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Chapter 10

Regulation of financial analysts

Outline

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- Financial analysts have been heavily criticised for the quality of their reports and the bias in their recommendations.
- There have been regulatory efforts to improve the quality and address the bias, but these have not been very successful.
- We will here look ate two approaches and assess their effectiveness. Firstly we will look at the separation of financial analysts from other investment banking business and then looking at the disclosure of information about the quality of financial analysts.

Outline

- We will use unregulated financial analysts as a benchmark for our analysis and then compare the resulting quality of analyst reports with financial analysts suvject to regulation.

- Problem and model assumptions
- Unregulated analysts
- Chinese Walls
- Disclosure of wages
- Summary

- We will first look at the incentives of financial analysts and investment banks to acquire precise information.

Types of financial analysts

- Buy-side financial analysts provide reports on companies aimed at investors
- Sell-side financial analysts work for companies on mergers and acquisitions and security offerings
- Traditionally financial switched between these roles, but this has been abolished by regulation
- The aim was to reduce the conflict of interest between the roles and improve the quality buy-side financial analyst reports

Types of financial analysts

→ Financial analysts can have different roles in investment banks, depending on who they are supporting.

- Investors seeking information on the prospects of companies would be served by buy-side analysts as investors are seen as the buyers of securities.
- An analyst working for the benefits of companies, those issuing or seeling securities, are known as sell-side analysts.
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  - Until the dotcom boom in the early 2000s financial analysts often had no fixed role, but they would switch between them, depending on demand for their services. The involvement of buy-side analysts in sell-side activities gave them more insights to benefit investors and the involvements with investors allowed for additional insights when advising companies.
  - After the dotcom bubble burst this dual role was abolished by regulation.
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  - There was a conflict of interest in that their main focus was on gaining additional investment banking business and the analyst reports to investors were geared towards the needs of companies rather than objective advice to investors, resulting in excessively positive recommendations. Consequently the roles were separated and analysts have to be either buy-side or sell-side analysts.
  - The aim of this regulation was to improve the accuracy of buy-side analyst recommendation to investors. This regulation did not have the desired effect but reduced analyst coverage of companies instead as costs would not be covered by full-time buy-side analysts selling their reports.

→ We will look at the regulation imposed and assess their effectiveness.

Regulatory aims

- Financial analysts are forecasting the future value of securities, using information (signals) they receive
- The more precise their signal, the better the forecast
- The aim would be to maximize the quality of such forecasts through regulation
- Regulatory interventions affect the remuneration of financial analysts as an incentive to improve the quality

Regulatory aims

→ The regulation of financial analysts was developed in the aftermath of the dotcom bubble and had the aim to address the conflicts of interest between giving advice to investors and advising companies.

- A key part of the financial analyst role is to collect information and based on this information provide a forecast about the future value of a security; this is usually done by publishing a target price.
- This forecast will be based on the information, called a signal in economic theory, and they should report the result of their objective analysis of this information.

- If the information is better, the signal they have obtain more precise, the forecast should be more accurate.

- The quality of analyst forecasts should be as accurate as possible and reflect the information the financial analyst holds.
- The regulation of their activities should support this aim and avoid or reduce any possible conflict of interest that might affect them publishing their object assessment of the company.

- Much of the regulation has been concerned with the remuneration of financial analysts and how this is arrived at.
- It was seen that by separating their pay from the performance of the remainder of the investment bank and instead only base it on their own performance, should eliminate any influence these parts have on their decision-making.

→ We will see why this regulation was ineffective in improving the quality of financial analyst recommendations.

Signals

- The true value of a stock is either high P_H with probability π or low $P_L < P_H$ otherwise
- Analysts obtain a signal s_i on this value
- The signal is correct with probability $Prob_i(H|P_H) = Prob_i(L|P_L) = \rho_i \geq \frac{1}{2}$
- We have strong analysts and weak analysts with $\rho_S > \rho_W$
- An analyst is strong with probability γ

Signals

→ We first will look at information, in the form of signals, and its quality, as well as the ability of financial analysts.
- To simplify the analysis, we assume the future price of the security will be either high or low, where the probability of this occurring is known.
- While the two possible values are known, financial analysts obtain information about which value is realised, this is the signal.
- We assess the precision of the information by how likely it is to be correct. They receive the signal corresponding to the price with some probability and the higher this probability, the more precise the signal is. A signal is only informative if it is more likely to be correct than incorrect.
- The ability of financial analysts are not equal, some analysts are strong and their information is more precise than that of weak analysts.
- There is a fraction of strong and weak analysts, but we will see that analysts can affect their type.

→ We will now look at the forecast error and how the different types of analysts affect this.

Forecast error

- Financial analysts make a prediction $\hat{P}$ based on their signal and the forecast error is $E\left[\left(\hat{P}-P_j\right)^2\right]$
- If the prediction is wrong we have $(\hat{P}-P_j)^2=(P_H-P_L)^2$ and $(\hat{P}-P_j)^2=0$ if the prediction is correct
- A prediction is wrong if the signal is wrong, it has probability $1-\rho_i$
- Forecast error of an analyst is $(1-\rho_i)\left(P_H-P_L\right)^2$
- Combining this for the strong and weak analyst we get $E\left[\left(\hat{P}-P_j\right)^2\right]=\left(\gamma(1-\rho_S)+(1-\gamma)\left(1-\rho_W\right)\right)\left(P_H-P_L\right)^2$

Forecast error

→ We can determine the forecast errors of individual financial analysts and the average forecast error in the market.

- Financial analysts use the information they receive, the signal, and use this signal to make their forecast of the future price.
  - This forecast is compared to the realisation of the price and the (square) difference is the forecast error.
- If the prediction is wrong, then the error is the difference between the two prices as the other would have been predicted.
  - If the prediction is correct, there is no error.
- If the signal that has been received is wrong, the prediction will be wrong, hence the probability of having the forecast error is the probability of receiving the wrong signal.
- For an individual financial analyst the forecast error is given by the *formula*.
- Overall, with strong and weak financial analysts present, the forecast error will be the combination of the forecast errors by strong and weak financial analysts, with their respective weights.

→ We can now use the forecast errors to determine the profits financial analysts make.

Analyst profits

- Analyst is paid remuneration w_i, depending in its type
- Obtaining strong signals costs c_I
- Costs of forecast errors from loss of reputation are c_P
- Profits: $\Pi_A = \gamma w_S + (1-\gamma)\, w_W - \frac{1}{2} c_I \gamma^2 - c_P E\left[\left(\hat{P} - P_j\right)^2\right]$
- We assume financial analysts are competitive and $\Pi_A = 0$

Analyst profits

→ We can now look at the profits that financial analysts make.

- A financial analyst is paid a wage
  - A financial analyst is paid a wage
  - This wage is dependent on whether he is a strong or weak analyst. As analysts do not know their own type, at least ex ante, they will use the expected wages, based on the fraction of each type.
- Financial analysts can seek to obtain the more precise signal at some costs, which will become more and more costly the more strong financial analysts are operating in the market. This will reflect the difficulties in finding new relevant information that other financial analysts have not yet discovered.
- The financial analyst will suffer a loss in reputation from the getting the forecast wrong and we thus use the forecast error as the size of the reputation loss, which reduces their profits.
- *Formula*
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  - As there will be multiple financial analysts covering a company, we assume that they are acting competitively.
  - Perfect competition implies that financial analysts make not profits.

→ Having determined the profits of financial analysts, we can now determine the profits of the investment bank employing them.

Investment bank profits

- Investment banks obtain additional investment bank business V from the covered company if they forecast a high value P_H
- The high value is predicted if the value is high and the signal is correct or the value is low and the signal wrong, for each type of analyst
- $Prob\left(V_H\right) = \gamma\left(\rho_S\pi + \left(1-\rho_S\right)\left(1-\pi\right)\right) + \left(1-\gamma\right)\left(\rho_W\pi + \left(1-\rho_W\right)\left(1-\pi\right)\right)$
- Investment bank get this additional revenue if the forecast is high and pay the salaries of the analyst
- $\Pi_B = Prob\left(P_H\right)V - \left(\gamma w_S + \left(1-\gamma\right)w_W\right)$

Investment bank profits

→ After the profits of financial analysts have been determined, we can now see how much profits investment banks make.

- We assume that the company financial analysts cover provide them with additional business that generates profits V to the investment bank.
- But the company provides the investment bank with this additional business only if the financial analyst forecasts a high value, as this benefits the company if the stock price subsequently increases to this value.

- A high value is predicted if the value is actually high and the signal is correct, or the value is low and the signal is wrong. As the type of financial analysts is not knows, both types have to be considered. We here assume that the financial analysts will provide a forecast based on the information received and will not provide a different forecast.
- *Formula*

- The investment bank's profits are given by this additional business, provided the forecast is for the high price.
- From this revenue, the investment bank then pays the wages of the financial analyst.

- *Formula*

→ Having the profits analysts make and the profits investment banks make, we can now determine the optimal decisions of analysts about their acquisition of information and investment banks about the wages they pay financial analysts.

- We first consider the case where there are no restrictions on financial analysts.
- This can be used as the benchmark against which to evaluate any regulation.

Optimal fraction of strong analysts

- Analysts optimize over the likelihood of obtaining a precise signal, solving $\frac{\partial \Pi_A}{\partial \gamma} = 0$
- This gives $\gamma = \frac{w_S - w_W}{c_I} + \frac{c_P}{c_I} (\rho_S - \rho_W) (P_H - P_L)^2$
- Investment banks maximize their profits by setting wages w_i optimally, solving $\frac{\partial \Pi_B}{\partial w_i} = 0$ with $\Pi_A = 0$
- This gives $\gamma = \frac{2\pi - 1}{c_I} (\rho_S - \rho_W) V + \frac{c_P}{c_I} (\rho_S - \rho_W) (P_H - P_L)^2$
- Setting these equal, we get $w_S - w_W = (2\pi - 1) (\rho_S - \rho_W) V$
- And then $\gamma^* = \frac{\rho_S - \rho_W}{c_I} \left((2\pi - 1) V + c_P (P_H - P_L)^2 \right)$

Optimal fraction of strong analysts

→ We are overall concerned with the fraction of strong financial analysts in the market and will compare them across different regulatory regimes.

- Financial analysts will decide on the optimal investment to obtain a precise signal, thus they will choose the optimal probability of obtaining this precise signa, γ. We can interpret γ as the fraction of strong financial analysts, but also as the probability that a specific analyst has been able to obtain the more precise signal.
- The optimal probability is then given by the first order condition.

- Conducting this optimisation and solving the resulting equation gives us this *formula*.

- The investment bank will choose optimal wages for financial analysts that maximize their own profits, trading off the wages against the probability of obtaining the additional business.
- The optimisation will also take into account that financial analysts are competitive and make no profits. The first order condition will be solved subject to this constraint.

- *Formula*
- The two expressions for γ as determined by financial analysts and the investment bank need to be consistent and we can solve these two equations for the difference in wages between strong and weak financial analysts.
- This result can then be entered into the optimal fraction of strong analysts and we obtain this *formula*.

→ We have established the optimal fraction of strong analysts in the market and can take this as an indicator for the quality of analyst coverage.

Properties

- More uncertainty $P_H - P_L$ and loss to reputation c_P increases the strong analysts
- Larger difference in ability $\rho_S - \rho_W$ increases the strong analysts
- Larger additional business V increases the strong analysts
- Higher costs of becoming strong, reduces the strong analysts

Properties

→ We can discuss some properties of this result in an unregulated market.

- If there is a larger difference between the two possible prices, we can interpret this as more uncertainty in the market, similar to a higher volatility, then more strong analysts are present as the forecast errors increase and more precise information reduces them again. Similarly, if financial analysts are more concerned about their loss of reputation, they will invest more into obtaining a precise signal.
- Also, if the difference between signal qualities are larger, more seek out the more precise signal. This is because the advantage of the better signal is higher.
- If the value of the additional business is higher, then the investment bank will set higher wages for strong analysts to ensure high values are reported correctly.
- If it is more costly to acquire precise information, this will reduce the number of strong analysts.

→ Having established the benchmark without any regulations of financial analysts, we can now continue with assessing the impact any regulation has.

- We now consider the regulation that financial analysts cannot be rewarded for attracting investment banking business.
- This rules out linking their wages to the value of the business they attract, as was the case with unregulated financial analysts, where V was part of the wage determination.
- With Chinese Walls the remuneration of financial analysts has to be connected to their ability, thus the forecast error.

Remuneration

- Chinese walls refers to a situation where analysts cannot be rewarded for bringing in additional business, but only for the quality of their forecasts
- Suppose the remuneration is a base wage, adjusted by the forecast error
- $w_i = \frac{w_0}{E_i\left[\left(\hat{P}-P_j\right)^2\right]} = \frac{w_0}{(1-\rho_i)(P_H-P_L)^2}$
- This gives $w_S - w_W = \frac{w_0}{(P_H-P_L)^2}\left(\frac{1}{1-\rho_S} - \frac{1}{1-\rho_W}\right)$
- Set $w_0 = (2\pi-1)(1-\rho_S)(1-\rho_W)V(P_H-P_L)$, then $w_S - w_W = (2\pi-1)(\rho_S-\rho_W)V$
- This gives $\gamma^{**} = \gamma^*$

Remuneration

→ Chinese walls impose restrictions on how financial analysts can be remunerated. We will look at a way this can be implemented by investment banks.

- Financial analysts cannot be rewarded for the additional business they attract through their forecasts, thus this element cannot be part of the wage determination.
- Instead they have to be rewarded for the precision of their forecasts, this a lower forecast error should result in a higher wage.

- We determine the wage an analyst receives as being based on a fixed base wage as a starting point.
- The more precise his forecasts are, the higher this wage will get.

- *Formula*
- We insert for the forecast error from above.

- We can now determine the wage differential between strong and weak analysts by inserting the information precision.

- The investment bank is free to set the base wage as in any way as they want, the composition does not have to be disclosed. Hence we can set this base wage as given in the *formula*.
- Inserting this base wage, gives then the wage differential as shown in the *formula*.

- In this case the wage differential is identical to the case of unregulated analysts. As all the incentives of financial analysts are unaffected by the regulation, they will make the same choices with regards to acquiring more precise signals.

→ We have established that the acquisition of information is not affected by Chinese Walls.

Ineffective Chinese Walls

- With Chinese Walls the quality of analysts does not improve
- Investment banks recover their optimal solution by setting base wages accordingly
- The remuneration differences are the same as before and hence the incentives to analysts are identical

Ineffective Chinese Walls

→ We can now assess how much Chinese Walls have improved the quality of analyst coverage.

- As the likelihood of acquiring more precise information does not change in the presence of Chinese Walls, the quality of financial analysts is unaffected. Chinese Walls do not improve the quality of analyst coverage.
- By setting the base wage in such a way that the wage differential between strong and weak financial analysts is identical to the optimal value without any regulation, investment banks retain the optimal outcome and undermine the aim of the regulation.
  - The key to undermining the regulation is that investment banks can retain the same wage differential for financial analysts.
  - With the same wage differential, the incentives for financial analysts are the same, regardless of regulatory constraints.

→ Chinese Walls have been shown to not affect the quality of analyst coverage. This regulation is therefore not effective in achieving its aim.

- With Chinese Walls not achieving an improvement in the quality of analyst coverage, another proposal has been made, namely to disclose the wages of financial analysts.
- Knowing the wage should allow investors and companies to determine whether an analyst is strong or weak.
- They might use this information int heir decision-making, which in turn might affect the decision of seeking precise information in the first place.

Fraction of strong analysts

- We assume that investment banks and analysts know if the analyst is strong
- We also assume that the additional business is only attracted if the high forecast is made by a strong analyst
- As weak analysts do not add value, we set $w_W = 0$
- Analyst profits: $\Pi_A = \gamma w_S - \frac{1}{2} c_I \gamma^2 - c_P E\left[\left(\hat{P} - P_j\right)^2\right]$
- This is maximized at $\gamma = \frac{w_S}{c_I} + \frac{c_P}{c_I}\left(\rho_S - \rho_W\right)\left(P_H - P_L\right)^2$

Fraction of strong analysts

→ With no business being routed towards the investment bank employing weak analysts, we can now determine the optimal fraction of strong analysts.

- Assume that the analyst and the investment bank employing the analyst know whether the analyst is strong or weak. This is reasonable as investment banks as well as the analysts will know their past performance and understand the information they have acquired.
- With the type of analyst disclosed through wages, we can assume that companies will only be attracted to investment banks that sjow a high level of competence, such as employing strong analysts. Hence they will provide additional business only to investment banks with strong analysts. We maintain that the business is only awarded if the forecast of this strong analyst is for the high price.
- As weak analysts do not attract any additional business, there is no value to the investment bank in employing them, hence they will not be employed, or equivalent, receive a wage of zero.
- The analyst profits are as before, we have only set $w_W = 0$.
- Conducting the same maximization of these profits as before, we get the optimal acquisition of the precise signal as given in the *formula*.

→ We can now determine how the investment bank sets the wage of the strong analysts in this case.

Optimal wages

- Investment bank only gets additional revenue if the analyst is strong and predicts the high value and wage is only paid to the strong analyst
- $\Pi_B = \gamma\left(\left(\rho_S\left(2\pi - 1\right) + \left(1 - \pi\right)\right)V - w_S\right)$
- The optimal wage gives us $\gamma^{***} = \frac{\rho_S(2\pi-1)+(1-\pi)}{c_I}V + \frac{c_P}{c_I}\left(\rho_S - \rho_W\right)\left(P_H - P_L\right)^2$
- We easily see that $\gamma^{***} > \gamma^{**}$

Optimal wages

→ We can now determine the optimal wage of the strong analyst.

- The company provides additional business only to an investment bank that employs strong analysts, which happens with probability γ.
  - If they employ a strong analyst, they obtain this business if the prediction is high only
  - And only when employing a strong analyst will a wage have to be paid.
- *Formula*
- We can again determine the optimal wage by maximizing the investment bank profits, given that analysts make no profit. This results in the optimal fraction of strong analysts as in the *formula*.
- The fraction of strong analysts has increased compared to the case of no regulation or Chinese Walls.

→ Having established that the quality of analyst provision has increased, we will next identify the mechanism that lead to this result.

Increasing analyst quality

- Wages are disclosed

$\Rightarrow$ Companies can identify the type of analyst

$\Rightarrow$ Route additional business only to strong analysts

$\Rightarrow$ Erasing the value of weak analysts to the investment bank

$\Rightarrow$ Allowing it to set their wages to zero

$\Rightarrow$ Increasing the wage differential between weak and strong analysts

$\Rightarrow$ Increases the incentives to become strong

Increasing analyst quality

→ We can now look at the reasons for the quality of the analyst coverage to increase.
- The key change from the previous regulation here is that wages were disclosed.
- [⇒] This allows companies to know which type of analyst is covering them.
- [⇒] We assumed that they are only willing to give additional business to those investment banks employing strong analysts, which they now can identify.
- [⇒] This implies that weak analysts have no value for the investment bank and they are not employed anymore.
- [⇒] A weak analyst will not receive any wages.
- [⇒] The wage differential between strong and weak analysts increases as the weak analysts wage is kept at zero, but the value of the strong analyst is still unchanged
- [⇒] This larger wage differential induces analysts to increase the acquisition of precise signals and the analyst coverage increases.

→ The key assumption here is that companies will provide additional business only to those investment banks employing strong analysts.

- Problem and model assumptions
- Unregulated analysts
- Chinese Walls
- Disclosure of wages
- Summary

- We can now summarize the results on the regulation of financial analysts.

Ineffectiveness of Chinese Walls

- Financial analysts can help to gain additional investment banking business by providing positive assessments of companies
- Regulation seeks to improve the quality of these assessments by focussing remuneration only on these assessments
- Chinese Walls can be circumvented by investment banks setting pay structures that give the same incentives to financial analysts
- Disclosing the wages and hence the quality of a financial analyst allows discrimination between them and can increase incentives to increase the quality

Ineffectiveness of Chinese Walls

→ We have seen that introducing Chinese Walls does not improve the quality of analyst provision.

- The key driver for analysts to acquire more precise information was that investment banks obtain additional business when providing positive coverage of companies. With more precise information, they are less likely to misinterpret any positive information and they profits increase.
- Focussing on the link between attracting this additional business and the remuneration financial analysts receive, regulations seek to improve the quality of information financial analysts acquire.
- With Chinese Walls this goal is undermined by investment banks setting pay such that the same pay structure emerges as without any regulation, thereby not changing the incentive of financial analysts to acquire better information.
- Only once companies can discriminate between different analysts by knowing their type, will this affect their choices. Disclosure of information that allows to identify the type is thus essential, but only if companies actually are concerned about these characteristics.

→ Regulation of financial analysts can be undermined and while the disclosure of information about financial analysts can affect the outcome positively, it relies on companies discriminating against financial analysts on that basis, rather than providing an incentive to the financial analysts directly.

Effectiveness of regulation

- Measures to increase the quality of analyst coverage have focussed on the separation of analysts from other business lines
- These results suggest they are not effective as investment banks can adjust their remuneration schedules
- Disclosure of remuneration might be a more effective policy tool

Effectiveness of regulation

→ Investment banks may find ways around any regulations, making them ineffective.

- Regulation of financial analysts has so far focussed on separating them from other business lines and thereby forcing them to rely on their own ability, which should provide an incentive to improve.
- However, investment banks have found ways around such restrictions and Chinese Walls were not effective. Since its introduction, the quality of analyst reports has not significantly increased.
- Information disclosure about the quality of financial analysts seems to be a more promising approach, but this relies more the behaviour of companies routing their business based on the competence of financial analysts they are not going to work with as they will work with sell-side rather than the here discussed sell-side analysts.

→ Thus far attempt at regulating financial analysts has not been very successful and the quality of analyst reports has not improved.

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