



# Sustainability policy for listed companies in Taiwan

## The impact of ESG performance

Oral examination for master's thesis in the  
Department of Economics

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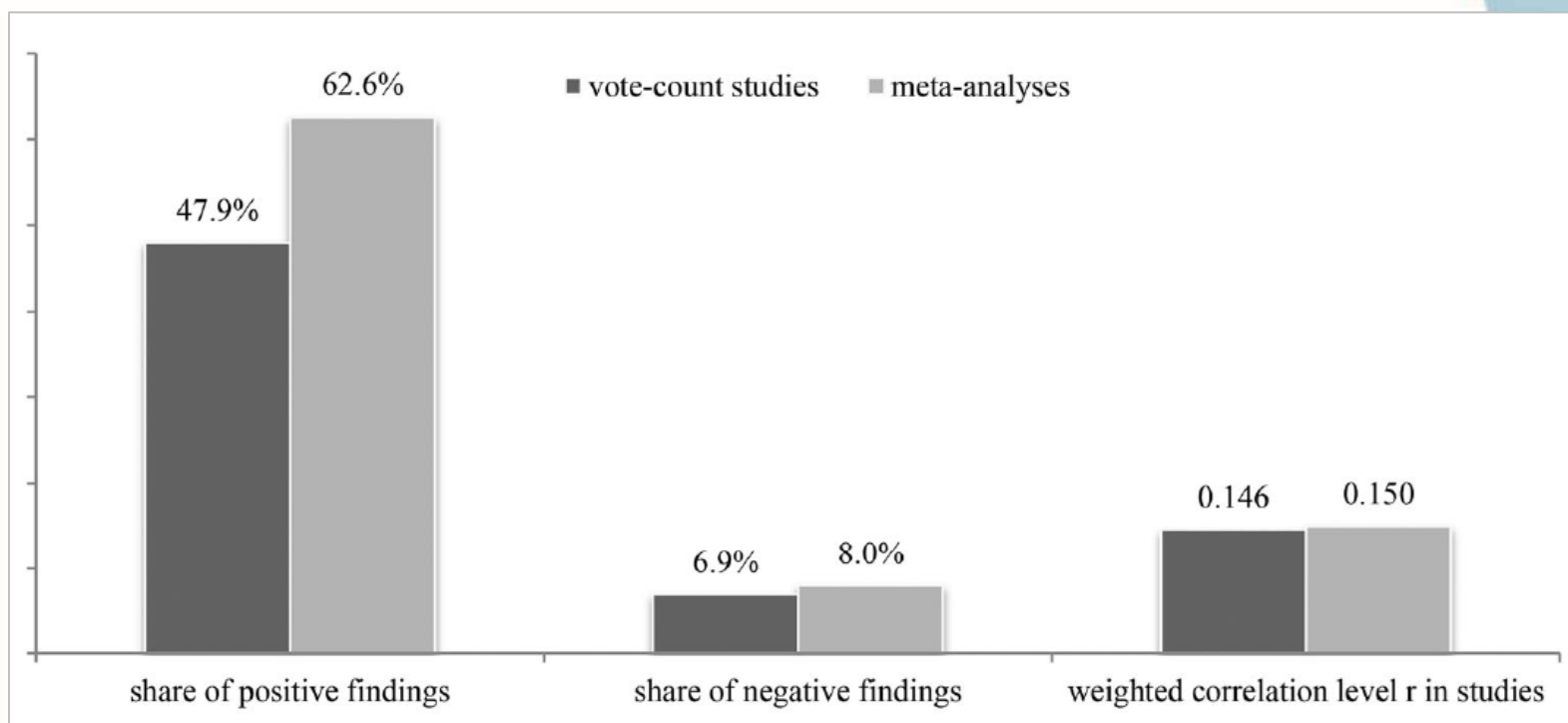
# Category

- Introduction
- Data Introduction
- Descriptive Statistics
- Research Methodology
- Research Findings
- Conclusion and Recommendations

# Discussion – The importance of ESG to companies

- Positive impact : Investment Appetite, Risk Reduction, Credibility Enhancement, Competition and long-term value...
- 
- Negative effect : Additional investments, financial burdens, stock compensation...

# Introduction – ESG and Corporate Finance



綜合研究顯示，2200篇論文的研究統整，大多呈現正面關係

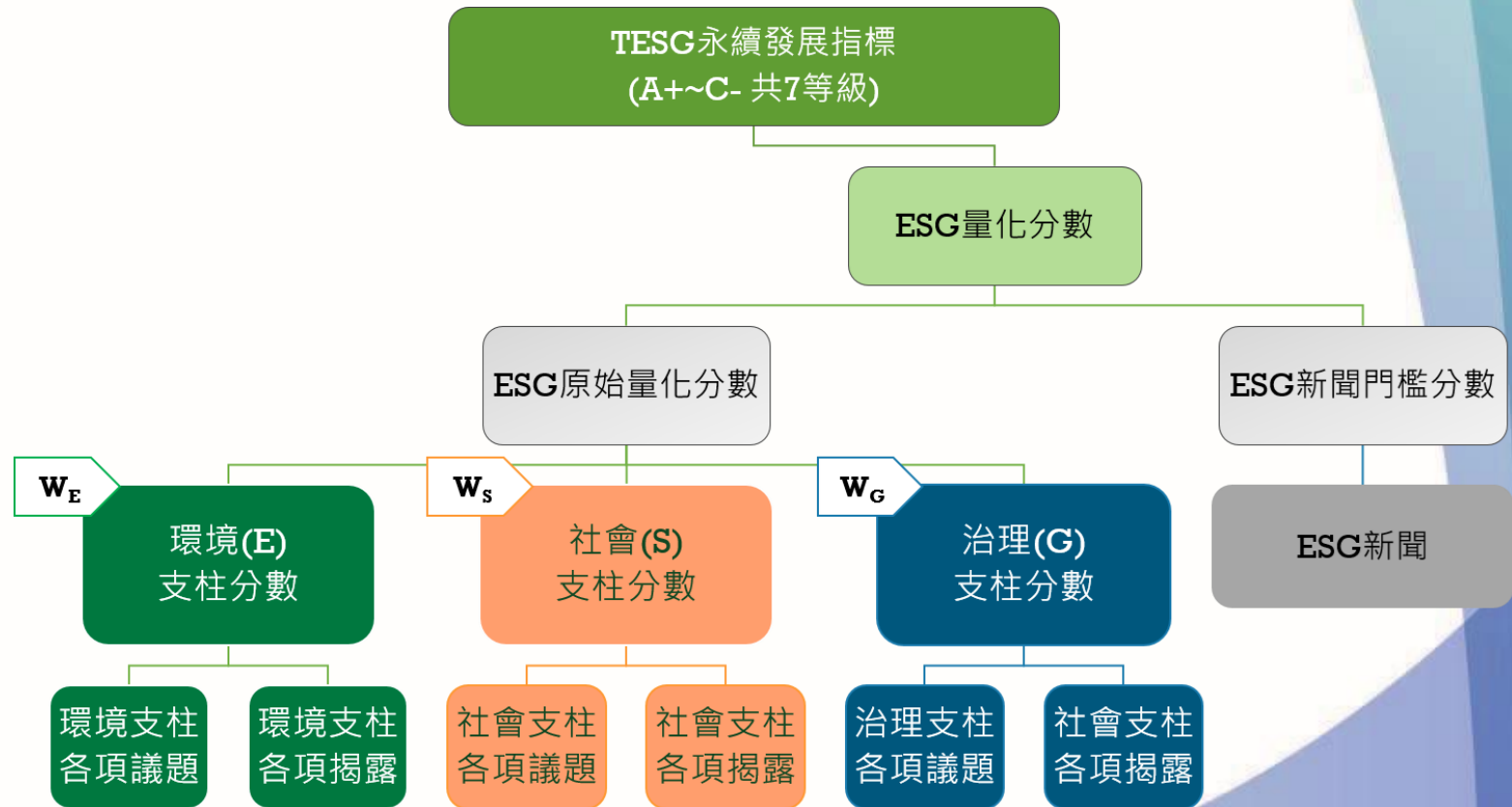
# Introduction – Research Objectives

- Previous studies have mostly been related studies or often have endogenetic problem
- Explore: The causal relationship between sustainability policies and relevant regulations and the ESG performance of listed companies

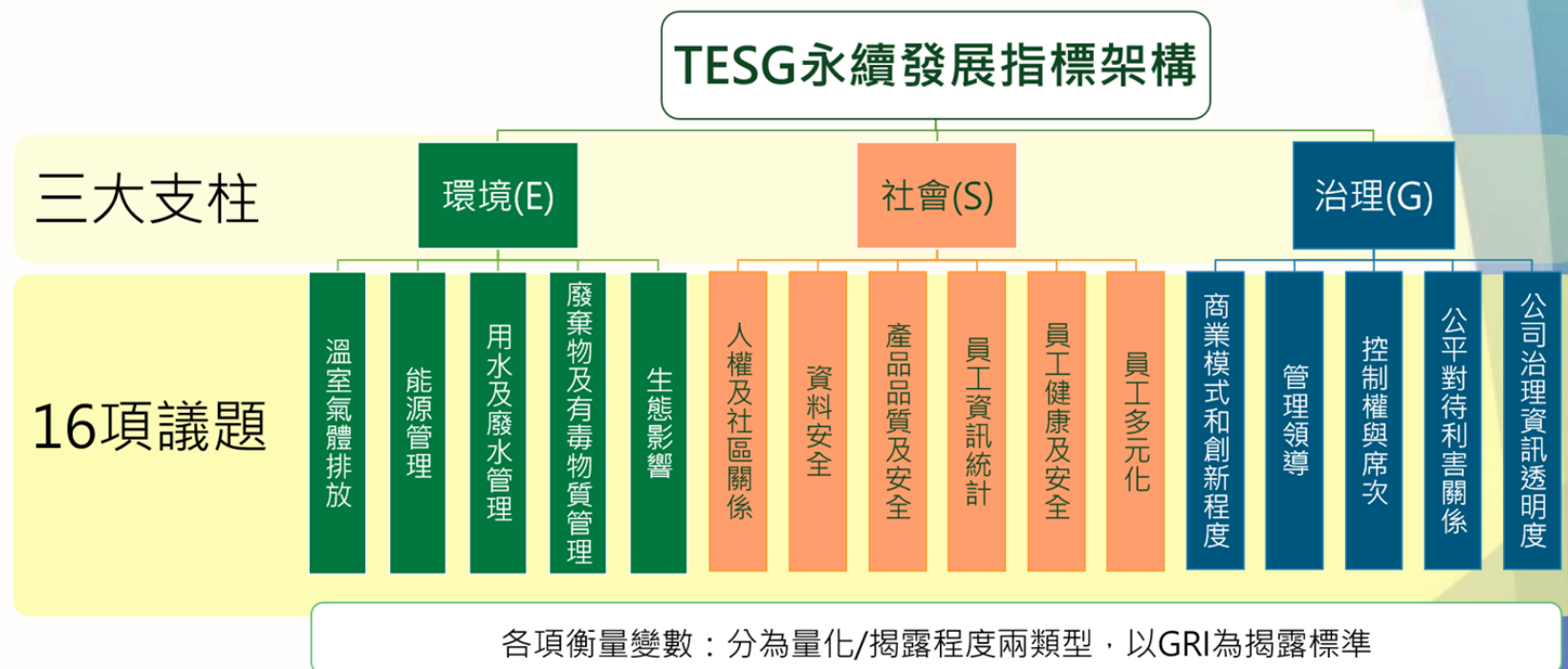
# Introduction

- Taiwan Economic News Database (TEJ)--TESG Sustainable Development Indicators:
- In 2015~2021, listed companies + OTC companies (1610)
- ESG Report: Voluntary/Mandatory Submission, Verification of Operations
- Company data: amount of paid-up capital, industry category
- Supplementary data: a total of 45 financial indicators

# Presentation – Scoring process

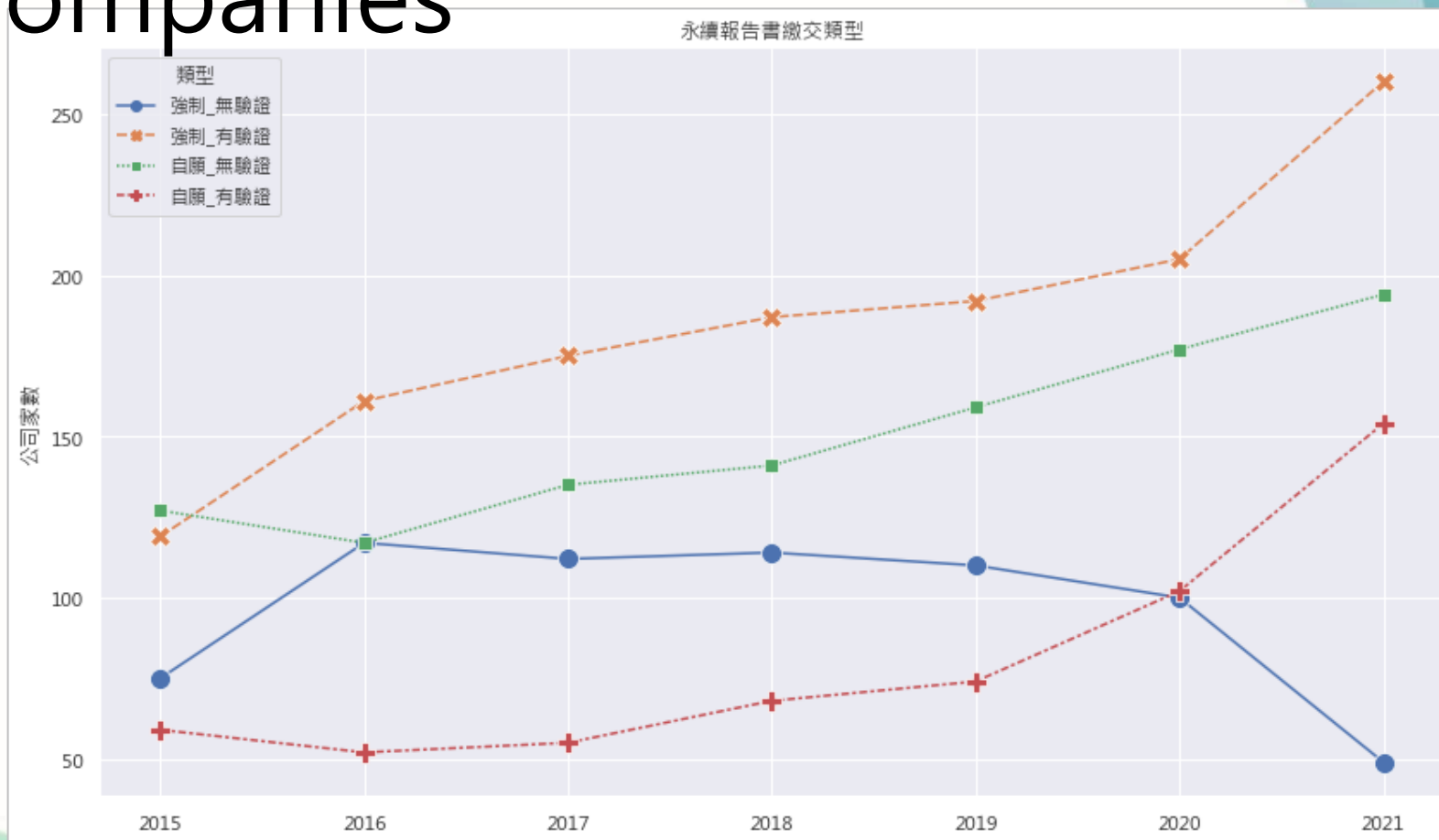


# Profile – Scoring details

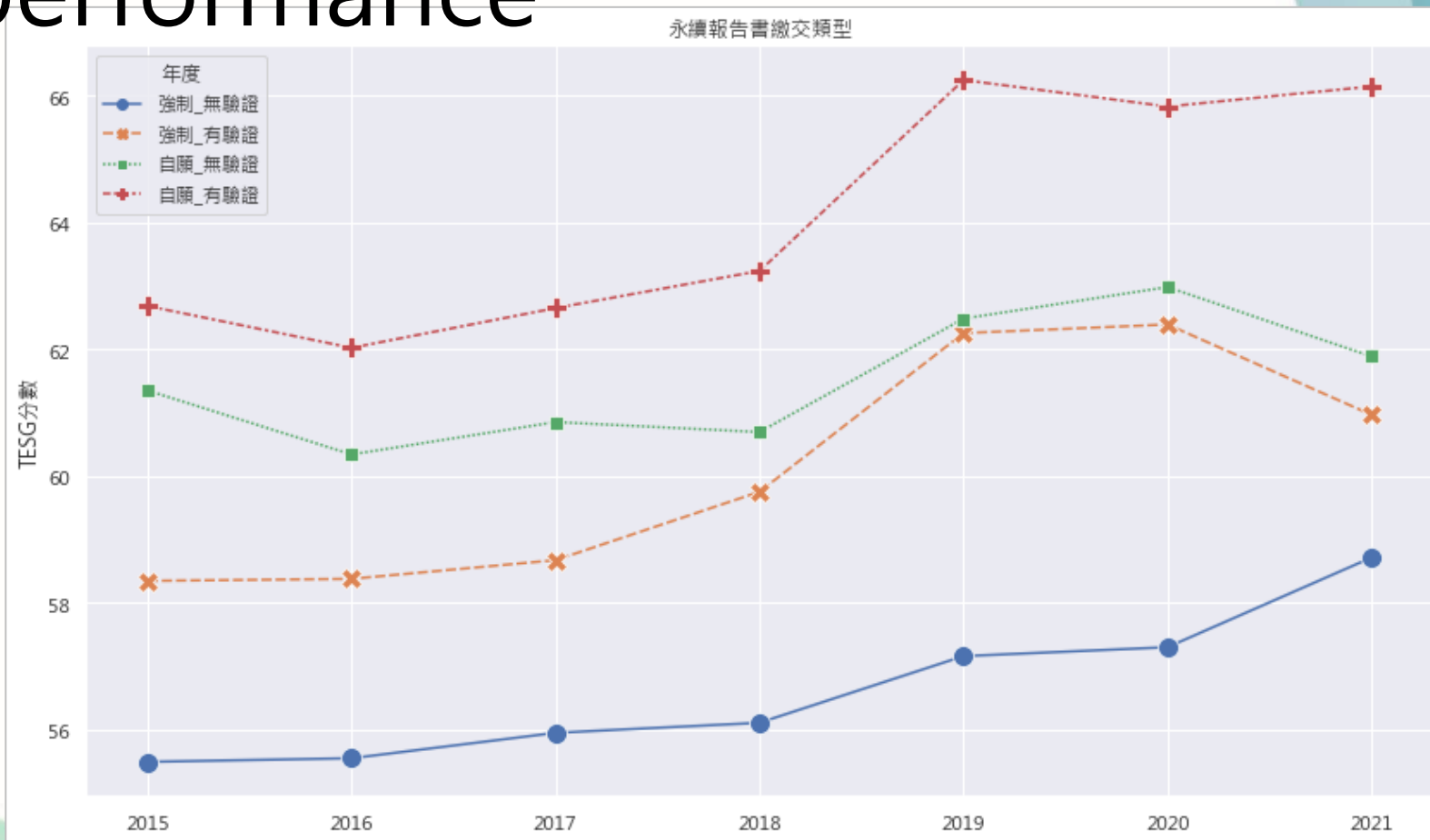




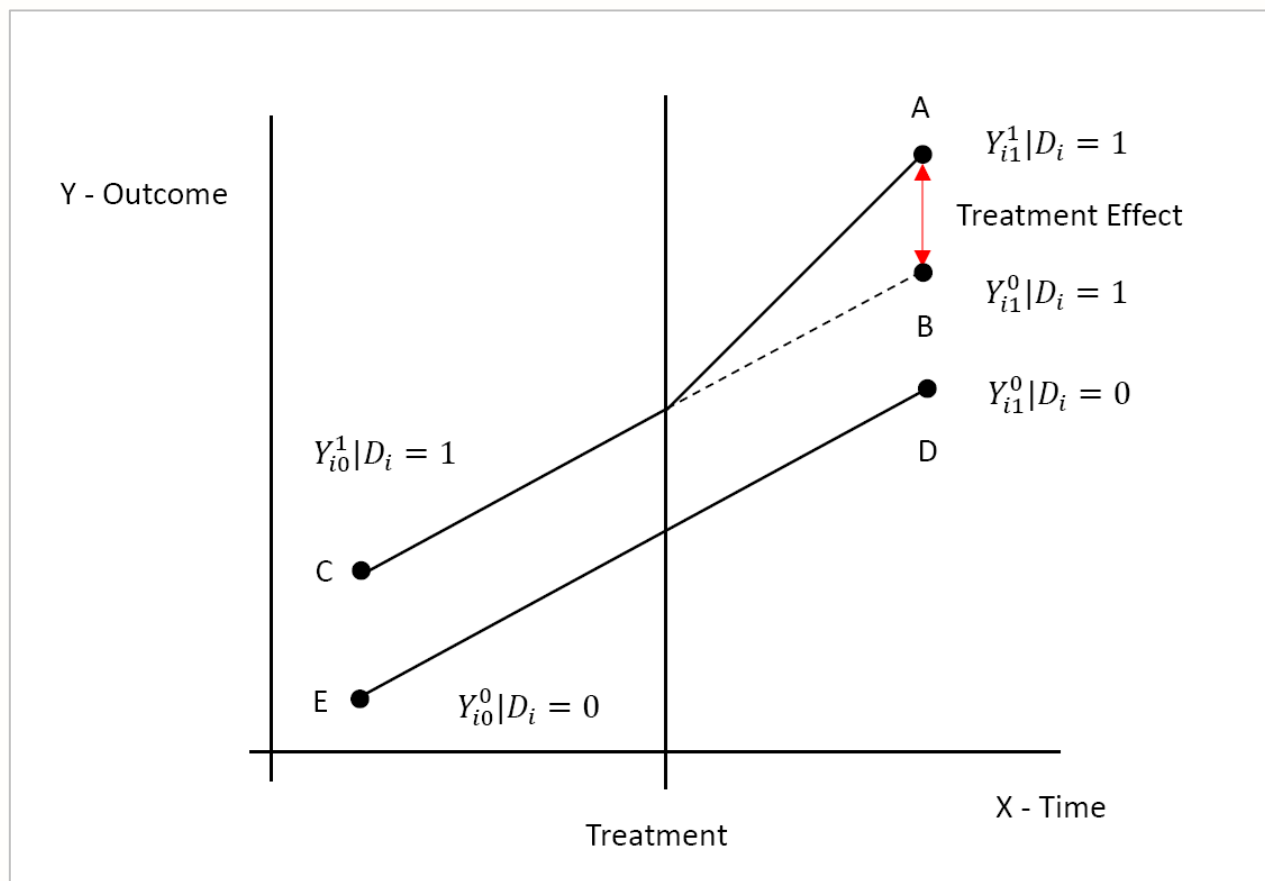
# Narrative statistics – the number of companies



# Narrative statistics – TESG performance



# Research Methods – DID



# Research Methods – OLS Design for DIDs

$$Y_{it} = \mu + \gamma \cdot T_t + \theta \cdot D_i + \alpha \cdot (T_t \cdot D_i) + \varphi \cdot X_{it} + \varepsilon_{it}$$

*Define Dummy Variables:*

$\varepsilon_{it}$ : Error term  $X_{it}$

$T_t = 1$  / factor intervention,

$D_i = 1$  / experimental group

	Post-intervention	Pre-intervention	Differences
Experimental group	$\mu + \gamma + \theta + \alpha$	$\mu + \theta$	$\gamma + \alpha$
Control group	$\mu + \gamma$	$\mu$	$\gamma$
Group-specific differences	$\theta + \alpha$	$\theta$	$\alpha$

# Research Results – Problems

- Hypothetical Verification-1: Does the Regulation Have Its Effect?
- Hypothesis Check-2: Signaling Effect
- Assuming Verification-2-1: The report is submitted voluntarily
- Verification is assumed to be verified by the Verification-2-2: Report

# Findings – Regulations

年度	驗證家數	強制繳交家數	上市櫃總數	法規轉變
2010	1	0	1433	
2011	2	0	1488	
2012	16	0	1522	
2013	60	0	1573	
2014	157	189	1621	法規一
2015	174	194	1649	
2016	212	279	1685	法規二
2017	224	288	1722	
2018	252	306	1747	
2019	272	308	1765	法規三
2020	316	312	1780	
2021	442	317	1786	

TESG data  
Start point



# Research Findings – Regulatory Effects (Act 2)

In 2016, the "Mandatory Submission Report" was amended to add:

Capital of 10 billion yuan > 5 billion yuan and



group\_a: Mandatory before 2016  
group\_b: 2016 began to be mandatory  
group\_c: Still not affected

	假說檢定一		假說檢定二	
	模型一	模型二	模型三	模型四
常數項	58.686*** (0.55)	51.313*** (0.99)	53.432*** (0.20)	50.611*** (0.38)
C ( group_b ) [T.1]	-0.568 (0.96)	-2.250*** (0.87)	4.686*** (0.77)	4.074*** (0.73)
C ( Policy_2016 ) [T.1]	1.774*** (0.59)	1.378*** (0.53)	0.109 (0.22)	-0.104 (0.21)
C ( 可再生能源 )		-2.881** (1.33)		3.003*** (0.72)
C ( 提煉與礦產 )		0.706 (0.86)		-0.976** (0.42)
C ( 服務 )		1.086 (1.36)		1.321*** (0.46)
C ( 消費品 )		-1.486* (0.84)		-0.232 (0.32)
C ( 科技與通訊 )		1.329* (0.70)		-0.299 (0.28)
C ( 資源轉化 )		-0.966 (0.72)		0.051 (0.31)
C ( 運輸 )		-0.587 (0.87)		-0.763* (0.40)
C ( 醫療保健 )		1.867 (1.37)		2.719*** (0.38)
C ( 金融 )		-6.946*** (0.83)		-5.119*** (1.71)
C ( 食品與飲料 )		-3.887*** (0.78)		-5.416*** (1.10)
C ( 上市別 ) [T.TSE]		3.314*** (0.46)		1.064*** (0.15)
交乘效果	0.199 (1.03)	0.081 (0.92)	1.864** (0.83)	1.749** (0.78)
ROA		0.190*** (0.02)		0.125*** (0.01)
每股淨值		0.040*** (0.01)		0.036*** (0.00)
短期借款比率		-10.285*** (2.07)		-10.653*** (0.82)
負債總額比率		11.595*** (0.97)		5.237*** (0.47)

Hypothetical test 1:  
group\_b & group\_a  
Hypothetical test II:  
group\_b & group\_c

'\*\*\*' : p-value<0.01

'\*\*' : p-value <0.05

'\*' : p-value <0.1

Sample	2027	2027	9815	9815
R2	0.007	0.219	0.046	0.145
adj_R2	0.006	0.213	0.046	0.144



# Results of the study – Signal effect

In order to solve the problem of the irregular number of companies, the definition of voluntary & verification:

Voluntary: D\_WFN

Validation: Full attendance rewards

2019 (Law 3) Amendment: Grant a concession on the deadline for the first submission of the report and the verifier.

# Findings – Voluntary Effect



	假說檢定三		假說檢定四	
	模型五	模型六	模型七	模型八
常數項	56.488*** (0.17)	54.250*** (0.54)	51.983*** (0.10)	50.435*** (0.31)
C ( D_WFN ) [T.自願]	5.267*** (0.28)	4.756*** (0.28)	4.506*** (0.19)	4.105*** (0.19)
C ( Policy_2019 ) [T.1]	2.873*** (0.25)	2.396*** (0.25)	-1.214*** (0.16)	-1.440** (0.15)
C ( 可再生能源 )		-1.204 (0.93)		2.352*** (0.63)
C ( 提煉與礦產 )		-0.668 (0.58)		-2.054*** (0.39)
C ( 服務 )		2.137*** (0.79)		1.861*** (0.42)
C ( 消費品 )		-1.398*** (0.52)		0.128 (0.29)
C ( 科技與通訊 )		-1.389*** (0.43)		-0.584** (0.25)
C ( 資源轉化 )		-1.149** (0.47)		0.268 (0.28)
C ( 運輸 )		-0.963* (0.58)		-0.587 (0.37)
C ( 醫療保健 )		-0.544 (0.61)		2.480*** (0.35)
C ( 金融 )		-4.894*** (0.60)		-2.045*** (0.54)
C ( 食品與飲料 )		-2.455*** (0.56)		-2.105*** (0.45)
C ( 上市別 ) [T.TSE]		1.008*** (0.23)		0.651*** (0.13)
交乘效果	0.092 (0.43)	0.19 (0.42)	4.087*** (0.28)	3.961*** (0.27)
ROA		0.130*** (0.01)		0.091*** (0.01)
每股淨值		0.016*** (0.00)		0.017*** (0.00)
短期借款比率		-9.525*** (1.36)		-6.391*** (0.73)
負債總額比率		6.181*** (0.66)		3.508*** (0.42)

Hypothesis test III:  
Voluntary & Forced  
Hypothesis test IV:  
強制 & 未無

C ( D\_WFN )  
[T. Forced]

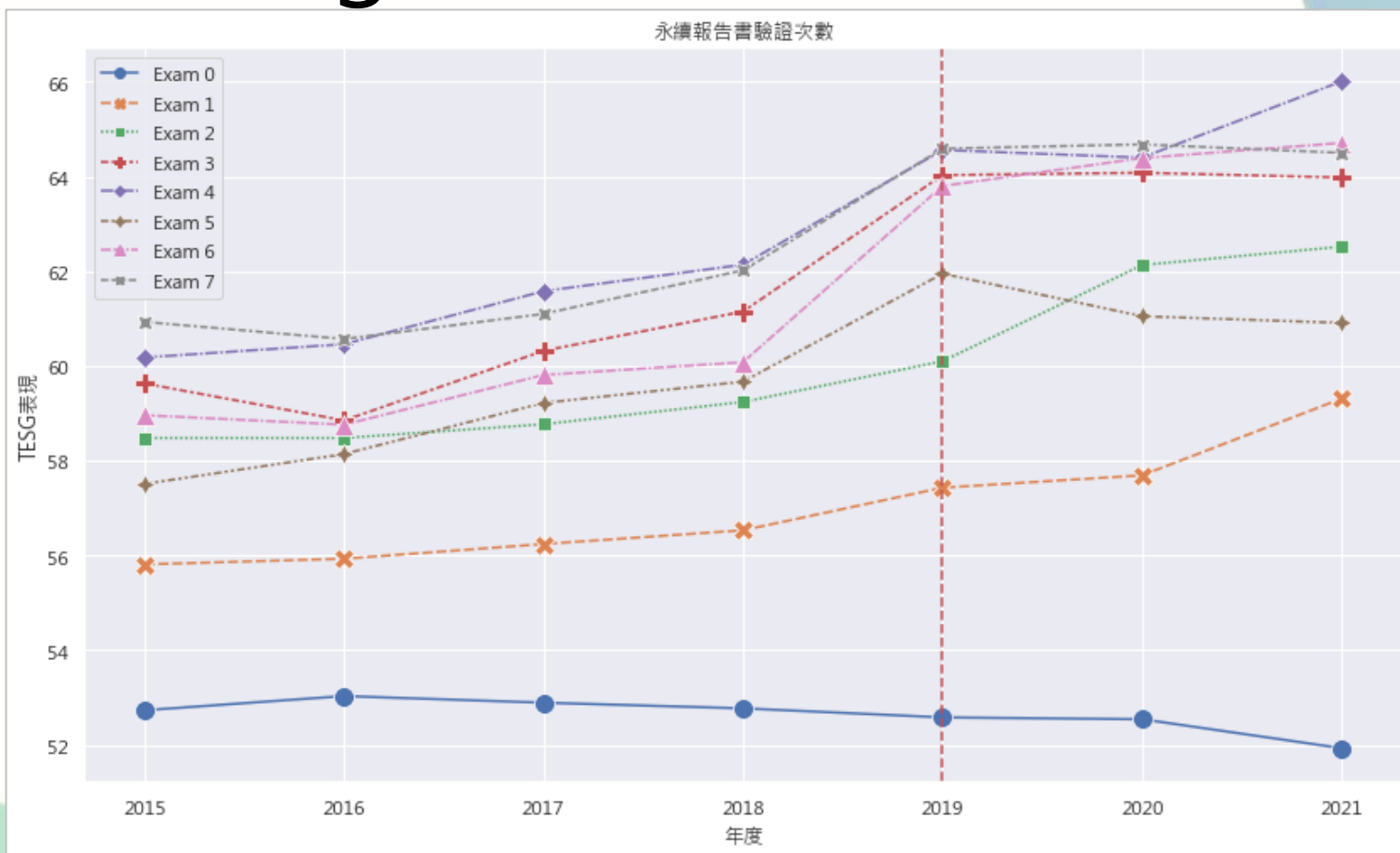
'\*\*\*' : p-value<0.01

'\*\*' : p-value <0.05

'\*' : p-value <0.1

Sample	4559	4559	9681	9681
R2	0.151	0.215	0.186	0.239
adj_R2	0.15	0.212	0.186	0.237

# Results of the study – Validating the effect



假說檢定五

	模型九	模型十
常數項	53.827*** (0.10)	50.220*** (0.33)
C ( exam_7 ) [T.1]	7.328*** (0.30)	7.015*** (0.31)
C ( Policy_2019 ) [T.1]	0.135 (0.15)	-0.295** (0.14)
C ( 可再生能源 )		2.070*** (0.65)
C ( 提煉與礦產 )		-0.241 (0.39)
C ( 服務 )		1.446*** (0.44)
C ( 消費品 )		-0.199 (0.31)
C ( 科技與通訊 )		-0.146 (0.27)
C ( 資源轉化 )		0.569* (0.29)
C ( 運輸 )		-0.094 (0.38)
C ( 醫療保健 )		3.022*** (0.37)
C ( 金融 )		-2.991*** (0.50)
C ( 食品與飲料 )		-5.052*** (0.50)
C ( 可再生能源 )		1.748*** (0.14)
交乘效果	3.299*** (0.46)	3.359*** (0.44)
ROA		0.127*** (0.01)
每股淨值		0.031*** (0.00)
短期借款比率		-10.403*** (0.77)
負債總額比率		5.937*** (0.43)

Hypothesis Test Five:

Examine for full time participation

'\*\*\*' : p-value<0.01

'\*\*' : p-value <0.05

'\*' : p-value <0.1

Sample	11270	11270
R2	0.119	0.216
adj_R2	0.119	0.215

# Findings – Subsections

DID Effect T value	Regulatory Effects		Signal effect (Voluntary)		Signal effect
	Test 1	Test 2	Test 3	Test 4	Test 5
controls	0.088	2.231	0.457	14.477	7.696
No- controls	0.192	2.252	0.213	14.469	7.136

# Conclusions and Recommendations

- Effect of regulations: The effect of supervision is obvious.
- Signal effect: both voluntary and verified have obvious effects.
- Direction:
- Unified definition: ESG indicators and data quantification methods
- Data Time: Panel Data is of a better nature
- Use models: Other empirical methods for individuals may be considered (Regression discontinuity, synthetic control method)



# THANK YOU

Thank you for listening, and please don't  
hesitate to give us advice