

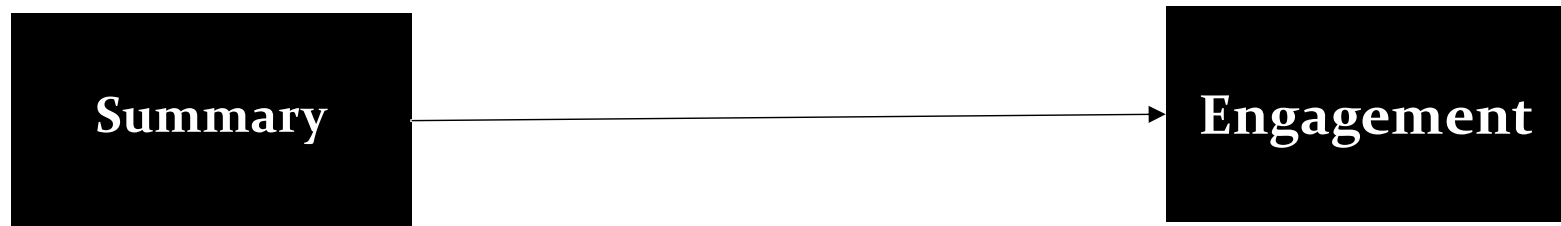
# Enhancing Investor Engagement with AI-Summarized Disclosures

T.J. Wong, Yang Yi, Gwen Yu, Shubo Zhang  
and Tianyu Zhang

ABFER  
May 2025

# Research question

Does providing a summary of annual reports increase investor engagement?



Investor participation  
# of questions  
Quality of firms'  
response

Challenges:

- Summaries in archival settings: selective disclosure.
- Aggregate level outcome variables.

# Motivation

- Growing complexity in company's annual reports and the processing cost imposed on investors.
- Examine the role of providing **SUMMARIES**.

## A Model of Two-Tiered Financial Reporting

ROBERT M. BUSHMAN,\* FRANK GIGLER,\*  
AND RAFFI J. INDJEJIKIAN†



# Setting

- China: A market dominated by individual investors.
  - more than 80% of trading volume consist of retail investors.
- Earning Communication Calls (ECCs)
  - Mandated: ECCs must be held within 15 trading days of its annual report releases.
  - Virtual: Exclusively online and open to the public.
  - Q&A: Participants can freely submit questions using an online chat feature.
- We partner with the largest conference call platform provider (Quanjing).

# The intervention

***We insert a link to the annual report summary (“Annual Report Highlights”) on the firm’s ECC announcement page.***

# The intervention

兆威机电2023年度业绩说明会

兆威机电 003021

预告

举办时间: 2024-04-08 15:00 ~ 16:30  
支持平台: 全景路演

Video/livestream of the presentation

进入路演厅 查看年报

分享: 微信 微博 抖音 快手 小红书 复制链接 关注

活动介绍

Brief introduction

深圳市兆威机电股份有限公司（以下简称“公司”）已于2024年3月30日在巨潮资讯网(www.cninfo.com.cn)上披露了2023年年度报告及相关公告，为便于广大投资者更深入全面地了解公司情况，公司定于2024年4月8日（星期一）下午15:00-16:30在全景网举办本公司2023年度网上业绩说明会。出席本次年度业绩说明会的人员有：公司董事长李海周先生；董事、总经理叶耀兵先生；独立董事沈险峰先生；财务总监左梅女士；董事会秘书邱泽恋女士。

互动交流

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年报亮点

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发送

全部 问答

关键词 / 提问者

主持人

各位嘉宾、各位投资者，兆威机电2023年度业绩说明会到此结束，本次活动得到广大投资者的热情参与，同时公司各位嘉宾对投资者的提问给予了认真的解答，在此一并表示感谢！我们与投资者的沟通渠道是永远开放的，欢迎广大投资者继续通过平台的“在线实时提问”与公司高管进行日常交流。再次感谢您的热情参与！再见！

相关公告

兆威机电：2024年半年度报告	2024-08-28
兆威机电：2024年一季度报告	2024-04-26
兆威机电：2023年年度报告	2024-03-30
兆威机电：2023年三季度报告	2023-10-27
兆威机电：2023年半年度报告	2023-08-22

Question input chat box

Link to annual report summary

Interaction between participants and management

# Summary: 5 key topics presented in bullet points

全景路演 首页 全景成交 全景智播 路演中心 路演厅

代码关键词 搜索

山东晨鸣纸业集团股份有限公司

证券简称: 晨鸣纸业  
证券代码: 000488  
所属地区: 山东省  
所属行业: 造纸及纸制品业

年报亮点

1. 公司概况与主营业务

山东晨鸣纸业集团股份有限公司是一家位于中国山东省寿光市的股份有限公司, 前身为寿光县造纸总厂, 后经过多次改制和股份制改造, 成为一家以机制纸及纸浆生产为主的大型企业。公司的主要业务包括机制纸、电力及热力、建筑材料、造纸化工用品的生产与销售, 同时涉足林木种植、苗木培育、木材及建筑材料的加工销售, 以及酒店服务、设备融资租赁经营等多个领域。

2. 财务状况

根据2023年年度报告, 公司面临一定的债务压力。报告期内, 公司营业收入为26,608,570,228.20元, 较上年下降16.06%; 归属于上市公司股东的净利润为-1,281,289,649.83元, 出现了亏损。公司的总资产为7,948,052,953.58元, 总负债为58,389,197,107.95元, 负债率约为73.6%, 显示出公司有一定的债务压力。

3. 研发与创新

公司高度重视技术研发和创新, 报告期内申请专利33项, 获得授权专利42项, 这体现了公司在技术创新方面的持续投入和成果。通过不断的技术改进和产品创新, 公司旨在提升产品质量和市场竞争能力, 为长期发展奠定基础。

4. 市场与销售

公司产品主要销往中国大江及海外市场, 其中机制纸业务是公司收入的主要来源。公司通过建立销售网络、实施销售策略和优化客户服务, 努力拓展市场和提升销售效率。然而, 报告期内, 由于下游需求疲软和原材料价格波动, 公司销售收入有所下降。

5. 环境与社会责任

公司积极履行环境保护责任, 遵循“绿色发展、环保先行”的理念, 投入大量资金建设环保设施, 如减排回收系统、中水回用系统等, 以降低生产过程中的环境污染。同时, 公司也关注社会责任, 通过各种公益活动回馈社会, 如向“好品山东”品牌贡献力量, 提升品牌形象。

最新路演

山东晨鸣纸业集团股份有限公司  
2023年度业绩说明会  
2024-04-07 15:00

晨鸣纸业2023年度业绩说明会

2024-04-07 15:00

问题征集

请选择提问类型

您还未登录, 请 登录 后提问!

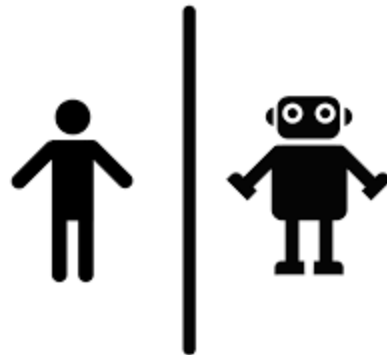
提问

**Why 5 topics?**  
*Cognitive overload of human working memory starts after processing 7( $\pm$ 2) units of information (George Miller, 1956).*



# AI technology

- We use AI technology to populate summaries of the annual report.
  - Kimi AI: OpenAI GPT alternative in China.
  - Known for its ability to process long text (vs. Deepseek).
- Evaluate the quality of the summaries based on automated metrics (e.g., BERTScore, Rouge, and SummaC).
  - AI-generated texts consistently show higher scores than human summaries (BERTScore: 0.66 vs. 0.59).



# Treatment conditions

- **Summary (35%):** A summary consisting of five key points was posted on the company's page for the annual conference call section.
- **Summary & sentiment label (35%):** In addition to the summary, each key point was accompanied by a sentiment label; positive, negative, neutral.
  - Reduce the uncertainty investors may face when interpreting whether each key point represents good or bad sentiment for the firm.
- **Control (30%):** No intervention was applied.

# Structure of the empirical tests

## 1. Track investor engagement levels.

- *# of participants*: Do more investors attend the calls?
- *# of questions*: Are there more questions raised by investors?

## 2. Analyzing the content of the questions.

- Do the questions' topics become more "aligned" with those in the summary?

## 3. Analyzing the types of investors who ask questions.

- Who asks more questions from the summary? Less/more experienced investors?

## 4. Management's answers:

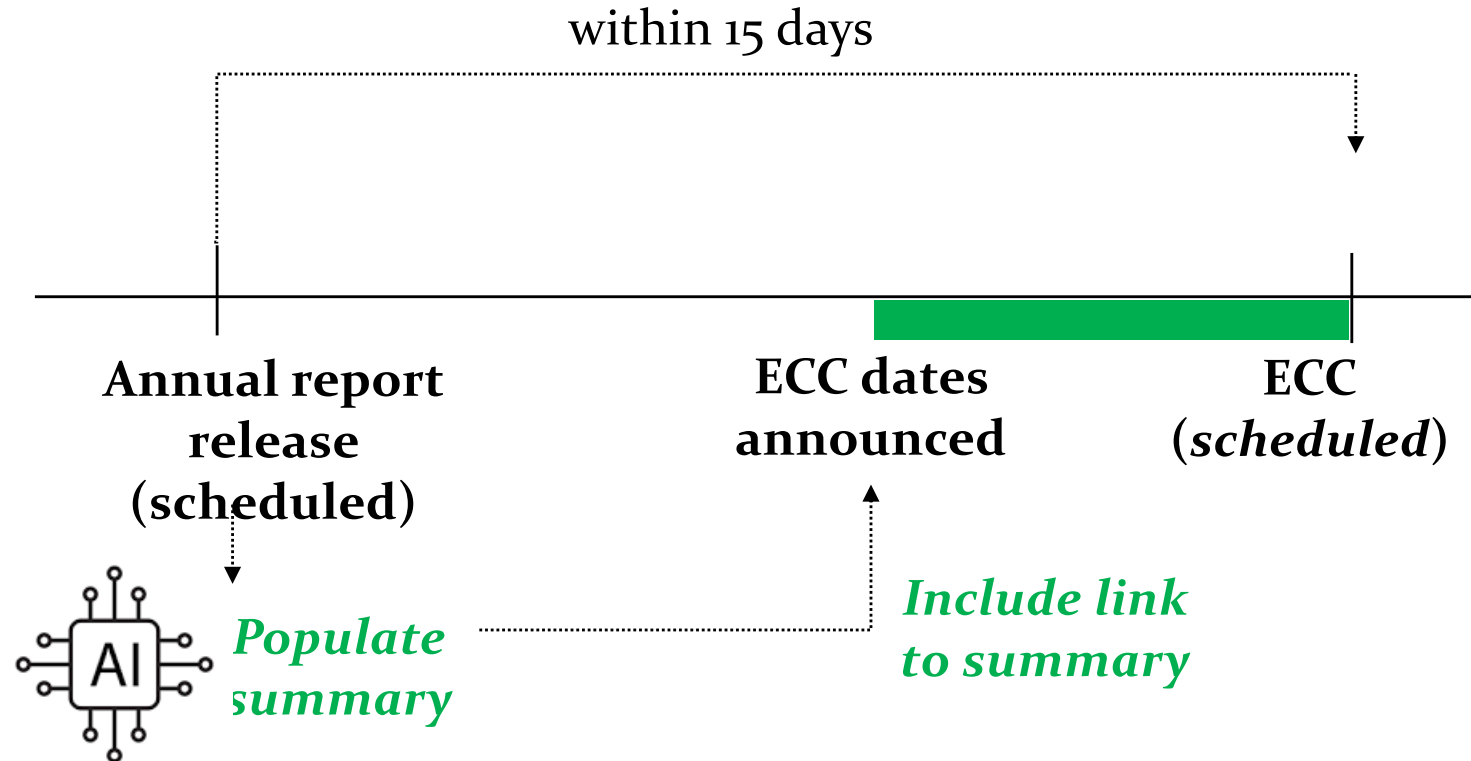
- Does the management answer become more informative?

## 5. Looking beyond the platform.

Table 2.A: Sample

Groups	Listed firms	Percentage (%)	Preassigned	New
Control (30%)	343	31.04	246	97
Treatment 1: Summary only (35%)	373	33.76	277	96
Treatment 2: Summary & Sentiment (35%)	389	35.20	292	97
In Total	1,105	100.00	815	290

# Implementation



- On average, firms announce their ECC dates 7 days before the call.
- No significant difference in the duration between treatment and control firms.

Table 2.A: Distribution of annual report summary topics

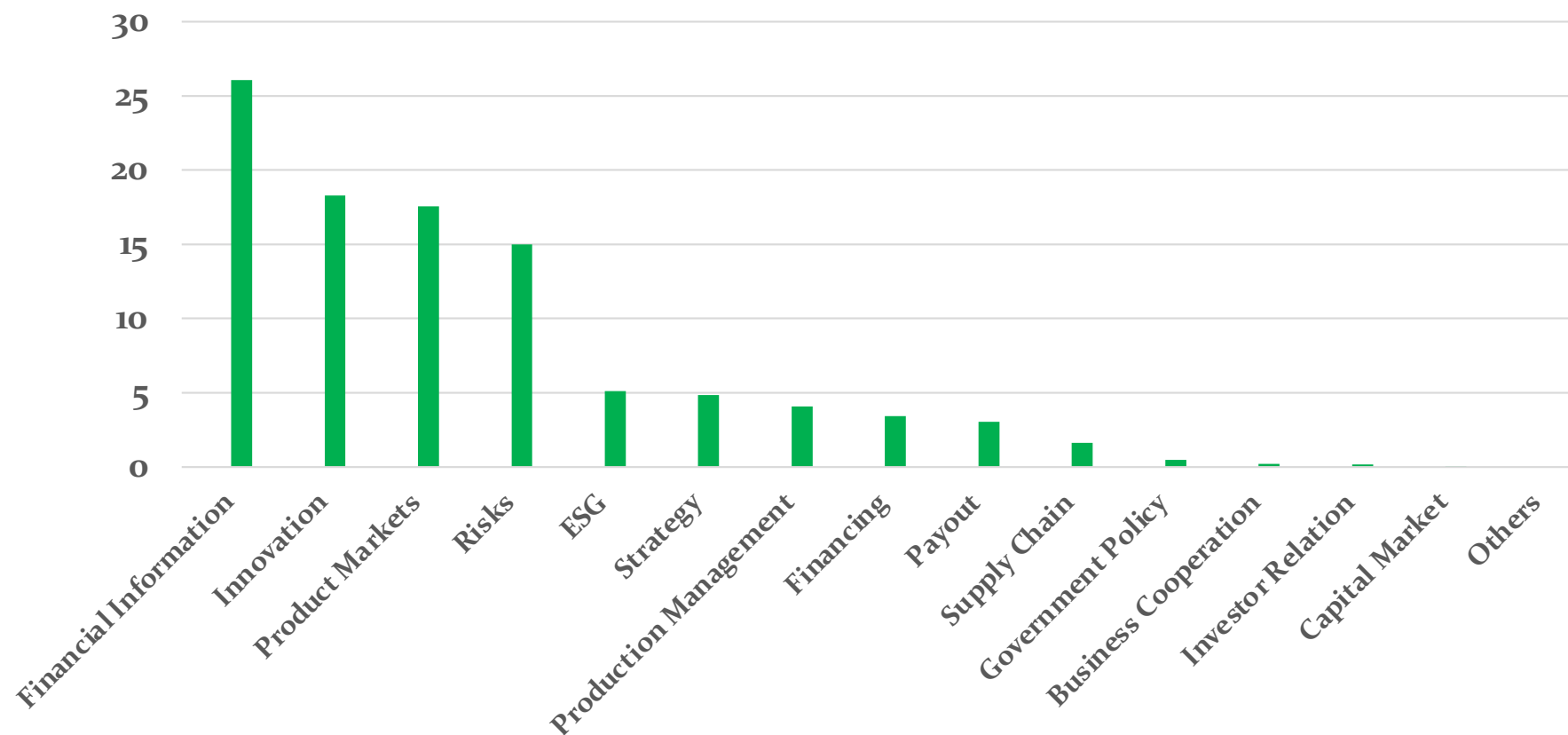
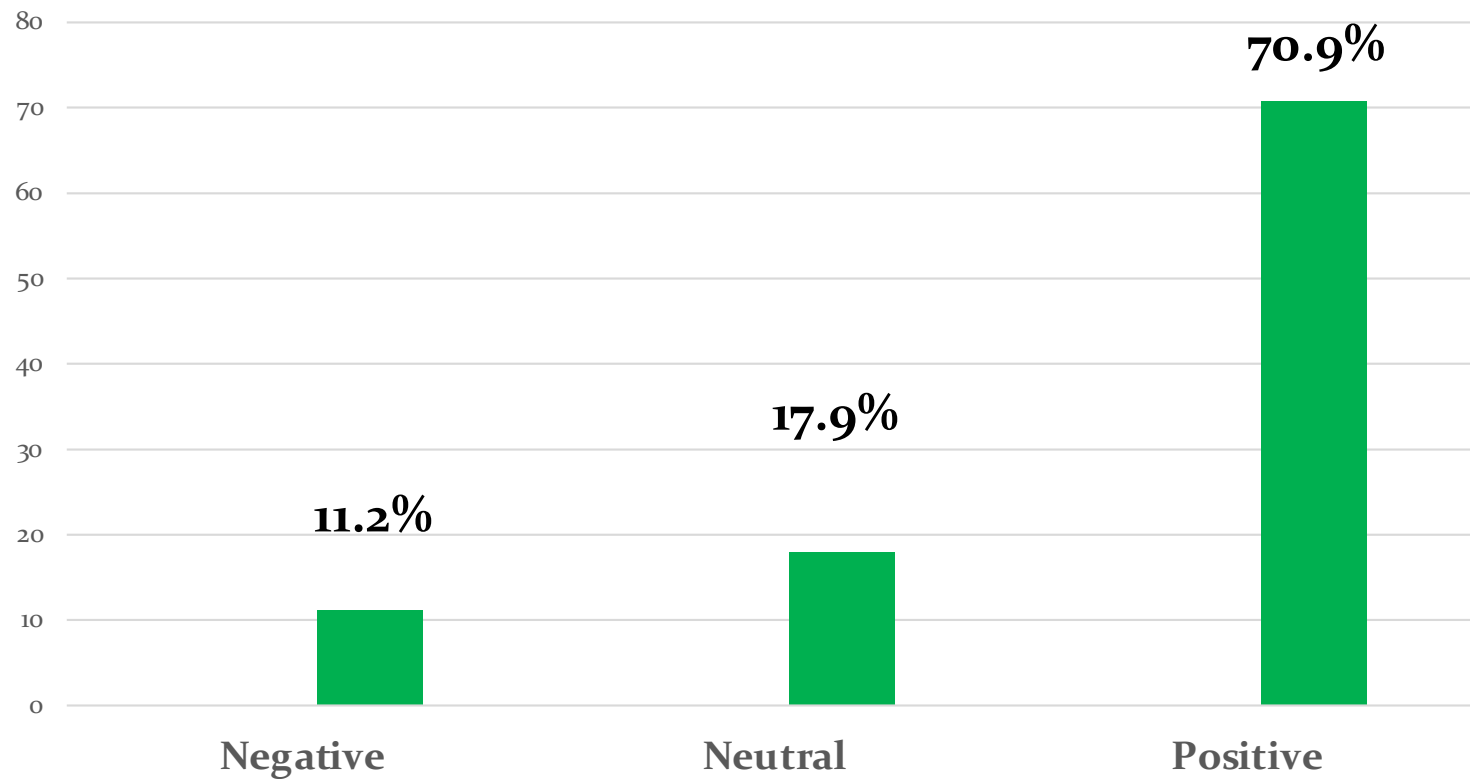


Table 2.B: Distribution of Annual Report  
Topic Sentiment



# Structure of the empirical tests

## 1. Track investor engagement levels

- *# of questions*: 40% increase in the number of questions (19.8 vs. 14.3).
- *# of participants*: 6.8% more participants attending the calls (209.9 vs. 197.2).

## 2. Analyzing the content of the questions

- Questions' topics become more “aligned” with those in the summary provided.

## 3. Analyzing the types of investors who ask questions

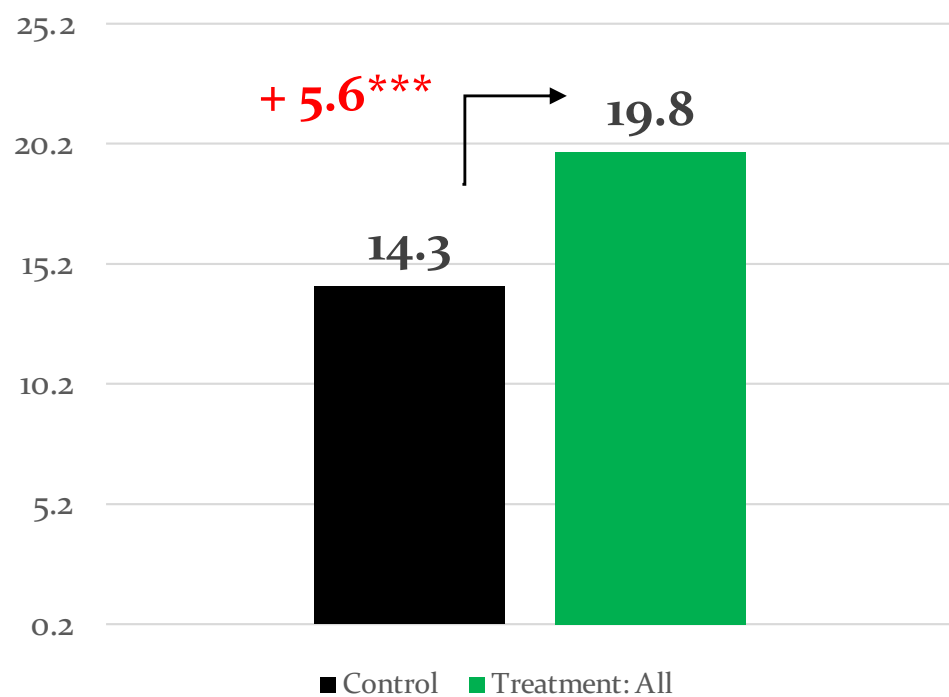
- Less experienced investors ask more questions from the summaries.
- More experienced ask about topics outside of the summaries.

## 4. Management's answers: Become longer and more specific.

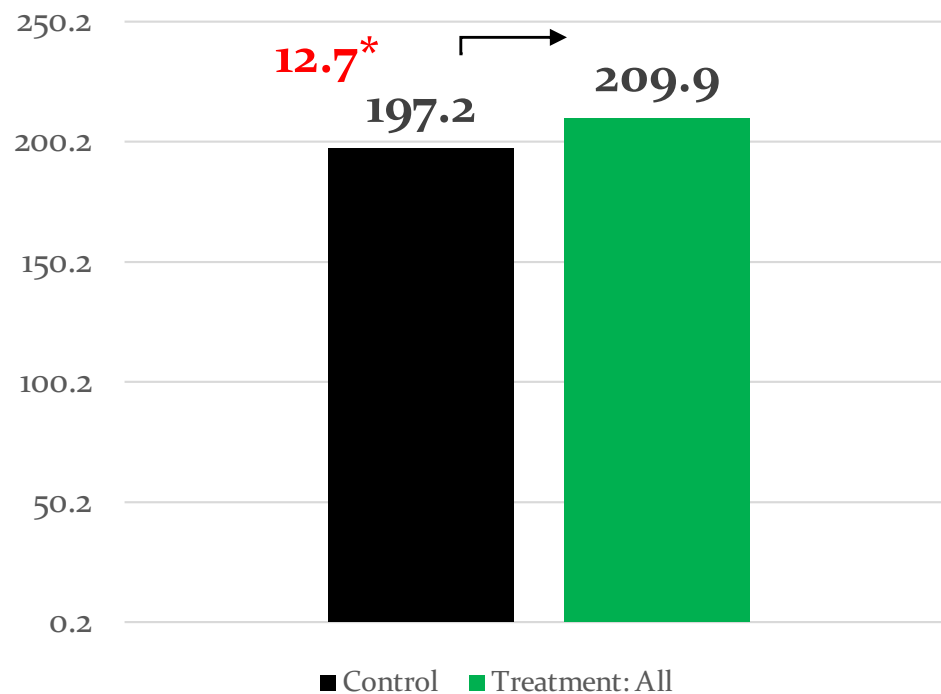
## 5. Looking beyond the platform

# Investor engagement

# of questions



# of participants



# Participant engagement

Dependent Variable:	Questions		Participants	
	(1)	(2)	(3)	(4)
<b>Treat</b>	0.383*** (3.97)		0.090** (2.04)	
<b>Summary</b>		0.378*** (4.41)		0.065 (0.83)
<b>Summary &amp; Sentiment Label</b>		0.388*** (3.53)		0.115*** (2.64)
<b>Size</b>	0.206* (1.90)	0.206* (1.91)	0.282*** (4.37)	0.281*** (4.30)
<b>MB</b>	0.067*** (3.05)	0.067*** (3.04)	0.078*** (3.66)	0.078*** (3.64)
<b>ROA</b>	0.293 (0.39)	0.291 (0.39)	-0.335 (-0.39)	-0.341 (-0.40)
<b>SOE</b>	0.015 (0.14)	0.015 (0.14)	0.003 (0.08)	0.005 (0.11)
<b>Institutional holdings</b>	-0.047 (-0.31)	-0.046 (-0.31)	-0.048 (-0.37)	-0.044 (-0.34)
<b>Analysts following</b>	0.055 (1.10)	0.055 (1.10)	0.057 (1.23)	0.057 (1.23)
<b>Earning surprise</b>	1.698* (1.12)	1.701* (1.11)	0.613* (0.62)	0.620* (0.62)
<b>Ho: T1-T2</b>		-0.010 (0.05)		-0.050 (0.32)
<b>Industry FE, Province FE and Day FE</b>	Yes	Yes	Yes	Yes
<b># of Observations</b>	1,105	1,105	1,105	1,105
<b>R-squared</b>	0.20	0.20	0.48	0.48

# Structure of the empirical tests

## 1. Track investor engagement levels

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- *# of participants*: 6.8% more participants attending the calls (209.9 vs. 197.2).

## 2. Analyzing the content of the questions

- Questions' topics become more “aligned” with those in the summary provided.

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## 5. Looking beyond the platform

Table 4.A Topical alignment

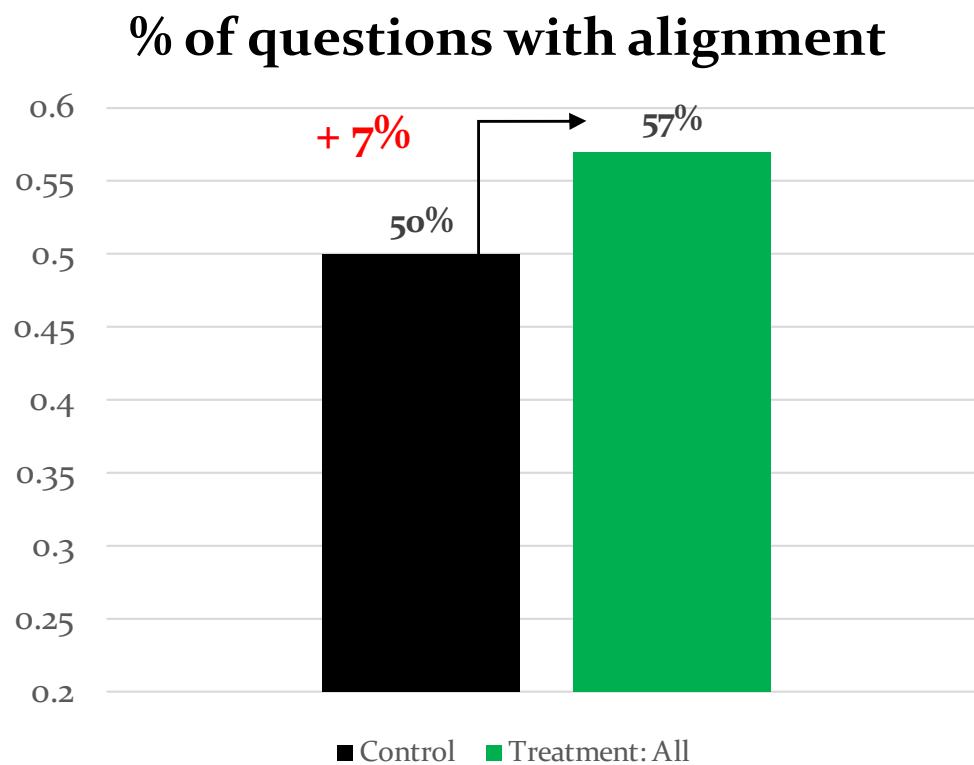


Table 4.B Topical alignment

Dependent Variable:	Alignment	
	(1)	(2)
Treat	0.247*** (3.78)	
Summary		0.201*** (3.05)
Summary & Sentiment Label		0.294*** (3.89)
Ho: T1-T2		-0.093* (2.80)
Controls	Yes	Yes
Industry FE, Province FE and Day FE	Yes	Yes
# of Observations	20,031	20,031
R-squared	0.02	0.02

Table 5 Which topics do investors ask about?

Dependent Variable:	Financial		Risk		Strategy		Payout	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Treat</b>	0.111** (2.29)		0.510*** (4.00)		0.758*** (4.45)		0.935*** (3.59)	
<b>Summary</b>		0.135*** (2.58)		0.486*** (3.05)		0.821*** (4.64)		1.145*** (4.71)
<b>Summary &amp; Sentiment Label</b>		0.086 (1.42)		0.536*** (4.67)		0.684*** (4.01)		0.747** (2.18)
<b>Controls</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Industry FE, Province FE and Day FE</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b># of Observations</b>	11,078	11,078	11,078	11,078	11,078	11,078	11,078	11,078
<b>R-squared</b>	0.03	0.03	0.05	0.05	0.08	0.08	0.18	0.18

Table 5.A Which topic sentiment do investors ask about?

Dependent Variable:	Non-positive	
	(1)	(2)
Treat	0.204*** (3.13)	
Summary		0.203 (1.54)
Summary & Sentiment Label		0.204** (2.26)
Controls	Yes	Yes
Industry FE, Province FE and Day FE	Yes	Yes
# of Observations	11,078	11,078
R-squared	0.18	0.18

# Structure of the empirical tests

## 1. Track investor engagement levels

- *# of questions*: 40% increase in the number of questions (19.8 vs. 14.2).
- *# of participants*: 6.8% more participants attending the calls (209.9 vs. 197.2).

## 2. Analyzing the content of the questions

- Questions' topics become more “aligned” with those in the summary provided.

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## 4. Management's answers: Become longer and more specific.

## 5. Looking beyond the platform

# Table 6.A: Silent vs. vocal investors

Dependent Variable:	Questions		Questions	
	(1)	(2)	(3)	(4)
	Silent Investors		Vocal Investors	
<b>Treat</b>	0.249**		0.143*	
	(2.35)		(1.95)	
<b>Summary</b>		0.253**		0.156***
		(2.55)		(2.73)
<b>Summary &amp; Sentiment Label</b>		0.246**		0.131
		(2.12)		(1.06)
<b>Controls</b>	Yes	Yes	Yes	Yes
<b>Industry FE, Province FE and Day FE</b>	Yes	Yes	Yes	Yes
<b># of Observations</b>	1,091	1,091	1,091	1,091
<b>R-squared</b>	0.16	0.16	0.15	0.15

# Table 6.B: Alignment of silent vs. vocal investors

Dependent Variable:	Alignment			Alignment	
	(1)	(2)		(3)	(4)
	Silent Investors			Vocal Investors	
Treat	0.162**			-0.183***	
	(2.54)			(-3.00)	
Summary		0.119*			-0.195***
		(1.87)			(-3.71)
Summary & Sentiment Label		0.205***			-0.170*
		(2.72)			(-1.83)
Controls	Yes	Yes		Yes	Yes
Industry FE, Province FE and Day FE	Yes	Yes		Yes	Yes
# of Observations	11,369	11,369		2,367	2,367
R-squared	0.18	0.18		0.12	0.12

# Structure of the empirical tests

## 1. Track investor engagement levels

- *# of questions*: 40% increase in the number of questions (19.8 vs. 14.2).
- *# of participants*: 6.8% more participants attending the calls (209.9 vs. 197.2).

## 2. Analyzing the content of the questions

- Questions' topics become more “aligned” with those in the summary provided.
- Participants ask about firm-specific topics and negative sentiment topics.

## 3. Analyzing the types of investors who ask questions

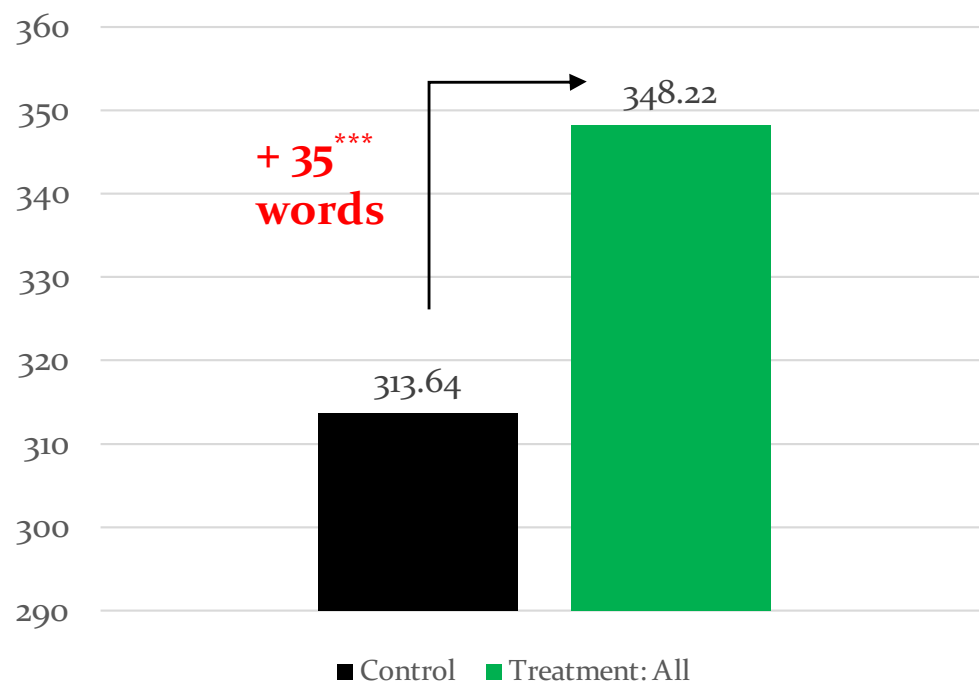
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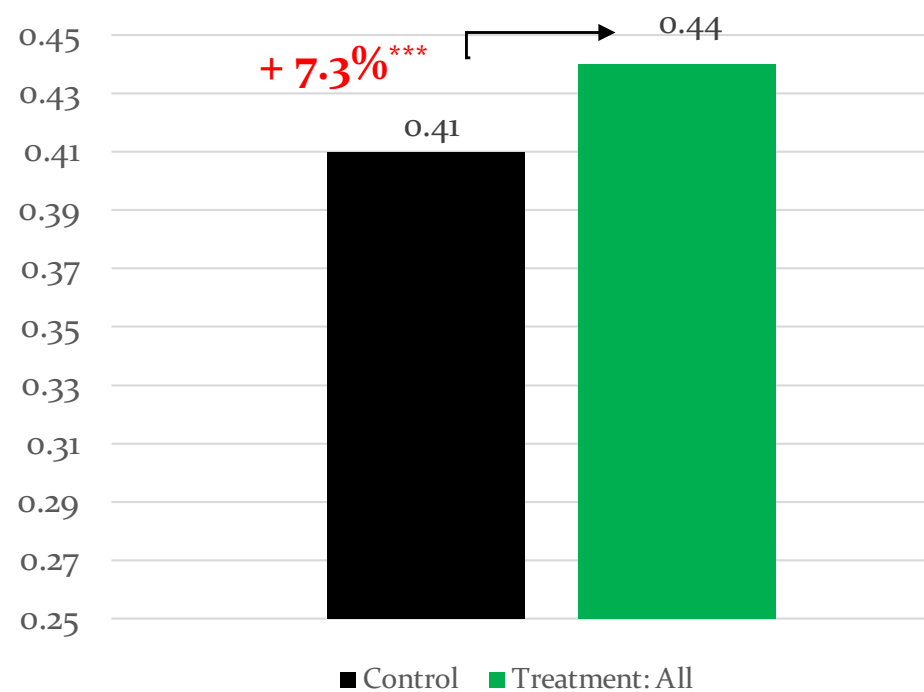
## 5. Looking beyond the platform

# Table 7: Firms' responses

## Length



## Informative



# Table 7: Firms' responses

Dependent Variable:	Length		Informative	
	(1)	(2)	(3)	(4)
Treat	0.127*** (5.87)		0.146*** (2.94)	
Summary		0.135*** (4.77)		0.176** (2.04)
Summary & Sentiment Label		0.118*** (4.50)		0.114* (1.91)
Controls	Yes	Yes	Yes	Yes
Industry FE, Province FE and Day FE	Yes	Yes	Yes	Yes
Date Fixed Effects	Yes	Yes	Yes	Yes
# of Observations	17,417	17,417	17,417	17,417
R-squared	0.05	0.05	0.05	0.05

Table 7: Firms' responses conditional on questions' alignment

Dependent Variable:	Length		Informative	
	(1)	(2)	(3)	(4)
	Aligned	Not-aligned	Aligned	Not-aligned
<b>Treat</b>	0.144*** (5.83)	0.085*** (2.69)	0.162*** (2.97)	0.113* (1.90)
<b>H1: A-NA</b>		0.059 (2.47)		0.051 (0.34)
<b>Controls</b>	Yes	Yes	Yes	Yes
<b>Industry FE, Province FE and Day FE</b>	Yes	Yes	Yes	Yes
<b># of Observations</b>	9,705	7,712	9,705	7,712
<b>R-squared</b>	0.07	0.08	0.03	0.03

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## 5. Looking beyond the platform

Table 8.A: Market-wide effects

Dependent Variable:	Turnover [-1, 5]		Abs_CAR[-1, 5]	
	(1)	(2)	(3)	(4)
<b>Treat</b>	0.021*		0.004	
	(1.91)		(0.74)	
<b>Summary</b>		0.045**		0.011**
		(2.67)		(2.60)
<b>Summary &amp; Sentiment Label</b>		-0.003		-0.003
		(-0.20)		(-0.39)
<b>Controls</b>	Yes	Yes	Yes	Yes
<b>Industry FE, Province FE and Day FE</b>	Yes	Yes	Yes	Yes
<b># of Observations</b>	1,105	1,105	1,105	1,105
<b>R-squared</b>	0.01	0.24	0.14	0.04

Table 9.A: Potential costs (from more questions being raised)

Dependent Variable:	Questions withheld (by firms)	
	(1)	(2)
<b>Treat</b>	0.547** (2.02)	
<b>Summary</b>		0.653** (2.12)
<b>Summary &amp; Sentiment Label</b>		0.445* (1.70)
<b>Controls</b>	Yes	Yes
<b>Industry FE, Province FE and Day FE</b>	Yes	Yes
<b># of Observations</b>	20,031	20,031
<b>R-squared</b>	0.21	0.21

Table 9.B: Questions from the summaries are more likely to be withheld by management

Dependent Variable:	Questions withheld (by firms)	
	(1)	(2)
<b>Treat * <u>Alignment</u></b>	0.286*** (2.81)	
<b>Summary * <u>Alignment</u></b>		0.343*** (2.74)
<b>Summary &amp; Sentiment Label * <u>Alignment</u></b>		0.241** (2.23)
<b>Treat</b>	0.427 (1.64)	
<b>Summary</b>		0.501 (1.60)
<b>Summary &amp; Sentiment Label</b>		0.351 (1.45)
<b>Alignment</b>	-0.424*** (-4.49)	-0.423*** (-4.41)
<b>Controls</b>	Yes	Yes
<b>Industry FE, Province FE and Day FE</b>	Yes	Yes
<b># of Observations</b>	20,031	20,031
<b>R-squared</b>	0.21	0.21

Table 9.C: Potential costs (from more questions being raised)

Dependent Variable:	Redundant		Redundant Indicator	
	(1)	(2)	(3)	(4)
<b>Withhold</b>	0.021*** (8.53)	0.030* (2.04)	0.820*** (10.35)	0.977*** (3.49)
<b>Withhold * Treat</b>		-0.011 (-0.58)		-0.177 (-0.48)
<b>Treat</b>		0.004* (1.77)		-0.100 (-0.95)
<b>Controls</b>	Yes	Yes	Yes	Yes
<b>Industry FE, Province FE and Day FE</b>	Yes	Yes	Yes	Yes
<b># of Observations</b>	20,031	20,031	20,031	20,031
<b>R-squared</b>	0.041	0.042	0.077	0.077

- *Redundant* is the mean of the Jaccard similarity of each question with other questions for the same firm and same topic.
- *Redundant Indicator* is an indicator variable, which equals one if the similarity mean score is above 0.25 (i.e., the top 10 percentile), and zero otherwise.

# Conclusion

- Providing investors with annual report summaries increases investor engagement during the calls.
- Investor questions (i) become more aligned with topics presented in the summaries and (ii) are more likely to come from less experienced investors.
- The summaries lead to management answers that are longer and provide more details.

Thank you!