

RIETI Policy Symposium

FIRM LEVEL INCENTIVE COMPATIBILITY FOR IMPROVING ESG AND GENDER EQUALITY



Hyeok Jeong

Seoul National University GSIS

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MOTIVATION



CRITICAL CHALLENGES FOR SUSTAINABLE FUTURE

❑ **Climate Changes**

- Irreversible diminution of scope of production (time and space) and survival probability of human being
- Fundamental problem for solutions: Global coordination needed

❑ **Population Crisis**

- De-population economy: More than half of the countries in the era of low fertility
- Asymmetric compositional changes: Age group reversal, regional migration and local extinction
- Growth slowdown or absolutely shrinking economy with increasing inequality
- Fundamental problem for solutions: (i) Outcomes are based on individual rationality, (ii) Current socio-economic institutions and resource allocation rules were built on the assumption of positive growth and stable composition of population

❑ **Common features**

- Broken connections: (i) People-to-Nature; (ii) People-to-People (Inter-generational)
- Both phenomena are about long-term collective suicides.
- Both need two-dimensional response measures: (i) mitigation; (ii) adaptation

SKEPTIC PERSPECTIVES IN THE LITERATURE

- ❑ Despite the general consensus about the grave significance of the above challenges, the box of solutions is scanty, and the expectation to find effective ones is low.
- ❑ One of the major reasons for this paucity of reform measures and pessimism is that most of good policy efforts or initiatives are **considered as incentive incompatible** for the implementing agents. That is, any policy efforts to improve on climate or population crises involve immediate and visible costs for implementation, but the consequential benefits are less clear.
- ❑ In particular, when the benefits are realized at societal level while implementation costs are borne by specific individuals or organizations, such policy efforts are not incentive compatible, hence difficult to implement. Then, the name of the game becomes how to enforce the public regulations for the social good by sacrificing individual interests with the expectation of the long-term positive spillovers.
- ❑ However, such presumption about incentive compatibility is rarely subject to rigorous empirical testing. This paper attempts to put this premise under test by examining the effects of improving ESG scores and gender equality measures on individual firm level performance including firm's own profitability.

PERSPECTIVE AND QUESTION OF THIS PAPER

❑ Concept of firm as an institutional arrangement of connecting people

- “Firm” is not merely a business enterprise or company represented by products and production technology. We consider firm as an institutional arrangement or a coalition connecting economic agents organized by a division of labor.
- It is a critical **channel of influencing connections** (people-to-nature, people-to-people), hence shaping the features of economic activities as well as social progress
- This paper seeks to identify the effects of improving firm-level management and workforce practices in relation to the below connection measures on firm-level performance:
 1. **ESG**: **E** for People-to-Nature connection, **S** for People-to-People connection, and **G** for Class-to-Class connection \Rightarrow ESG is a metric for better connections in economic activities
 2. **Gender gap in workplace**: Particular kind of people-to-people connection which is related to family formation, hence the population crisis

❑ Prior

- If the firm is a coalition of connecting people in engaging economic activities, better connection is likely to improve on firm's own performance.
- However, improving ESG and gender equality is costly so that final result for profitability is open.

TASKS AND GOALS OF THIS PAPER

❑ Tasks

- The studies of ESG impacts on firm level performance and those of gender gap on firm level performance are rare, and the two groups are segregated, not just in literature but also in data use. Consolidate the firm level DBs by matching External Audit Companies DB (extensive balance-sheet and worker characteristics variables) with Refinitiv DB (ESG variables).
- Validate the impacts of ESG on diverse measures of firm performance
- Validate the impacts of different dimensions of gender gap on diverse measures of firm performance (ESG reporting vs. non-ESG reporting samples)
- Validate the impacts of ESG and gender gaps on firm performance, taking the endogeneity of ESG

❑ Policy Implications

- Improvement of management and workplace practices within firms can be an effective and incentive-compatible policy measure to overcome the critical challenges for sustainable future in the context of ESG and gender equality.
- What policy implications for the challenge of climate changes?
- What policy implications for the challenge of population crisis?

DATA



DATA 1: LISTED FIRMS SUBJECT TO EXTERNAL AUDIT

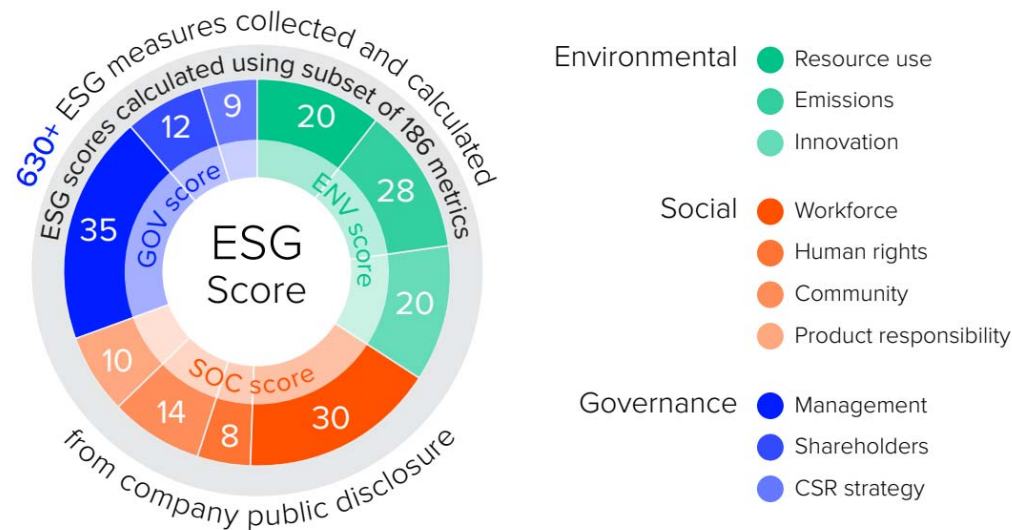
❑ Listed firms subject to external audit obligation

- External audit obligation status for each firm is determined by the combined criteria of size measures such values of asset, sales, debt, and number of employees during the last operation year
- Firms subject to external audit should submit the data of **comprehensive financial and income statements (about 500 variables)** together with basic firm level characteristics (**establishment year, address**), **employment and payment composition (gender, regular worker status, executive)** to the financial regulation authorities
- Listed firms should submit the **market value, stock price, and stockholding composition** data also.
- We use the sample of listed companies to evaluate the impacts of gender and ESG scores on market values
- Sample period: 2010-2022
- Sample companies: 2,693 firms each year

DATA 2: REFINITIV ESG SCORES

❑ Refinitiv from Thomson Reuters

- Global firm-level ESG scores DB
- Korean sample firms (92 to 160 companies during the sample period)
- Contents of ESG scores



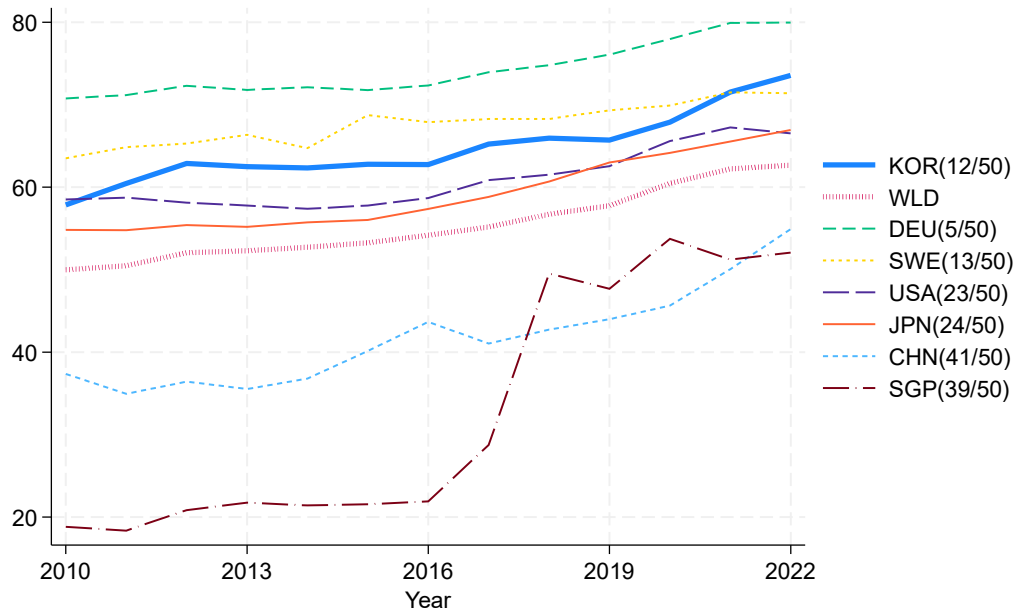
DEFINING SCOPES OF REFINITIV ESG SUB-INDICES

Score	Definition
Refinitiv ESG resource use score	The resource use score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.
Refinitiv ESG emissions reduction score	The emission reduction score measures a company's commitment and effectiveness towards reducing environmental emissions in its production and operational processes.
Refinitiv ESG innovation score	The innovation score reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes, or eco-designed products.
Refinitiv ESG workforce score	The workforce score measures a company's effectiveness in terms of providing job satisfaction, a healthy and safe workplace, maintaining <u>diversity and equal opportunities</u> , and development opportunities for its workforce.
Refinitiv ESG human rights score	The human rights score measures a company's effectiveness in terms of respecting fundamental human rights conventions.
Refinitiv ESG community score	The community score measures the company's commitment to being a good citizen, protecting public health and respecting business ethics.
Refinitiv ESG product responsibility score	The product responsibility score reflects a company's capacity to produce quality goods and services, integrating the customer's health and safety, integrity and data privacy.
Refinitiv ESG management score	The management score measures a company's commitment and effectiveness towards following best practice corporate governance principles.
Refinitiv ESG shareholders score	The shareholders score measures a company's effectiveness towards equal treatment of shareholders and the use of anti-takeover devices.
Refinitiv ESG CSR strategy score	The CSR strategy score reflects a company's practices to communicate that it integrates economic (financial), social and environmental dimensions into its day-to-day decision-making processes.

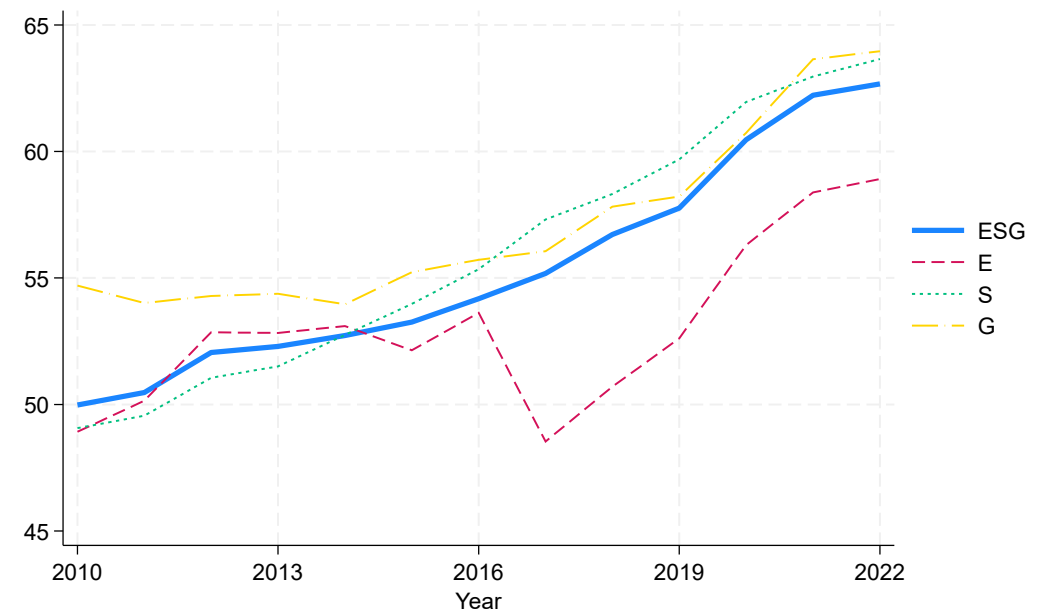
- Little gender gap contents other than equal opportunities at workforce

PROGRESS OF ESG

A. Cross-country Comparison

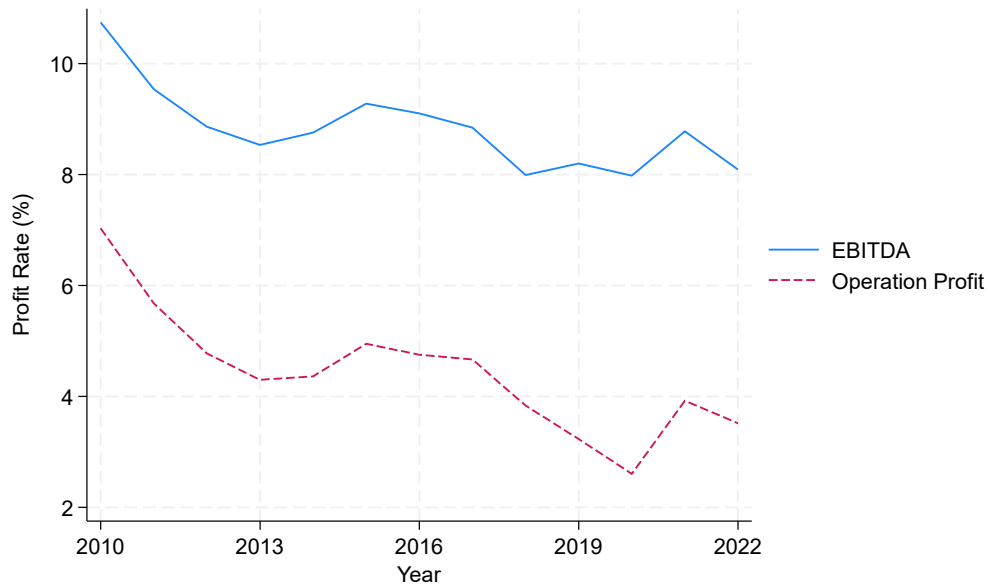


B. Korean ESG Decomposition

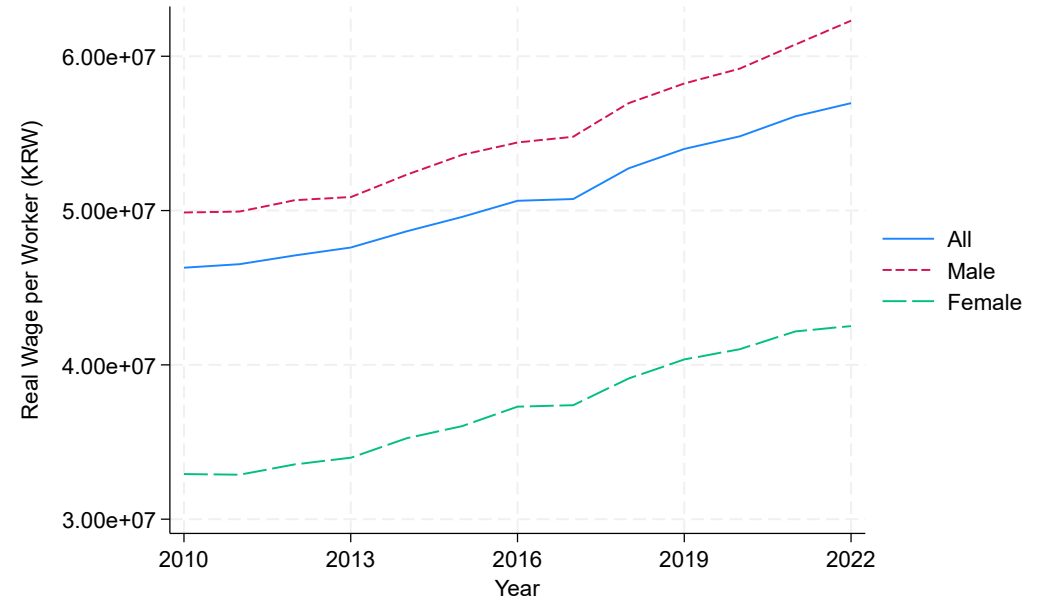


PROFITABILITY AND REAL WAGES OF KOREAN FIRMS

A. Profit Rates



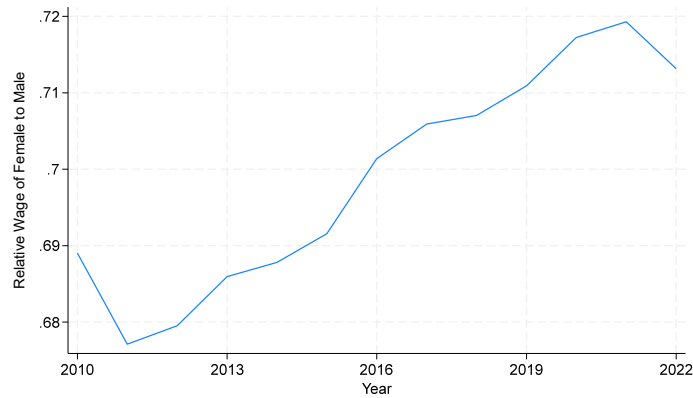
B. Real Wages per Worker



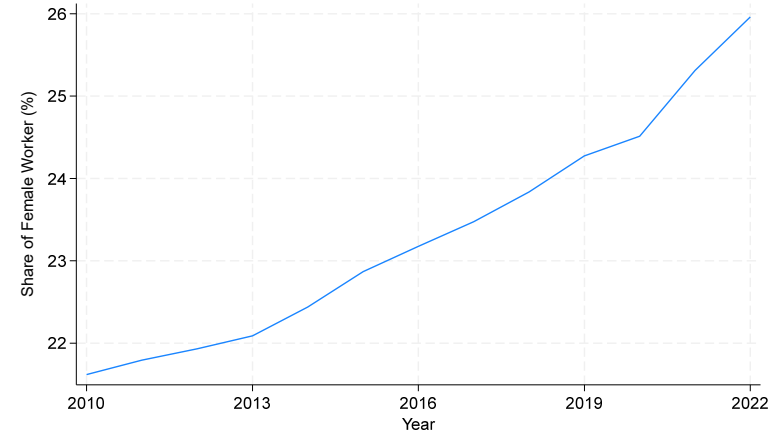
- **EBITDA Margin Rate** = (Sales - Prod. cost - Sales & management costs)/Revenue
- Sunk costs such as depreciation cost, interest cost, corporate tax are not subtracted, hence it is a profitability measure in relation to operational productivity.
- Operation profit reflects the above costs

FOUR DIMENSIONS OF WORKPLACE GENDER GAP

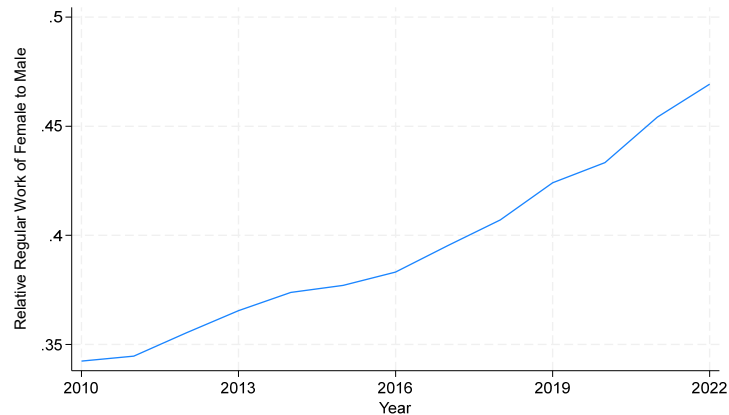
1. Wage Gap



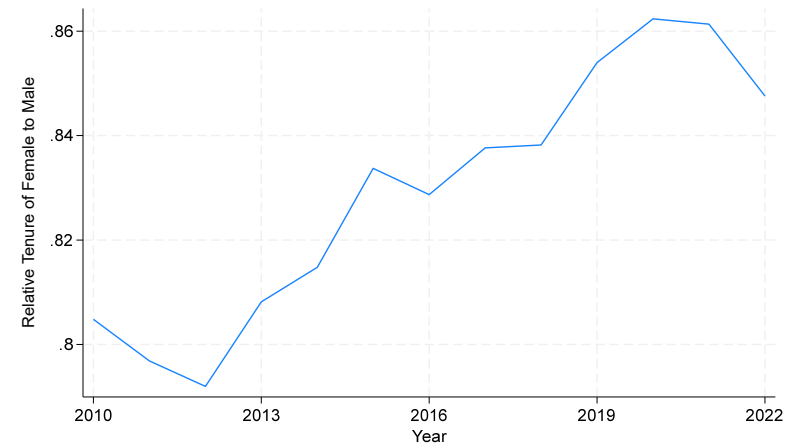
2. Job Access Gap



3. Work Quality Gap

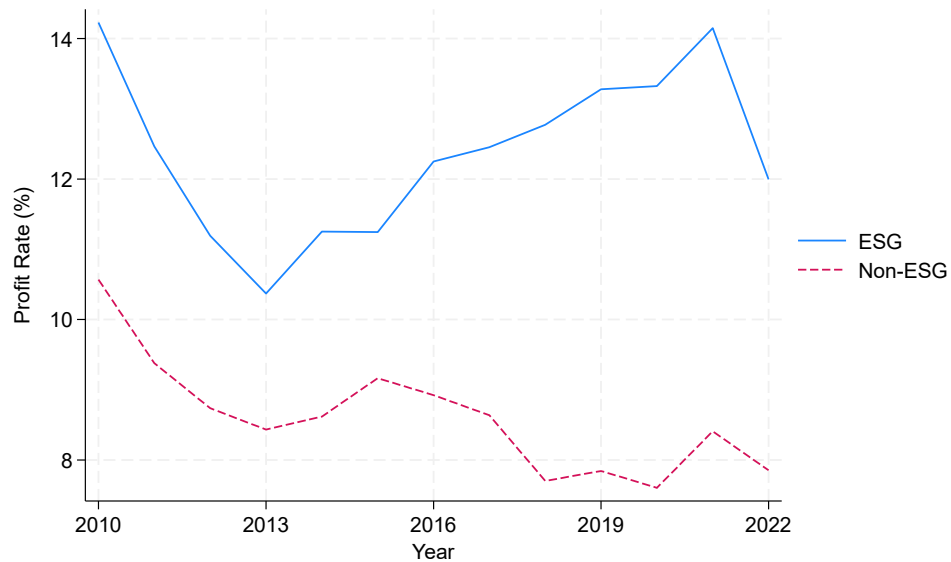


4. Retention Gap

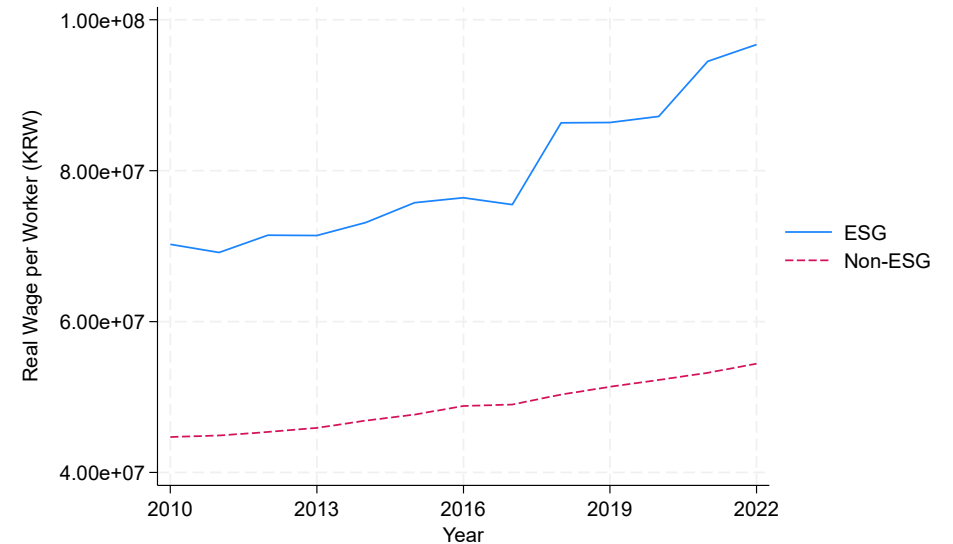


PROFITABILITY AND REAL WAGES: ESG VS. NON-ESG FIRMS

A. Profit Rates

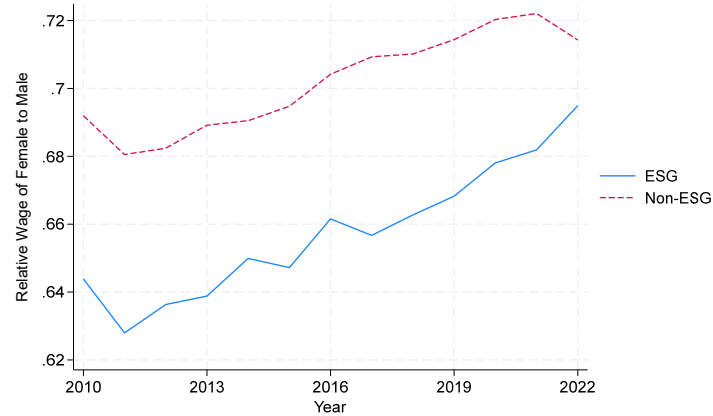


B. Real Wages per Worker

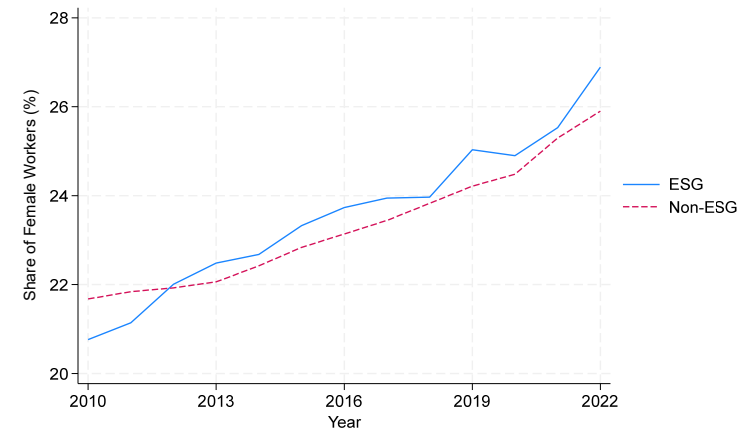


WORKPLACE GENDER GAP : ESG VS. NON-ESG FIRMS

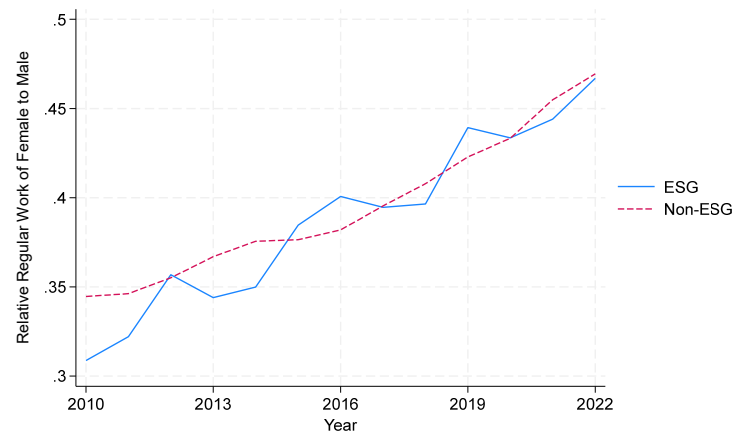
1. Wage Gap



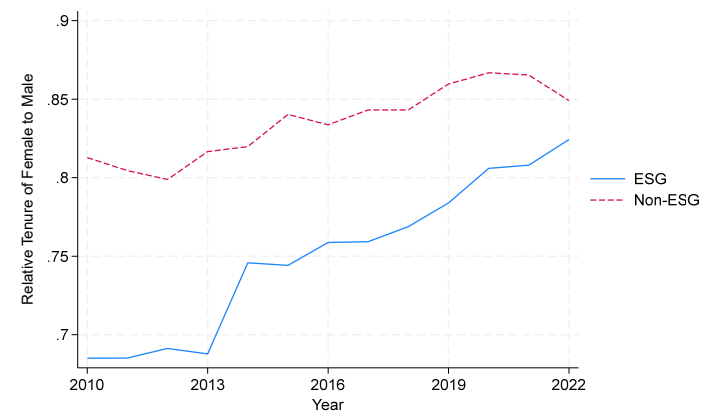
2. Job Access Gap



3. Work Quality Gap



4. Retention Gap



FINDINGS



EBITDA ESTIMATION

	EBITDA	M1		M2		M3		M4		M5	
	Regressors	Coefficient P-value		Coefficient P-value		Coefficient P-value		Coefficient P-value		Coefficient P-value	
ESG	ln_ESG_1	-0.045	(0.887)			0.209	(0.517)	1.853	(0.000)***		
Gender gap	f_rel_wage_1			1.002	(0.009)***	8.529	(0.000)***	2.488	(0.189)	0.961	(0.009)***
	sh_f_worker_1			0.035	(0.000)***	0.198	(0.000)***	0.226	(0.000)***	0.055	(0.000)***
	f_rel_reg_work_1			-1.333	(0.000)***	-5.152	(0.001)***	-5.828	(0.000)***	-1.641	(0.000)***
	f_rel_tenure_1			0.513	(0.019)**	3.948	(0.000)***	4.998	(0.000)***	0.719	(0.001)***
Size, history productivity investment	seoul							-1.726	(0.033)**	-1.197	(0.000)***
	ggi							-0.734	(0.412)	-0.628	(0.002)***
	ln_rev_1							-0.585	(0.042)**	0.938	(0.000)***
	history							-0.004	(0.792)	-0.038	(0.000)***
	ln_lp2_1							-0.899	(0.000)***	-0.604	(0.000)***
	sh_rnd_1							0.007	(0.772)	-0.006	(0.362)
	sh_intangible_1							-0.045	(0.118)	0.006	(0.565)
Financial flows	sh_cashflow_1							0.246	(0.000)***	0.356	(0.000)***
	sh_q_asset_1							-0.159	(0.000)***	-0.033	(0.000)***
	sh_inventory_1							-0.115	(0.022)**	-0.131	(0.000)***
	sh_debt_1							-0.007	(0.000)***	-0.000	(0.554)
Worker composition	exe_rel_wage_1							-0.010	(0.664)	0.000	(0.852)
	sh_reg_work_1							-0.060	(0.060)*	-0.002	(0.043)**
	ln_tenure_1							0.585	(0.430)	0.584	(0.001)***
	#Obs.	1,476		20,209		1,377		1,110		18,282	
	R ²	0.069		0.028		0.119		0.333		0.206	

* Year and industry dummies are included in all specifications.

ESG SELECTION EQUATION

Regressors	Coefficient	P-value
f_rel_wage_1	0.004	(0.976)
sh_f_worker_1	-0.002	(0.598)
f_rel_reg_work_1	-0.060	(0.704)
f_rel_tenure_1	0.162	(0.000)***
seoul	-0.084	(0.368)
ggi	0.115	(0.312)
ln_rev_1	-0.107	(0.095)*
history	0.009	(0.001)***
ln_lp2_1	-0.022	(0.417)
sh_rnd_1	0.008	(0.006)***
sh_intangible_1	0.004	(0.210)
sh_cashflow_1	-0.006	(0.145)
sh_q_asset_1	-0.000	(0.872)
sh_inventory_1	-0.004	(0.383)
sh_debt_1	-0.000	(0.014)**
exe_rel_wage_1	0.000	(0.022)**
sh_reg_work_1	-0.009	(0.002)***
ln_tenure_1	0.107	(0.122)
ln_asset_1	0.675	(0.000)***
ln_mv_ytd_1	0.869	(0.000)***
sh_foreign_mv_1	0.016	(0.000)***
sh_ext_exe_1	-0.567	(0.000)***
sh_control_stock_1	0.014	(0.000)***
history_list	-0.014	(0.000)***
athrho	-0.381	(0.001)***
lnsigma	2.121	(0.000)***
#Obs.	17699	

- Heckman selection correction with robust variance
- Selection effect is statistically significant.

- Instruments to identify the ESG selection are:

1. Asset size (in log): +
2. Company's market value (in log): +
3. Share of foreigners' stock ownership: +
4. Share of external executive board members: -
5. Share of control stock: +
6. Number of years of being listed: -

*Control stock: shares strengthening influence to major shareholders via enhanced voting rights so that major shareholders' interests are reflected more to corporate decision making

EBITDA ESTIMATION WITH SELECTION CORRECTION

EBITDA	M6		M7		M8		M9	
Regressors	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
ln_ESG_1	1.355	(0.007)***						
ln_E_1			0.717	(0.066)*				
ln_S_1					1.147	(0.000)***		
ln_G_1							1.048	(0.059)*
f_rel_wage_1	2.164	(0.161)	3.202	(0.050)*	2.446	(0.112)	1.789	(0.244)
sh_f_worker_1	0.224	(0.000)***	0.205	(0.000)***	0.222	(0.000)***	0.219	(0.000)***
f_rel_reg_work_1	-5.845	(0.001)***	-5.288	(0.003)***	-5.749	(0.001)***	-5.622	(0.001)***
f_rel_tenure_1	6.109	(0.000)***	4.843	(0.001)***	6.056	(0.000)***	6.422	(0.000)***
seoul	-2.372	(0.003)***	-2.496	(0.001)***	-2.395	(0.003)***	-2.334	(0.004)***
ggi	-1.306	(0.195)	-0.419	(0.682)	-1.296	(0.200)	-1.355	(0.177)
ln_rev_1	-1.379	(0.008)***	-1.473	(0.003)***	-1.299	(0.013)**	-1.277	(0.011)**
history	-0.002	(0.888)	0.017	(0.181)	-0.000	(0.999)	-0.005	(0.697)
ln_lp2_1	-0.811	(0.001)***	-0.703	(0.002)***	-0.887	(0.000)***	-0.777	(0.002)***
sh_rnd_1	0.006	(0.863)	-0.048	(0.154)	0.006	(0.857)	0.012	(0.721)
sh_intangible_1	-0.057	(0.053)*	-0.077	(0.009)***	-0.061	(0.039)**	-0.053	(0.073)*
sh_cashflow_1	0.228	(0.048)**	0.464	(0.000)***	0.222	(0.052)*	0.225	(0.056)*
sh_q_asset_1	-0.147	(0.000)***	-0.143	(0.000)***	-0.153	(0.000)***	-0.142	(0.000)***
sh_inventory_1	-0.095	(0.056)*	-0.050	(0.315)	-0.084	(0.094)*	-0.102	(0.040)**
sh_debt_1	-0.005	(0.020)**	-0.002	(0.306)	-0.005	(0.019)**	-0.005	(0.019)**
exe_rel_wage_1	-0.011	(0.733)	-0.026	(0.424)	-0.012	(0.719)	-0.010	(0.757)
sh_reg_work_1	-0.038	(0.261)	-0.016	(0.662)	-0.038	(0.263)	-0.042	(0.214)
ln_tenure_1	0.566	(0.468)	0.300	(0.717)	0.353	(0.649)	0.750	(0.336)

OPERATION PROFITS WITH SELECTION CORRECTION

OPER_PROF	M6		M7		M8		M9	
Regressors	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
ln_ESG_1	1.049	(0.032)**						
ln_E_1			0.487	(0.226)				
ln_S_1					0.846	(0.002)***		
ln_G_1							0.784	(0.152)
f_rel_wage_1	-1.460	(0.324)	-1.119	(0.465)	-1.268	(0.389)	-1.740	(0.238)
sh_f_worker_1	0.141	(0.002)***	0.121	(0.011)**	0.139	(0.003)***	0.137	(0.003)***
f_rel_reg_work_1	-3.851	(0.011)**	-3.338	(0.031)**	-3.769	(0.012)**	-3.687	(0.014)**
f_rel_tenure_1	5.793	(0.000)***	5.370	(0.000)***	5.792	(0.000)***	6.035	(0.000)***
seoul	-2.063	(0.010)**	-1.953	(0.012)**	-2.081	(0.009)***	-2.039	(0.012)**
ggi	-1.684	(0.091)*	-1.049	(0.299)	-1.678	(0.093)*	-1.721	(0.082)*
ln_rev_1	-1.778	(0.000)***	-1.731	(0.000)***	-1.712	(0.000)***	-1.683	(0.000)***
history	-0.003	(0.812)	0.015	(0.226)	-0.002	(0.891)	-0.005	(0.654)
ln_lp2_1	0.249	(0.256)	0.326	(0.131)	0.190	(0.374)	0.269	(0.241)
sh_rnd_1	-0.081	(0.007)***	-0.130	(0.000)***	-0.081	(0.007)***	-0.076	(0.012)**
sh_intangible_1	-0.041	(0.153)	-0.052	(0.080)*	-0.044	(0.130)	-0.038	(0.190)
sh_cashflow_1	0.181	(0.047)**	0.348	(0.000)***	0.176	(0.051)*	0.179	(0.054)*
sh_q_asset_1	-0.022	(0.193)	-0.012	(0.522)	-0.027	(0.124)	-0.018	(0.292)
sh_inventory_1	0.023	(0.638)	0.044	(0.377)	0.031	(0.527)	0.017	(0.724)
sh_debt_1	-0.006	(0.004)***	-0.003	(0.054)*	-0.006	(0.004)***	-0.006	(0.003)***
exe_rel_wage_1	0.016	(0.621)	0.006	(0.842)	0.016	(0.629)	0.017	(0.603)
sh_reg_work_1	-0.042	(0.175)	-0.016	(0.633)	-0.042	(0.175)	-0.045	(0.143)
ln_tenure_1	-0.114	(0.878)	-0.230	(0.773)	-0.267	(0.719)	0.026	(0.972)

MARKET VALUE WITH SELECTION CORRECTION

Market Value	M12		M14		M15		M16	
Regressors	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
ln_ESG_1	0.032	(0.297)						
ln_E_1			0.043	(0.053)*				
ln_S_1					0.027	(0.207)		
ln_G_1							0.017	(0.594)
f_rel_wage_1	0.069	(0.638)	0.006	(0.959)	0.075	(0.612)	0.061	(0.678)
sh_f_worker_1	0.027	(0.000)***	0.023	(0.000)***	0.027	(0.000)***	0.027	(0.000)***
f_rel_reg_work_1	-0.614	(0.000)***	-0.606	(0.000)***	-0.612	(0.000)***	-0.610	(0.000)***
f_rel_tenure_1	0.196	(0.040)**	0.314	(0.010)***	0.196	(0.036)**	0.205	(0.032)**
seoul	-0.136	(0.030)**	-0.128	(0.055)*	-0.137	(0.030)**	-0.136	(0.030)**
ggi	-0.214	(0.006)***	-0.204	(0.012)**	-0.215	(0.006)***	-0.216	(0.006)***
ln_rev_1	0.328	(0.000)***	0.338	(0.000)***	0.329	(0.000)***	0.334	(0.000)***
history	-0.001	(0.524)	-0.001	(0.513)	-0.001	(0.549)	-0.001	(0.487)
ln_lp2_1	-0.128	(0.000)***	-0.146	(0.000)***	-0.129	(0.000)***	-0.128	(0.000)***
sh_rnd_1	0.001	(0.812)	-0.005	(0.018)**	0.001	(0.819)	0.001	(0.757)
sh_intangible_1	-0.006	(0.005)***	-0.006	(0.017)**	-0.006	(0.004)***	-0.006	(0.007)***
sh_cashflow_1	0.007	(0.206)	0.017	(0.000)***	0.007	(0.216)	0.007	(0.214)
sh_q_asset_1	0.002	(0.170)	0.003	(0.074)*	0.002	(0.207)	0.002	(0.154)
sh_inventory_1	-0.005	(0.176)	-0.008	(0.031)**	-0.004	(0.204)	-0.005	(0.161)
sh_debt_1	-0.001	(0.000)***	-0.001	(0.000)***	-0.001	(0.000)***	-0.001	(0.000)***
exe_rel_wage_1	0.003	(0.202)	0.003	(0.251)	0.003	(0.201)	0.003	(0.198)
sh_reg_work_1	0.010	(0.000)***	0.011	(0.000)***	0.010	(0.000)***	0.010	(0.000)***
ln_tenure_1	-0.169	(0.008)***	-0.230	(0.001)***	-0.174	(0.006)***	-0.166	(0.009)***
ln_stock_num	0.195	(0.000)***	0.191	(0.000)***	0.196	(0.000)***	0.194	(0.000)***

Hyeok Jeong, Firm Level Incentive Compatibility for Promoting ESG and Gender Equality

TOBIT ESTIMATION OF ESG

Regressors	Coefficient	P-value
f_rel_wage_1	-0.027	(0.927)
sh_f_worker_1	-0.007	(0.313)
f_rel_reg_work_1	0.082	(0.729)
f_rel_tenure_1	0.071	(0.691)
seoul	-0.082	(0.538)
ggi	0.025	(0.865)
ln_rev_1	0.033	(0.730)
history	0.005	(0.227)
ln_lp2_1	-0.017	(0.703)
sh_rnd_1	0.015	(0.000)***
sh_intangible_1	0.019	(0.000)***
sh_cashflow_1	-0.017	(0.000)***
sh_q_asset_1	0.000	(0.970)
sh_inventory_1	-0.007	(0.401)
sh_debt_1	0.000	(0.641)
exe_rel_wage_1	0.001	(0.582)
sh_reg_work_1	-0.019	(0.000)***
ln_tenure_1	0.363	(0.002)***
ln_asset_1	0.838	(0.000)***
ln_mv_ytd_1	1.456	(0.000)***
sh_foreign_mv_1	0.011	(0.004)***
sh_ext_exe_1	-1.093	(0.000)***
sh_control_stock_1	0.015	(0.000)***
history_list	-0.011	(0.087)*
var(e)	4.436	(0.000)***
#Obs.	17,746	

- Tobit estimation of “ln ESG” with robust variance

- Instruments to identify the ESG prediction are:

1. Asset size (in log): +
2. Company's market value (in log): +
3. Share of foreigners' stock ownership: +
4. Share of external executive board members: -
5. Share of control stock: +
6. Number of years of being listed: -

*Same signs and significance with those of Heckman selection equation

EBITDA WITH TOBIT IV ESG

Regressors	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
ln_ESG_1_pr	1.011	(0.000)***	0.629	(0.000)***	4.272	(0.000)***	6.268	(0.000)***
ln_E_1_pr								
ln_S_1_pr								
ln_G_1_pr								
f_rel_wage_1	1.058	(0.004)***	0.783	(0.034)**	1.006	(0.006)***	0.985	(0.008)***
sh_f_worker_1	0.044	(0.000)***	0.065	(0.000)***	0.040	(0.000)***	0.039	(0.000)***
f_rel_reg_work_1	-1.384	(0.000)***	-2.030	(0.000)***	-1.195	(0.000)***	-1.177	(0.000)***
f_rel_tenure_1	0.765	(0.000)***	1.151	(0.000)***	0.622	(0.003)***	0.615	(0.004)***
seoul	-1.268	(0.000)***	-1.637	(0.000)***	-1.630	(0.000)***	-1.615	(0.000)***
ggi	-0.607	(0.003)***	-0.855	(0.000)***	-0.660	(0.001)***	-0.708	(0.000)***
ln_rev_1	-0.952	(0.000)***	-1.104	(0.000)***	-1.420	(0.000)***	-1.467	(0.000)***
history	-0.039	(0.000)***	-0.038	(0.000)***	-0.028	(0.000)***	-0.028	(0.000)***
ln_lp2_1	-0.149	(0.103)	-0.190	(0.036)**	0.265	(0.007)***	0.323	(0.001)***
sh_rnd_1	-0.041	(0.000)***	-0.051	(0.000)***	-0.045	(0.000)***	-0.043	(0.000)***
sh_intangible_1	-0.035	(0.002)***	-0.032	(0.004)***	-0.043	(0.000)***	-0.041	(0.000)***
sh_cashflow_1	0.370	(0.000)***	0.371	(0.000)***	0.382	(0.000)***	0.383	(0.000)***
sh_q_asset_1	-0.027	(0.000)***	-0.028	(0.000)***	-0.025	(0.000)***	-0.023	(0.000)***
sh_inventory_1	-0.083	(0.000)***	-0.087	(0.000)***	-0.082	(0.000)***	-0.082	(0.000)***
sh_debt_1	0.000	(0.132)	0.000	(0.251)	0.000	(0.469)	0.000	(0.484)
exe_rel_wage_1	-0.001	(0.664)	-0.001	(0.685)	-0.002	(0.467)	-0.002	(0.459)
sh_reg_work_1	0.018	(0.000)***	0.022	(0.000)***	-0.003	(0.002)***	-0.003	(0.001)***
ln_tenure_1	0.426	(0.019)**	0.285	(0.117)	0.578	(0.001)***	0.643	(0.000)***

OPERATION PROFITS WITH TOBIT IV ESG

Regressors	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
ln_ESG_1_pr	0.559	(0.000)***						
ln_E_1_pr			0.347	(0.000)***				
ln_S_1_pr					2.509	(0.000)***		
ln_G_1_pr							3.659	(0.000)***
f_rel_wage_1	0.767	(0.053)*	0.616	(0.121)	0.741	(0.062)*	0.728	(0.067)*
sh_f_worker_1	0.011	(0.307)	0.022	(0.037)**	0.008	(0.472)	0.007	(0.480)
f_rel_reg_work_1	-0.794	(0.016)**	-1.150	(0.000)***	-0.669	(0.042)**	-0.661	(0.044)**
f_rel_tenure_1	0.605	(0.008)***	0.818	(0.000)***	0.521	(0.022)**	0.518	(0.023)**
seoul	-0.685	(0.003)***	-0.888	(0.000)***	-0.899	(0.000)***	-0.889	(0.000)***
ggi	-0.258	(0.235)	-0.395	(0.070)*	-0.290	(0.181)	-0.318	(0.143)
ln_rev_1	-0.110	(0.389)	-0.193	(0.151)	-0.452	(0.002)***	-0.471	(0.001)***
history	-0.023	(0.000)***	-0.023	(0.000)***	-0.017	(0.004)***	-0.017	(0.004)***
ln_lp2_1	0.301	(0.002)***	0.278	(0.005)***	0.560	(0.000)***	0.591	(0.000)***
sh_rnd_1	-0.054	(0.000)***	-0.059	(0.000)***	-0.057	(0.000)***	-0.056	(0.000)***
sh_intangible_1	-0.065	(0.000)***	-0.063	(0.000)***	-0.071	(0.000)***	-0.070	(0.000)***
sh_cashflow_1	0.354	(0.000)***	0.354	(0.000)***	0.361	(0.000)***	0.362	(0.000)***
sh_q_asset_1	0.060	(0.000)***	0.060	(0.000)***	0.062	(0.000)***	0.063	(0.000)***
sh_inventory_1	0.012	(0.247)	0.010	(0.336)	0.014	(0.171)	0.014	(0.170)
sh_debt_1	0.000	(0.678)	0.000	(0.548)	0.000	(0.437)	0.000	(0.426)
exe_rel_wage_1	-0.002	(0.500)	-0.002	(0.509)	-0.002	(0.393)	-0.002	(0.391)
sh_reg_work_1	0.009	(0.000)***	0.011	(0.000)***	-0.003	(0.003)***	-0.003	(0.003)***
ln_tenure_1	0.918	(0.000)***	0.841	(0.000)***	1.001	(0.000)***	1.039	(0.000)***

MARKET VALUE WITH TOBIT IV ESG

Regressors	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
ln_ESG_1_pr	0.472	(0.000)***						
ln_E_1_pr			0.288	(0.000)***				
ln_S_1_pr					1.739	(0.000)***		
ln_G_1_pr							2.511	(0.000)***
f_rel_wage_1	0.039	(0.004)***	-0.088	(0.000)***	0.009	(0.575)	0.000	(0.986)
sh_f_worker_1	0.007	(0.000)***	0.016	(0.000)***	0.006	(0.000)***	0.006	(0.000)***
f_rel_reg_work_1	-0.102	(0.000)***	-0.400	(0.000)***	-0.043	(0.002)***	-0.039	(0.006)***
f_rel_tenure_1	-0.034	(0.000)***	0.143	(0.000)***	-0.092	(0.000)***	-0.093	(0.000)***
seoul	0.090	(0.000)***	-0.077	(0.000)***	-0.050	(0.000)***	-0.041	(0.000)***
ggi	0.010	(0.170)	-0.102	(0.000)***	-0.007	(0.456)	-0.025	(0.006)***
ln_rev_1	-0.163	(0.000)***	-0.218	(0.000)***	-0.248	(0.000)***	-0.252	(0.000)***
history	-0.001	(0.002)***	0.000	(0.305)	0.004	(0.000)***	0.004	(0.000)***
ln_lp2_1	0.002	(0.604)	-0.020	(0.000)***	0.145	(0.000)***	0.163	(0.000)***
sh_rnd_1	-0.005	(0.000)***	-0.009	(0.000)***	-0.004	(0.000)***	-0.003	(0.000)***
sh_intangible_1	-0.005	(0.000)***	-0.004	(0.000)***	-0.006	(0.000)***	-0.005	(0.000)***
sh_cashflow_1	0.012	(0.000)***	0.012	(0.000)***	0.016	(0.000)***	0.016	(0.000)***
sh_q_asset_1	0.003	(0.000)***	0.003	(0.000)***	0.004	(0.000)***	0.005	(0.000)***
sh_inventory_1	0.006	(0.000)***	0.004	(0.000)***	0.004	(0.000)***	0.004	(0.000)***
sh_debt_1	0.000	(0.000)***	0.000	(0.000)***	0.000	(0.489)	0.000	(0.281)
exe_rel_wage_1	-0.001	(0.000)***	-0.001	(0.000)***	-0.001	(0.000)***	-0.001	(0.000)***
sh_reg_work_1	0.009	(0.000)***	0.011	(0.000)***	0.000	(0.000)***	0.000	(0.000)***
ln_tenure_1	-0.225	(0.000)***	-0.287	(0.000)***	-0.148	(0.000)***	-0.122	(0.000)***
ln_stock_num	0.057	(0.000)***	0.064	(0.000)***	0.085	(0.000)***	0.090	(0.000)***

IMPLICATIONS



RESULTS SUMMARY

- Improvement of some or all ESG scores is incentive compatible with firm's own profitability and market valuation

	EBITDA	Operation Profits	Market Value
Environment	+	~	O
Social	+	+	~
Governance	+	~	~

- Improvement of gender gaps in terms of job access and retention is incentive compatible with firm's own profitability and market valuation, but not via wages and work quality, measured by regular works, gaps.

	EBITDA	Operation Profits	Market Value
Wage gap	~	~	~
Job access gap	+	+	+
Work quality gap	-	-	-
Retention gap	+	+	+

IMPLICATIONS

- ❑ The adoption of better management practices in terms of ESG contributes to enhancing profitability, despite the adoption costs. That is, the ESG management practices may not be simply a matter of following trend (Rollback vs. Rebranding “Responsible Business” ⇒ “ESG 2.0”)
- ❑ Most studies about gender diversity on firm performance focus on the composition of executives. This paper shows that **gender diversity among workforce** has strong positive impacts on firm performance for both profitability and market valuation.
- ❑ Positive impact of narrowing the gender gap in tenure suggest that promotion of the retention of female workers would not only improve on the social problem of the M-curve of Korean women's labor force participation but also increase the firm's profits and values. Further exploration of the relationship between the tenure of female workers and the work practices such as work schedule flexibility and paid-leave is needed.
- ❑ Incentive-compatibility is less robust for improving gender wage gap itself.
- ❑ Negative impacts of ratio of regular female workers relative to male are puzzling. This may indicate the presence of dual workforce groups among female workers.

CONJECTURED MECHANISMS BEHIND

- ❑ Potential channels of the positive impacts of ESG on firm performance
 - Customer valuation for ESG practices and market demand responses
 - Investor valuation for ESG practices and investment responses
 - Banker valuation for ESG practices and interest cost differentiation
 - Worker valuation for ESG practices and firm-worker matching
- ❑ Potential channels of the positive impacts of ESG on firm performance
 - Binding constraints of female workforce participation among talented women
 - Worker valuation for ESG practices and firm-worker matching
- ❑ Paradox: If improvement of ESG and gender equality is a good thing for the sake of firm's own interests, why do we still observe such mal-practices in workplaces?
 - Lack of information?
 - Short-sightedness of short-lived “managers” about explicit costs and latent benefits?
 - Rational choice based on “prejudice” (firm owner or manager's preferences)?
 - Will market will eventually crowd out discrimination following Gary Becker's dictum?

[END]

