Tax Planning Under Pressure: The Impact of Carbon Emission Management Post-Paris Agreement

Abstract

We examine the Paris Agreement's impact on corporate tax planning across a global dataset. Firms actively managing carbon emissions increase tax planning to offset compliance costs, with a stronger effect among historically aggressive tax planners. Channel analyses suggest financial constraints and reputational concerns partly explain this relationship. Firms with higher agency costs and analyst scrutiny are more likely to engage in tax planning to balance environmental commitments with profitability. Country-level heterogeneity shows stronger effects in civil law countries. By integrating the natural resource-based view and profit maximization principle, this study advances understanding of climate policies' influence on tax planning.

Keywords: Paris Agreement; Carbon emission management; Tax planning; Legitimacy theory; Natural resource-based view (NRBV); Profit maximization principle

1. Introduction

In the wake of increasing global concerns about climate change, the Paris Agreement stands as a landmark international initiative designed to limit global warming and mitigate climate change effects (United Nations 2015; Carbon Disclosure Project 2017). This agreement, along with subsequent national regulations, has compelled firms worldwide to manage and reduce their carbon emissions (Aldy et al. 2023). As businesses adapt, the financial burden imposed by these carbon management strategies, such as increased operational costs and investment in green technologies, may incentivize firms to seek avenues for financial relief through tax planning. However, despite the substantial implications of the Paris Agreement on corporate environmental strategies, the effects on firm-level financial behavior, particularly tax planning, remain underexplored (Mbanyele and Muchenje 2022; Degryse et al. 2023). Considering that the Paris Agreement puts an incremental financial stress on firms (Aldy et al. 2023), and since tax planning has been documented as a way to meet financial resource needs through internally generated cash flows (e.g., Edwards et al. 2016), it becomes interesting to examine whether firms with carbon emission management use tax planning as a coping strategy in a transitioning economy.

In this paper, we examine whether and how the Paris Agreement impacts firms' tax planning within an international context. Our theoretical approach presents two competing perspectives: legitimacy theory and a combination of the natural resource-based view (NRBV) and the profit maximization principle. These perspectives allow us to analyze the effects of the Paris Agreement on firms' tax planning behavior from both a societal and strategic standpoint.

From the legitimacy theory perspective, firms with improved carbon management following the Paris Agreement may be less likely to engage in tax planning. This is because societal expectations increasingly align with greater transparency and a fair contribution to

public resources. Tax payments, akin to other forms of corporate social responsibility (CSR), are a way for firms to legitimize their operations and align with stakeholder expectations (Lanis and Richardson 2012, 2015; Davis et al. 2016). In this view, the firm's obligation to pay its fair share of taxes is a fundamental part of its societal responsibility (Freedman 2003). Engaging in aggressive tax planning, while legally permissible, can undermine social and economic structures and risk significant reputational damage (Landolf 2006; Lanis and Richardson 2015). Thus, firms committed to environmental responsibility tend to be dissuaded from adopting tax planning strategies, as these strategies appear inconsistent with, and potentially counteract, the positive effects associated with enhanced environmental engagement (Lanis and Richardson 2015). Under this theory, firms that seek to maintain legitimacy in an environment of increasing climate awareness are incentivized to enhance their societal contributions through increased tax payments.

Conversely, from a strategic management perspective, the Paris Agreement may increase the marginal benefit of tax planning, encouraging firms to adopt such strategies to gain a competitive advantage while balancing environmental commitments. The NRBV and the profit maximization principle together provide a rationale for this behavior. The NRBV suggests that building and sustaining distinct environmental capabilities, such as reducing carbon emissions, can enhance a firm's competitive edge (Hart 1995; Lengnick-Hall and Wolff 1999; Journeault 2016). Metrics like carbon emission reduction or energy efficiency improvements can serve as direct indicators of these capabilities, contributing to firm performance (Michalisin and Stinchfield 2010; Alam et al. 2019; Khanra et al. 2022).

The transition to less carbon-intensive operations and the development of environmentally friendly products involve significant costs, necessitating efficient resource management (Compagnie et al. 2023). The profit maximization principle aligns with this strategic approach, emphasizing that firms must balance social responsibilities, such as environmental

sustainability, with profitability (Friedman 1962). In this context, tax planning emerges as a cost-effective method to free up internal resources for environmental investments, complementing sustainability initiatives (Cook et al. 2017; Campbell et al. 2021; Lee et al. 2023). By minimizing tax expenditures, firms can redirect resources to continue their environmental efforts while maintaining profitability, which aligns more closely with their strategic business goals and provides a competitive advantage (Lash and Wellington 2007; Davis et al. 2016). We argue that the Paris Agreement intensifies the necessity to redirect resources via tax planning by imposing stricter environmental targets and significantly increasing compliance-related costs. While the marginal benefit of tax planning always exists, firms facing increased compliance costs may view tax savings as an essential mechanism to fund environmental investments. By minimizing tax liabilities, firms can reallocate resources to meet regulatory demands and maintain financial stability (Compagnie et al. 2023). Based on this reasoning, we propose that the Paris Agreement positively influences firms' tax planning behavior in a carbon-constrained economy.

Ultimately, these two perspectives—legitimacy versus strategic resource allocation—present contrasting arguments regarding the role of tax planning in the aftermath of the Paris Agreement. On one hand, legitimacy theory posits that tax payments and environmental responsibility act as complements, both aimed at enhancing societal legitimacy. On the other hand, the NRBV and profit maximization principle suggest that tax planning and carbon management may act as substitutes, with firms employing tax strategies to compensate for the increased financial burden of environmental investments. By examining these competing perspectives, we seek to provide a deeper understanding of the relationship between climate regulation and corporate tax planning.

This study employs a comprehensive international sample and uses a quasi-experimental difference-in-differences (DID) design to empirically test the competing hypotheses about the

effect of the Paris Agreement on corporate tax planning. After controlling for year- and firm-fixed effects and a vector of firm-, industry-, and country-level factors, identified from prior international studies (e.g., Hu et al. 2023) on tax planning, we find that firms with carbon emissions management following the Paris Agreement experience a significant increase in tax planning across all measures, implying an increase in unintended tax planning consequences, rather than a decrease, post the implementation of the Paris Agreement.

We conduct a battery of tests to confirm the robustness of our empirical results. We assess the validity of the parallel trend assumption underlying the DID method, that is, in the absence of the Paris Agreement, there is no significant difference in tax planning between the treatment and control firms. Specifically, we conduct a trend analysis and two placebo regressions restricting the analysis to the pre- and post-agreement period, respectively. The evidence shows that there are no pre- or post-trends in the data. The parallel trend assumption holds in all three tests. To mitigate the concern about cross-sectional variation in error terms and the confounding effects of other macroeconomic shocks, apart from clustering the standard errors at the firm level in our main model, we also use an alternative cluster approach that cluster standard errors by country. Further, we account for potential sample bias by using a constant sample that requires firms appearing in both the pre- and post-agreement periods, alternative test windows including the [–3, +3] window and [–4, +4] window instead of the [–5, 5] window (where year 0 is the reform year) used in our main tests. We also apply entropy balancing to adjust for systematic and random inequalities in representation without sacrificing observations (Hainmueller 2012). We supplement our analysis by assessing whether our results are sensitive to several alternative measures of tax planning (i.e., cash-scaled tax planning, book-tax conformity, and tax planning over five years). Our results are robust to all of these sensitivity analyses.

We mitigate the concern regarding the choice of the DID model by using alternative DID specifications. First, we explore an alternative window (i.e., 3-year averages) to identify agreement-induced changes in carbon emissions management, in order to mitigate the concern that using the change in averaging emissions over five years before and after the agreement may reduce the treatment effect. Second, we identify firms in countries that had not entered into the Paris Agreement before 2019 as the control group, and firms from the other countries as the treatment group. Specifically, there are three countries (i.e., Bermuda, the Cayman Islands, and the Isle of Man) that did not sign the agreement, and three countries (i.e., Colombia, Kenya, and the Republic of Trinidad and Tobago) that ratified the agreement in 2019. We find our results remain qualitatively similar using the two alternative DID specifications.

Having established a robust positive effect of the Paris Agreement for firms with reduced carbon emissions on their tax planning, we conduct several additional tests to further explain the results. Our heterogeneity analysis shows that the Paris Agreement's impact on tax planning is more pronounced among firms with a history of aggressive tax strategies. Our channel analyses confirm our prediction that the Paris Agreement affects firms' tax planning by imposing pressures on firms' financial resource status and reputational concerns, thus transferring part of the increased costs of the carbon management back to society via reduced tax contributions. Moreover, our cross-sectional analyses find that the potential of the Paris Agreement to incentivize firms to conduct tax planning is pronounced in firms with high agency costs, with higher analysts' coverage, and located in countries with civil law systems.

This study provides incremental contributions to the extant literature in several ways. First, this study uncovers an unforeseen economic response from firms when they are faced with such a large-scale environmental policy as the Paris Agreement.[1] The research on the Paris

[1] Aside from the Paris Agreement, we acknowledge that there are other cross-country climate policies, such as the European Union Emission Trading Scheme (EU ETS). However, studies assessing the actual effects of these

Agreement from the perspective of microeconomic subject-firms is sparse (e.g., Mbanyele and Muchenje 2022; Bolognesi and Burchi 2023; Degryse et al. 2023; Pang et al. 2023; Chatjuthamard et al. 2024), which mainly focuses on the effect of the Agreement at a macro level. A few studies document significant real effects of enacting the Paris Agreement, including enhanced financial incentives for green firms by green banks (Degryse et al. 2023), the increased sensitivity of corporate social responsibility (CSR) performance to climate change risk (Mbanyele and Muchenje 2022), reduced total factor productivity in the short term, elevated total factor productivity in the long term (Pang et al. 2023), and more favorable market reactions for firms (Chatjuthamard et al. 2024). We extend this line of research considering the real effects of the Paris Agreement on firms' tax planning, an important but previously ignored corporate decision in this setting. Specifically, our findings show that the Agreement, through the channels of financial needs and reputational concerns, incentivizes firms to engage in tax planning to optimize resource allocation. This highlights how an agreement aimed at increasing societal welfare also inadvertently shapes firms' tax behaviors.

Second, by integrating the NRBV and the profit maximization principle, this study contributes to the literature on the strategic impacts of carbon emissions. Prior research has explored market reactions and the long-term financial effects of carbon emissions and carbon disclosure (e.g., Griffin et al. 2017; Jung et al. 2018; Bui et al. 2020), but there remains a lack of consensus on the effects of carbon emission levels and environmental initiatives on firm

policies on emissions reduction are still limited, and the vast majority focus on Europe (see Green (2021) for a review). An imperative limitation of these studies is that their settings are rather narrow, drawing conclusions based primarily on one region, and focus on a relatively small set of companies. For example, Compagnie et al. (2023) examine the EU ETS's effects on tax avoidance. Our study extends their analysis at least in two different directions. First, they conduct their study in a relatively narrow setting and employ a different regime, specifically 351 publicly listed firms headquartered in the EU, while our study is an international setting, improving the universal applicability of the research findings (Linnenluecke et al. 2016). Second, Compagnie et al. (2023) identify their treatment group using the most highly polluting firms as the treated group. When they repeat the regression by studying the behavior of all the treated firms in the post-intervention period, they find no statistically significant coefficient loading. In contrast to compare the least and most polluting firms, we identify our treatment group based on whether firms have reduced their average carbon emissions since the Agreement's enactment.

performance. Moreover, previous studies have not fully applied theoretical frameworks to demonstrate how competitive strategies might influence firm behavior via carbon emission management (Gallego-Álvarez et al. 2015). By combining the NRBV and profit maximization perspectives, our study adds a new dimension to this inconclusive literature from the perspective of tax planning. It reveals that, for environmentally responsible firms, pursuing competitive advantages through carbon emissions management can also influence their tax behaviors. In addition, this study offers insights into the mixed findings on the relationship between CSR and tax planning (Marques et al. 2024), using the lens of climate policy-driven carbon emission management.

Finally, by utilizing an international context, this study avoids the limitations of drawing conclusions from a single-region analysis (Linnenluecke et al. 2016) and illustrates how the effects of the Paris Agreement vary across firms and countries based on their pre-agreement characteristics and institutional environments. Specifically, we find that the Paris Agreement's influence on tax planning is significantly stronger for firms with a history of aggressive tax strategies, highlighting the role of prior tax planning experience in shaping corporate responses to regulatory changes. We also provide evidence that firm-level factors, such as internal managerial pressures (e.g., high agency costs) and external market pressures (e.g., analyst coverage), drive firms to adopt tax planning strategies to manage the financial burden of environmental commitments while maintaining short-term financial stability. Furthermore, our analysis reveals significant country-level heterogeneity, showing that civil law countries, characterized by more stringent regulatory enforcement, amplify the impact of climate goals on corporate tax planning activities. These findings offer valuable insights for policymakers, emphasizing the need to consider both country-specific institutional contexts and firm-level factors to mitigate the unintended consequences of increased tax planning on societal benefits.

2. Background and Context

2.1.Global Efforts and Regulatory Pressure

On 12 December 2015, 195 countries reached an agreement on a new climate treaty, known as the Paris Agreement.[2] This agreement marked a significant shift in the UN-sponsored climate negotiations, transitioning from the top-down mandates of previous protocols to a more flexible framework that emphasizes national discretion and accountability, thereby pressuring firms to reduce their greenhouse gas (GHG) emissions (United Nations 2015).[3] After adopting the UN Framework Convention on Climate Change (UNFCCC) in 1992, which aimed at stabilizing GHG concentrations in the atmosphere to prevent dangerous human-induced climate change, the international community has spent over two decades negotiating legally binding regulations to control global emissions (UNFCCC 2021). Despite the establishment of the 1997 Kyoto Protocol and instruments such as the Clean Development Mechanism, emissions of the main GHGs (carbon dioxide, methane and nitrous oxide) have continued to rise. Unlike the Kyoto Protocol, which set mandatory emission reduction targets,[4] the Paris Agreement introduces a system of nationally determined contributions (NDCs). This system recognizes the primacy of domestic politics in climate policy and allows countries to set their own climate action plans, which are then subject to international review and comparison. This approach aims to foster global ambition through a process of transparent reporting and peer pressure, often referred to as 'naming and shaming' (Dannenberg et al. 2023).

According to the United Nations (2024, p.1), 'the real action is happening at the country level, or even at the city or local level',[5] where governments and businesses are actively working to reduce their carbon footprints and improve climate resilience. The Agreement

[2] In all, 196 parties, comprising 195 countries and the European Union, had agreed to the deal.
[3]For more information, please visit the UN official website: https://unfccc.int/process-and-meetings/the-paris-agreement.
[4] The 2009 Copenhagen conference continued to focus on establishing mandatory emission reductions and intended to create a more effective successor treaty to the Kyoto Protocol, collapsed in acrimony (Falkner 2016).
[5] For more information, please refer to https://www.un.org/sustainabledevelopment/climate-change/.

requires all countries to periodically submit their NDCs, establishing a formal mechanism not only for planning but also for evaluating progress on these commitments. This continuous upgrade and review process ensures that there is no regression in efforts (Dannenberg et al. 2023).

To ensure corporate compliance with emission reduction targets, various countries have implemented stringent regulations and incentives that compel firms to integrate carbon management into their strategic planning.[6] An example is the European Union's European Green Deal, which not only aims to make Europe the first climate-neutral continent by 2050 but also sets specific legislative measures to achieve this goal (European Commission 2020). One key component of this deal is the EU ETS, which has been significantly expanded under the Green Deal. The system now covers sectors like aviation and maritime, and introduces tighter emission cap schedules. These measures directly impact corporate operations by requiring companies to either innovate to reduce their carbon output or purchase emission rights, fostering a rapid shift towards greener technologies (European Commission n.d.). In addition, the introduction of the Carbon Border Adjustment Mechanism (CBAM) aims to level the playing field for European companies by imposing a carbon price on imports of certain goods from outside the EU, thus preventing carbon leakage and encouraging global partners to strengthen their climate policies (European Commission 2023). Similarly, China, as the world's largest emitter, has made significant strides towards establishing its national carbon market. China conducted several regional pilot carbon trading schemes, starting in cities and

[6] For instance, Japan's Green Growth Strategy supports innovations in renewable energy, hydrogen, and energy efficiency measures to achieve a 46% reduction in greenhouse gas emissions from 2013 levels by 2030 (Ministry of Foreign Affairs of Japan 2021). India's strategy includes enhancing its installed electric capacity from non-fossil fuel sources to about 50% by the same year (Ministry of Environment, Forest, and Climate Change, Government of India 2022). New Zealand's Climate Change Response (Zero Carbon) Amendment Act targets net-zero emissions of all greenhouse gases, except biogenic methane, by 2050, with specific methane reduction goals (Ministry for the Environment, New Zealand 2019). In the ASEAN region, Indonesia and Malaysia have specific targets; Indonesia aims to reduce emissions by up to 41% with international support by 2030, while Malaysia targets a 45% reduction in emissions intensity of GDP relative to 2005 levels by the same year (ASEAN Secretariat 2021).

provinces like Beijing, Shanghai, Guangdong, and Shenzhen. By the time the national market was launched, it was prepared to include 2,162 power generation companies covering approximately 4.5 billion tons of carbon dioxide emissions. These efforts are a part of China's broader strategy to cap carbon emissions by 2030 and achieve carbon neutrality by 2060 (UNFCCC 2021).

2.2.Corporate Responses to Carbon Emission Management Pressure

As international and domestic regulations tighten, many firms proactively manage their environmental initiatives, such as carbon emission management (Ioannou et al. 2016). The transformation in corporate commitment to carbon reduction became more pronounced following the Paris Agreement (Aldy et al. 2023). Aldy et al. (2023) state that initially, few companies engaged in meaningful carbon reduction, but the Paris Agreement catalyzed a substantial increase in the number of companies committing to decarbonization through platforms like the Carbon Disclosure Project (CDP), which is underpinned by data from the CDP's 2017 annual report. According to the 2017 CDP report, there has been a notable rise in the adoption of science-based targets, signaling a substantial strategic pivot towards sustainability among corporations (Carbon Disclosure Project 2017).

Effective carbon management involves not only tracking and reporting emissions but also implementing strategies to reduce them (Matsumura et al. 2014). Common techniques include adopting renewable energy sources, enhancing energy efficiencies, and engaging in carbon offset programs. However, with the growing adoption of these carbon management practices, companies face financial barriers in implementing effective carbon management practices (Kannan et al. 2022). Bhatia et al. (2024) note that firm management has expressed concerns over budget constraints and the high costs associated with implementing digital technologies aimed at achieving carbon neutrality. As one firm pointed out, 'The financing of the project

was identified as the greatest risk. If credit financing did not work out—if we did not get a loan, it would be rather difficult for us to introduce digital technologies in order to achieve carbon neutrality' (Bhatia et al. 2024: 11).

The management of financial burdens associated with carbon management initiatives and regulatory compliance is increasingly debated (Jung et al. 2018), highlighting the need for firms to meet climate targets while also enhancing financial health.

3. Literature Review and Hypotheses Development

Drawing on legitimacy theory, firms with improved carbon management after the Paris Agreement might decrease their tax planning activities, as tax planning is perceived as socially irresponsible and could undermine the positive image they aim to foster (Lanis and Richardson 2012, 2015; Davis et al. 2016). A firm has societal responsibilities, including paying its fair share of taxes as lawfully imposed by the government (Freedman 2003). While minimizing corporate taxes could be a legitimate activity within the framework of the law to maximize profits, firms that engage in actions solely aimed at minimizing taxes may be viewed as detracting from social welfare (Hoi et al. 2013; Davis et al. 2016). Such behavior is perceived as socially irresponsible, which can lead to reputational damage and loss of stakeholder support (Lanis and Richardson 2015; Marques et al. 2024). Consequently, socially and environmentally responsible firms are more cautious about adopting tax planning strategies, as these could contradict their social and environmental commitments (Lanis and Richardson 2012, 2015). Given that carbon emission management is a crucial aspect of corporate social responsibility (CSR), firms might be incentivized to increase their tax payments following the Paris Agreement to align more closely with societal expectations. Ultimately, legitimacy theory suggests that tax payments and environmental responsibility act as complements, both aimed at enhancing societal legitimacy.

H1a: *After the implementation of the Paris Agreement, firms that actively manage their carbon emissions are less likely to engage in tax planning compared to those that have not.*

Conversely, drawing from the NRBV (Hart 1995) and the profit maximization principle (Friedman 1962), we argue that when the Paris Agreement imposes an exogenous shock to firms' carbon management, the marginal benefits of tax planning increase, making firms more likely to implement previously forgone tax planning strategies to maintain a competitive advantage.

The NRBV, specifically adapted for environmental management, posits that building and sustaining distinct environmental capabilities, such as effective carbon management, can enable firms to transform environmental responsibility into a source of strategic advantage (Hart 1995; Lengnick-Hall and Wolff 1999). Under this perspective, climate change presents a competitive challenge rather than a moral obligation. As environmental resources become scarcer and more valuable, firms that commit to environmental performance are positioned to achieve higher brand value, enhanced stakeholder approval, and a competitive advantage in the marketplace (Michalisin and Stinchfield 2010; Alam et al. 2019; Khanra et al. 2022). With the implementation of carbon neutrality targets, firms are increasingly required to proactively manage their carbon footprint to meet regulatory demands (Aldy et al. 2023). Moreover, stakeholders—including investors, customers, and employees—are increasingly concerned about a firm's carbon footprint, adding additional pressure on firms to demonstrate environmental responsibility (Melville and Whisnant 2014). Consequently, carbon emission management has become a valuable and non-substitutable capability that contributes to a firm's competitive advantage (Hart 1997; Gallego-Álvarez et al. 2015).

Despite the growing trend toward environmental preservation, the primary mission of firms remains profit maximization (Friedman 1962), which inherently conflicts with the costs

of implementing carbon emission management strategies. Reducing carbon emissions requires significant financial resources, which can reduce a firm's profitability and push it to seek cost-cutting measures to preserve its profit margins (Armstrong et al. 2012; Gaertner 2014). Carbon management often involves substantial investments in monitoring emissions, setting reduction targets, acquiring or developing less carbon-intensive technologies, engaging in R&D to create low-carbon goods and services, and reducing the overall carbon footprint of employees and operations (Matsumura et al. 2014). Firms must therefore balance the challenge of mitigating climate change (Weinhofer and Hoffmann 2010) with the financial pressures posed by the increased costs of carbon management (Gallego-Álvarez et al. 2015). This dual challenge underscores the tension and possible synergies between environmental and financial objectives. As such, firms that manage climate risks while also pursuing profit-oriented goals are more likely to achieve a competitive advantage in a carbon-constrained environment (Lash and Wellington 2007).

Tax planning emerges as a practical solution to this dual challenge. Although tax planning carries potential reputational damage and legal risks, firms now also face reputational and legal consequences if they fail to meet carbon neutrality targets. Before the Paris Agreement, firms had some leeway in avoiding the internalization of carbon emission costs, allowing local communities or governments to bear the financial burden of pollution (Jung et al. 2018). Now, firms are increasingly required to internalize these costs (Clarkson et al. 2015), meaning they are directly responsible for the environmental consequences of their operations. As such, minimizing tax liabilities allows firms to generate internal funds without compromising operational efficiency, thereby effectively managing the costs of carbon reduction (Cook et al. 2017; Campbell et al. 2021; Lee et al. 2023; Wang et al. 2025). Unlike traditional cost-cutting measures—such as reducing R&D, advertising, or staff—which may harm long-term growth, tax planning offers a cost-effective source of capital for financing

environmental projects while maintaining operational stability. This potential financial relief becomes even more attractive as firms balance their increased environmental commitments with profit-maximization goals (Friedman 1962). As a result, the Paris Agreement amplifies the perceived marginal benefits of tax planning. Firms are incentivized to engage in previously forgone tax strategies to optimize resource allocation and maintain competitiveness without sacrificing financial stability.

Ultimately, the NRBV and profit maximization principle suggest that tax planning and carbon management may act as substitutes, with firms employing tax strategies to compensate for the increased financial burden of environmental investments. When the costs (or benefits) of generating funds through tax planning are lower (or higher) than those of non-compliance (or compliance) with climate policies, firms are more likely to resort to tax planning to meet their financial needs for carbon management. Based on this framework, we expect that, given the increasing value of carbon management as a firm resource and the heightened pressures after the Paris Agreement, firms will perceive the marginal benefits of tax planning as higher. Consequently, these firms will be more willing to execute these previously forgone tax planning strategies.

H1b: *After the implementation of the Paris Agreement, firms that actively manage their carbon emissions are more likely to engage in tax planning compared to those that have not.*

4. Research Design

4.1. Sample and Data

The data are collected from several sources. We first obtain data on firms' carbon emissions through the investor survey of the CDP for the years starting from 2011. We then merge the carbon emissions data with firm's financial data from Compustat Global and analyst coverage from IBES. We then obtain country-level data from the World Bank database and

statutory corporate income tax rates around the world from the OECD tax database. The Paris Agreement was adopted on December 12, 2015, but it officially became effective on November 4, 2016, after being ratified by enough countries to represent at least 55% of global greenhouse gas emissions.[7] Thus, this study utilizes 2016 as the year of implementation, and employs the [−5, +5] year window.[8] The sample period starts in 2011 and ends in 2021.

We follow the literature and exclude firms in the financial industries (Standard Industrial Classification codes 6000–6999) as they tend to be highly regulated (Li et al. 2023). To mitigate the concern about the large sample bias and considering the U.S.'s changing political landscape,[9] following previous international studies (e.g., Zhong 2018), we exclude U.S. firms to avoid an overly unbalanced sample across countries. Furthermore, we require all firms in the DID analysis to have at least one year of data for the pre- and post-policy periods to ensure a constant sample (Dyreng et al. 2016; Hu et al. 2023). Finally, we winsorize effective tax rates prior to being adjusted by statutory tax rates, and all other continuous variables at the 1st and 99th percentiles (Dyreng et al. 2016). These criteria leave a sample of 41,199 firm years from 4,976 unique firms around the world for the period 2011–2021.

4.2. Variables and Measurement

Dependent Variables. Following previous studies on tax planning (e.g., Atwood et al. 2012; Hu et al. 2023), our primary measure of tax planning, *TAXPLAN*, is calculated based on *GAAP ETRs*, *Cash ETRs*, and *ETRs*, and adjusted by each country's statutory corporate income tax rate. Specifically, *TAXPLAN* is measured as the country's statutory corporate income tax

[7] In 2015, 195 countries and the European Union signed on.

[8] The selection of a five-year window for analysis constitutes a deliberate trade-off, recognizing that shorter periods may not fully capture the agreement' effects, whereas longer spans could be influenced by other concurrent events. However, our findings (untabulated) remain consistent when employing alternative timelines of three or four years before and after the implementation of the Paris Agreement.

[9] On June 1, 2017, President Donald Trump announced the U.S.'s withdrawal from the Paris Agreement. The formal withdrawal process began on November 4, 2019, and the U.S. officially exited the agreement on November 4, 2020. On January 20, 2021, President Joe Biden signed an executive order to rejoin the Paris Agreement, with the U.S. officially re-entering on February 19, 2021.

rate less *GAAP ETRs*, *Cash ETRs*, and *ETRs*, respectively. Because one-year measures of tax planning are highly volatile and are not predictive of a firm's long term tax planning strategy (Dyreng et al. 2008), to capture the long-term effect of carbon emission policy on corporate tax planning, we follow prior studies (e.g., Hu et al.2023) and sum each element in computing *TAXPLAN* over the previous two years and the current year.

We also employ several alternative tax planning measures, including the measures scaled by cash flows (*Cash-flow scaled TAXPLAN*), 5-year measures (*long-term TAXPLAN*), and book-tax conformity (*BTC*). The cash-flow scaled measure helps rule out possible effects of changes in accounting policies that affect pre-tax income but not tax planning behavior. The five-year measure allows us to explore the sustained impact of carbon management strategies on tax planning over a more extended period, reflecting more accurately the long-term strategic adjustments firms might make in response to evolving environmental regulations and stakeholder pressures. Further, following Atwood et al. (2012), we define *BTC* as the flexibility that a firm has to report taxable income that is different from pre-tax book income in a given country year. Higher values of these tax planning measures indicate a greater degree of tax planning.

Key Explanatory Variable. The main explanatory variable used to test our hypotheses is *Post_Pressure* × *Change in Carbon Emissions*, representing the interaction of two variables: *Post_Pressure* and *Change in Carbon Emissions*. *Post_Pressure* is an indicator variable that equals one beginning in the year (i.e., year 2016) in which the Paris Agreement becomes effective, and zero otherwise. Following the prior DID design papers (e.g., Jackson et al. 2014; Wang et al. 2024), we create *Change in Carbon Emissions* to identify agreement-induced changes in carbon emissions management.[10] The firms that experience decreases in carbon

[10] Since the Paris Agreement itself may affect emissions, there could be a feedback loop between the agreement and emissions. The correlation between carbon emission reduction and tax planning might have existed even

emissions post-agreement are considered to have received a more intense influence (i.e., greater exposure to the effects of the agreement). *Change in Carbon Emissions* is an indicator variable that equals one if a firm's average level of *Carbon Emissions* over the five years after agreement is less than the average level of *Carbon Emissions* over the five years before the agreement, and zero otherwise.[11]

Control Variables. A set of firm- and country-level control variables are identified following the tax planning literature (e.g., Campbell et al. 2021; Hu et al. 2023). The firm-level variables are (1) firm size (*SIZE*), measured as the natural logarithm of prior year total assets; (2) capital intensity (*PPE*), measured as property, plant, and equipment divided by prior year total assets; (3) financial leverage (*LEV*), measured as the ratio of total debt to prior year total assets; (4) return on assets (*ROA*), measured as pre-tax income divided by prior year total assets; (5) inventory (*INVENTORY*), measured as inventory scaled by prior year total assets; (6) capital expenditures scaled by prior year total assets (*CAPEX*); (7) depreciation and amortization expenses (*DEPRECIATION*), measured as depreciation expense divided by prior year total assets; (8) intangible assets (*INTANG*) scaled by prior year total assets; (9) an indicator variable for non-zero international operating income, to capture multinational operations (*MULT*). At the country-level, we include each country's tax system (*Statutory Corporate Tax Rate*) and GDP growth (*GDPG*). Appendix A provides detailed variable definitions.

4.3. Model Specification

before the Paris Agreement. To mitigate this concern, our trend analysis and two placebo tests suggest that, prior to the Paris Agreement, there was no pre-existing trend where carbon emission management was systematically linked to tax planning behavior. This indicates that the relationship we are testing (between agreement-induced carbon emission management and tax planning post-Paris Agreement) is likely driven by the policy intervention (the Paris Agreement) rather than some pre-existing correlation.

[11] Averaging emissions over five years before and after the agreement may introduce noise or reduce the treatment effect, especially if firms had significant emissions changes in a specific year, we explore an alternative window (i.e., 3-year averages) to check the robustness. We find the results (untabulated) remain similar to our main results.

To examine the impact of carbon management post-Paris Agreement, we estimate the following regression model:

$$TAXPLAN = \beta_0 + \beta_1\, Post\_Pressure \times Change\ in\ Carbon\ Emissions + \sum \beta_m Control\ Variables + \sum \beta_k Year\ fixed\ effects + \sum \beta_l Firm\ fixed\ effects + \varepsilon \quad (1)$$

In Equation (1), *TAXPLAN* is the dependent variables calculated based on ETRs, GAAP ETRs, and Cash ETRs, and adjusted by each country's statutory corporate income tax rate. The variable of interest is the interaction term *Post_Pressure* × *Change in Carbon Emissions*. Its coefficient estimate is the main DID estimator, which captures the changes (from the pre- to post-agreement periods) in the dependent variable for firms conducting carbon emissions management relative to the corresponding changes in tax planning for firms in the control group. Similar to previous studies (e.g., Lel and Miller 2015), the variables *Post_Pressure* and *Change in Carbon Emissions* become redundant and are dropped because we employ firm and year fixed effects.

We include year and firm fixed effects to control for the within-firm and within-year variations in firm tax planning. We include firm-clustered standard errors throughout tests in our manuscript. Clustering the standard errors at the country level yields similar results (untabulated). All of the continuous variables are winsorized at the top and bottom one percentile to mitigate the effects of outliers.

5. Results Analysis

5.1. Main Analyses

Table 1 reports the summary statistics of the main variables used in our regression analyses. On average, the actions taken under GAAP by these firms (through various legal tax planning strategies and deductions) have reduced their tax by 1.4% relative to what it would have been under the statutory tax rate, based on their earnings before tax. Similarly, when we

use the broader *ETRs* to calculate *TAXPLAN*, firms, on average, reduce their tax by 3.5%. However, on average, the *Cash ETRs* is slightly above the statutory rate by approximately 2.3%. Consistent with prior studies on tax planning (e.g., Compagnie et al. 2023), the average statutory corporate income tax rate in our sample is 25.8% and displays a large standard deviation.

[Insert Table 1 here]

Table 2 reports results for *TAXPLAN_GAAPETR* in column (1), for *TAXPLAN_CashETR* in column (2), and for *TAXPLAN_ETR* in column (3). Consistent with our expectation, the coefficients on *Post_Pressure*× *Change in Carbon Emissions* (β_1) are significantly positive across all specifications, supporting *H1b*. This is consistent with prior studies. A recent study (Cooper et al. 2018) shows that although environmental regulation may indirectly spill over to other CSR actions that are more easily adjustable in the short run, potentially altering other corporate actions such as increasing tax contributions (Hoi et al. 2013; Lanis and Richardson 2015), the commitment to carbon management cannot be offset by being socially responsible in other areas, indicating the necessity of carbon emissions management under such circumstances. Economically, these results indicate that after controlling for other factors, firms that managed their carbon emissions increase their tax planning on average by 1.7%, 1.4%, and 1.7% for *TAXPLAN_GAAPETR*, *TAXPLAN_CashETR*, *TAXPLAN_ETR*, respectively, post the implementation of the Paris Agreement. These findings suggest that firms transfer part of the increased costs of carbon emission management resulting from the carbon-neutral targets back to society by lowering their tax contributions.

[Insert Table 2 here]

We follow prior research (e.g., Wang et al. 2022) and perform two analyses to assess the parallel trends assumption underlying our DID approach, which assumes that the treatment and

control groups exhibit similar trends in tax planning in the absence of the Paris Agreement. We first conduct a trend analysis to assess the dynamic effects of the Paris Agreement on firms' tax planning in the years surrounding the implementation of the agreement. This analysis also allows us to investigate whether the agreement has a long-lasting effect on tax planning. We generate nine indicator variables to indicate whether a given year is 4 more years (*Year -4plus*), 3 years (*Year –3*), 2 years (*Year –2*), or 1 year (*Year –1*) before implementation of the Paris Agreement, or the year of implementation (*Year 0*), the first year (*Year 1*), second year (*Year 2*), third year (*Year 3*), or fourth year and subsequent years (*Year 4plus*) after the implementation of the Paris Agreement. We drop *Year* –1 to avoid collinearity. We then interact *Change in Carbon Emissions* with each of the eight temporal indicator variables, rather than with just one indicator variable *Post_Pressure* as we did in our main analyses. Table 3 presents the dynamic effects of the Paris Agreement on firms' tax planning. Across all tax planning measures, we find insignificant coefficients on the interaction terms between *Change in Carbon Emissions* and the pre-agreement indicator variables. This indicates that the increase in tax planning for the treatment group is unlikely due to a pre-agreement trend.

[Insert Table 3 here]

In our second analysis, we conduct falsification tests to further assess the parallel trends assumption. In the first (second) placebo test, we restrict our sample to the *pre-agreement* periods and set a pseudo-reform year as three (two) years prior to the actual implementation year. We define an indicator variable *After agreement_Pseudo1* (*After agreement_Pseudo2*) to indicate whether a given year is the year following the pseudo-agreement year. Table 4 presents the results. We find that the coefficients on *After agreement_Pseudo1* × *Change in Carbon Emissions* and *After agreement_Pseudo2* × *Change in Carbon Emissions* are all insignificant at conventional levels, indicating that our treatment and benchmark samples exhibit a similar trend in corporate tax planning in the absence of the Paris Agreement.

[Insert Table 4 here]

5.2. Supplementary Analyses

Our main findings show the existence of a corporate tax planning response to the pressures of carbon emission management following the Paris Agreement. In this section, we further analyze the mechanisms underlying this relationship. We argue that firms managing their carbon emissions increase their tax planning to offset costs and finance climate-friendly projects. Thus, we investigate whether firms' financial resource status can partly explain the observed relationship. Additionally, we explore the reputational concerns channel, because reputational concerns are both influential for tax planning engagement and carbon emission management (Edwards et al. 2016; Austin and Wilson 2017), thus probably influencing the cost-benefit trade-offs of allocating resources in our scenario. Furthermore, recognizing the influence of analysts and management in guiding tax planning (e.g., Ayers et al. 2018; Compagnie et al. 2023), we examine firm-level heterogeneity by investigating the roles of analyst coverage and agency cost. Finally, we assess the impact of the Paris Agreement on tax planning conditional on country-level institutions.

5.2.1. Pre-Agreement Tax Planning Heterogeneity

To further examine heterogeneity in firms' responses, we partition the sample based on pre-agreement tax planning behavior. Firms with a history of aggressive tax planning are classified as aggressive tax planners if their average *TAXPLAN* is above the 25th percentile during the pre-agreement period, and non-aggressive otherwise. Across all three outcome variables, we find that the Paris Agreement's impact on tax planning is more pronounced among firms with a history of aggressive tax strategies. These firms likely possess the expertise and resources to further optimize tax planning in response to the increased financial pressures

imposed by the agreement. In contrast, the effect is weaker and insignificant for non-aggressive planners, possibly due to reputational concerns or limited internal capacity for tax optimization.

[Insert Table 5 here]

5.2.2. Channel Analysis – Financial Resource Status

To determine whether financial resource status explains why firms engaging in carbon emissions management also engage in tax planning, we first consider two proxies for financial constraints (i.e., the *KZ index* and *WW index*). We classify firms into financially constrained and unconstrained groups based on the *KZ index* or *WW index*. To be specific, we split our sample based on whether the mean financial constraints index (i.e., *KZ index* and *WW index*) in the pre-agreement period is greater than the median of its cohort. The underlying rationale is that firms facing greater financial constraints suffer more from the pursuit of carbon-neutral targets, thereby creating less flexibility for carbon management projects and tending to internally generate funds (Campbell et al. 2021). Panels A and B in Table 5 document a significantly larger corporate tax planning response among the more financially constrained firms across both indices.

We then explore a proxy for the extent to which firms can absorb the increasing costs of carbon management (i.e., *Profit Margin*). Following Compagnie et al. (2023), we divide our sample based on the three-year averaged operating profit margins (*Profit Margin*). We expect that firms with lower operational cash flows, compared to those with higher cash flows, are more likely to be constrained by limited resources and, therefore, resort to tax planning for support. Table 5 Panel C shows a significant interaction term *Post_Pressure*× *Change in Carbon Emissions* for the subset of firms with lower profit margins across all tax planning measurements. The corporate tax planning response after the Paris Agreement is significantly greater for firms with smaller profit margins.

These results provide suggestive evidence that financial resource status can (partly) explain why firms with carbon emissions management exhibit more tax planning behavior following the Paris Agreement.

[Insert Table 6 here]

5.2.3. Channel Analysis – Reputational Concerns

The reputational costs associated with both conducting tax planning and non-compliance with climate policy are influential (Austin and Wilson 2017; Cooper et al. 2018). On the one hand, an important cost that affects a firm's decision on tax planning is the risk of reputational damage (Austin and Wilson 2017). On the other hand, studies show that environmental irresponsibility, such as higher carbon emissions, can harm a company's reputation as well (e.g., Cooper et al. 2018), resulting in consumer boycotts, demands for lower product prices, or decreased sales (Mohr and Webb 2005). Thus, reputation cost is an influential element in the cost-benefit trade-offs of relying on tax planning to support carbon emissions reduction initiatives.

We partition the sample into two categories: firms in business-to-consumer (*B2C*) industries and others (Eccles et al. 2014).[12] Specifically, firms in the 'consumer goods' are considered highly sensitive to public perception because they rely primarily on individual consumers to maintain demand for their products and services (Lev et al. 2010). Firms in all other industries are classified as having low sensitivity to public perception. The results are presented in Table 6. We find that the coefficient of the interaction term (*Post_Pressure*× *Change in Carbon Emissions*) is positive and significant for firms in industries with higher

[12] The following four-digit SIC codes are assigned to the consumer goods group: 0000–0999, 2000–2399, 2500–2599, 2700–2799, 2830–2869, 3000–3219, 3420–3429, 3523, 3600–3669, 3700–3719, 3751, 3850–3879, 3880–3999, 4813, 4830–4899, 5000–5079, 5090–5099, 5130–5159, 5220–5999, 7000–7299, 7400–9999.

sensitivity to reputational concerns but insignificant for firms in other industries, suggesting that reputational concerns play a significant role in the cost-benefit trade-offs of allocating resources following the Paris Agreement.

[Insert Table 7 here]

5.2.4. Balancing Long-Term Environmental Goals Against Short-Term Financial Targets

Although the results suggest that firms with carbon emission management tend to increase their tax planning after the Paris Agreement, it is important to acknowledge that the effects may not be uniform across firms. For instance, the Paris Agreement represents a significant regulatory shift, mandating countries and consequently their firms to commit to stricter carbon emission standards and enhance their environmental responsibilities. However, firms often face a fundamental tension between long-term sustainability goals and short-term financial pressures, especially when their financial flexibility is limited. This section discusses how different internal and external pressures shape the tax planning responses of firms as they navigate these conflicting objectives.

From an agency theory perspective, managers and shareholders often have misaligned priorities, particularly when it comes to reconciling immediate profitability with long-term investments (Jensen and Meckling 1976). While shareholders typically prioritize the long-term value of the firm, managers, particularly those in firms with high agency costs, may be incentivized to deliver short-term results. The introduction of carbon regulations by the Paris Agreement intensifies these conflicts by imposing additional financial burdens, particularly for firms that are significant carbon emitters. Managers in such firms often face increased pressure from investors, who demand a “carbon premium” to compensate for the risks associated with high levels of emissions (Griffin et al. 2017; Bolton and Kacperczyk 2021). These pressures are most acute in firms with higher agency costs, where the management's interests may diverge

from the broader goal of value maximization. Under these conditions, tax planning becomes a pragmatic strategy for managers—providing the means to alleviate investor concerns by reducing the direct financial burden imposed by environmental commitments without compromising the firm's short-term performance.

In this context, the results of our analysis suggest that firms with high agency costs are more likely to engage in increased tax planning activities following the Paris Agreement. These firms are responding to the dual pressures of maintaining profitability while also committing to stricter environmental regulations. The empirical evidence, summarized in Table 7, indicates a significant interaction effect between the regulatory pressures brought by the Paris Agreement and the tax planning strategies employed by firms, especially those with higher agency costs.

[Insert Table 8 here]

Furthermore, the influence of external pressures, such as analyst coverage, also plays a crucial role in shaping managerial behavior. Analysts, as key stakeholders, often encourage firms to meet short-term cash flow targets, exerting pressure on managers to take actions that enhance the firm's immediate financial performance (Freeman 1984; Ayers et al. 2018). The introduction of stringent carbon regulations by the Paris Agreement requires countries and their firms to allocate considerable resources toward sustainability initiatives, which can be at odds with the goal of maximizing near-term profitability. In such cases, tax planning serves as an effective tool to generate internal funds without adversely affecting other key operational areas. By minimizing tax liabilities, managers can improve the firm’s cash flow position, thereby allowing it to meet analyst expectations and maintain its attractiveness to investors (Campbell et al. 2021).

Our empirical findings support this argument, as firms with higher analyst coverage exhibit a stronger tendency to engage in tax planning in response to the Paris Agreement.

Specifically, the positive and significant coefficients of the three-way interaction term—*Post_Pressure* × *Change in Carbon Emissions* × *High Analyst Coverage*—highlight the critical role of analyst pressure in driving corporate tax behavior. These results, presented in Table 8, show that firms under heightened analyst scrutiny are more likely to adopt tax planning strategies as a mechanism for addressing the immediate financial pressures posed by environmental regulation.

[Insert Table 9 here]

The results presented in this section underscore the complex interplay between long-term environmental commitments and short-term financial targets. The Paris Agreement, while promoting sustainable practices, introduces additional financial burdens that force firms to reevaluate their resource allocation strategies. For firms with high agency costs or significant analyst coverage, tax planning provides a mechanism to balance these competing demands—enabling them to maintain financial stability while fulfilling their regulatory obligations.

5.2.5. Country-level Heterogeneity

We examine whether the impact of the Paris Agreement on tax planning varies by legal origin, as the effectiveness of implementing carbon-neutral targets may depend on the rigor of enforcement and the ease of monitoring tax activities. Common law countries typically provide greater flexibility in the interpretation and enforcement of laws, whereas civil law countries enforce more codified statutes with greater legislative control (Sarkar 2011). This suggests that civil law countries may enforce the Paris Agreement more stringently, thereby increasing institutional pressure on firms to comply and integrate climate policies deeply into their strategies. The resulting higher operational costs could motivate firms to adopt more aggressive tax planning to offset these expenses. Additionally, more robust institutional frameworks in civil law countries may enhance the visibility of tax planning activities, leading to better

detection and reporting. Thus, we expect that the Paris Agreement might have a more pronounced influence in civil law countries.

We use whether the 'origin' of a country's legal system falls into the 'common law', or 'civil law' systems to test this conjecture (La Porta et al. 1997, 1998). The interaction term *Post_Pressure* × *Reduced Carbon Emissions*, as shown in Columns (1), (3), and (5) of Table 9, is positive and significant only in the *Civil Law* subsample. These results support our conjecture, suggesting that the Paris Agreement leads to a more pronounced increase in tax planning activities among firms in civil law countries. Alternatively, the observed correlation between stringent institutional controls and increased tax planning may also be influenced by the enhanced monitoring mechanisms in civil law countries. Therefore, higher observed tax planning levels may not be solely due to increased firm activity but also reflect better oversight.

[Insert Table 10 here]

6. Other Robustness Checks

In this section, we perform additional tests, aside from the trend analysis conducted in section 6.1, to strengthen our confidence in the robustness of our findings. Our inferences remain unchanged in all of these tests. To start with, we supplement our analysis by assessing whether our results are sensitive to the following alternative measures of tax planning: (1) *Cash-flow scaled TAXPLAN*; and (2) Book-tax conformity (*BTC*). As shown in Table 10 Columns (1) and (2), the coefficients on *Post_Pressure* × *Change in Carbon Emissions* are significant and positive in both columns. Furthermore, in models (3)-(5), we sum each element in computing *TAXPLAN* over five years. Our inferences remain unchanged using these alternative measures of tax planning.

Observations of firms that reduced their carbon emissions and those that have not are unbalanced in the sample. Following prior literature (e.g., Kuang et al. 2021), we apply entropy

balancing as a preprocessing method to achieve covariate balance within the binary treatment – specifically, being subject to the carbon emissions management (*Change in Carbon Emissions* = 1) in our study. The control sample consists of observations without carbon emission management (*Change in Carbon Emissions* = 0). By adjusting unit weights through entropy balancing, we can effectively adjust for "systematic and random inequalities in representation" without sacrificing observations (Hainmueller 2012, 26). The results (reported in Table 11) show that our inference remains unchanged.

We also utilize an alternative DID setting to validate robustness. We identify firms in countries that had not entered into the Paris Agreement before 2019 as the control group. Specifically, there are three countries (i.e., Bermuda, the Cayman Islands, and the Isle of Man) that did not sign the agreement, and three countries (i.e., Colombia, Kenya, and Trinidad and Tobago) that ratified the agreement in 2019. As the control group is relatively smaller than the treatment group, we also disclose the results after applying entropy balancing. Our inferences remain unchanged using this setting.

[Insert Tables 11, 12 & 13 here]

7. Conclusion

Despite the global significance of the Paris Agreement in addressing climate change, our understanding of its implications on corporate financial behavior, particularly tax planning, remains limited. Taking advantage of the Paris Agreement that places climate change high on the political agenda, enhancing public awareness of climate-related risks and strengthening policymakers' soft commitment to a stricter enforcement of climate policy (Degryse et al. 2023), we provide the following main empirical findings: First, corroborating the theoretical perspectives of NRBV and the profit maximization principle, we find that the Paris Agreement intensifies tax planning activities through both direct financial pressures and indirect

reputational concerns. Second, our cross-sectional analyses suggest that tax planning adjustments are particularly pronounced among firms with a history of aggressive tax planning, high agency costs, and intense analyst coverage. Third, our findings indicate that country-level institutional factors significantly shape corporate tax strategies. Firms in civil law countries, characterized by stringent regulatory enforcement, show significant increases in tax planning activities.

Overall, our study contributes to the literature that explores the consequences of a large-scale environmental policy – the Paris Agreement – from the perspective of microeconomic subject-firms, showing the effect of the Paris Agreement on corporate tax planning. Our study corresponds to calls for further research on the outcome perspective of environmental policies, which is still scarce and underrepresented (Christensen et al. 2021). This study also adds to the stream of literature on the variation in carbon emissions by corroborating the theoretical perspectives of NRBV and the profit maximization principle. We offer insights into how tax planning and carbon management may act as substitutes, with firms employing tax strategies to compensate for the increased financial burden of environmental investments. This approach provides a deeper understanding of the relationship between climate regulation and corporate tax planning. Lastly, by utilizing an international context, we avoid the limitations of single-region analysis (Linnenluecke et al. 2016), showing how the effects of the Paris Agreement vary across firms and countries based on their pre-agreement characteristics and institutional environments.

In addition, this study provides useful insights for policymakers and regulators who aim to promote more sustainable and financially balanced corporate practices. Our results indicate that public authorities should not presume that firms with enhanced carbon emission management will behave ethically and responsibly in the other CSR areas, such as tax contributions. Firms managing their carbon emission levels may be involved in corporate

misbehavior and thus transfer part of the increased costs of the carbon management back to society. The decrease in tax contribution raises an important concern regarding the implementation of climate policies as a standalone means. Therefore, this study provides a potential warning signal to policymakers.

Nevertheless, our study is not without limitations. As with all studies on regulatory reforms, especially those conducted in a cross-country setting, a key concern about our research is the potential confounding effects arising from other concurrent economy-wide shocks. To address this concern, we have done a series of robustness tests, such as utilizing alternative samples, conducting a trend analysis, and using two placebo tests. However, to the end that these techniques cannot fully rule out potential confounding effects, our findings may still partially result from other macro-economic shocks or the changes in national institutions. We acknowledge this as a potential weakness of our study and leave this as an open question for possible future research. Moreover, although our study provides evidence within the international setting, we urge future research to provide evidence from different institutional settings, which would lead to a better understanding of the real effects of the Paris Agreement.

REFERENCES

Alam, M.S., Atif, M., Chien-Chi, C. and Soytaş, U., 2019. Does corporate R&D investment affect firm environmental performance? Evidence from G-6 countries. *Energy Economics*, *78*(2019), pp.401-411.

Aldy, J.E., Bolton, P., Halem, Z. and Kacperczyk, M.T., 2023. Behind schedule: The corporate effort to fulfill climate obligations. *Journal of Applied Corporate Finance*, Forthcoming.

Armstrong, C.S., Blouin, J.L. and Larcker, D.F., 2012. The incentives for tax planning. *Journal of Accounting and Economics*, *53*(1-2), pp.391-411.

ASEAN Secretariat. 2021. ASEAN State of Climate Change Report. Retrieved from https://asean.org/wp-content/uploads/2021/10/ASCCR-e-publication-Correction_8-June.pdf

Atwood, T.J., Drake, M.S., Myers, J.N. and Myers, L.A., 2012. Home country tax system characteristics and corporate tax avoidance: International evidence. *The Accounting Review*, *87*(6), pp.1831-1860.

Austin, C.R. and Wilson, R.J., 2017. An examination of reputational costs and tax avoidance: Evidence from firms with valuable consumer brands. *The Journal of the American Taxation Association*, *39*(1), pp.67-93.

Ayers, B.C., Call, A.C. and Schwab, C.M., 2018. Do analysts' cash flow forecasts encourage managers to improve the firm's cash flows? Evidence from tax planning. *Contemporary Accounting Research*, *35*(2), pp.767-793.

Bhatia, M., Meenakshi, N., Kaur, P. and Dhir, A., 2024. Digital technologies and carbon neutrality goals: An in-depth investigation of drivers, barriers, and risk mitigation strategies. *Journal of Cleaner Production, 451*(2024), pp.141946.

Bolognesi, E. and Burchi, A., 2023. The impact of the ESG disclosure on sell-side analysts' target prices: The new era post Paris agreements. *Research in International Business and Finance*, *64*, p.101827.

Bolton, P. and Kacperczyk, M., 2021. Do investors care about carbon risk?. *Journal of Financial Economics*, *142*(2), pp.517-549.

Bui, B., Moses, O. and Houqe, M.N., 2020. Carbon disclosure, emission intensity and cost of equity capital: multi-country evidence. *Accounting & Finance*, *60*(1), pp.47-71.

Campbell, J.L., Goldman, N.C. and Li, B., 2021. Do financing constraints lead to incremental tax planning? Evidence from the Pension Protection Act of 2006. *Contemporary Accounting Research*, *38*(3), pp.1961-1999.

Carbon Disclosure Project. 2017. China Edition: Climate Change Report 2017. Retrieved from https://cdn.cdp.net/cdp-production/cms/reports/documents/000/002/866/original/China-edition-climate-change-report-2017-EN.pdf

Chatjuthamard, P., Singh, S., Jiraporn, P. and Lee, S.M., 2024. Climate change exposure, shareholder wealth, and the adoption of the Paris agreement: A text-based approach. *International Review of Financial Analysis*, *94*(2024), pp.103327.

Chen, C. and Lai, S., 2012. Financial constraint and tax aggressiveness. *Journal of Financial Economics*, *2012*(11), pp.1-41.

Christensen, H.B., Hail, L. and Leuz, C. 2016. Capital-market effects of securities regulation: Prior conditions, implementation, and enforcement. *The Review of Financial Studies, 29*(11), pp.2885–2924.

Christensen, H.B., Hail, L. and Leuz, C. 2021. Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies*, *26*(3), pp.1176-1248.

Compagnie, V., Struyfs, K. and Torsin, W., 2023. Tax avoidance as an unintended consequence of environmental regulation: Evidence from the EU ETS. *Journal of Corporate Finance, 82*, p.102463.

Cook, K.A., Moser, W.J. and Omer, T.C., 2017. Tax avoidance and ex ante cost of capital. *Journal of Business Finance & Accounting*, *44*(7-8), pp.1109-1136.

Cooper, S.A., Raman, K.K. and Yin, J., 2018. Halo effect or fallen angel effect? Firm value consequences of greenhouse gas emissions and reputation for corporate social responsibility. *Journal of Accounting and Public Policy*, *37*(3), pp.226-240.

Dannenberg, A., Lumkowsky, M., Carlton, E.K. and Victor, D.G., 2023. Naming and shaming as a strategy for enforcing the Paris Agreement: The role of political institutions and public concern. *Proceedings of the National Academy of Sciences*, *120*(40), p.e2305075120.

Davis, A.K., Guenther, D.A., Krull, L.K. and Williams, B.M., 2016. Do socially responsible firms pay more taxes?. *The Accounting Review*, *91*(1), pp.47-68.
Degryse, H., Goncharenko, R., Theunisz, C. and Vadasz, T., 2023. When green meets green. *Journal of Corporate Finance*, *78*(2023), pp.102355.
Dyreng, S.D., Hanlon, M. and Maydew, E.L., 2008. Long-run corporate tax avoidance. *The Accounting Review*, *83*(1), pp.61-82.
Dyreng, S.D., Hoopes, J.L. and Wilde, J.H., 2016. Public pressure and corporate tax behavior. *Journal of Accounting Research*, *54*(1), pp.147-186.
Eccles, R.G., Ioannou, I. and Serafeim, G., 2014. The impact of corporate sustainability on organizational processes and performance. *Management Science*, *60*(11), pp.2835-2857.
Edwards, A., Schwab, C. and Shevlin, T., 2016. Financial constraints and cash tax savings. *The Accounting Review*, 91(3), pp.859-881.
El Ghoul, S., Guedhami, O. and Kim, Y. 2017. Country-level institutions, firm value, and the role of corporate social responsibility initiatives. *Journal of International Business Studies, 48*(3): 360–385.
European Commission., 2020. The European Green Deal. Retrieved from https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
European Commission., 2023. Carbon Border Adjustment Mechanism (CBAM). Retrieved from https://trade.ec.europa.eu/access-to-markets/en/news/carbon-border-adjustment-mechanism-cbam
European Commission., n.d. *Development of the EU ETS from 2005 to 2020*. Retrieved from https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/development-eu-ets-2005-2020_en
Falkner, R., 2016. The Paris Agreement and the new logic of international climate politics. *International Affairs, 92*(5), pp.1107-1125.
Freedman, J., 2003. Tax and corporate responsibility. *Tax Journal, 695*(2), pp. 1–4.
Friedman, M., 1962. Capitalism and freedom. University of Chicago Press.
Gaertner, F.B., 2014. CEO after-tax compensation incentives and corporate tax avoidance. *Contemporary Accounting Research*, *31*(4), pp.1077-1102.
Gallego-Álvarez, I., Segura, L. and Martínez-Ferrero, J., 2015. Carbon emission reduction: The impact on the financial and operational performance of international companies. *Journal of Cleaner Production*, *103*(2015), pp.149-159.
Graham, J.R., Hanlon, M., Shevlin, T. and Shroff, N., 2014. Incentives for tax planning and avoidance: Evidence from the field. *The Accounting Review*, *89*(3), pp.991-1023.
Green, J.F., 2021. Does carbon pricing reduce emissions? A review of ex-post analyses. *Environmental Research Letters*, *16*(4), pp.043004.
Griffin, P.A., Lont, D.H. and Sun, E.Y., 2017. The relevance to investors of greenhouse gas emission disclosures. *Contemporary Accounting Research*, 34(2), pp.1265-1297.
Hainmueller, J. 2012. Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis 20*(1), pp.25–46.
Hart, S.L., 1995. A natural-resource-based view of the firm. *Academy of Management Review*, *20*(4), pp.986-1014.
Hart, S.L., 1997. Beyond greening: strategies for a sustainable world. *Harvard Business Review*, *75*(1), pp.66-77.
Healy, P.M. and Palepu, K.G., 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, *31*(1-3), pp.405-440.
Hoi, C.K., Wu, Q. and Zhang, H., 2013. Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities. *The Accounting Review*, *88*(6), pp.2025-2059.
Hu, J., Li, S. and Shevlin, T., 2023. How does the market for corporate control impact tax avoidance? Evidence from international M&A laws. *Review of Accounting Studies*, *28*(1), pp.340-383.
Ioannou, I., Li, S.X. and Serafeim, G., 2016. The effect of target difficulty on target completion: The case of reducing carbon emissions. *The Accounting Review*, *91*(5), pp.1467-1492.
Jackson, C.K., Johnson, R. and Persico, C., 2014. *The effect of school finance reforms on the distribution of spending, academic achievement, and adult outcomes* (No. w20118). National Bureau of Economic Research.

Jensen, M.C. and Meckling, W.H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), pp. 305-360.
Journeault, M., 2016. The influence of the eco-control package on environmental and economic performance: A natural resource-based approach. *Journal of Management Accounting Research*, *28*(2), pp.149-178.
Jung, J., Herbohn, K. and Clarkson, P., 2018. Carbon risk, carbon risk awareness and the cost of debt financing. *Journal of Business Ethics, 150*, pp.1151-1171.
Kannan, D., Solanki, R., Kaul, A. and Jha, P.C., 2022. Barrier analysis for carbon regulatory environmental policies implementation in manufacturing supply chains to achieve zero carbon. *Journal of Cleaner Production, 358*(2022), pp.131910.
Khanra, S., Kaur, P., Joseph, R.P., Malik, A. and Dhir, A., 2022. A resource-based view of green innovation as a strategic firm resource: Present status and future directions. *Business Strategy and the Environment*, *31*(4), pp.1395-1413.
Kuang, Y.F., Lee, G. and Qin, B., 2021. Whistleblowing allegations, audit fees, and internal control deficiencies. *Contemporary Accounting Research*, *38*(1), pp.32-62.
Lamont, O., Polk, C. and Saá-Requejo, J., 2001. New evidence on measuring financial constraints: moving beyond the KZ index. *The RAND Journal of Economics*, *32*(1), pp.101-128.
Landolf, U., 2006. Tax and corporate responsibility. *International Tax Review, 29*(July), 6–9.
Lanis, R., Richardson, G., 2012. Corporate social responsibility and tax aggressiveness: an empirical analysis. *Journal of Accounting and Public Policy, 31*(1), pp.86–108.
Lanis, R., Richardson, G., 2015. Is corporate social responsibility performance associated with tax avoidance? *Journal of Business Ethics, 127*(2), pp.439–457.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W., 1997. Legal determinants of external finance. *The Journal of Finance*, *52*(3), pp.1131-1150.
La Porta, R. and Lopez-de-Silanes, F., 1998. Capital markets and legal institutions. *Beyond the Washington consensus: Institutions matter*, *73*(92).
Lash, J. and Wellington, F., 2007. Competitive advantage on a warming planet. *Harvard Business Review, 2007*(March), pp. 1-11.
Lee, Y., Shevlin, T. and Venkat, A., 2023. The effect of tax avoidance on capital structure choices. *Journal of the American Taxation Association*, *45*(1), pp.91-115.
Lel, U. and Miller, D.P., 2015. Does takeover activity cause managerial discipline? Evidence from international M&A laws. *The Review of Financial Studies*, *28*(6), pp.1588-1622.
Lengnick-Hall, C.A. and Wolff, J.A., 1999. Similarities and contradictions in the core logic of three strategy research streams. *Strategic Management Journal*, *20*(12), pp.1109-1132.
Lev, B., Petrovits, C. and Radhakrishnan, S., 2010. Is doing good good for you? How corporate charitable contributions enhance revenue growth. *Strategic Management Journal*, *31*(2), pp.182-200.
Li, Q., Maydew, E.L., Willis, R.H. and Xu, L., 2023. Taxes and director independence: Evidence from board reforms worldwide. *Review of Accounting Studies*, *28*(2), pp.910-957.
Linnenluecke, M.K., Smith, T. and McKnight, B., 2016. Environmental finance: A research agenda for interdisciplinary finance research. *Economic Modelling*, *59*(2016), pp.124-130.
Marques, M., Montenegro, T.M. and Bras, F.A., 2024. Tax Avoidance and Corporate Social Responsibility: A Meta-Analysis. *Journal of the American Taxation Association*, *46*(1), pp.137–156.
Matsumura, E.M., Prakash, R. and Vera-Muñoz, S.C., 2014. Firm-value effects of carbon emissions and carbon disclosures. *The Accounting Review*, *89*(2), pp.695-724.
Mbanyele, W. and Muchenje, L.T., 2022. Climate change exposure, risk management and corporate social responsibility: Cross-country evidence. *Journal of Multinational Financial Management*, *66*(2022), pp.100771.
Melville, N.P. and Whisnant, R., 2014. Energy and carbon management systems: organizational implementation and application. *Journal of Industrial Ecology*, *18*(6), pp.920-930.
Michalisin, M.D. and Stinchfield, B.T., 2010. Climate change strategies and firm performance: an empirical investigation of the natural resource-based view of the firm. *Journal of Business Strategies*, *27*(2), pp123-149.
Mills, L., M. M. Erickson, and E. L. Maydew. 1998. Investments in tax planning. *Journal of the American Taxation Association 20*(1), pp.1–20.

Ministry of Ecology and Environment of the People's Republic of China., 2021. China's carbon market running smoothly: Ministry. Xinhua. Retrieved from https://english.mee.gov.cn/News_service/media_news/202108/t20210819_858347.shtml
Ministry of Environment, Forest, and Climate Change, Government of India., 2022. Updated First Nationally Determined Contribution. Retrieved from https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf
Ministry for the Environment, New Zealand., 2019. Summary of the Climate Change Response (Zero Carbon) Amendment Bill. Retrieved from https://environment.govt.nz/assets/Publications/Files/climate-change-response-zero-carbon-amendment-bill-summary.pdf
Ministry of Foreign Affairs of Japan., 2021. Green Growth Strategy Through Achieving Carbon Neutrality in 2050. Retrieved from https://www.mofa.go.jp/files/100153688.pdf
Mohr, L.A. and Webb, D.J., 2005. The effects of corporate social responsibility and price on consumer responses. *Journal of Consumer Affairs*, *39*(1), pp.121-147.
Pang, J., Liu, Z., Hou, W. and Tao, Y., 2023. How does the Paris Agreement affect firm productivity? International evidence. *Finance Research Letters*, *56*(2023), pp.104150.
Rego, S.O. and Wilson, R., 2012. Equity risk incentives and corporate tax aggressiveness. *Journal of Accounting Research*, *50*(3), pp.775-810.
Reijnders, L., 2003. Policies influencing cleaner production: the role of prices and regulation. *Journal of Cleaner Production*, *11*(3), pp.333-338.
Sarkar, P., 2011. Common Law vs. Civil Law: Which system provides more protection to shareholders and promotes financial development. *Journal of Advanced Research in Law and Economics*, *2*(04), pp.143-161.
Scholes, M., M. Wolfson, M. Erickson, M. Hanlon, E. Maydew, and T. Shevlin. 2020. *Taxes and business strategy: A planning approach*, 6th ed. Westmont, IL: Cambridge Business Publishers
Stafford, S.L., 2002. The effect of punishment on firm compliance with hazardous waste regulations. *Journal of Environmental Economics and Management*, *44*(2), pp.290-308.
United Nations. 2015. Adoption of the Paris Agreement. Retrieved from https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf.
United Nations. 2024. Retrieved from https://www.un.org/sustainabledevelopment/climate-change/
United Nations Framework Convention on Climate Change (UNFCCC). 2021. China's Achievements, New Goals and New Measures for Nationally Determined Contributions. Retrieved from https://unfccc.int/sites/default/files/NDC/2022-06/China%E2%80%99s%20Achievements%2C%20New%20Goals%20and%20New%20Measures%20for%20Nationally%20Determined%20Contributions.pdf
Wang, K.T., Cui, L., Zhu, N.Z. and Sun, A., 2024. Board Gender Diversity Reforms Around the World: The Impact on Corporate Innovation. *Organization Science*, *Articles in Advance*, pp. 1–22.
Wang, K.T., Liu, Y. and Wang, W.W. 2022. Government control, regulatory enforcement actions, and the cost of equity. *European Accounting Review, 31*(2): 449-493.
Wang, X., Chan, K.F., Chang, M., Shan, Y.G. and Yang, J.W., 2025. Does Tax-Aggressive Behavior Motivate More CSR Engagement?. *Economics & Politics*.
Weinhofer, G. and Hoffmann, V.H., 2010. Mitigating climate change–how do corporate strategies differ?. *Business Strategy and the Environment*, *19*(2), pp.77-89.
Whited, T.M. and Wu, G., 2006. Financial constraints risk. *The Review of Financial Studies*, *19*(2), pp.531-559.
Zhong, R.I., 2018. Transparency and firm innovation. *Journal of Accounting and Economics*, *66*(1), pp.67-93.

Appendix A Variable Definitions and Data Sources

Variable	Definition	Data Source
Dependent Variables		
TAXPLAN	Tax planning measure, computed as the country's statutory corporate tax rate (*Statutory Corporate Tax Rate*) less *GAAPETR*, *CASHETR*, and *ETRs*, respectively. Each element in the computation is summed over the previous two years and the current year. A higher value indicates a greater degree of tax planning.	Compustat Global
long-term TAXPLAN	Long-run tax planning measure. Each element in the *TAXPLAN* computation is summed over the previous four years and the current year. A higher value indicates a greater degree of tax planning.	Compustat Global
Cash-flow scaled TAXPLAN	Cash-flow scaled tax planning measure, computed as the country's statutory corporate tax rate (*Statutory Corporate Tax Rate*) less total income tax expense divided by net cash flows from operations. Each element in the computation is summed over the previous two years and the current year. A higher value indicates a greater degree of tax planning.	Compustat Global
BTC	Book-tax conformity (*BTC*) is the flexibility that a firm has to report taxable income that is different from pre-tax book income in a given country year.	Compustat Global
Variables of Interest		
Post_Pressure	An indicator variable that equals to one beginning in the year (i.e., year 2016) in which the Paris Agreement becomes effective, and zero otherwise.	Own construction
Change in Carbon Emissions	An indicator variable that equals to one if a firm's average level of *Carbon Emissions* over the five years after agreement is less than the average level of *Carbon Emissions* over the five years before the agreement, and zero otherwise.	Own construction
Treat_Alternative	An indicator variable that equals one if a firm is in a country that accepted and ratified the agreement before 2019, and zero otherwise.	Own construction
Year -4plus *(Year –3)* *(Year –2)* (*Year -1*)	An indicator variable equals to one a given year is 4 more years (*Year -4plus*), 3 years (*Year -3*), 2 years (*Year -2*), or 1 year (*Year -1*) before implementation of the Paris Agreement, and zero otherwise.	Own construction
Year 0	An indicator variable equal to one for the year of implementation (*Year 0*) of the Paris Agreement, and zero otherwise	Own construction

Year 1 *(Year 2)* *(Year 3)* *(Year 4plus)*	An indicator variable equal to one for the first year (*Year 1*), second year (*Year 2*), third year (*Year 3*), or fourth year and subsequent years (*Year 4plus*) after the implementation of the Paris Agreement, and zero otherwise.	Own construction
After agreement_Pseudo1 (*After agreement_Pseudo2*)	An indicator variable equals to one if a given year is the year following the pseudo-agreement year, and zero otherwise.	Own construction
Control Variables		
SIZE	Natural logarithm of prior year total assets.	Compustat Global
PPE	Property, plant, and equipment divided by prior year total assets.	Compustat Global
LEV	The ratio of total debt to prior year total assets.	Compustat Global
ROA	Pre-tax income divided by prior year total assets.	Compustat Global
INVENTORY	Inventory scaled by prior year total assets.	Compustat Global
Capex	Capital expenditures scaled by prior year total assets.	Compustat Global
DEPRECIATION	Depreciation expense divided by prior year total assets.	Compustat Global
INTANG	Intangible assets scaled by prior year total assets.	Compustat Global
MULT	An indicator variable for non-zero international operating income, to capture multinational operations.	Compustat Global
Statutory Corporate Tax Rate	Country-level corporate tax rate.	OECD tax database
GDPG	GDP growth.	World Bank
Other Variables		

KZ index	Financial constraints index constructed following Lamont et al. [2001]. It is calculated as {−1.001909 × [((Income before extraordinary items + Depreciation) ÷ Lag property, plant, and equipment)]} + {0.2826389 × [(Total assets + December market capitalization in prior year − Common equity − Deferred taxes) ÷ Total assets]} + {3.139193 × [(Long-term debt + Short-term debt) ÷ (Long-term debt + Short-term debt + Shareholders' equity)]} − {39.3678 × [(Common dividends DVC + Preferred dividends) ÷ Lag property, plant, and equipment]} − {1.314759 × [(Cash ÷ Lag property, plant, and equipment)]}. All of the individual components of the KZ Index are winsorized at the 5% level.	Compustat Global
WW index	Financial constraints index proposed by Whited and Wu [2006]. It is calculated as {−0.091 × [(Income before extraordinary items + Depreciation) ÷ Total assets]} − {0.062 × Dividend paying indicator} + {0.021 × (Long-term debt ÷ Total assets)} − {0.044 × Ln (Total assets)} + {0.102 × Average yearly sales growth at three-digit SIC level} −{0.035 × [(Sales − Lag Sales) ÷ Lag Sales]}. All of the individual components of the WW Index are winsorized at the 5% level.	Compustat Global
Profit Margin	Net income scaled by the total revenue.	Compustat Global
High Agency Cost	An indicator variable equals to one if the mean of agency cost in the pre-agreement period for the firm is greater than the median of its cohort, and zero otherwise.	Compustat Global
High Analyst Coverage	An indicator variable equals to one if the firm's averaged analyst coverage in the pre-agreement period is above the median of its cohort, and zero otherwise.	I/B/E/S
B2C	An indicator variable equals to one if the firm is in the in business-to-consumer (*B2C*) industries, and zero otherwise.	CompustatGlobal
Civil Law	An indicator variable equals to one if the 'origin' of a country's legal system falls into the 'civil law' systems, and zero otherwise.	La Porta et al. (1997, 1998)
GAAP_ETRs	Total tax expense divided by net income before tax.	Compustat Global
Cash_ETRs	Cash paid for taxes divided by net income before tax.	Compustat Global
ETRs	Current tax expense divided by net income before tax.	Compustat Global

Table 1. Summary Statistics.

Var Name	N	Mean	SD	Min	Max	P25	Median	P75
TAXPLAN_GAAPETRs	41,199	0.014	0.156	-0.999	0.483	-0.047	0.022	0.109
TAXPLAN_CashETRs	39,296	-0.023	0.187	-1.000	0.483	-0.113	-0.000	0.098
TAXPLAN_ETRs	39,121	0.035	0.170	-0.992	0.483	-0.044	0.039	0.140
Post_Pressure	41,199	0.564	0.496	0.000	1.000	0.000	1.000	1.000
Change in Carbon Emissions	41,199	0.048	0.213	0.000	1.000	0.000	0.000	0.000
SIZE	41,199	22.079	2.368	13.824	28.909	20.429	21.878	23.441
PPE	41,199	0.338	0.233	0.000	1.360	0.155	0.299	0.483
LEV	41,199	0.131	0.152	0.000	0.991	0.005	0.083	0.208
INTANG	41,199	0.119	0.182	0.000	0.978	0.003	0.037	0.153
ROA	41,199	0.075	0.077	-1.230	0.487	0.029	0.059	0.103
INV	41,199	0.150	0.132	0.000	0.734	0.042	0.126	0.218
Capex	41,199	0.060	0.066	0.000	0.576	0.020	0.040	0.076
DEPRECIATION	41,199	0.040	0.027	0.000	0.201	0.022	0.035	0.050
MULTI	41,199	0.796	0.403	0.000	1.000	1.000	1.000	1.000
GDPG	41,199	2.669	3.519	-8.034	10.103	0.828	2.734	5.568
Statutory Corporate Tax Rate	41,199	0.257	0.119	0.000	0.483	0.200	0.250	0.300

This table presents the summary statistics for variables used in the main regression. This study utilizes 2016 as the year of implementation, and employs the [−5, +5] year window. The final sample comprises 41,199 firm years from 4,976 unique firms around the world during 2011–2021. See Appendix A for variable definitions.

Table 2. The Effect of Carbon Management Pressure on Tax Planning Following the Paris Agreement

VARIABLES	(1) *TAXPLAN_GAAPETRs*	(2) *TAXPLAN_CashETRs*	(3) *TAXPLAN_ETRs*
Post_Pressure* × *Change in Carbon Emissions	**0.017*****	**0.014****	**0.017****
	(2.88)	**(2.26)**	**(2.36)**
SIZE	0.012***	0.014***	–0.002
	(4.65)	(4.01)	(–0.67)
PPE	–0.018*	0.020	0.027**
	(–1.71)	(1.58)	(2.53)
LEV	0.005	–0.027**	0.003
	(0.56)	(–2.41)	(0.29)
INTANG	0.018*	–0.000	0.022*
	(1.87)	(–0.03)	(1.90)
ROA	0.178***	0.473***	0.290***
	(13.30)	(25.15)	(18.48)
INVENTORY	–0.027**	0.027	–0.012
	(–2.09)	(1.54)	(–0.84)
Capex	0.032**	0.008	–0.001
	(2.34)	(0.48)	(–0.06)
DEPRECIATION	–0.134**	–0.433***	–0.423***
	(–2.27)	(–6.01)	(–6.58)
MULTI	–0.003	–0.000	–0.004
	(–1.14)	(–0.09)	(–1.32)
GDPG	0.001	0.001***	0.003***
	(1.64)	(2.69)	(6.80)
Statutory Corporate Tax Rate	0.876***	0.890***	0.901***
	(66.84)	(57.46)	(57.73)
Constant	–0.477***	–0.591***	–0.173***
	(–8.50)	(–7.68)	(–2.64)
N	41,199	40,248	40,117
Adj. R^2	0.684	0.669	0.676
Year fixed effect	YES	YES	YES
Firm fixed effect	YES	YES	YES

This table presents the results examining the effect of carbon management pressure on tax planning following the Paris Agreement. Standard errors are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 3. Validity of the Parallel Trend Assumption: Trend Analysis

VARIABLES	(1) *TAXPLAN_GAAP*	(2) *TAXPLAN_CashETRs*	(3) *TAXPLAN_ETRs*
Year -4plus × Change in Carbon Emissions	**–0.006**	**0.003**	**0.005**
	(–0.98)	**(0.42)**	**(0.70)**
Year –3 × Change in Carbon Emissions	**–0.010**	**–0.003**	**–0.000**
	(–1.43)	**(–0.34)**	**(–0.04)**
Year –2 × Change in Carbon Emissions	**–0.010**	**–0.004**	**0.008**
	(–1.18)	**(–0.44)**	**(0.77)**
Year 0 × Change in Carbon Emissions	**0.005**	**0.003**	**0.016****
	(0.62)	**(0.40)**	**(2.34)**
Year 1× Change in Carbon Emissions	**0.014***	**0.010**	**0.013**
	(1.80)	**(1.14)**	**(1.45)**
Year 2× Change in Carbon Emissions	**0.019****	**0.016***	**0.024****
	(2.30)	**(1.65)**	**(2.56)**
Year 3× Change in Carbon Emissions	**0.015**	**0.027*****	**0.036*****
	(1.40)	**(2.74)**	**(3.66)**
Year 4plus× Change in Carbon Emissions	**0.001**	**0.009**	**0.021****
	(0.15)	**(0.80)**	**(1.98)**
SIZE	0.012***	0.015***	–0.002
	(4.63)	(4.18)	(–0.67)
PPE	–0.018*	0.026**	0.032***
	(–1.71)	(2.18)	(3.12)
LEV	0.005	–0.029***	0.003
	(0.58)	(–2.74)	(0.29)
INTANG	0.018*	0.006	0.026**
	(1.87)	(0.53)	(2.34)
ROA	0.178***	0.458***	0.276***
	(13.30)	(24.50)	(17.71)
INVENTORY	–0.027**	0.023	–0.012
	(–2.10)	(1.32)	(–0.90)
Capex	0.032**	0.001	–0.003
	(2.34)	(0.05)	(–0.21)
DEPRECIATION	–0.134**	–0.437***	–0.416***
	(–2.27)	(–6.17)	(–6.77)
MULTI	–0.003	–0.000	–0.004
	(–1.14)	(–0.05)	(–1.51)
GDPG	0.001*	0.001***	0.003***
	(1.66)	(2.76)	(6.93)
Statutory Corporate Tax Rate	0.877***	0.896***	0.903***
	(66.91)	(59.71)	(59.63)
Constant	–0.477***	–0.610***	–0.175***
	(–8.47)	(–7.82)	(–2.69)
N	41,199	39,296	39,121
Adj. R^2	0.684	0.684	0.694
Year fixed effect	YES	YES	YES
Firm fixed effect	YES	YES	YES

This table presents the trend analysis for assessing the parallel trends assumption embedded in our DID design. The *Year –4plus* is an indicator variable that equals one for the four or more years prior to the implementation of the Paris Agreement, and zero otherwise. The *Year –3* is an indicator variable that equals one in the third year prior to the implementation, and zero otherwise. The *Year –2* is an indicator variable that equals one in the second year prior to the implementation, and zero otherwise. *Year 0* is an indicator variable that equals one in the year of the implementation, and zero otherwise. *Year 1* is an indicator variable that equals one in the first year after the implementation, and zero otherwise. *Year 2* is an indicator variable that equals one in the second year after the implementation, and zero otherwise. *Year 3* is an indicator variable that equals one in the third year after the implementation, and zero otherwise. *Year 4plus* is an indicator variable that equals one in the fourth year and subsequent years after the implementation, and zero otherwise. We drop *Year* –1 to avoid collinearity. Standard errors are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 4. Validity of the Parallel Trend Assumption: Placebo Regressions

VARIABLES	(1) *TAXPLAN_GAAPET*	(2) *TAXPLAN_CashETR*	(3) *TAXPLAN_ETR*	(4) *TAXPLAN_GAAPET*	(5) *TAXPLAN_CashETR*	(6) *TAXPLAN_ETRs*
***After agreement_Pseudo1* ×**	**0.008**	**0.003**	**0.004**			
Change in Carbon Emissions	**(1.11)**	**(0.37)**	**(0.50)**			
***After agreement_Pseudo2* ×**				**0.007**	**0.005**	**0.003**
Change in Carbon Emissions				**(1.02)**	**(0.51)**	**(0.38)**
SIZE	0.011**	0.015*	0.006	0.011**	0.015*	0.006
	(2.20)	(1.82)	(1.12)	(2.20)	(1.83)	(1.12)
PPE	0.004	0.042**	0.068***	0.004	0.042**	0.068***
	(0.24)	(2.29)	(3.81)	(0.24)	(2.29)	(3.81)
LEV	0.009	–0.045**	–0.018	0.009	–0.045**	–0.018
	(0.64)	(–2.35)	(–1.09)	(0.63)	(–2.35)	(–1.09)
INTANG	0.005	–0.009	0.016	0.004	–0.009	0.016
	(0.32)	(–0.40)	(0.93)	(0.30)	(–0.41)	(0.92)
ROA	0.082***	0.328***	0.182***	0.081***	0.328***	0.181***
	(3.72)	(11.50)	(7.27)	(3.71)	(11.50)	(7.27)
INVENTORY	–0.025	0.001	–0.025	–0.025	0.001	–0.025
	(–1.16)	(0.04)	(–1.12)	(–1.17)	(0.04)	(–1.13)
Capex	0.003	0.016	–0.060***	0.003	0.016	–0.059***
	(0.17)	(0.68)	(–2.74)	(0.18)	(0.69)	(–2.73)
DEPRECIATION	–0.074	–0.477***	–0.495***	–0.073	–0.476***	–0.494***
	(–0.84)	(–4.25)	(–4.57)	(–0.82)	(–4.24)	(–4.56)
MULTI	–0.002	–0.001	–0.002	–0.002	–0.001	–0.002
	(–0.48)	(–0.26)	(–0.60)	(–0.46)	(–0.25)	(–0.60)
GDPG	0.000	0.001	0.001	0.000	0.001	0.001
	(0.67)	(1.41)	(1.50)	(0.65)	(1.40)	(1.49)
Statutory Corporate Tax Rate	0.938***	0.931***	0.950***	0.937***	0.931***	0.949***
	(46.06)	(37.59)	(40.55)	(46.20)	(37.65)	(40.63)
Constant	–0.468***	–0.604***	–0.340***	–0.468***	–0.605***	–0.339***
	(–4.35)	(–3.36)	(–3.02)	(–4.35)	(–3.36)	(–3.01)
N	11,556	11,556	11,556	11,556	11,556	11,556
Adj. R^2	0.815	0.798	0.818	0.815	0.798	0.818
Year fixed effect	YES	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES	YES

This table presents the results using pseudo adoption years in the pre-agreement period. *After agreement_Pseudo1* (*After agreement_Pseudo2*) equals one if a given year is the year following the pseudo-agreement year (i.e., three or two years, respectively, before the actual implementation year), and zero otherwise. Standard errors are clustered at the

firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 5. Pre-Agreement Tax Planning Heterogeneity

	Aggressive Tax Planners	Non-Aggressive Tax Planners	Aggressive Tax Planners	Non-Aggressive Tax Planners	Aggressive Tax Planners	Non-Aggressive Tax Planners
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*TAXPLAN_GAAPETRs*		*TAXPLAN_CashETRs*		*TAXPLAN_ETRs*	
Post_Pressure × Change in Carbon Emissions	**0.035***** **(2.71)**	**0.018 (1.14)**	**0.025***** **(2.64)**	**–0.001 (–0.03)**	**0.037**** **(2.18)**	**0.010 (0.59)**
SIZE	0.018***	0.009	0.009	0.019**	0.001	–0.013**
	(3.02)	(1.53)	(1.38)	(2.40)	(0.16)	(–2.11)
PPE	–0.029	–0.019	0.032*	–0.013	0.037*	0.004
	(–1.57)	(–0.69)	(1.69)	(–0.40)	(1.91)	(0.15)
LEV	0.022	–0.004	–0.005	–0.033	0.023	0.003
	(1.13)	(–0.17)	(–0.24)	(–1.20)	(1.05)	(0.15)
INTANG	0.031*	0.013	–0.037	0.038	0.002	0.034
	(1.94)	(0.49)	(–1.45)	(1.29)	(0.09)	(1.12)
ROA	0.070***	0.419***	0.320***	0.761***	0.198***	0.532***
	(3.40)	(12.09)	(10.84)	(15.16)	(7.73)	(14.51)
INVENTORY	–0.046**	–0.011	0.044	0.018	–0.018	0.048
	(–2.53)	(–0.29)	(1.49)	(0.42)	(–0.74)	(1.23)
Capex	0.005	0.047	–0.035	0.045	–0.052**	0.039
	(0.27)	(0.95)	(–1.44)	(0.97)	(–2.57)	(0.85)
DEPRECIATION	–0.229**	–0.381**	–0.263**	–0.737***	–0.313***	–0.613***
	(–2.09)	(–2.50)	(–2.03)	(–4.72)	(–2.72)	(–4.02)
MULTI	–0.001	–0.007	–0.008	–0.009	–0.002	–0.004
	(–0.14)	(–1.08)	(–1.35)	(–1.16)	(–0.32)	(–0.67)
GDPG	0.000	–0.002*	0.001	–0.002	0.004***	–0.001
	(0.68)	(–1.78)	(1.49)	(–1.29)	(4.54)	(–1.01)
Statutory Corporate Tax	0.899***	0.902***	0.834***	0.911***	0.871***	0.835***
	(36.23)	(24.94)	(29.32)	(18.79)	(30.84)	(17.92)
Constant	–0.557***	–0.460***	–0.380***	–0.797***	–0.175	0.013
	(–4.24)	(–3.83)	(–2.74)	(–4.64)	(–1.34)	(0.10)
N	10,323	10,002	9,958	9,681	9,801	9,795
Adj. R^2	0.595	0.502	0.584	0.485	0.637	0.487
Year fixed effect	YES	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES	YES

This table reports the regression results examining the heterogeneity in firms' responses to the Paris Agreement based on pre-agreement tax planning behavior. Firms are classified as aggressive tax planners if their average *TAXPLAN* is above the 25th percentile during the pre-agreement period and non-aggressive otherwise. The interaction term *Post_Pressure × Change in Carbon Emissions* captures the differential impact of carbon emission changes on tax planning strategies after the Paris Agreement. Standard errors

are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 6. Channel Analysis – Financial Resource Status

Panel A. Financial Constraints – WW Index

	LOW WW	HIGH WW	LOW WW	HIGH WW	LOW WW	HIGH WW
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*TAXPLAN_GAAPETRs*		*TAXPLAN_CashETRs*		*TAXPLAN_ETRs*	
Post_Pressure* × *Change in Carbon Emissions	**0.020*****	**0.013**	**0.020****	**0.008**	**0.023****	**0.010**
	(2.62)	**(1.55)**	**(2.45)**	**(0.82)**	**(2.38)**	**(0.95)**
SIZE	0.014***	0.010***	0.015***	0.013***	–0.006	0.000
	(3.70)	(3.01)	(2.88)	(2.75)	(–1.31)	(0.11)
PPE	–0.052***	0.013	–0.002	0.038**	0.016	0.036**
	(–3.32)	(0.96)	(–0.10)	(2.22)	(1.05)	(2.47)
LEV	0.016	–0.005	–0.014	–0.037**	0.009	0.000
	(1.06)	(–0.43)	(–0.80)	(–2.57)	(0.54)	(0.02)
INTANG	0.001	0.031**	–0.001	0.001	0.037**	0.013
	(0.04)	(2.46)	(–0.06)	(0.09)	(2.16)	(0.84)
ROA	0.164***	0.189***	0.478***	0.469***	0.292***	0.288***
	(8.14)	(10.58)	(17.53)	(18.17)	(11.92)	(14.26)
INVENTORY	–0.031	–0.021	0.026	0.030	0.006	–0.027
	(–1.57)	(–1.27)	(0.98)	(1.24)	(0.29)	(–1.43)
Capex	0.086***	–0.011	0.054**	–0.027	0.031	–0.024
	(4.75)	(–0.60)	(2.27)	(–1.13)	(1.49)	(–1.23)
DEPRECIATION	–0.012	–0.231***	–0.457***	–0.422***	–0.449***	–0.402***
	(–0.14)	(–2.94)	(–4.22)	(–4.37)	(–4.50)	(–4.76)
MULTI	–0.008**	–0.001	–0.003	0.002	–0.005	–0.003
	(–2.09)	(–0.46)	(–0.64)	(0.45)	(–1.23)	(–0.68)
GDPG	0.000	0.001*	0.001	0.001**	0.002***	0.004***
	(0.37)	(1.77)	(1.50)	(2.24)	(2.74)	(6.73)
Statutory Corporate Tax Rate	0.850***	0.898***	0.882***	0.897***	0.872***	0.924***
	(44.94)	(49.80)	(39.34)	(41.82)	(40.44)	(41.83)
Constant	–0.514***	–0.454***	–0.619***	–0.561***	–0.072	–0.232***
	(–6.05)	(–6.12)	(–5.25)	(–5.56)	(–0.69)	(–2.78)
N	19,236	21,963	18,829	21,419	18,698	21,419
Adj. R^2	0.683	0.686	0.679	0.660	0.667	0.684
Year fixed effect	YES	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES	YES

Panel B. Financial Constraints – KZ Index

	HIGH KZ	LOW KZ	HIGH KZ	LOW KZ	HIGH KZ	LOW KZ
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*TAXPLAN_GAAPETRs*		*TAXPLAN_CashETRs*		*TAXPLAN_ETRs*	
Post_Pressure* × *Change in Carbon Emissions	**0.032*****	**0.006**	**0.018****	**0.009**	**0.019****	**0.017**
	(4.57)	**(0.65)**	**(2.47)**	**(0.99)**	**(1.98)**	**(1.65)**
SIZE	0.005	0.006	0.000	–0.005	–0.000	–0.009
	(1.41)	(1.22)	(0.10)	(–0.78)	(–0.09)	(–1.64)
PPE	–0.003	–0.025	0.048**	0.013	0.047***	0.024
	(–0.24)	(–1.26)	(2.48)	(0.67)	(3.01)	(1.26)
LEV	–0.005	0.018	–0.017	–0.017	–0.010	0.005
	(–0.38)	(1.10)	(–1.19)	(–0.91)	(–0.73)	(0.31)
INTANG	0.023**	0.028	0.040**	–0.000	0.038**	0.033
	(2.04)	(1.33)	(2.52)	(–0.01)	(2.37)	(1.49)
ROA	0.141***	0.291***	0.422***	0.629***	0.230***	0.434***
	(7.98)	(9.00)	(17.83)	(13.68)	(11.04)	(12.74)
INVENTORY	–0.034**	0.001	–0.001	0.100***	–0.011	0.004
	(–2.29)	(0.03)	(–0.06)	(2.86)	(–0.59)	(0.15)
Capex	0.034*	0.028	–0.021	–0.014	0.015	–0.013
	(1.84)	(1.01)	(–0.84)	(–0.45)	(0.72)	(–0.46)
DEPRECIATION	–0.166**	–0.095	–0.460***	–0.384**	–0.496***	–0.458***
	(–2.18)	(–0.72)	(–5.18)	(–2.52)	(–5.48)	(–3.36)
MULTI	–0.008***	0.002	–0.007	0.002	–0.010**	0.005
	(–2.73)	(0.40)	(–1.48)	(0.44)	(–2.36)	(0.96)
GDPG	–0.000	0.002**	0.001	0.001*	0.002***	0.004***
	(–0.15)	(2.49)	(1.57)	(1.66)	(3.83)	(5.21)
Statutory Corporate Tax Rate	0.856***	0.881***	0.873***	0.853***	0.903***	0.918***
	(52.65)	(39.22)	(44.17)	(33.99)	(44.87)	(35.78)
Constant	–0.314***	–0.384***	–0.272***	–0.157	–0.206*	–0.043
	(–3.97)	(–3.45)	(–2.76)	(–1.15)	(–1.95)	(–0.35)
N	17,691	17,171	17,325	16,949	17,068	16,818
Adj. R^2	0.748	0.629	0.675	0.609	0.716	0.651
Year fixed effect	YES	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES	YES

Panel C. Profit Margin

	LOW Profit Margin	HIGH Profit Margin	LOW Profit Margin	HIGH Profit Margin	LOW Profit Margin	HIGH Profit Margin
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*TAXPLAN_GAAPETRs*		*TAXPLAN_CashETRs*		*TAXPLAN_ETRs*	
***Post_Pressure* × *Change in Carbon Emissions* Emissions**	**0.025*****	**0.004**	**0.022****	**–0.000**	**0.022***	**0.007**
	(2.72)	**(0.53)**	**(2.20)**	**(–0.00)**	**(1.76)**	**(0.82)**
SIZE	0.017***	0.004	0.012*	0.012***	–0.007	–0.006*
	(3.30)	(1.44)	(1.96)	(2.65)	(–1.27)	(–1.79)
PPE	–0.010	–0.019	0.023	0.025*	0.059***	0.024*
	(–0.58)	(–1.40)	(0.95)	(1.80)	(3.13)	(1.91)
LEV	0.017	0.002	–0.010	–0.036***	0.010	0.001
	(1.00)	(0.19)	(–0.49)	(–2.92)	(0.60)	(0.10)
INTANG	0.014	0.012	–0.011	0.015	0.020	0.022*
	(0.85)	(1.03)	(–0.57)	(1.12)	(1.04)	(1.68)
ROA	0.258***	0.104***	0.650***	0.317***	0.424***	0.166***
	(9.12)	(6.65)	(14.72)	(15.06)	(13.57)	(9.06)
INVENTORY	–0.018	–0.034**	0.096***	–0.081***	0.020	–0.073***
	(–0.96)	(–2.13)	(3.92)	(–3.53)	(1.01)	(–4.19)
Capex	0.042*	0.037**	0.011	–0.000	0.001	0.009
	(1.91)	(2.09)	(0.34)	(–0.02)	(0.02)	(0.55)
DEPRECIATION	–0.280***	–0.002	–0.583***	–0.308***	–0.673***	–0.179**
	(–2.61)	(–0.03)	(–4.24)	(–3.59)	(–6.05)	(–2.41)
MULTI	–0.004	–0.001	–0.001	0.002	–0.007	–0.001
	(–1.10)	(–0.16)	(–0.11)	(0.40)	(–1.47)	(–0.26)
GDPG	0.000	0.001**	0.001*	0.001***	0.002***	0.003***
	(0.27)	(2.45)	(1.80)	(2.59)	(3.87)	(6.21)
Statutory Corporate Tax Rate	0.888***	0.880***	0.883***	0.916***	0.924***	0.900***
	(43.59)	(54.34)	(36.93)	(52.22)	(39.72)	(47.40)
Constant	–0.597***	–0.302***	–0.570***	–0.527***	–0.094	–0.060
	(–5.41)	(–4.49)	(–4.17)	(–5.37)	(–0.81)	(–0.77)
N	20,194	20,304	19,020	19,550	19,155	19,239
Adj. R^2	0.660	0.749	0.666	-0.000	0.685	0.747
Year fixed effect	YES	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES	YES

This table reports the regression results estimating whether the effect of the Paris Agreement on corporate tax planning varies based on firms' financial resource status, which is proxied by *WW Index* (Panel A), *KZ Index* (Panel B), and *Profit Margin* (Panel C), respectively. *WW Index* is the financial constraints index proposed by Whited and Wu

(2006). A lower *WW Index* score indicates that a firm is more financially constrained. *KZ Index* is the financial constraints index constructed following Lamont et al. (2001). A higher *KZ Index* score indicates greater financial constraints. *Profit Margin* is measured as net income scaled by the total revenue. Panels A and B split the sample based on whether the mean financial constraints index (i.e., *KZ index* and *WW index*) in the pre-agreement period is greater than the median of its cohort. Panel C divides the sample based on mean cutoff of the three-year average profit margin. Standard errors are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 7. Channel Analysis – Reputational Concerns

	B2C	Other	B2C	Other	B2C	Other
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*TAXPLAN_GAAPETRs*		*TAXPLAN_CashETRs*		*TAXPLAN_ETRs*	
Post_Pressure* × *Change in Carbon Emissions	**0.022*****	**0.012**	**0.020****	**0.008**	**0.031*****	**0.005**
	(2.72)	**(1.46)**	**(2.10)**	**(0.96)**	**(2.61)**	**(0.55)**
SIZE	0.014***	0.010***	0.018***	0.011**	0.003	–0.007*
	(4.01)	(2.71)	(3.62)	(2.22)	(0.59)	(–1.76)
PPE	–0.013	–0.022	0.013	0.025	0.042***	0.013
	(–0.85)	(–1.57)	(0.77)	(1.44)	(2.75)	(0.88)
LEV	0.007	0.005	–0.029*	–0.026	–0.016	0.023
	(0.49)	(0.35)	(–1.90)	(–1.59)	(–1.11)	(1.57)
INTANG	0.013	0.021	–0.007	0.007	0.032*	0.013
	(0.97)	(1.64)	(–0.44)	(0.36)	(1.82)	(0.85)
ROA	0.180***	0.176***	0.439***	0.507***	0.277***	0.299***
	(9.53)	(9.32)	(16.10)	(20.43)	(12.13)	(13.99)
INVENTORY	–0.014	–0.040**	0.042*	0.011	–0.011	–0.015
	(–0.79)	(–2.07)	(1.91)	(0.40)	(–0.60)	(–0.70)
Capex	0.015	0.047**	0.005	0.012	–0.016	0.011
	(0.74)	(2.58)	(0.21)	(0.47)	(–0.84)	(0.56)
DEPRECIATION	–0.169**	–0.100	–0.330***	–0.547***	–0.449***	–0.387***
	(–2.00)	(–1.22)	(–3.08)	(–5.74)	(–4.65)	(–4.53)
MULTI	–0.003	–0.003	–0.004	0.003	–0.003	–0.005
	(–0.84)	(–0.77)	(–0.82)	(0.63)	(–0.77)	(–1.15)
GDPG	0.002***	–0.000	0.002**	0.001	0.003***	0.003***
	(3.20)	(–0.89)	(2.44)	(1.28)	(5.00)	(4.47)
Statutory Corporate	0.863***	0.888***	0.897***	0.883***	0.922***	0.881***
	(44.80)	(49.74)	(39.80)	(41.55)	(39.75)	(42.14)
Constant	–0.522***	–0.434***	–0.681***	–0.515***	–0.285***	–0.066
	(–6.92)	(–5.34)	(–6.24)	(–4.85)	(–2.83)	(–0.81)
N	20,363	20,836	19,900	20,348	19,743	20,374
Adj. R^2	0.696	0.672	0.678	0.660	0.682	0.672
Year fixed effect	YES	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES	YES

This table reports the regression results estimating whether the effect of the Paris Agreement on corporate tax planning varies based on reputation sensitivity. *B2C* is an indicator variable equals to one if the firm is in the in business-to-consumer (*B2C*) industries, and zero otherwise. Standard errors are clustered at the firm-level and are

reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 8. Firm-level Heterogeneity - Agency Costs and Tax Planning

VARIABLES	(1) *TAXPLAN_GAAPE*	(2) *TAXPLAN_CashET*	(3) *TAXPLAN_ETRs*
Post_Pressure × Change in Carbon Emissions	0.002	–0.005	–0.010
	(0.19)	(–0.57)	(–0.92)
Post_Pressure × High Agency Cost	0.000	0.007*	–0.000
	(0.14)	(1.96)	(–0.01)
Post_Pressure × Change in Carbon Emissions × High Agency Cost	**0.025****	**0.031****	**0.046*****
	(2.17)	**(2.49)**	**(3.24)**
SIZE	0.012***	0.014***	–0.002
	(4.61)	(3.95)	(–0.70)
PPE	–0.018*	0.019	0.027**
	(–1.71)	(1.58)	(2.53)
LEV	0.005	–0.027**	0.003
	(0.57)	(–2.46)	(0.27)
INTANG	0.018*	–0.000	0.022*
	(1.87)	(–0.02)	(1.91)
ROA	0.178***	0.474***	0.290***
	(13.29)	(25.14)	(18.52)
INVENTORY	–0.027**	0.028	–0.012
	(–2.08)	(1.59)	(–0.82)
Capex	0.032**	0.008	–0.001
	(2.32)	(0.48)	(–0.08)
DEPRECIATION	–0.133**	–0.436***	–0.424***
	(–2.25)	(–6.04)	(–6.59)
MULTI	–0.003	–0.000	–0.004
	(–1.13)	(–0.09)	(–1.32)
GDPG	0.001	0.001***	0.003***
	(1.64)	(2.66)	(6.81)
Statutory Corporate Tax Rate	0.876***	0.891***	0.902***
	(66.88)	(57.46)	(57.80)
Constant	–0.476***	–0.587***	–0.171***
	(–8.47)	(–7.66)	(–2.62)
N	32,649	32,649	32,649
Adj. R^2	0.684	0.669	0.676
Year fixed effect	YES	YES	YES
Firm fixed effect	YES	YES	YES

This table reports the regression results estimating whether the effect of the Paris Agreement on corporate tax planning varies based on agency cost. *High Agency Cost* is an indicator variable equals to one if the mean of agency cost in the pre-agreement period for the firm is greater than the median of its cohort, and zero otherwise. Standard errors are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 9. Firm-level Heterogeneity - Influence of Analyst Coverage

VARIABLES	(1) *TAXPLAN_GAAPETRs*	(2) *TAXPLAN_CashETRs*	(3) *TAXPLAN_ETRs*
Post_Pressure × Change in Carbon Emissions	–0.091**	–0.055***	–0.032
	(–2.46)	(–2.84)	(–1.32)
Post_Pressure × High Agency	–0.006*	–0.004	0.004
	(–1.91)	(–1.03)	(1.08)
Post_Pressure × Change in Carbon Emissions × High Analyst Coverage	**0.114*** **	**0.074*** **	**0.049***
	(3.05)	**(3.61)**	**(1.94)**
SIZE	0.011***	0.014***	–0.002
	(4.39)	(3.88)	(–0.60)
PPE	–0.017*	0.020	0.027**
	(–1.65)	(1.64)	(2.53)
LEV	0.006	–0.026**	0.002
	(0.59)	(–2.39)	(0.24)
INTANG	0.017*	–0.001	0.022*
	(1.86)	(–0.04)	(1.89)
ROA	0.178***	0.473***	0.290***
	(13.31)	(25.18)	(18.47)
INVENTORY	–0.027**	0.027	–0.012
	(–2.08)	(1.54)	(–0.84)
Capex	0.031**	0.008	–0.000
	(2.27)	(0.44)	(–0.02)
DEPRECIATION	–0.134**	–0.434***	–0.426***
	(–2.28)	(–6.02)	(–6.62)
MULTI	–0.003	–0.000	–0.004
	(–1.17)	(–0.12)	(–1.25)
GDPG	0.001*	0.001***	0.003***
	(1.71)	(2.73)	(6.79)
Statutory Corporate Tax Rate	0.876***	0.890***	0.901***
	(66.85)	(57.48)	(57.72)
Constant	–0.463***	–0.581***	–0.178***
	(–8.16)	(–7.50)	(–2.70)
N	32,649	32,649	32,649
Adj. R^2	0.685	0.669	0.677
Year fixed effect	YES	YES	YES
Firm fixed effect	YES	YES	YES

This table reports the regression results estimating whether the effect of the Paris Agreement on corporate tax planning varies based on analyst coverage. *High Analyst Coverage* is an indicator variable equals to one if the firm's averaged analyst coverage in the pre-agreement period is above the median of its cohort, and zero otherwise. Standard errors are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 10. Country-level Heterogeneity – The Legal Origin

	Civil	Common	Civil	Common	Civil	Common
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*TAXPLAN_GAAPETRs*		*TAXPLAN_CashETRs*		*TAXPLAN_ETRs*	
Post_Pressure × Change in Carbon Emissions	**0.015*****	**0.010**	**0.015****	**0.005**	**0.025*****	**–0.004**
	(2.79)	(1.52)	(2.32)	(0.74)	(4.15)	(–0.44)
SIZE	0.011***	0.017***	0.019***	0.002	–0.005*	–0.006
	(4.35)	(4.21)	(4.98)	(0.36)	(–1.95)	(–1.13)
PPE	–0.037***	–0.006	0.016	0.025	0.005	0.027
	(–2.96)	(–0.35)	(1.00)	(1.20)	(0.37)	(1.40)
LEV	–0.001	0.003	–0.049***	–0.010	–0.008	–0.017
	(–0.06)	(0.24)	(–3.29)	(–0.57)	(–0.66)	(–1.08)
INTANG	0.019*	0.007	–0.017	0.024	0.020*	0.007
	(1.86)	(0.42)	(–1.10)	(1.30)	(1.66)	(0.35)
ROA	0.171***	0.205***	0.478***	0.510***	0.310***	0.344***
	(10.10)	(7.97)	(20.42)	(14.22)	(16.25)	(12.11)
INVENTORY	–0.038***	–0.010	0.043*	0.010	0.000	–0.004
	(–2.93)	(–0.41)	(1.71)	(0.31)	(0.03)	(–0.16)
Capex	0.063***	0.020	0.040	–0.023	0.032*	0.015
	(3.59)	(0.69)	(1.58)	(–0.65)	(1.82)	(0.41)
DEPRECIATION	0.023	–0.283***	–0.486***	–0.484***	–0.328***	–0.560***
	(0.34)	(–3.09)	(–5.43)	(–4.27)	(–4.57)	(–5.42)
MULTI	–0.002	–0.007	0.005	–0.007	–0.008**	–0.010**
	(–0.74)	(–1.50)	(1.12)	(–1.35)	(–2.14)	(–2.13)
GDPG	0.001**	–0.002**	0.003***	–0.002***	0.003***	0.001
	(2.39)	(–2.58)	(3.56)	(–2.69)	(4.47)	(1.10)
Statutory Corporate Tax Rate	0.960***	0.256**	0.935***	0.766***	0.890***	0.233*
	(40.38)	(2.23)	(34.25)	(6.86)	(34.68)	(1.94)
Constant	–0.470***	–0.480***	–0.742***	–0.248**	–0.083	0.027
	(–8.33)	(–5.54)	(–8.84)	(–2.31)	(–1.38)	(0.24)
N	18,532	9,321	17,707	9,403	18,308	8,991
Adj. R^2	0.587	0.672	0.637	0.641	0.596	0.643
Year fixed effect	YES	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES	YES

This table reports the regression results estimating the role of legal origin in the effect of the Paris Agreement on corporate tax planning. *Civil Law* is an indicator variable equals to one if the 'origin' of a country's legal system falls into the 'civil law' systems, and zero otherwise, obtained from La Porta et al. (1997, 1998). Standard errors are

clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 11. Alternative Dependent Variables

VARIABLES	(1) *Cash-flow scaled TAXPLAN*	(2) *BTC*	(3) *long-term TAXPLAN_GAAP ETRs*	(4) *long-term TAXPLAN_Cash ETRs*	(5) *long-term TAXPLAN_ ETRs*
Post_Pressure* × *Change in Carbon Emissions	**0.018****	**0.016****	**0.011****	**0.012***	**0.006**
	(2.52)	**(2.40)**	**(2.07)**	**(1.86)**	**(0.83)**
SIZE	–0.014***	0.016***	0.006**	0.010**	0.001
	(–3.92)	(4.17)	(2.30)	(2.01)	(0.34)
PPE	0.058***	0.022*	0.000	0.016	0.030***
	(3.91)	(1.68)	(0.00)	(1.35)	(2.89)
LEV	0.005	–0.025**	0.013	–0.006	0.010
	(0.40)	(–2.07)	(1.53)	(–0.55)	(0.99)
INTANG	0.037***	–0.006	–0.007	–0.012	0.005
	(3.01)	(–0.48)	(–0.77)	(–0.96)	(0.52)
ROA	–0.141***	0.434***	0.056***	0.210***	0.091***
	(–7.32)	(22.62)	(5.02)	(13.19)	(7.19)
INVENTORY	–0.316***	0.023	–0.029**	0.001	–0.043***
	(–13.23)	(1.20)	(–2.13)	(0.07)	(–2.65)
Capex	–0.121***	–0.006	0.005	–0.029*	–0.020
	(–5.88)	(–0.30)	(0.39)	(–1.67)	(–1.47)
DEPRECIATION	0.940***	–0.422***	–0.082	–0.205***	–0.200***
	(11.83)	(–5.30)	(–1.35)	(–2.77)	(–2.97)
MULTI	–0.006	–0.000	0.000	–0.001	–0.000
	(–1.43)	(–0.09)	(0.01)	(–0.22)	(–0.03)
GDPG	0.000	0.002***	0.001**	0.001***	0.001***
	(0.28)	(4.16)	(2.19)	(4.43)	(4.49)
Statutory Corporate Tax Rate	0.945***	0.897***	0.922***	0.938***	0.977***
	(50.35)	(57.45)	(93.82)	(76.98)	(81.99)
Constant	0.096	–0.643***	–0.361***	–0.485***	–0.256***
	(1.23)	(–7.45)	(–5.74)	(–4.37)	(–3.01)
N	32,649	32,649	14,881	14,880	14,879
Adj. R^2	0.623	0.704	0.914	0.894	0.908
Year fixed effect	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES

This table presents the results of robustness tests using alternative dependent variables. In Columns (1) and (2), the dependent variables are *Cash-flow scaled TAXPLAN* (Column 1) and *BTC*, respectively. In Columns (3)-(5), the dependent variables are the long-run tax planning measures (*long-term TAXPLAN*). Specifically, each element in the *TAXPLAN* computation is summed over the previous four years and the current year. *Cash-flow scaled TAXPLAN* is computed as the country's statutory corporate tax rate (*Statutory*

Corporate Tax Rate) less total income tax expense divided by net cash flows from operations. *BTC* is the flexibility that a firm has to report taxable income that is different from pre-tax book income in a given country year. Standard errors are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 12. Entropy Balancing Method – After Matching

VARIABLES	(1) *TAXPLAN_GAAPE*	(2) *TAXPLAN_CashET*	(3) *TAXPLAN_ETRs*
Post_Pressure* × *Change in Carbon Emissions	**0.019*** **	**0.011***	**0.017****
	(3.37)	**(1.69)**	**(2.36)**
SIZE	0.021***	0.012*	0.001
	(4.04)	(1.70)	(0.22)
PPE	–0.041	0.043*	0.029
	(–0.91)	(1.77)	(1.32)
LEV	0.014	–0.058***	–0.034*
	(0.72)	(–3.07)	(–1.73)
INTANG	0.035**	0.043**	0.058***
	(2.15)	(2.39)	(3.18)
ROA	0.140***	0.478***	0.370***
	(4.60)	(11.85)	(10.28)
INVENTORY	–0.040	0.052	–0.038
	(–1.35)	(1.10)	(–0.96)
Capex	0.119**	0.060	0.143***
	(2.14)	(1.17)	(2.98)
DEPRECIATION	0.019	–0.306**	–0.299**
	(0.11)	(–2.21)	(–2.28)
MULTI	–0.008	–0.011*	–0.007
	(–1.20)	(–1.68)	(–0.96)
GDPG	0.000	0.002**	0.004***
	(0.60)	(2.12)	(4.29)
Statutory Corporate Tax Rate	0.845***	0.799***	0.844***
	(32.63)	(28.37)	(28.54)
Constant	–0.700***	–0.524***	–0.266*
	(–5.95)	(–3.28)	(–1.66)
N	41,199	40,248	40,117
Adj. R^2	0.659	0.642	0.654
Year fixed effect	YES	YES	YES
Firm fixed effect	YES	YES	YES

This table shows the results using the entropy balancing method. Standard errors are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.

Table 13. Alternative DID Model

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	TAXPLAN_GAAPETRs		*TAXPLAN_CashETRs*		*TAXPLAN_ETRs*	
		Balanced Sample		Balanced Sample		Balanced Sample _3yr
Post_Pressure* × *Treat_Alternative	**0.024*** **	**0.024*** **	**0.019*** **	**0.018*** **	**0.025*** **	**0.025*** **
	(5.01)	**(4.84)**	**(3.64)**	**(3.17)**	**(4.71)**	**(4.71)**
SIZE	0.007**	0.003	0.020***	0.014	–0.001	–0.001
	(2.32)	(0.47)	(5.12)	(1.54)	(–0.32)	(–0.32)
PPE	–0.005	–0.014	0.007	0.016	0.025***	0.025***
	(–0.70)	(–0.83)	(0.66)	(0.87)	(3.12)	(3.12)
LEV	–0.001	–0.001	–0.027***	–0.039**	–0.001	–0.001
	(–0.15)	(–0.10)	(–3.07)	(–2.35)	(–0.16)	(–0.16)
INTANG	0.007	–0.025	–0.019*	0.006	–0.001	–0.001
	(1.04)	(–1.09)	(–1.78)	(0.19)	(–0.13)	(–0.13)
ROA	0.110***	0.178***	0.426***	0.370***	0.189***	0.189***
	(9.06)	(7.84)	(21.70)	(8.19)	(13.72)	(13.72)
INVENTORY	–0.013	–0.011	0.023	–0.017	0.008	0.008
	(–1.22)	(–0.34)	(1.44)	(–0.50)	(0.67)	(0.67)
Capex	0.009	–0.014	0.002	–0.056	–0.029**	–0.029**
	(0.95)	(–0.50)	(0.16)	(–1.58)	(–2.50)	(–2.50)
DEPRECIATION	–0.141***	–0.172**	–0.425***	–0.458***	–0.337***	–0.337***
	(–3.36)	(–2.01)	(–7.00)	(–3.78)	(–7.10)	(–7.10)
MULTI	–0.000	–0.004	0.001	–0.004	–0.002	–0.002
	(–0.05)	(–0.73)	(0.23)	(–0.87)	(–0.81)	(–0.81)
GDPG	0.001*	0.000	0.003***	–0.000	0.005***	0.005***
	(1.81)	(0.42)	(5.61)	(–0.04)	(8.23)	(8.23)
Statutory Corporate Tax Rate	0.936***	0.926***	0.963***	0.949***	0.879***	0.879***
	(49.43)	(36.99)	(43.16)	(36.98)	(42.91)	(42.91)
Constant	–0.376***	–0.291**	–0.782***	–0.575***	–0.198***	–0.198***
	(–6.16)	(–2.00)	(–9.13)	(–2.90)	(–3.02)	(–3.02)
N	41,847	41,847	41,847	41,847	41,847	41,847
Adj. R^2	0.795	0.843	0.795	0.782	0.778	0.778
Year fixed effect	YES	YES	YES	YES	YES	YES
Firm fixed effect	YES	YES	YES	YES	YES	YES

This table presents the results based on an alternative model. It shows the effect of the Paris Agreement on corporate tax planning in countries accepted and ratified the agreement before 2019, relative to firms in countries without ratification before 2019. Therefore, the regression is estimated using a [–3, +3] year window. *Treat_Alternative* is an indicator variable that equals one if a firm is in a country that accepted and ratified the agreement before 2019, and zero otherwise. As the control group is relatively smaller than the

treatment group, columns (2), (4), and (6) disclose the results after applying entropy balancing. Standard errors are clustered at the firm-level and are reported between parentheses. *, **, and *** represent statistical significance at the 10%, 5% and 1% level respectively based on a two-sided t-test. All of the variables are defined in Appendix A.