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Climate change mitigation targets set by global firms: Overview and implications for renewable energy

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ABSTRACT

Global firms are increasingly adopting greenhouse gas mitigation targets in response to climate change. These targets serve as a spur for carbon mitigation initiatives, provide guidelines to select appropriate mitigation actions, and set the standards to measure the progress of the mitigation efforts. Despite their important functionalities, firm-level mitigation targets have rarely been studied. In this paper we aim to provide a comparative view on mitigation targets set by global firms across different countries and industrial sectors. The analysis focuses on four dimensions, i.e., adoption, metric, scope, and stringency. We find Japan far leads the other major countries in terms of target adoption, but the targets of Japanese firms are generally less stringent. Canadian firms are laggards in both target adoption and target stringency. The mitigation targets are also considerably uncommon among Australian firms. Firms in developing countries fall behind in target stringency and display a significantly greater divergence than developed countries in sectoral adoption rate. The European Union firms are most likely to cover the emissions in their supply chains in targets. Target stringency has substantially tightened from 2005 to 2012. For all the countries in this study, around 95% of the firm-level targets are more stringent than the Intended Nationally Determined Contributions submitted to the Paris Agreement. Setting mitigation target has a significant positive impact on both the likelihood of investing in renewable energy and the amount of investment in renewable energy. However, there is no evidence that more stringent targets lead to higher investment. These findings point to the most pressing issues with regard to corporate mitigation target-setting that policymakers and corporate management should address.

1. Introduction

Due to mounting pressures of climate change, firms around the world have started to set up greenhouse gas (GHG) mitigation targets to control the climate impact of their business activities. For firms, target-setting is a vital step in managing climate change risk and precedes specific mitigation actions [1]. The targets can serve as spur for future carbon mitigation initiatives, provide guidelines to select appropriate mitigation actions, stimulate research and eco-innovations, and set the standards to measure the progress of the mitigation efforts [2]. For policymakers, the way corporates set mitigation targets epitomizes the attitude and response of the private sector toward climate change, and is a crucial factor that policymakers should consider in formulating climate policies [3,4]. Further, how the firms design the mitigation

targets may influence the firms' use of renewable energy. Therefore, investigating the way the firms set mitigation targets is an important research topic with important implications for both the climate policy and the development of renewable energy. However, despite its importance, the subject of firm-level target-setting in coping with climate change has not been well addressed in literature [4].

Existing studies on target-setting have primarily focused on targets at the international, national, regional, and sectoral levels [5,6]. Little attention has been paid to mitigation targets set by firms. But consensus is building among policymakers and business leaders that firm-level targets can play critical roles in coping with climate change [4]. The United States (US) Environment Protection Agency (EPA) stresses that it intends to encourage firm-level target-setting through the Climate Leadership Awards, the most conspicuous awards program in the US for

Abbreviations: BAU, business as usual; CDP, Carbon Disclosure Project; CO₂e, carbon dioxide equivalent; EPA, Environment Protection Agency; ETS, Emissions Trading System; EU, European Union; GHG, greenhouse gas; INDC, Intended Nationally Determined Contribution; MtCO₂e, Million tons of carbon dioxide equivalents; SEC, Securities and Exchange Commission; UK, United Kingdom; US, United States

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excellent corporate and organizational leadership against climate change.¹ Science Based Target Initiative (<http://sciencebasedtargets.org>), as a joint program by the Carbon Disclosure Project (CDP), the World Wide Fund for Nature, the World Resources Institute, and the United Nations Global Compact, was set up in 2015 to promote scientific methods for setting firm-level targets. These moves signal a growing awareness of the policymakers and the private sector regarding the importance of firm-level target-setting.

In this study we aim to provide a comprehensive overview on the pattern of mitigation targets set by global firms. Specifically, we aim to answer the following three research questions. Is target-setting a common practice for firms in different countries and industrial sectors? What are the distinctive features of the targets? Are the firms' targets compatible with national mitigation goals? Do mitigation targets lead to more use of renewable energy? Answering these questions can serve three purposes. First, comparative analysis can help policymakers identify the leaders and laggards among the countries and sectors in target-setting, so policies can be tailored to induce desirable target-setting outcomes in specific countries and sectors. Second, the results can help policymakers assess the appropriateness of the national targets. If corporate targets are more stringent than national targets, it may imply that there is a potential to further tighten the national targets. Third, our study also serves as a stepping stone to further analysis of mitigation targets, such as the institutional and economic factors that can shape the mitigation targets.

We examine the mitigation targets set by 1495 prominent firms in the largest emitting countries in this study. We focus on analyzing the following four aspects of targets: adoption, metric, scope, and stringency. As in [7], target adoption corresponds to the status of whether a firm has established any emission targets or not. Target metric represents the way GHG emissions are measured, i.e., absolute measure or intensity measure [5]. Target scope defines the range of emissions covered in the target [8]. Target stringency refers to the quantity of emissions to be mitigated as specified by the target, and hence reflects to a certain degree the effectiveness of the target in mitigating climate change [9]. The data are provided by CDP, which builds one of the largest datasets of firm-level climate strategies by major corporates around the world [10]. The countries under study include major developed countries (the US, the European Union (EU) members, Japan, Canada and Australia), and major developing countries (Brazil, China, India, South Africa, and Turkey). The firms in the sample are typically among the largest and most notable ones in each country. This distinguishes our study from research on small and medium-sized firms, which display significant difference in engagement with the climate change problem compared to the large firms [11].

Our study makes four contributions to literature. First, while there do exist a few studies on firm-level mitigation targets, they all focus on a small number of firms in specific countries or sectors, such as supermarkets in United Kingdom (UK) [2] and firms in Netherlands [6]. Through this study, we greatly expand the research scope to global corporates in major emitting countries across all industrial sectors. Second, prior research lacks in connecting the firm-level targets to national goals. We assess the effectiveness of the firm targets by benchmarking firm targets against the Intended Nationally Determined Contributions (INDCs) submitted to the Paris Agreement. The agreement and the INDCs lay out the foundations and plans for international community to move forward on climate change mitigation and adaptation. Third, we investigate the regulatory and economic reasons behind the distribution of targets, and discuss the most pressing target-setting issues that different countries should address. Finally and most importantly, we analyze the relationship between firms' target-setting and their use of renewable energy, a topic that has never been studied

in literature. While there is recent evidence that a firm's target stringency influences its investment in GHG mitigation projects [9], it is unclear whether and how the mitigation target affects the use of renewable energy. Our study deepens the understanding of the development of renewable energy from a corporate perspective.

The rest of this study proceeds in the following way. In Section 2, we review literature related to corporate target-setting. Section 3 illustrates the institutional and economic context around corporate target-setting. Section 4 describes the data sample and method. Section 5 presents the results. Section 6 discusses implications of the results. Section 7 concludes with limitations of this study and future research directions.

2. Literature review

Setting GHG mitigation targets is a central issue in global efforts against climate change. There is a substantial literature on setting international, national, and subnational GHG mitigation targets [4]. Existing studies have examined the methodology for formulating the targets, feasibility of the established targets, approaches for achieving the targets, and economic and environmental consequences of the targets [12–14]. Some recent studies have also investigated sectoral targets. Hamidi-Cherif et al. [15] examine the economic implications of sectoral targets for developing countries. Kuramochi [16] assesses the mitigation potential of the Japanese iron and steel sector, and finds the sector is likely to overachieve the voluntary target it sets for 2030. However, firm-level target-setting has received little attention so far [4].

Various factors can drive the firms to set climate change mitigation targets. Under the framework of institutional theory, firms obtain legitimacy by conforming to the expectations of social players including institutions and stakeholders [17]. The pressures to meet the social expectations drive the firms to adopt specific managerial practices such as target-setting to achieve alignment of corporate and social values [18]. Beside the legitimization reason, profitability is also a driving factor since target-setting is associated with better performance [19].

This study of corporate mitigation targets is related to the literature on the study of firm-level actions in response to climate change. Since the theoretically “first-best” solution of a global carbon pricing system often fails in practice due to political and economic constraints [20], firm-level actions have emerged as an increasingly critical element of the human society's efforts against climate change [1,21]. Persson and Rockström [22] observe that stakeholder pressures and perceptions of risks/opportunities on climate change have fueled a rising willingness of business managers to take actions to curb GHG emissions. This is evidenced by a wide range of mitigation actions employed by the firms, such as reporting and monitoring the climate change performance, using green product design to reduce carbon footprint, replacing conventional energy with renewable energy, and improving eco-efficiency to save energy input [23–28].

Despite the abundance of research on firms' responses to climate change, corporate target-setting remains a less studied topic in literature. Existing studies are either outdated or limited in the breadth of firms. Using a sample of large multinational companies obtained from CDP, Kolk and Pinkse [21] find that more than half of the companies have set up targets to control direct GHG emissions and the target-setting procedures exhibit a great divergence among firms in different sectors. But the study is dated more than ten years ago. Gouldson and Sullivan [2] study the efficacy of voluntary targets set by 7 major supermarkets in UK and find that those targets are in line with the national goals set by policymakers. A few comparative studies have also been carried out but are restricted to a small number of firms in specific countries and sectors. Sullivan and Gouldson [8] compare the targets set by 11 retailers in the US and 9 retailers in the UK, and find UK retailers set more stringent reduction targets and are more prone to addressing emissions in the supply chains. Focusing on firms in Netherlands, Rietbergen et al. [6] analyzes in detail the target-setting

¹ <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-goal-setting>, accessed on September 1st, 2017.

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