

Climate Regulations and Corporate Demand for ESG Talent

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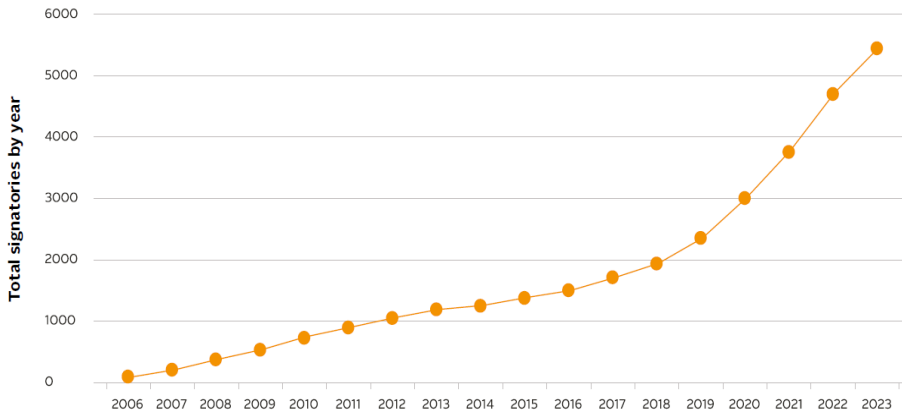
Dragon Yongjun Tang

The University of Hong Kong

ABFER 2024 Annual Conference

05/20/2024

Rapid Growth of ESG Industry and Practices



Source: UNPRI 2023 Annual Report

Growing Demand for ESG Skills

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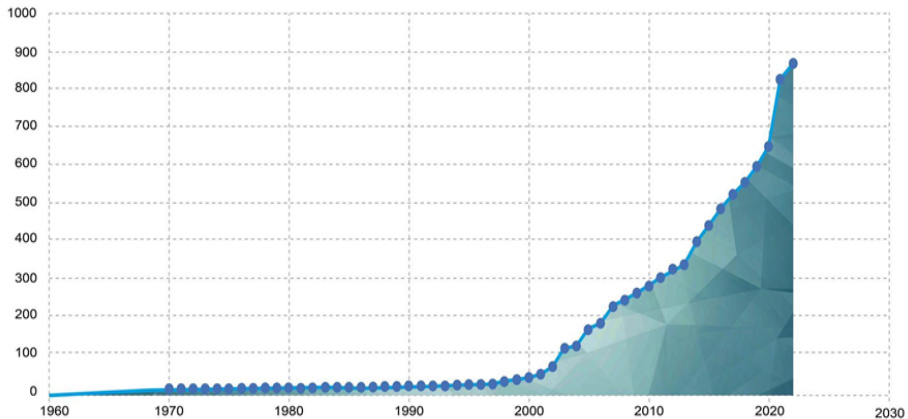
Demand Grows for Sustainability Skills as ESG Sentiment Shifts and Regulatory Pressures Rise

Business Wire

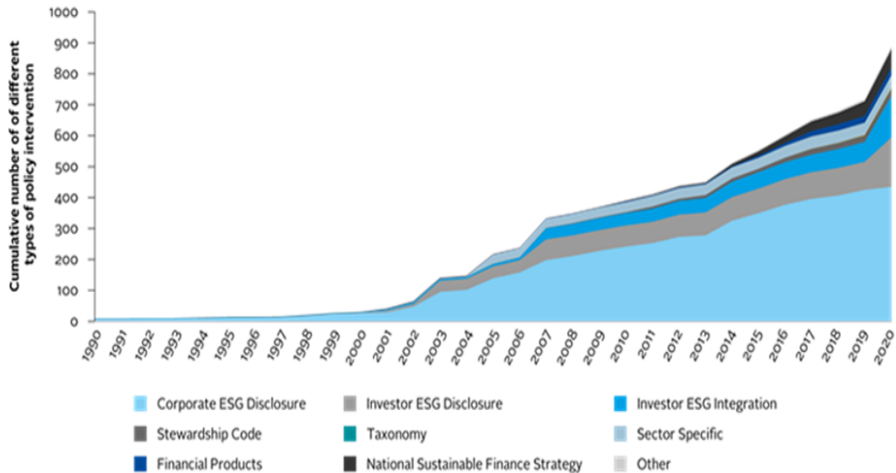
Wed, Apr 24, 2024 • 5 min read



UNPRI: Increasing Regulations on ESG/Environment



Many Areas Covered, Specialists Needed



China Lacks Qualified ESG Talent



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Green finance: China faces acute lack of talent for sustainability-linked investment, says CFA Institute

- 60 per cent of ESG professionals have received no relevant training, and fewer than 10 per cent hold a relevant qualification, organisation says
- Government, enterprises and universities should work together to cultivate ESG talent, institute says


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 [Why you can trust SCMP](#)

Government Responds to Shortage of ESG Talent



中华人民共和国教育部

Ministry of Education of the People's Republic of China

当前位置: 首页 > 公开

Information Notice from the Ministry of Education on the issuance of the "Work Plan for Strengthening the Construction of a Talent Training System for Carbon-Free and Carbon-Neutral Higher Education"

name: Construction of a Talent Training System for Carbon-Free and Carbon-Neutral Higher Education"

Information 360A08-07-2022-0012-1 **Generation** 2022-04-24 **Issuing** Ministry of Education of the

index: **date:** **organization:** People's Republic of China

Text Jiao Gao Han [2022] **Information** higher education

number: No. 3 **category:**

Content The Ministry of Education issued the "Work Plan for Strengthening the Construction of a Talent

overview: Training System for Carbon-neutral Higher Education at the Carbon Peak".

Notice from the Ministry of Education on the issuance of the "Work Plan for Strengthening the Construction of a Talent Training System for Carbon-Free and Carbon-Neutral Higher Education "

Jiao Gao Han [2022] No. 3

Research Questions

- Is corporate demand for ESG talent driven by ESG regulations?
- If so, which firms are affected?
- What do ESG talents bring to firms?

China's Environmental Protection Tax

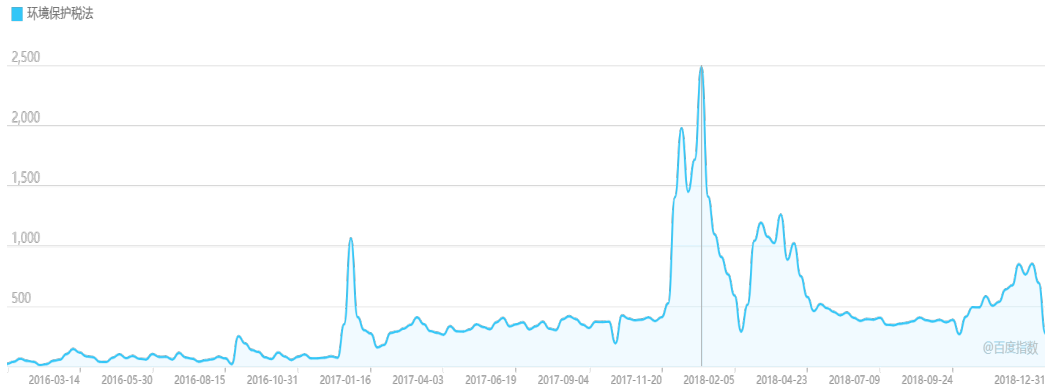
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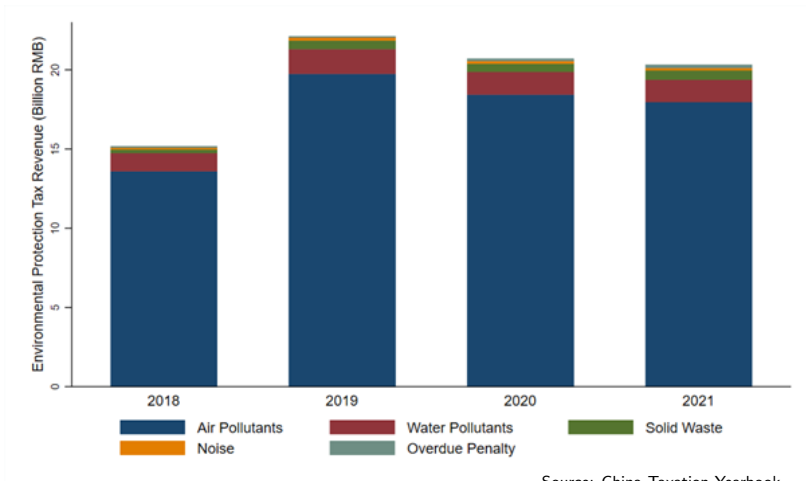
China's Environmental Protection Tax

- Applicable to **all** polluting firms operating in China

Article 2: Enterprises, institutions, and other production and business operators that directly emit pollutants into the environment within the territorial and maritime jurisdictions of the People's Republic of China are designated as taxpayers of the Environmental Protection Tax. These entities are required to remit the Environmental Protection Tax in accordance with the provisions set forth in this Law.

China's Environmental Protection Tax

- Tax revenue of over 20 billion RMB (\approx 3 billion USD) per year



Source: China Taxation Yearbook

Hypothesis: Regulations → Green Hiring

- H1: The implementation of environmental taxation regulations **increases** the demand for employees with green skills in high-pollution firms.
 - ▶ Firms need ESG talent to understand and implement ESG policies and regulations.
 - ▶ Bartram, Hou, and Kim (2022 JFE) cast doubt on climate policy in California.
 - ▶ Campello, Gao, and Xu (2024 MS): tax may cause labor downskilling.
- H2: the effects of environmental taxation regulations on corporate green hiring are **more pronounced** if the regulations are **more stringent**.
 - ▶ Enforcement of regulatory compliance affects the cost (Trebbi, Zhang, and Simkovic, 2023).

Main Findings

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- More pronounced effects among firms with **higher public attention**
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 - ▶ Keep up with the Joneses.

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- More pronounced effects among firms with **lower pre-tax-law green hiring rates**.
 - ▶ Keep up with the Joneses.
- Green new hiring is associated with **increased green innovation and profitability**.

Contributions

- Environmental regulations → corporate behavior
 - ▶ Dang, Gao, and Yu (2023): capital structure
 - ▶ Brown, Martinsson, and Thomann (2022): green innovation
 - ▶ Choi, Levine, Park, and Xu (2024): CEO compensation
 - ▶ Li, Tang, and Xie (2024): cross-border mergers and acquisitions
 - ▶ Martinsson, Sajtos, Strömberg, and Thomann (2024, RFS): carbon emissions
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- Green transition of corporate workforce
 - ▶ Hagendorff, Nguyen, and Sila (2023): a steady increase in corporate demand for employees with green skills in the United States since 2010
 - ▶ Darendeli, Law, and Shen (2022): the concentration of green skills required in firms' job postings contains additional information than traditional ratings widely used to evaluate firms' environmental efforts
 - ▶ This paper: [green taxes are driving corporate demand for green skills](#).

Contributions

- Changes in the demand for labor skills
 - ▶ Acemoglu, Autor, Hazell, and Restrepo (2022): technological advancement
 - ▶ Lu and Ng (2013): trade shocks
 - ▶ Autor and Dorn (2013): changes in consumer preferences
 - ▶ Modestino, Shoag, and Balance (2020): variations in labor availability
 - ▶ Clemens, Kahn, and Meer (2021): statutory increases in minimum wage
 - ▶ This paper: [environment/climate-related regulations](#)

Data and Sample

- Job postings from **51job.com**
 - ▶ **Leading** online recruitment service provider in China
 - ▶ **Highest market share** among Chinese online recruitment platforms in 2021
 - ▶ **Diverse range** of hiring companies, encompassing firms of all sizes across various industries
 - ▶ **Over 200 million users** (firms and job seekers) by 2023
 - ▶ Sample: **over 6 million job postings** of Chinese A-share companies between 2015 and 2021
- Green-skill-related keywords from the *Occupational Classification Dictionary of the People's Republic of China*
 - ▶ **133** green occupations
 - ▶ **Top 200** most common words related to green skills
 - ▶ A green job posting: ≥ 3 unique green-skill-related keywords
- Corporate financial and other information from CSMAR and CNRDS

Screenshot of One Job Posting on 51job.com

环保工程师

1-2万

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申请职位

职位信息

岗位职责:

- (1) 参与产品碳足迹统筹工作, 完成客户提出的碳足迹各项要求, 主导原材料的资料收集, 并汇总各部门相关的信息;
- (2) 负责向供应商收集原材料环保方面信息或调查;
- (3) 参与新产品和新客户环保标准评审工作;
- (4) 负责将法律法规和客户要求转化为内部标准, 并传达给供应商;
- (5) 负责产品委外环保测试认证;
- (6) 负责安排和统筹环保测试实验室测试工作;
- (7) 负责处理来料环保异常工作;
- (8) 督促、指导供应商改善物料环保异常, 包括对不符合绿色产品管理要求的改善;
- (9) 负责物料风险评估并制定管控方案等工作;
- (10) 负责组织、培训、指导、审核GP测试员的各项工作;
- (11) 负责供应商的现场环保审核、评估和后续改进措施实施;
- (12) 负责编写实验室相关文件和操作指引;
- (13) 负责各客户环保资料收集, 环保调查等工作;
- (14) 按要求完成上级交办的各项工作。

任职资格:

- (1) 本科或以上学历, 二年以上电子行业环保管理工作经验;
- (2) 熟悉现有环保行业法律法规, 并掌握有一定的材料或化学基础知识。
- (3) 具备良好的英语读写能力, 较强的语言组织与报告能力, 熟悉Office操作;
- (4) 具备良好的沟通协调能力, 问题分析处理能力;
- (5) 具有良好的分析判断能力, 良好的工作计划及推动能力。

职能类别: 环保工程师

关键字: 环保 碳足迹 ROHS REACH 环保资料收集 有害物质

工作地址

上班地址: 广州市花都区新雅街镜湖大道8号国光工业园

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Example Green Job Posting

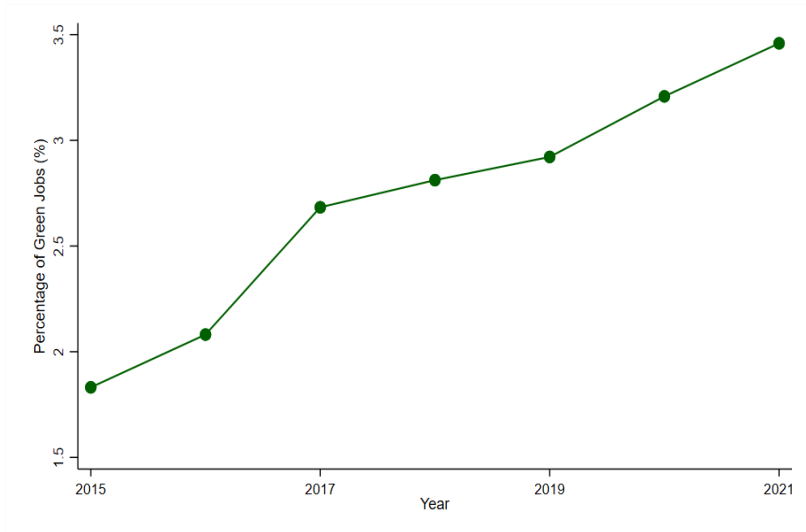
Table IA.2 Examples of Green Job Postings

This table presents an example of green job postings. The green-skill keywords are highlighted in bold.

岗位描述: 1.根据国家安全生产及**环境保护**的法律法规和技术要求来开展日常运转工作; 2.监督公司各部门在生产、研发、新改扩等活动中有关**废气、废水**等安全环保方面工作的实施,使其对员工及**环境**的影响降至最低; 3.维护及更新公司相关安全、**健康、环境**等管理制度,进行定期的安全检查和整改处理,并组织对员工进行安全教育培训及考核; 4.对工伤及安全事故进行处理并制订预防对策; 5.主导职业健康管理,每年组织公司人员进行职业健康体检; 6.负责对接政府部门的检查对接工作。了解易制毒、易制爆、剧毒备案流程及消防安全管理; 7.落实集团总部及公司领导各项工作要求。任职要求: 1.大专以上学历,化工、**环境、安全工程**等相关专业; 2.有相关**EHS**工作经验3年以上,具备危险化学品管理经验; 3.工作积极主动、耐心细致,学习应变能力及沟通协调强,能独立解决安全管理方面各项问题,提出合理化建议; 4.持有注册安全工程师证书优先。

Job Description: 1. Carry out daily operations in accordance with national laws, regulations, and technical requirements related to safety production and **environmental protection**. 2. Supervise various departments in the company to ensure that **waste gas, wastewater**, and other safety and **environmental aspects** are implemented during production, research and development, new projects, modifications, and expansions, minimizing the impact on employees and **the environment**. 3. Maintain and update relevant safety, **health**, and **environmental** management systems in the company, conduct regular safety inspections and rectification, and organize safety education and training for employees. 4. Handle work-related injuries and safety accidents and formulate prevention measures. 5. Take the lead in occupational health management and organize annual occupational health checks for company personnel. 6. Be responsible for connecting with government departments for inspection and coordination work. Familiar with the process of making dangerous chemicals, explosives, and toxic substances, as well as fire safety management. 7. Implement the requirements of the group headquarters and company leaders. Requirements: 1. College degree or above in chemical, **environmental**, or safety engineering related fields. 2. More than 3 years of relevant **EHS** work experience, including experience in the management of dangerous chemicals. 3. Proactive, meticulous, and strong learning ability in problem-solving and communication coordination, able to independently solve various safety management issues and provide reasonable suggestions. 4. Hold a registered safety engineer certificate is preferred.

Percentage of Green Jobs Over Time



Baseline Model

$$\%Green\ Jobs_{i,t} = \alpha + \beta Polluter_i \times Taxation_t + X_{i,t-1}\gamma + \delta_t + \delta_i + \epsilon_{i,t}$$

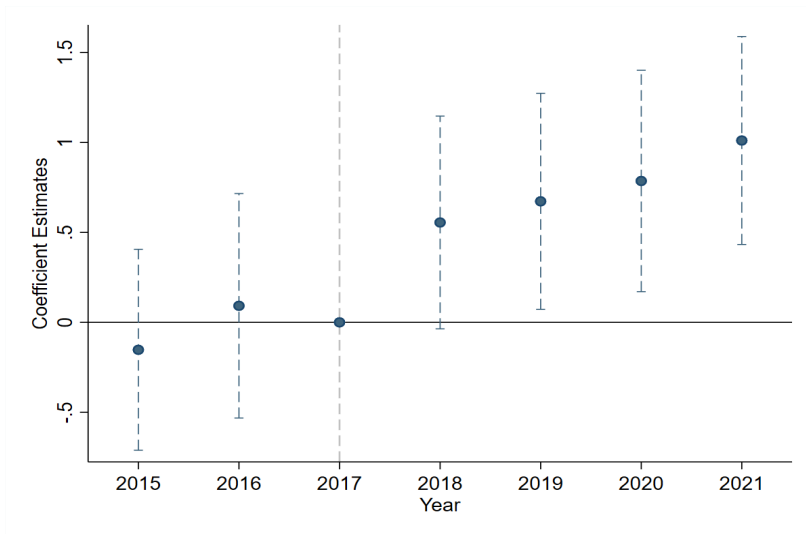
- *%Green Jobs*: percentage of green job postings among all postings released by firm i in year t
- *Taxation_t*: indicator for the implementation of the environmental protection tax law
- *Polluter_i*: indicator for highly-polluting firms
 - ▶ 16 highly-polluting industries based on the *Industry Classification Directory for Environmental Inspection and Management of Listed Companies* issued by the Ministry of Environmental Protection
 - ▶ E.g., coal, mining, textiles, tanning, and paper manufacturing

Baseline Results: Green Tax and Green Hiring

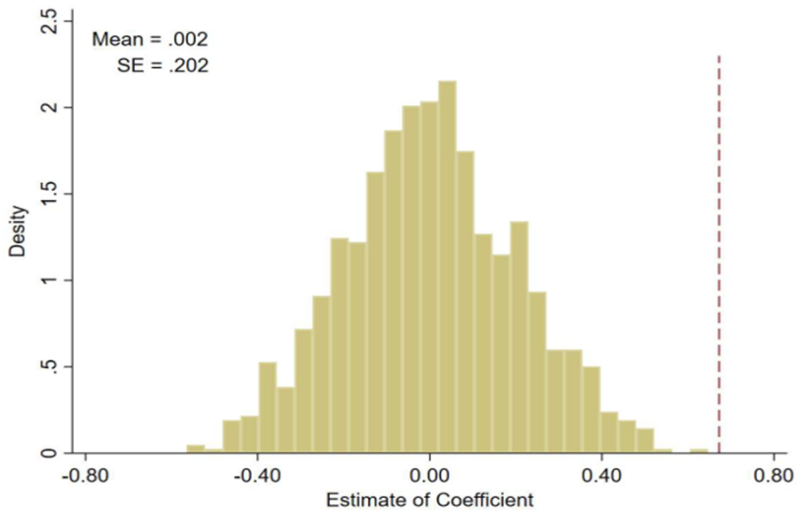
22% of the mean

	%Green Jobs		
	(1)	(2)	(3)
Polluter × Taxation	0.746*** (3.23)	0.738*** (3.18)	0.672*** (2.90)
Size		0.203*** (3.09)	0.180 (1.29)
Q		0.018 (0.46)	-0.083** (-2.03)
Leverage		0.421 (1.14)	0.429 (0.79)
ROA		1.008 (1.58)	1.141* (1.73)
Cash		-0.446 (-0.94)	-0.318 (-0.57)
R&D		-8.765** (-2.51)	0.448 (0.12)
log(Age)		-0.099 (-1.32)	0.423** (2.35)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Firm FE	No	No	Yes
Obs	19,314	19,314	19,314
Adjusted R ²	0.129	0.131	0.350

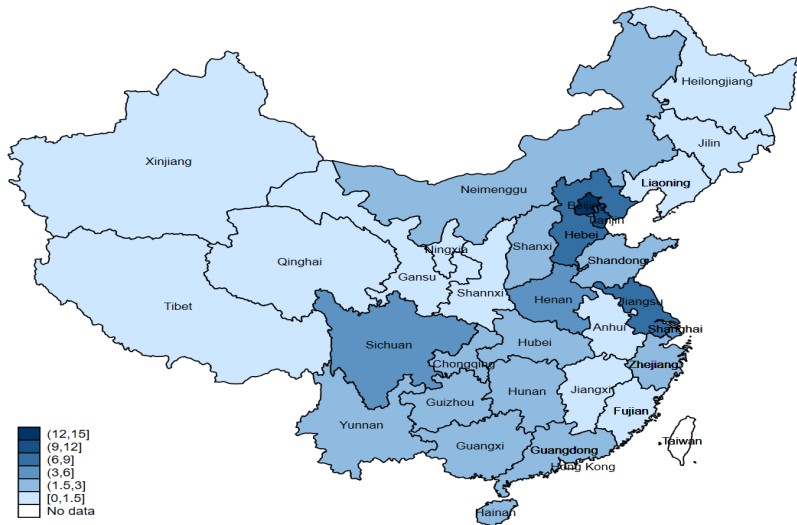
Dynamic Estimation



Placebo Test



Environmental Tax Rates By Provinces



Heterogeneity across Provinces

	%Green Jobs	
	Low Tax Rate (1)	High Tax Rate (2)
Polluter \times Taxation	0.088 (0.23)	0.971*** (3.38)
Size	0.313 (1.12)	0.125 (0.78)
Q	-0.049 (-0.58)	-0.090** (-1.96)
Leverage	-0.166 (-0.16)	0.719 (1.13)
ROA	0.539 (0.51)	1.457* (1.75)
Cash	-0.795 (-0.77)	-0.048 (-0.07)
R&D	2.026 (0.24)	-0.342 (-0.08)
log (Age)	0.342 (0.85)	0.460** (2.38)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Obs	5,756	13,558
Adjusted R ²	0.313	0.365

Financial Constraints

	%Green Jobs	
	Low Financial Constraints	High Financial Constraints
	(1)	(2)
Polluter \times Taxation	0.723** (2.26)	0.391 (0.98)
Size	0.002 (0.01)	0.278 (1.63)
Q	-0.087 (-1.20)	-0.072 (-1.37)
Leverage	1.092 (1.39)	-0.870 (-1.06)
ROA	0.851 (0.94)	2.064* (1.85)
Cash	-0.207 (-0.22)	-0.536 (-0.70)
R&D	3.275 (0.52)	1.510 (0.26)
log (Age)	-0.953 (-0.69)	0.252 (0.93)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Obs	9,618	9,696
Adjusted R ²	0.298	0.418

Tax Avoidance Experience

	%Green Jobs	
	Low Tax Avoidance (1)	High Tax Avoidance (2)
Polluter × Taxation	0.711** (2.06)	0.566* (1.66)
Size	0.293 (1.34)	0.101 (0.49)
Q	-0.056 (-0.75)	-0.038 (-0.73)
Leverage	-0.726 (-0.74)	1.086 (1.47)
ROA	-3.309 (-1.45)	1.668** (2.04)
Cash	-0.610 (-0.65)	-0.289 (-0.39)
R&D	4.343 (0.57)	-8.568 (-1.57)
log (Age)	-0.191 (-0.57)	0.695*** (2.82)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Obs	9,664	9,642
Adjusted R ²	0.336	0.414

Public Attention

	%Green Jobs	
	Low Attention (1)	High Attention (2)
Polluter \times Taxation	0.130 (0.30)	0.896*** (2.93)
Size	0.160 (0.88)	0.224 (1.22)
Q	-0.017 (-0.27)	-0.146** (-2.28)
Leverage	-1.767* (-1.96)	1.355* (1.75)
ROA	1.050 (0.63)	1.239 (1.54)
Cash	0.099 (0.11)	-0.386 (-0.48)
R&D	11.043* (1.65)	-1.327 (-0.26)
log (Age)	0.502* (1.70)	0.120 (0.33)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Obs	8,793	10,521
Adjusted R ²	0.369	0.350

Pre-tax-law Green Hiring

	%Green Jobs	
	Low Pre-tax-law Green Hiring (1)	High Pre-tax-law Green Hiring (2)
Polluter \times Taxation	1.052*** (4.03)	0.502 (1.46)
Size	0.183 (1.35)	0.300 (1.31)
Q	0.097** (2.26)	-0.191*** (-2.77)
Leverage	0.112 (0.20)	0.553 (0.61)
ROA	1.331** (2.34)	0.855 (0.71)
Cash	0.463 (0.81)	-1.258 (-1.29)
R&D	-7.507 (-1.51)	9.442* (1.69)
log (Age)	0.165 (0.79)	0.344 (1.11)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Obs	8,602	9,745
Adjusted R ²	0.239	0.358

Impact of Green Hiring on Profitability

	ROE		
	All (1)	High $\Delta\%$ Green Jobs (2)	Low $\Delta\%$ Green Jobs (3)
Polluter \times Taxation	0.049*** (6.12)	0.058*** (4.72)	0.041*** (3.94)
Size	-0.055*** (-6.55)	-0.068*** (-5.36)	-0.043*** (-3.90)
Q	0.011*** (4.71)	0.008** (2.17)	0.014*** (5.04)
Leverage	0.168*** (5.70)	0.141*** (3.40)	0.193*** (4.58)
ROA	0.109* (1.93)	0.076 (0.91)	0.139* (1.90)
Cash	0.210*** (8.65)	0.238*** (6.51)	0.179*** (5.67)
R&D	1.049*** (5.73)	1.316*** (5.24)	0.764*** (2.90)
log (Age)	-0.029*** (-4.07)	-0.033*** (-3.02)	-0.025*** (-2.83)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Obs	18,880	9,441	9,439
Adjusted R ²	0.174	0.165	0.185

Impact of Green Hiring on Green Innovation

	log(1+#Green Patent Application)		
	All (1)	High $\Delta\%$ Green Jobs (2)	Low $\Delta\%$ Green Jobs (3)
Polluter \times Taxation	0.042 (1.40)	0.088** (2.07)	-0.006 (-0.14)
Size	0.327*** (13.69)	0.332*** (9.15)	0.312*** (10.13)
Q	0.044*** (7.00)	0.045*** (5.30)	0.042*** (4.46)
Leverage	-0.180*** (-2.58)	-0.171* (-1.75)	-0.183* (-1.84)
ROA	0.352*** (4.02)	0.312*** (2.78)	0.398*** (2.88)
Cash	-0.007 (-0.10)	-0.005 (-0.05)	-0.003 (-0.03)
R&D	1.689*** (2.67)	1.28 (1.48)	2.057** (2.21)
log (Age)	-0.141*** (-5.00)	-0.147*** (-3.78)	-0.136*** (-3.35)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Obs	18,905	9,461	9,444
Adjusted R ²	0.765	0.744	0.779

On-going Analysis

- Heterogeneities across **job positions**
- **Wage** premium for green skills
- Extension to **private** firms
- ...

Conclusions

- This is among the first papers examining **green tax** effects (among other environmental regulations) on corporate green transitions and ESG capacity building.
- **Green hiring increases** after the enactment of environmental protection tax in China, especially for polluting firms.
- **Climate regulations affect workforce**, shifting more people to ESG industry.