INCENTIVES FOR ACCURACY IN ANALYST RESEARCH

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Abstract:

This paper develops a model to explore the dynamic interaction between incentive contracts and financial analysts' efforts in producing high-quality research, while accounting for both ethical and reputational concerns. Our findings indicate that compensation structures shaped by reputational and ethical considerations can give rise to incentive-related challenges. Specifically, an exclusive reliance on financial incentives exacerbates conflicts of interest, as analysts may prioritize short-term gains at the expense of their long-term reputation. In contrast, a more balanced approach, which integrates both monetary and non-monetary rewards aligned with analysts' intrinsic work ethic, allows them to better resist such pressures, leading to enhanced research quality and a strengthened long-term reputation.

Keywords: Motivation, Reputation, Reporting, Investment Analysts.

JEL Classification: M14; M12; M52; K31; C23

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Acknowledgement
We thank participants at the European Accounting Association Conference, the MACORGESCP EAP seminar, and the École Polytechnique Seminar. This work has been carried out at the Energy4climate (E4C) interdisciplinary center of IPParis, which is in part supported by 3d programme d'investissement d'avenir (ANR-18-EUR-0006-02). Support from IdR FDIR 2016-2025 (Ecole Polytechnique and TSE IDEI) is gratefully acknowledged. Of course, the usual disclaimer applies.

Introduction

Financial analysts play a critical role in shaping financial markets by offering insights that guide investment decisions and influence market dynamics. However, conflicts of interest, arising from compensation structures, reputational concerns, and ethical dilemmas, can impact the accuracy and transparency of their reporting. These conflicts can either enhance or undermine market efficiency, depending on the nature of the incentives at play. Notable scandals, such as the 2020 Wirecard fraud, underscore the risks associated with misaligned incentives. In this case, despite clear red flags, external auditors, internal controls, and regulatory bodies failed to take timely action, and analysts faced pressure to present a favourable outlook, which compromised the accuracy of their assessments. This incident highlights the need for enhanced oversight mechanisms that encourage truthful and accurate reporting, even though such forecast and reports may negatively affect a company's stock performance. Similarly, the 2016 Wells Fargo scandal, triggered by the incentive structure for cross-selling, involved the creation of millions of unauthorized accounts to meet aggressive sales targets. Senior analysts, in turn, overlooked the associated risks. In light of recent incidents that illustrate how pressure-driven, short-term incentives can distort analysts' reporting behaviors, this paper emphasizes the need for stronger regulatory oversight to ensure that analysts provide accurate and truthful information, even when such reports may negatively affect a company's stock performance.

To tackle this important issue, we explore the influence of incentive compensation contracts on security analysts' reporting behavior. To do so, we propose a theoretical model that assesses the effects of such contracts on analysts' reporting practices, accounting for both analysts' reputational and ethical concerns. The incentive structures governing analysts' behavior are crucial in determining the quality and integrity of financial reporting. In particular, we focus on the trade-off between short-term financial incentives and long-term reputational concerns, where incentives may include both financial and non-financial rewards. Previous studies have highlighted how conflicts of interest, such as analysts issuing overly optimistic reports to secure lucrative underwriting deals, can undermine their credibility with investors and lead to long-term reputational damage (Dechow et al., 2010). Within this framework,

Ethical Review of Social Sciences

https://doi.org/10.70150/wnyczh29

analysts may prioritize short-term financial rewards over their long-term reputation for providing accurate and objective information (Hong & Kubik, 2003).

The design of compensation contracts for financial analysts requires careful consideration of the inherent conflicts of interest that arise in their research activities, particularly in balancing long-term reputational concerns with short-term incentives. Agency theory highlights the potential hidden costs of relying exclusively on monetary incentives, especially in cases where analysts are intrinsically motivated (Benabou & Tirole, 2003; Lindenberg, 2001; Deci & Ryan, 1985; Frey & Oberholzer-Gee, 1997; Kreps, 1997). This paper extends this framework by arguing that compensation structures for analysts should incorporate both financial and non-financial incentives, with particular attention to work ethic and professional integrity (Noe & Rebello, 1994; Carlin & Gervais, 2009). Since ethical considerations and intrinsic motivations are private and difficult to observe, firms must design contracts that not only address analysts' financial incentives but also screen for their ethical preferences. Drawing on the work of Heinle, Hoffman, and Kunz (2012), we propose that analysts may experience ethical distress when their forecasts and reporting activity deviate from the standards and ethical norms outlined in their compensation contracts. This distress can lead to compromised research quality and undermine the accuracy of their investment recommendations. Therefore, to ensure that analysts provide objective and truthful assessments, compensation contracts must be structured to align both financial rewards and ethical incentives, mitigating the pressure to prioritize short-term gains over long-term credibility. We thus argue that it is essential for compensation contracts to account for these ethical dimensions in order to ensure that analysts are incentivized to maintain the integrity of their research, even in the face of short-term financial pressures.

The role of financial analysts encompasses a range of tasks, including data collection, company visits, forecasting, and the production of research reports that inform investment recommendations. We model this process as one in which an analyst's research effort involves interpreting data, drafting reports, and formulating investment recommendations. The firm subsequently offers a contract that ties compensation to the quality of the research produced, which is assessed based on the accuracy of forecasts and the value of stock reports to investors. The value of these reports is determined by the information it provides. Our model incorporates the understanding that an analyst's research effort is influenced by both monetary incentives (performance-based) and non-monetary incentives (such as ethical distress). When an analyst is intrinsically committed to delivering high-quality research, financial incentives may be unnecessary. However, when this commitment is lacking, the firm may need to introduce performance-based compensation linked to both the informativeness and accuracy of the research produced. We propose that conflicts of interest emerge when substantial monetary incentives undermine research quality, as significant financial rewards increase the temptation to compromise on thoroughness and objectivity. Our dynamic analysis explores the trade-off between monetary and ethical incentives in shaping compensation contracts that seek to balance short-term financial rewards with long-term concerns about an analyst's reputation and the integrity of their research.

Our analysis reveals that the structure of compensation contracts can significantly influence incentive dynamics, particularly in the context of reputational concerns and work ethic. Specifically, contracts based entirely on financial incentives - full financial incentives contracts - tend to amplify conflicts of interest, encouraging analysts to prioritize short-term gains at the expense of long-term reputational capital. In contrast, leveraging an analyst's intrinsic work ethic fosters higher-quality research, thereby enhancing long-term reputation. Overall, while purely financial incentive contracts appear detrimental to both research quality and long-term reputational outcomes, hybrid incentive structures - mixed incentives contracts- can mitigate these conflicts, facilitating an equilibrium where high research quality and robust reputation coexist.

We contribute to two key strands of literature. First, we examine how compensation contracts impact analyst bias in reporting. Incentive structures often reward short-term performance through bonuses tied to trading volume, investment banking deals, or client relationships, which can conflict with objective reporting (Kothari, Ramanna, & Skinner, 2010). Much research has focused on the role of financial analysts as information providers (see Womack, 1996; Barber et al., 2001; Jegadeesh et al., 2004) and how their expertise and firm relationships affect performance (Madureira & Underwood, 2008; Ljungqvist et al., 2006). Benabou and Laroque (1992) explore analysts' incentives to profit from superior information, while Morgan and Stocken (2003) show how investment banking conflicts can bias recommendations and reduce report informativeness. Similarly, Ergungor et al. (2007) find that lending-affiliated analysts offer more accurate earnings forecasts to protect their reputation but may provide overly optimistic recommendations to benefit their lending clients. Guo, Li, and Wei (2020) stress that analysts often issue overly optimistic forecasts for profitable firms or potential investment banking clients, indicating a persistent bias from incentive-driven conflicts of interest. Lastly, Zhang et al. (2022) show that analysts with compensation tied to trading commissions tend to issue more frequent, favourable updates, particularly for firms with existing business

relationships, demonstrating how compensation incentives can influence report positivity and immediacy, often at the cost of objectivity. We contribute to this literature by exploring how performance-based compensation affects analysts' research and reporting. We show that contracts rewarding analysts solely based on financial accuracy can unintentionally lower research quality. Analysts in such arrangements often prioritize short-term gains over long-term credibility, leading to a decline in rigorous analysis. In contrast, a balanced incentive structure—combining both financial and ethical rewards—tends to support higher-quality research, as it encourages analysts to focus on integrity and reliability. Overall, purely financial incentives may harm long-term quality and reputation, while mixed incentives can align analysts' motivations with both research quality and reputation goals, fostering a stable, high-quality research environment.

The second strand of literature explores how reputation, ethics, and career concerns influence analyst forecasting. Milbourn et al. (2001) show that long-term career concerns can motivate analysts to produce accurate information, while Bolton et al. (2007) highlight how conflicts of interest may hinder full disclosure. Chen and Marquez (2009) further explore how career concerns and short-term compensation shape analysts' incentives. Reputation is a key factor in driving analysts to maintain accuracy and integrity (Chen et al., 2023; Lu et al., 2018). High-reputation analysts often gain career benefits, such as promotions and market credibility, incentivizing unbiased reporting. However, reputation alone may not counteract incentives for optimistic forecasts, especially during market uncertainty (Chang & Choi, 2017). The ethical dimension of analyst behavior has gained attention, with research showing that analysts in firms with strong ethical or ESG standards tend to provide more accurate forecasts (Schiemann & Tietmeyer, 2022; Cowan & Salotti, 2020). This suggests that public or private regulatory pressures, combined with incentive structures favoring long-term performance, can help deter biased reporting. Our approach complements this literature as we analyze how compensation structures may provide adequate incentives to analysts to avoid exploiting conflicts of interest. In particular, we endogenously derive the incentive structure of the analyst by modelling the interaction between the investment bank and the analyst, when both reputational and ethical concerns matter. We show that implicit incentives arising from the presence of ethical concerns play a crucial role in inducing analysts to resist pressure from conflicts of interest. Our theory indicates that without ethical considerations at stake, the attraction of lucrative compensation and then the temptation to liquidate reputation for profits are stronger for reputable analysts.

The remainder of the paper is organized as follows. Section 2 presents the model. Section 3 presents the equilibrium behaviors of agents. Section 4 analyzes the stationary equilibrium and discusses the main results of the paper. Section 5 concludes.

1. Model

1.1. Timing

The model has three dates, t, t + 1 and t + 2. All agents are risk neutral. The economy is composed of a continuum of financial analysts and a continuum of investment banks. At date t, analysts are employed by investment banks to conduct research on the clients' firms ongoing operations and provide forecast or recommendations about the firms' earnings. We model the relationship between the employer and the analyst as a principal-agent relationship with moral hazard due to imperfect observability of the analyst's research effort.

Traditional proxies for research activity typically encompass metrics such as the frequency of forecast revisions, the number of coverage initiations, and the volume of research notes disseminated. These outputs represent the analyst's efforts to generate information, albeit yielding a noisy signal regarding the firm's earnings prospects. The analyst uses this information to provide forecasts to his investor client at date t + 1.

The employer must design a contract that effectively addresses the moral hazard problem inherent in the analyst's role. Analyst compensation structures are inherently complex, incorporating diverse mechanisms for incentivization. Within the framework of this model, we assume that all contracts include financial incentives to encourage analysts to deliver valuable insights to investor clients. However, we differentiate between two distinct categories of contracts. The first category incorporates additional financial rewards for the provision of qualitative insights, such as Environmental, Social, and Governance (ESG) information, thereby aligning incentives with the delivery of such data. In contrast, the second category excludes explicit financial incentives for such qualitative insights, relying instead on the analyst's intrinsic ethical commitment to underscore the importance of this information.

The timing of the model is summarized as follows.

- date t:

Financial analysts and employers are matched one-to-one randomly. The analyst uses her unit time endowment to exert a research effort, θt

- date t + 1:

The employer offers a contract to the analyst,
The analyst accepts or rejects the contract
The analyst's effort level in acquiring information determines the value of her forecast which is

imperfectly observable by the employer, and contains both quantitative (e_{t+1}) and qualitative (q_{t+1},) information

- date t + 2:

Realized value of the client firm is revealed to all participants, and the analyst receives payoff according to the value (i.e. public and private information) of the forecast

1.2. Output and profits

The contractual relationship is modeled based on the linear multi-task approach developed by Itoh (1994) and Feltham & Xie (1994), from Holmstrom & Milgrom (1987, 1991)'s canonical model.

In this framework, observable output is defined over quantitative and qualitative information contained in the analyst's forecast by

$$y_{t+1} = e_{t+1} + q_{t+1} + \varepsilon_{t+1} \quad (1)$$

where:

e_{t+1} is the effort for gathering quantitative information,

q_{t+1} is the effort for gathering qualitative information

ε_{t+1} is a random (noise) term with distribution $N(0,(\sigma_{t+1})^2)$

The analyst's expected compensation is

$$E(w_{t+1}) = \alpha \, . \, E(y_{t+1}) + \beta \quad (2)$$

where α and β are endogenous parameters determined so as to maximize the employer's expected profits (see appendix)

The analyst's net compensation is

$$\omega_{t+1} = E(w_{t+1}) - C(e_{t+1}, q_{t+1}) \quad (3)$$

where C (.,.) is the analyst's cost of efforts defined below (equations 8a and 8b)

The employer's expected profit is defined by

$$B_{t+1} = \pi(\rho_{t+1}) \, . \, E(y_{t+1}) - E(w_{t+1}) \quad (4)$$

where

$\pi(\rho_{t+1})$ is the employer reputation level
ρ_{t+1} is the analyst's productivity
$E(y_{t+1})$ is the firm's expected profit
$E(w_{t+1})$ is the analyst's expected compensation

Firm reputation is defined as in Kreps (1990):

$$\pi(\rho_{t+1}) = \rho_{t+1} / [\rho_{t+1} + (1-\rho_{t+1}) \eta_{t+1}] \quad (5)$$

where η measures the weight of unproductive behaviors or external judgments.

This functional form captures the idea that a firm's reputation depends on the interaction between an employee's productivity (ρ_{t+1}) and an external factor or parameter (η), which determines the relative influence of unproductive actions or their external perceptions.

1.3. Analysts' Utility and Productivity

The analyst's utility depends both on leisure time and consumption.

During the first period (from t to t+1), the analyst allocates her unit time endowment to undertake research efforts, represented by θ_t. The research effort cost corresponds to the time invested in research activity.

In the second period (from t+1 to t+2), the analyst's consumption level is represented by c_{t+1}. The analyst earns a wage and consumes only during the second period. Consequently, the budget constraint is given by $c_{t+1} \leq \omega_{t+1}$, where ω_{t+1} is the expected wage (net of effort costs) defined previously.

Since the analyst consumes all earnings in the second period (with no savings or bequests), substituting c_{t+1} into the intertemporal utility function yields the following expression for the analyst's utility:

$$u_{t+1} = \log(1 - \theta_t) + \log \omega_{t+1} \quad (6)$$

with $1 - \theta_t$ the first period leisure time and ω_{t+1} the net compensation received in the second period.

The analyst's productivity in t + 1, ρ_{t+1} depends on two arguments: the research effort, θ_t, and the productivity level, ρt:

$$\rho_{t+1} = \rho(\rho_t, \theta_t) \quad (7)$$

where ρ (.,.) is increasing in both arguments, differentiable and concave.

More specifically, when computing the equilibrium, we will assume that:

$$\rho_{t+1} = A_t (\theta_t)^{\gamma} (\rho_t)^{1-\gamma} \quad (7')$$

where $0 < A_t \leq 1$is an efficiency parameter and $0 < \gamma < 1$.

1.4. Incentives and effort for quantitative and

qualitative information

In the second period (between t+1 and t+2), the employer offers the analyst a contract that includes financial rewards for effort on quantitative (hard) information, e_{t+1}, and may also incorporate additional incentives for qualitative (soft) information, q_{t+1}. As a result, two types of contracts arise:

- A Qualitative Information Incentive Contract: This contract offers financial incentives for providing quantitative information, and offers additional financial incentives for qualitative insights (e.g. including ESG-related information).
- An Ethics-Driven Contract: This contract offers financial incentives for providing quantitative information, but does not provide financial rewards for qualitative insights like ESG information, relying instead on the analyst's ethical commitment.

The objective of the employer is to design the contract in a way acceptable by the analyst (i.e. such that participation is ensured) and inducing the analyst to exert the maximal effort level (i.e. such that it is incentive compatible).

In period 2 (t+1 to t+2), the effort cost function depends on the type of contract that the analyst has accepted.

With a Qualitative Information Incentive Contract, additional financial incentives for providing qualitative insights are provided[1], the effort cost is then defined by:

$$C(e_{t+1}, q_{t+1}) = (e_{t+1})^2 / 2 + (q_{t+1})^2 / 2 + \mu \times (q_{t+1} \times e_{t+1}) \quad (8a)$$

where $-1<\mu<1$ is the degree of interdependence between effort for gathering quantitative and qualitative information.

With an Ethics-Driven Contract, qualitative insights are not incentivized, relying instead on the analyst's ethical commitment, the effort cost is then defined by[2]:

$$C(e_{t+1}, q_{t+1}) = (e_{t+1})^2 / 2 + \lambda \times (q_{t+1} - e_{t+1})^2 / 2 \quad (8b)$$

The parameter λ, where $0< \lambda <1$, quantifies the degree to which the analyst internalizes or identifies with the acquired qualitative information. Thus, λ serves as a measure of the ethical tension or "ethical distress" experienced by the analyst when engaging with qualitative information. This construct can be interpreted as a reflection of the analyst's adherence to normative principles or their intrinsic work ethic.

2. Equilibrium

2.1. Second period equilibrium

To compute the model's equilibrium, we start backward with the second period equilibrium. Comparing the firm's expected profits under the two possible contracts we get the following result.

Assumption 1:

$0< \rho_{t+1} <1$, that is: $\frac{\sigma_t}{2}\sqrt{\frac{1+\mu}{2}\frac{1-\mu+2\lambda}{1-\mu}} < 1$

Proposition 1.

Under Assumption 1, the equilibrium contract that maximizes the firm's expected profits B_{t+1} is the Ethics-Driven Contract if and only if the analyst's productivity is below the following threshold level

$$\overline{\rho}_{t+1} = \frac{\Xi\Psi_{t+1}\eta_{t+1}}{1+\Xi\Psi_{t+1}(\eta_{t+1}-1)} \quad \text{where } \Xi = \sqrt{\frac{1+\mu}{2}\frac{1-\mu+2\lambda}{1-\mu}}$$

and $\Psi_{t+1} = \frac{\sigma_{t+1}}{\sqrt{2}}$;

if the analyst's productivity is above the threshold level, the equilibrium contract that maximizes the firm's expected profits B_{t+1} is the Qualitative Information Incentive Contract.

Proof: see appendix 5.1.

Under the **Ethics-Driven Contract**, financial incentives are exclusively allocated to the provision of quantitative information, whereas the **Qualitative Information Incentive Contract** extends financial rewards to both quantitative and qualitative contributions. Proposition 1 posits that when an analyst's reputation for delivering high-quality research falls below a critical threshold ($\overline{\rho}_{t+1}$), employers opt for an Ethics-Driven Contract, relying on the analyst's intrinsic motivation or work ethic to ensure the provision of qualitative information. Conversely, for analysts with an established reputation for high-quality research, the Qualitative Information Incentive Contract incorporates substantial monetary rewards to incentivize the inclusion of qualitative insights.

Proposition 1 thus highlights how analysts' productivity and status shape the design of incentive contracts. Specifically, our findings show that reputation reflects analysts' abilities and correlates with higher compensation, aligning with empirical evidence linking pay to performance for financial analysts (e.g., Eccles and Crane, 1988; Stickel, 1992; Fang and Yasuda, 2009). In this framework, analysts' reputational concerns further influence incentives to deliver valuable and accurate reports. The Qualitative Information Incentive Contract allows employers to offer analysts significantly higher compensation,

[1] A similar assumption is made in Itoh (1994).

[2] A similar assumption is made in Heinle, Hofmann & Kunz (2012).

recognizing their prestige. Consistent with evidence that star analysts command substantially higher salaries than their lower-status counterparts, analysts with a strong reputation for high-quality research receive financial incentives for both quantitative and qualitative information, effectively motivating their performance. However, this lucrative compensation linked to performance can create conflicting incentives. In contrast, non-reputable analysts, who must establish a reputation for delivering quality research, rely more on intrinsic motivation or ethical concerns to deliver qualitative information. Consequently, employers are more likely to offer them Ethics-Driven Contracts.

2.2. First period equilibrium

Based on the second-period contractual, we calculate the first-period equilibrium research effort.

The analyst's research effort in the first period is determined according to the following program

$$\max_{\theta_t} \ln(1-\theta_t) + \ln(\omega_{t+1}), \text{ s.t. } \rho_{t+1} = \rho(\rho_t, \theta_t)$$

We thus have (see appendix 5.2):

$$\theta_t = \frac{\gamma \rho_{t+1} \pi'(\rho_{t+1})}{\gamma \rho_{t+1} \pi'(\rho_{t+1}) + \pi(\rho_{t+1}) - \Delta\Psi_{t+1}} \quad (9)$$

and

$$\rho_{t+1} = A_t \left[\frac{\gamma \rho_{t+1} \pi'(\rho_{t+1})}{\gamma \rho_{t+1} \pi'(\rho_{t+1}) + \pi(\rho_{t+1}) - \Delta\Psi_{t+1}}\right]^{\gamma} [\rho_t]^{1-\gamma} \quad (10)$$

where $\pi'(\rho_{t+1}) = \frac{\eta_{t+1}}{[\rho_{t+1} + (1-\rho_{t+1})\eta_{t+1}]^2}$, $\Delta = 1+\lambda$ in the ethics-driven contract or $\Delta = (1+\mu)/2$ in the qualitative information incentive contract, and $\Psi_{t+1} = \sigma_{t+1}/\sqrt{2}$.

2.3. Stationary equilibrium

Condition 1.

Under assumption 1, there exists a unique equilibrium contract if and only if

either $\rho = \frac{2\eta(1-\eta)\Delta\Psi - \eta(1+\gamma) + \sqrt{D}}{2(1-\eta)(1-(1-\eta)\Delta\Psi} \leq \bar{\rho}$ and the optimal contract is an Ethics-Driven Contract

or $\rho = \frac{2\eta(1-\eta)\Delta\Psi - \eta(1+\gamma) + \sqrt{D}}{2(1-\eta)(1-(1-\eta)\Delta\Psi} > \bar{\rho}$ and the optimal contract is a Qualitative Information Incentive Contract

where $\overline{\rho} = \frac{\Xi\Psi\eta}{1+\Xi\Psi(\eta-1)}$, $\Xi = \sqrt{\frac{1+\mu}{2}\frac{1-\mu+2\lambda}{1-\mu}}$, $\Psi = \frac{\sigma}{\sqrt{2}}$,

$D = (2\eta(1-\eta)\Delta\Psi - \eta(1+\gamma))^2 + 4(1-\eta))(1-\Delta\Psi(1-\eta))(\gamma\ \eta + \Delta\Psi\ \eta^2) > 0$

and $\Delta = 1+\lambda$ in the ethics-driven contract or $\Delta = (1+\mu)/2$ in the qualitative information incentive contract.

We then have the following result.

Proposition 2.

Under condition 1, the economy has a unique stationary equilibrium. The Ethics-Driven Contract is implemented when an analyst's productivity - and consequently their reputation - falls below the threshold level $\overline{\rho}$. Conversely, the Qualitative Information Incentive Contract is employed when the analyst's productivity and reputation exceed this threshold.

Proof: Immediate from Condition 1.

Proposition 2 illustrates that financial analysts with high productivity or strong reputations are provided financial incentives for both quantitative and qualitative information. In contrast, analysts with lower productivity or weaker reputations receive monetary incentives exclusively for quantitative information, with qualitative contributions being driven by ethics-based incentives. This suggests that ethical considerations function as a substitute for reputation within the incentive frameworks designed for analysts. Given the intricate interplay of parameters influencing the model's endogenous variables, numerical simulations are essential to effectively compare research efforts and compensation across the various incentive regimes.

2.4. Comparison of Research Levels and Wages

As reported in figure 1, we see that the Qualitative Information Incentive Contract is characterized by lower research effort at date t and a high expected wage at date t + 1 (Figure 1, case a). On the contrary, the Ethics-Driven Contract is characterized by a high research effort at date t and a low expected wage (tied to the quality of the analysts' research) at date t + 1 (Figure 1, case b).

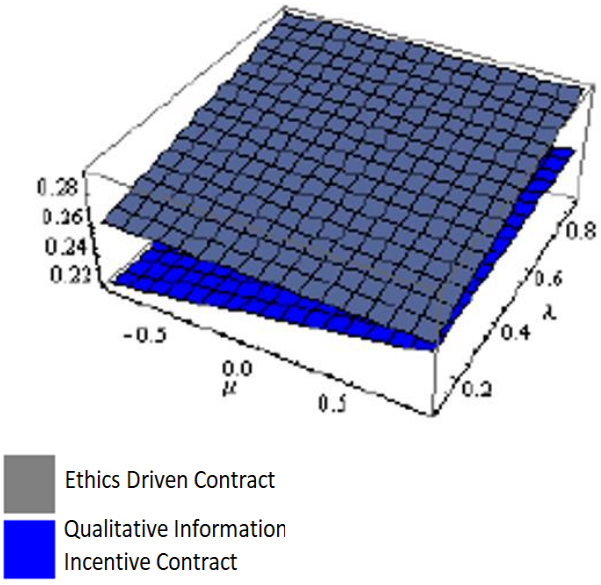
Our simulations show that implementing a contract that leverages ethical distress ensures analysts exert substantial research effort at date t. Within the framework of the Ethics-Driven Contract, the reduced sensitivity of effort to incentives in the second period is offset by a heightened research effort relative to the hypothetical, out-of-equilibrium level that would arise if monetary incentives were applied uniformly to both quantitative and qualitative information. Consequently, this elevated research effort at date t contributes to an enhanced reputation for the analyst at date t+1. In summary, the Ethics-Driven Contract capitalizes on analysts' intrinsic "work ethic" to incentivize the production of valuable and reliable research, achieving a high research-reputation equilibrium.

Alternatively, under the Qualitative Information Incentive Contract, the higher sensitivity of effort to incentives at date t + 1 coupled with the prospect of a higher expected wage, results in reduced research effort at date t compared to the hypothetical, out-of-equilibrium level that could be achieved through non-monetary incentives for qualitative information. This diminished effort at date t undermines the analyst's reputation for delivering valuable reports and recommendations at date t + 1. This finding indicates that a Qualitative Information Incentive Contract exposes analysts to conflicts of interest. Specifically, the emphasis on short-term gains—manifested as the higher wage anticipated at date t+1 distracts analysts from producing high-quality research, thereby adversely affecting their reputation. This dynamic gives rise to a low research-reputation equilibrium.

Our findings highlight the impact of compensation structures on analysts' effort decisions, taking into account the roles of reputational considerations and intrinsic work ethic. The key insight is that the structure of compensation contracts, when influenced by reputational concerns and ethical considerations, can lead to incentive misalignments and suboptimal decision-making among analysts. Specifically, we argue that when compensation contracts emphasize financial rewards for producing high-quality research (as opposed to relying on ethical pressures), analysts face a trade-off between short-term financial gains and long-term reputational concerns. This trade-off often results in analysts "liquidating" their reputation.

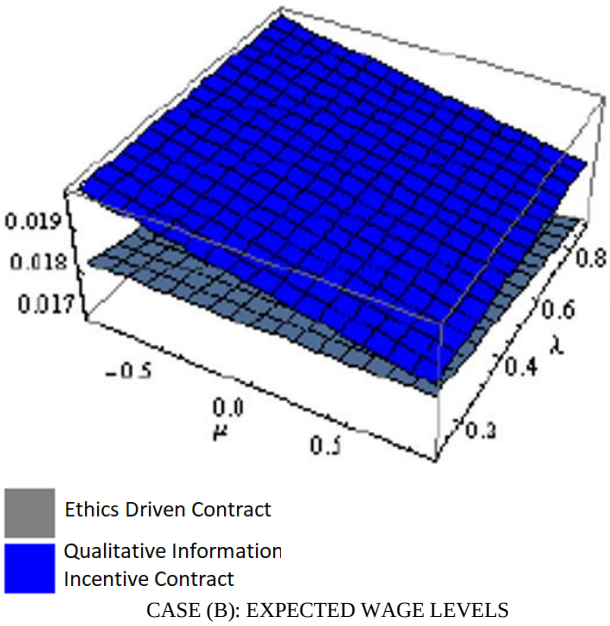
In this framework, the prospect of higher short-term rewards—such as the increased wages provided by Qualitative Information Incentive Contracts—encourage analysts to act opportunistically, resulting in a deterioration of research quality and a subsequent erosion of their reputation. The theory of analyst conflicts of interest suggests that analysts with established reputations for delivering high-quality research are more likely to resist opportunistic behaviors to preserve the long-term benefits of their reputation. Yet, our findings suggest the opposite: Conflicts of interest have a more pronounced negative effect on analysts with strong reputations. The lure of lucrative compensation intensifies the temptation for these analysts to trade their reputation for immediate financial gains, challenging the theoretical effectiveness of personal reputation as a disciplinary mechanism. In contrast to Fang and Yasuda (2009) who argue that personal reputation can effectively deter conflicts of interest, our results show that the significant compensation associated with full financial incentive contracts weakens analysts' motivation to uphold research quality and preserve their reputation. In contrast, analysts driven by ethical considerations in their research are more likely to produce accurate work. This implies that compensation structures that align with analysts' work ethic help mitigate the pressures of conflicts of interest or enable analysts to better resist them.

Overall, we find that Qualitative Information Incentive Contracts exacerbate conflicts of interest, harming both long-term reputation and research quality. In contrast, Ethics-Driven Contracts, which emphasize analysts' ethical motivations, help mitigate conflicts and foster a high research-reputation equilibrium.



Parameters value: σ=0.1 η=0.7 γ=0.3

CASE (A): ANALYST'S PRODUCTIVITY LEVELS



CASE (B): EXPECTED WAGE LEVELS

FIGURE 1: SIMULATIONS ON RESEARCH LEVELS AND EXPECTED WAGES (CASE A,B)

3. Conclusion

In response to scandals in the U.S. and growing global concern over analyst research practices, the SEC implemented a 2003 settlement requiring securities firms to significantly separate research activities from investment banking, particularly in terms of analysts' compensation. It is widely acknowledged that conflicts of interest exist in analyst research, and recent empirical studies have explored the role of reputation in addressing these conflicting incentives.

This paper develops a dynamic model that examines the interplay between work ethic, reputational concerns, and incentives in analyst research. Our central premise is that while potential conflicts of interest exist, they are unlikely to be exploited unless incentivized by the compensation structure. Specifically, we propose that employers can offer either an Ethics-Driven Incentive Contract or a Qualitative Information Incentive Contract, depending on analysts' reputational and ethical considerations.

By exploring the dynamic relationship between compensation contracts and analysts' effort in delivering high-quality research, this study highlights the role and limitations of reputation in mitigating conflicts of interest. Our findings reveal that full financial incentive contracts, which offer extrinsic rewards for both quantitative and qualitative information, tend to amplify conflicts of interest. The promise of lucrative compensation under these contracts often discourages analysts from putting in the necessary research effort, ultimately undermining their reputation for providing valuable insights to investors.

Conversely, contracts that combine monetary and non-monetary rewards based on an analyst's work ethic lead to greater research effort and support the development of a strong long-term reputation. This analysis underscores the critical relationship between ethical and reputational concerns and incentives as a key driver of research quality. In the absence of ethical considerations, the temptation of short-term financial rewards may prompt even high-reputation analysts to compromise their reputation for immediate gains, resulting in less accurate research.

Conflicts of interest

The author(s) states that there is no conflict of interests.

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Appendix

A. Optimal Contracts

The contractual relationship is modeled based on the linear multi-task approach developed by Itoh (1994) and Feltham & Xie (1994), from Holmstrom & Milgrom (1987, 1991)'s canonical model.

Observable output is given by $y_{t+1} = e_{t+1} + q_{t+1} + \varepsilon_{t+1}$

where: e_{t+1} is the effort for gathering quantitative information, q_{t+1} is the effort for gathering qualitative information and ε_{t+1} is a random (noise) term with distribution $N(0,(\sigma_{t+1})^2)$

The analyst's net compensation is $\omega_{t+1} = E(w_{t+1}) - C(e_{t+1}, q_{t+1})$

where C (.,.) is the analyst's cost of efforts (equations 8a and 8b) and the analyst's expected compensation is $E(w_{t+1}) = \alpha \cdot E(y_{t+1}) + \beta$

Parameters α and β are determined so as to maximize the employer's expected profits

$B_{t+1} = \pi(\rho_{t+1}) \cdot E(y_{t+1}) - E(w_{t+1})$, with $\pi(\rho_{t+1}) = \rho_{t+1} / [\rho_{t+1} + (1-\rho_{t+1})\eta_{t+1}]$.

In this context, the optimal contract is determined in three steps:

- *Step 1 : Incentive compatible constraint : α such that e_{t+1} = argMax CE_{t+1}*
- *Step 2 : Participation constraint: β such that $CE_{t+1} = 0$*
- *Step 3 : Optimal contract: $(e_{t+1}, q_{t+1}) =$ argMax B_{t+1}*

Where the analyst's certain equivalent is defined by $CE = E(w_{t+1}) - C(e_{t+1}, q_{t+1}) - r(\alpha)^2(\sigma_{t+1}{}^2/2)$, with r the absolute risk aversion coefficient: $r = -u''(.) / u'(.) = 1 / (w_{t+1} - C(e_{t+1}, q_{t+1}))$, given a second period reservation utility null

Solving step 1, 2 and 3 leads to the following optimal contracts:

- Qualitative Information Incentive Contract (QIIC):

$e_{t+1} = \pi(\rho_{t+1}) - \Psi_{t+1}$
$q_{t+1} = \pi(\rho_{t+1})$
$E(w_{t+1}) = (\pi(\rho_{t+1}))^2/2 - (\Psi_{t+1})^2(1+\lambda)/2$
$B_{t+1} = (\pi(\rho_{t+1}))^2/2 - \pi(\rho_{t+1})\Psi_{t+1} + (\Psi_{t+1})^2(1+\lambda)/2$
with $\Psi_{t+1} = \sigma_{t+1}/\sqrt{2}$.

- Ethics-Driven Contract (EDC):

$e_{t+1} = \pi(\rho_{t+1})/(1+\mu) - \Psi_{t+1}/2$
$q_{t+1} = \pi(\rho_{t+1})/(1+\mu) - \Psi_{t+1}/2$
$E(w_{t+1}) = (\pi(\rho_{t+1}))^2/(1+\mu) - (\Psi_{t+1})^2(1+\mu)/4$
$B_{t+1} = (\pi(\rho_{t+1}))^2/(1+\mu) - \pi(\rho_{t+1})\Psi_{t+1} + (\Psi_{t+1})^2(1+\mu)/4$
with $\Psi_{t+1} = \sigma_{t+1}/\sqrt{2}$.

Proof of Proposition 1.

We compute the difference between expected profits from the QIIC and expected profits from the EDC, and find that

$(\pi(\rho_{t+1}))^2/2 - \pi(\rho_{t+1})\Psi_{t+1} + (\Psi_{t+1})^2(1+\lambda)/2 - (\pi(\rho_{t+1}))^2/(1+\mu)$
$- \pi(\rho_{t+1})\Psi_{t+1} + (\Psi_{t+1})^2(1+\mu)/4$
$= (\pi(\rho_{t+1}))^2(\mu-1)/2(\mu+1) + (\Psi_{t+1})^2(1-\mu+2\lambda)/4$

Given that $-1<\mu<1$, $(\pi(\rho_{t+1}))^2(\mu-1)/2(\mu+1) + (\Psi_{t+1})^2(1-\mu+2\lambda)/4 > 0$ iff
$(\pi(\rho_{t+1}))^2 < (\Psi_{t+1})^2(1+\mu)(1-\mu+2\lambda)/2(1-\mu)$, that is: $\pi(\rho_{t+1}) < \bar{\pi}_{t+1} = \Psi_{t+1}\sqrt{\frac{1+\mu}{2}\frac{1-\mu+2\lambda}{1-\mu}}$

which is equivalent to $\rho_{t+1} < \bar{\rho}_{t+1} = \frac{\Xi\Psi_{t+1}\eta_{t+1}}{1+\Xi\Psi_{t+1}(\eta_{t+1}-1)}$, with $\Xi = \sqrt{\frac{1+\mu}{2}\frac{1-\mu+2\lambda}{1-\mu}}$ and $\Psi_{t+1} = \sigma_{t+1}/\sqrt{2}$.

B. Dynamics of analyst's research and productivity

Solving $\max_{\theta_t} \ln(1-\theta_t) + \ln(\omega_{t+1})$, s.t. $\rho_{t+1} = \rho(\rho_t,\theta_t) = A_t(\theta_t)^{\gamma}(\rho_t)^{1-\gamma}$

leads to the following condition: $\frac{1}{1-\theta_t} = \frac{\partial(\ln\omega_{t+1})}{\partial\rho_{t+1}}\frac{\partial\rho_{t+1}}{\partial\theta_t}$

where $\frac{\partial(\ln\omega_{t+1})}{\partial\rho_{t+1}} = \frac{\partial\omega_{t+1}/\partial\rho_{t+1}}{\omega_{t+1}}$ and $\frac{\partial\rho_{t+1}}{\partial\theta_t} = \gamma\rho_{t+1}/\theta_t$

We thus have $\frac{1}{1-\theta_t} = \frac{\partial\omega_{t+1}/\partial\rho_{t+1}}{\omega_{t+1}}\frac{\gamma\rho_{t+1}}{\theta_t}$, that is:

$$\frac{\theta_t}{1-\theta_t} = \gamma\rho_{t+1}\frac{\partial\omega_{t+1}/\partial\rho_{t+1}}{\omega_{t+1}}$$

Using
$\omega_{t+1} = E(w_{t+1}) - C(e_{t+1}, q_{t+1})$
and $E(w_{t+1}) = (\pi(\rho_{t+1}))^2/2 - (\Psi_{t+1})^2(1+\lambda)/2$ in the QIIC
and $E(w_{t+1}) = (\pi(\rho_{t+1}))^2/(1+\mu) - (\Psi_{t+1})^2(1+\mu)/4$ in the EDC

we get:

$\omega_{t+1} = \Psi_{t+1}\pi(\rho_{t+1}) - \Delta(\Psi_{t+1})^2$ and $\frac{\partial\omega_{t+1}}{\partial\rho_{t+1}} = \Psi_{t+1}\pi'(\rho_{t+1})$

In turn, we obtain

$$\theta_t = \frac{\gamma\rho_{t+1}\pi'(\rho_{t+1})}{\gamma\rho_{t+1}\pi'(\rho_{t+1}) + \pi(\rho_{t+1}) - \Delta\Psi_{t+1}}$$

where $\pi'(\rho_{t+1}) = \frac{\eta_{t+1}}{[\rho_{t+1}+(1-\rho_{t+1})\eta_{t+1}]^2}$
and $\Delta = 1+\lambda$ in the QIIC , $\Delta = (1+\mu)/2$ in the EDC and $\Psi_{t+1} = \sigma_{t+1}/\sqrt{2}$

Then we show that ρ_{t+1} is monotonic and strictly increasing in ρ_t

We compute

$$\rho_{t+1} = A_t \left[\frac{\gamma\rho_{t+1}\pi'(\rho_{t+1})}{\gamma\rho_{t+1}\pi'(\rho_{t+1})+\pi(\rho_{t+1})-\Delta\Psi_{t+1}}\right]^{\gamma} [\rho_t]^{1-\gamma}$$

In turn, we can write:

$$\rho_{t+1}$$
$$= A_t[\rho_t]^{1-\gamma}[\rho_{t+1}]^{\gamma}\left[\frac{\gamma\pi'(\rho_{t+1})}{\gamma\rho_{t+1}\pi'(\rho_{t+1})+\pi(\rho_{t+1})-\Delta\Psi_{t+1}}\right]^{\gamma}$$

$$\rho_{t+1}{}^{1-\gamma}$$
$$= A_t[\rho_t]^{1-\gamma}\left[\frac{\gamma\pi'(\rho_{t+1})}{\gamma\rho_{t+1}\pi'(\rho_{t+1})+\pi(\rho_{t+1})-\Delta\Psi_{t+1}}\right]^{\gamma}$$

$$\rho_{t+1}$$
$$= A_t{}^{\frac{1}{1-\gamma}}\rho_t\left[\frac{\gamma\pi'(\rho_{t+1})}{\gamma\rho_{t+1}\pi'(\rho_{t+1})+\pi(\rho_{t+1})-\Delta\Psi_{t+1}}\right]^{\frac{\gamma}{1-\gamma}}$$

$$\rho_{t+1} = \rho_t\left[A_t{}^{\frac{1}{\gamma}}\frac{\gamma\pi'(\rho_{t+1})}{\gamma\rho_{t+1}\pi'(\rho_{t+1})+\pi(\rho_{t+1})-\Delta\Psi_{t+1}}\right]^{\frac{\gamma}{1-\gamma}}$$

That is $\rho_{t+1} = \rho_t[G(\rho_{t+1})]^{\frac{\gamma}{1-\gamma}}$ with $G(\rho_{t+1}) = A_t{}^{\frac{1}{\gamma}}\frac{\gamma\pi'(\rho_{t+1})}{\gamma\rho_{t+1}\pi'(\rho_{t+1})+\pi(\rho_{t+1})-\Delta\Psi_{t+1}}$

We show that $G'(\rho_{t+1}) < 0 \quad \Leftrightarrow \quad \pi''(.) < 0$

Given that $\pi(\rho_{t+1}) = \rho_{t+1} / [\rho_{t+1}+(1-\rho_{t+1})\eta_{t+1}]$, hence, function G(.) is strictly decreasing. Using the implicit function theorem, ρ_{t+1} therefore is monotonic and strictly increasing in ρ_t.

For each ρ_t corresponds a unique ρ_{t+1}.