

# ESG Performance and Firm Productivity: Evidence from South Korea

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**Part 1. Motivation**

**Part 2. Data and Methodology**

**Part 3. Findings and Discussions**

# Part 1: How does ESG ratings affect Productivity

# Non-fundamental ESG

E

Environmental strategy, structure, management, performance, and response to stakeholders

S

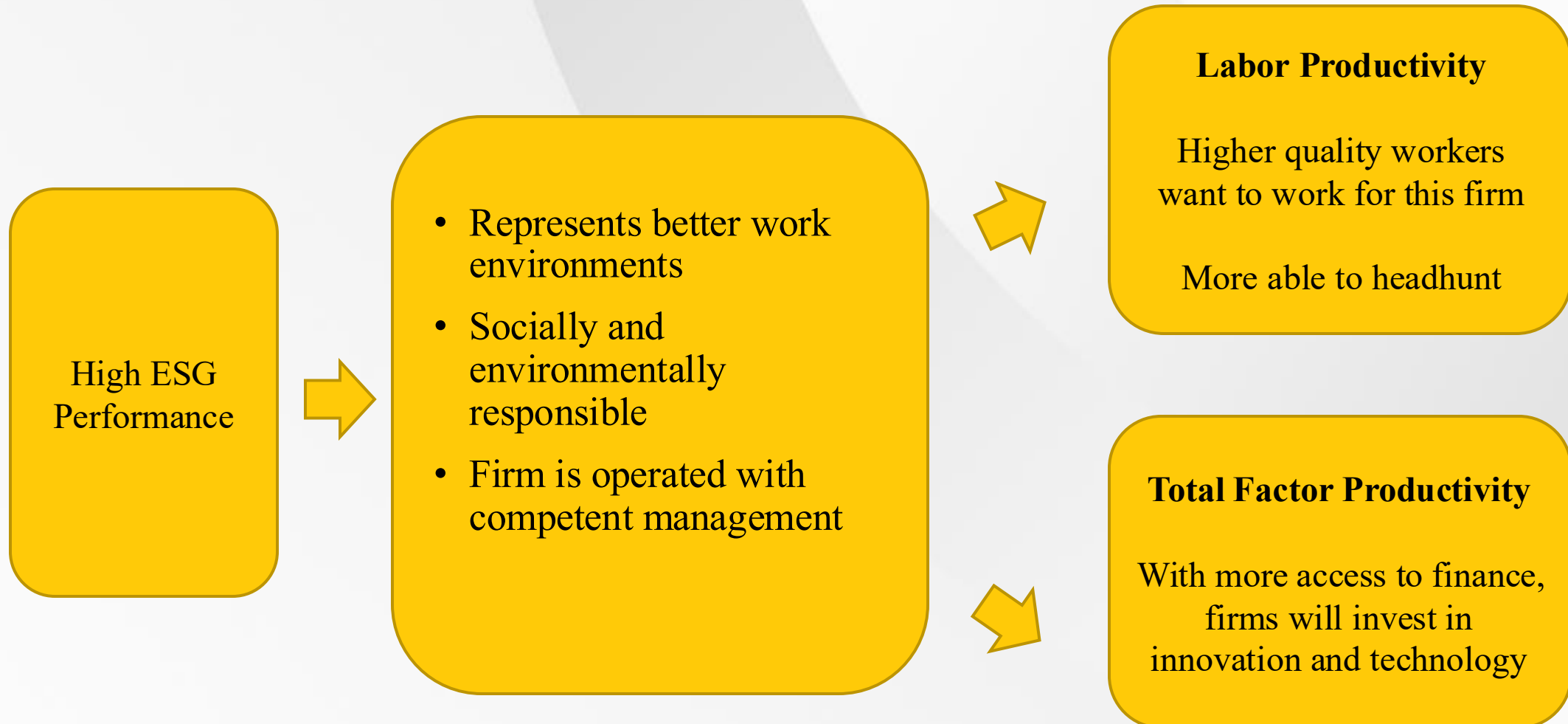
Employee protection, competition and acquaintances, consumer protection, and regional community facilitation

G

Shareholder rights, board of directors quality, audit, and transparency

# Motivation Behind ESG Efforts

- Consumers
  - Recent abnormalities in weather conditions around the world
  - How corporations treat their employees (wrongful termination, coercion, etc.)
- Investors
  - UN's Principles for Responsible Investment
  - Preference for ESG-friendly assets
  - Risk management (sustainability)
  - Less financial friction



- Labor productivity
  - Barrymore and Sampson (2021)
  - Fonseca and Van (2022)
  
- Total factor productivity
  - Deng, Li, and Ren (2023)
  - Luo, Wei, and He (2023)

# Part 2: Data and Methodology

# ESG Scores

- ESG ratings and scores are obtained from Korea Corporate Governance Service (KCGS)
- E : environmental strategy, structure, management, performance, and response to stakeholders
- S : employee protection, competition and acquaintances, consumer protection, and regional community facilitation
- G: shareholder rights, board of directors quality, audit, and transparency
  
- In 2021, 1,009 firms were rated by KCGS, but only 940 were public
- Data ranges from 2011 to 2021 for ESG
  
- ESG score ranges from 0 to 7
- G score ranges from 0 to 100

# Productivity Measures

- Total Factor Productivity
  - Akerberg, Caves, and Frazer (2015) control for the unobserved productivity shock and endogeneity issues by using an intermediate input
    - Generally, energy or materials
  - Levinsohn and Petrin (2003) use a similar method
- Labor Productivity
  - Total Sales / Labor Cost
  - Total Sales / # of Employees
- Control Variables
  - Herfindahl index, capital intensity, size, book to market ratio, leverage, and profitability

# Empirical Specification

$$Productivity_{i,t} = \alpha + \beta_1 ESG_{i,t} + \gamma Controls_{i,t} + \delta_i + \theta_t + \varepsilon_{i,t}$$

- Productivity is TFP and Labor Productivity
- ESG is the quantified ESG rating that ranges from 0 to 7
- Fixed-effect and year-effect are included
- Endogeneity issue: IV method
  - The average of industry ESG score (Benlemlih, 2019)

# Part 3: Findings and Discussions

# Total Factor Productivity

	(1)	(2)
<b>VARIABLES</b>	TFP <sub>t+1</sub>	TFP
<b>ESG Score</b>	-0.001 (-0.09)	0.040 (1.29)
<b>Constant</b>	2.101*** (5.18)	-0.464 (-1.40)
<b>Observations</b>	6,883	7,153
<b>Firm-Fixed Effect</b>	Yes	Yes
<b>Time Effect</b>	Yes	Yes
<b>Controls</b>	Yes	Yes
<b>R-squared</b>	0.0949	0.1699
<b>Number of Firms</b>	953	1,003

	TFP	TFP	TFP
<b>VARIABLES</b>	TFP	TFP	TFP
<b>E Score</b>	0.001		
	(0.53)		
<b>S Score</b>		0.001	
		(0.62)	
<b>G Score</b>			0.008**
			(2.29)
<b>Constant</b>	-0.138	-0.144	-0.348
	(-0.40)	(-0.42)	(-1.47)
<b>Observations</b>	7,566	7,566	15,099
<b>Firm-Fixed Effect</b>	Yes	Yes	Yes
<b>Controls</b>	Yes	Yes	Yes
<b>Time Effect</b>	Yes	Yes	Yes
<b>R-squared</b>	-0.1181	0.1414	0.1525
<b>Number of Firms</b>	1,003	1,003	1,563

- By method
  - No significance
- By ESG performance improvements
  - No significance
- Not for TFP
- Only Governance seems to influence TFP
  - Consistent with previous research

# Labor vs Capital

	(1)	(2)
<b>VARIABLES</b>	Labor productivity	Capital productivity
<b>ESG Score</b>	6.341***	-23.429
	(3.10)	(-1.48)
<b>Constant</b>	-105.910***	-267.727
	(-4.60)	(-1.46)
<b>Observations</b>	8,049	8,041
<b>Firm-Fixed Effect</b>	Yes	Yes
<b>Time Effect</b>	Yes	Yes
<b>R-squared</b>	0.0805	0.0038
<b>Controls</b>	Yes	Yes
<b>Number of firms</b>	1,042	1,041

	(1)	(2)	(3)
<b>VARIABLES</b>	Labor productivity	Labor productivity	Labor productivity
<b>E Score</b>	-0.176** (-2.17)		
<b>S Score</b>		0.198* (1.65)	
<b>G Score</b>			0.950*** (4.53)
<b>Constant</b>	-105.160*** (-4.87)	-106.733*** (-4.93)	-124.105*** (-9.07)
<b>Observations</b>	7,594	7,594	15,134
<b>Firm-Fixed Effect</b>	Yes	Yes	Yes
<b>Time Effect</b>	Yes	Yes	Yes
<b>R-squared</b>			
<b>Controls</b>	Yes	Yes	Yes
<b>Number of Firms</b>	1,004	1,004	1,563

# Potential Determinant

- Financial constraint
- Whited and Wu's (2006) financial constraint measure is constructed (WW)
- WW is divided into quartile
  - Firms in the lowest quarter are financially unconstrained
  - Firms in the highest quarter are financially constrained

	(1)	(3)
	Unconstrained	Constrained
<b>VARIABLES</b>	Labor Productivity	Labor Productivity
<b>ESG Score</b>	5.203**	-10.540
	(2.55)	(-0.69)
<b>Constant</b>	-169.295***	206.383
	(-4.70)	(1.01)
<b>Observations</b>	4,776	341
<b>Firm-Fixed Effect</b>	Yes	Yes
<b>Time Effect</b>	Yes	Yes
<b>R-squared</b>	0.0496	0.0757
<b>Controls</b>	Yes	Yes
<b>Number of Firms</b>	737	116

	(1)	(2)	(3)	(4)	(5)	(6)
	Unconstrain	Unconstrain	Unconstrain	Constrained	Constrained	Constrained
<b>VARIABLE</b>	LP	LP	LP	LP	LP	LP
<b>E Score</b>	-0.133			-0.291		
	(-1.08)			(-1.34)		
<b>S Score</b>		0.301**			-0.443	
		(2.18)			(-1.12)	
<b>G Score</b>			0.804**			-0.461
<b>Observations</b>	4,390	4,390	5,998	1,369	1,369	4,967
<b>Firm Effect</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time Effect</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>R-squared</b>	0.0396	0.0391	0.0367	0.0143	0.0745	0.1331
<b>Number of Firms</b>	706	706	816	339	339	959

# Conclusion

1. ESG affects firm productivity through the labor market (Short-run)
2. Financial constraint affects the relationship between ESG and labor productivity
  - Already financially constrained firms do not benefit from higher ESG performance while unconstrained firms do

- Indonesia was initially a lower-income country but was reclassified as a lower-middle-income country in 2003. Total factor productivity and finance sector productivity show no general pattern. It is possible that there is another source driving economic growth in Indonesia.

