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The Impact of Market Competition on Corporate Environmental Responsibility

Evidence from the United States of America

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Authorship declaration

"I hereby declare and confirm that this thesis is entirely the result of my own work except where otherwise indicated. I acknowledge the supervision and guidance I have received from Christine Zulehner. This thesis is not used as part of any other examination and has not yet been published."

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Abstract

In this paper, I empirically investigate the impact of market competition on corporate environmental responsibility (CER). I use data of US firms and find evidence that the impact differs for competition between US firms and competition from foreign firms. While internal competition significantly improves CER, foreign competition has no significant impact. The role of climate engagement on this relation is limited and only positively impacts the relation between foreign competition and CER. The impact of competition induced-CER on firm value also differs for internal and foreign competition. Firm value has an nonsignificant relation with internal competition-induced CER and a positive relation with foreign competition-induced CER. Lastly, I find no evidence that market competition impacts innovation induced-CER. Overall, my results show that anticompetitive agreements do not only have an impact on CER of the involved firms, but also on CER in the whole market.

Keywords: Market Competition, Corporate Environmental Responsibility, Sustainability

JEL Classification: K320; L190.

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1. Introduction

"Sustainability is one of the key priorities of the Netherlands Authority for Consumers and Markets (ACM) … Agreements between undertakings can contribute in an effective manner to the realization of public sustainability objectives." – ACM (2021) in Guidelines on Sustainable Agreements

Agreements between corporations that distort or restrict competition are generally prohibited or restricted by governments around the world. Yet, there are exemptions to this rule. Competition authority applying a consumer welfare standard can allow anticompetitive agreements if the buyers of the products concerned obtain a fair share of the benefits of that agreement (see e.g. article 101(3) TFEU, in the European Union, and *Reiter v. Sonotone Corp.*, 1979, in the United States). In recent years, a new shift in the area of the consumer welfare standard is taking place; the notion of a fair share for consumers is getting more broadly interpreted. Competition authorities and scholars have argued that consumers do not need to receive a full fair share if society at large benefits. This shift is especially present in the European Union, where competition authorities increasingly focus on sustainability. The Dutch and Greek competition authorities already made steps towards this direction by introducing guidelines and commissioning technical reports on sustainability agreements (ACM, 2021; Inderst, Sartzetakis & Xepapadeas, 2021). Furthermore, last February, the European Commission organized the conference "Competition Policy and the Green Deal" to look into possible revisions of guidelines on horizontal agreements. Also in the United States, the call for more socially responsible markets is increasing, partly thanks to the 2019 Business Roundtable statement in which influential business leaders called for collective corporate social responsibility (Schinkel & Treuren, 2021).

This novel way of looking at the consumer welfare standard raises new relevant questions on the relation between market competition and corporate environmental responsibility (CER). CER can be defined as ''the duty to cover the environmental implications of the company's operations, products and facilities; eliminate waste and emissions; maximize the efficiency and productivity of its resources; and minimize practices that might adversely affect the enjoyment of the country's resources by future generations'' (Mazurkiewicz, 2004). The decision of companies to invest in CER can be an altruistic or a strategic choice. The altruistic view asserts that companies take social interests into account when making business decisions, even if it limits profitability (Elhauge, 2005). Pro-CER behaviour can be on behalf of stakeholders or initiated by company insiders themselves (Bénabou & Tirole, 2010). The strategic view on the other hand stresses that companies profit from doing good; CER adds firm value (Baron, 2001; Bénabou & Tirole, 2010).

While a vast literature on the topic of CER exists, its relation with market competition has been largely neglected (Duanmu, Bu & Pittman, 2018). Most literature that does address this area, focuses on whether and to what extent merger control should include sustainability considerations. For instance, Schinkel and Treuren (2020) argue that actions of competition authorities to stimulate sustainability could backfire. Anticompetitive agreements could be sold to the authorities by greenwashing ex-ante, while ex-post the firms concerned engage in exploitative behaviour, thereby harming consumers. Yet, the overall impact of market competition on sustainability, or more specifically CER, remains understudied. As such, in this paper, I empirically test this notion. I complement existing literature by taking novel data and investigating new areas of this topic: i.e. analysing the impact of climate engagement; empirically testing the difference between altruistic and strategic induced CER; and studying the non-linear relation of competition and innovation-induced CER.

The remainder of the paper is organized as follows. Firstly, I will discuss literature on the relationship between market competition and CER, and formulate my hypotheses. In the next chapter, I go over the methodology and data, and provide descriptive statistics. Thereafter, I test my hypothesis in numerical order and discuss my findings. Lastly, I give a conclusion, go over the implications of this paper and provide possibilities for future research.

2. Literature review

To understand the impact of competition on environmental performance, it is vital to first understand why firms engage in CER activities in the first place. Most research focuses on the aforementioned strategic view; firms do good to perform well. This improved performance is driven via four channels: consumers, financial markets, employees and regulators. As for the consumer channel, companies can theoretically: charge higher prices for environmentally-friendly products, since consumers have a willingness to pay for these products (Trivedi, Patel & Savalia, 2015; Vlosky, Ozanne & Fontenot, 1999); signal a high quality of products to consumers (Waddock & Graves, 1997); improve the image consumers have of the firm (Mitchell & Ramey, 2011; Siegel & Vitaliano, 2007); differentiate their products from competitors in the eyes of consumers, thereby escaping competition (Bourreau, Jullien & Lefouili, 2018). From the perspective of financial markets, it has been well documented that altruistic investors and financial institutions are willing to pay a premium for green companies, leading to a lower cost of capital (Barber, B. M., Morse, A., & Yasuda, A., 2021; Hong & Kacperczyk, 2009; Reboredo, Quintela & Otero, 2017). Most banks nowadays have implemented sustainable financing frameworks to promote environmental goals (Leins, 2020). Furthermore, environmentally-friendly firms are better at attracting and retaining employees (Brekke & Nyborg, 2008; Turban & Greening, 1997). Lastly, higher CER is associated with more lobbying power, which significantly decreases the likelihood of regulators taking harmful regulatory actions against the firm (Bansal & Roth, 2000). The altruistic view, on the other hand, focuses on companies that do good, even when these actions come at a clear cost for the company (Elhauge, 2005). The reason for such actions can be found in the altruistic motives of either managers or owner-shareholders. If shareholders are altruistic, they will appoint managers that take philanthropic actions or force the company to focus on CER by other means.[1] Even if shareholders solely care about stock returns, altruistic managers might still engage in philanthropic actions, resulting in agency problems (Bénabou & Tirole, 2010). Vogel (2005) provides some evidence in this direction, by showing a link between the rise of corporate social responsibility and the separation of ownership. Overall, it seems that the strategic and the altruistic view coexist; empirical research provides support for both views (Fernández-Kranz & Santaló, 2010).

Market competition interacts with both strategic and altruistic CER. With strategic CER, the impact can be largely summed up by a decision between differentiation or cost leadership. While CER undoubtedly comes with costs and drives up prices, the benefits of differentiation might offset these costs. Firms may be inclined to increase CER in order to differentiate themselves from competitors, thereby partly escaping the market. Especially in competitive environments, focusing on CER can help firms attract more consumers, investors and qualified employees compared to their peers (Bourreau et al., 2018). Higher market competition does however harm lobbying efforts. In more competitive environments, firms have difficulty organizing for collective action, because the benefits that these firms reap from beneficial regulatory actions are shared by a relatively large number of parties (MacKenzie & Collin,

[1] For instance, in a recent case, activist investors together with environmental groups successfully went to court against Shell to force the company to increase its CER-efforts (Rechtbank Den Haag, 2021).

2008). The impact of competition on altruistic CER is less straightforward. Indeed, there is little evidence that market competitiveness would somehow lead to (the attraction of) more altruistic managers or owner-stockholders. Yet, low market competition does give companies more scope for philanthropic actions. In 1935, Hicks coined the term: "The best of all monopoly profits is a quiet life". He explained this statement as follows. Running a company efficiently, and finding optimal output levels, comes at subjective costs (for managers). Moreover, the variation in monopoly profit on either side of the optimal output level is often small. So, the subjective costs involved in securing perfect adaptation of the most profitable output might outweigh the small gains. Free from the pressure of rivals, monopolists lack incentives to produce efficiently. Generally, this "quiet life" is seen as a negative consequence of low market competition (Niels, Jenkins & Kavanagh, 2011). Yet, in a CER context, its impact is more ambiguous. Monopolies are undoubtedly worse innovators than firms that face significant competition (Aghion, Bloom, Blundell, Griffith & Howitt, 2005). Moreover, innovation is one of the main drivers of CER (Aghion, Hemous & Veugelers, 2009). However, they might have more scope for altruistic CER. Subjective costs outweighing the marginal gains of optimal production levels, do not necessarily outweigh the subjective gains that an altruistic manager gets from improving corporate environmental performance. Therefore, managers of monopolists might shift their effort from maximizing profit towards CER. In a recent paper, Francoeur, Lakhal, Gaaya and Saad (2021) find that managers with less pressure of profit-maximization on average seem to perform better environmentally.[2] Yet, there is a third channel outside of the traditional strategic and altruistic view which impacts the relationship between market competition and environmental performance. Monopolists lower output levels to maximize profits. As such, they exhaust a given stock of resources more slowly than firms in competitive markets (Hotelling, 1929). Solow (1974) once remarked on this finding that therefore "the monopolist is the conservationist's friend". Duanmu et al. (2018) update this proposition by replacing "conservationist" with "environmentalist". Output reductions associated with monopolies can be expected to be accompanied by lower levels of resource usage and consequently a decrease in the production of negative externalities such as pollution, greenhouse gas emission and global warming.

[2] It should be noted that Francoeur et al. (2021) use manager power instead of market power. Nevertheless, the same reasoning holds; an altruistic manager that faces low subjective costs for not focusing on efficient production either due to manager power or market power, will shift effort levels to environmental performance.

Taking these channels into account, several studies have empirically investigated the impact of market competition on corporate social and environmental responsibility. Overall, these studies sketch an ambiguous picture. Fernández-Kranz and Santaló (2010) and Flammer (2015) conclude that competition has a significant positive impact on corporate social responsibility. Hawn and Kang (2013) on the other hand, find a significant negative impact of competition on social responsibility. Fisman, Heal and Nair (2006), using the same data, fail to find any significant relation at all. Declerck and M'Zali (2012) try a different approach and split corporate social responsibility goals into different areas. They find that competition only significantly impacts employee and stockholder-related social actions. However, no relation is found with social actions impacting other stakeholders, e.g. actions benefiting the environment. Duanmu et al. (2018), using data from China, find that intensified market competition has an overall negative impact on environmental performance of firms. In the most recent paper, Aghion, Bénabou, Martin & Roulet (2020) find that competition fosters innovations in general, but only has an insignificant advantage towards cleaner innovations.

2.1. Hypotheses

Market competition brings with it both advantages and disadvantages in the area of CER. This might explain why studies on the relation between competition and environmental performance have ambiguous results. Yet, theoretically there is more evidence for a positive impact of competition on CER. Higher market concentration, ceteris paribus, positively impacts the firms' incentive to increase CER to escape competition (Bourreau et al., 2018). In competitive environments, CER can be used to attract consumers, investors and qualified employees (Fernández-Kranz & Santaló, 2010). Moreover, lower innovation levels that accompany monopolies further hurt CER-efforts of these firms. It is reasonable to assume that a large scope for altruistic CER and lower output levels of monopolies are unable to offset these disadvantages.

Hypothesis 1: market competition positively impacts CER.

Over the last three decades, researchers from Gallup News, Pew Research, Yale and the George Mason University run a yearly string of surveys on climate awareness and engagement of the American public.[3] These surveys show that the number of Americans that believe

[3] Surveys can be found in figures A1, A2 and A3 in appendix A

climate change is happening, and moreover largely human-caused, has been steadily increasing over the last decade. Nowadays, two-thirds of the American people feel a personal responsibility to help reduce global warming, and a majority is willing to sacrifice economic growth to protect the environment (Gallup, 2021; Leiserowitz et al., 2021). Climate awareness is especially high among younger generations, nota bene the people entering the labour market (Ballew et al., 2019). Furthermore, sustainable sector funds in the US have significantly outgrown the overall equity market in the last decade, indicating increased climate engagement of investors. Nearly every large investment bank has sustainability funds (Clemens, Dai & Hugo, 2020). It is reasonable to assume that the strategic benefits of CER have grown and that it is increasingly possible to escape competition by focusing on CER.

Hypothesis 2: the positive impact of market competition on CER in the US depends on climate engagement of the American public.

Many studies have been conducted on whether environmental performance creates firm value. Yet, the results are quite inconclusive. There are studies that show that environmental performance increases financial performance (Dowell, Hart & Yeung, 2000; Wahba, 2008; Konar & Cohen, 2001), decreases financial performance (Jaggi & Freedman, 1992; Wagner, Van Phu, Azomahou & Wehrmeyer, 2002) and has no significant impact on financial performance at all (Murray, Sinclair, Power & Gray, 2006). A possible reason for these ambiguous results can be found in market competition. While both strategic and altruistic CER improves environmental performance, they affect firm value differently. In competitive markets, firms theoretically improve environmental performance because of strategic reasons, while monopolists improve their performance because of altruistic reasons. As such, in competitive markets, environmental initiatives should add firm value, while better environmental performance of monopolies should decrease firm value.

Hypothesis 3: market competition-induced CER positively impacts firm value.

Innovation is a significant component of the battle against climate change and global warming. According to the United Nations, by 2030, artificial intelligence and digital technology could reduce global carbon dioxide emissions by ten to twenty percent (United Nations Framework Convention on Climate Change, 2021). Environmental innovation is often essential in achieving corporate climate goals (Aghion et al., 2009; Carrión-Flores & Innes, 2010). Earlier research on the relationship between market power and innovation finds an inverted U-shape. Given a competitive market, a decrease in competition initially leads to more innovation until innovation reaches an optimum, after which additional decreases in competition start negatively impacting innovation (Aghion et al., 2005). Hawn & Kang (2013) were the first to test the curvilinear relation between competition and corporate social responsibility, but find little evidence for such a relation. I instead look more directly to innovation-induced environmental performance and test whether its relationship with market competition takes on an inverted U-shape.[4]

Hypothesis 4: the relationship between market competition and innovation-induced environmental performance takes on an inverted U-shape.

3. Methodology & Data

3.1. Methodology

To test my hypotheses, I run regressions over panel data. Firstly, to test the general impact of competition on CER, I regress environmental performance on competition. Moreover, I control for firm size ('Employees'), firm profitability ('ROA') and a firms' debt structure ('Leverage').[5] I also absorb company (Y_i) and year fixed effects (Y_t) when using firm-level data and industry (Y_s) and year fixed effects when using industry-level data. I discuss my variables in more detail in paragraph 3.2.1.

(1) $$\text{Environmental Performance}_{i,t} = \beta_0 + \beta_1 * \text{Competition}_{i,t} + \beta_2 * \text{Employees}_{i,t} + \beta_3 * \text{ROA}_{i,t} + \beta_4 * \text{Leverage}_{i,t} + Y_i + Y_t + \varepsilon$$

β_0 = constant
β_a = regression coefficients
ε = error term

To test hypothesis 2, I run the same regression, but add an interaction term of the competition and climate engagement variables, 'Competition × Climate Engagement'. This interaction variable shows whether the impact of competition on CER depends on the climate engagement of the American public.

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[4] Note that for hypotheses 1, 2 and 3, as a robustness check, I control for firm innovativeness and absorb its effect on CER to limit endogeneity problems (see also par. 3.2.3.).

[5] I run additional tests where I also control for firm innovativeness and state ownership. However, because data on these variables are limited, these variables are solely used to add robustness to my results.

(2) $\text{Environmental Performance}_{i,t} = \beta_0 + \beta_1 * \text{Competition}_{i,t} + \beta_2 * (\text{Competition}_{i,t} \times \text{Climate Engagement}_t) + \beta_3 * \text{Employees}_{i,t} + \beta_4 * \text{ROA}_{i,t} + \beta_5 * \text{Leverage}_{i,t} + \text{Y}_i + \text{Y}_t + \varepsilon$

β_0 = constant
β_a = regression coefficients
ε = error term

Thirdly, I use a similar regression to investigate the impact of competition-induced CER on firm value. I regress my firm value proxy, 'Tobins Q', on an interaction variable 'Competition × Environmental Performance'.

(3) $\text{Tobins Q}_{i,t} = \beta_0 + \beta_1 * \text{Competition}_{i,t} + \beta_2 * \text{Environmental Performance}_{i,t} + \beta_3 * (\text{Competition}_{i,t} \times \text{Environmental Performance}_{i,t}) + \beta_4 * \text{Employees}_{i,t} + \beta_5 * \text{ROA}_{i,t} + \beta_6 * \text{Leverage}_{i,t} + \text{Y}_i + \text{Y}_t + \varepsilon$

β_0 = constant
β_a = regression coefficients
ε = error term

Lastly, I run a quadratic regression to test whether the relationship between market competition and innovation ('R&D Expenses') induced environmental performance takes on an inverted U-shape. The quadratic relation is determined by the interaction variables 'Competition × R&D Expenses' and 'Competition × Competition × R&D Expenses'.

(4) $\text{Environmental Performance}_{i,t} = \beta_0 + \beta_1 * \text{Competition}_{i,t} + \beta_2 * \text{R\&D Expenses}_{i,t} + \beta_3 * (\text{Competition}_{i,t} \times \text{R\&D Expenses}_{i,t}) + \beta_4 * (\text{Competition}_{i,t} \times \text{Competition}_{i,t} \times \text{R\&D Expenses}_{i,t}) + \beta_5 * \text{Employees}_{i,t} + \beta_6 * \text{ROA}_{i,t} + \beta_7 * \text{Leverage}_{i,t} + \text{Y}_i + \text{Y}_t + \varepsilon$

β_0 = constant
β_a = regression coefficients
ε = error term

For all hypotheses, I use standard OLS regressions with fixed effects and robust standard errors. I perform tests on both firm-level and industry-level data. Industry-level data are computed by taking the mean firm-level value per industry and year. A possible drawback of these regressions is potential endogeneity of the competition variable and related reverse causation issues with CER. Therefore, I also use trade data as a yearly exogenous competition shock. I elaborate further on my competition variables in paragraph 3.2.1.2.

3.2. Data

To run these regressions, I use data on US firms from 1995 to 2018. I combine several databases to construct my dataset. Firstly, I use Compustat for financial data. Compustat provides annual data on firm fundamentals of public firms. Secondly, for environmental data, I access the MSCI (formerly KLD) database. MSCI's environmental ratings are based on assessments of independent experts and are considered to be more objective than self-reported environmental activities used in most other indexes (Fernández-Kranz & Santaló, 2010). Therefore, the MSCI database is frequently used in empirical studies investigating the impact of competition on corporate social and environmental responsibility (see for example Fernández-Kranz & Santaló, 2010; Fisman et al. 2006; and Hawn & Kang, 2013). Data on US trade are collected from the U.S. International Trade Commission (USITC) DataWeb. Lastly, I use ORBIS (BvD) to gain data on state ownership.

To limit issues with my dataset, I make several adjustments. Firstly, I focus exclusively on diversified firms which report a primary sector of activity and non-diversified firms to limit endogeneity issues. Six-digit NAICS codes are used to classify industry sectors. As such, I drop firms that focus on multiple six-digit NAICS industries. This filtering mechanism is in line with earlier papers by Arora & Cason (1995) and Fernández-Kranz & Santaló (2010). Secondly, I drop duplicates with the same identifier and year; company-years with missing firm- or industry-level information; firms with negative total assets; and firms with negative leverage ratios. Thirdly, I drop firms for which only a limited number of environmental areas, less than four strengths or concerns, were investigated by MSCI. Fourthly, I use z-scores (Z_i) to detect and drop outliers. In line with common practice, I define a datapoint as an outlier, when the z-score is higher than |3.29| (Bakker and Wicherts, 2014; Tabachnick and Fidell, 2001). Z-scores are calculated with formula 5.

$$(5) \quad Z_{i,t} = (X_{i,t} - \bar{X}_t) / S_t$$

$X_{i,t}$: raw value of company i at time t

$\bar{X}_t$: mean of sample at time t

S_t: standard deviation of sample at time t

Based on my z-scores, I drop 1,367 outliers.[6] Lastly, I adjust my data to limit problems associated with non-normal distributions. For large sample sizes, it is common to adopt more informal procedures for determining normality. I use Shapiro-Francia tests (SF tests), skewness and kurtosis as indications for possible non-normality distributions. Ahmad & Khan (2015) show that the SF test is the most powerful conventional normality test in most cases. Moreover, the SF test can handle larger data samples of up to 5,000 observations, which is

[6] See datapoints that are dropped per variable in table B1 in appendix B.

significantly more than other normality tests. However, this is still significantly smaller than my sample size of 23,570 observations. As such, in my dataset, unimportant deviations from normality can end up significant and therefore the SF test can only be used as an indication. The test statistic W' of the SF test is computed with formula 6.

$$(6) \quad W' = \frac{\left[\sum_{i=1}^{n} m_i X_{(i)}\right]^2}{\sum_{i=1}^{n} (X_{(i)} - \bar{X})^2}$$

m_i: vector of standard normal ordered statistics
X_i: the ith largest order statistic
$\bar{X}$: mean of sample

The test statistic W' takes a value between zero and one. The closer the value is to one, the more the data distribution resembles a normal distribution (Shapiro & Francia, 1972).

To limit issues, I take the natural logarithm of variables with a non-normal distribution. Since the logarithm of the value zero or lower is undefined, those datapoints are dropped. In total, 463 datapoints with a zero or negative value are dropped.[7] The variables on environmental data, tariffs, ROA, leverage, R&D expenses and state ownership are not converted to a logarithm, since a significant part of their values is negative or zero. After the cleaning procedure, I end up with 23,570 observations of 4,470 companies in 678 industries in the US.

3.2.1. Descriptive Statistics

3.2.1.1. Dependent variables: environmental variables and firm value

I use the same measure as in CER studies and compute the difference between the total amount of environmental strengths and concerns for each firm and year (Fernández-Kranz & Santaló, 2010; Siegel & Vitaliano, 2007).[8] This amount naturally depends on the number of environmental areas that MSCI investigates in a certain year. However, the number of strengths and concerns investigated increased from 13 areas in 1995 to 21 in 2018 and several investigated areas were discontinued during the sample period. Moreover, for only a limited number of firms, all areas were investigated throughout the entire sample period. To limit the impact of these issues, I make some slight modifications to the methodology used in previous

[7] See datapoints that are dropped per variable in table B1 in appendix B.
[8] See description of environmental strengths and concerns and their relative time period in table B2 in appendix B.

studies and instead look at the total environmental performance relative to the total amount of environmental performance areas investigated per firm and year. All environmental areas are equally weighted. To ensure continuity with earlier studies and add robustness, I repeat my tests with the environmental performance proxy used in the studies of Fernández-Kranz and Santaló (2010) and Siegel and Vitaliano (2007). My results do not significantly differ when using the environmental performance proxy of these studies.[9] Furthermore, I run additional tests investigating concerns and strengths separately, since consumers may value strengths and concerns differently (Creyer and Ross, 1996; Mattingly and Berman, 2006).

It should be noted that I exclude regulatory compliance from the total number of environmental concerns. The regulatory compliance dummy looks at companies that have paid a settlement, fine or penalty due to non-compliance with environmental regulations in the United States (MSCI ESG Research, 2019). Theoretically, market competition positively impacts environmental performance via the consumer, investor and employment channels. Via the regulatory channel, the impact is less clear. Firms share corporate benefits from beneficial regulatory actions with participants in the same market. As such, firms have less incentive to lobby for corporate-friendly regulation in highly competitive environments (MacKenzie & Collin, 2008). Lobbying does not improve CER, but can prevent environmental fines. Therefore, to prevent any interpretation issues, I absorb the impact of the regulatory compliance dummy.

To proxy climate engagement of the American public, I use the survey of Gallup News. This survey has the advantage over other surveys that it runs throughout my time sample (excluding the year 1996). In the survey, respondents answer the following question: "*With which one of these statements about the environment and the economy do you most agree -- protection of the environment should be given priority, even at the risk of curbing economic growth (or) economic growth should be given priority, even if the environment suffers to some extent?*". I subtract the percentage of people that want to prioritize the economy from the percentage of people that give the environment priority.

The last dependent variable used in this paper is Tobin's Q, which looks at a firms' market value relative to the replacement value of its assets. I use it to investigate whether

[9] See tables B5, B8, B13 and B19 in appendix B.

competition-induced environmental performance adds firm value (hypothesis 3). I compute Tobin's Q following the methodology of Gompers, Ishii and Metrick (2003) and use formula 3.

$$(7) \quad Tobin's\ Q_{i,t} = \frac{Total\ Assets_{i,t} + Market\ Equity_{i,t} - Book\ Equity_{i,t}}{Total\ Assets_{i,t}}$$

Total $Assets_{i,t}$ = Book value total assets as reported at time t
Market $Equity_{i,t}$ = Stock $value_{i,t}$ × Common Shares $Outstanding_{i,t}$
Book $Equity_{i,t}$ = Shareholder $Equity_{i,t}$ + Deferred $Taxes_{i,t}$ + Investment Tax $Credit_{i,t}$ – Preferred $Stock_{i,t}$[10]

As can be seen from table 1b, the null hypothesis that my dependent variables follow a normal distribution is rejected for all variables, despite W' scores being close to one for most variables. This rejection can be explained by my large sample size. Instead, as stated before, I adopt a more informal procedure and use the test statistic W' together with the found skewness and kurtosis as an indication for testing normality. The 'Environmental Performance', 'Environmental Strengths' and 'Environmental Concerns' variables have relatively high kurtosis and a relatively low test statistic 'W, indicating non-normal distributions. To counteract the impact of non-normality on my tests, I run robust regressions throughout this paper (Leroy & Rousseeuw, 1987).

Table 2a Descriptive statistics of dependent variables in the period of 1995-2018. For the variable 'Climate Engagement' years are equally weighted.

	Environmental $Performance_{i,t}$	Environmental $Strengths_{i,t}$	Environmental $Concerns_{i,t}$	Climate $Engagement_t$	Tobin's $Q_{i,t}$
Observations	23,570	23,570	23,570	23,570	23,570
Minimum	-.800	.000	.000	-.180	.296
Maximum	.857	.857	.800	.440	35.881
Mean	.037	.055	.018	.137	2.100
Median	.000	.000	.000	.170	1.622
Std. Deviation	.134	.130	.072	.175	1.538

Table 2b Normality tests on dependent variables. For the variable 'Tobin's Q' the natural logarithm is taken to perform the test. For the variable 'Climate Engagement' years are equally weighted.

	Environmental $Performance_{i,t}$	Environmental $Strengths_{i,t}$	Environmental $Concerns_{i,t}$	Climate $Engagement_t$	Ln(Tobin's $Q_{i,t}$)
W'	.891	.922	.926	.982	.959
Skewness	1.861	2.898	4.855	-.094	.768
Kurtosis	11.401	12.244	30.695	2.193	3.355

** $p < .100$; ** $p < .050$; *** $p < .010$*

[10] The value of preferred stock is equal to the redemption value. If the redemption value is not available or equal to zero, I take the liquidation value. If the liquidation value is also not available or equal to zero, I take the carrying value.

3.2.1.2. Independent variables: market competition

To proxy market competition, I compute market shares for every firm. I use six-digit NAICS codes to classify markets. NAICS codes are specifically developed for the analysis of statistical data related to the US Economy and frequently used for that purpose (NAICS, 2021). They are a coherent and straightforward way to classify industries and make it easier to compare my results to previous studies. To compute the market share of each firm within a certain six-digit NAICS industry, I use the complete Compustat database and look at firm revenues relative to industry revenues. Fernández-Kranz and Santaló (2010) point out that this measure suffers from an upward bias since private firms are excluded from the Compustat database. In table 3a, I indeed find that the 'Market Share' variable has quite a high median value of 4.99 percent. However, the impact of this bias on my results is relatively small. Public firms are on average significantly larger than private firms. These smaller private firms generally have little impact on competition and in some cases do not compete with larger public firms at all (Fernández-Kranz and Santaló, 2010).

To get a proxy for market concentration on an industry level, I use firm market shares to compute the Hirschman–Herfindahl Index (HHI). Again, the same upward bias is present. To test whether my variable indeed strongly correlates with the actual HHI index, I regress HHI data from the US Census Bureau on my self-computed HHI proxy. To compute their HHI, the US Census Bureau uses data of the 50 largest firms, both private and public, and as such comes very close to the true HHI value. However, data by the US Census is only available for the year 2017 and calculated for specific industries, and hence not suited for panel data analyses.

Table 2 Linear regression to test whether the self-computed HHI strongly correlates with the US Census HHI. Constant is forced to be zero. Robust standard errors are used.

Dependent variable	$\text{Ln(HHI Census)}_{s,t}$
Explanatory variable	βa (SE)
$\text{Ln(HHI proxy)}_{s,t}$	.852*** (.003)
R^2	.963
Number of obs.	274

$*p < .100$; $**p < .050$; $***p < .010$

In table 2, I find that the self-computed HHI proxy strongly correlates with the HHI ratio computed by the US Census Bureau. Furthermore, the self-computed HHI proxy indeed seems to suffer from a slight upward bias.

To further add robustness, I add a second measure for market concentration, namely 'Players'. It looks at the total number of firms in a certain six-digit NAICS industry. Again, the full Compustat database is used for computing the variable.

The 'Market share', 'HHI' and 'Players' variables have one significant downside, they might lead to reverse causality issues. While these proxies can be used to indicate whether there is a relation between competition and environmental performance, they cannot be used to test which way this relationship goes. It is possible to argue that environmental performance impacts competition. CER strategies can be used as a form of entry barriers thereby decreasing competition (Fernández-Kranz & Santaló, 2010). Furthermore, governments might be willing to take actions to protect incumbent high-CER firms to sustain good environmental performance. Therefore, I need an exogenous competitive shock. I partly copy the methodology of Amiti and Khandelwal (2013), Fernández-Kranz and Santaló (2010) and Guadalupe (2007), and focus on competition from foreign firms, rather than competition between US firms. More specifically, I use data on US import tariffs. There is no evidence that environmental performance is taken into account when establishing import tariff rates. Import tariffs do however restrict market penetration by foreign firms. Import tariffs consist of ad valorem tariffs, specific tariffs and other tariffs, and may differ per exporting country. To gain a clear competition proxy and limit interpretation problems, I divide the import charges by the total value of imports for every industry in every year. Data on trade are available from 1997 onwards and only available for a specific number of industries.[11]

Table 3a Descriptive statistics of competition variables in the period of 1995-2018. Data on tariffs are available from 1997 onwards. The variable 'Market share' is firm-level data and the variables 'HHI', 'Players' and 'Tariffs' industries are industry-level data.

	Market Share$_{i,t}$	HHi$_{s,t}$	Players$_{s,t}$	Tariffs$_{s,t}$
Observations	23,570	7,794	7,794	3,104
Minimum	.000	161.670	1.000	.000
Maximum	100.000	10000.000	750.000	335.711
Mean	18.795	4768.271	19.778	4.702
Median	4.985	4114.030	6.000	3.073
Std. Deviation	27.881	2908.158	53.321	22.387

[11] For instance, tariffs do not play a role for industries focused on services.

Table 3b Normality tests on dependent variables. For all variables the natural logarithms are taken to perform the tests. Furthermore, for the variable Tariffs' I add an one, since many tariffs are equal to zero and the logarithm of zero is undefined.

	$Ln(Market Share_{i,t})$	$Ln(HHi_{s,t})$	$Ln(Players_{s,t})$	$Ln(1+Tariffs_{s,t})$
W'	.965	.974	.989	.964
Skewness	-.699	-.709	.585	.863
Kurtosis	3.329	3.227	3.343	6.983

$*p < .100$; $**p < .050$; $***p < .010$

3.2.1.3. Control variables

To prevent omitted variable bias, I add several control variables. I base these control variables on previous studies of Declerck and M'Zali (2012), Duanmu et al. (2018), Fernández-Kranz and Santaló (2010), Fisman et al. (2006), Flammer (2015), Hawn and Kang (2015). I control for firm size, profitability, firm innovativeness, state ownership and financial leverage. Firm size is positively associated with environmental performance, because of possible economies of scale that limit costs associated with environmental performance. I control for firm size by using the total number of employees as a proxy. Profitability positively impacts CER as well; higher profitability gives firms more financial abilities to focus on CER. Return on assets using net income is used to indicate profitability. Firm innovation is also considered a significant driver of CER and can be used as a way to circumvent competition (Carrión-Flores & Innes, 2010). It is unclear whether changes in R&D expenses are the result of a desire to improve environmental performance or a way to escape competition. Firms subject to more competition might increase R&D expenses in addition to undertake CER initiatives. Not controlling for innovation would then lead to an overestimation of the impact of competition on CER (Fernández-Kranz & Santaló, 2010). I divide R&D expenses by firm revenue to proxy firm innovativeness. Since information on R&D expenses is limited, the variable serves only as a robustness check. State ownership also positively impacts environmental performance (Hsu, Liang & Matos, 2018). It has so far been largely overlooked in research on market competition and corporate social responsibility. Evidently, state ownership is relatively low in the United States. Nevertheless, since it significantly impacts both market competition and environmental performance (Song, Wang & Cavusgil, 2015), it does serve as an interesting robustness check. Data on state ownership are available from 2007 onwards. I also control for firm leverage. Leverage is, contrary to my other control variables, negatively associated with social performance. More leverage leads to a reduction of resources that managers can allocate to CER. Leverage is calculated using formula 4.

$$(8) \qquad Leverage_{i,t} = \frac{Long\ Term\ Debt_{i,t} + Debt\ in\ Current\ Assets_{i,t}}{Shareholder\ Equity_{i,t} + Long\ Term\ Debt_{i,t} + Debt\ in\ Current\ Assets_{i,t}}$$

Lastly, non-normality problems for my control variables mainly seem to exist for the 'R&D expenses' variable and to a lesser extent for the 'ROA' variable (table 4b). Again, I rely on robust regressions to limit the impact of possible issues related to non-normal distributions.

Table 4a Descriptive statistics of control variables in the period of 1995-2018. Data on state ownership are available from 2007 onwards. Employees are in quantities of a thousand. R&D expenses are in thousands of US dollars.

	$Employees_{i,t}$	$ROA_{i,t}$	$Leverage_{i,t}$	R&D $Expenses_{i,t}$	State $Ownership_{i,t}$
Observations	23,570	23,570	23.570	14,626	13,832
Minimum	.005	-.615	.000	.000	.000
Maximum	812.858	.599	1.947	.610	4.880
Mean	17.806	.031	.334	.001	.000
Median	4.000	.045	.312	.000	.643
Std. Deviation	47.409	.115	.286	.013	1.212

Table 4b Normality tests on control variables. For the variable 'Employees' the natural logarithm is taken to perform the tests.

	$Ln(Employees_{i,t})$	$ROA_{i,t}$	$Leverage_{i,t}$	R&D $Expenses_{i,t}$	State $Ownership_{i,t}$
W'	.998	.815	.956	.036	.951
Skewness	-.154	-1.882	.960	30.744	1.720
Kurtosis	2.960	10.456	4.509	1104.819	4.618

$*p < .100$; $**p < .050$; $***p < .010$

3.2.2. Correlation

In table 5, I find ambiguous results on the relation between competition and CER. I get contradicting correlations when using the 'Market Power' 'HHI', 'Players' and 'Tariffs' variables, although the correlation coefficients are all quite close to zero (see also figure 1). The 'Employees', 'ROA' and 'State Ownership' variables are in line with theory positively correlated with 'Environmental Performance'. On the other hand, the positive correlation of the variable 'Leverage' and the negative correlation of the variable 'R&D expenses' with 'Environmental Performance' contradict theory. Furthermore, I find a strong positive correlation between the 'HHI' and 'Tariffs' variables and a strong negative correlation between the 'Players' and 'Tariffs'

Table 5 Correlation table

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Environmental $Performance_{i,t}$	-													
2. Environmental $Strengths_{i,t}$	$.852^{***}$	-												
3. Environmental $Concerns_{i,t}$	$-.332^{***}$	$.211^{***}$	-											
4. Climate $Engagement_t$	$-.040^{***}$	$-.020^{***}$	$.038^{***}$	-										
5. Ln(Tobin's $Q_{i,t}$)	$.022^{***}$	$-.023^{***}$	$-.083^{***}$	$.085^{***}$	-									
6. Ln(Market $Share_{i,t}$)	$.115^{***}$	$.209^{***}$	$.162^{***}$	$.078^{***}$	$-.192^{***}$	-								
7. Ln($HHi_{s,t}$)	-.007	.005	$.022^{***}$	$-.024^{***}$	$-.046^{***}$	$.554^{***}$	-							
8. Ln($Players_{s,t}$)	$.021^{***}$	$-.049^{***}$	$-.049^{***}$	-.010	$.211^{***}$	$-.765^{***}$	$-.764^{****}$	-						
9. Ln(1+$Tariffs_{s,t}$)	-.005	$.044^{***}$	$.083^{***}$	$.027^{***}$	$-.278^{***}$	$.473^{***}$	$.397^{***}$	$-.538^{***}$	-					
10. Ln($Employees_{i,t}$)	$.207^{***}$	$.334^{***}$	$.214^{***}$	$.131^{***}$	$-.120^{***}$	$.632^{***}$	$.217^{***}$	$-.344^{***}$	$.177^{***}$	-				
11. $ROA_{i,t}$	$.070^{***}$	$.091^{***}$	$.033^{***}$	$.046^{***}$	$.188^{***}$	$.310^{***}$	$.088^{***}$	$-.190^{***}$	$.181^{***}$	$.254^{***}$	-			
12. $Leverage_{i,t}$	$.083^{***}$	$.133^{***}$	$.085^{***}$	$.042^{***}$	$-.222^{***}$	$.233^{***}$	$.013^{*}$	$-.156^{***}$	$.179^{***}$	$.218^{***}$	$-.105^{***}$	-		
13. R&D $Expenses_{i,t}$	$-.017^{**}$	$-.026^{***}$	$-.015^{*}$	.006	$.049^{***}$	$-.199^{***}$	$-.030^{***}$	$.083^{***}$	$-.081^{***}$	$-.103^{***}$	$-.176^{***}$	$-.031^{***}$	-	
14. State $Ownership_{i,t}$	$.105^{***}$	$.120^{***}$	$.042^{***}$	$-.052^{***}$	$.049^{***}$	$.131^{***}$	$.016^{*}$	$-.050^{***}$	$-.047^{***}$	$.164^{***}$	$.112^{***}$	$-.025^{***}$	$-.032^{***}$	-

$*p < .100$; $**p < .050$; $***p < .010$

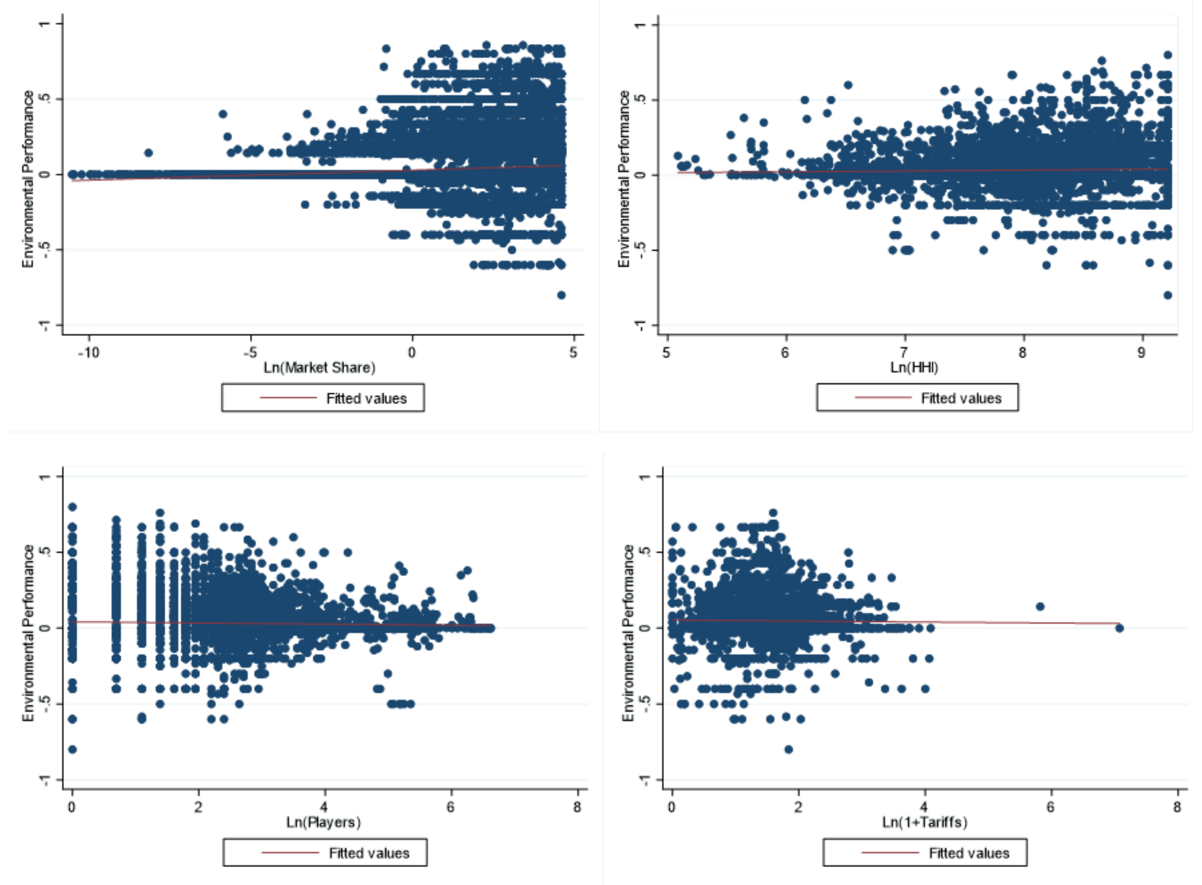

Figure 1 Scatterplots on the relation between environmental performance and competition with fitted linear lines.

variables, thereby adding evidence that my 'Tariffs' variable strongly impacts market competition. The same is the case for 'State Ownership', where I find a negative correlation with market competition.

4. Results

4.1. General Impact of competition on CER

First, I look at hypothesis 1 and test the general impact of market competition on CER. In table 5 columns 1-5, I find a significant, positive relationship between competition and CER.[12] It is however uncertain whether market competition impacts CER. When using tariffs as an exogenous competition shock, I find no significant impact on CER (columns 7-8). This might suggest that CER impacts competition rather than the opposite. Another possible explanation would be that internal (between US firms) competition and competition from foreign firms impact CER differently. In the United States, CER is considered to be an important

[12] In column 6, I also find a positive, but nonsignificant relationship between competition and CER.

Table 5 Fixed effects regressions to test the general impact of competition on CER. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.004*** (.002)	-.006* (.003)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.013*** (.004)	-.023*** (.008)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.007* (.004)	.008 (.011)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.010 (.019)	-.011 (.026)
Ln(Employees$_{i,t}$)	-.018*** (.002)	-.031*** (.004)	.008*** (.002)	.034*** (.004)	.008*** (.002)	.034*** (.004)	.026*** (.007)	.071*** (.013)
ROA$_{i,t}$	.017** (.007)	-.026** (.013)	.033* (.018)	-.022 (.012)	.034** (.018)	-.019 (.037)	.008 (.025)	-.029 (.066)
Leverage$_{i,t}$	.023*** (.005)	.023*** (.009)	-.004 (.008)	-.004 (.016)	-.004 (.008)	.005 (.016)	-.103*** (.024)	-.183*** (.040)
R&D Expenses$_{i,t}$	-	-.002 (.003)	-	.058* (.034)	-	-.067** (.035)	-	.031 (.680)
State Ownership$_{i,t}$	-	.002 (.007)	-	-.000 (.004)	-	.000 (.004)	-	-.005 (.007)
Constant (β_0)	.060*** (.003)	.118*** (.007)	.126*** (.032)	-.202*** (.071)	.007 (.009)	-.004 (.022)	.044* (.026)	.067* (.035)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.604	.731	.480	.606	.480	.605	.567	.581
Number of obs.	22,551	7,974	7,742	2,753	7,742	2,753	3,079	1,462

$*p < .100$; $**p < .050$; $***p < .010$

factor in the business world, and relatively high (Forte, 2013). As such, US firms often already outcompete foreign firms in the area of CER and therefore have little incentive to increase CER if new foreign firms enter the market. If market competition between US firms on the other hand increases, CER-efforts could be used to escape the market. At first glance, my findings seem to contradict an earlier study of Duanmu et al. (2018), who find that competition harms CER-efforts. A possible explanation for these paradoxical results may be found in the empirical context. Contrary to my study, their study looks at Chinese data and exclusively focuses on competition by foreign firms. In China, CER is a relatively new subject; CER-efforts

Table 6 Fixed effects regressions to test the impact of internal and foreign competition on CER. Industry and year fixed effects absorbed for all regressions. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance$_{i,t}$			
	(1)	(2)	(3)	(4)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(HHI2)$_{s,t}$	-.006 (.008)	-.011 (.013)	-	-
Ln(Internal Competition)$_{s,t}$	-	-	-.017*** (.005)	-.002 (.010)
Ln(Foreign Competition)$_{s,t}$	-	-	-.004 (.003)	.002 (.007)
Ln(Employees$_{i,t}$)	.009*** (.002)	.043*** (.006)	.012*** (.004)	.044*** (.007)
ROA$_{i,t}$	.035 (.028)	-.055 (.050)	.041 (.030)	-.053 (.057)
Leverage$_{i,t}$	.023* (.013)	.036 (.024)	.026* (.015)	.039 (.030)
R&D Expenses$_{i,t}$	-	-.038 (.041)	-	-.030* (.058)
State Ownership$_{i,t}$	-	.000 (.006)	-	.005 (.006)
Constant (β_0)	.020** (.010)	.003 (.016)	-.026 (.020)	.014*** (.036)
Level of data	Industry-level		Industry-level	
R^2	.522	.616	.553	.635
Number of obs.	3,768	1,749	3,079	1,462

$*p < .100$; $**p < .050$; $***p < .010$

of Chinese firms were close to non-existent in the past (Yin & Zhang, 2012). Foreign firms could relatively easily outcompete Chinese firms on CER. As such, Chinese firms cannot use CER to escape the market after entry of foreign firms.

To further investigate this issue, I create a second HHI proxy (HHI2), one which combines competition between US firms and competition from foreign firms. I treat total imports as revenues of one single foreign company.[13] Market shares are computed by taking firm revenues relative to total revenues and total imports in an industry. The values of the control variables do not change. Using this new HHI proxy in table 6 in columns 1 and 2, I find that

[13] Naturally, this assumption is an oversimplification. For instance, an increase in imports is not necessarily driven by more sales of one foreign company, but can also be the result of the entrance of new foreign firms. Nevertheless, the proxy can help better understand the difference between competition of US and foreign firms.

combining internal and foreign competition leads to nonsignificant results. Next, I split the new HHI proxy into internal competition, which takes into account the market share of US firms, and foreign competition, which looks at the market share of foreign firms.[14] In columns 3 and 4, I find nonsignificant and ambiguous results for foreign competition, but a positive impact of internal competition on CER, thereby adding evidence that foreign and internal competition influence CER differently.

Interestingly, the positive impact of internal competition on CER is entirely driven by environmental strengths of companies. There is no significant relationship between market competition and environmental concerns.[15] Creyer & Ross (1996) argue that companies considered socially responsible are not rewarded for ethical behaviour but punished for unethical behaviour. For companies considered socially unresponsible, the opposite holds. This suggests that a relatively large part of my sample consists of firms in socially unresponsible sectors.

Overall, for competition between US firms I accept hypothesis 1: market competition positively impacts CER. I reject hypothesis 1 for competition from foreign firms.

4.2. Climate engagement

Secondly, I investigate hypothesis 2 and test the influence of climate engagement on the relationship between competition and CER. In table 7 columns 1-8, I find ambiguous results, also when looking at the strengths and concerns separately.[16] Overall, there seems to be little evidence that the impact of competition on CER is driven by consumer engagement. This result might be explained by the way consumer engagement is measured. More people prioritize the economy over the environment when a country faces difficult economic times. A clear drop in climate engagement is observable during the crisis in the early 2000s, the financial crisis and the current Covid-19 crisis.[17] Consumer spending on CER products on the other hand is quite robust and relatively untouched by financial cycles (Carrigan & De Pelsmacker, 2009). This is often given as a reason why firms that focus on CER perform relatively well during periods of severe financial distress (Kearney, 2009).

To test if the nonsignificant results are indeed driven by macroeconomic factors, I first

[14] Market shares are again computed relative to total revenues and total imports in an industry.
[15] See table B3 and B4 in appendix B.
[16] See table B6 and B7 in appendix B.
[17] See table A1 in appendix A.

Table 7 Fixed effects regressions to test whether climate engagement of the American public impacts the effect of competition on CER. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.005*** (.002)	-.006** (.003)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.009** (.004)	-.024*** (.009)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.004 (.004)	.008 (.011)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.011 (.019)	-.012 (.026)
Climate Engagement$_t$ × Ln(Market Share)$_{i,t}$	-.001 (.003)	.017*** (.004)	-	-	-	-	-	-
Climate Engagement$_t$ × Ln(HHI)$_{s,t}$	-	-	-.023* (.013)	.010 (.020)	-	-	-	-
Climate Engagement$_t$ × Ln(Players)$_{s,t}$	-	-	-	-	.016* (.006)	-.008 (.012)	-	-
Climate Engagement$_t$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.011 (.045)	-.107 (.076)
Ln(Employees$_{i,t}$)	-.018*** (.002)	-.031*** (.004)	.009*** (.002)	.034*** (.004)	.009*** (.002)	.034*** (.004)	.025*** (.007)	.072*** (.013)
ROA$_{i,t}$	.018** (.008)	-.027** (.013)	.036** (.018)	-.022 (.037)	.037** (.018)	-.020 (.037)	.007 (.025)	-.039 (.064)
Leverage$_{i,t}$	.024*** (.005)	.024*** (.009)	-.005 (.008)	.004 (.016)	-.005 (.008)	.005 (.016)	-.103*** (.024)	-.184*** (.040)
R&D Expenses$_{i,t}$	-	-.055 (.042)	-	-.058* (.034)	-	-.068* (.035)	-	.012 (.667)
State Ownership$_{i,t}$	-	.002 (.003)	-	.000 (.004)	-	.000 (.004)	-	-.004 (.007)
Constant (β_0)	.060*** (.003)	.116*** (.006)	.114*** (.033)	.204*** (.071)	.009 (.009)	-.003 (.022)	.045* (.026)	.072** (.036)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.606	.731	.485	.606	.485	.606	.567	.583
Number of obs.	22,225	7,974	22,225	7,974	22,225	7,974	10,068	4,654

** $p < .100$; ** $p < .050$; *** $p < .010$*

regress climate engagement on economic growth in the US.[18] I find that not only this year's economic growth, but also last year's economic growth impacts climate engagement. I use the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) to determine the best model. I find that a model with three lags yields superior results.[19] Secondly, I use this model to absorb the impact of economic growth on climate engagement by taking the residuals and using these residuals to rerun the regressions in table 8. For my competition proxies focusing on internal competition, I find ambiguous results making interpretation difficult (columns 1-6). There seems to be no significant impact of climate engagement on the relationship between internal competition and CER. This might be because the strategic benefit of CER for an individual firm is endogenous and depends in equilibrium not only on climate engagement but also on CER-efforts of competitors. Since CER-efforts of competitors depend on the same climate engagement, it is difficult for a single firm to become a CER leader and escape the market. When looking at foreign competition, I find that climate engagement significantly and positively influences the impact of foreign competition on CER (columns 7 and 8). CER-efforts of foreign firms mostly depend on climate engagement in their home market rather than climate engagement in the US. If climate engagement in the home market is relatively low, US firms can still become a CER leader and reap the higher CER benefits.

To further test this, I run the same regressions with the 'HHI2' variable and again separate this variable into internal and foreign competition. I find no unambiguous significant results for the 'HHI2' and 'Internal Competition' variables. However, I do again find a significant positive impact of climate engagement on the relationship between foreign competition and CER, indicating that CER-efforts of foreign firms indeed depend on climate engagement of the home market rather than the US market.[20]

As such, hypothesis 2, the positive impact of market competition on CER in the US depends on climate engagement of the American public, only seems to hold when looking at competition from foreign firms and when accounting for economic growth. I strongly reject hypothesis 2 when looking at competition between US firms.

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[18] I use data from the World Bank for economic growth (GDP growth in US dollars).
[19] See table B9 in appendix B.
[20] See table B10 in appendix B.

Table 8 Fixed effects regressions to test whether climate engagement of the American public impacts the effect of competition on CER. I absorb the impact of economic growth on climate engagement (R.Climate Engagement). When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.004*** (.002)	-.005** (.003)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.012** (.004)	-.023*** (.008)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.006 (.004)	.008 (.011)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.004 (.020)	-.013 (.026)
R.Climate Engagement$_t$ × Ln(Market Share)$_{i,t}$	.027*** (.005)	.012** (.006)	-	-	-	-	-	-
R.Climate Engagement$_t$ × Ln(HHI)$_{s,t}$	-	-	-.024 (.023)	.040 (.033)	-	-	-	-
R.Climate Engagement$_t$ × Ln(Players)$_{s,t}$	-	-	-	-	.032** (.014)	-.009 (.018)	-	-
R.Climate Engagement$_t$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.171** (.086)	-.241** (.121)
Ln(Employees$_{i,t}$)	-.017*** (.002)	-.031*** (.004)	.009*** (.002)	.034*** (.004)	.009*** (.002)	.034*** (.004)	.025*** (.007)	.070*** (.013)
ROA$_{i,t}$	.017** (.008)	-.026** (.013)	.036** (.018)	-.023 (.037)	.037** (.018)	-.019 (.037)	.004 (.024)	-.035 (.061)
Leverage$_{i,t}$	.024*** (.005)	.023*** (.009)	-.005 (.008)	.003 (.016)	-.005 (.008)	.005 (.016)	-.103*** (.023)	-.179*** (.040)
R&D Expenses$_{i,t}$	-	-.041 (.154)	-	-.057* (.034)	-	-.066* (.035)	-	-.060 (.673)
State Ownership$_{i,t}$	-	.002 (.003)	-	.001 (.004)	-	.000 (.004)	-	-.004 (.007)
Constant (β_0)	.059*** (.003)	.117*** (.007)	.117*** (.032)	.202*** (.071)	.010 (.009)	-.004 (.022)	.048* (.027)	.070** (.035)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.606	.731	.485	.606	.485	.606	.569	.584
Number of obs.	22,225	7,974	22,225	7,974	22,225	7,974	10,068	4,654

$*p < .100$; $**p < .050$; $***p < .010$

4.3. Firm value

Thirdly, I look at hypothesis 3 and test whether market competition affects the impact of CER on firm value. Remember that theoretically firms in competitive markets can use CER to escape the market and create firm value, while monopolies focus on CER for altruistic reasons thereby destroying firm value. In table 9, I find ambiguous results. There seems to be a negative relationship between internal competition-induced CER and firm value (columns 1-6), and a positive impact of foreign competition-induced CER on firm value (columns 7 and 8). Although for internal competition, I only find significant results in three of the six regressions. Nevertheless, the first result seems quite counterintuitive. CER of monopolies seems to add, at least in the eyes of investors, more firm value than CER of firms in competitive markets. I run additional tests to understand this result and check its robustness. Firstly, I find that my results on firm value are mainly driven by CER strengths. I find little evidence that market competition influences the impact of CER concerns on firm value.[21] Secondly, I check my control variables. Firm size can negatively impact firm value as measured by Tobin's Q due to relatively low growth rates of large firms compared to small firms (Hall, 1986). Profitability naturally has a positive relationship with firm value. And leverage can both create firm value because of the tax advantages and destroy value because of additional bankruptcy costs (Modigliani & Miller, 1963). Overall, my control variables seem in order. Thirdly, I add a lag of Tobin's Q in the regression to control for the relatively high robustness of Tobin's Q over time. The results become a bit noisier, but do not significantly change.[22] Fourthly, I check to what extent firm value is explained by market competition and CER. I find that models including competition and CER are significantly better estimators for firm value, based on both AIC and BIC scores. However, only a small part of the data is explained by competition and CER. For the 'Market Share' 'HHI' 'Players' variables R^2 increases between .03% to .11%. For 'Tariffs' the increase is between 1.63% to 1.70%.[23] Lastly, I again use the 'HHI2' as a proxy for competition. For the 'HHI2', 'Internal Competition' and 'Foreign Competition' variables, I get mostly nonsignificant ambiguous results making interpretation difficult.

Overall, for internal competition I find no evidence for hypothesis 3: market competition-induced CER positively impacts firm value. My results point more in the direction of a negative

[21] See table B11 and B12 in appendix B.
[22] See table B14 in appendix B.
[23] See table B15 in appendix B.

Table 9 Fixed effects regressions to test whether market competition influences the impact of CER on firm value. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Ln(Tobins Q)$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.022*** (.007)	-.045*** (.014)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	.006 (.012)	.017 (.030)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	-.005 (.012)	-.037 (.028)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.343* (.180)	.002 (.093)
Env. Performance$_{i,t}$	-.186*** (.045)	-.067 (.072)	-.094*** (.325)	.022 (.593)	.264*** (.050)	.011 (.078)	.943* (.354)	1.376*** (.324)
Env. Performance$_{i,t}$ × Ln(Market Share)$_{i,t}$	.070*** (.014)	.032 (.022)	-	-	-	-	-	-
Env. Performance$_{i,t}$ × Ln(HHI)$_{s,t}$	-	-	.124*** (.038)	.007 (.069)	-	-	-	-
Env. Performance$_{i,t}$ × Ln(Players)$_{s,t}$	-	-	-	-	-.094*** (.023)	.048 (.045)	-	-
Env. Performance$_{i,t}$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.562** (.276)	-.974*** (.189)
Ln(Employees$_{i,t}$)	-.112*** (.008)	-.081*** (.018)	-.054*** (.006)	-.073*** (.012)	-.052*** (.006)	-.076*** (.013)	-.051* (.031)	-.150*** (.032)
ROA$_{i,t}$	1.003*** (.040)	.810*** (.062)	1.571*** (.086)	1.246*** (.129)	1.568*** (.086)	1.246*** (.128)	.562* (.287)	1.008*** (.333)
Leverage$_{i,t}$	-.039** (.017)	-.034 (.028)	-.040 (.027)	.037 (.048)	-.040 (.027)	.038 (.047)	-.306** (.131)	-.178 (.171)
R&D Expenses$_{i,t}$	-	-.493 (.344)	-	2.600*** (.178)	-	2.641*** (.179)	-	5.787*** (1.802)
State Ownership$_{i,t}$	-	.001 (.008)	-	.008 (.010)	-	.008 (.010)	-	-.045** (.023)
Constant (β_0)	.739*** (.013)	.791*** (.026)	.528*** (.102)	.470* (.246)	.585*** (.030)	.684*** (.063)	.229 (.243)	.750*** (.131)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.777	.814	.679	.742	.679	.742	.666	.707
Number of obs.	22,551	7,974	7,742	2,753	7,742	2,753	3,079	1,462

** $p < .100$; ** $p < .050$; *** $p < .010$*

impact, however many nonsignificant results make interpretation difficult. For competition from foreign firms I accept hypothesis 3, although it should be noted that the impact of competition and CER on firm value is limited. My results provide some evidence that in environments of high competition from foreign firms, strategic CER can create firm value, while altruistic CER of monopolies destroys firm value.

4.4. Innovation

Lastly, I look into the role of innovation. Innovation is both a driver of CER and has an inverted U-shaped relation with market competition (Aghion et al., 2005; Aghion et al., 2009; Carrión-Flores & Innes, 2010). In the scatterplots in figure 2, I find that for the variables 'Market Share' and 'Players' the fitted line resembles an inverted-U shape, while for the variables 'HHI' and 'Tariffs' I observe no quadratic relation.

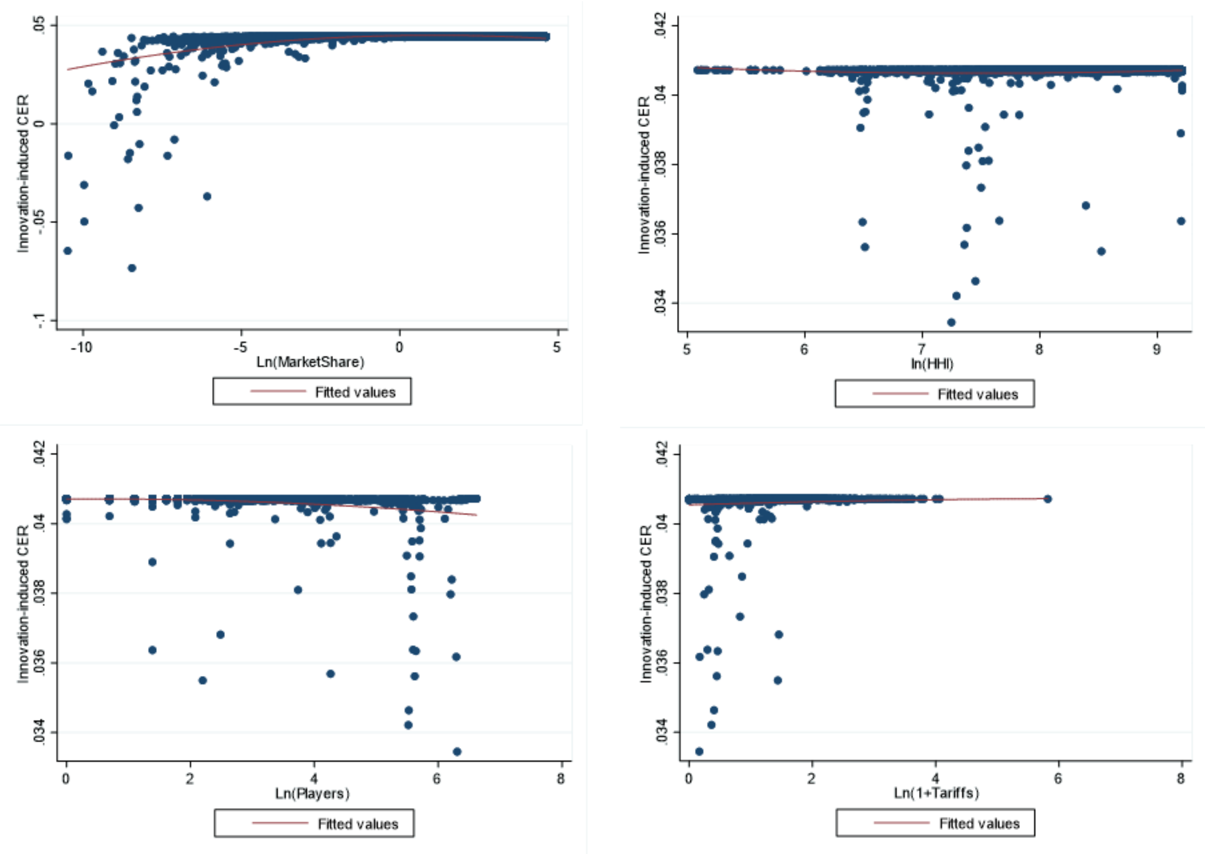

Figure 2 Scatterplots on the relation between innovation-induced CER and competition with fitted quadratic lines.

Next, I investigate the impact of market competition on innovation-induced CER more formally by running regressions (table 10). For all market competition proxies, I find no evidence that innovation-induced CER takes on an inverted U-shape or has a positive impact

Table 10 Quadratic regressions to test if innovation-induced CER takes on an inverted U-shaped relation with market competition. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.007*** (.002)	-.006* (.003)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.026*** (.005)	-.023*** (.073)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.020*** (.006)	.008 (.010)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.001 (.020)	-.011 (.026)
R&D Expenses$_{i,t}$	1.823 (1.377)	-.656 (1.669)	104.163** (49.351)	63.481* (37.430)	3.504 (4.941)	4.599 (4.347)	-2.723 (2.666)	-1.662 (1.750)
R&D Expenses$_{i,t}$ × Ln(Market Share)$_{i,t}$	.455 (.308)	-.123 (.347)	-	-	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(HHI)$_{s,t}$	-	-	-28.333** (13.042)	-18.150* (9.730)	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(Players)$_{s,t}$	-	-	-	-	-1.668 (2.678)	-2.329 (2.312)	-	-
R&D Expenses$_{i,t}$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.751 (12.488)	4.998 (5.793)
R&D Expenses$_{i,t}$ × Ln(Market Share)$^2_{i,t}$	.026 (.017)	-.006* (.018)	-	-	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(HHI)$^2_{s,t}$	-	-	1.906** (.859)	1.269** (.632)	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(Players)$^2_{s,t}$	-	-	-	-	.137 (.316)	.224 (.263)	-	-
R&D Expenses$_{i,t}$ × Ln(1+Tariffs)$^2_{s,t}$	-	-	-	-	-	-	1.988 (8.002)	-2.594 (3.062)
Ln(Employees$_{i,t}$)	-.021*** (.003)	-.031*** (.005)	.012*** (.003)	.034*** (.031)	.012*** (.003)	.034*** (.004)	.035*** (.008)	.071*** (.013)
ROA$_{i,t}$	.005 (.009)	.026** (.013)	.029 (.023)	-.022 (.037)	.033 (.023)	-.020 (.037)	.002 (.037)	-.029 (.066)
Leverage$_{i,t}$	.031*** (.007)	.023*** (.008)	-.010 (.011)	.004 (.016)	-.009 (.011)	.005 (.016)	-.106*** (.030)	-.183*** (.040)
State Ownership$_{i,t}$	-	.002 (.003)	-	.001 (.004)	-	.000 (.004)	-	-.005 (.007)
Constant (β_0)	.071*** (.004)	.118*** (.007)	.232*** (.042)	.205*** (.071)	-.022* (.013)	-.003 (.022)	.063** (.025)	.067** (.035)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.631	.731	.513	.606	.531	.606	.590	.581
Number of obs.	13,986	7,974	4,937	2,753	4,937	2,753	2,469	1,462

** $p < .100$; ** $p < .050$; *** $p < .010$*

on CER in general.[24] I get similar results when investigating environmental strengths and concerns separately.[25] These results can for a large part be explained by earlier research of Aghion et al. (2020), who find that competition has a similar impact on both green and non-green innovations. Since market competition increases both green and non-green innovations, the overall effect on CER is close to zero.

Therefore, I reject hypothesis 4. The relationship between market competition and innovation-induced environmental performance does not take on an inverted U-shape.

5. Conclusion

In this paper, I look at the relationship between market competition and CER. Firstly, I provide evidence that competition between US firms is associated with higher CER. This impact can be largely attributed to an increase in environmental strengths. However, I find no significant impact of competition from foreign firms on CER in the US. These paradoxical results can either be explained by reverse causality issues or by relatively high CER-efforts of US firms compared to foreign firms. Secondly, I find no evidence that the impact of internal competition on CER is significantly driven by climate engagement of the US public, also after accounting for the impact of economic growth on climate engagement. For foreign competition, I do find a significant positive impact of climate engagement on competition induced-CER. CER-efforts of foreign competitors depend on climate engagement of their home market rather than climate engagement of the US public, making it possible for US firms to become CER leaders. Thirdly, I find that also the way market competition impacts the relationship between CER and firm value depends on the form of competition. Firm value is negatively associated with internal competition-induced CER and positively associated with foreign competition-induced CER. Although only for foreign competition I find significant results. This results provides some evidence that in competitive environments strategic CER creates firm value and altruistic CER of monopolies destroys firm value. Lastly, I find no relationship between market competition and innovation-induced CER. It seems that market competition impacts green and non-green innovations in a similar manner.

It is important to extrapolate my results cautiously. One might get the impression that these results advocate against the recent trend of competition authorities to include

[24] See also table B20 in the appendix B.
[25] See tables B17 and B18 in appendix B.

sustainability in their merger control guidelines. However, such a conclusion would in my opinion be too harsh. In fact, whether competition authorities are best suited to deal with sustainability is an entirely different story and ultimately depends on a large range of factors that I do not deal with in this paper.[26] It is however clear that assessments of the impact of possible mergers on sustainability should not only consider the direct impact on the merging firms, but also the impact on the overall market. Otherwise, the initiatives of the competition authorities to promote sustainability might backfire.

5.1. Suggestions for further research

Further research can focus on the unclarities that remain after my paper. To better understand the disparities between internal and foreign competition, it is necessary to absorb country-specific effects. Therefore, new studies can focus on acquiring and using data from multiple countries, in particular data on firms from both developed and undeveloped countries. Such studies would be welcome additions in providing further evidence for the theoretical framework laid out in this paper. Another area that would be interesting to look into would be the separate areas of CER. CER is in itself already quite a broad subject. As such, it would be interesting to see whether these results hold for every separate area of CER (for instance for greenhouse emissions, recycling, waste, biodiversity, et cetera). Lastly, it would be interesting to search for other market characteristics that might impact sustainability, so that we can get a better understanding of CER.

In a time when an increasing number of people are concerned about sustainability, understanding what drives it, can be of great help in creating a more sustainable society. I therefore sincerely hope that my research can help spark future research on the relationship between market competition and sustainability.

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[26] I strongly recommend people interested in this topic to read Schinkel and Treuren (2020).

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Appendix A

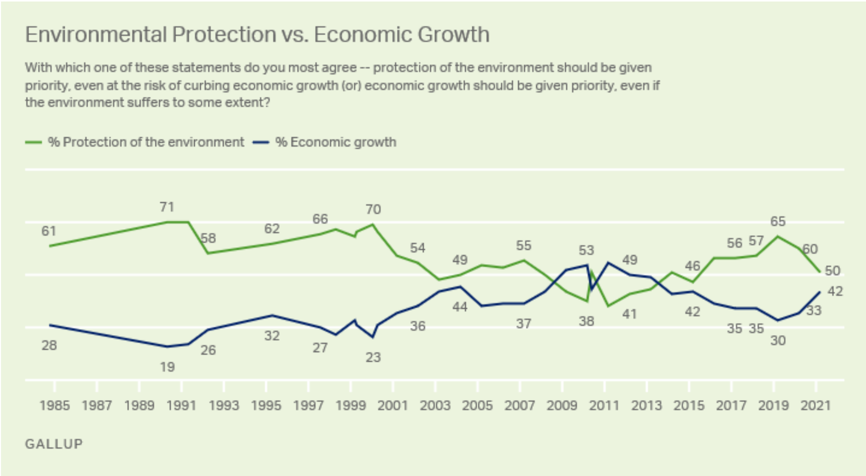

Figure A1 Willingness of the American public to sacrifice economic growth for environmental protection (Source: Gallup News, 2021)

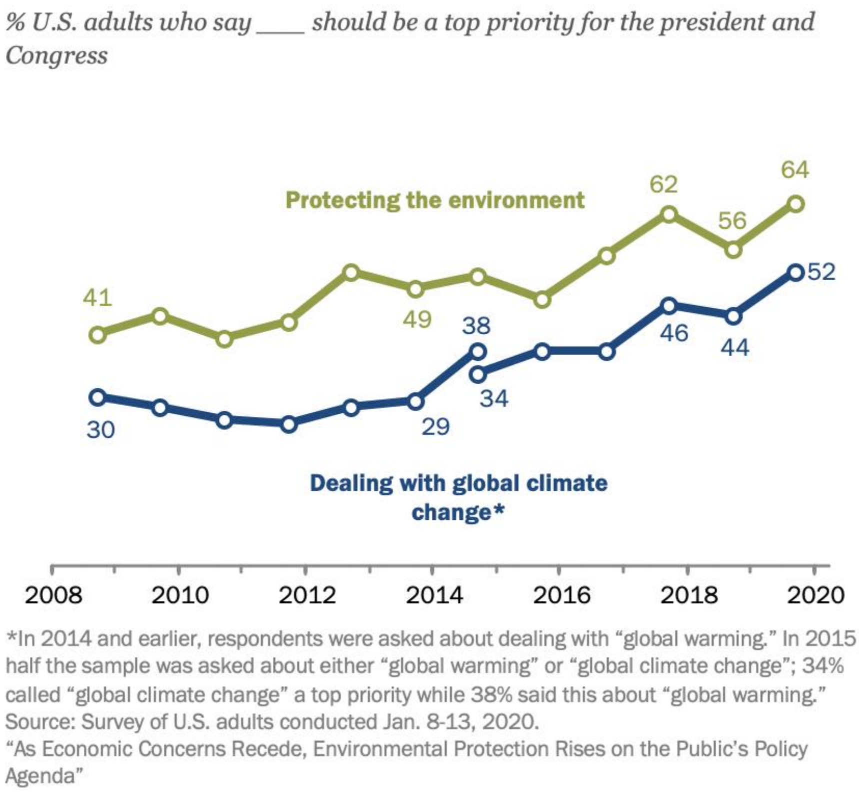

Figure A2 Support for prioritizing policies on the environment (Source: Pew Research Center, 2020)

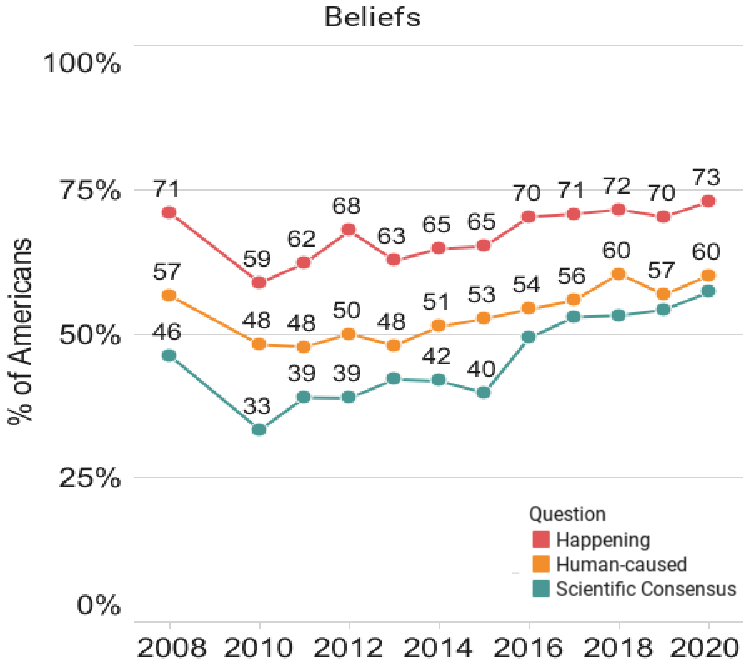

Figure A3 Climate views of the American public over time

(Source: Yale University, 2021)

Appendix B

Table B1 Table indicating the amount of datapoints being dropped per variable. Furthermore, the cause for the variable being dropped is given in the upper row.

Variable	Negative or zero value	Outlier
Environmental Performance$_{i,t}$	n/a	0
Environmental Strengths$_{i,t}$	n/a	0
Environmental Concerns$_{i,t}$	n/a	0
Climate Engagement$_{t}$	n/a	0
Tobin's Q$_{i,t}$	0	180
Market Shares$_{i,t}$	128	0
HHI$_{s,t}$	0	0
Market Players$_{s,t}$	0	0
Tariffs$_{s,t}$	n/a	101
Employees$_{i,t}$	335	52
ROA$_{i,t}$	n/a	556
Leverage$_{i,t}$	n/a	201
R&D Expenses$_{i,t}$	n/a	18
State Ownership$_{i,t}$	n/a	259
Total	463	1,367

Table B2 List of environmental strengths and concerns and the time period during which these areas were investigated by MSCI. Please note that in this paper regulatory problems are excluded.

Name	Time period
Strength	
Beneficial Products and Services	1995-2018
Pollution Prevention	1995-2018
Recycling	1995-2018
Clean Energy	1995-2018
Environment Other Strength	1995-2013
Management Systems	2006-2018
Natural Capital - Water Stress	2012-2018
Natural Capital - Biodiversity & Land Use	2012-2018
Natural Capital - Raw Material Sourcing	2012-2018
Climate Change - Financing Environmental Impact	2013-2018
Environmental Opportunities = Opportunities in Green Building	2013-2018
Environmental Opportunities - Opportunities in Renewable Energy	2013-2018
Pollution & Waste - Electronic Waste	2013-2018
Climate Change - Energy Efficiency	2013-2018
Climate Change - Product Carbon Footprint	2013-2018
Climate Change - Climate Change Vulnerability	2013-2018
Concern	
Hazardous Waste	1995-2018
Regulatory Problems	1995-2018
Ozone Depleting Chemicals	1995-2018
Substantial Emissions	1995-2018
Agriculture Chemicals	1995-2018
Environment Other Concerns	1995-2013
Climate Change	1999-2018
Negative Impact of Products and Services	2010-2014
Land Use & Biodiversity	2010-2018
Non Carbon Releases	2010-2018
Supply Chain Management	2012-2018
Water Management	2012-2018

Table B3 Fixed effects regressions to test the general impact of competition on CER strengths. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Strengths$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.005*** (.001)	-.005* (.003)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.014*** (.003)	-.026*** (.008)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.009*** (.003)	.011 (.010)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.011 (.019)	-.014 (.029)
Ln(Employees$_{i,t}$)	-.002 (.002)	-.013*** (.004)	.021*** (.002)	.043*** (.004)	.021*** (.002)	.043*** (.004)	.038*** (.007)	.082*** (.014)
ROA$_{i,t}$	.015** (.006)	-.021* (.012)	-.015 (.014)	-.027 (.029)	.016** (.014)	-.024 (.029)	-.004 (.025)	-.023 (.066)
Leverage$_{i,t}$	.025*** (.005)	.024*** (.008)	.001 (.007)	-.001 (.015)	.001 (.007)	.015 (.015)	-.102*** (.025)	-.191*** (.042)
R&D Expenses$_{i,t}$	-	-.043 (.040)	-	-.033 (.056)	-	-.045 (.056)	-	.923*** (.292)
State Ownership$_{i,t}$	-	.002 (.003)	-	-.002 (.004)	-	.002 (.004)	-	-.009 (.009)
Constant (β_0)	.057*** (.003)	.104*** (.006)	.135*** (.028)	.224*** (.068)	.003 (.007)	-.013 (.020)	.047* (.027)	.074* (.038)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.671	.786	.558	.692	.558	.691	.601	.581
Number of obs.	22,551	7,974	7,742	2,753	7,742	2,753	3,079	1,462

$*p < .100$; $**p < .050$; $***p < .010$

Table B4 Fixed effects regressions to test the general impact of competition on CER concerns. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental $Concerns_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market $Share)_{i,t}$	-.000 (.001)	.000 (.001)	-	-	-	-	-	-
$Ln(HHI)_{s,t}$	-	-	-.001 (.002)	-.003 (.004)	-	-	-	-
$Ln(Players)_{s,t}$	-	-	-	-	.002 (.002)	.008 (.011)	-	-
$Ln(1+Tariffs)_{s,t}$	-	-	-	-	-	-	.001 (.006)	-.004 (.011)
$Ln(Employees_{i,t})$	.016*** (.001)	.019*** (.002)	.012*** (.001)	.009*** (.002)	.013*** (.001)	.034*** (.004)	.012*** (.002)	.011*** (.004)
$ROA_{i,t}$	-.002 (.004)	.005 (.006)	-.019* (.010)	-.005 (.021)	-.018* (.010)	-.019 (.037)	-.011 (.007)	.006 (.016)
$Leverage_{i,t}$	.002 (.002)	.001 (.003)	.005 (.004)	-.010 (.009)	.005 (.004)	.005 (.016)	.002 (.006)	-.008 (.010)
R&D $Expenses_{i,t}$	-	.014 (.019)	-	.025 (.038)	-	-.067** (.035)	-	.892 (.765)
State $Ownership_{i,t}$	-	.000 (.001)	-	.002 (.002)	-	.000 (.004)	-	-.004 (.003)
Constant (β_0)	-.003* (.002)	-.014*** (.003)	.009 (.016)	.021 (.032)	-.004 (.005)	-.004 (.022)	.002 (.008)	.007* (.013)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.684	.632	.596	.552	.596	.605	.567	.581
Number of obs.	22,551	7,974	7,742	2,753	7,742	2,753	3,079	1,462

$*p < .100$; $**p < .050$; $***p < .010$

Table B5 Fixed effects regressions to test the general impact of competition on CER. Environmental performance is computed using the methodology of Fernández-Kranz and Santaló (2010) and Siegel and Vitaliano (2007). When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance Old$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.026*** (.010)	-.023* (.018)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.088*** (.023)	-.169*** (.055)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.048* (.024)	.077 (.068)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.083 (.123)	.067 (.180)
Ln(Employees$_{i,t}$)	-.107*** (.014)	-.175*** (.027)	.040*** (.012)	.207*** (.027)	.038*** (.012)	.209*** (.027)	.163*** (.047)	.494*** (.089)
ROA$_{i,t}$	.091** (.049)	-.200** (.080)	.204* (.111)	-.173 (.242)	.211* (.111)	-.155 (.241)	-.037 (.150)	-.350 (.414)
Leverage$_{i,t}$	.115*** (.031)	.127** (.054)	-.042 (.048)	.019 (.099)	-.041 (.048)	.024 (.099)	-.617*** (.154)	-1.110*** (.278)
R&D Expenses$_{i,t}$	-	-.284 (.335)	-	.178 (.460)	-	.090 (.459)	-	10.211 (2.715)
State Ownership$_{i,t}$	-	.017 (.019)	-	.023 (.029)	-	.023 (.029)	-	-.030 (.047)
Constant (β_0)	.341*** (.021)	.669*** (.040)	.840*** (.194)	1.447*** (.456)	.022 (.055)	-.108 (.137)	.216 (.172)	.164 (.243)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.601	.716	.484	.606	.483	.607	.559	.580
Number of obs.	22,551	7,974	7,742	2,753	7,742	2,753	3,079	1,462

$* p < .100$; $** p < .050$; $*** p < .010$

Table B6 Fixed effects regressions to test whether climate engagement of the American public impacts the effect of competition on CER strengths. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Strengths$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.004*** (.001)	-.005* (.003)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.011** (.004)	-.027*** (.008)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.007** (.000)	.011 (.010)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.012 (.020)	-.016 (.029)
Climate Engagement$_t$ × Ln(Market Share)$_{i,t}$	-.004 (.002)	.010*** (.004)	-	-	-	-	-	-
Climate Engagement$_t$ × Ln(HHI)$_{s,t}$	-	-	-.020* (.010)	.011 (.021)	-	-	-	-
Climate Engagement$_t$ × Ln(Players)$_{s,t}$	-	-	-	-	.011* (.006)	-.010 (.011)	-	-
Climate Engagement$_t$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.015 (.046)	-.139 (.077)
Ln(Employees$_{i,t}$)	-.003 (.002)	-.012*** (.004)	.021*** (.002)	.043*** (.004)	.021*** (.002)	.043*** (.004)	.038*** (.007)	.084*** (.014)
ROA$_{i,t}$	.016** (.006)	-.022* (.012)	.017 (.014)	-.028 (.029)	.018 (.014)	-.025 (.029)	-.004 (.025)	-.036 (.062)
Leverage$_{i,t}$	.025*** (.005)	.025*** (.008)	-.001 (.007)	.014 (.029)	.001 (.007)	.015 (.015)	-.102*** (.025)	-.192*** (.042)
R&D Expenses$_{i,t}$	-	-.042 (.036)	-	-.033 (.056)	-	-.046 (.057)	-	.899*** (.339)
State Ownership$_{i,t}$	-	.002 (.003)	-	.002 (.004)	-	.002 (.004)	-	-.007 (.009)
Constant (β_0)	.057*** (.003)	.102*** (.006)	.127*** (.029)	.225*** (.068)	.004 (.008)	-.012 (.020)	.047* (.026)	.081** (.039)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.673	.786	.563	.692	.562	.691	.601	.622
Number of obs.	22,225	7,974	22,225	7,974	22,225	7,974	10,068	4,654

** $p < .100$; ** $p < .050$; *** $p < .010$*

Table B7 Fixed effects regressions to test whether climate engagement of the American public impacts the effect of competition on CER concerns. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Concerns$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	.000 (.001)	.001 (.001)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.002 (.002)	-.003 (.004)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.003 (.002)	.003 (.005)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.002 (.006)	-.004 (.010)
Climate Engagement$_t$ × Ln(Market Share)$_{i,t}$	-.003** (.001)	-.006*** (.002)	-	-	-	-	-	-
Climate Engagement$_t$ × Ln(HHI)$_{s,t}$	-	-	.004 (.007)	.001 (.013)	-	-	-	-
Climate Engagement$_t$ × Ln(Players)$_{s,t}$	-	-	-	-	-.004 (.004)	-.002 (.006)	-	-
Climate Engagement$_t$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.004 (.017)	-.032 (.022)
Ln(Employees$_{i,t}$)	.015*** (.001)	.018*** (.002)	.012*** (.001)	.009*** (.002)	.012*** (.001)	.009*** (.002)	.012*** (.002)	.012*** (.004)
ROA$_{i,t}$	-.002 (.004)	.005 (.006)	-.020 (.010)	-.005 (.021)	-.019** (.010)	-.005 (.021)	-.012 (.007)	.002 (.016)
Leverage$_{i,t}$	-.002 (.002)	.001 (.003)	.006 (.004)	.010 (.009)	.006 (.004)	.010 (.009)	-.002 (.006)	-.008 (.010)
R&D Expenses$_{i,t}$	-	-.013 (.016)	-	.025 (.038)	-	.022 (.038)	-	.887 (.773)
State Ownership$_{i,t}$	-	.000 (.001)	-	.002 (.002)	-	.002 (.002)	-	-.003 (.003)
Constant (β_0)	.003* (.002)	-.014*** (.003)	.014 (.016)	.021 (.032)	-.005 (.005)	-.009 (.010)	.003 (.008)	.009 (.012)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.680	.632	.592	.552	.592	.552	.528	.460
Number of obs.	22,225	7,974	22,225	7,974	22,225	7,974	10,068	4,654

** p < .100; ** p < .050; *** p < .010*

Table B8 Fixed effects regressions to test whether climate engagement of the American public impacts the effect of competition on CER. Environmental performance is computed using the methodology of Fernández-Kranz and Santaló (2010) and Siegel and Vitaliano (2007). When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance old$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.025*** (.010)	-.027 (.017)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.057** (.026)	-.176*** (.057)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.032 (.025)	.079 (.068)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.091 (.128)	.062 (.183)
Climate Engagement$_t$ × Ln(Market Share)$_{i,t}$	-.025 (.017)	.093*** (.026)	-	-	-	-	-	-
Climate Engagement$_t$ × Ln(HHI)$_{s,t}$	-	-	-.191*** (.074)	.088 (.143)	-	-	-	-
Climate Engagement$_t$ × Ln(Players)$_{s,t}$	-	-	-	-	.121** (.044)	-.063 (.075)	-	-
Climate Engagement$_t$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.119 (.336)	-.376 (.568)
Ln(Employees$_{i,t}$)	-.107*** (.014)	-.171*** (.027)	.042*** (.012)	.207*** (.027)	.039*** (.013)	.209*** (.027)	.162*** (.048)	.500*** (.090)
ROA$_{i,t}$	.097** (.049)	-.207** (.080)	.219* (.112)	-.180 (.242)	.223** (.113)	-.163 (.241)	-.041 (.149)	-.386 (.405)
Leverage$_{i,t}$	.118*** (.031)	.132** (.054)	-.040 (.049)	.017 (.099)	-.041 (.049)	.024 (.099)	-.615*** (.156)	-1.114*** (.280)
R&D Expenses$_{i,t}$	-	-.270 (.302)	-	.176 (.462)	-	.086 (.467)	-	10.012*** (2.836)
State Ownership$_{i,t}$	-	.020 (.019)	-	.023 (.029)	-	.022 (.029)	-	-.025 (.047)
Constant (β_0)	.345*** (.020)	.659*** (.040)	.769*** (.200)	1.458*** (.457)	.030 (.056)	-.106 (.137)	.220 (.169)	.183** (.253)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.600	.716	.488	.607	.487	.607	.567	.581
Number of obs.	22,225	7,974	22,225	7,974	22,225	7,974	10,068	4,654

$* p < .100$; $** p < .050$; $*** p < .010$

Table B9 Linear regression to test whether climate engagement is impacted by economic growth in the US.

Dependent variable	Climate Engagement$_t$				
	(1)	(2)	(3)	(4)	(5)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Economic growth$_t$	6.020*** (1.548)	2.636* (1.350)	3.133*** (.970)	3.393*** (.882)	3.362*** (.891)
L1.Economic growth$_t$	-	6.448*** (.992)	3.380*** (.887)	3.294*** (.600)	3.461*** (.690)
L2.Economic growth$_t$	-	-	5.661*** (.633)	3.954*** (.801)	3.894*** (.827)
L3.Economic growth$_t$	-	-	-	3.282*** (.687)	2.905** (1.064)
L4.Economic growth$_t$	-	-	-	-	.787 (1.273)
Constant (β_0)	-1.001 (4.788)	-9.098* (4.388)	-16.673*** (2.762)	-21.472*** (2.512)	-22.615*** (3.300)
R^2	.306	.583	.787	.859	.864
Number of obs.	23	23	23	23	23
AIC	191.384	181.657	168.170	160.747	161.959
BIC	193.655	185.064	172.712	166.425	168.772

** $p < .100$; ** $p < .050$; *** $p < .010$*

Table B10 Fixed effects regressions to test whether climate engagement of the American public impacts the effect of internal and foreign competition on CER. For 'R.Climate Engagement' I absorb the impact of economic growth on climate engagement. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(HHI2)$_{s,t}$	.001 (.008)	-.014 (.014)	-	-	-.005 (.008)	-.013 (.013)	-	-
Ln(Internal Competition)$_{s,t}$	-	-	-.014*** (.005)	.002 (.010)	-	-	-.017*** (.005)	.002 (.010)
Ln(Foreign Competition)$_{s,t}$	-	-	-.004 (.004)	.002 (.006)	-	-	-.004 (.003)	.001 (.007)
Climate Engagement$_t$ × Ln(HHI2)$_{s,t}$	-.047** (.025)	.036 (.040)	-	-	-.102** (.051)	.065 (.063)	-	-
Climate Engagement$_t$ × Ln(Internal Comp.)$_{s,t}$	-	-	-.030* (.016)	.001 (.026)	-	-	-	-
Climate Engagement$_t$ × Ln(Foreign Comp.)$_{s,t}$	-	-	-.001 (.008)	-.021 (.013)	-	-	-	-
R.Climate Engagement$_t$ × Ln(HHI2)$_{s,t}$	-	-	-	-	-	-	-	-
R.Climate Engagement$_t$ × Ln(Internal Comp.)$_{s,t}$	-	-	-	-	-	-	.015 (.032)	.040 (.045)
R.Climate Engagement$_t$ × Ln(Foreign Comp.)$_{s,t}$	-	-	-	-	-	-	-.023 (.018)	-.015** (.022)
Ln(Employees$_{i,t}$)	.009*** (.003)	.043*** (.006)	.012*** (.004)	.044*** (.007)	.009*** (.003)	.043*** (.006)	.013*** (.004)	.044*** (.007)
ROA$_{i,t}$	.035 (.028)	-.057** (.050)	.038 (.030)	-.051 (.058)	.036 (.028)	-.055 (.050)	.039 (.030)	-.051 (.057)
Leverage$_{i,t}$	.022* (.013)	.036*** (.024)	.026 (.015)	.039 (.030)	.023* (.013)	.035 (.024)	.025* (.015)	.039 (.030)
R&D Expenses$_{i,t}$	-	-.038 (.041)	-	.050 (.082)	-	-.037 (.041)	-	-.033 (.057)
State Ownership$_{i,t}$	-	-.000 (.006)	-	.006 (.006)	-	.000 (.006)	-	.005 (.006)
Constant (β_0)	.022** (.010)	.002 (.017)	-.027*** (.020)	.012 (.036)	.021** (.010)	.001 (.017)	-.025 (.020)	.013 (.037)
Level of data	Industry-level		Industry-level		Industry-level		Industry-level	
R^2	.522	.616	.554	.637	.522	.616	.554	.635
Number of obs.	3,768	1,749	3,079	1,462	3,768	1,749	3,079	1,462

** $p < .100$; ** $p < .050$; *** $p < .010$*

Table B11 Fixed effects regressions to test whether market competition influences the impact of CER strengths on firm value. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Ln(Tobins Q)$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.022*** (.007)	-.045*** (.014)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	.005 (.013)	.021 (.030)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	-.005 (.012)	-.043 (.028)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.362** (.184)	.021 (.095)
Env. Strengths$_{i,t}$	-.207*** (.050)	-.083 (.077)	-.901** (.359)	.382 (.592)	.222*** (.055)	.000 (.081)	1.159* (.543)	1.454*** (.336)
Env. Strengths$_{i,t}$ × Ln(Market Share)$_{i,t}$	.072*** (.015)	.034 (.024)	-	-	-	-	-	-
Env. Strengths$_{i,t}$ × Ln(HHI)$_{s,t}$	-	-	.119*** (.042)	-.029 (.069)	-	-	-	-
Env. Strengths$_{i,t}$ × Ln(Players)$_{s,t}$	-	-	-	-	-.072*** (.027)	.087* (.046)	-	-
Env. Strengths$_{i,t}$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.828** (.304)	-.981*** (.205)
Ln(Employees$_{i,t}$)	-.112*** (.008)	-.082*** (.018)	-.053*** (.006)	-.077*** (.012)	-.052*** (.006)	-.081*** (.013)	-.053* (.032)	-.159*** (.034)
ROA$_{i,t}$	1.004*** (.040)	.810*** (.062)	1.575*** (.086)	1.247*** (.128)	1.573*** (.086)	1.246*** (.128)	.558* (.285)	1.002*** (.332)
Leverage$_{i,t}$	-.037** (.017)	-.033 (.028)	-.040 (.027)	.035 (.047)	-.041 (.027)	.038 (.047)	-.307** (.131)	-.161 (.170)
R&D Expenses$_{i,t}$	-	-.495 (.344)	-	2.600*** (.174)	-	2.649*** (.174)	-	5.789*** (1.813)
State Ownership$_{i,t}$	-	.001 (.008)	-	.007 (.010)	-	.008 (.010)	-	-.044* (.023)
Constant (β_0)	.741*** (.013)	.792*** (.026)	.537*** (.103)	.436* (.246)	.585*** (.031)	.697*** (.063)	.207 (.247)	.722*** (.132)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.777	.814	.679	.742	.679	.743	.667	.708
Number of obs.	22,551	7,974	7,742	2,753	7,742	2,753	3,079	1,462

** $p < .100$; ** $p < .050$; *** $p < .010$*

Table B12 Fixed effects regressions to test whether market competition influences the impact of CER concerns on firm value. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Ln(Tobins Q)$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.020*** (.007)	-.044*** (.014)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	.011 (.012)	.017 (.029)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	-.010 (.012)	-.034 (.028)	-	-
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	.336* (.177)	-.116 (.095)
Env. Concerns$_{i,t}$	-.087 (.104)	-.111 (.179)	.978 (.619)	1.338 (.891)	.404*** (.108)	-.122 (.191)	.723 (.477)	.009 (.654)
Env. Concerns$_{i,t}$ × Ln(Market Share)$_{i,t}$	-.052 (.032)	.014 (.051)	-	-	-	-	-	-
Env. Concerns$_{i,t}$ × Ln(HHI)$_{s,t}$	-	-	-.128*** (.076)	-.144 (.112)	-	-	-	-
Env. Concerns$_{i,t}$ × Ln(Players)$_{s,t}$	-	-	-	-	.158*** (.043)	.150* (.081)	-	-
Env. Concerns$_{i,t}$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.802** (.327)	.386 (.380)
Ln(Employees$_{i,t}$)	-.112*** (.008)	-.081*** (.018)	-.051*** (.006)	-.072*** (.012)	-.052*** (.006)	-.073*** (.012)	-.034* (.030)	-.112*** (.034)
ROA$_{i,t}$	1.003*** (.040)	.810*** (.062)	1.572*** (.086)	1.243*** (.128)	1.569*** (.086)	1.241*** (.128)	.575* (.296)	1.036*** (.339)
Leverage$_{i,t}$	-.038** (.017)	-.032 (.028)	-.040 (.027)	.035 (.047)	-.040 (.027)	.036 (.047)	-.343** (.145)	-.299* (.172)
R&D Expenses$_{i,t}$	-	-.482 (.343)	-	2.593*** (.177)	-	2.624*** (.176)	-	5.347*** (1.624)
State Ownership$_{i,t}$	-	.001 (.008)	-	.008 (.010)	-	.008 (.010)	-	-.050* (.024)
Constant (β_0)	.737*** (.013)	.791*** (.026)	.488*** (.101)	.469* (.242)	.598*** (.030)	.678*** (.061)	.256 (.237)	.915*** (.138)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.777	.814	.678	.742	.679	.700	.664	.694
Number of obs.	22,551	7,974	7,742	2,753	7,742	2,753	3,079	1,462

$^{*}p < .100$; $^{**}p < .050$; $^{***}p < .010$

Table B13 Fixed effects regressions to test whether market competition influences the impact of CER on firm value. Environmental performance is computed using the methodology of Fernández-Kranz and Santaló (2010) and Siegel and Vitaliano (2007). When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	$Ln(Tobins\ Q)_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
$Ln(Market\ Share)_{i,t}$	-.021*** (.007)	-.045*** (.011)	-	-	-	-	-	-
$Ln(HHI)_{s,t}$	-	-	.007 (.012)	.015 (.029)	-	-	-	-
$Ln(Players)_{s,t}$	-	-	-	-	-.006 (.012)	-.036 (.028)	-	-
$Ln(1{+}Tariffs)_{s,t}$	-	-	-	-	-	-	.337* (.179)	-.026 (.093)
$Env.\ Performance\_old_{i,t}$	-.027*** (.007)	-.011 (.011)	-.163*** (.053)	-.032 (.093)	.043*** (.008)	-.001 (.012)	.137* (.071)	.204*** (.045)
$Env.\ Performance\_old_{i,t} \times Ln(Market\ Share)_{i,t}$	.010*** (.002)	.005 (.003)	-	-	-	-	-	-
$Env.\ Performance\_old_{i,t} \times Ln(HHI)_{s,t}$	-	-	.022*** (.006)	.005 (.011)	-	-	-	-
$Env.\ Performance\_old_{i,t} \times Ln(Players)_{s,t}$	-	-	-	-	-.015*** (.004)	.007 (.007)	-	-
$Env.\ Performance\_old_{i,t} \times Ln(1{+}Tariffs)_{s,t}$	-	-	-	-	-	-	-.078** (.037)	-.141*** (.024)
$Ln(Employees_{i,t})$	-.111*** (.008)	-.081*** (.018)	-.052*** (.006)	-.072*** (.012)	-.052*** (.006)	-.075*** (.012)	-.052* (.031)	-.154*** (.024)
$ROA_{i,t}$	1.003*** (.008)	.810*** (.062)	1.571*** (.086)	1.246*** (.129)	1.569*** (.087)	1.246*** (.128)	.573* (.290)	1.050*** (.341)
$Leverage_{i,t}$	-.039** (.017)	-.033 (.028)	-.040 (.027)	.036 (.047)	-.041 (.027)	.038 (.047)	-.309** (.134)	-.183 (.168)
$R\&D\ Expenses_{i,t}$	-	-.491 (.344)	-	2.593*** (.177)	-	2.630*** (.175)	-	5.714*** (1.791)
$State\ Ownership_{i,t}$	-	.001 (.008)	-	.008 (.010)	-	.008 (.010)	-	-.042** (.023)
Constant (β_0)	.738*** (.013)	.791*** (.026)	.521*** (.102)	.484* (.246)	.587*** (.030)	.683*** (.062)	.239 (.242)	.791*** (.131)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.777	.814	.679	.742	.679	.742	.665	.708
Number of obs.	22,551	7,974	7,742	2,753	7,742	2,753	3,079	1,462

$*p < .100$; $**p < .050$; $***p < .010$

Table B14 Fixed effects regressions to test whether market competition influences the impact of CER on firm value. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	$Ln(Tobins\ Q)_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
$L1.Ln(Tobins\ Q)_{i,t}$	.503*** (.010)	.393*** (.020)	.459*** (.018)	.349*** (.029)	.458*** (.018)	.351*** (.029)	.442*** (.049)	.420*** (.079)
$Ln(Market\ Share)_{i,t}$	-.005 (.007)	-.032** (.015)	-	-	-	-	-	-
$Ln(HHI)_{s,t}$	-	-	.009 (.013)	.032 (.029)	-	-	-	-
$Ln(Players)_{s,t}$	-	-	-	-	-.001 (.011)	-.064** (.026)	-	-
$Ln(1+Tariffs)_{s,t}$	-	-	-	-	-	-	-.087 (.057)	.018 (.083)
$Env.\ Performance_{i,t}$	-.031 (.043)	.016 (.068)	-.715** (.291)	-.023 (.587)	.115** (.047)	-.085 (.075)	.870*** (.322)	1.345*** (.292)
$Env.\ Performance_{i,t} \times Ln(Market\ Share)_{i,t}$	.012 (.013)	-.002 (.020)	-	-	-	-	-	-
$Env.\ Performance_{i,t} \times Ln(HHI)_{s,t}$	-	-	.090*** (.035)	.006 (.069)	-	-	-	-
$Env.\ Performance_{i,t} \times Ln(Players)_{s,t}$	-	-	-	-	-.042* (.022)	.077* (.044)	-	-
$Env.\ Performance_{i,t} \times Ln(1+Tariffs)_{s,t}$	-	-	-	-	-	-	-.551*** (.188)	-.906*** (.171)
$Ln(Employees_{i,t})$	-.087*** (.008)	-.085*** (.019)	-.035*** (.006)	-.046*** (.012)	-.034*** (.006)	-.051*** (.013)	-.043* (.020)	-.112*** (.028)
$ROA_{i,t}$	.485*** (.043)	.566*** (.075)	1.024*** (.095)	.992*** (.123)	1.024*** (.096)	.989*** (.122)	.283* (.252)	.873*** (.280)
$Leverage_{i,t}$	-.044** (.017)	-.059 (.031)	-.011 (.026)	.031 (.047)	-.011 (.026)	.034 (.047)	-.074** (.106)	-.013 (.123)
$R\&D\ Expenses_{i,t}$	-	-.040 (.317)	-	3.799* (2.243)	-	3.772* (2.220)	-	3.492* (1.853)
$State\ Ownership_{i,t}$	-	-.006 (.008)	-	.006 (.010)	-	.006 (.010)	-	-.055*** (.021)
Constant (β_0)	.419*** (.016)	-.006*** (.008)	.243*** (.103)	.122 (.240)	.315*** (.031)	.521*** (.063)	.496 (.081)	.437*** (.113)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.844	.843	.761	.789	.761	.790	.788	.782
Number of obs.	15,366	5,528	6,409	2,405	6,409	2,405	2,675	1,290

** $p < .100$; ** $p < .050$; *** $p < .010$*

Table B15 Goodness of fit tests for regressions run in table 8. Base regression 1 includes the control variables 'Ln(Employees)', 'ROA', 'Leverage' and fixed effects (firm and year fixed effects for firm-level regressions and industry and year fixed effects for industry-level regressions). Base regression 2 also control for 'R&D Expenses' and 'State Ownership'. Increase in R^2 is measured to the closest base regression. See table 8 for the exact regression run in column i.

Model	AIC	BIC	R^2	Increase in R^2
Firm-level data				
Base regression 1	250.766	282.849	.777	-
Model 1	202.379	258.525	.777	.06%
Base regression 2	-1089.882	-1048.001	.813	-
Model 2	-1111.577	-1048.756	.814	.06%
Industry-level data				
Base regression 1	218.902	246.719	.678	-
Model 3	206.024	254.705	.679	.08%
Model 5	199.597	248.278	.679	.11%
Base regression 2	-873.267	-837.745	.742	-
Model 4	-870.853	-817.569	.742	.03%
Model 6	-874.057	-820.773	.742	.06%
Base regression 3	893.157	917.286	.649	-
Model 7	745.890	788.116	.666	1.70%
Base regression 4	-241.970	-210.244	.691	-
Model 8	-315.219	-267.631	.707	1.63%

Table B16 Fixed effects regressions to test whether internal and foreign competition influences the impact of CER on firm value. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	$Ln(Tobins\ Q)_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
$L1.Ln(Tobins\ Q)_{i,t}$	-	-	-	-	.499*** (.024)	.381*** (.035)	.471*** (.027)	.334*** (.042)
$Ln(HHI2)_{s,t}$	-.028 (.022)	-.051 (.037)	-	-	-.038** (.019)	-.063* (.035)	-	-
$Ln(Internal\ Competiton)_{s,t}$	-	-	.031* (.017)	.043 (.027)	-	-	.015 (.015)	.028 (.025)
$Ln(Foreign\ Competititon)_{s,t}$	-	-	.025*** (.008)	-.022 (.014)	-	-	.021*** (.007)	.008 (.015)
$Env.\ Performance_{i,t}$	.256*** (.066)	-.079 (.090)	.322*** (.107)	-.362** (.161)	.144** (.066)	.059 (.097)	.086 (.102)	-.417** (.159)
$Env.\ Performance_{i,t} \times Ln(HHI2)_{s,t}$	.200*** (.058)	.040 (.087)	-	-	.137** (.054)	.059 (.089)	-	-
$Env.\ Performance_{i,t} \times Ln(Internal\ Comp.)_{s,t}$	-	-	.089* (.052)	-.192*** (.071)	-	-	.015 (.015)	-.217*** (.070)
$Env.\ Performance_{i,t} \times Ln(Foreign\ Comp.)_{s,t}$	-	-	.013 (.012)	-.042** (.020)	-	-	.007 (.014)	-.037* (.021)
$Ln(Employees_{i,t})$	-.052*** (.010)	-.085*** (.016)	-.047*** (.012)	-.091*** (.017)	-.032*** (.054)	-.054*** (.016)	-.033*** (.012)	-.067*** (.017)
$ROA_{i,t}$	1.353*** (.115)	1.149*** (.152)	1.287*** (.129)	1.145*** (.161)	.805*** (.111)	.868*** (.138)	.796*** (.126)	.866*** (.143)
$Leverage_{i,t}$	-.092** (.042)	-.016 (.062)	-.125 (.049)	-.078 (.075)	-.040*** (.037)	-.008 (.060)	-.077* (.042)	-.065 (.069)
$R\&D\ Expenses_{i,t}$	-	2.606*** (.149)	-	2.747*** (.167)	-	2.057 (2.379)	-	.649 (2.864)
$State\ Ownership_{i,t}$	-	-.003 (.012)	-	-.013 (.013)	-	-.004 (.011)	-	-.012 (.012)
Constant (β_0)	.600*** (.033)	.618*** (.049)	.793*** (.057)	.852*** (.089)	.282*** (.032)	.353*** (.051)	.469*** (.056)	.568* (.091)
Level of data	Industry-level		Industry-level		Industry-level		Industry-level	
R^2	.650	.714	.660	.735	.751	.767	.758	.779
Number of obs.	3,768	1,749	3,079	1,462	3,298	1,568	2,675	1,290

$^{*}p < .100$; $^{**}p < .050$; $^{***}p < .010$

Table B17 Quadratic regressions to test if innovation-induced CER strengths has an inverted U-shaped relation with competition. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Strengths$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.008*** (.002)	-.005* (.003)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	-.026*** (.004)	-.027*** (.008)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	.020*** (.005)	.010 (.010)	-	-
Ln(Competition)$_{s,t}$	-	-	-	-	-	-	-.002 (.021)	-.014 (.029)
R&D Expenses$_{i,t}$	1.501 (1.135)	-.778 (1.178)	106.006** (50.054)	103.597** (52.806)	4.724 (4.128)	9.777** (4.218)	-1.760 (1.955)	-2.583 (1.605)
R&D Expenses$_{i,t}$ × Ln(Market Share)$_{i,t}$	.395 (.253)	-.143 (.241)	-	-	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(HHI)$_{s,t}$	-	-	-28.292** (13.111)	-29.287** (14.136)	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(Players)$_{s,t}$	-	-	-	-	-2.499 (2.240)	-5.085** (2.240)	-	-
R&D Expenses$_{i,t}$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	12.633 (8.516)	9.557** (4.321)
R&D Expenses$_{i,t}$ × Ln(Market Share)$^2_{i,t}$	.024* (.014)	-.007 (.013)	-	-	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(HHI)$^2_{s,t}$	-	-	1.874** (.857)	2.031** (.941)	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(Players)$^2_{s,t}$	-	-	-	-	.277 (.266)	.539** (.256)	-	-
R&D Expenses$_{i,t}$ × Ln(1+Tariffs)$^2_{s,t}$	-	-	-	-	-	-	-7.519 (5.296)	-4.820** (2.328)
Ln(Employees$_{i,t}$)	-.004*** (.014)	-.012*** (.004)	.027*** (.003)	.043*** (.004)	.027*** (.003)	.043*** (.004)	.047*** (.008)	.082*** (.014)
ROA$_{i,t}$	.003 (.008)	-.021** (.012)	.002 (.018)	-.028 (.029)	.007 (.018)	-.025 (.029)	-.011 (.038)	-.023 (.066)
Leverage$_{i,t}$	.030*** (.006)	.024*** (.008)	.001 (.010)	.014 (.015)	.002 (.010)	.015 (.015)	-.108*** (.030)	-.191*** (.042)
State Ownership$_{i,t}$	-	.002 (.003)	-	.003 (.004)	-	.002 (.004)	-	-.009 (.009)
Constant (β_0)	.068*** (.004)	.104*** (.006)	.227*** (.037)	.228*** (.068)	-.024** (.012)	-.012 (.020)	.067** (.026)	.074* (.038)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.694	.786	.595	.692	.594	.691	.608	.619
Number of obs.	13,986	7,974	4,937	2,753	4,937	2,753	2,469	1,462

** p < .100; ** p < .050; *** p < .010*

Table B18 Quadratic regressions to test if innovation-induced CER concerns has an inverted U-shaped relation with competition. When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Concerns$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.001 (.001)	.001 (.001)	-	-	-	-	-	-
Ln(HHI)$_{s,t}$	-	-	.000 (.002)	-.003 (.004)	-	-	-	-
Ln(Players)$_{s,t}$	-	-	-	-	-.001 (.003)	.003 (.005)	-	-
Ln(Competition)$_{s,t}$	-	-	-	-	-	-	-.001 (.007)	-.004 (.011)
R&D Expenses$_{i,t}$	-.322 (.368)	-.122 (.659)	1.843 (40.012)	40.115 (36.520)	1.220 (3.396)	5.177** (2.515)	.963 (2.143)	-.921 (1.212)
R&D Expenses$_{i,t}$ × Ln(Market Share)$_{i,t}$	-.059 (.080)	-.020 (.136)	-	-	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(HHI)$_{s,t}$	-	-	.041 (10.753)	-11.137 (9.977)	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(Players)$_{s,t}$	-	-	-	-	-.831 (1.816)	-2.756** (1.338)	-	-
R&D Expenses$_{i,t}$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	13.384 (10.311)	4.560 (5.033)
R&D Expenses$_{i,t}$ × Ln(Market Share)$^2_{i,t}$	-.003 (.004)	-.001 (.007)	-	-	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(HHI)$^2_{s,t}$	-	-	-.032 (.718)	.762 (.674)	-	-	-	-
R&D Expenses$_{i,t}$ × Ln(Players)$^2_{s,t}$	-	-	-	-	.140 (.211)	.315** (.153)	-	-
R&D Expenses$_{i,t}$ × Ln(1+Tariffs)$^2_{s,t}$	-	-	-	-	-	-	-9.507 (6.463)	-2.226 (2.617)
Ln(Employees$_{i,t}$)	.017*** (.004)	.019*** (.002)	.015*** (.002)	.009*** (.002)	.015*** (.001)	.010*** (.002)	.012*** (.002)	.011*** (.004)
ROA$_{i,t}$	-.002 (.005)	.005 (.006)	-.027 (.014)	-.005 (.021)	-.026* (.014)	-.005 (.021)	-.014 (.012)	.006 (.016)
Leverage$_{i,t}$	-.000 (.003)	.001 (.003)	.010 (.006)	.010 (.009)	-.026* (.014)	.010 (.009)	-.002 (.007)	-.008 (.010)
State Ownership$_{i,t}$	-	.000 (.001)	-	.002 (.002)	-	.002 (.002)	-	-.004 (.003)
Constant (β_0)	-.003 (.002)	-.014*** (.003)	-.005 (.021)	.022 (.032)	-.003 (.007)	-.009 (.010)	.004 (.009)	.007 (.013)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.708	.632	.637	.606	.637	.552	.555	.458
Number of obs.	13,986	7,974	4,937	2,753	4,937	2,753	2,469	1,462

** p < .100; ** p < .050; *** p < .010*

Table B19 Quadratic regressions to test if innovation-induced CER has an inverted U-shaped relation with competition. Env. performance is computed using the methodology of Fernández-Kranz and Santaló (2010) and Siegel and Vitaliano (2007). When using trade data, datapoints are weighted based on the size of imports relative to the total market. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable	Environmental Performance old$_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(Market Share)$_{i,t}$	-.043***	-.022	-	-	-	-	-	-
	(.014)	(.019)						
Ln(HHI)$_{s,t}$	-	-	-.171***	-.173***	-	-	-	-
			(.032)	(.055)				
Ln(Players)$_{s,t}$	-	-	-	-	.149***	.076	-	-
					(.036)	(.068)		
Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	-.046	.067
							(.132)	(.180)
R&D Expenses$_{i,t}$	12.765	.879	785.892*	724.889**	37.578	40.142	-18.944	-26.026**
	(7.926)	(9.276)	(429.681)	(103.580)	(39.831)	(30.637)	(12.381)	(10.437)
R&D Expenses$_{i,t}$ × Ln(Market Share)$_{i,t}$	2.988*	.181	-	-	-	-	-	-
	(1.778)	(1.936)						
R&D Expenses$_{i,t}$ × Ln(HHI)$_{s,t}$	-	-	-219.932*	-204.960**	-	-		-
			(114.882)	(103.580)				
R&D Expenses$_{i,t}$ × Ln(Players)$_{s,t}$	-	-	-	-	-17.614	-20.110	-	-
					(21.456)	(16.264)		
R&D Expenses$_{i,t}$ × Ln(1+Tariffs)$_{s,t}$	-	-	-	-	-	-	75.562	98.573***
							(61.573)	(27.922)
R&D Expenses$_{i,t}$ × Ln(Market Share)$^2_{i,t}$	.171*	-.006*	-	-	-	-	-	-
	(.017)	(.103)						
R&D Expenses$_{i,t}$ × Ln(HHI)$^2_{s,t}$	-	-	15.144**	14.222**	-	-	-	-
			(7.632)	(6.949)				
R&D Expenses$_{i,t}$ × Ln(Players)$^2_{s,t}$	-	-	-	-	1.424	1.971	-	-
					(2.506)	(1.854)		
R&D Expenses$_{i,t}$ × Ln(1+Tariffs)$^2_{s,t}$	-	-	-	-	-	-	-39.356	-49.678***
							(8.002)	(14.916)
Ln(Employees$_{i,t}$)	-.129***	-.175***	.059***	.208***	.058***	.209***	.232***	.494***
	(.020)	(.028)	(.017)	(.031)	(.017)	(.027)	(.057)	(.089)
ROA$_{i,t}$	.008	-.200**	.182	-.180	.209	-.160	-.120	-.351
	(.057)	(.080)	(.146)	(.037)	(.146)	(.241)	(.245)	(.414)
Leverage$_{i,t}$	.170***	.127**	-.078	.019	-.072	.023	-.609***	-1.110***
	(.040)	(.054)	(.069)	(.099)	(.069)	(.099)	(.200)	(.278)
State Ownership$_{i,t}$	-	.017	-	.024	-	.023	-	-.030
		(.019)		(.029)		(.029)		(.047)
Constant (β_0)	.421***	.669***	1.528***	1.477***	-.186*	-.107	.271	.164
	(.026)	(.040)	(.264)	(.456)	(.084)	(.137)	(.167)	(.243)
Level of data	Firm-level		Industry-level		Industry-level		Industry-level	
R^2	.625	.716	.534	.608	.533	.607	.587	.581
Number of obs.	13,986	7,974	4,937	2,753	4,937	2,753	2,469	1,462

** p < .100; ** p < .050; *** p < .010*

Table B20 Quadratic regressions to test whether innovation-induced CER takes on an inverted U-shaped relation with internal and foreign competition. Firm and year fixed effects are absorbed for regressions on firm-level data, and industry and year fixed effects for regressions on industry-level data. Robust standard errors are used for all regressions.

Dependent variable				
	(1)	(2)	(3)	(4)
Explanatory variable	βa (SE)	βa (SE)	βa (SE)	βa (SE)
Ln(HHI2)$_{s,t}$	-.015* (.009)	-.011 (.013)	-	-
Ln(Internal Competition)$_{s,t}$	-	-	-.016*** (.006)	.002 (.010)
Ln(Foreign Competition)$_{s,t}$	-	-	-.007* (.004)	.002 (.007)
R&D Expenses$_{i,t}$	-5.081 (3.303)	-5.846 (4.226)	13.156* (7.387)	14.922 (15.177)
R&D Expenses$_{i,t}$ × Ln(HHI2)$_{s,t}$	-7.245 (4.511)	-8.315 (5.728)	-	-
R&D Expenses$_{i,t}$ × Ln(Internal Comp.)$_{s,t}$	-	-	14.030* (8.203)	15.792 (15.468)
R&D Expenses$_{i,t}$ × Ln(Foreign Comp.)$_{s,t}$	-	-	-3.197* (1.913)	-2.089 (1.918)
R&D Expenses$_{i,t}$ × Ln(HHI2)$_{s,t}$ × Ln(HHI2)$_{s,t}$	-2.221* (1.285)	-2.593* (1.586)	-	-
R&D Expenses$_{i,t}$ × Ln(Internal Comp.)$_{s,t}$ × Ln(Internal Comp.)$_{s,t}$	-	-	1.959 (1.445)	2.870 (3.451)
R&D Expenses$_{i,t}$ × Ln(Foreign Comp.)$_{s,t}$ × Ln(Foreign Comp.)$_{s,t}$	-	-	-.249* (.142)	-.170 (.136)
Ln(Employees$_{i,t}$)	-.015*** (.004)	.043*** (.006)	.019*** (.004)	.044*** (.007)
ROA$_{i,t}$	.034 (.032)	-.054 (.050)	.027 (.035)	-.052 (.057)
Leverage$_{i,t}$	.022 (.016)	.036 (.024)	-.078 (.069)	.039 (.020)
State Ownership$_{i,t}$	-	-.000 (.006)	-	.005 (.006)
Constant (β_0)	.005 (.012)	.003*** (.017)	.011 (.019)	.015 (.037)
Level of data	Industry-level		Industry-level	
R^2	.563	.616	.593	.635
Number of obs.	2,973	1,749	2,469	1,462

** $p < .100$; ** $p < .050$; *** $p < .010$*