

Real Effects of Climate Policy

Financial Constraints and Spillovers

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Climate change is among the most intensely debated socioeconomic issues of current times. As a response to potential catastrophic risks from climate change, governments around the world are pushing for various regulations to curb greenhouse gas emissions. However, there is far from a consensus on optimal policy approaches, and as a result, climate policies are highly fragmented across the jurisdictions in which they are designed and implemented. More importantly, it is unknown whether such localized yet uncoordinated policies are able to internalize potential externalities that may impede efforts to address climate change as a global phenomenon or simply distort allocations in the economy. For example, at the beginning of 2013, California became the first and only state to put a comprehensive mandatory carbon regulation in place in the form of a cap-and-trade system that applies universally to all industrial greenhouse gas emissions. Exploiting the introduction of the California cap-and-trade rule, we investigate the internal resource-allocation responses by firms and the real

but unintended spillover effects of localized climate policies that arise from the importance of financial constraints. Our study analyzes the interplay between climate policy and firm behavior, and it informs policymakers regarding the effectiveness of climate regulation.

We use detailed data on plant-level greenhouse gas emissions from mandatory reporting to the U.S. Environmental Protection Agency hand-matched to Compustat data covering 2,806 industrial plants of 511 publicly listed firms over the period 2010–2015 to show that the 2013 California cap-and-trade rule has real spillover effects across the United States due to firm financial constraints. Specifically, we find that while financially constrained firms reduce greenhouse gas emissions from plants located in California by 33 percent relative to plants in other states, they significantly increase emissions of plants in other states by 29 percent compared with those owned by firms without a presence in California. In contrast, we find no evidence that financially unconstrained firms adjust emissions in response to the new regulation, either



Editor, **JEFFREY MIRON**, Harvard University and Cato Institute.

in California or in other states. The differences in responses between constrained and unconstrained firms are statistically significant across a host of financial constraint measures.

Our economic hypothesis is that financially constrained firms reallocate their emissions away from California to other states in the face of heightened regulatory costs that alter the relative net expected returns of plants. The cost of external capital for constrained firms renders profitable emission projects mutually exclusive, and so constrained firms reallocate their emissions away from California as net returns from emitting at alternative locations become relatively more attractive than the returns from continuing to emit in California after the regulatory change. Based on back-of-the-envelope calculations, the additional costs of emissions to constrained firms under the California cap-and-trade rule are equivalent to a 9 percent increase in tax expenses or a 4 percent increase in interest expenses. For the subset of firms that reallocate their emissions the most in response to the policy, the impact of the policy on costs is more severe, equivalent to a 15 percent increase in taxes or an 11 percent increase in interest expenses. We posit that this increase in regulatory cost distorts the ranking of net returns on capital across plants, incentivizing constrained firms to reallocate their emissions even though emitting in California might remain profitable.

Our conjecture and findings are consistent with criticisms by the media and small business owners that the regulatory costs from the cap-and-trade rule are not large enough to constitute significant deterrents to emissions for firms with deep pockets but raise the burden for players that are less financially capable, ultimately causing emission leakages. Anecdotal evidence also supports the economic importance of the spillover effects we uncover. For example, a major petroleum products company recovering from large operating losses after the financial crisis in the early 2010s strongly objected to the implementation of the cap-and-trade rule. It rallied other firms and warned citizens against the legislation with placards at their California gas pumps stating that it would cost jobs and consumer welfare. After the rule went into effect at the beginning of 2013, the company reduced the emissions of one of its largest Californian refineries by

8 percent over the next three years but sharply increased the emissions of some of its largest refineries in other states (Louisiana and Texas, for example) by more than 10 percent.

We explore the economic mechanisms for our results and find that constrained firms reallocate their emissions from their plants in California primarily to plants with similar functions in other states rather than to plants that play different roles within their organizational structure.

Constrained firms also reallocate their emissions more toward states that are nearby or less regulated, and they are more likely to do so when they have invested little in abatement technologies prior to the regulation. Finally, we provide evidence that firms affected by the regulation do not reduce their firmwide emissions. In fact, constrained firms increase their total emissions by as much as 21 percent. Overall, our main results suggest that firms perform corporate internal reallocation of pollutive activities and resources to avoid regulatory costs in the face of limited access to external financing, highlighting the hidden costs of environmental policies through financial channels.

Policy remedies to climate change are heatedly debated. Such policies have important implications for the behavior of industrial firms and how they respond to regulatory frictions, which are of key interest to financial economists. Understanding these effects is important to guide policymakers to internalize externalities that may otherwise result in unintended consequences and to coordinate solutions to climate change more effectively. Given the importance of a sound evaluation of the efficacy and real effects of climate policy, our research aims to take the debate on climate change, climate policy, and corporate environmental responsibility one step closer in this direction.

NOTE

This research brief is based on Söhnke M. Bartram, Kewei Hou, and Sehoon Kim, “Real Effects of Climate Policy: Financial Constraints and Spillovers,” *Journal of Financial Economics* 143, no. 2 (February 2022): 668–96, <http://dx.doi.org/10.2139/ssrn.3262211>.



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