Climate Politics, Environmental Policy Stringency and Carbon Market Microstructure

Abstract

Using hand-collected data on the lobby tactics of business lobby groups and the policy actions of policy makers, this study investigates the role of environmental policy stringency in shaping political interactions between these actors and the subsequent impact on the market microstructure of the New Zealand Emissions Trading Scheme. Conditioning on environmental policy stringency, the study finds that policy actions have a constraining effect on market activity while lobby tactics have the opposite effect of increasing market liquidity and participation. Economically, policy actions are associated with a decline in market volume of 24.85 million NZUs, 1021 fewer transactions and 600 fewer market participants while lobby tactics are associated with an increase in market volume of 3.76 million NZUs and 63 additional market participants. The NZU price reacts significantly to both.

JEL Classification: Q58, H23

Keywords: carbon markets, environmental policy stringency, NZ ETS

1 Introduction

Carbon markets are regulatory and policy instruments created and operated within political environments shaped by the policy actions of policy makers and the corporate political activity (CPA) of firms which these markets seek to regulate. The policy objective of policy makers, either towards greater or lesser environmental policy stringency, influences the policy actions that policy makers enact and the degree and intensity of the CPA tactics that firms utilize to respond to these policy actions.

The CPA tactics of firms has been studied across a number of fields and have been categorized by Katic and Hillman (2023) as formal and indirect; formal and direct; informal and indirect or as informal and direct. Figure 1 presents the detailed categorization of CPA tactics along the two dimensions of directness and formality conceptualized by Katic and Hillman (2023). The outcome of these tactics can result in policy changes and oftentimes policy reversals which reduce the regulatory burden faced by firms. Leippold et al. (2024) who studied corporate climate lobbying by US firms demonstrate that climate related CPA (CRCPA) tactics can be quite effective and that the stock market responds to the outcomes of these tactics. They found that the stock prices of firms that spent more on anti-climate lobbying went up when a bill (Waxman-Markey bill) to establish a national cap-and-trade system failed and down when the Inflation Reduction Act (a pro-climate legislation) was announced (Leippold et al., 2024).

Insert Figure 1 here

While firms deploy climate related CPA (CRCPA), policy makers enact climate related policy actions (CRPA) through policy and market design changes, price controls, free allocation of emissions units and controlling the supply of emissions units within carbon markets (Ibikunle et al., 2016). Taken together, CRCPA and CRPA constitute politically driven events, shaped by environmental policy stringency, which influences carbon market microstructure dynamics. I study these dynamics using the New Zealand ETS (NZ ETS) as the climate policy setting. The NZ ETS is the second oldest ETS in the world and is one of the most comprehensive in terms of its sectoral coverage. It is an ideal setting to examine the impact of climate politics on carbon market activity.

CRPA in New Zealand is generally implemented by policy makers through three main mechanism: industrial allocations, Minister's directives for free allocation of New Zealand Units (NZUs) to market participants and ad hoc policy reviews of the ETS. On the other hand, CRCPA in New Zealand is, largely, exercised directly, both formally and informally, by business lobby groups which engage in corporate political activity on behalf of member firms. The most influential business lobby group in New Zealand is The New Zealand Initiative which has a corporate membership made up of the largest firms in New Zealand. The New Zealand Initiative operates as a policy think-tank which engages in lobbying through hosting private events where

politicians are invited to speak to its members, regulatory co-creation and framing, commenting on proposed and existing regulation, supplying position papers and technical reports, undertaking research projects and publicizing the results, providing media content and making regular media appearances. An example of CRCPA undertaked by The New Zealand Initiative is an op-ed published in December 2020 in which the Executive Director stated, "The New Zealand ETS is so well-designed, it will drive down our country's emissions in the most efficient way. It is a work of economic beauty and can cut several times more emissions per dollar than politicians. Unfortunately, political interference is now sabotaging this path to lower emissions."

I investigate the impact of both CRPA and CRCPA on NZ ETS market microstructure. I answer two questions. First, what is the reaction of the NZU carbon price to climate related political events? Second, conditioning on environmental policy stringency, how does CRPA and CRCPA affect NZ ETS market activity? To answer the first question I use a market index of the NZU carbon price as an expectation model and perform event studies using events dates for several events related to the NZ ETS. I answer the second question using panel regressions of proxy variables for CRPA, CRCPA and three measures of NZ ETS market activity, namely, NZUs transferred (volume), transaction quantity, and number of participants.

From these analyses I find that the NZU carbon price reacts strongly to climate related political events generating statistically significant cumulative

abnormal returns ranging from -60.56% to 67.69%. I also find that CRPA generally constrains NZ ETS market activity while CRCPA has the opposite effect as it increases the liquidity of the market as well as the number of participants. Economically, policy actions are associated with a decline in market volume of 24.85 million NZUs, 1021 fewer transactions and 600 fewer market participants while lobby tactics are associated with an increase in market volume of 3.76 million NZUs and 63 additional market participants.

I explain these results by pointing to the overwhelming focus of policy makers on increasing environmental policy stringency and the overwhelming focus of the lobby activity of business lobby groups for less stringency and greater self-governance of the market. I support this explanation by highlighting the increase in the OECD's Environmental Policy Stringency (EPS) and Climate Policy Uncertainty (CPU) indices for New Zealand overtime and showing that an increase in the EPS index and CPU Index has a similar effect of constraining market activity as CRPA. Another possible explanation for the results I obtain is endogeneity. Some policy actions such as industrial allocations may actually determine the level of trading that market participants engage in and the level of market activity may then drive market participants to lobby policy makers to either increase or decrease the number of industrial allocations distributed to the market. I use instrumental variables (IV) analysis to sort out the direction of causality. My instrument is the Cabinet status (inside or outside of Cabinet) of the Minister of Climate

Change. This instrument should be largely exogenous to the decision of market participants to trade NZUs but is correlated with the CRPA implemented by policy makers. Ex ante, I expect the IV estimates to be larger than those provided by OLS models because of an underestimation of the effect of policy actions on ETS market activity. Ex post, I find that CRPA remains a significant driver of NZ ETS market activity and that the estimates of its impact are indeed larger when instrumented. I follow the approach suggested by Jiang (2017) in providing economic reasoning which explains the larger IV estimates.

This paper contributes to three main strands of literature. The first strand of literature explores the effect of the stringency of environmental policy instruments on energy consumption, technological innovation, carbon emissions and economic outcomes (Hassan et al., 2024; Frohm et al., 2023; Dechezlepretre et al., 2023; Dechezlepretre and Sato, 2017). I add to this literature by examining the effect of environmental policy stringency on the behavior of political actors in carbon markets and the flow on effects on carbon market microstructure dynamics.

The second strand relates to emerging evidence on the impact of corporate political activity on environmental policy. Recent work in this area has addressed the impact of environmental lobbying on firm's green innovation (Kwon et al., 2023) and the pricing of corporate climate lobbying in financial markets (Leippold et al., 2024); these papers quantify and utilize data on

corporate lobbying expenses and campaign contributions. Kim (2024) uses similar data to clarify the direction of environmental lobbying and showed that firms which own more green patents engage in pro-environmental lobbying. Another recent study making use of corporate lobbying expenses and campaign contributions data is An et al. (2024) which found that excessive lobbying decreases R&D investment and capital investment but increases a firm's cost of capital. Previous work on corporate climate lobbying has focused on its impact on climate change legislation (Paul et al., 2017; Brulle, 2018) and the enactment of climate polices (Meng and Rode, 2019; Delmas et al., 2016). The conventional measure of CPA in the literature is lobby expenditure by firms (Adelino and Dinc, 2014; Kerr et al, 2014; Bertrand et al., 2014; Borisov et al., 2016; Cao et al., 2018); given, however, that there is no public disclosure of lobby expenditure in New Zealand, I depart from this convention and present a measure of CPA which exploits the media and advocacy activity of the New Zealand Initiative. I, therefore, add to the CPA literature by examining a non-financial form of corporate climate lobbying which is more reliant on the use of media, power of persuasion and shaping public policy through position papers, technical reports and publicizing of research. I also focus on corporate climate lobbying within the specific context of an emissions trading scheme. The papers most closely related to my work are Niczyporuk (2024) and Bui and Houque (2015). Using firm-level data, Nicyporuk (2024) shows that larger firms with higher carbon intensity are more likely to lobby on EU ETS regulation. Bui and Houque (2015) studied

why firms either supported or opposed the legislation which established the NZ ETS. While I also examine lobbying within an ETS setting, my study differs in that I focus on the lobby activities of business lobby groups rather than individual firms and on market microstructure dynamics.

The third strand of literature I contribute to relates to the market microstructure of carbon markets. The majority of this literature has had a limited focus on intraday trading dynamics (Ibikunle et al., 2016) and bid and ask spreads (Mizrach and Otsubo, 2014; Ibrahim and Kalaitzoglou, 2016) within the EU ETS. This paper broadens the focus by studying the NZ ETS, which is a less studied climate policy setting, and examining a broader range of factors that influence trading activity and price formation within carbon markets.

In recognition of the fact that an ETS is a climate policy instrument shaped by the policy actions of policy makers and the corporate political activity of firms, this study combines both perspective to illustrate the dilectical nature and market consequences of climate politics and environmental policy stringency. The remainder of the paper is organized as follows. Section 2 discusses lobbying in New Zealand and the political background of the NZ ETS. Section 3 outlines the conceptual framework . Section 4 describes the data and variables used. Section 5 presents and discusses the empirical results and Section 6 concludes.

2 Lobbying, Politics and The NZ ETS

2.1 Lobbying by Industry and Business Groups in New Zealand

New Zealand does not currently regulate lobbyist. A Lobbying Disclosure Bill which was put forward by Green MP Holly Walker in 2012 failed because it was opposed by all the major industry and business lobby groups and criticized for being too broad in scope (Walker, 2014). New Zealand has been described as having a village lobbying environment where those who engage in lobbying, lobby as a collective, in contrast to the more individual firm approach in North America (Williams, 2014). Anderson and Chapple (2018) in painting a picture of the lobbying market in New Zealand through the number and distribution of lobbyists with swipe card access to Parliament found that 32% of cardholders represented corporations, 32% represented third-party lobbyist and only 9% represented industry bodies. These data suggest that business lobby groups may be more informal in their approach to influencing government policy. According to Roper (2006), who analyzed a sample of business publications, policy submissions, speeches and media releases of business lobby groups in New Zealand, corporate political activity (CPA) by these groups is carried out through public campaigning and proselytising, funding policy research with a pro-business ideological orientation, participation in political parties and official policy-making bodies, exchanging ideas with Treasury and Reserve Bank officials, and exerting influence

over the media. These CPA tactics fit into the formal and direct and informal and direct categories of the Katie and Hillman (2023) CPA schema. Roper further argues that the CPA of business lobby groups in New Zealand is shaped by free market fundamentalism and is generally aimed at maintaining a neoliberal, business friendly, policy regime; he also noted that the decision of firms to join business lobby groups in New Zealand appears to be driven by managerial political ideology and biases (Roper, 2006) which raises the question of the agency problem of CPA.

Cao et al. (2018) examined whether CPA aligns with the predictions of agency theory and found a negative relationship between CPA and firm value, thereby confirming that corporate lobbying is driven largely by managerial incentives and personal political interest (Unsal et al., 2016) and other firm-specific characteristics, such as weak corporate governance mechanism, which tend to induce agency problems (Aggarwal et al., 2012). Earlier work by Hadani and Schuler (2013) also found that CPA decreased firm value and profitability with subsequent investment in CPA leading to greater deterioration in financial return. These findings were further validated by Adelino and Dinc (2014) who used the 2008 financial crisis and the subsequent availability of stimulus payments from the US Government to demonstrate that distressed firms with weaker financial health became rent seeking, lobbied more on the Stimulus Act and as a result received a larger share of stimulus funds. Furthermore, CPA is dominated by larger firms (Bertrand et al.,

2014) which have limited growth prospects and engage in less investment and R&D expenditure (Aggarwal et al., 2012). Of particular interest to this paper, is the further finding by Bombardini and Trebbi (2012) that firms in sectors characterized by greater levels of competition tend to lobby together through the formation of trade associations and business lobby groups. A major implication of the empirical finding that CPA does not enhance firm value is that CPA is utilized by incompetent managers who are unable to adjust to the changing competitive environment and therefore seek to benefit from government subsidies as a means of maintaining their competitive advantage (Cao et al., 2016); this may be particularly true as it relates to the significant impact of climate policy on the ability of legacy firms to compete in the marketplace.

As there exists no register of lobbyist and no public disclosure of lobbying activity, the most visible medium through which lobbying can be observed in New Zealand is through the media and advocacy activity of industry and business groups. Two of the largest and most prominent of these lobby groups are the Employers and Manufacturers Association (EMA) and the New Zealand Initiative. The EMA has 7,000 members and is New Zealand's largest business association. It is the lead organization in the Business New Zealand (Business NZ) network which describes itself as a advocacy group for enterprise in New Zealand with the capability to influence the policy making process. The EMA/BusinessNZ also markets its advocacy expertise as a

key benefit to members and lists formal submissions on legislative change, consultation on non-legislative issues, discussions with officials and ministers as CPA tactics that it utilizes (EMA, 2023). The New Zealand Initiative is a business membership organization funded by the major companies in New Zealand. As indicated in Appendix A, several of the corporate members of the New Zealand Initiative (43%) are also members of the EMA/Business NZ Major Companies Group (MCG) network. The New Zealand Initiative also markets its advocacy expertise as a benefit to members and engages in similar CPA tactics as the EMA/BusinessNZ. In their seminal study of lobby group participation and the political reaction of firms to the introduction of New Zealand's Emissions Trading Bill, Bui and Houqe (2015) argued that firms participate in multiple business lobby groups as a way to increase the success of their lobby efforts. I extend these arguments by adding a perspective on the specialization levels of business lobby groups.

When firms participate in multiple business associations and lobby groups, they inevitably face constraints on their resources, including time, money, and personnel dedicated to lobbying efforts. In such a scenario, firms may employ a specialization strategy by requiring that at least one group have a special issues focus in its lobbying activities so as to differentiate between the various groups and justify the allocation of resources to each. As business lobby groups compete for the limited lobby resources of firms in the form of membership fees, they develop expertise in particular issues and at-

tract members based on their specialization level and focus on specific issues or policy areas to which individual firms have exposure. I demonstrate, in subsequent sections, that this specialization strategy is at play between the EMA and the New Zealand Initiative as it relates to climate issues.

2.2 The Politics of the NZ ETS

The New Zealand Emissions Trading Scheme (NZ ETS) has been a pivotal tool for policymakers in New Zealand to address climate change and meet international obligations. Successive political administrations have strategically utilized the NZ ETS to advance climate policy stringency. The government has explicitly identified the reformed NZ ETS as a key policy tool for achieving New Zealand's Nationally Determined Contribution (NDC) under the Paris Agreement. Since its inception, the NZ ETS has undergone several reviews and amendments. The passage of the Climate Change Response (Zero Carbon) Amendment Act 2019 set ambitious greenhouse gas (GHG) reduction targets for New Zealand. Politicians have incorporated these targets into the NZ ETS framework, ensuring that the scheme aligns with long-term emission reduction goals.

Post-2020, policymakers have engaged in extensive policy reviews and political intervention to increase the efficacy of NZ ETS as a climate policy tool. The post-2020 climate policy environment has been largely shaped by the then Green Party co-leader and Climate Change Minister, James Shaw,

who sought to move New Zealand towards a more stringent climate policy regime after facing the prospect of being ousted as leader of the Green Party over criticisms that he was not doing enough on climate issues (Wade, 2022; Witton, 2023). As a co-leader of the Green Party, James Shaw brought a strong commitment to environmental issues and climate action to the political arena. His appointment as Climate Change Minister signaled the then coalition government's intent to prioritize green policies and appealed to the Green Party's base of environmentally-conscious voters. Increasing the stringency of climate policies, including the NZ ETS, was seen as fulfilling the party's campaign promises and maintaining support among its core supporters. Shaw's policy objectives were centered around ambitious climate action and he advocated for more stringent regulations and targets within the NZ ETS framework to accelerate New Zealand's transition to a low-carbon economy. This advocacy drove the need for policy reviews and political intervention which resulted in significant politically induced climate policy uncertainty and NZU carbon price volatility. Furthermore, Shaw's tenure as Climate Change Minister coincided with a period of heightened global attention to climate change, including the implementation of the Paris Agreement and efforts to increase ambition in emission reduction targets. Under his leadership, New Zealand sought to align its climate policies, including the NZ ETS, with international commitments, necessitating policy reviews, political intervention and increased climate policy stringency.

3 Conceptual Framework

The decision of firms to engage in climate related corporate political activity (CRCPA) is conditional on their view of the policy environment while the implementation of climate related policy action (CRPA) is conditional on the policy objective of policy makers to either increase or decrease the level of environmental policy stringency. In the following, I discuss how the sentiment of firms towards the policy environment shapes the direction of their CRCPA and possible expectations of the subsequent impact of CRCPA on carbon market dynamics conditional on this sentiment. I then discuss how the policy objective of policy makers, either towards greater or lesser environmental policy stringency, influences the use of CRPA and the subsequent expectations for the market impact of these actions, conditional on the policy objective being targeted.

3.1 CRCPA and Environmental Policy Stringency

The CRCPA of firms can either be in the direction of advocating for greater environmental policy stringency and policy intervention or in the direction of advocating for less stringency and intervention. If firms want less stringency and political interference their corporate climate lobbying tactics will be targeted at reversing stringent polices and reducing political intervention in the market. If firms, however, want greater stringency their tactics will be targeted at influencing policy makers to enact stricter measures.

In countries, such as New Zealand, where dedicated lobbying expenditure and making political contributions are less prominent forms of corporate political activity, firms through their membership in business lobby groups engage in informal and direct lobbying tactics which rely heavily on the use of the media, commissioned research, position papers, commenting on proposed and existing regulations and regulatory co-creation and framing. If firms want less policy stringency the media statements, research and policy positions produced by their business lobby groups will largely be oppositional and negative if policy makers are proposing and enacting stricter environmental policy but supportive and positive otherwise. As member firms become exposed to the sentiment of their lobby groups through their media statements, research and policy positions this shapes the sentiments of these firms which in turn shapes their behavior as they engage in carbon market activity. An empirical implication of this is that the sentiment, whether it be positive or negative, should be reflected in the reaction of carbon prices to these media statements, research and policy positions. If the sentiment of these CRCPA tactics are positive then one can expect a positive reaction from carbon prices but if sentiment is negative the reaction should be negative. Furthermore, if the CRCPA tactics are aimed at advocating for greater self-governance of the market, this should increase rather than constrain market activity.

3.2 CRPA and the Climate Policy Objective of Policy Makers

From the perspective of policy makers, the main mechanisms through which CRPA is implemented within the context of carbon markets is through free allocations, ETS design and policy changes and supply and price controls of emissions units. As with CRCPA, if the sentiment towards the implementation of CRPA is negative then an empirical implication is that the reaction of carbon prices to the announcement of these policy actions should be negative but positive otherwise. As industrial allocations act as a subsidy (Ibikunle et al., 2016) and therefore do not have a policy objective of increasing stringency, the empirical implication of CRPA implemented through increased industrial allocation is that market liquidity and participation should increase. In the case of CRPA which makes use of ETS design and policy changes and supply and price controls of emissions units, if these are aimed at achieving greater stringency then the empirical implication is that market activity will be constrained as firms reduce their market activity in response to the more stringent policies. If, however, these are aimed at achieving less stringency then one would expect market activity to increase. Additionally, if the implementation of any of these CRPA are uncertainty inducing then I expect market activity to be constrained. If, however, the CRPA has the effect of providing policy certainty then I expect market activity to increase.

4 Data and Methodology

4.1 Event Study for Carbon Price Reaction to Climate Related Political Events

The first set of data I collect are related to a series of CRPA, CRCPA and politically induced events which I use to perform several event studies. I begin with the nine NZ ETS policy review consultations announced by the Minister of Climate Change between 2019 and 2023. I use the mid-point of the consultation periods and the release of the final Cabinet decisions as event dates in event study A, which estimates the reaction of the NZU carbon price to the implementation of CRPA through these ad hoc policy reviews of the ETS. A description and related event dates for all the NZ ETS policy review consultations which took place from 2012-2021 and 2022-2023 are presented in Table 1 and Table 2 respectively.

Insert Table 1 here

Insert Table 2 here

In event study B, I exploit the high level of CRCPA of the New Zealand Initiative in relation to the NZ ETS. Between 2019 and 2023, the New Zealand Initiative made six submissions to the NZ ETS policy review consultations which occurred during this period. The lobby group also released twelve research reports and media statements related to the NZ ETS in the

same period. I, therefore, treat the submission, report and media statement release dates as events and estimate the response of the NZU market around several event windows. I obtain the submission, report and media statement release dates from the New Zealand Initiative website. Finally, To paint a picture of the wider political environment in which the NZ ETS operates, I estimate the response of the NZU market to 31 political, media, legislative , regulatory and legal events, inclusive of five national elections, in event study C. I collect the dates of these events from media reports.

To conduct the event studies, I use the dates collected above as event dates and estimate the abnormal returns using an event date clustering approach for the entire NZU market. My baseline event window is [-30, 30]. I also consider the time intervals [-10, 30] and [-30, 60] to capture reactions that may precede and exceed the baseline event window. To calculate cumulative abnormal returns for the event studies, I estimate a benchmark model for NZU price expectation by constructing a market index using the daily prices of NZUs. I collect historical daily price data for NZUs from Bloomberg and calculate the daily and cumulative returns. After selecting a base date and initial index value of 100, I calculate the index value for each day by multiplying the cumulative return for that day by the initial index value. I estimate:

$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_t$, where $CAR(t_1, t_2)$ is the average cumulative abnormal return of the daily NZU price between day t_1 and day t_2.

The abnormal returns are given by:

$AR_t = R_t - (\alpha_i + \beta_i R_{m,t})$, where R_t is the NZU price on day t and $R_{m,t}$ is the cumulative return of the NZU market index on day t.

4.2 NZ ETS Market Activity Data

I present data on the market microstructure of the NZ ETS using the The New Zealand Emissions Trading Register, maintained by the Ministry of Environment. The register provides monthly data on various aspects of the NZ ETS. I focus on NZUs transferred (volume), transaction quantity and number of participants as measures of market activity and collect data on these for the 2010-2022 period. I aggregate the data up to the yearly level. Figures 2 and 3 illustrate the variation in transaction volume and quantity over the sample period.

Insert Figure 2 here

Insert Figure 3 here

4.3 CRPA and CRCPA Data and Variable Construction

I identify three main mechanisms for CRPA, namely, industrial allocations, Minister's directives for free allocations and ad hoc policy reviews of the NZ ETS. Industrial allocations are free units of NZUs allocated to eligible industry applicants on a yearly basis. I collect data on the number of

units issued as industrial allocations from the New Zealand Emissions Trading Register. Minister's directives for free allocations refers to free units of NZUs given to market participants at the discretion of the Minister of Climate Change. I create two variables for this type of CRPA, a variable which is a count of the number of directives issued by the Minister in a given year for 2010-2022 and another which I use in robustness tests is a yearly summation of the number of NZUs released to the market as a result of these directives. The third mechanism of CRPA I focus on is the NZ ETS policy review consultations which are adhocly undertaken at the discretion of the Minister. I create a dummy variable for this type of CRPA by assigning a value of 1 to years where policy reviews of the NZ ETS are undertaken and 0 otherwise. I therefore obtain measures for three types of CRPA: industrial allocations, Minister's directives and NZ ETS policy reviews.

My main identification strategy for CRCPA focuses on the lobby activities of the New Zealand Initiative. I treat the six ETS review submissions, twelve policy reports and media statements on the NZ ETS released by the New Zealand Initiative as measures of CRCPA. I construct two variables from this data, a variable which is a count of the number of submissions, policy reports and media statements released in a given year from 2010-2022 and another which I use in robustness tests is a dummy variable which takes the value of 1 in years where the New Zealand Initiative releases submissions, policy reports and media statements on the NZ ETS and 0 otherwise. I adopt the approach

of Bombardini and Trebbi (2012) in treating the count of submissions, policy reports and media statements as a measure of CRCPA intensity and the dummy variable as a measure of CRCPA presence. These serve as non-financial measures of CRCPA. As data on the the membership fee income of the New Zealand Initiative is not publicly available, I use EMA/BusinessNZ membership fee income as a financial measure of CRCPA. My basis for this is the shared membership of 43% of New Zealand Initiative members in the EMA/BusinessNZ. I collect data on the income earned from membership fees from the annual reports of the EMA/BusinessNZ. As the EMA/BusinessNZ advertises advocacy on government policy as one of its core services, the EMA/BusinessNZ membership fees can reasonably be treated as a proxy of lobby expenditure by EMA/BusinessNZ member firms.

4.4 Macro-level Data and Variables

I collect a range of macro-level variables which I use as controls. I collect yearly data for GDP per capita growth, industrial production, percentage value added, crude oil production and crude oil import prices from the OECD statistics database. I also collect data for the New Zealand activity index and the business confidence index from Statistics New Zealand. Finally, I follow Julio and Yook (2012) in using elections as a proxy for general policy uncertainty and controlling for it. I create an election year variable by collecting election dates from the Electoral Commission and assigning a value of 1 to years where an election is held and 0 otherwise.

4.5 Environmental Policy Stringency, Climate Policy Uncertainty, Economic Policy Uncertainty and Climate Attention Index Data

As I argue that the direction of CRPA and CRCPA is conditional on the level of environmental policy stringency (EPS), I collect data from the OECD EPS index for New Zealand for the 2010-2022 period and include it as a control variable. The EPS index is a country-level index constructed by assigning scores on a scale from 0-6 to 13 climate change and air pollution policy instruments from three sub-indices which are aggregated into a single index which increases scores for countries with more stringent policies (Kruse et al., 2022). Figure 4 illustrates the New Zealand EPS Index over the sample period and indicates an increase in policy stringency over time.

Insert Figure 4 here

An intense political environment around climate issues, can create significant uncertainty for market participants in an ETS. Berestycki et al. (2022) sought to capture this uncertainty in the OECD climate policy uncertainty (CPU) index. The index is based on newspaper coverage frequency of climate issues. Data for the New Zealand CPU index is only available from 2010-2018. Figure 5 illustrates the CPU Index for New Zealand for this period and indicates an increase in climate policy uncertainty over time.

Insert Figure 5 here

In further analyses where I examine the determinants of CRCPA, I include measures of economic policy uncertainty (EPU) and climate attention. I obtain data for the New Zealand EPU index from Ali et al. (2022). The index is a newspaper based measure of policy related terms. I also make use of the climate attention index (CAI) developed by Arteaga-Garavito et al. (2022). The CAI measures the extent to which climate change is discussed in the news media by analyzing the tweets of major newspapers within a country. All variables are described in Table 3.

Insert Table 3

4.6 Empirical Strategies

I organize the panel data around the 24 economic activities covered by the NZ ETS and obtain 312 activity-year observations. Using multi-way fixed effect models I estimate the effect of climate related corporate political activity and climate related policy action on NZ ETS market activity using various specifications of the following :

$$Y_{i,t} = \alpha_i + \beta lnCRCPA_t + \gamma X_{i,t} + \epsilon_{i,t} \qquad (1)$$

$$Y_{i,t} = \alpha_i + \beta lnCRPA_t + \gamma X_{i,t} + \epsilon_{i,t} \qquad (2)$$

Where $Y_{i,t}$ represents the various measures of NZ ETS market activity for activity i in year t, which includes NZUs transferred, transaction quantity and number of participants. α_i is the activity fixed effects. $lnCRCPA_t$ represents

the two measures of climate related corporate political activity (ln(number of CRCPA) and ln(EMA membership fees)) in year t , while $lnCRPA_t$ represents the three measures of climate related policy action (ln(number of CRPA), ln(industrial allocation) and NZ ETS review) in year t. $X_{i,t}$ is a vector of the control variables which includes the EPS index, GDP per capita growth, the NZ activity index, industrial production, percentage value added, crude oil production, crude oil import prices and the election year dummy. I include activity fixed effects, sector fixed effects and cluster standard errors by activity-year.

I also utilize the following specifications which estimate the impact of environmental policy stringency and climate policy uncertainty on NZ ETS market activity:

$$Y_{i,t} = \alpha_i + \beta lnEPSIndex_t + \gamma X_{i,t} + \epsilon_{i,t} \qquad (3)$$

$$Y_{i,t} = \alpha_i + \beta lnCPUIndex_t + \gamma X_{i,t} + \epsilon_{i,t} \qquad (4)$$

Where $Y_{i,t}$ and α_i are the same as in equations 1 and 2, $lnEPSIndex_t$ is the measure of environmental policy stringency in year t and $lnCPUIndex_t$ is the measure of climate policy uncertainty in year t. $X_{i,t}$ is the same vector of the controls in equations 1 and 2.

5 Empirical Results

5.1 Summary Statistics

In Table 4, I provide summary statistics on the main variables of interest. On average, the New Zealand Initiative released 1 ETS review submission, policy report or media statement on the NZ ETZ per year and the EMA/BusinessNZ received, on average, NZD$6.9 M in annual membership fees from 2010 and 2022. With an estimated membership of 7000, the average lobby expenditure made by EMA/BusinessNZ members is NZD$985.71 per year over the sample period. The implementation of climate related policy actions is robust with an annual average of 1 NZ ETS review consultations per year, 15 Minister's directive and 26.6 M NZUs issued to market participants as a result of these directives. The number of NZUs issued by Minister's directive is 5.12 times larger than the annual average of 5.2 M issued via industrial allocation. As it relates to NZ ETS market activity, over the 13 years from 2010 to 2022, an annual average of 114 M NZUs were traded from an average of 3,238 transactions by 2,333 market participants.

5.2 Empirical Findings: Event Studies

I begin the empirical investigation with event study A which investigates the NZU price impact of CRPA implemented through NZ ETS review consultations. As indicated in panel A of Table 5, I find that the announcement of the 2012 and 2018 Cabinet decisions for the reviews conducted in those years

exhibit positive cumulative abnormal return (CAR) of 40.78% and a negative CAR of -31.57% respectively, with both being statistically significant at the 10% level. The second review of 2021 which consulted on proposed changes to the issuing of industrial allocations to market participants was received positively by the market with a positive CAR of 35.84% which is statistically significant at the 10% level. The six review consultations conducted between 2022 and 2023 all resulted in negative CARs, however, only one of these is statistically significant. The review in question was the first one conducted in 2023 which consulted on proposed changes to limits and price control settings in the ETS. With a negative CAR of 47.17% which is statistically significant at the 5% level, this particular review had the largest price impact of the 12 review consultations examined.

Insert Table 5 here

I explain the largely negative response of the market to the NZ ETS review consultations conducted between 2022 and 2023 by pointing to the strident opposition of the New Zealand Initiative to the increased intervention of policy makers in the ETS during this period. The results of event study B, displayed in Table 6, show that most of the ETS review submissions, policy reports and media statements released by the New Zealand initiative in 2022 and 2023 had a largely negative sentiment towards the Government's ETS policies resulting in negative CARs. As it is the only event with a statistically significant negative CAR, I single out the media statement of April 11, 2023

which resulted in a negative CAR of 62.38% which is statistically significant at the 1% level. The media statement was an opinion editorial written by Dr. Eric Crampton, Chief Economist at the New Zealand Initiative, almost a month before the Government began its first review for 2023 which consulted on proposed changes to limits and price control settings in the ETS. The editorial took a predominantly critical and skeptical stance towards the Government's ETS policy and argued against the price cap mechanism which was proposed and would be later consulted on in the first review for 2023. This negative stance, towards the overall policy objectives of policy makers for the NZ ETS review, would have already influenced the sentiment of market participants, thereby demonstrating the import of the CRCPA carried out by the New Zealand Initiative in shaping market sentiment and response to the implementation of CRPA by policy makers.

Insert Table 6 here

The results for event study C, where I investigate the reaction of the NZU price to 31 political, media, regulatory and legal action events related to the ETS are shown in Appendix B. The event with the most significant price impact was the passage of the Industrial Allocation Reform Amendment Act which resulted in a positive CAR of 61.17% which is statistically significant at the 1% level.

5.3 Empirical Findings: CRCPA and ETS Market Activity

In the following section I explore the relationship between my measures of CRCPA intensity, CRCPA presence and the three measures of ETS market activity, namely, NZUs transferred (volume), transaction quantity and number of participants. Table 7 reports the coefficient estimates for the specification of Equation 1 where the CRCPA intensity variable is used.

Insert Table 7 here

Columns 1 and 3 indicate a positive relationship between NZUs transferred, the number of NZ ETS participants and the CRCPA carried out by the New Zealand Initiative, both results are also statistically significant at the 1% level. The coefficient estimate in column 1 shows that a percentage increase in the number of submissions, policy reports and media statements by the New Zealand Initiative on the ETS is associated with a 3.3% increase in NZUs transferred which represents an increase of approximately 3.762 million NZUs in economic terms. The coefficient estimate in column 3 indicates that for a percentage increase in CRCPA there is an increase in the number of market participants by 2.7% which represents approximately 63 more participants being involved in the NZ ETS. Column 2 shows that there is no significant relationship between transaction quantity and the CRCPA tactics of the New Zealand Initiative.

To check the robustness of these results, I use the CRCPA presence variable as an alternative measure and obtain consistent results with larger coefficient estimates. I report these results in Panel A of Table 8. I also utilize a random effects linear regression as an alternative estimation model and obtain results which correspond with the baseline.

Insert Table 8 here

For the specification of Equation 1, where the variable for CRCPA is the annual membership fees/lobby expenditure paid by EMA/BusinessNZ members, I obtain insignificant results, across all measures of NZ ETS market activity. These results, reported in Panel B of Table 8, support my thesis that when firms share membership across business lobby groups, they will engage in strategies aimed at managing limited lobbying resources by requiring that the groups prioritize and specialize in particular issues or policy areas. In this instance, the New Zealand Initiative has developed expertise in lobbying on climate issues while the EMA/BusinessNZ focuses on other issues.

To further confirm the specialization of the New Zealand Initiative in lobbying on climate issues, I want to rule out any possible influence that the lobby expenditure made by the firms which share membership with both lobby groups may have on the CRCPA tactics of the New Zealand Initiative. To do this, I estimate a regression which seeks to determine whether EMA membership fees are a driver of the New Zealand Initiative's CRCPA tactics. The results, reported in Table 9, confirm that this is not the case and

indicate that the increase in environmental policy stringency and climate attention overtime are the main drivers. In unreported results, I also uncover a statistically significant and sizeable positive relationship between climate policy uncertainty and CRCPA. The other drivers of the CRCPA tactics include economic policy uncertainty, crude oil prices, crude oil production and the NZU carbon price. I also included my three measures of climate policy actions in the regression. The results indicate a positive association between the CRCPA tactics of the New Zealand Initiative and CRPA implemented through industrial allocation but a negative relationship with CRPA implemented through Minister's directive. CRPA implemented through NZ ETS policy review consultations also exhibits a negative coefficient, however, this result is not statistically significant.

Insert Table 9 here

As an additional check, I follow Bertrand et al. (2014) in calculating an annual climate related Herfindahl Index (HHI) which measures how concentrated on climate issues the lobby activities of the New Zealand Initiative and EMA/BusinessNZ are across all the issues they lobby on. I do this by squaring the sum of all the climate related policy submissions as a percentage of all policy submissions made by both lobby groups in a given year. Formally, I calculate:

$$HHI_{NZI_t} = \left(\frac{C_{NZI_t}}{T_{NZI_t}}\right)^2$$

$$HHI_{EMA_t} = \left(\frac{C_{EMA_t}}{T_{EMA_t}}\right)^2$$

Where:

HHI_{NZI_t} is the Herfindahl Index representing the concentration of lobby activities on climate issues by the New Zealand Initiative (NZI) in a given year. The annual average HHI for the NZI is 0.03.

C_{NZI_t} is the total number of climate-related policy submissions made by the New Zealand Initiative in a given year. Between 2010 and 2022, 14 such submissions were made.

T_{NZI_t} is the total number of policy submissions made by the New Zealand Initiative across all issues in a given year. Between 2010 and 2022, a total of 76 submissions were made.

HHI_{EMA_t} is the Herfindahl Index representing the concentration of lobby activities on climate issues by the EMA/BusinessNZ in a given year. The annual average HHI for the EMA/BusinessNZ is 0.01.

C_{EMA_t} is the total number of climate-related policy submissions made

by the EMA/BusinessNZ in a given year. Between 2010 and 2022, 27 such submissions were made.

T_{EMA_t} is the total number of policy submissions made by the EMA/BusinessNZ across all issues in a given year. Between 2010 and 2022, a total of 297 submissions were made.

I extend the empirical analysis by exploring the relationship between my HHI measures and the three measures of ETS market activity. Table 10, which reports the results for the specification of Equation 1 where the measures of CRCPA are HHI_{NZI_t} and HHI_{EMA_t}, shows that these measures have a similar effect as my measures of CRCPA intensity and presence.

Insert Table 10 here

5.4 Empirical Findings: CRPA and ETS Market Activity

I now turn attention to the results for my three measures of CRPA. I begin with CRPA implemented through Minister's directive and report in Panel A of Table 11 the coefficient estimates for the specification of Equation 2 where the variable for CRPA is the number of Minister's directives issued each year.

Insert Table 11 here

The coefficient estimates across all measures of NZ ETS market activity are all statistically significant at the 1% level and indicate an inverse relationship with Minister's directive. In column 1, the 21.8% decrease in NZUs transferred represents a decline in volume of 24.852 million NZUs in economic terms. For transaction quantity in column 2, the 31.5% decrease represents 1,021 fewer transactions and for number of participants in column 3, the 25.7% decrease translates to 600 fewer market participants.

As a robustness check of these results, I use the actual number of NZUs authorized annually by Minister's directive as an alternative measure and find that the results, which are reported in Panel B of Table 11, are consistent with the baseline results. These results, as well as the baseline results remain robust with alternative estimation methods.

For the specification of Equation 2, where the variable for CRPA is the dummy variable for whether or not an NZ ETS policy review consultation is held in a given year, I obtain results which suggest that this particular CRPA

increases the number of market participants but reduces market volume and quantity. These results are reported in Panel A of Table 12.

Insert Table 12 here

For the specification of Equation 2, where the variable for CRPA is the number of industrial allocations issued to market participants, the results are in the expected direction as the coefficient estimates across all measures of NZ ETS market activity indicate a positive relationship. Results are reported in Panel B of Table 12.

5.5 Addressing Endogeneity of CRPA Implemented Through Minister's Directive and Industrial Allocation

While the underlying economics of NZ ETS policy reviews suggest that they are exogenous, CRPA implemented through Minister's directive and industrial allocation raise an issue of endogeneity as they represent NZUs which are distributed to market participants which they may then trade in the market. Changes in the distribution of NZUs, resulting from these two types of CRPA, can directly influence market volume, transaction quantity, and the number of participants. For instance, an increase in industrial allocation to a specific sector may lead to more units being transferred within that sector, affecting transaction quantities and potentially attracting more participants. Furthermore, firm's may lobby the Minister to either increase or decrease the issuance of NZUs through Minister's directive and industrial allocation

based on their level of market activity. In Table 13, I use an instrumental variable (IV) approach (two-stage least squares (2SLS) regression) to address this issue, and instrument these two measures of CRPA.

My instrument is a dummy variable for the Cabinet status of the Minister of Climate Change in a given year which takes the value of 1 if the Minister of Climate Change is a Minister inside Cabinet and 0 otherwise. In New Zealand's governmental structure, there are two main categories of ministers: those inside the Cabinet and those outside of it. Ministers outside of Cabinet do not hold a seat in the Cabinet. While they still have ministerial responsibilities and may oversee specific policy areas or government agencies, their decision-making power and influence may be more limited compared to Cabinet ministers. They are not part of the Cabinet discussions and do not have access to the same level of privileged information as Cabinet ministers. The Cabinet status of the Minister of Climate Change is likely to be correlated with CRPA given that policy actions are generally debated and voted on at Cabinet. If the Minister is inside Cabinet, the opinions of his colleagues may influence the type of CRPA and whether a particular CRPA being considered by the Minister is implemented. The Minister may also be able to exert influence over his or her Cabinet colleagues so that decisions on policy actions are made in his or her favour. If, however, the Minister is outside of Cabinet, they may have less influence in the collective decision making of Cabinet. The Cabinet status of the Minister of Climate Change,

should therefore, serve as a strong instrument for CRPA. Indeed, I do find that this is the case as the F-statistics from the first-stage regressions exceed 10 for both ln(Number of CRPA) reported in Panel A and ln(Industrial Allocation) reported in Panel B. Furthermore, the first-stage F-statistic is the same across all the regressions, indicating that the instrument is equally strong in each model. The exogeneity assumption for the instrument is also reasonable since it is unlikely that market participants make trading decisions based on whether or not the Minister of Climate Change is a member of Cabinet.

Insert Table 13 here

The IV estimates I obtain are larger than those obtained from the ordinary least squares (OLS) models. To explain these results, I adopt the classification system suggested by Jiang (2017) and classify the endogeneity issue I am addressing as corrective endogeneity. According to Jiang (2017), in a case of corrective endogeniety, the underlying economics suggests that the true effect of the treatment variables are underestimated and the purpose of the IV is to correct this bias resulting in larger estimates. I explain my IV estimates by arguing that the underlying economics of the phenomenon I am studying do indeed suggest a downward bias in OLS estimates of the sample correlation between my variables for CRPA and ETS market activity. My basic intuition for the relative magnitude of OLS estimates and IV estimates is that it is more likely that policy actions have a greater effect on market

activity than vice versa. While an ETS is theoretically a market where the trading activity between buyers and sellers of emissions units sets the price of carbon, it is, in practice, a policy controlled market where the policy actions of policy makers tend to have an outsized effect on the trading decisions of market participants. Market participants may indeed lobby policy makers but these lobby tactics may not always be successful or effective. The effects of policy actions, however, are quite direct and more readily observable as indicated by the NZU price reactions reported in event study A and C.

5.6 Empirical Findings: EPS, CPU and ETS Market Activity

In this section, I further the analysis by isolating the impact of the increase in environmental policy stringency and climate policy uncertainty in New Zealand overtime. Table 14 reports the coefficient estimates for Equation 3 and Equation 4 which relates the EPS index and the CPU index to the measures of NZ ETS market activity. In both Panel A, which reports the results for the EPS index and Panel B, which reports the results for the CPU index, market volume, transaction quantity and the number of participants all experience declines when there is increased environmental policy stringency and climate policy uncertainty. These results suggest that EPU and CPU have similar market constraining effects as CRPA and support my thesis that the market impact of CRPA is conditional on policy stringency

and policy uncertainty.

Insert Table 14 here

5.7 Discussion of CRPA and CRCPA Market Activity Findings

As independent measures, environmental policy stringency (EPS) and climate policy uncertainty (CPU) have significant impacts on liquidity, transaction quantity and market participation. The coefficient estimate in column 1 of Table 14 suggest that there is a decrease of between 50% to 100% in market volume for every 1% increase in EPS and CPU. These results confirm the market constraining effects of the increased levels of EPS and CPU in New Zealand overtime and I now use this as a basis for explaining the results I obtain for my CRPA and CRCPA variables. I begin with the results for CRPA implemented through industrial allocations. Because industrial allocations are planned and legislated for in advance of their distribution to market participants who qualify, they offer some level of certainty to market participants. Additionally, the policy objective of industrial allocations is not aimed at achieving greater policy stringency but to actually provide leniency and encourage market participation. As I had predicted that any CRPA that is not aimed at achieving greater policy stringency should increase market activity, I explain the positive association between industrial allocation and NZ ETS market activity by pointing to the fact that it is a le-

nient rather than stringent policy. Furthermore, as many market participants rely on industrial allocations as the first port of call to meet their surrender obligations under the ETS, the legislated supply of these units provides a significant level of certainty which allows for planning of market activity in advance. The results for climate policy uncertainty reported in Table 14 indicate an inverse relationship between climate policy uncertainty and NZ ETS market activity; as industrial allocations serve the purpose of reducing climate policy uncertainty through legislating certainty of NZU supply, I also explain its positive association with NZ ETS market activity by pointing to the fact that it is a certainty inducing policy action. This also explains the significant positive reaction of the market to the passage of the Industrial Allocation Reform Amendment Act in event study C. Of importance to this discussion and the earlier literature on the agency costs of CPA is the fact that industrial allocations act as a subsidy which firms lobby on. The positive relationship between industrial allocation and CRCPA reported in Table 9 implies that the New Zealand Initiative, through its advocacy activities, is successful in securing the benefit of this particular subsidy for its members. New Zealand Initiative member firms are generally larger and older firms which the literature suggest are more likely to engage in CPA due to agency issues (Bertrand et al., 2014; Aggarwal et al., 2012; Cao et al., 2016).

On the other hand, CRPA implemented through Minister's directive induces climate policy uncertainty as the distribution of these units are entirely

at the discretion of the Minister of Climate Change. While data on the number of NZUs issued by Minister's directive is publicly available, very little is known about the timing and volume of these units, hence creating a significant amount of uncertainty for market participants resulting in the market constraining impacts I observe for this particular CRPA. As the number of NZUs issued by Minister's directive is 5x larger than that issued via industrial allocation, an alternative explanation is that Minister's directives represent a positive supply shock to the market making it less necessary for market participants to engage in the market to meet their surrender obligations.

As it relates to CRPA implemented through NZ ETS policy review consultations, the ad hoc nature with with these can be implemented by policy makers represent a significant source of uncertainty for market participants as the timing of proposals for major policy changes which usually accompany these policy reviews is generally unknown to market participants. A cursory content analysis of the six policy review consultations held in 2022 and 2023 indicate that the policy objective of most of the proposed policy changes which were being consulted on where aimed at increasing policy stringency; this is further confirmed by media reports which highlight the ambitious policy goals of the then Minister of Climate Change, James Shaw (Wade, 2022; Witton, 2023). Furthermore, as indicated in event study A, the market has a largely negative sentiment towards NZ ETS policy reviews. The combined policy uncertainty and stringency of this particular CRPA explains its con-

straining effect on market liquidity and transaction quantity. I explain the positive association with the number of market participants by pointing to the fact that the policy consultation process could possibly have the effect of influencing the participation of firms that have an interest in being voluntary participants in the market.

In respect of the positive association between CRCPA, market liquidity and the number of market participants, I explain these results by highlighting the positive sentiment of the New Zealand Initiative towards emissions trading. A cursory content analysis of the policy submissions, reports and media statements released by the New Zealand Initiative indicate advocacy for greater market self-governance and a general positive sentiment towards the NZ ETS itself. The negative sentiment, registered in event study B, was towards the policy actions of policy makers rather than the NZ ETS as a climate policy tool.

6 Conclusion

This paper investigates the relationship between political interactions, lobby tactics, and policy actions on the market microstructure of the New Zealand Emissions Trading Scheme (NZ ETS). The paper presents results which confirm the impact of political events on the NZU carbon price, analyzes the effects of policy actions and lobby tactics on market activity, and explores the role of environmental policy stringency and climate policy uncertainty in shaping these impacts.

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	INDIRECT	DIRECT
FORMAL	• Market actions • Corporate charitable giving • CSR programs • Litigation	• Lobbying • Campaign contributions • Covert political giving • Expert witness testimony • Supplying position papers or technical reports • Commissioning research projects and reporting results
INFORMAL	• Constituency-building strategies • Advocacy advertising • Public relations, press conferences and political education programs • CEO/corporate activism • Political party affiliation • Venue shifting/regulatory arbitrage/jurisdiction shopping • Deliberate rule breaking (also known as "Asking for forgiveness, not permission") • Geopolitical jockeying • Dormancy	• Speaking honoraria • Paid travel • Government official visit • Personal service/political connections • Favors for politicians • Self-regulation • Regulatory co-creation and framing • Commenting on proposed regulations • Corruption/bribery

Figure 1: This figure shows a detailed categorization of CPA tactics, along the two dimensions of directness and formality, adopted from Katic and Hillman (2024).

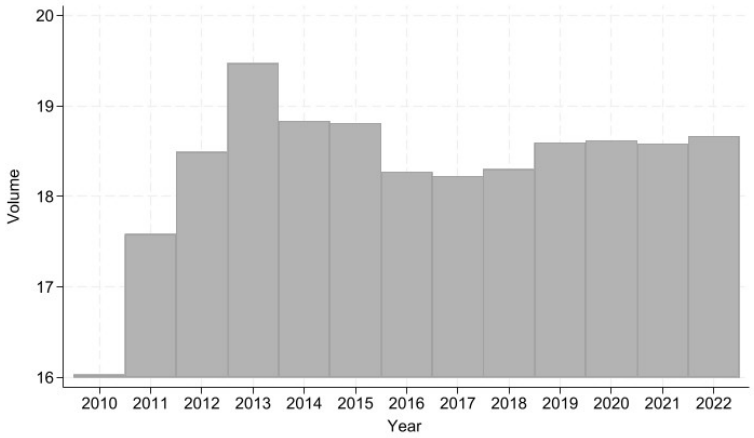

Figure 2: This figure shows the annual variation in transaction volume for NZUs traded between NZ ETS market participants from 2010 and 2022.

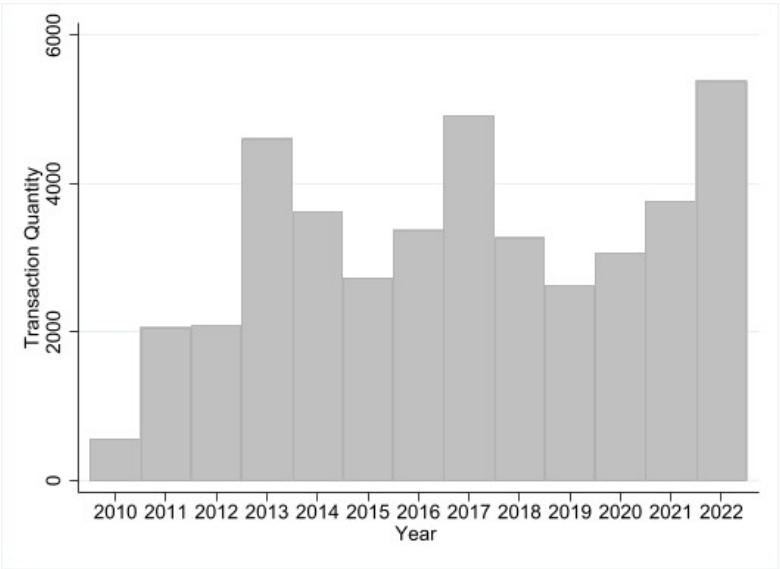

Figure 3: This figure shows the annual variation in transaction quantity for NZUs traded between NZ ETS market participants from 2010 and 2022.

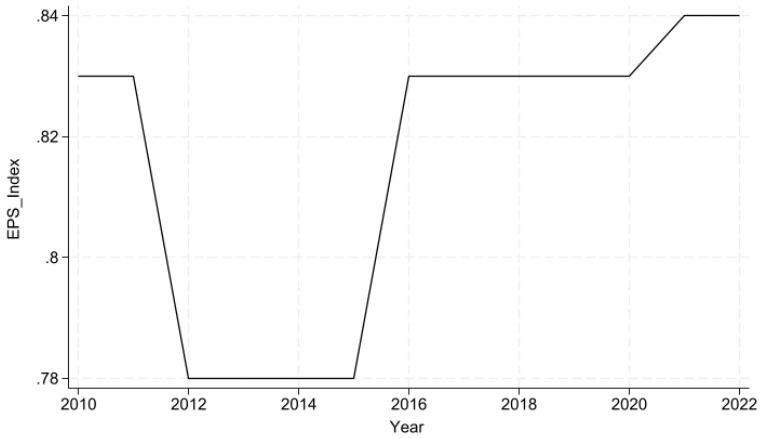

Figure 4: This figure illustrates the trend in the New Zealand EPS Index from 2010 to 2022. The index shows an increasing level of environmental policy stringency over time.

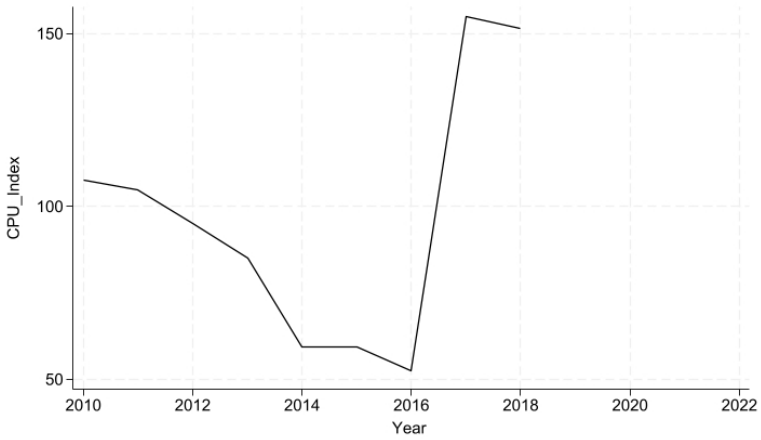

Figure 5: This figure illustrates the trend in the CPU index for New Zealand from 2010 to 2018. The index shows an increasing level of climate policy uncertainty over time.

Table 1: **Description of NZ ETS review consultations for 2012-2021**. This table provides descriptions for the six NZ ETS review consultations which took place between 2012 and 2021. The event dates reported in column 3 are the mid-points of the start and end of each consultation period. These dates along with the dates for release of the Cabinet decisions are used as event dates in event study A.

Start of Consultation	End of Consultation	Event Date	Cabinet Decision	Consultation Description
April 11,2012	May 11,2012	April 26,2012	August 5,2012	Consultation on Updating the NZ ETS Trading Scheme
November 24,2015	April 30,2016	February 11, 2016	May 10,2016	New Zealand Emissions Trading Scheme Review 2015/16
August 8,2018	September 18,2018	August 28,2018	November 25,2018	Consultation on options to improve regulatory predictability of ETS and better align unit supply
December 20,2019	February 28,2020	January 24,2020	June 2,2020	Consultation on Government's proposals for the provisional emissions budget and the accompanying proposed reform of NZ ETS settings
April 20, 2021	May 28,2021	May 9,2021	November 28,2022	Consultation on Proposed NZ ETS and Synthetic Greenhouse Gas Levy regulation updates 2021
July 8,2021	September 17,2021	August 13,2021	December 20,2022	Consultation on options to improve industrial allocation (IA) policy in the New Zealand Emissions Trading Scheme (NZ ETS) and Consultation on designing a governance framework for the New Zealand Emissions Trading Scheme

Table 2: **Description of NZ ETS review consultations for 2022-2023**. This table provides descriptions for the six NZ ETS review consultations which took place between 2022 and 2023. The event dates reported in column 3 are the mid-points of the start and end of each consultation period. These dates along with the dates for release of the Cabinet decisions are used as event dates in event study A.

Start of Consultation	End of Consultation	Event Date	Cabinet Decision	Consultation Description
March 14,2022	April 22,2022	April 2,2022	September 30,2022	Consultation on Managing exotic afforestation incentives by changing the forestry settings in the NZ Emissions Trading Scheme
March 17,2022	April 28,2022	April 7,2022	July 21,2022	Consultation on Proposed changes to regulations for the NZ ETS 2022
August 2,2022	August 30,2022	August 16, 2022	December 20,2022	Consultation on Changing the surrender/repayment penalty for small forestry participants in the New Zealand Emissions Trading Scheme
September 8,2022	October 6,2022	September 22, 2022	December 15,2022	Consultation on Proposed changes to NZ ETS limit and price control settings for units for 2022
May 19,2023	June 16,2023	June 2, 2023	July 24,2023	Consultation on Annual updates to New Zealand Emissions Trading Scheme limits and price control settings for units 2023
June 19,2023	August 11,2023	July 15, 2023	October 14,2023	Consultation on Proposals to redesign the permanent forest category in the New Zealand Emissions Trading Scheme

Table 3: **Definition of Variables**. This table defines the variables used in this paper.

Variables	Definitions
CRCPA Variables	
ln(CRCPA Intensity)	Natural log of count of number of policy and media reports on the ETS released by the New Zealand Initiative
CRCPA Presence	Takes the value of 1 if a policy or media report is released in a given year and 0 otherwise
ln(EMA membership fees)	Natural log of annual membership fee income earned by the EMA
CRPA Variables	
ln(Number of CRPA)	Natural log of the number of Minister's directive issued each year
ln(CRPA NZUs)	Natural log of the number of NZUs issued to market participants by Minister's directive each year
ln (Industrial Allocation)	Natural log of the number of industrial allocations issued to market participants each year
NZ ETS Review	Variable which takes the value of 1 if there is an NZ ETS review in a given year and 0 otherwise
NZ ETS Market Activity Variables	
NZUs Transferred	Natural log of annual number of NZUs transferred between by NZ ETS participants
Transaction Quantity	Natural log of annual count of individual trades made by NZ ETS participants
Number of Participants	Natural log of annual number of NZ ETS participants
Business Environment Variables	
ln(Business Confidence Index)	Natural log of survey measures of planned production, orders and finished goods in the business sector
EPU Index	Natural log of economic policy uncertainty; news based index of frequency of economic policy coverage
Macro-level Variables	
GDP Per Capita Growth Rate	Growth rate (annual change) of total value of goods and services scaled by population
NZ Activity Index	Index of broad measures of economic activity in New Zealand
Industrial Production	Index measure of output of industrial establishments in New Zealand
Percentage Value Added	Measure of value generated by the production of good and services in New Zealand
Crude Oil Production	Quantity of oil extracted from the ground in New Zealand
Crude Oil Import Prices	Annual prices of crude oil imported by New Zealand
Election Year	Variable which takes the value of 1 if there is an election in a given year and 0 otherwise
Policy Environment Variables	
ln(EPS Index)	Natural log of country-level stringency index of climate change and air pollution policy instruments
CAI	Country-level index of climate change news coverage on twitter
ln(CPU Index)	Natural log of climate policy uncertainty; news based index of frequency of climate policy coverage

Table 4: **Descriptive Statistics of Variables**. This table presents descriptive statistics of the variables in my sample from 2010-2022.

Variables	N	Mean	SD	P25	Median	P75
CRCPA Variables						
CRCPA Intensity	312	1.23	2.12	0	0	1
CRCPA Presence	312	0.38	0.48	0	0	1
EMA membership fees	312	$6.9M	$4.8M	$6.2M	$7.0M	$7.3M
CRPA Variables						
Number of CRPA	312	15.46	11.12	10	12	21
CRPA NZUs	312	26.6M	42.2M	161810	443046	56.4M
Industrial Allocation	312	5.2M	1.8M	4.3M	4.8M	6.6M
NZ ETS Review	312	0.46	0.49	0	0	1
NZ ETS Market Activity Variables						
NZUs Transferred	312	114.0M	62.7M	86.0M	117.0M	128.0M
Transaction Quantity	312	3237.54	1251.44	2631.00	3274.00	3759.00
Number of Participants	312	2333.23	741.89	2136.00	2386.00	2427.00
Business Environment Variables						
ln(Business Confidence Index)	312	4.60	0.01	4.59	4.61	4.62
EPU Index	312	1297.83	383.50	1047.96	1317.32	1531.21
Macro-level Variables						
GDP Per Capita Growth Rate	312	3.01	1.74	1.50	3.50	3.90
NZ Activity Index	312	32.40	15.82	26.86	34.82	37.47
Industrial Production	312	100.08	3.64	97.2	100.1	102.9
Percentage Value Added	312	12.77	4.64	6.86	14.63	16.62
Crude Oil Production	312	1553.38	520.45	1119.57	1640.31	1925.32
Crude Oil Import Prices	312	81.55	24.52	58.00	77.70	106.00
Election Year	312	0.31	0.46	0	0	1
Policy Environment Variables						
EPS Index	312	0.82	0.02	0.78	0.83	0.83
CAI	312	0.23	0.02	0.21	0.22	0.24
ln(CPU Index)	216	4.50	0.38	4.09	4.56	4.68

Table 5: **Cumulative Abnormal Returns for Event Study A.** This table reports the CARs for event study A which uses NZ ETS review consultation dates and dates of the subsequent Cabinet decision announcement as event dates for an event study of the impact of CRPA on the NZU carbon price. Panel A reports the CARs for NZ ETS reviews which took place for 2012-2021, while Panel B reports the CARs for reviews which took place 2022-2023. The event window is [-30,30]. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Panel A	
Event	**CAR**
2012 Review	2.16%
2012 Cabinet Decision	40.78%*
2015 Review	-3.28%
2015 Cabinet Decision	5.21%
2018 Review	-9.36%
2018 Cabinet Decision	-31.57%*
2019 Review	3.15%
2019 Cabinet Decision	23.70%
2021 Review #1	7.02%
2021 Cabinet Decision #1	-14.74%
2021 Review #2	35.84%*
2021 Cabinet Decision #2	-21.81%
Panel B	
2022 Review #1	-13.72%
2022 Cabinet Decision #1	0.60%
2022 Review #2	-9.24%
2022 Cabinet Decision #2	8.54%
2022 Review #3	2.00%
2022 Cabinet Decision #3	-21.81%
2022 Review #4	1.74%
2022 Cabinet Decision #4	-19.55%
2023 Review #1	-47.17%**
2023 Cabinet Decision #1	31.35%
2023 Review #2	26.21%
2023 Cabinet Decision #2	-3.93%

Table 6: **Cumulative Abnormal Returns for Event Study B**. This table reports the CARs for event study B which uses release dates for submissions, policy reports and media statements released by the New Zealand Initiative as event dates for an event study of the impact of CRCPA on the NZU carbon price. The event windows are [-10,10], [-30,30] and [-30, 60].*** p < 0.01, ** p < 0.05, * p < 0.1.

New Zealand Initiative ETS Submissions, Policy and Media Reports 2022-2023			
Date	**Title**	**Event Window**	**CAR**
March 7, 2022	Let the emissions trading scheme do the work	[-10,+10]	-14.70%
		[-30,+30]	-1.65%
		[-30,+60]	-4.16%
March 21, 2022	Expensive climate policies have "no effect on emissions" – Pretennce of Necessity Report	[-10,+10]	-4.57%
		[-30,+30]	-5.70%
		[-30,+60]	-7.04%
April 4, 2022	Path to net zero	[-10,+10]	2.74%
		[-30,+30]	-14.04%
		[-30,+60]	-17.03%
April 22, 2022	Submission: Managing exotic afforestation incentives	[-10,+10]	-1.00%
		[-30,+30]	4.29%
		[-30,+60]	-3.20%
April 26, 2022	Government chips away at emissions trading scheme	[-10,+10]	-0.89%
		[-30,+30]	1.11%
		[-30,+60]	-6.04%
September 28, 2022	Strong support for the ETS to get us to Net Zero	[-10,+10]	-7.03%
		[-30,+30]	4.32%
		[-30,+60]	-11.67%
April 11, 2023	How to make the emissions trading scheme bulletproof	[-10,+10]	-1.59%
		[-30,+30]	-25.59%
		[-30,+60]	-62.83%***
August 11, 2023	Submission: ETS review and permanent forestry	[-10,+10]	7.68%
		[-30,+30]	53.53%***
		[-30,+60]	58.46%**

Table 7: **CRCPA Intensity and NZ ETS Market Activity**. This table shows the results for the the specification of Equation 1 where the variable for CRCPA is the number of ETS review submissions, policy reports and media statements released by the New Zealand Initiative in a given year. The dependent variables are three measures of NZ ETS market activity, namely, NZUs transferred (volume), transaction quantity and number of participants.*** p $<$ 0.01, ** p $<$ 0.05, * p $<$ 0.1.

	NZ ETS Market Activity		
	(1) **Volume**	**(2)** **Quantity**	**(3)** **Number of Participants**
ln(CRCPA Intensity)	0.0325***	0.00419	0.0269***
	(6.47)	(1.02)	(17.05)
EPS index	-26.72***	-4.442***	-3.896***
	(-38.57)	(-7.30)	(-10.20)
GDP PC Growth	0.151***	0.170***	0.175***
	(5.54)	(8.47)	(28.25)
NZ Activity Index	0.0167***	0.0231***	0.0170***
	(7.58)	(13.03)	(26.21)
Industrial Production	-0.132***	-0.170***	-0.124***
	(-8.28)	(-14.17)	(-24.80)
Percentage Value Added	0.0520*	0.0326	-0.00272
	(3.08)	(1.81)	(-0.27)
Crude Oil Production	-0.00183***	-0.00171***	-0.00104***
	(-25.47)	(-28.15)	(-36.96)
Crude Oil Import Prices	-0.0145***	-0.0138***	-0.0123***
	(-8.50)	(-11.92)	(-27.51)
Election Year	-0.201***	-0.00463	-0.321***
	(-3.62)	(-0.10)	(-12.64)
Constant	56.11***	30.72***	25.19***
	(37.06)	(25.03)	(47.68)
Adjusted R-squared	0.903	0.837	0.911
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312

Table 8: **CRCPA Presence, EMA Membership Fees and NZ ETS Market Activity**. Panel A of this table shows the results for the the specification of Equation 1 where the variable for CRCPA is a dummy variable which takes the value of 1 if the New Zealand Initiative releases an ETS review submissions, policy reports or media in a given year and 0 otherwise. Panel B shows the results for the the specification of Equation 1 where the variable for CRCPA is the membership fee income of the EMA which represents the lobby expenditure of its 7000 members.The dependent variables are three measures of NZ ETS market activity, namely, NZUs transferred (volume), transaction quantity and number of participants.*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	NZ ETS Market Activity		
Panel A	**(1) Volume**	**(2) Quantity**	**(3) Number of Participants**
ln(CRCPA Presence)	0.535***	0.108	0.379***
	(7.94)	(1.91)	(17.82)
Constant	57.11***	31.43***	25.08***
	(41.37)	(27.13)	(49.35)
Adjusted R-squared	0.909	0.839	0.909
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312
Panel B			
ln(EMA Membership Fees)	-0.0326	-0.0209	0.0685
	(-0.14)	(-0.11)	(0.61)
Constant	49.72***	30.16***	18.39***
	(12.26)	(9.28)	(9.51)
Adjusted R-squared	0.885	0.837	0.852
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312

Table 9: **Determinants of CRCPA**.This table shows results of a regression with CRCPA represented by the number of ETS review submissions, policy reports and media statements released by the New Zealand Initiative as the dependent variable and EMA membership fees as the main explanatory variable.*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	Climate Related Corporate Political Activity	
	(1) **ln(CRCPA Intensity)**	**(2)** **ln(CRCPA Intensity)**
ln(EMA Membership Fees)	2.013	1.047
	(0.35)	(0.53)
EPU index		0.00527***
		(15.52)
EPS index		117.8***
		(11.43)
CAI		274.2***
		(12.94)
NZ ETS Review		-0.351
		(-0.98)
ln(CRPA Intensity)		-0.657**
		(-2.97)
ln(Industrial Allocation)		13.95***
		(17.42)
Crude Oil Import Prices		0.122***
		(16.92)
Crude Oil Production		0.0107***
		(12.16)
ln(NZU Carbon Price Index)		-3.971***
		(-7.90)
ln(Business Confidence Index)		1.786
		(-5.32)
Constant	-39.85	-392.6***
	(-0.44)	(-4.42)
Adjusted R-squared	-0.003	0.939
N	312	312

Table 10: **Climate Related HHI and NZ ETS Market Activity**. This table shows the results for the the specifications of Equation 1 where the variables for CRCPA are the climate related HHI of the New Zealand Initiative and the EMA/Business NZ. Panel A shows the results for the climate related HHI of the New Zealand Initiative while Panel B shows the results for the climate related HHI of the EMA/Business NZ. The dependent variables are three measures of NZ ETS market activity, namely, NZUs transferred (volume), transaction quantity and number of participants.*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	NZ ETS Market Activity		
Panel A	**(1) Volume**	**(2) Quantity**	**(3) Number of Participants**
HHI_{NZI_t}	2.908**	-1.241	4.577***
	(3.04)	(-1.67)	(15.43)
Constant	51.80***	28.72***	23.57***
	(29.08)	(21.54)	(41.89)
Adjusted R-squared	0.889	0.838	0.901
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312
Panel B			
HHI_{EMA_t}	16.98***	-3.534	4.082**
	(7.39)	(-1.51)	(2.91)
Constant	45.63***	30.57***	18.62***
	(26.69)	(22.90)	(25.58)
Adjusted R-squared	0.899	0.838	0.855
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312

Table 11: **CRPA and NZ ETS Market Activity**. Panel A of this table shows the results for the the specification of Equation 2 where the variable for CRPA is the number of Minister's directive issued in a given year. Panel B shows the results for the the specification of Equation 2 where the variable for CRPA is the number of NZUs authorized by Minister's directive in a given year. The dependent variables are three measures of NZ ETS market activity, namely, NZUs transferred (volume), transaction quantity and number of participants.*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	NZ ETS Market Activity		
Panel A	**(1) Volume**	**(2) Quantity**	**(3) Number of Participants**
ln(Number of CRPA)	-0.245***	-0.378***	-0.297***
	(-7.66)	(-17.96)	(-29.88)
Constant	42.29***	19.14***	11.09***
	(19.64)	(13.96)	(18.26)
Adjusted R-squared	0.899	0.905	0.948
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312
Panel B			
ln(CRPA NZUs)	-0.0618***	-0.0195*	-0.0494***
	(-7.78)	(-2.52)	(-13.54)
Constant	41.44***	27.39***	13.28***
	(20.79)	(16.59)	(19.55)
Adjusted R-squared	0.901	0.841	0.899
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312

Table 12: **NZ ETS Review, Industrial Allocation and NZ ETS Market Activity**. Panel A of this table shows the results for the the specification of Equation 2 where the variable for CRPA is a dummy variable for whether or not an NZ ETS policy review consultation is held in a given year. Panel B shows the results for the the specification of Equation 2 where the variable for CRPA is the industrial allocation awarded to market participants each year. The dependent variables are three measures of NZ ETS market activity, namely, NZUs transferred (volume), transaction quantity and number of participants.*** p < 0.01, ** p < 0.05, * p < 0.1.

	NZ ETS Market Activity		
Panel A	**(1) Volume**	**(2) Quantity**	**(3) Number of Participants**
NZ ETS Review	-0.158**	-0.130**	0.210***
	(-3.58)	(-3.37)	(11.65)
Constant	48.21***	29.01***	20.80***
	(27.36)	(23.96)	(28.88)
Adjusted R-squared	0.888	0.842	0.884
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312
Panel B			
ln(Industrial Allocation)	2.435***	1.623***	0.562***
	(53.54)	(26.07)	(10.28)
Constant	14.29***	6.564***	11.42***
	(16.26)	(5.62)	(12.53)
Adjusted R-squared	0.986	0.927	0.876
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312

Table 13: **Cabinet Status of Climate Change Minister as IV for CRPA**. This table shows the results from an instrumental variable regression (2SLS) where two measures of CRPA are instrumented with a dummy variable for whether or not the Minister of Climate Change is a Minister inside or outside of Cabinet in a given year. Panel A shows the results when ln(Number of CRPA) is instrumented with this variable while Panel B shows the results when ln(Industrial Allocation) is instrumented with this variable. The dependent variables are three measures of NZ ETS market activity, namely, NZUs transferred (volume), transaction quantity and number of participants.*** p < 0.01, ** p < 0.05, * p < 0.1.

	NZ ETS Market Activity		
Panel A	**(1) Volume**	**(2) Quantity**	**(3) Number of Participants**
ln(Number of CRPA)	-1.563***	-1.684***	-0.346***
	(-5.27)	(-6.06)	(-7.61)
Constant	22.74***	23.39***	16.59***
	(7.01)	(7.69)	(33.31)
First-stage F-statistics	25.93	25.93	25.93
R-squared	0.537	0.184	0.950
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312
Panel B			
ln(Industrial Allocation)	3.619***	3.901***	0.802***
	(19.3)	(11.48)	(4.95)
Constant	-9.870***	-11.76**	9.366***
	(-4.90)	(-3.23)	(5.38)
First-stage F-statistics	76.62	76.62	76.62
R-squared	0.965	0.772	0.881
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312

Table 14: **EPS, CPU and NZ ETS Market Activity**. This table shows the results for environmental policy stringency and climate policy uncertainty. Panel A shows the specification of Equation 3 where the EPS index is the explanatory variable while Panel B shows the specification of Equation 4 where the CPU index is the explanatory variable. The dependent variables are three measures of NZ ETS market activity, namely, NZUs transferred (volume), transaction quantity and number of participants.*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	NZ ETS Market Activity		
Panel A	**(1) Volume**	**(2) Quantity**	**(3) Number of Participants**
ln(EPS Index)	-19.97***	-3.370***	-1.867***
	(-27.37)	(-6.59)	(-4.11)
Constant	24.87***	25.72***	17.21***
	(12.02)	(19.78)	(22.38)
Adjusted R-squared	0.885	0.837	0.852
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	312	312	312
Panel B			
ln(CPU Index)	-0.711***	-0.335***	-0.171***
	(-10.28)	(-18.74)	(-7.60)
Constant	56.62***	30.07***	23.27***
	(44.36)	(91.29)	(55.91)
Adjusted R-squared	0.894	0.984	0.921
Controls	Yes	Yes	Yes
Activity FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
N	216	216	216