

Corporate Governance and Innovation; An Information Design Perspective

Matthias Müllner

University of Graz

June 13, 2023



DART. *Doctoral Program
in Accounting, Reporting,
and Taxation*
www.dart.ac.at

Overview

My doctoral thesis analyzes the effect of information design on decision making in three analytical papers:

- **Costly Communication: Implications of Board Busyness and Board Expertise**
- **Why Perfect Monitoring May Not Be Optimal Even When Costless**
- **The Effects of Accounting Conservatism and Input Pricing Regulations on Innovation and Welfare**

Costly Communication: Implications of Board Busyness and Board Expertise

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Motivation - Introduction

- Costs of communication affect communication between the manager and the board and thereby also shareholders.
- Busy boards are more time constrained and face higher costs of attention.
- Boards with higher expertise are more proficient in understanding information by the manager.
- Attention and expertise are required to understand information provided by the manager.

Motivation - Setting

- The board has to decide on the approval of a project.
- There is a conflict of interest between the empire-building manager and the diligent board.
- The manager designs the information available for the board when deciding on the approval of the project.

Research Question:

How do board busyness and board expertise affect the manager's information design, the board's decisions, and ultimately shareholders?

Related Literature

Costly Communication:

Sims, 2003; Dewatripont & Tirole, 2005; **Bloedel & Segal, 2020.**

Bayesian Persuasion:

Göx & Wagenhofer, 2009; Kamenica & Gentzkow, 2011; **Bloedel & Segal, 2020.**

Board Bias:

Adams & Ferreira, 2007; Baldenius et al., 2019, **Gregor & Michaeli, 2020.**

Empirical Literature:

Fich & Shivdasani, 2006; Field et al., 2013; Tan et al., 2019.

Model - Preferences

- There exists a project with unknown value $x \in [\underline{x}, \bar{x}]$.
- The manager may design a costly information system that generates a report for the board.
- The board may pay attention $a_i \in \{a_L, a_H\}$ to a manager's report which results in costs $c_B(a_L) = 0$ and $c_B(a_H) = c_B$, where c_B captures board busyness.
- The board decides whether to approve ($d = 1$) or reject ($d = 0$) the project.

Ex post utilities:

Shareholders: $U_S = d \times x$

Board: $U_B = d \times x - c_B(a_i)$

Manager: $U_M = d \times B - 1_m c_M$

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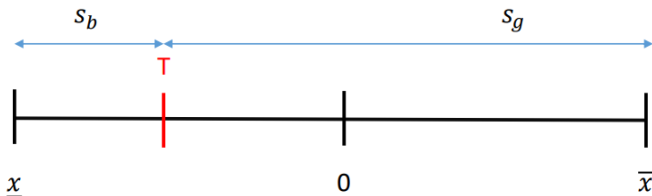
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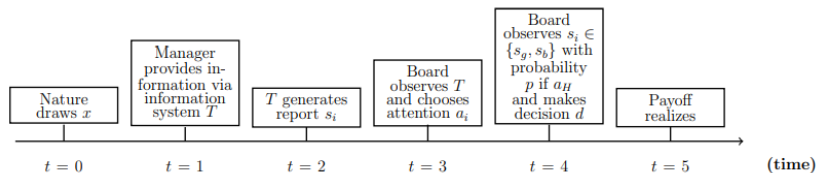
Manager: $U_M = d \times B - 1_m c_M$

Model - Information System (Göx & Wagenhofer, 2009)

- The manager's information system consists of a binary report $s_i \in \{s_b, s_g\}$ and a cutoff value T .
- The board observes $s_i \in \{s_b, s_g\}$ with probability $p \in (0, 1]$ which captures board expertise and observes s_\emptyset with probability $1 - p$ if it pays attention, otherwise $p = 0$.



Model - Sequence of Events



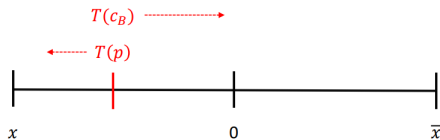
Results - Communication

The decision relevance of information T^* is ceteris paribus increasing in the board's busyness, i.e.,

$$\frac{dT^*}{dc_B} > 0,$$

and decreasing in the board's expertise, i.e.,

$$\frac{dT^*}{dp} < 0.$$



There always exists an optimal $c_B^* \in [0, \bar{c}_B]$ that maximizes shareholders' expected utility, where c_B^* is implicitly defined such that

$$\int_{T^*(c_B^*)}^{\bar{x}} f(\tilde{x}) d\tilde{x} \times B = \frac{c_M}{p}.$$

Results - Extension of Innovation

The manager's optimal innovation effort e^* in a communicative equilibrium is ceteris paribus decreasing in board busyness, i.e.,

$$\frac{de^*}{dc_B} < 0,$$

and increasing in board expertise, i.e.,

$$\frac{de^*}{dp} > 0.$$

In the non-communicative equilibrium there is no innovation and the manager's innovation effort is trivially zero, i.e., $e^* = 0$.

Why Perfect Monitoring May Not Be Optimal Even When Costless

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June 13, 2023

Motivation - Introduction

- **Motivation:**

General impression is that the best response to reoccurring monitoring failures seems to be increasing the board's monitoring duties, ideally requiring the board to perfectly know everything the manager knows.

- **Research questions:**

- Does more (perfect) monitoring necessarily lead to better decisions by the board?
- How does a board's commitment to imperfect monitoring affect the manager's reporting?

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Motivation - Setting

We capture the board's responsibility of deciding on important investments (the approval of a project) when there is:

- a conflict of interest between the empire-building manager and the diligent board,
- the manager privately chooses properties of the report on the project's profitability,
- the board has to assess the report properties through monitoring and then decides whether to approve or reject the project based on its assessment (monitoring outcome).

Basic friction:

The manager knows report informativeness, the board only has a noisy monitoring outcome if it imperfectly monitors.

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Related Literature

Bayesian persuasion literature (Kamenica & Gentzkow, 2011):

- Noisy persuasion (Tsakas & Tsakas, 2021).
- Persuasion and rational inattention (Bloedel & Segal, 2020).
- Ambiguous persuasion (Beauchen et al., 2019).
- No commitment (**Best & Quigley, 2020**).
- Resistance strategies (**Tsakas et al., 2021**).

Corporate governance literature:

- Board commitment and information sharing (Baldenius et al., 2021).
- CEO friendliness and information provision (Gregor & Michaeli, 2020).
- Interaction of board tasks (Faleye et al., 2011).
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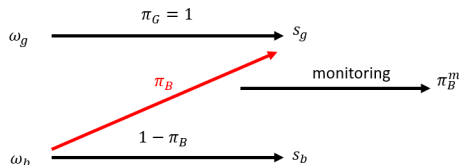
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Model - Information System (Kamenica & Gentzkow, 2011)

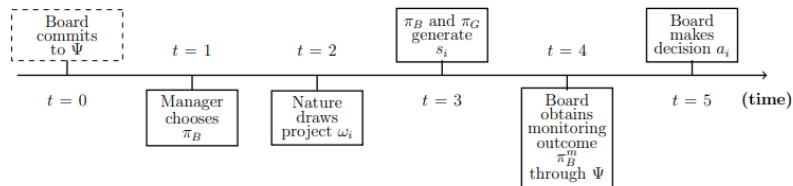
The manager privately chooses the **report properties** π_B that generate the report $s_i \in \{s_g, s_b\}$, where s_g indicates a profitable project (ω_g) and s_b indicates an unprofitable project (ω_b).

- $\Pr(s_g | \omega_g) = \pi_G = 1,$
- $\Pr(s_g | \omega_b) = \pi_B \in [0, 1].$



The report informativeness is decreasing in π_B as it defines the probability of an overstatement error.

Model - Sequence of Events



Results - Imperfect Monitoring

There always exists a monitoring threshold $\bar{\Psi}$ such that for a commitment to $\Psi \in [\bar{\Psi}, \Psi_P) \subseteq [0, \Psi_P)$ the manager's optimal report informativeness and the equilibrium outcome are given by:

$$\begin{aligned}\pi_B^* &< \frac{\mu_0(1-T)}{(1-\mu_0)T} \\ \mathbb{E}[U_B(\Psi, \pi_B^*)] &> I \\ \mathbb{E}[U_M(\Psi, \pi_B^*)] &< \frac{\mu_0 B}{T}.\end{aligned}$$

Results - Imperfect Monitoring

If the board commits to imperfect monitoring:

- the board's monitoring outcome is noisy,
- the board's decision is not deterministic,
- the manager faces a trade-off.

The manager's **trade-off** is to:

- maximize the probability of a favorable report,
- maximize the probability of the board's approval given a favorable report.

Consequences of the **trade-off** for the board:

- Noise leads to "mistakes" in the project decision by the board.
- "Mistakes" are a threat to the manager when they lead to "mistakenly" rejected projects.
- Manager responds to threat of "mistakes" by increasing report informativeness.

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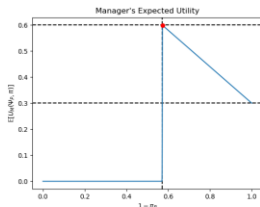
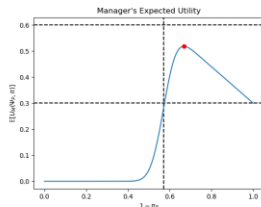
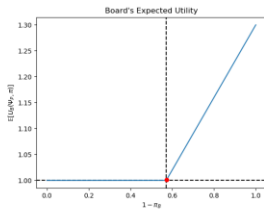
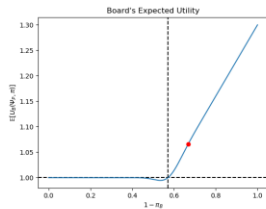
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Results - Comparison of Perfect and Imperfect Monitoring

(a) $\mathbb{E}[U_M(\Psi_P, \pi_B)]$ (b) $\mathbb{E}[U_M(\Psi = 100, \pi_B)]$ (c) $\mathbb{E}[U_B(\Psi_P, \pi_B)]$ (d) $\mathbb{E}[U_B(\Psi = 100, \pi_B)]$

The Effects of Accounting Conservatism and Input Pricing Regulations on Innovation and Welfare

Matthias Müllner ¹ Thomas Müllner ²

¹University of Graz

²University of Graz

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Motivation - Introduction

Accounting conservatism:

Asymmetric information about true financial condition of a firm.

Accounting conservatism requires firms to rather understate than overstate their financial performance in order to protect outside shareholders.

In Austrian and German GAAP embedded through "Vorsichtsprinzip".

International GAAP: True and fair view.

Pricing Regulations:

- The interaction between competitors and suppliers is governed by market policies.
- US: Robinson-Patman-Act prohibits third-degree price discrimination from producers.

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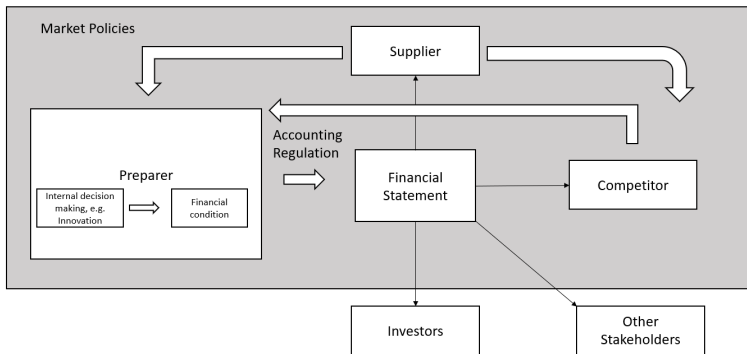
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Motivation - Setting



Motivation - Paper in a Nutshell

- We aim to shed further light on the subtle link between accounting regulations (conservatism), pricing regulations and real effects of accounting conservatism on innovation to ultimately describe the effects of accounting conservatism on total welfare.
- We examine the impact of mandated accounting conservatism on firms' innovation and total welfare in a vertically related market among different input pricing regulations.
- We show that the coordination of accounting conservatism and input pricing regulations plays a crucial role in determining firms' innovation strategies and subsequently total welfare.

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Related Literature

Accounting conservatism in competitive markets:

Recently, accounting conservatism in Cournot markets gained considerable attention (Guo, 2012), (**Friedman et al., 2016**), (Chen & Jorgensen, 2018) and papers find mixed results on the desirability of conservatism.

Pricing regulations and disclosure:

Arya et al., 2020 find that downstream firms would like to share (not share) their private values under uniform input pricing (discriminatory input pricing). Increased incentives to gather and share information under uniform pricing may benefit all parties.

Pricing regulations and innovation:

Uniform input pricing yields higher incentives for downstream firms to innovate (DeGraba, 1990; Herweg & Müller, 2014).

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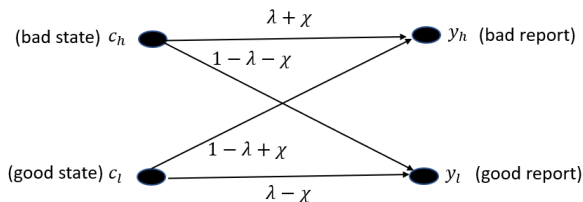
Model - Market Structure, Innovation

- We consider an economy that encompasses a downstream Cournot duopoly and a monopolistic supplier.
- Downstream firms initially face marginal costs of production $c_h > 0$, but have an option to innovate in order to reduce their marginal costs.
- Innovation requires capital $K > 0$. The innovation is successful (not successful) with probability θ ($1 - \theta$) and yields marginal costs of $c_l = 0$ (c_h), where we normalise $\theta = \frac{1}{2}$.
- We assume that the linear inverse demand function is given by

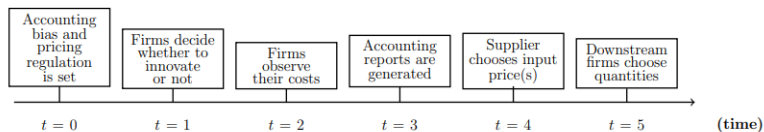
$$p(q) = a - q_1 - q_2.$$

Model - Accounting System (Friedman et al., 2016)

- The downstream firms privately and perfectly learn the outcome of their innovation, i.e., their marginal costs $c \in \{c_l, c_h\}$ and issue a report $y \in \{y_l, y_h\}$.



Model - Sequence of Events



Results - Each Pricing Regulation

Uniform Pricing:

Accounting conservatism affects innovation strategies if costs of innovation are moderately low or moderately high. Accounting conservatism increases tendency to innovate and total welfare.

Price Discrimination:

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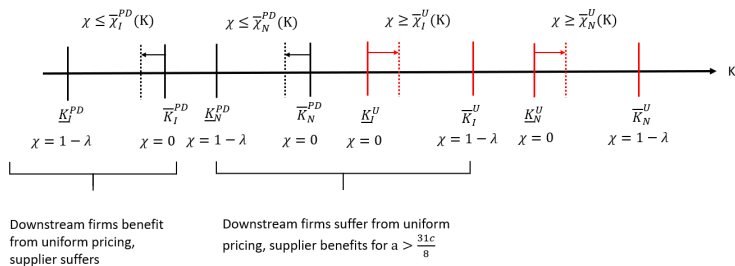
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Results - Comparison Pricing Regulations

- Downstream firms may benefit from price discrimination if it prevents a profit decreasing prisoner's dilemma.
- The interval in which downstream firm prefer price discrimination is increasing in conservatism.



Thank you for your attention!