathcal{L} = \Pi_C - \zeta \left(\sum_{i=1}^N p_i - 1 \right)$

- ▶ $\frac{\partial \mathcal{L}}{\partial p_i} = \frac{\alpha_C V_B}{2N b_i} - \zeta = 0$

$$\frac{\partial \mathcal{L}}{\partial \frac{1}{\sigma_i^2}} = \frac{\alpha_C}{2N b_i} \left(\frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}} \right)^2 - \frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} = 0$$

- ▶ This gives $b_i = \frac{\alpha_C}{2N} \frac{1}{\frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} \left(\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2} \right)^2} > 0$

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ **Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.**
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business and precision of information they provide

- ▶ Objective function: $\mathcal{L} = \Pi_C - \zeta \left(\sum_{i=1}^N p_i - 1 \right)$

- ▶ $\frac{\partial \mathcal{L}}{\partial p_i} = \frac{\alpha_C V_B}{2N b_i} - \zeta = 0$

$$\frac{\partial \mathcal{L}}{\partial \frac{1}{\sigma_i^2}} = \frac{\alpha_C}{2N b_i} \left(\frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}} \right)^2 - \frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} = 0$$

- ▶ This gives $b_i = \frac{\alpha_C}{2N} \frac{1}{\frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} \left(\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2} \right)^2} > 0$

- ▶ Setting this and the competitive bias of investment banks equal, we get the **precision of information**

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business and precision of information they provide

- ▶ Objective function: $\mathcal{L} = \Pi_C - \zeta \left(\sum_{i=1}^N p_i - 1 \right)$

- ▶ $\frac{\partial \mathcal{L}}{\partial p_i} = \frac{\alpha_C V_B}{2N b_i} - \zeta = 0$

$$\frac{\partial \mathcal{L}}{\partial \frac{1}{\sigma_i^2}} = \frac{\alpha_C}{2N b_i} \left(\frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}} \right)^2 - \frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} = 0$$

- ▶ This gives $b_i = \frac{\alpha_C}{2N} \frac{1}{\frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} \left(\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2} \right)^2} > 0$

- ▶ Setting this and the competitive bias of investment banks equal, we get the precision of information and the **first** condition solves for p_i

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Optimal bias

- ▶ Companies maximize profits over the allocation of investment banking business and precision of information they provide

- ▶ Objective function: $\mathcal{L} = \Pi_C - \zeta \left(\sum_{i=1}^N p_i - 1 \right)$

- ▶ $\frac{\partial \mathcal{L}}{\partial p_i} = \frac{\alpha_C V_B}{2N b_i} - \zeta = 0$

$$\frac{\partial \mathcal{L}}{\partial \frac{1}{\sigma_i^2}} = \frac{\alpha_C}{2N b_i} \left(\frac{1}{\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2}} \right)^2 - \frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} = 0$$

- ▶ This gives $b_i = \frac{\alpha_C}{2N} \frac{1}{\frac{\partial C_i}{\partial \frac{1}{\sigma_i^2}} \left(\frac{1}{\sigma_P^2} + \frac{1}{\sigma_i^2} \right)^2} > 0$

- ▶ Setting this and the competitive bias of investment banks equal, we get the precision of information and the first condition solves for p_i

- We can now maximize the company profits by choosing the allocation of future business and the information precision optimally.
 - ▶
 - Companies seek to maximize their profits by optimally allocating their investment banking business.
 - In addition they also decide on the precision of information they provide. Companies will maximize these two aspects simultaneously.
 - ▶ Thus companies maximize their profits, subject to the probabilities of allocating their future business to investment banks summing up to one.
 - ▶ The first order condition for the optimal allocation of future investment banking business can easily be derived after inserting for the bias that ensures investment banks make no profits.
 - ▶ Similarly the optimal information precision can be obtained. Here $\frac{1}{\sigma_i^2}$ can be interpreted as the information precision.
 - ▶ Combining these two conditions, and noting that probabilities add to 1, we can solve for the optimal bias. It is easy to see that this bias is positive.
 - ▶
 - If we set this expression equal to the bias investment banks have if no profits are generated allows us to determine the optimal precision of information.
 - Using this result and inserting this into the first order conditions here, will also give us the probability an investment bank obtain their future business. We are, however, not much interest in these aspects and focus on the bias.
- We can now provide some more analysis of the bias investment banks will have in their forecast of companies' prospects.

Properties of the bias

→ We can now investigate how the optimal bias is determined.

- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
 - ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
 - ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
 - ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more **important** the bias is for the company α_C , the **higher** it is

→ We can now investigate how the optimal bias is determined.

- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
- ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
- ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
- ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.

→ It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more important the bias is for the company α_C , the higher it is
- ▶ **More financial analysts** reduce the bias

Properties of the bias

- We can now investigate how the optimal bias is determined.
- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
 - ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
 - ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
 - ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more important the bias is for the company α_C , the higher it is
- ▶ More financial analysts reduce the bias as each investment bank has **less influence**

Properties of the bias

- We can now investigate how the optimal bias is determined.
- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
- ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
- ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
- ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more important the bias is for the company α_C , the higher it is
- ▶ More financial analysts reduce the bias as each investment bank has less influence and **less likely** to obtain the investment banking business

Properties of the bias

- We can now investigate how the optimal bias is determined.
- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
- ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
- ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
- ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more important the bias is for the company α_C , the higher it is
- ▶ More financial analysts reduce the bias as each investment bank has less influence and less likely to obtain the investment banking business
- ▶ Investment banks compete for a **larger share** of the investment banking business

Properties of the bias

→ We can now investigate how the optimal bias is determined.

- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
 - ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
 - ▶
 - **The competition between investment banks is about attracting future business from the companies they cover.**
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
 - ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more important the bias is for the company α_C , the higher it is
- ▶ More financial analysts reduce the bias as each investment bank has less influence and less likely to obtain the investment banking business
- ▶ Investment banks compete for a larger share of the investment banking business by **biasing** their forecasts

- We can now investigate how the optimal bias is determined.
- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
- ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
- ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - **This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.**
- ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more important the bias is for the company α_C , the higher it is
- ▶ More financial analysts reduce the bias as each investment bank has less influence and less likely to obtain the investment banking business
- ▶ Investment banks compete for a larger share of the investment banking business by biasing their forecasts
- ▶ They forego investor revenue

Properties of the bias

- We can now investigate how the optimal bias is determined.
- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
- ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
- ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
- ▶
 - **By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.**
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more important the bias is for the company α_C , the higher it is
- ▶ More financial analysts reduce the bias as each investment bank has less influence and less likely to obtain the investment banking business
- ▶ Investment banks compete for a larger share of the investment banking business by biasing their forecasts
- ▶ They forego investor revenue to gain **investment banking business**

Properties of the bias

- We can now investigate how the optimal bias is determined.
- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
- ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
- ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
- ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

Properties of the bias

- ▶ The more important the bias is for the company α_C , the higher it is
- ▶ More financial analysts reduce the bias as each investment bank has less influence and less likely to obtain the investment banking business
- ▶ Investment banks compete for a larger share of the investment banking business by biasing their forecasts
- ▶ They forego investor revenue to gain investment banking business

Properties of the bias

- We can now investigate how the optimal bias is determined.
- ▶ Not surprisingly, if a positive analyst coverage is important to the company, a high α_C , then the bias investment banks have is larger. Companies will put more emphasis on this bias in their allocation of future business and this will induce investment banks to increase their bias in order to obtain the future business.
- ▶
 - If we have more financial analysts, the bias is reduced.
 - In this case, each analyst has less impact on the average bias, hence the company will not be willing to shift as much the allocation in favour of a financial analyst with a larger bias as the benefits are limited. The consequence is that over all the bias is reduced.
 - In addition, the future investment banking business is divided up between more investment banks, making the incentives for financial analysts to have a bias smaller; the benefits of doing so will be less, while the costs in terms of lost reputation will remain unchanged.
- ▶
 - The competition between investment banks is about attracting future business from the companies they cover.
 - This competition is not done via the price of the services they provide, but by showing a bias in their recommendations.
- ▶
 - By showing a bias, they lose reputation and thereby lose the confidence of investors who rely on their expertise and advice for investment decisions. This could well lead to reduced revenue from these clients.
 - On the other hand, investment banks gain business from companies by showing a bias. When competing the losses from investors losing confidence in their ability, is compensated for by increasing revenue from the companies they cover.
- It is optimal for investment banks to have a positive bias in their recommendations as this attracts investment banking business.

- Problem and model assumptions
- Competitive investment banks
- Optimizing companies
- Summary

- We can now derive some conclusions from this model and discuss its implications for analyst recommendations in general.

Seeking additional revenue

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Seeking additional revenue

- ▶ Companies **value** positive analyst coverage

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Seeking additional revenue

- ▶ Companies value positive analyst coverage and will **reward** investment banks with other additional revenue

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Seeking additional revenue

- ▶ Companies value positive analyst coverage and will reward investment banks with other additional revenue
- ▶ Investment banks **compete** for this revenue

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Seeking additional revenue

- ▶ Companies value positive analyst coverage and will reward investment banks with other additional revenue
- ▶ Investment banks compete for this revenue by **biasing** their forecast

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Seeking additional revenue

- ▶ Companies value positive analyst coverage and will reward investment banks with other additional revenue
- ▶ Investment banks compete for this revenue by biasing their forecast
- ▶ The extent of this bias will depend on the relative **importance of the bias** to companies

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - **The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.**
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Seeking additional revenue

- ▶ Companies value positive analyst coverage and will reward investment banks with other additional revenue
- ▶ Investment banks compete for this revenue by biasing their forecast
- ▶ The extent of this bias will depend on the relative importance of the bias to companies and the importance of **reputation** to investment banks

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Seeking additional revenue

- ▶ Companies value positive analyst coverage and will reward investment banks with other additional revenue
- ▶ Investment banks compete for this revenue by biasing their forecast
- ▶ The extent of this bias will depend on the relative importance of the bias to companies and the importance of reputation to investment banks
- ▶ More financial analysts covering a company will **reduce** the bias

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Seeking additional revenue

- ▶ Companies value positive analyst coverage and will reward investment banks with other additional revenue
- ▶ Investment banks compete for this revenue by biasing their forecast
- ▶ The extent of this bias will depend on the relative importance of the bias to companies and the importance of reputation to investment banks
- ▶ More financial analysts covering a company will reduce the bias

- Providing financial analyst reports solely for the benefit of investors is not profitable, therefore investment banks use analyst report to attract other business, most notably from the company they are covering.
- ▶
 - Positive analyst coverage should increase the value of the stocks of a company and this in itself is beneficial as it prevents hostile takeovers and makes mergers when using shares to pay for the merger more attractive; in addition the management compensation is often linked to the stock price and hence management benefits from this being high, too.
 - Companies are more likely to choose investment banks that are positively inclined towards them as the positive bias gives them the share price increase that benefits them. They use this mechanism to induce the positive bias in analyst recommendations.
- ▶
 - Investment banks are very competitive and will seek to obtain any business a company might provide in the future. Traditionally it is assumed that this competition is based on the price for such services or their quality.
 - Here we find another way of competing for investment banking business, namely by providing a positive bias in analyst reports.
- ▶
 - The more important the bias is to companies, the larger the actual bias will be; This is because investment banks competing for the future business from companies will be selected more strongly on their bias by the company and they react more strongly to this incentive by competing with other investment banks showing a larger bias.
 - As any bias in the recommendation reduces the reputation of investment banks, this will limit the extend of the bias. The more important reputation is for investment banks, the less they are willing to show this positive bias.
- ▶ More financial analyst means more competition, but also smaller chances of obtaining the future business, which limits the benefits of the bias, which will therefore reduce.
- We see that investment banks compete for the business of companies by providing analyst reports that are positively biased.

Implications

- We now move from looking at the recommendations for individual companies towards some more generic consequences of these results.
- ▶ As all investment banks will face the pressure to show a positive bias in their recommendations for all stocks, we will generally see that financial analysts' recommendations are positively biased.
- ▶ Regulators might want to address the problem of positively biased recommendations by increasing the importance of the reputation of the investment bank as this would reduce the positive bias. Regulators cannot achieve this through limiting the impact financial analyst reports has on gaining future investment banking business, as these are decisions companies make. Hence increasing the prominence of the precision of analyst reports might be the most feasible way of achieving this aim.
- ▶
 - Many regulations restricting the use of financial analysts with the aim of reducing the bias has made providing analyst reports more costly; this has lead to the reduction in financial analyst coverage.
 - Given our results here, this would increase the bias shown by financial analysts. Hence we would not expect a positive effect of such constraints on the positive bias of financial analyst recommendations.
- We thus observe a positive bias in all analyst reports and regulation of analyst activities is unlikely to change this outcome.

Implications

- ▶ The focus of financial analysts on **gaining investment banking business** will cause upwardly biased recommendations

Implications

- We now move from looking at the recommendations for individual companies towards some more generic consequences of these results.
- ▶ As all investment banks will face the pressure to show a positive bias in their recommendations for all stocks, we will generally see that financial analysts' recommendations are positively biased.
- ▶ Regulators might want to address the problem of positively biased recommendations by increasing the importance of the reputation of the investment bank as this would reduce the positive bias. Regulators cannot achieve this through limiting the impact financial analyst reports has on gaining future investment banking business, as these are decisions companies make. Hence increasing the prominence of the precision of analyst reports might be the most feasible way of achieving this aim.
- ▶
 - Many regulations restricting the use of financial analysts with the aim of reducing the bias has made providing analyst reports more costly; this has lead to the reduction in financial analyst coverage.
 - Given our results here, this would increase the bias shown by financial analysts. Hence we would not expect a positive effect of such constraints on the positive bias of financial analyst recommendations.
- We thus observe a positive bias in all analyst reports and regulation of analyst activities is unlikely to change this outcome.

Implications

- ▶ The focus of financial analysts on gaining investment banking business will cause upwardly biased recommendations
- ▶ Policies that **limit** the ability of financial analysts to attract additional revenue, higher α_B , will **reduce the bias**

Implications

- We now move from looking at the recommendations for individual companies towards some more generic consequences of these results.
- ▶ As all investment banks will face the pressure to show a positive bias in their recommendations for all stocks, we will generally see that financial analysts' recommendations are positively biased.
- ▶ Regulators might want to address the problem of positively biased recommendations by increasing the importance of the reputation of the investment bank as this would reduce the positive bias. Regulators cannot achieve this through limiting the impact financial analyst reports has on gaining future investment banking business, as these are decisions companies make. Hence increasing the prominence of the precision of analyst reports might be the most feasible way of achieving this aim.
- ▶
 - Many regulations restricting the use of financial analysts with the aim of reducing the bias has made providing analyst reports more costly; this has lead to the reduction in financial analyst coverage.
 - Given our results here, this would increase the bias shown by financial analysts. Hence we would not expect a positive effect of such constraints on the positive bias of financial analyst recommendations.
- We thus observe a positive bias in all analyst reports and regulation of analyst activities is unlikely to change this outcome.

Implications

- ▶ The focus of financial analysts on gaining investment banking business will cause upwardly biased recommendations
- ▶ Policies that limit the ability to financial analysts to attract additional revenue, higher α_B , will reduce the bias
- ▶ If financial analysts are **not profitable**, there will be **less** financial analysts

- We now move from looking at the recommendations for individual companies towards some more generic consequences of these results.
- ▶ As all investment banks will face the pressure to show a positive bias in their recommendations for all stocks, we will generally see that financial analysts' recommendations are positively biased.
- ▶ Regulators might want to address the problem of positively biased recommendations by increasing the importance of the reputation of the investment bank as this would reduce the positive bias. Regulators cannot achieve this through limiting the impact financial analyst reports has on gaining future investment banking business, as these are decisions companies make. Hence increasing the prominence of the precision of analyst reports might be the most feasible way of achieving this aim.
- ▶
 - Many regulations restricting the use of financial analysts with the aim of reducing the bias has made providing analyst reports more costly; this has lead to the reduction in financial analyst coverage.
 - Given our results here, this would increase the bias shown by financial analysts. Hence we would not expect a positive effect of such constraints on the positive bias of financial analyst recommendations.
- We thus observe a positive bias in all analyst reports and regulation of analyst activities is unlikely to change this outcome.

Implications

- ▶ The focus of financial analysts on gaining investment banking business will cause upwardly biased recommendations
- ▶ Policies that limit the ability to financial analysts to attract additional revenue, higher α_B , will reduce the bias
- ▶ If financial analysts are not profitable, there will be less financial analysts, **increasing** the bias

- We now move from looking at the recommendations for individual companies towards some more generic consequences of these results.
- ▶ As all investment banks will face the pressure to show a positive bias in their recommendations for all stocks, we will generally see that financial analysts' recommendations are positively biased.
- ▶ Regulators might want to address the problem of positively biased recommendations by increasing the importance of the reputation of the investment bank as this would reduce the positive bias. Regulators cannot achieve this through limiting the impact financial analyst reports has on gaining future investment banking business, as these are decisions companies make. Hence increasing the prominence of the precision of analyst reports might be the most feasible way of achieving this aim.
- ▶
 - Many regulations restricting the use of financial analysts with the aim of reducing the bias has made providing analyst reports more costly; this has lead to the reduction in financial analyst coverage.
 - Given our results here, this would increase the bias shown by financial analysts. Hence we would not expect a positive effect of such constraints on the positive bias of financial analyst recommendations.
- We thus observe a positive bias in all analyst reports and regulation of analyst activities is unlikely to change this outcome.

Implications

- ▶ The focus of financial analysts on gaining investment banking business will cause upwardly biased recommendations
- ▶ Policies that limit the ability to financial analysts to attract additional revenue, higher α_B , will reduce the bias
- ▶ If financial analysts are not profitable, there will be less financial analysts, increasing the bias

Implications

- We now move from looking at the recommendations for individual companies towards some more generic consequences of these results.
- ▶ As all investment banks will face the pressure to show a positive bias in their recommendations for all stocks, we will generally see that financial analysts' recommendations are positively biased.
- ▶ Regulators might want to address the problem of positively biased recommendations by increasing the importance of the reputation of the investment bank as this would reduce the positive bias. Regulators cannot achieve this through limiting the impact financial analyst reports has on gaining future investment banking business, as these are decisions companies make. Hence increasing the prominence of the precision of analyst reports might be the most feasible way of achieving this aim.
- ▶
 - Many regulations restricting the use of financial analysts with the aim of reducing the bias has made providing analyst reports more costly; this has lead to the reduction in financial analyst coverage.
 - Given our results here, this would increase the bias shown by financial analysts. Hence we would not expect a positive effect of such constraints on the positive bias of financial analyst recommendations.
- We thus observe a positive bias in all analyst reports and regulation of analyst activities is unlikely to change this outcome.



This presentation is based on
Andreas Krause: Theoretical Foundations of Investment Banking, Springer Verlag 2024
Copyright © 2024 by Andreas Krause

Picture credits:

Cover: The wub, CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Canary_Wharf_from_Greenwich_riverside.2022-03-18.jpg

Back: Seb Tyler, CC BY 3.0 <https://creativecommons.org/licenses/by/3.0>, via Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Canary_Wharf_Panorama_Night.jpg

Andreas Krause
Department of Economics
University of Bath
Claverton Down
Bath BA2 7AY
United Kingdom

E-mail: mnsak@bath.ac.uk