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Environmental sustainability and employee satisfaction

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ABSTRACT

Given the increasing emphasis on environmental sustainability, we investigate whether firm pollution drives employee satisfaction and find that satisfaction is substantially lower in more polluting firms. We also show that more educated employees, employees aged between 30 and 40, and management employees are less satisfied when their firms pollute. Additionally, employees in heavy-polluting firms are less satisfied with their senior leadership, and are less likely to recommend their firms to their friends. Overall, employees care about environmental sustainability and reducing pollution seems essential to increasing employee satisfaction.

1. Introduction

Environmental sustainability is an issue at the top of many agendas - political, educational, health, and business - and it receives a lot media attention. A recent article in Forbes highlights that "being sustainable is something that is demanded by your workforce".[1] A recent but limited survey shows that 67% of employees demand that firms become more environmentally sustainable.[2] Relatedly, social identity theory (Tajfel and Turner, 1986) posits that working for a firm with similar values (i.e., employee-organization CSR congruence) is important for employees who identify themselves as a member of the firm (Singhapakdi et al., 2015). We thus hypothesize that poor corporate environmental performance damages corporate image, which in turn can reduce employee satisfaction (e.g., Riordan et al., 1997; Bauman and Skitka, 2012; Barakat et al., 2016). To test the hypothesis, we investigate the effect of firm pollution on employee satisfaction.

By combining a dataset on pollution by U.S. firms with a novel dataset on employee satisfaction, we find the following results. First, the relationship between firm pollution and employee satisfaction is negative. Second, this relationship is stronger for employees who are more educated, aged between 30 and 40 (i.e., those more likely to have young families), and mid-level managers. These results are likely due to employees with more education and young families being more environmentally conscious (Meyer, 2015; Brumberg et al., 2021) and that management employees care more about corporate sustainability and long-term performance.[3] Similarly, we find that the relationship is stronger for firms in blue states and high social capital states where people highly value sustainability (Di Giuli and Kostovetsky, 2014; Jha and Cox, 2015). Third, employees in heavy-polluting firms are less optimistic about career opportunities, are less satisfied with their compensation and senior management, and are less likely to recommend their firms to their friends.

This is the first study to examine the relationship between environmental sustainability and employee satisfaction. Our contributions are two-fold. First, we contribute to the growing literature on the drivers of employee satisfaction (e.g., Huang et al., 2015; Jing et al., 2019) by showing the importance of corporate environmental performance in improving employee satisfaction. Second, we add to the burgeoning

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[1] See https://www.forbes.com/sites/adigaskell/2021/10/31/employees-demand-that-we-become-more-sustainable

[2] See https://hrnews.co.uk/67-of-employees-demand-that-we-become-more-sustainable-according-to-new-study

[3] More educated people are more aware of the harmful effects of toxic pollution and are more concerned about environmental issues (Jiang et al., 2014; Meyer, 2015). Employees with young families may care more about environmental sustainability given that children are more vulnerable to air pollution partly because of their faster breathing rate than adults (Brumberg et al., 2021). Mid-level managers may bear the direct consequence of employee-organization CSR incongruence that makes it harder to motivate and work with rank-and-file employees, and it is also likely that mid-level managers have better access to the information regarding firm environmental performance and are, therefore, more responsive to environmental issues. Moreover, CSR matters from the managers' perspective because being socially responsible cannot only increase employee loyalty and retention but also reduce wage expenditures (e.g., Greening and Turban, 2000). Nevertheless, the exact drivers of the observed cross-sectional heterogeneity are worthy of further investigation in future studies.

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Table 1
Descriptive statistics.

Panel A. Employee characteristics

Variable	Obs.	Mean	Std. dev.	25th	Median	75th
Overall satisfaction	21,495	3.39	1.13	3.00	4.00	4.00
Career	21,105	3.25	1.17	2.50	3.00	4.00
Compensation	21,073	3.31	1.10	3.00	3.00	4.00
Senior leadership	21,019	2.97	1.23	2.00	3.00	4.00
Work-life balance	21,078	3.49	1.20	3.00	4.00	4.50
Recommendation	18,756	0.67	0.47	0.00	1.00	1.00
CEO approval	13,321	0.74	0.44	0.00	1.00	1.00
Age	21,495	34.84	10.09	27.00	32.00	41.00
Education	21,495	1.22	0.68	1.00	1.00	2.00
Manager	21,495	0.27	0.44	0.00	0.00	1.00

Panel B. Firm characteristics

Variable	Obs.	Mean	Std. dev.	25th	Median	75th
Average overall satisfaction	850	3.38	0.62	3.00	3.40	3.80
Pollution (1000s)	850	2657.99	8779.77	1.23	36.91	415.40
Log(Pollution)	850	9.69	4.73	7.12	10.52	12.94
Size	850	9.93	1.27	8.97	9.89	10.69
Capex	850	0.04	0.03	0.02	0.03	0.05
Cash	850	0.12	0.10	0.05	0.09	0.16
Leverage	850	0.27	0.14	0.17	0.25	0.36
Book-to-market	850	0.38	0.27	0.22	0.32	0.50
Tangibility	850	0.26	0.19	0.11	0.19	0.34
Ln(Employee)	850	3.65	1.01	2.92	3.55	4.29
R&D	850	0.03	0.03	0.00	0.02	0.04

literature on the consequences of pollution for corporations (e.g., Chava, 2014; Levine et al., 2018) by showing that firm pollution is detrimental to its human capital.

2. Data and empirical model

We collect data on employee satisfaction with their employers from Glassdoor.[4] Glassdoor is an online employer review website where employees can anonymously rate the various aspects of the employer, including overall satisfaction and sub-ratings. In addition, employees can share their personal information (i.e., age, education, job title) in the reviews. To avoid biased reviews, we exclude the reviews from former employees and senior management (e.g., CEO, CFO, and other top executives).

We then merge the Glassdoor sample with the firm pollution data from the Toxic Release Inventory (TRI) database maintained by the Environmental Protection Agency (EPA). Following the literature (e.g., Currie et al., 2015; Xu and Kim, 2022), we employ the total amount of toxic chemicals released per year as a proxy for corporate environmental performance. We obtain firm financial information from Compustat. Our sample consists of 21,495 reviews from 424 unique U.S. firms between 2008 and 2015.

We examine the relationship between corporate environmental performance and employee satisfaction as follows:

$$Employee\ satisfaction_{ijt} = \alpha + \beta_1 Log(Pollution)_{jt} + \gamma\, Z_{ijt} + \lambda_{jt} + \varepsilon_{ijt} \quad (1)$$

where i indexes individual review, j indexes the firm, and t indexes the year, respectively. *Employee satisfaction* is the overall satisfaction (*Overall satisfaction*) and other subcategory ratings (i.e., *Career, Compensation, Work-life balance, Senior leadership, Recommendation, CEO approval*). Log*(Pollution)* is the logarithm of firm pollution released on-site into the air, water, and ground. Z is a set of employee characteristics, including the reviewer's age in years (*Age*), the reviewer's highest education level (*Education*), a dummy variable that equals one if the reviewer is a mid-level manager (*Manager*). λ indexes firm-level characteristics, namely *Size, Capex, Cash, Leverage, Book-to-market, Tangibility*, Log*(Emp)* and *R&D*. Online Appendix Table A1 provides detailed variable definitions. Firm and year fixed effects are included. Standard errors are clustered at the firm level.

3. Results

3.1. Descriptive statistics

Panel A (B) in Table 1 presents the summary statistics for the review-level (firm-level) observations.[5] The mean value of *Overall satisfaction* is 3.39 while sub-category ratings vary from 2.97 (*Senior leadership*) to 3.49 (*Work-life balance*). 67% of reviewers recommend their own employers to friends and the approval rate for the CEO is 74%. Approximately 27% of reviews are from mid-level managers. The average education level is bachelor and the average employee age is 35. The average pollution of a firm is 2.7 million pounds, with a standard deviation of 8.8 million pounds. Online Appendix Table A2 shows average employee satisfaction and pollution across Fama-French 12 industries. The three most (least) polluting industries are Utilities, Mines, and Consumer Durable (Wholesale, Finance, and Business Equipment).[6]

3.2. Regression analysis

In Table 2 the dependent variable is *Overall satisfaction*. In Column (1) we find that firm pollution significantly reduces employee satisfaction, consistent with the argument that employees care about their employers' environmental performance and firm pollution reduces employee satisfaction. The result is robust to the inclusion of employee location (city) fixed effects in Column (2) and the exclusion of firm-years

[4] Glassdoor data is widely used in the literature to measure employee satisfaction and opinions (e.g., Jing et al., 2019; Kim and Ra, 2022).

[5] In our firm-level analysis we drop firms with fewer than 100 employee ratings over the sample period to make sure that the firm-level average employee satisfaction is representative.

[6] The correlation matrix in Online Appendix A3 suggests that the Glassdoor information related to employee rating and characteristics (i.e. Overall satisfaction, Age, Education, Manager) are distinctive from one another, since the correlations among these variables are low (below 0.2).

Table 2
Pollution and employee satisfaction.

	Overall satisfaction		
	Baseline	Control for employee location fixed effects	Excluding firm-years with zero pollution
	(1)	(2)	(3)
Log(pollution)	**−0.023*** **	**−0.018** **	**−0.018** **
	(0.009)	**(0.009)**	**(0.008)**
Age	−0.012***	−0.011***	−0.014***
	(0.002)	(0.002)	(0.002)
Education	−0.001	−0.019	0.003
	(0.013)	(0.014)	(0.015)
Manager	0.103***	0.086***	0.079***
	(0.031)	(0.024)	(0.026)
Size	−0.401	−0.309	−0.403
	(0.300)	(0.265)	(0.286)
Capex	0.550	0.393	−0.312
	(1.289)	(1.297)	(1.298)
Cash	0.898	1.020*	0.742
	(0.623)	(0.547)	(0.629)
Leverage	0.608*	0.527*	0.430
	(0.314)	(0.275)	(0.292)
Book-to-market	0.303**	0.213*	0.295**
	(0.142)	(0.125)	(0.148)
Tangibility	1.962**	2.059**	1.607*
	(0.855)	(0.833)	(0.839)
Log(Emp)	0.381	0.267	0.397
	(0.251)	(0.232)	(0.247)
R&D	0.163	−0.909	1.083
	(1.776)	(1.829)	(1.731)
Firm & year FE	Yes	Yes	Yes
Location FE	No	Yes	No
N	21,495	17,906	18,503
R-sq	0.047	0.038	0.057

***$p<0.01$, **$p<0.05$, *$p<0.1$.

Table 3
Instrumental variable analysis.

Panel A. Instrumental variable approach: First stage

	Log(Pollution)		
	Baseline	**Control for employee location fixed effects**	**Excluding firm-years with zero pollution**
	(1)	**(2)**	**(3)**
Average distance	**0.005*** **	**0.004*** **	**0.004*** **
	(0.001)	**(0.001)**	**(0.001)**
Controls	Yes	Yes	Yes
State & industry & year FE	Yes	Yes	Yes
Location FE	No	Yes	No
F-stat	27.31	23.62	22.49
N	21,479	16,686	18,482
R-sq	0.249	0.216	0.277

Panel B. Instrumental variable approach: Second stage

	Overall Satisfaction		
	Baseline	**Control for employee location fixed effects**	**Excluding firm-years with zero pollution**
	(1)	**(2)**	**(3)**
Log(pollution) (instrumented)	**−0.052***	**−0.075** **	**−0.049***
	(0.027)	**(0.037)**	**(0.029)**
Controls	Yes	Yes	Yes
State & industry & year FE	Yes	Yes	Yes
Location FE	No	Yes	No
N	21,479	16,686	18,482
R-sq	0.035	0.055	0.045

***$p<0.01$, **$p<0.05$, *$p<0.1$.

with zero pollution in Column (3).

To mitigate endogeneity concerns, we employ an instrumental variable (IV) approach in Table 3. We instrument Log*(Pollution)* with the average distance (*Average distance*) between a firm's plants and the regional EPA offices.[7] The rationale is that a longer geographic distance between a plant and the regional EPA office increases the monitoring cost for the regulators and may weaken regulatory scrutiny of environmental performance (Jing et al., 2023). It is plausible that the average distance drives employee satisfaction only through its positive effect on pollution. The first-stage regression in Panel A has an *F*-statistic of 27.31 and the coefficient on *Average distance* is positive and statistically significant, suggesting that the IV is not weak. The second-stage results in Panel B remain similar to the results in Table 2.[8,9]

In Panel A of Table 4 we examine whether the effect of firm pollution on employee satisfaction varies across employee characteristics. We find higher-educated employees (Column 2), employees aged between 30 and 40 (Column 4), and management employees (Column 6) are more sensitive to firm pollution. Panel B of Table 4 presents the results of firm-level cross-sectional analysis, showing a stronger effect of pollution on the firm average employee satisfaction for firms headquartered in blue states (Column 1) and states with high social capital (Column 3). The tests on coefficient differences between subsamples confirm that the heterogeneities are statistically significant.

In Table 5 we investigate the effects of firm pollution on subcategories of employee satisfaction. We show that employees working

[7] EPA has ten regional offices and each office monitors the environmental performance of plants in its neighboring states. We calculate the distance between each plant and the regional EPA office using the Haversine formula.

[8] Since the average distance has limited time variation within firms, we control for industry (SIC 4-digit), state, and year fixed effects rather than firm and year fixed effects.

[9] Online Appendix Table A4 shows that the baseline results are robust to the regression analysis at the firm level.

Table 4
Cross-sectional tests.

Panel A. Employee characteristics							
	Overall satisfaction						
	Education		Age			Job title	
	Bachelor and below (1)	Above bachelor (2)	Below 30 (3)	30–40 (4)	Above 40 (5)	Manager (6)	Non-manager (7)
Log(pollution)	**−0.012**	**−0.043*** **	**−0.007**	**−0.033*** **	**−0.020**	**−0.036** **	**−0.014***
	(0.008)	**(0.013)**	**(0.012)**	**(0.011)**	**(0.013)**	**(0.014)**	**(0.008)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	14,566	6929	7991	7692	5812	5724	15,771
R-sq	0.040	0.066	0.022	0.046	0.032	0.043	0.049
Coefficient difference (p-value)	(1)=(2): 0.004***		(3)=(4): 0.062* (3)=(5): 0.329 (4)=(5): 0.377			(5)=(6): 0.097*	

Panel B. Firm characteristics				
	Average overall satisfaction			
	Blue state		Social capital	
	Blue state	Non-blue state	High (above median)	Low (below median)
	(1)	(2)	(3)	(4)
Log(pollution)	**−0.057*** **	**0.040**	**−0.085*** **	**−0.006**
	(0.016)	**(0.056)**	**(0.025)**	**(0.019)**
Controls	Yes	Yes	Yes	Yes
Firm & year FE	Yes	Yes	Yes	Yes
N	648	202	425	425
R-sq	0.112	0.168	0.117	0.133
Coefficient difference (p-value)	(1)=(2): 0.080*		(3)=(4): 0.009***	

***$p<0.01$, **$p<0.05$, *$p<0.1$.

Table 5
Pollution and employee sub-ratings.

	Career (1)	Compensation (2)	Senior leadership (3)	Work-life balance (4)	Recommendation (5)	CEO approval (6)
Log(pollution)	**−0.022** **	**−0.018*** **	**−0.020***	**−0.009**	**−0.014*** **	**−0.013*** **
	(0.010)	**(0.005)**	**(0.010)**	**(0.009)**	**(0.003)**	**(0.004)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm & year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	21,105	21,073	21,019	21,078	18,756	13,321
R-sq	0.038	0.011	0.025	0.022	0.046	0.065

***$p<0.01$, **$p<0.05$, *$p<0.1$.

in high-polluting firms are more pessimistic about career opportunities (Column 1), are less satisfied with the compensation (Column 2), and have worse assessments of senior leadership (Column 3). Consequently, those unsatisfied employees are less likely to recommend the employer to friends (Column 5) and to approve their CEO (Column 6).

4. Conclusion

Using employee satisfaction and firm pollution data, we find employees in more polluting firms are less satisfied. Moreover, we find the satisfaction of more well-educated employees, employees aged between 30 and 40, and management employees is more sensitive to their employers' environmental performance. Such employees, who are relatively more experienced and may possess valuable skills, represent key human capital that has a strong influence on organizational effectiveness and performance. Our study has an important policy implication: if firms are to build and maintain a strong and positive relationship with their employees, it is essential to improve environmental sustainability.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.econlet.2023.111402.

References

Barakat, S.R., Isabella, G., Boaventura, J.M.G., Mazzon, J.A., 2016. The influence of corporate social responsibility on employee satisfaction. Manag. Decis. 54, 2325–2339.
Bauman, C.W., Skitka, L.J., 2012. Corporate social responsibility as a source of employee satisfaction. Res. Organ. Behav. 32, 63–86.
Brumberg, H.L., Karr, C.J., Bole, A., Ahdoot, S., Balk, S.J., Bernstein, A.S., Byron, L.G., Landrigan, P.J., Marcus, S.M., Nerlinger, A.L., Pacheco, S.E., 2021. Ambient air pollution: health hazards to children. Pediatrics 147.
Chava, S., 2014. Environmental externalities and cost of capital. Manag. Sci. 60, 2223–2247.

Currie, J., Davis, L., Greenstone, M., Walker, R., 2015. Environmental health risks and housing values: evidence from 1,600 toxic plant openings and closings. Am. Econ. Rev. 105, 678–709.
Di Giuli, A., Kostovetsky, L., 2014. Are red or blue companies more likely to go green? Politics and corporate social responsibility. J. Financ. Econ. 111, 158–180.
Greening, D.W., Turban, D.B., 2000. Corporate social performance as a competitive advantage in attracting a quality workforce. Bus. Soc. 39, 254–280.
Huang, M., Li, P., Meschke, F., Guthrie, J.P., 2015. Family firms, employee satisfaction, and corporate performance. J. Corp. Finance 34, 108–127.
Jha, A., Cox, J., 2015. Corporate social responsibility and social capital. J. Bank Financ. 60, 252–270.
Jiang, L., Lin, C., Lin, P., 2014. The determinants of pollution levels: firm-level evidence from Chinese manufacturing. J. Comp. Econ. 42, 118–142.
Jing, C., Keasey, K., Lim, I., Xu, B., 2019. Financial constraints and employee satisfaction. Econ. Lett. 183.
Jing, C., Keasey, K., Lim, I. and Xu, B., 2023. Analyst coverage and corporate environmental policies. *J. Financ. Quant. Analy.*, Forthcoming.
Kim, J.S., Ra, K., 2022. Employee satisfaction and asymmetric cost behavior: evidence from Glassdoor. Econ. Lett. 219.
Levine, R., Lin, C., Wang, Z., 2018. Pollution and Human Capital Migration: Evidence from Corporate Executives (No. w24389). National Bureau of Economic Research.
Meyer, A., 2015. Does education increase pro-environmental behavior? Evidence from Europe. Ecol. Econ. 116, 108–121.
Riordan, C.M., Gatewood, R.D., Bill, J.B., 1997. Corporate image: employee reactions and implications for managing corporate social performance. J. Bus. Ethic. 16, 401–412.
Singhapakdi, A., Lee, D.J., Sirgy, M.J., Senasu, K., 2015. The impact of incongruity between an organization's CSR orientation and its employees' CSR orientation on employees' quality of work life. J. Bus. Res. 68, 60–66.
Tajfel, H., Turner, J.C., 1986. The Social Identity Theory of Intergroup Behavior, Psychology of Intergroup Relations. Nelson-Hall, Chicago, pp. 7–24.
Xu, Q., Kim, T., 2022. Financial constraints and corporate environmental policies. Rev. Financial Stud. 35, 576–635.