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Business for Climate: A Qualitative Comparative Analysis of Policy Support and Opposition from Transnational Companies

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Abstract

Transnational Companies (TNCs) are becoming increasingly influential in the global governance of climate change. Therefore, it is of paramount importance to understand the factors that explain why some TNCs broadly support policies to tackle climate change, while others oppose them. This study subjects previous findings from small-N case studies to a more systematic fuzzy set Qualitative Comparative Analysis (fsQCA). It investigates previous findings that link exposure to fossil fuels to policy opposition, and transnational operations, exposure to consumers, certain factors in the institutional environment and pressure from investors to policy support. It finds strong evidence that not being exposed to fossil fuels *or* transitioning to a low-carbon business model is a necessary condition for policy support. It also finds moderate evidence that being exposed to fossil fuels *or* not transitioning to a low-carbon business model is a necessary condition for policy opposition. Moreover, it finds that an institutional environment characterised by stringent environmental policy, organic growth strategies and high research and development spending is a sufficient condition for policy support in combination with other conditions. The findings on transnational operations and consumer exposure are inconclusive, while the findings on investor pressure directly contradict the expectation that it would contribute to policy support. The key findings suggest that policymakers should rely on industries that are not exposed to fossil fuels or are transitioning to a low-carbon future to form pro-policy alliances, while implementing targeted policies to gradually reduce exposure to fossil fuels and kick-start a low-carbon transition to nurture support for larger, more general policies to address climate change.

Key words: transnational companies, climate change, policy, QCA, fuzzy set.

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1. Introduction

During the most recent wave of globalisation – which is commonly believed to have started in the second half of the 20th century and continues today (Zürn 2013, 404) – the number of Transnational Companies (TNCs) has boomed. TNCs now account for the large majority of the world's economic activity. They are increasingly becoming involved in the global governance of the environment amongst other issues, influencing (international) policymaking, researching and developing alternative technologies, shaping public discourse and even starting private governance initiatives where state-led regulation lacks (Andrade & Puppim de Oliveira 2014, 376; Falkner 2008, 9-10; Levy & Newell 2005, 3; Vormedal 2008, 48). On climate change policy specifically, some TNCs have developed sophisticated strategies to safeguard their interests. Single companies like ExxonMobil have had far-reaching policy influence in key states like the United States of America (USA) (Levy & Newell 2005, 4). This study will seek to explain variation in support for and opposition to climate policy from TNCs.

Before elaborating on the increased role of TNCs in global and national climate governance, it is important to clarify what is meant by 'TNC,' as definitions diverge. Arts (2003, 6) defines a TNC as a "large-scale, profit-making, commercial organisation with offices and/or production units in many countries around the world." There is some debate about whether TNCs should be distinguished from Multinational Companies (MNCs). The latter are argued to replicate activities in different world regions, whereas the former are more truly global, with operations divided across the globe (Allen & Thompson 1997, 214; Arts 2003, 6; Fuchs 2007, 10). What matters for the purpose of this analysis is that a TNC/MNC has operations in different countries and is thus exposed to different regulatory environments and markets. Therefore, this study will not distinguish between TNCs and MNCs, and use Arts' (2003, 6) definition.

TNCs seek to influence their regulatory environment because they have to consider how future trends, expectations and demands in terms of policies and regulations, technological developments, consumer preferences and public opinion might influence them on the medium to long term (Vormedal 2010, 254; Vormedal 2011, 2). International treaties send signals to markets about the long-term political objectives of the international community by, for example, putting in place governance mechanisms that incentivise low-carbon development or encouraging and supporting private actors to undertake voluntary efforts (Falkner 2016, 1123). Specific 'green' policies such as feed-in-tariffs or renewable portfolio standards often precede larger, more general policies such as carbon pricing schemes, suggesting that green policy "nurtures a political landscape of interests and coalitions that benefit from a transformation to low-carbon energy use" and coalesce to develop more stringent climate policies (Meckling et al. 2015, 1170).

It may not come as a surprise that globalisation has played a vital role in enabling TNCs to gain deeper influence over (inter)national policy. Non-state actors, including businesses, increasingly participate in environmental governance due to shifts in the patterns of investment and production as well as in the nature of institutional authority and standard-setting from the national to the global level. There is a broad consensus that "business is gaining the upper hand in the state-[T]NC[1] bargaining process" (Newell 2005, 34). This is, in large part, due to the structural power that companies enjoy as the central nodes in capitalist economies, being the main drivers of economic growth, investment and employment upon which governments depend (Bernhagen & Bräuninger 2005, 44; Fairfield 2015, 413; Fuchs 2013, 80; Newell 2000, 99; Newell & Paterson 1998, 691; Vormedal 2008, 47). For these reasons, TNCs are 'key agents' (Falkner 2008, 4). In combination with the fact that TNCs are large contributors to the Greenhouse Gas (GHG)

[1] Newell refers to MNC.

emissions that cause climate change, this suggests that corporate climate policy strategies should receive more attention (Levy & Newell 2005, 5).

Traditional regime scholarship has overlooked the fact that TNCs and industry associations play an important role in influencing the negotiation and creation of (international) policy due to its state-centric approach (Andrade & Puppim de Oliveira 2014, 375; Vormedal 2010, 251-252). Systematic comparative studies of the role of TNCs in environmental policy have been in short supply (Bernhagen 2008, 79; Skjærseth & Skodvin 2001, 43; Vormedal 2008, 48), especially in terms of how corporate political strategies are developed (Levy & Newell 2002, 84; Levy & Newell 2005, 2). Recently, interest in the role TNCs play as actors in global environmental politics has been growing (Downie 2017, 21). The majority of studies in environmental politics that do consider transnational actors conclude that they influence outcomes in terms of the negotiation, structuring and implementation of international environmental governance regimes and national policies significantly (Downie 2014, 376; Downie 2017, 21; Levy & Newell 2002, 84). However, these studies often focus on a particular kind of company and a specific policy project – Downie (2017, 35) suggests testing his results across other industries as an important avenue for future research. That is exactly what this dissertation aims to do.

This dissertation will subject findings from small-N case studies that seek to explain the climate policy strategies of TNCs to a more systematic, cross-industry Qualitative Comparative Analysis (QCA) on 25 of the world's largest TNCs. It aims to identify which factors hold explanatory power across a larger, more diverse sample by examining which conditions or combinations of conditions are necessary or sufficient for TNC support for or opposition to climate policy. As this would be the first systematic comparative study on a medium-N sample of TNCs from different industries and world regions, it should be more generalizable than those of previous studies. The next section will review the literature on corporate climate policy influence. Section 3 will introduce the QCA methodology. Section 4 will identify and operationalise the conditions to be tested. Section 5 will introduce the results, which are discussed in section 6. Section 7 will conclude.

2. Literature Review

This section will briefly review the literature on the role of TNCs in global climate governance through a neo-pluralist lens. Neo-pluralism developed from pluralism, which posited that business as an interest group is systematically favoured in international policymaking due to its critical role in the economy, providing employment, economic growth and technological innovation (Lindblom 1977, 170-188). Neo-pluralism counters that this argument does not explain the differential outcomes of environmental policy attempts and the gradual emergence of an international environmental agenda. It argues that businesses' power and influence over policy outcomes depends on the specific issue area and the presence of countervailing forces – from states, transnational civil society and conflict within the business sector (Falkner 2008, 13-26; Meckling 2011, 28). The point that conflict about policy engagement strategies may exist within the business sector is reflected in the wide variation in how supportive TNCs are of international climate policy – this study's key outcome of interest. Both pluralism and neo-pluralism contrast with realism and other state-centric regime theories, which see corporations as marginal or subordinate actors in a state-driven international system (Falkner 2008, 11).

Climate policies have differential effects on industries and individual companies as they seek to change corporate behaviour in a targeted and specific way (Falkner 2008, 32-33; Meckling 2015, 19-20). This leads to conflicting preferences, strategies and engagements with policymakers from different companies, termed 'business conflict' by Falkner (2008, 32-33). Fossil fuel companies have historically opposed climate policy as their main business model is and will need to remain focused on fossil fuels, even though some companies have started to develop alternative energy sources. The companies that have been most proactive in this have also generally become most supportive of some form of international climate regime, although they continue to seek to minimise its cost to their business. Energy producers such as utilities depend on a secure supply of energy and have historically sided with fossil fuel companies. Uncertainty about future carbon restrictions has led some energy producers to support a gradual shift to renewable sources. Industrial, energy-intensive firms similarly depend on stable, cheap energy supplies and have also historically sided with fossil fuel companies, although they benefit from input reductions and could support renewables if they become as reliable and cheap as fossil fuels. Transportation companies are vulnerable to fuel price fluctuations and have opposed climate measures where they would increase costs, but have supported improving fuel efficiency and have started looking into carbon offsetting under consumer pressure. Other companies, such as renewable energy firms, financial service companies and the insurance industry see climate policy as a business opportunity and have supported more decisive action (Falkner 2008, 97-99; Meckling 2015, 26-29).

Business conflicts have decreased the power of business in relation to climate change (Newell & Paterson 1998, 696). Conflicts complicate collective action and delegitimise businesses' role as international actors in the eyes of national governments. Collective action is made difficult, for example, by business conflict within global supply chains. As the economic consequences of policy choices differ throughout global supply chains, policymakers can choose those interests that are most supportive towards the proposed policy to align themselves with (Meckling & Hughes 2018, 88-89). Policymakers find it easier to push ahead on a policy proposal without unified business opposition because fragmented opposition is perceived to be less legitimate. A framework for liability and redress under the Cartagena Protocol on Biosafety which was proposed by a limited group of businesses – consisting exclusively of biotechnology firms – was ignored by governments, as the proposal did not represent the interests of other biotechnology firms and genetically modified product transporters. Governments that favoured a more stringent protocol delegitimised the industry proposal by pointing to the small and narrow group of companies behind it (Orsini 2012, 970-975).

Building upon the work on business conflicts, Vormedal (2011, 6) argues that this perspective does not explain why and how business strategies develop over time or how dynamics around governance and strategic engagement can create conditions for change. She argues that once an international agreement has been reached, its core provisions will cascade down to the regional and national levels. This will likely increase liable industries' perception of regulatory uncertainty and risk. Countries that seek to free-ride will not immediately implement the international agreement into national policy, causing an uneven playing field. On the other hand, new market opportunities are created where regulation is implemented. Uncertainty impedes the ability of corporations to invest for the future, and so the cost of inaction may over time become (perceived as) larger than the cost of compliance. These developments are argued to make business preferences and strategies 'tip' towards policy support. Critically, this will likely lead to a tipping point in the regime formation process itself, as support from businesses will enhance states' capacity for more affirmative action (Vormedal 2010, 259-260). The history of the international climate regime does show convergence towards policy support. According to Levy (2005, 73-75), that convergence is explained by the narrowing of corporate perspectives as international climate policy negotiations continued and a win-win discourse regarding business and environmental interests diffused. In consequence, firms started to invest in low-carbon technology and participate in voluntary programmes to inventory, limit and trade GHG emissions. Evidence from another environmental issue area, Ozone depletion, also seems to confirm the tipping point theory. At first, the European aerosol industry was united in opposition to the regulation of Ozone-Depleting Substances (ODSs) such as Hydrochlorofluorocarbons (HCFCs). As soon as some firms started opting for non-ODS products and advertising them as 'ozone-friendly', other firms stopped supporting HCFCs as well (Falkner 2005, 114-115).

It should be noted that business associations play an important role in representing business interests in global politics. Business associations may speak for a wide range of businesses from different national contexts, or for more narrow groups of businesses that are aligned on a specific topic (Falkner 2008, 41). Such coalitions are a key source of power that businesses use to achieve political clout. TNC coalitions have become a key arrangement in global policy-making because public actors demand a broad-based representation of interest groups, the diversity in large firm interests has increased, and TNCs have come to accept the need to accommodate public interests. Transnational coalitions also provide 'power through organisation' as resources are pooled, interests are aggregated, different firms engage at different policy levels, and state allies are mobilised (Meckling 2011, 28-31). The most powerful coalitions are those that combine businesses with environmental organisations, so-called 'baptist-bootlegger' coalitions (Meckling 2011, 29; Vormedal 2011, 6). At the other end of the spectrum, umbrella associations such as the GCC took a stronger position against climate policy than most of their individual company members. According to a former GCC staffer, the GCC was able to 'take the heat' for stronger statements because it acted as a focal point, shielding its members from the spotlight (Downie 2014, 382).

In short, the literature on corporate climate policy strategies has found a diverse picture of business interests which has led to business conflict, explained how business conflict weakens corporate power, conceptualised change mechanisms through tipping points and described how business associations may solve collective action problems, strengthening corporate power. This literature has shed light on how TNCs influence climate policy on the national and international level, and what determines the power of business as an interest group vis-à-vis other interest groups and states. This study will take a step back and investigate which factors explain whether TNCs support or oppose climate policy in the first place. The next section will introduce the fuzzy-set QCA (fsQCA) methodology which was employed to answer this question.

3. Methodology

3.1 Qualitative Comparative Analysis

QCA attempts to understand configurations of cases that are similar across the analysed independent variables ('conditions') and explain how they are linked to a certain outcome (Marx 2008, 256). It is often presented as a hybrid method, combining the best of case study and quantitative statistical methods (Schneider & Wagemann 2012, 10).

QCA is particularly well-suited for this study, in terms of the type of actor studied, TNCs; the key outcome of interest, support for climate policy; and the aim to systematically test previously identified findings over a larger sample. QCA perceives each individual case as a complex set of properties, which should be analysed as a 'specific whole' (Berg-Schlosser et al. 2009, 6). This approach suits TNCs as they are complex entities, consisting of many divisions with their own specific remit that are spread over various countries. In addition, TNCs are often part of complicated, global supply chains. This analysis will study factors both internal and external to TNCs, paying attention to the competitive dynamics of their markets as well as the institutional context of the wider political economy (Newell & Levy 2005, 329). Moreover, QCA's notion of causal complexity, which allows for 'equifinality' – the possibility that multiple combinations may generate the same outcome – rhymes perfectly with the expectation that this study's dependent variable – support for climate policy – is likely influenced by one or more combinations of several independent variables – emanating from TNCs' internal characteristics, the market and institutional environment (Berg-Schlosser et al. 2009, 8; Marx 2008, 255; Primc & Čater 2015, 662; Schneider & Wagemann 2012, 5). Finally, QCA looks at the causes of an outcome rather than the outcomes of a cause, equipping it well for systematically testing hypotheses or existing theories over a medium-N sample of cases (Andreas, Burns & Touza 2017, 83), which is precisely the aim of this study.

The main difference between the simpler crisp-set QCA (csQCA) and the fsQCA used in this study is that the former dichotomises cases' membership in conditions by scoring them as either 'out' (0) or 'in' (1), whereas the latter allows case membership to be expressed in degrees between 0 and 1. FsQCA still dichotomises: case membership of <0.5 denotes 'more out than in' and >0.5 denotes 'more in than out' of a condition. Therefore, "[f]uzzy sets incorporate the insight that many social science concepts are dichotomous *in principle*, but that their empirical manifestations occur in degrees" (Ibid, 14; emphasis in original). FsQCA enables a more demanding and precise assessment of sufficiency and necessity because consistency is based on the degree of membership rather than the dichotomy of membership or non-membership (Ragin 2009, 119). It minimises the loss of empirical information associated with binary case membership scores. It also decreases sensitivity to the location of the dichotomisation threshold, maximising result robustness (Schneider & Wagemann 2012, 25). For these reasons, Schneider and Wagemann (Ibid, 15) argue that it is best practice to use fsQCA wherever possible.

Fuzzy sets can be made as detailed as desired by adding 'levels' of case membership in conditions. The amount of levels should be chosen based on how much differentiation can be justified through substantive and theoretical knowledge (Ragin 2009, 91-92). This analysis will use a relatively low amount of levels – four – because it is the first systematic analysis of the climate policy strategies of TNCs and thus cannot rely on a strong enough body of substantive and theoretical knowledge to justify more detailed set membership scores. The four levels of the fuzzy set are set out in table 3.1.

Fuzzy set score	**Case membership in a condition / set of conditions**
1	Fully in
0.67	More in than out
0.33	More out than in
0	Fully out

Table 3.1 – Four-level fuzzy set

A four-level fuzzy set requires three 'qualitative anchors': the points at which full and full non-membership in a set are reached and the point of maximum ambiguity, where a case is neither more 'in than out' nor more 'out than in' of a condition (Ragin 2009, 92; Schneider & Wagemann 2012, 30). The qualitative anchors used to determine the fuzzy values of all indicators are reported in Appendix II.

3.2 Data sources

The data upon which the fuzzy scores of cases on the conditions[2] were based came from various sources: the Asset4 ESG database; Statista dossiers; Factiva searches of news archives; the Organisation for Economic Co-operation and Development (OECD) environmental policy stringency index; the Ceres climate and sustainability shareholder resolutions database; and company websites. These sources provided the most high-quality, comparable data that was available. Appendix I lists each indicator's data source(s).

The outcome variable, TNCs' support for or opposition to climate policy, is based on data from the Non-Governmental Organisation (NGO) InfluenceMap. InfluenceMap ranks TNCs according to publicly available information, including promotional information, voluntary disclosures, legislative consultations and external reports on TNCs from respected media sources. InfluenceMap scores TNCs based on the company's own policy engagement and messaging as well as on the industry associations with which the company has relationships (InfluenceMap 2018).[3] The overall score is expressed in a value between 0 and 100. A score of over 60 signals a TNC actively supports policies for a low carbon future, while a score of under 40 signals a TNC actively obstructs this (Ibid). These values will serve as the qualitative anchors (see table 3.2).

InfluenceMap score	**Fuzzy set score on climate policy support**
>60	1
50–60	0.67
50	*Point of maximum ambiguity; not scored*
40–50	0.33
<40	0

Table 3.2 – Conversion of InfluenceMap scores to fuzzy scores on the outcome variable

[2] Introduced in section 4.
[3] More information about InfluenceMap and its methodology can be found on its website www.influencemap.org.

3.3 Sample selection

The universe of cases from which this study's sample was selected consists of the world's largest TNCs according to the 2018 Forbes Global 2000 list, which ranks publicly-traded companies based on four metrics: sales, profits, assets and market value (Murphy 2018). The focus on the world's largest TNCs means that the companies in this study's universe are predominantly from North America and Europe, and to a lesser extent Asia. Within this inherently limited universe, a sample was selected in order to achieve "a maximum of heterogeneity over a minimum number of cases" (Berg-Schlosser & De Meur 2009, 21). For each sector, three to five companies were selected that differed from each other in terms of the world region of their origin and their score on the outcome variable. This resulted in a sample of 25 TNCs.

InfluenceMap excludes financial services companies such as investment funds, banks and insurers from its analysis. Although this is a limitation,[4] InfluenceMap's dataset is the most thorough and complete information on how supportive TNCs are of climate policy that is available, as it combines both the organisation's own activities as well as those of the trade associations and other 'influencers' that it has relationships with. Table 3.3 shows the sample with the abbreviations that will be used to refer to each company in subsequent tables. Cases that are struck through had to be dropped due to a lack of key data on one or more conditions. The sample excludes conglomerates such as Berkshire Hathaway because such companies do not belong to a clear sector, which would complicate the analysis.

[4] See section 6.2 for further elaboration.

Case	**Sector**	**Region of origin**	**Forbes 2018 rank**	**Fs score on outcome**	**Abbreviation**
Apple	Technology	North America	8	1	APP
Samsung Electronics	Technology	Asia	14	1	SAM
Microsoft	Technology	North America	20	1	MIC
Intel	Technology	North America	49	0.67	INT
~~Foxconn Technology Group~~	~~Technology~~	~~Asia~~	~~105~~	~~0~~	
Royal Dutch Shell	Energy	Europe	11	0.33	RDS
ExxonMobil	Energy	North America	13	0	EXX
BP	Energy	Europe	36	0	BP
~~Rosneft~~	~~Energy~~	~~Eurasia~~	~~73~~	~~0~~	
~~Equinor~~	~~Energy~~	~~Europe~~	~~91~~	~~0.67~~	
Toyota Motor	Car	Asia	12	0.33	TOY
Volkswagen Group	Car	Europe	16	0.33	VW
~~Honda Motor~~	~~Car~~	~~Asia~~	~~58~~	~~0.67~~	
Ford Motor	Car	North America	67	0	FOR
AT&T	Telecom	North America	15	0.33	ATT
Verizon Communica-tions	Telecom	North America	18	1	VER
~~Comcast~~	~~Telecom~~	~~North America~~	~~34~~	~~0~~	
~~Nippon Telegraph & Telephone~~	~~Telecom~~	~~Asia~~	~~46~~	~~1~~	
Deutsche Telekom	Telecom	Europe	79	1	DET
Table continues on the next page					
Walmart Stores	Retail	North America	24	1	WAL
Anheuser Busch InBev	Retail	Europe	41	1	ANB
Home Depot	Retail	North America	121	0.33	HOM
Pfizer	Pharmaceuticals	North America	44	0.67	PFI
Novartis	Pharmaceuticals	Europe	63	1	NOV
Bayer	Pharmaceuticals	Europe	100	0	BAY
Glencore International	Raw materials	Europe	64	0	GLE
BHP Billiton	Raw materials	Oceania	108	0.33	BHP

Case	Sector	Region of origin	Forbes 2018 rank	Fs score on outcome	Abbreviation
Rio Tinto Group	Raw materials	Europe	111	0.33	RIO
Enel	Utilities	Europe	75	1	ENE
EDF	Utilities	Europe	115	1	EDF
Iberdrola	Utilities	Europe	146	1	IBE

Table 3.3 – Sample

3.4 Timeframe

Cases were scored on conditions based on annual data spanning the years 2015-2018. This period was selected for analysis as TNCs' climate policy strategies are dynamic, adapting rapidly to changing internal and external factors. The sea change in international climate policy caused by the more decentralised and flexible approach of the 2015 Paris Agreement (Falkner 2016) is expected to have affected TNCs' positions on climate policy, explaining the choice for this timeframe.

The next section will introduce the conditions that have been argued to determine whether a TNC supports climate policy or not in the literature, formulate hypotheses on their expected relationship with climate policy support or opposition and operationalise them for QCA.

4. Conditions that determine TNCs' climate policy strategies

Climate policy – and environmental regulation more broadly – is distributional in nature. Its effects differ across industries and companies, and therefore create winners and losers as the costs and benefits of are distributed unevenly. Critically, corporate preferences on climate policy are shaped according to whether they expect to be a winner or loser (Falkner 2008, 9-10; Downie

2017, 23-24; Meckling 2015, 19-22). This general theoretical expectation will underpin the formulation of the conditions that are analysed.

Conditions are operationalised through indicators. For each condition, a 'concept tree' showing all indicators and sub-indicators as well as a table detailing the rules through which indicators' fuzzy scores are aggregated to one fuzzy set score for the condition as a whole are displayed.

4.1 Exposure to Fossil fuels (EF)

The operations of industries that either supply or use fossil fuel-based energy on a large scale, which includes the coal, oil & gas, heavy industry, automobile and chemical sectors, will be fundamentally affected by policies that aim to reduce GHG emissions (Newell 2000, 97; Skjærseth & Skodvin 2001, 44). These industries have broadly been the most heavily opposed to climate policy. Because low-carbon technologies are radically innovative and far removed from the expertise of incumbent firms, these firms are much less likely to be winners in future low-emission product markets than firms were in the ozone depletion case (Levy 2005, 76-77).

Two factors are argued to determine the degree of exposure to fossil fuels. Firstly, the larger the share of a firm's revenue that is derived from the production and sale of fossil fuels, the less supportive that firm will be of climate policy. Rio Tinto was the only top-ten US coal producer that did not oppose the Waxman-Markey bill, which attempted to implement an emissions trading system akin to the European Union Emissions Trading System (EU ETS) in the USA, in part because coal generated only 8% of Rio Tinto's global revenue compared to over 90% of the global revenue of the other nine companies (Downie 2017, 27-28). Companies for which the production and sale of fossil fuels is their main business are expected to be less supportive of climate policy than companies for which fossil fuels are only part of manufacturing or product use. The oil industry, for example, has been less willing to accept mandatory GHG emission controls than the automobile industry, both in the USA and Europe (Levy 2005, 73). This indicator will hence capture the share of energy companies' revenues from fossil fuels as well as distinguish between companies for which the core business is the production and sale of fossil and companies for which fossil fuels are used in production or the use of their products. Secondly, the carbon intensity of TNCs' activities can be expected to dictate climate policy supportiveness, in the sense that a higher carbon intensity would be associated with lower supportiveness (Skjærseth & Skodvin 2001, 46). Variation in utility support for the Waxman-Markey bill closely resembled generation portfolios, as the least carbon intensive utilities were the most supportive (Downie 2017, 28-29).

H1: Exposure to fossil fuels contributes to opposition to climate policy.

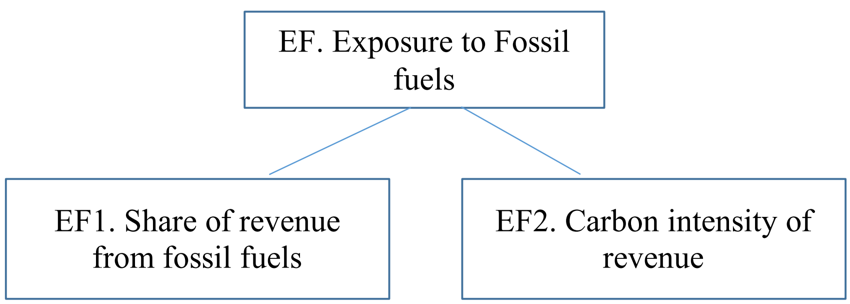

Figure 4.1 – Concept tree of EF.

Indicators		**fsQCA score**
EF1 and EF2 > 0.5	→	The higher of EF1 and EF2
EF1 or EF2 <0.5 but other >0.5	→	0.67
EF1 and EF2 = 0.33	→	0.33
All other combinations	→	0

Table 4.1 – Aggregation rules for EF.

4.2 Low-carbon Transition (LT)

Whether or not TNCs have already taken steps to decrease their dependence on fossil fuels can also be expected to determine their climate policy strategy. The more firms have invested in transitioning to a low-carbon business model, the more likely they are to support policy. Their compliance costs would namely be lower than those of their competitors, or a new, commercially viable market would be created for their products or services (Falkner 2008, 33-34; Vormedal 2010, 256-257). An example could be borrowed from the ozone depletion case. Hoechst, the first European Chlorofluorocarbon (CFC) producer to support a full phase-out of CFCs, did so because it was already three years ahead of the Montreal Protocol's second phase in 1988, one year after it had been agreed (Falkner 2005, 121-122). In the realm of climate change, the EU Low Fares Airlines Association was more supportive of expanding the EU ETS to cover air travel than the Association of European Airlines, as the former had already invested in more fuel-efficient fleets for cost reduction purposes (Meckling 2015, 29).

This condition, which is clearly related to EF, is included as a condition on its own to bring out the effect of whether a TNC is preparing for a carbon-constrained future or not as clearly as possible. Condition LT will be operationalised as follows. For all companies except for car manufacturers, it will be measured through two indicators – renewable energy produced or used as a share of total energy produced or used, and the percentage-point increase in this share over the past three years. For car companies, it will be measured through the fleet average CO2 emissions and the percentage-point change over the past three years. Fleet CO2 emissions are a better indicator of whether a car company is preparing for a carbon-constrained future than looking at that company's own energy use, as car manufacturers are exposed to fossil fuels mostly through fuel use in their products. In general, the fuzzy score for LT will be high if either the share of renewable energy produced or used is already high or if it has been increasing substantially and at a fast rate.

H2: Being in a low-carbon transition contributes to climate policy support.

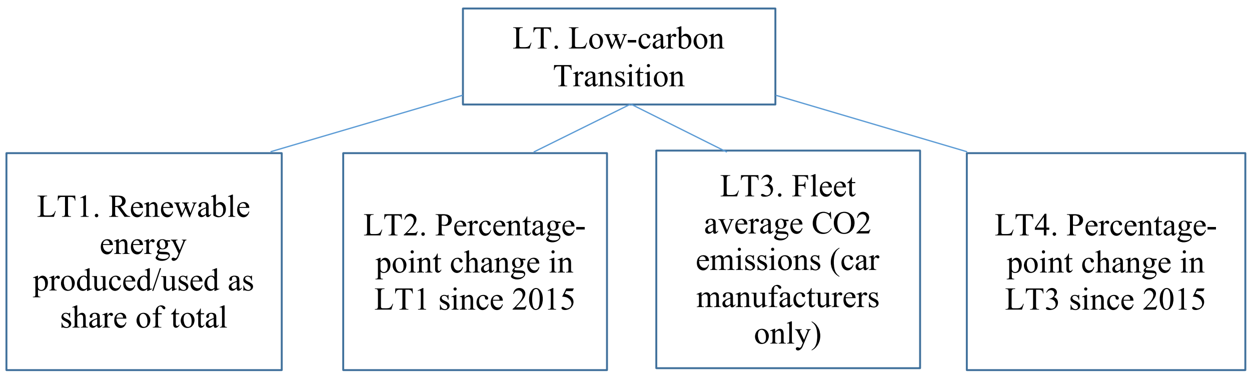

Figure 4.2 – Concept three of LT.

Indicators		**fsQCA score**
LT1 > LT2	→	LT1
LT1 = LT2	→	The common score
0 < LT1 < LT2	→	LT2
LT1 = 0; LT2 > 0.5	→	0.33
All other combinations	→	0
Car manufacturers	→	The higher of LT3 and LT4

Table 4.2 – Aggregation rules for LT

4.3 Transnational Nature (TN)

The more countries a TNC operates in, the more it is exposed to differences in the regulatory environment. Countries are most likely to be sympathetic to policy that favours their domestic economy rather than the interests of foreign TNCs (Orsini 2012, 975). Because TNCs depend on economies of scale, they are unable to profit from lower regulatory standards in some countries, creating a disadvantage in comparison with domestic producers. Therefore, more transnational firms would be more likely to support international rule-setting and harmonisation. That way, the playing field would be levelled, equalising costs for firms that operate in low-standard countries. The transaction costs of operating in various regulatory environments would also be decreased (Falkner 2008, 33; Meckling & Hughes 2018, 90-91; Vormedal 2010, 256-257). German CFC producers that took the lead in the CFC phase-out, for example, actively lobbied the German government to harmonise CFC reduction targets across Europe (Falkner 2005, 122).

The defining characteristics of a TNC is having operations in different countries and being exposed to different regulatory environments (Arts 2003, 6). Therefore, this condition will be operationalised through three indicators: the number of countries the TNC operates in; the number of continents the TNC operates in; and how evenly the TNC's revenue is distributed across the world. For the avoidance of doubt: all companies studied in this paper are transnational. However, some are more global than others, operating in more countries and continents and producing larger shares of their revenue in more world regions. The higher a TNC scores on these indicators, the more transnational it is and the more it is therefore exposed to different regulatory environments.

H3: The transnational nature of firms will contribute to climate policy support.

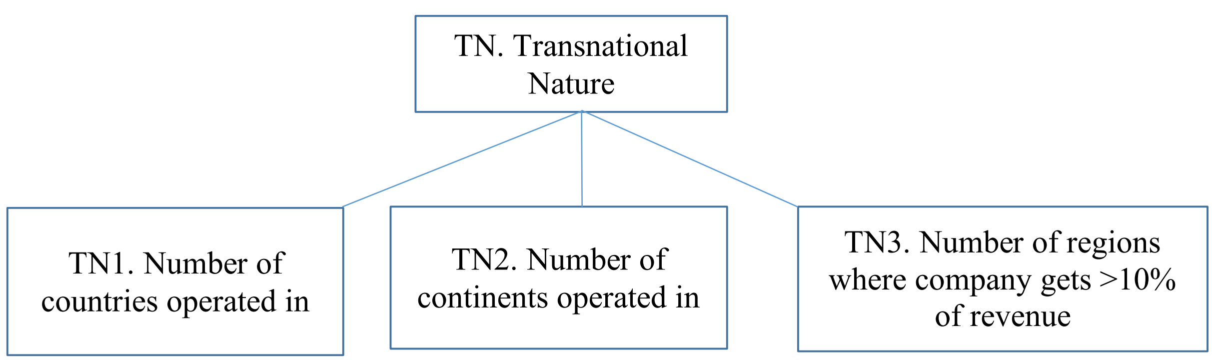

Figure 4.3 – Concept tree of TN.

Indicators		**fsQCA score**
All indicators > 0.5 and at least 2 = 1	→	1
TN1 and TN2 >0.5; TN3 >0	→	0.67
At least 2 indicators = 0.33	→	0.33
All other combinations	→	0

Table 4.3 – Aggregation rules for TN.

4.4 Exposure to Consumers (EC)

Companies that are situated at the top of supply chains, in direct contact with consumers, are more likely to favour more stringent climate policy as it will improve their consumer image. As public concern for climate change increases, firms that have experienced heavy public scrutiny are more likely to adopt a proactive climate strategy (Skjærseth & Skodvin 2001, 46). Companies lower in the chain, on the other hand, will more likely oppose it as they face an increase in production costs without reaping any reputational benefits (Falkner 2008, 34).

NGOs have effectively used consumer boycotts to effect changes in companies' policies. A case in point is the Brent Spar incident. Greenpeace's public campaign against Royal Dutch Shell's proposed disposal of the Brent Spar oil storage buoy at sea caused Shell's market share to decline in Germany and losses from the boycott may have been higher than the additional cost of alternatives to Shell's proposed sea decommissioning. Shell initiated a major corporation-wide reorganisation in response to public scrutiny related to the Brent Spar and other incidents (Skjærseth & Skodvin 2001, 47-56).

The rationale behind combining the share of revenue from direct consumer transactions and the number of environmental controversies as indicators for EC is that the former exposes companies to consumer campaigns in the first place, while the latter will force exposed companies to change business practices such as climate policy engagement.

H4: Consumer exposure will contribute to climate policy support.

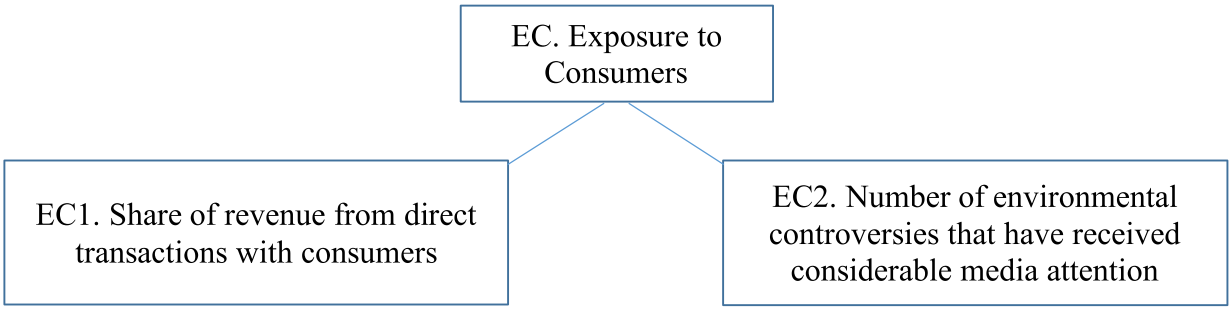

Figure 4.4 – Concept tree of EC.

Indicators		**fsQCA score**
EC1 > 0.5 and EC2 = 1	→	1
EC1 > 0.5 and EC2 = 0.67	→	0.67
EC1 > 0.5 and EC2 = 0.33	→	0.33
All other combinations	→	0

Table 4.4 – Aggregation rules for EC.

4.5 Institutional Environment (IE)

The perceptions of economic interest that inform corporate strategies are inherently subjective. In Levy's (2005, 74) words, they are "mediated by the different cultural, political, and competitive landscapes." Expectations regarding regulation, markets, technologies, consumer behaviour and competitor reactions vary according to companies' individual histories, membership in industry organisations and location of headquarters (Downie 2017, 23; Falkner 2008, 36; Levy 2005, 74). Various facets of the institutional environment play a role.

Firstly, the location of a TNC's headquarters has been found to play an important role in its climate policy position. This may be surprising in light of TNCs' transnational nature. However, the senior management that is responsible for developing the company's strategy is usually concentrated in the country where a TNC is headquartered (Levy 2005, 79; Skjærseth & Skodvin 2001, 47). Studies of fossil fuel companies' climate strategies have found that American companies were much more obstructive towards climate policy than European ones, and that these differences are not explained by companies' economic or technological characteristics alone (Levy 2005, 73-78; Rowlands 2000; Skjærseth & Skodvin 2001, 45; Skjærseth & Skodvin 2001, 50-52; Van Halderen et al. 2016, 571). The main relevant characteristic of the country where a TNC is headquartered is previous experience with regulation or a bigger regulatory threat. European firms have accepted that policies to address climate change are inevitable, and therefore desire to forge a constructive role for themselves in the policy debate, while a lower regulatory threat in the USA has allowed American firms to focus on whether climate change is a problem worthy of costly policy solutions at all (Newell 2000, 121). The fact that Rio Tinto was the only top-ten US coal producer that supported American climate policy – including the Waxman-Markey bill and the Clean Power Plan – is partially explained by its headquarters in the United Kingdom (UK). Rio Tinto had already been exposed to similar debates in the EU, making it familiar with and supportive of certain climate policies (Downie 2017, 28-31). Similarly, the difference between ExxonMobil's decision to remain reactive on climate policy and Royal Dutch Shell's decision to establish a renewables arm and pilot an ETS is explained by pointing at the failure of the US government to develop any mandatory climate policy instruments. The Dutch government, on the other hand, set ambitious CO2 emission goals and developed energy efficiency regulations (Skjærseth & Skodvin 2001, 57-58). The focus taken by EU regulations on increasing CO2 emission standards and fuel prices drove automobile manufacturers to invest in improving fuel efficiency and alternative power sources, while US automobile manufacturers remained 'stuck' due to their government's enduring focus on local air pollution (Levy 2005, 86-89).

Secondly, industry and/or company histories matter. Oil companies that were more supportive of climate policy in the 1990s/2000s – BP, Shell and Texaco – believed in first-mover advantages and preferred acquiring new competencies through gradual, internal, organic growth. Those that were more obstructive, such as ExxonMobil, were expected to follow an acquisition strategy once would have technology progressed, risk declined and regulatory pressure increased (Levy 2005, 86). Industries and companies that have a history of rapid innovation or possess a high learning capacity are able to respond to climate policy the quickest and hence are more likely to support it (Post & Altman 1992; Skjærseth & Skodvin 2001, 46). A prime example was the electronics industry in the ozone case (Falkner 2005, 116).

H5: Certain kinds of institutional environments – with high environmental policy stringency externally and organic growth strategies and innovative capacity internally – will contribute to climate policy support.

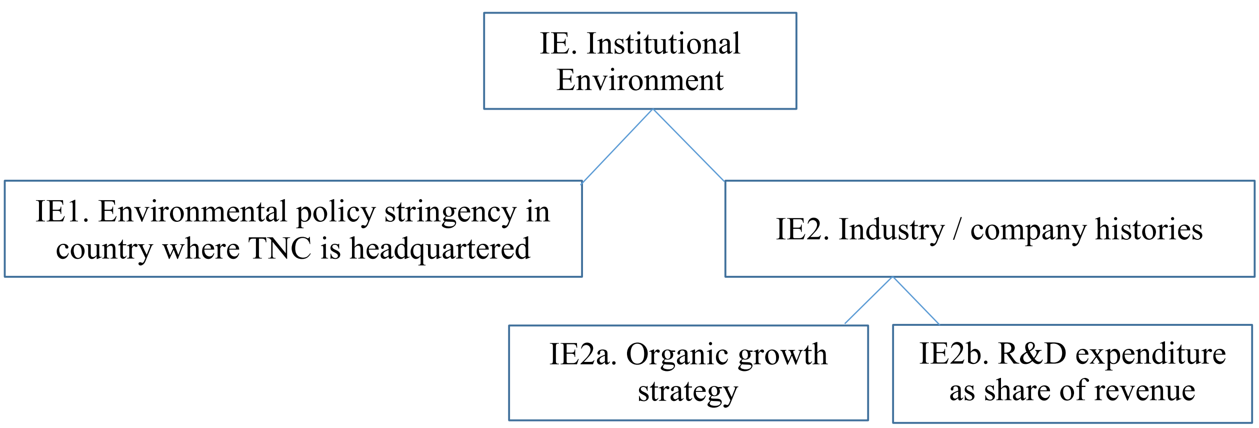

Figure 4.5 – Concept tree of IE.

Indicators		fsQCA score
IE1 and IE2 > 0.5	→	The higher of IE1 and IE2
IE1 < 0.5 and IE2 > 0.5	→	0.67
IE1 = 1 and IE2 = 0.33	→	0.67
IE1 < 1 and IE2 = 0.33	→	0.33
All other combinations	→	0

Table 4.5 – Aggregation rules for IE.

4.6 Investor Pressure (IP)

Investors are increasingly considering risks related to climate change (Mercer 2015, 78). Institutional investors such as pension funds are 'universal' owners, meaning that they own small parts of most of the firms in the global economy. Hence, their ability to satisfy their fiduciary duties depends on the overall health of the economy. Therefore, they can be expected to have a strong interest in both limiting climate change-related risks to investees as well as mitigating the economic impact of climate change itself. Universal owners own an increasing share of corporate equity and thus are becoming increasingly important and powerful (Hawley & Williams 2002, 284). Because universal investors depend on the overall health of the economy, they seek to maximise positive externalities and minimise negative externalities in their portfolios (Ibid, 286-287). Non-institutional investors,[5] however, also have reason to consider climate change risks, as climate change is found to "inevitably have an impact on investment returns" by consulting firm Mercer (2015, 7). Risks emanate both from how well-prepared investor portfolios are for the transition to a low-carbon economy and from higher physical damages due to climate change (Ibid, 78).

Investors have pressured companies over their membership in trade associations that have obstructed climate policy and voted to force fossil fuel companies to disclose their exposure to

[5] Perhaps with the exception of hedge funds and other investors which are focused on the extremely short term.

stranded asset risks under different carbon curb scenarios (Carroll 2017; Cook in Welsh & Passoff 2018, 28). Such votes have "sent a shockwave throughout the industry", signalling "that investors will wait no more for boards who fail to grasp the speed of the energy transition" (Doherty in Welsh & Passoff 2018, 17). Climate change-related shareholder resolutions have almost doubled in the USA from 36 in 2010 to 71 in 2018, starting to reach well beyond fossil fuel companies to firms such as Apple and Verizon (Welsh & Passoff 2018, 14). The fact that investor pressure is increasing can also be seen from the type of shareholder resolutions that receive most support at annual shareholder meetings. In 2012, the resolutions that attracted highest support were those that asked companies to disclose their GHG emissions through sustainability reports, whereas in 2017, shareholder resolutions regarding climate change strategy and risk reporting received the most support (Cook in Welsh & Passoff 2018, 28).

This affects publicly traded TNCs because they depend on investors for crucial financial resources (Van Halderen et al. 2016, 575). Even ExxonMobil, widely perceived as one of the most obstructive companies regarding climate policy, has had to change course due to investor pressure. The first climate change-related shareholder resolution was filed in 1998, receiving 4% of the vote. Subsequent resolutions received 10% (2003), 25% (2005), 27.5% (2008), 38% (2016), and 62% (2017) (Carroll 2017; Van Halderen et al. 2016, 572-576). ExxonMobil CEO Rex Tillerson was forced to accept that action to reduce risks from climate change was justified in 2006 and Exxon consequently ramped up its substantive actions by increasing investment in new fuel technologies (Van Halderen et al. 2016, 575).

In sum, investor pressure can be measured by looking at the support for shareholder resolutions on climate change as well as the stringency of such resolutions – from GHG emissions disclosure to reporting on climate strategy and risk to increased investment in GHG emission reduction or renewable energy generation.

To this author's knowledge, there has been little academic research into whether pressure from investors affects the degree to which TNCs support climate policy. The reason might be that investors have only recently begun to challenge companies regarding climate change on a large scale. When investors pressure a company on climate change and force it to decrease its exposure to fossil fuels and embark upon a low-carbon transition, that company will incur significant costs. It is expected that it would then become in that company's interests to support climate policy in order to force its competitors to incur similar costs.

H6: Investor pressure will contribute to climate policy support.

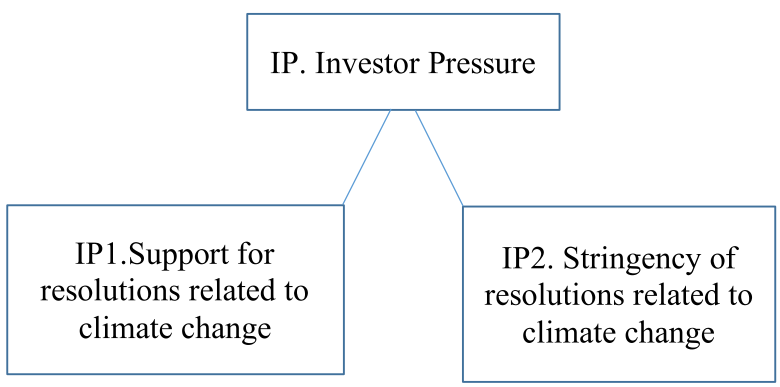

Figure 4.6 – Concept tree of IP.

Indicators		**fsQCA score**
IP1 and IP2 > 0.5	→	The higher of IP1 and IP2
IP1 = 0.33 and IP2 > 0.5	→	0.67
IP1 and IP2 = 0.33	→	0.33
All other combinations	→	0

Table 4.6 – Aggregation rules for IP.

5. Results

The QCA was run both for the presence of the outcome – support for climate policy (CPS) – and the absence – opposition to climate policy (cps). The results will be presented in that order. Table 5.1 shows the fuzzy set data matrix used for fsQCA.

	Condition	EF	LT	TN	EC	IE	IP	CPS
Company	Sector							
APP	Technology	0.00	1.00	0.67	0.33	0.67	0.67	1.00
SAM	Technology	0.00	0.33	1.00	0.00	0.67	0.00	1.00
MIC	Technology	0.00	1.00	0.67	0.00	1.00	0.00	1.00
INT	Technology	0.00	1.00	0.33	0.00	1.00	0.00	0.67
RDS	Energy	1.00	0.00	1.00	1.00	0.67	1.00	0.33
EXX	Energy	0.67	0.00	0.67	0.33	0.33	1.00	0.00
BP	Energy	1.00	0.00	1.00	0.67	0.33	1.00	0.00
TOY	Car	0.67	1.00	0.67	0.00	1.00	0.00	0.33
VW	Car	0.67	1.00	0.67	0.67	0.67	0.00	0.33
FOR	Car	0.67	0.00	0.67	0.33	0.67	0.67	0.00
ATT	Telecom	0.00	0.00	0.00	0.00	0.33	0.00	0.33
VER	Telecom	0.00	0.00	0.00	0.00	0.67	0.67	1.00
DET	Telecom	0.00	0.67	0.33	0.00	0.67	0.00	1.00
WAL	Retail	0.00	0.33	0.00	0.00	0.67	0.00	1.00
ANB	Retail	0.00	1.00	1.00	0.00	0.33	0.00	1.00
HOM	Retail	0.00	0.33	0.00	0.33	0.33	1.00	0.33
PFI	Pharmaceuticals	0.00	0.00	0.67	0.00	1.00	0.00	0.67
NOV	Pharmaceuticals	0.00	0.67	0.67	0.00	1.00	0.00	1.00
BAY	Pharmaceuticals	0.67	0.00	1.00	0.00	0.67	0.00	0.00
GLE	Raw materials	1.00	0.00	0.67	0.00	0.00	1.00	0.00
BHP	Raw materials	0.67	0.00	0.00	0.00	1.00	0.33	0.33
RIO	Raw materials	0.67	1.00	0.67	0.00	0.67	1.00	0.33
ENE	Utilities	0.67	0.67	0.67	0.33	0.67	0.00	1.00
EDF	Utilities	0.00	1.00	0.00	0.00	1.00	0.00	1.00
IBE	Utilities	0.67	0.67	0.00	0.00	0.67	0.00	1.00

Table 5.1 – Data matrix with fuzzy set scores for all cases on the conditions and outcome CPS

5.1 Climate Policy Support (CPS)

In QCA, the analysis of necessity should always precede that of sufficiency (Schneider & Wagemann 2012, 225). Necessary conditions are a superset of the outcome, meaning that they are always present when the outcome is present, while sufficient conditions are a subset of the outcome, meaning that the outcome can be present without the sufficient condition being present – but not the other way around (Ragin 2009, 110; Rihoux & Ragin 2009, xix; Schneider & Wagemann 2012, 56-90). The consistency parameter indicates the degree to which the outcome is a subset of a condition – necessary conditions must be highly consistent. Schneider and Wagemann (2012, 143) advise a threshold of 0.9 or higher. No *single* condition analysed here has a consistency that of at least 0.9. Combinations of single conditions can also be necessary. However, it is easy for combinations to attain a high consistency level: they should thus only be considered necessary if there are strong arguments for these conditions being 'functional equivalents' of a higher-order concept (Ibid, 74). One combination for which such an argument could be made is ef+LT – either not being exposed to fossil fuels or being in a low-carbon transition. These conditions belong to the higher-order concept of not being exposed to fossil fuels in the future. Table 5.2 reports this combination's parameters of fit.

Candidate necessary condition	**Consistency**	**Coverage**
ef+LT	0.93	0.73

Table 5.2 – Parameters of fit of candidate necessary condition ef+LT

Necessary conditions must, by definition, fully cover the outcome. The coverage of necessary conditions refers to their 'relevance'. A low score would mean that the condition covers many more cases than the outcome, making it irrelevant (Ibid, 144-145). Coverage values below 0.5 indicates irrelevance. On the other hand, even if a 'candidate' necessary condition has very high coverage values, it could still be irrelevant if both the condition and outcome are close to constants (Ibid, 146). That is not the case in this study as it is clear from table 5.1 that no condition – and indeed, no outcome – resembles a constant. Therefore, ef+LT, with a coverage of 73%, is a relevant necessary condition for CPS.

In order to find potential sufficient conditions, we need to construct a truth table (see table 5.3). A frequency threshold must be set for the minimum number of cases that a truth table row requires to represent in order to be considered. In studies with a relatively small N, like this one, a threshold of 1 case is acceptable (Primc & Čater 2015, 653-654; Ragin 2009, 107). Next, a consistency threshold must be set. In analyses of sufficiency, consistency values indicate how consistently a truth table row is a subset of the outcome. A threshold of over 75% is generally advised (Schneider & Wagemann 2012, 127-128); a gap in the consistency values can be used to place the threshold (Primc & Čater 2015, 654; Ragin 2009, 109; Schneider & Wagemann 2012, 128). There are two such gaps: between 0.8 and 0.9 and between 0.71 and 0.78. Row 8, however, is a contradictory configuration: Toyota is more out than in of the outcome with a fuzzy value of 0.33 on CPS, while Enel is fully in the set of supportive companies with a value of 1.00.[6] To facilitate the exclusion of this row, a consistency threshold of 90% is chosen.

[6] This is the only logical contradiction in this sufficiency analysis. Initially, there were more contradictory configurations. All applicable strategies that Rihoux and De Meur (2009, 49) propose were employed to resolve the other contradictions. Unresolved contradictions must be excluded from analysis (Rihoux & De Meur 2009, 46-48; Schneider & Wagemann 2012, 278-279), which is achieved based on the consistency threshold. A speculative explanation for this contradiction would be that Toyota opposes climate policy out of a fear that such policy would force competitors to further invest in hybrid technology, a segment where Toyota has been a pioneer and market leader. Therefore, while one would expect Toyota to be supportive of climate policy in terms of its membership in the conditions studied, it chooses to be mildly obstructive for unique strategic reasons not covered by our conditions.

Row	EF	LT	TN	EC	IE	IP	Number of cases	Cases	Consistency
1	0	1	0	0	1	0	3	INT, DET, EDF	1
2	0	1	1	0	1	0	2	MIC, NOV	1
3	0	1	1	0	0	0	1	ANB	1
4	1	1	0	0	1	0	1	IBE	1
5	0	1	1	0	1	1	1	APP	1
6	0	0	0	0	1	0	1	WAL	0.91
7	1	1	1	0	1	0	2	TOY; ENE	0.80
8	0	0	1	0	1	0	2	SAM, PFI	0.78
9	0	0	0	0	0	0	1	ATT	0.74
10	0	0	0	0	1	1	1	VER	0.67
11	1	1	1	1	1	0	1	VW	0.66
12	1	0	0	0	1	0	1	BHP	0.60
13	1	1	1	0	1	1	1	RIO	0.49
14	0	0	0	0	0	1	1	HOM	0.40
15	1	0	1	0	1	0	1	BAY	0.25
16	1	0	1	1	0	1	1	BP	0.20
17	1	0	1	1	1	1	1	RDS	0.20
18	1	0	1	0	0	1	2	EXX, GLE	0
19	1	0	1	0	1	1	1	FOR	0

Table 5.3 – Truth table for CPS

The solution terms delivered by the truth table algorithm are listed in table 5.4. Boolean notations are used: lower-case letters denote the absence of a condition – which corresponds to a fuzzy set value of 0 or 0.33 – while upper-case letters denote the presence of a condition – which corresponds to a fuzzy set value of 0.67 or 1. Furthermore, a '+' means 'or,' while a '*' means 'and.' The conservative or 'complex' solution does not use any logical remainders[7] for logical minimisation; the most parsimonious solution uses all logical remainders that are in line with empirical evidence for minimisation, and the intermediate solution uses only 'easy' logical remainders – that are both in line with empirical evidence and directional expectations about

[7] Logical remainders are truth table rows, or in other words potential combinations of conditions, which are not observed in any of the cases studied.

whether conditions contribute to the outcome in their presence or in their absence. The intermediate solution is the core of sufficiency analysis. Its parameters of fit are reported in table 5.5.

Conservative solution	ef*tn*ec*IE*ip + ef*LT*TN*ec*ip + LT*tn*EC*IE*ip + ef*LT*TN*ec*IE → CPS
Intermediate solution	ef*LT*TN + LT*tn*IE + ef*tn*IE*ip → CPS
Most parsimonious solution	LT*tn + ef*LT + ef*tn*IE*ip → CPS

Table 5.4 – Solution terms for CPS

	ef*LT*TN	LT*tn*IE	ef*tn*IE*ip	→ CPS
Raw coverage	0.36	0.41	0.45	
Unique coverage	0.16	0.05	0.11	
Covered cases (raw)	ANB, APP, MIC, NOV	EDF, IBE, INT, DET	EDF, WAL, INT, DET	
Uniquely covered cases	ANB, APP, MIC, NOV	EDF, IBE	WAL	
Consistency	1	1	0.95	
Solution coverage	0.68			
Uncovered cases	SAM, VER, ENE, PFI			
Solution consistency	0.97			

Table 5.5 – Parameters of fit of the intermediate solution

For sufficiency, low raw and unique coverage values are not a problem as they only indicate that a combination of conditions was not often observed empirically, which does not diminish their theoretical or substantive importance (Schneider & Wagemann 2012, 138). The consistency of 'path' ef*tn*IE*ip is lowered by Intel, which has a score of 0.67 on the outcome (CPS) but a score of 1 in the path – as its fuzzy set scores for EF and IP are 0, and therefore 1 for their complements ef and ip. Intel is not, however, a true logical contradiction (Ibid, 126-127; 185) because it is still more in than out of the outcome CPS. Therefore, Intel does not contradict a statement of sufficiency for this path.

5.2 Climate Policy Opposition (cps)

The initial necessity analysis does not uncover a single condition that surpasses the 90% consistency threshold. However, the argument made in the previous section that ef+LT could be a necessary combination also works the other way around: companies that are exposed to fossil fuels and not taking steps to reduce that exposure will remain so exposed for the foreseeable future, and would thus have good reasons to prevent costly policy. The combination EF+lt is found to be strongly consistent with outcome cps. Its parameters of fit are reported in table 5.6. Its comparatively lower coverage points to a lower relevance for this causal combination.

Candidate necessary condition	**Consistency**	**Coverage**
EF+lt	0.97	0.63

Table 5.6 – Parameters of fit of candidate necessary condition EF+lt

Table 5.7 constitutes the truth table for outcome cps. The clearest gap in consistency scores above 75% is clearly between rows 5 and 6. This threshold again excludes the contradictory configuration involving Toyota and Enel, in row 11.

Row	EF	LT	TN	EC	IE	IP	Number of cases	Cases	Consistency
1	1	0	1	0	0	1	2	EXX, GLE	1
2	1	0	1	1	0	1	1	BP	1
3	1	0	1	0	1	1	1	FOR	1
4	1	1	1	0	1	1	1	RIO	1
5	1	0	1	1	1	1	1	RDS	1
6	0	0	0	0	0	1	1	HOM	0.80
7	1	0	1	0	1	0	1	BAY	0.75
8	1	1	1	1	1	0	1	VW	0.67
9	0	0	0	0	1	1	1	VER	0.66
10	1	0	0	0	1	0	1	BHP	0.60
11	1	1	1	0	1	0	2	TOY; ENE	0.60
12	1	1	0	0	1	0	1	IBE	0.40
13	0	0	0	0	0	0	1	ATT	0.38
14	0	0	0	0	1	0	1	WAL	0.36
15	0	0	1	0	1	0	2	SAM, PFI	0.33
16	0	1	1	0	1	1	1	APP	0.33
17	0	1	1	0	1	0	2	MIC, NOV	0.25
18	1	1	0	1	1	0	1	IBE	0.25
19	0	1	0	0	1	0	2	INT, DET, EDF	0.20
20	0	1	1	0	0	0	1	ANB	0.14

Table 5.7 – Truth table for cps

The truth table algorithm produces the three solution terms listed in table 5.8. The relatively low raw and unique coverage values reported in table 5.9 mean that these two paths explain only some of the outcome of being obstructive towards climate policy. The consistency of the second path, EF*lt*IP, is lowered by Ford and Glencore, which have a fuzzy score of 1 on outcome cps but 0.67 on the path. As all these cases are more in than out of the set of companies which are exposed to fossil fuels, not in a low-carbon transition, and under pressure from investors on climate change, they are not true logical contradictions. Therefore, this path is a consistent sufficient condition for the *absence* of climate policy support.

Conservative solution	EF*lt*TN*IP + EF*TN*ec*IE*IP → cps
Intermediate solution	EF*ec*IP + EF*lt*IP → cps
Most parsimonious solution	EF*IP → cps

Table 5.8 – Solution terms for cps

	EF*ec*IP	EF*lt*IP	→ cps
Raw coverage	0.35	0.42	
Unique coverage	0.06	0.13	
Cases covered (raw)	GLE, RIO, EXX, FOR	RDS, BP, GLE, EXX, FOR	
Uniquely covered cases	RIO	RDS, BP	
Consistency	1	0.93	
Solution coverage	0.48		
Uncovered cases	TOY, VW, ATT, HOM, BAY, BHP		
Solution consistency	0.94		

Table 5.9 – Parameters of fit of the intermediate solution

5.3 Robustness

In QCA, robustness is determined by examining the effect of different choices – where plausible – about set-membership calibration in terms of the setting of qualitative anchors that determine the fuzzy score of cases on single conditions; consistency thresholds for truth table rows; and adding or dropping single cases. If different but plausible choices lead to changes in the parameters of fit that are so significant that they would warrant a different substantive interpretation and/or to new solution terms that are not subsets of the original terms, results cannot be deemed robust (Schneider & Wagemann 2012, 286).

Robustness checks were first performed by changing the qualitative anchors.[8] For the presence of the outcome, all findings were robust. For the absence of the outcome, the coverage of necessary combination of EF+lt was substantially decreased from 63% to 55%, which would further decrease the relevance of this necessary condition. Otherwise, all findings related to the absence of climate policy support were robust.

Secondly, the truth table algorithms were re-run with lower and higher consistency thresholds for sufficiency. For the presence of the outcome, a higher consistency threshold (92%) would exclude row 7 (Walmart), which has a consistency value of 0.91. Although the solution terms change, the new terms are all subsets of the original terms which are thus robust. A lower consistency threshold (75%) would include new rows 8 (Toyota and Enel) and 9 (Samsung and Pfizer). Again, all solution terms are robust. LT*TN*ec*IE*ip manifests itself as a new path. However, this is not a sufficient path for CPS, as it contains a true logically contradictory case with Toyota, which has a membership of 0.67 in the path but 0.33 in the outcome. For the absence of the outcome, taking a higher consistency threshold is impossible as there is no further gap above the threshold of 80% that was applied. A lower consistency threshold of 75% could be applied, however. This would include rows 6 and 7, containing Home Depot and Bayer. All solution terms were robust to this change, although a new solution term EF*lt*TN presents itself due to the inclusion of Bayer.

A third robustness check related to adding or dropping cases was not necessary as cases were only dropped when insufficient data was available.

[8] See Appendix II for the original placement of qualitative anchors and the alternative placement used for robustness checks.

6. Discussion

6.1 Key Findings

In short, the fsQCA led to the following results:

1. The absence of exposure to fossil fuels *or* the presence of a low-carbon transition is necessary for supporting climate policy
2. The absence of exposure to fossil fuels *and* the presence of a low-carbon transition *and* transnational operations is sufficient for supporting climate policy
3. The presence of a low-carbon transition *and* absence of transnational operations *and* presence of a supportive institutional environment is sufficient for supporting climate policy
4. The absence of exposure to fossil fuels *and* the absence of transnational operations *and* the presence of a supportive institutional environment *and* the absence of investor pressure is sufficient for supporting climate policy
5. The presence of exposure to fossil fuels *or* the absence of a low-carbon transition is necessary for opposing climate policy
6. The presence of exposure to fossil fuels *and* the absence of consumer exposure *and* the presence of investor pressure is sufficient for opposing climate policy
7. The presence of exposure to fossil fuels *and* the absence of a low-carbon transition *and* the presence of investor pressure is sufficient for opposing climate policy.

These findings will be discussed in their respective order.

The first finding confirms previous inferences that the most fossil fuel-intensive industries are also the most obstructive to climate policy. The fact that non-exposure to fossil fuels by itself is not necessary for climate policy support, but is necessary in combination with transitioning to a low-carbon business model, supports the argument that firms are more concerned with the effects of policy in relation to their competitors rather than in absolute terms (Falkner 2008, 9-10; Downie 2017, 23-24; Meckling 2015, 19-22). Iberdrola and Enel stand out in this regard, as they are the only two companies that are exposed to fossil fuels and supportive of climate policy. The specific history of European utilities may provide an explanation. European utilities lost over €100bn in market value between 2008 and 2013 because they failed to accurately predict the speed of wind and solar PV cost deflation and coal phase-out (Gray 2015). This dramatic event forced European utilities to face the reality of the energy transition, and may well have provided reasons for utilities to constructively engage with climate policy-making rather than oppose it (Meckling 2015). Although there have been warnings of a similar 'stranded asset' risk for oil & gas companies, no comparable value erosion has affected that industry so far.

EDF and Iberdrola are both uniquely covered by path LT*tn*IE. This sufficient path draws attention to the presence of a supportive institutional environment (IE). Therefore, the cases of EDF and Iberdrola confirm the argument made in previous studies that when companies have already been exposed to climate policy, pursue organic growth strategies, or are well-positioned to innovate are more likely to support climate policy. This evidence confirms hypothesis five, although the role of condition IE is clearly less important in determining TNCs' climate policy strategies than the role of conditions EF and LT.

The finding that the presence of transnational operations is part of one sufficient path, while the absence of transnational operations is part of another sufficient path suggests that there is no systematic evidence for hypothesis three which linked transnational nature to climate policy support. The new sufficient path for the absence of climate policy support that resulted from the robustness checks, which includes the presence of transnational operations, does not change the findings regarding hypothesis three.

The necessary condition that was found for opposition to climate policy is the opposite of the necessary condition for policy support. Although the necessary combination was found to be more relevant and robust for climate policy support than for policy opposition, the fact that these conditions – in opposite form – were found to be necessary both for support for and opposition to climate policy strengthens the evidence for hypotheses one and two – that exposure to fossil fuels and being in a low-carbon transition are key determinants of climate policy strategies – which are thus confirmed.

The fact that the *presence* of investor pressure is part of both sufficient paths leading to climate policy opposition is surprising. As explained in section four, this condition was hypothesised to contribute to support for climate policy. It may be that the timeframe of this study – 2015-2018 – is too short to capture this effect. The effects of shareholder resolutions related to climate change in recent annual shareholder meetings may need more time to materialise – especially as they often first call for reports on climate change-related issues to be produced, upon which action taken by company management should then be based. Another explanation for the sufficiency of investor pressure – in combination with other conditions – as a condition for opposition to climate policy would be that investors have tackled the lowest-hanging fruit – the companies that are most exposed to fossil fuels and taking the least action to reduce that exposure. This would be logical, as these companies are most exposed to climate change-related risks. If this would be the case, it could be that investor pressure has made these companies slightly less opposed to climate policy, but not enough for them to move above the qualitative anchor in the outcome variable. This study, however, is unable to provide evidence in favour of hypothesis six which linked investor pressure to climate policy support.

Furthermore, the *absence* of consumer exposure in combination EF*ec*IP, which was found to be sufficient for opposition to climate policy, is noteworthy, as the *presence* of consumer exposure was not found to be part of any sufficient combination for climate policy support. Some TNCs have been exposed to consumers but remain opposed to climate policy – for example Volkswagen – and many TNCs that support policy have not been exposed to consumer campaigns, probably because their environmental performance is already relatively strong. In sum, the evidence on consumer exposure is too weak to confirm hypothesis four, which is thus rejected.

In summary, whether a TNC is exposed to fossil fuels and whether it is transitioning to a low-carbon business model are the most important factors that explain whether it supports policies to address climate change. A TNCs' institutional environment – whether it has already been exposed to stringent environmental policies and whether it grows organically and has the capacity to innovate – is also linked to policy support but only in combination with other conditions.

6.2 Limitations and Future Research

This study suffered from a lack of data. Most importantly, this led to the exclusion of Technological Advancement as a condition. Previous literature has argued that companies that have already invested or can more easily invest in new, cleaner technology will support international policy as it would give them a competitive edge (Falkner 2008, 33-34; Vormedal 2010, 256-257). This would be operationalised by looking at whether TNCs have invested in Research and Development (R&D) of alternative technologies or cleaner production processes, and whether they plan to continue such R&D. However, although companies do disclose R&D

expenditure, they do not typically disclose any details on specific products or technologies. Therefore, this analysis does not consider how technologically advanced TNCs are. It would be interesting to uncover the share of climate-related R&D spending and replicate this study with the inclusion of TA as a condition. Another limitation that was mentioned in section 3 is the exclusion of financial services companies from InfluenceMap's dataset. This limits the analysis as these companies play an important role in the economy (Newell & Paterson 1998, 696) and have supported flagship climate policies such as the EU ETS (Meckling 2015, 26). If comparable data on these companies' climate policy engagement would become available, this study could be replicated with the inclusion of financial services companies.

A sub-indicator of IE was also dropped due to a lack of data. Previous literature has argued that companies' positions on climate policy are path dependent: a long history of opposition to environmental regulation explains more recent opposition to climate policy. A study of industry positions on the Waxman-Markey bill and Clean Power Plan found that whereas both the coal industry and coal-dependent utilities would be negatively impacted by these policies, the former's long history of opposition to environmental regulation reinforced its opposition to these specific policies whereas utilities were able to choose a more supportive stance as their institutional environment was not as hostile to climate policy (Downie 2017, 27-32). Because InfluenceMap only started compiling its climate policy engagement dataset from 2015 onwards, which is too recent to uncover 'long histories' of opposition, a comparable measure of historical climate policy positions was not available. An avenue for future research would thus be to test the explanatory power of previous positions on climate policy once comparable data is available.

While data was available on other indicators, it was not always perfect. For indicator IE1, 'environmental policy stringency in HQ location', the only source of comparable data is the OECD environmental policy stringency index. However, the last year for which this index contains a score for all the relevant countries is 2012. As governments and policy priorities change, environmental policy may have become more, or less, stringent since then. To ensure comparability across cases, however, there was no alternative to using the index values for 2012. Moreover, no data was found for indicator IE2b, 'R&D expenditure as share of revenues', for three cases – Verizon, BHP Billiton and Glencore. These companies do not disclose their R&D expenditure. Two ways to deal with these gaps existed: base the fuzzy score for IE2 on the other indicator – growth strategy – or assume that the R&D expenditure of these companies would be similar to that of other companies within their sector, as IE2b shows little variation within sectors. Both strategies were explored and delivered equal fuzzy scores for IE2, which were used.

As mentioned in section 3, the universe of TNCs from which this study's sample was selected is predominantly made up of TNCs from North America, Europe, and core Asian economies – China, India, Japan and South Korea. Therefore, the generalizability of this study's findings is limited to these regions and does not extend to most developing countries. While it may be complicated to construct a comparable sample from a well-defined universe that would include both the world's powerhouse TNCs and smaller companies from emerging economies, further studies on the climate policy engagement of such companies would build a more global understanding of the factors that underlie TNCs' climate policy strategies.

Furthermore, it would be interesting to further examine the surprising findings regarding investor pressure. A study that closely examines the influence of investor pressure on TNCs' climate policy support over a longer timeframe may be better poised to uncover whether those companies that were pressured by investors on climate change become more supportive of climate policy over time than similar companies which are not pressured.

This study has contributed to the literature on the key factors that determine TNCs' climate policy strategies by subjecting the findings of small-N case studies to a larger, more systematic analysis. The same could be done in relation to how TNCs' climate policy engagement influences policy. Similarly, the brunt of this literature draws findings from in-depth analysis of a very limited number of cases on specific policy projects (e.g. Meckling 2011). A medium-N, systematic study of the consequences of support for and opposition to climate policy would further our understanding of how TNCs are influencing the policies that are designed to address climate change.

Finally, the two combinations of conditions that were found to be sufficient for opposition to climate policy cover almost all fossil fuel and mining companies – with the exception of BHP Billiton – but almost none of the automobile companies – except for Ford Motors – and none of the telecommunications, retail or pharmaceutical companies that oppose climate policy. This suggests that, so far, the findings of small-N literature can only explain obstructiveness in companies that stand to lose the most from climate policy, while failing to explain obstructiveness in less exposed companies. This is not surprising, as the bulk of the literature has focused on comparing fossil fuel and heavy industry companies while largely ignoring other sectors. Hence, an important avenue for further research would be to conduct small-N case studies to build theories that explain policy opposition in companies that are not directly linked to fossil fuels.

7. Conclusion

This study has aimed to fill a gap in the literature on the climate policy strategies of TNCs by systematically examining the conditions that explain variation in whether and to what extent TNCs support policies to tackle climate change. It has found that TNCs which are not exposed to fossil fuels or are transitioning to a carbon-constrained future necessarily support such policy, while TNCs that are exposed to fossil fuels or not transitioning to a low-carbon future necessarily oppose it. Furthermore, it has found that a 'supportive' institutional environment – where firms have been exposed to stringent environmental policy in the past, pursue organic growth strategies and invest in large R&D budgets – is a sufficient condition for policy support in combination with transitioning to a low-carbon future and a high concentration of operations in few countries. No evidence, however, was found to confirm theoretical expectations that exposure to consumers, a strong transnational nature and pressure from investors are linked to policy support.

Two main policy implications can be drawn from these findings. Firstly, it is clear that policymakers are most likely to find allies for climate policy in TNCs that are not exposed to fossil fuels or are transitioning to a low-carbon business model. With these kinds of companies, governments can form alliances to push for and defend increasingly stringent policies to address climate change. However, it may be difficult to achieve strong climate change mitigation without involving the main industries that need to reduce fossil fuel production and use in the policymaking process. Secondly, therefore, it may be necessary to gradually reduce the reliance on fossil fuels by 'dirty' firms and slowly force them to prepare for a low-carbon future, before their support can be secured for more general and ambitious policies to reduce GHG emissions and mitigate climate change. Small, targeted policies such as gradually increasing renewable portfolio standards might not attract the same kind of attention and opposition as blanket policies such as a carbon tax, but may be useful to nudge companies to start to transition away from high-emission activities. Slowly decreasing the intensity of policy opposition from polluting industries and eventually shifting it into support in a strategic way will be key to successful, inclusive climate policy which covers the entire economy.

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9. Appendices

Appendix I – Data sources

The table below details the sources of the 'raw data' upon which the fuzzy scores for all indicators are based. These sources were selected for comparability across the cases studied. For some companies, Statista did not offer all of the relevant information. In these cases, the financial data disclosed in annual reports was consulted. This does not diminish comparability, however, as Statista uses the same reports as its source. For some indicators, a specific index or database was used. The OECD environmental policy stringency index which is used to measure indicator IE1 gives countries a value between zero and six, based on whether policy instruments place an explicit or implicit price on pollution, focusing on climate change and air pollution. This internationally comparable index covers all the countries where the TNCs analysed by this study are headquartered. The raw data for indicator IE2a was gathered from the Factiva database of global news: the 20 most relevant articles that resulted from the searches were read and the amount of times organic and/or external growth strategies were mentioned were listed. The Ceres climate and sustainability shareholder resolution database that provides the information for IP1 and IP2 lists all shareholder resolutions that in some way relate to climate change for companies in the USA. Unfortunately, there is no similar database for companies outside of the USA. For non-USA companies, the relevant information was found in media reports and annual shareholder meeting notes that were identified and accessed through Factiva.

Condition	Indicator	Sub-indicator / sector	Source	Data
EF. Exposure to Fossil fuels	EF1. Share of revenues from fossil fuels		Statista	Share of revenue by product category (fossil fuels)
	EF2. Carbon intensity of portfolio		Asset4 ESG (Thomson Reuters) & Statista	Total CO2 and CO2e emissions (ENERDP023) + CO2e indirect emissions scope 3 (ENERDP096) / total revenue (Statista)
LT. Low-carbon Transition	LT1. Renewable energy produced/used as share of total		Asset4 ESG	Purchased renewable energy / total energy use (ENRO06V)
	LT2. Percentage-point change since 2015		Same as LT1.	Same as LT1.
	LT3. Car companies: fleet average CO2 emissions		Asset4 ESG	Total fleet's average CO2 & CO2e emissions in g/km (ENPIP029)
	LT4. Percentage-point change since 2015		Same as LT3.	Same as LT3.
TN. Transnational Nature	TN1. Number of countries operated in		Company website	
	TN2. Number of continents operated in		Company website	
	TN3. Number of world regions where company gets >10% of its revenues		Statista	Revenue broken down by geographical region
EC. Exposure to Consumers	EC1. Share of revenues from direct transactions with consumers		Statista	Share of revenue by product category
	EC2. Effects of public scrutiny over environmental impact controversies		Asset4 ESG	Number of controversies related to the environmental impact of the company's operations (ENRRDP067)

Table continues on the next page

IE. Institutional Environment	IE1. Environmental policy stringency in country where TNC is headquartered		OECD	Environmental policy stringency index (0-6)
	IE2. Industry / company histories	IE2a. Organic / internal growth	Factiva (Dow Jones)	<company name> and "organic growth" or "internal growth" and "external growth" or "M&A"
		IE2b. Innovative capacity	Statista	R&D spending divided by total revenue
IP. Investor Pressure	IP1. Support for shareholder resolutions relating to climate change		Ceres	Climate and sustainability shareholder resolutions database
			Factiva (if not covered by ceres)	<company name> and resolution and climate
	Stringency of resolutions		Ceres or Factiva if not covered by Ceres (see above)	Average level of stringency (out of 3 – report on emissions =1; adopt targets/report on risks=2; implement concrete measures = 3)

Appendix II – Raw data and qualitative anchors

The full data matrix that was used for the fsQCA can be found below. For each (sub-)indicator, it shows two values, 'Raw data' and 'Fs score'. Raw data refers to the data point for that indicator. For example, the value for Apple on EF1 ('share of revenue from fossil fuels') is 0, meaning that 0% of Apple's revenue is derived from the production and sale of fossil fuels. For IE2a, 'O' refers to an organic growth strategy, while 'A' refers to a growth strategy through acquisitions. For IP1, 'W' means withdrawn – if a resolution is found to be unsuitable – and 'C' means that a resolution received commitment from company management and was subsequently withdrawn. Cells that contain 'n/a' are not applicable – for example 'n/a' in column IP1 means that there were no climate change-related shareholder resolutions. The qualitative anchors that are used to translate the raw data into fuzzy set scores are reported below the data matrix.

	Condition	EF				LT					
	Indicator	EF1		EF2		LT1		LT2		LT3	
	Sub-indicator										
	Data point	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score
Company	Sector										
APP	Technology	0.00	0.00	142.69	0.33	28.00	0.67	100.00	1.00	n/a	
SAM	Technology	0.00	0.00	141.64	0.33	1.00	0.00	100.00	1.00	n/a	
MIC	Technology	0.00	0.00	186.22	0.33	94.00	1.00	3.30	0.33	n/a	
INT	Technology	0.00	0.00	34.27	0.00	66.00	1.00	100.00	1.00	n/a	
RDS	Energy	100.00	1.00	1651.05	0.67	0.00	0.00	0.00	0.00	n/a	
EXX	Energy	63.38	0.67	1128.15	0.67	0.00	0.00	0.00	0.00	n/a	
BP	Energy	99.29	1.00	2138.03	1.00	0.00	0.00	0.00	0.00	n/a	
TOY	Car	0.00	0.00	1570.63	0.67	n/a	n/a	n/a	n/a	161.25	0.67
VW	Car	0.00	0.00	1530.46	0.67	n/a	n/a	n/a	n/a	145.68	1.00
FOR	Car	0.00	0.00	848.92	0.67	n/a	n/a	n/a	n/a	183.90	0.00
ATT	Telecom	0.00	0.00	59.57	0.00	1.00	0.00	0.00	0.00	n/a	
VER	Telecom	0.00	0.00	45.43	0.00	0.00	0.00	0.00	0.00	n/a	
DET	Telecom	0.00	0.00	46.89	0.00	35.00	0.67	29.63	0.67	n/a	
WAL	Retail	0.98	0.00	49.63	0.00	10.00	0.33	-23.08	0.00	n/a	
ANB	Retail	0.00	0.00	110.19	0.33	17.00	0.33	55.96	1.00	n/a	
HOM	Retail	0.00	0.00	49.09	0.00	5.00	0.00	100.00	1.00	n/a	
PFI	Pharmaceuticals	0.00	0.00	22.24	0.00	0.00	0.00	0.00	0.67	n/a	
NOV	Pharmaceuticals	0.00	0.00	31.10	0.00	29.20	0.67	4.29	0.33	n/a	
BAY	Pharmaceuticals	0.00	0.00	808.15	0.67	1.00	0.00	0.00	0.00	n/a	
GLE	Raw materials	59.12	0.67	2719.42	1.00	8.00	0.33	-11.11	0.00	n/a	
BHP	Raw materials	37.74	0.33	13981.01	1.00	1.00	0.00	-99.80 [15]	0.00	n/a	
RIO	Raw materials	7.57	0.00	27041.57	1.00	75.00	1.00	24.24	0.67	n/a	
ENE	Utilities	67.67	0.67	1444.37	0.67	33.00	0.67	6.45	0.33	n/a	
EDF	Utilities	12.35	0.00	807.90	0.67	89.00	1.00	22.22	0.67	n/a	
IBE	Utilities	70.33	0.67	1434.42	0.67	31.00	0.67	47.62	1.00	n/a	

Table continues on the following page

	Condition			TN						EC	
	Indicator	LT4		TN1		TN2		TN3		EC1	
	Sub-indicator										
	Data point	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score
Company	Sector										
APP	Technology	n/a		24.00	0.67	6.00	1.00	4.00	0.67	100.00	1.00
SAM	Technology	n/a		73.00	1.00	6.00	1.00	5.00	1.00	65.08	0.67
MIC	Technology	n/a		170.00	1.00	6.00	1.00	2.00	0.33	33.11	0.33
INT	Technology	n/a		7.00	0.33	3.00	0.33	4.00	0.67	0.00	0.00
RDS	Energy	n/a		70.00	1.00	6.00	1.00	4.00	0.67	85.00	1.00
EXX	Energy	n/a		51.00	1.00	6.00	1.00	3.00 [5]	0.33	69.06	0.67
BP	Energy	n/a		72.00	1.00	6.00	1.00	4.00	0.67	82.23	1.00
TOY	Car	-5.98	1.00	170.00	1.00	6.00	1.00	3.00	0.33	100.00	1.00
VW	Car	-2.56	0.67	153.00	1.00	6.00	1.00	3.00	0.33	93.50	1.00
FOR	Car	0.65	0.00	123.00	1.00	6.00	1.00	3.00	0.33	92.91	1.00
ATT	Telecom	n/a		57.00	1.00	6.00	1.00	1.00	0.00	75.55	0.67
VER	Telecom	n/a		150.00	1.00	6.00	1.00	1.00	0.00	61.99	0.67
DET	Telecom	n/a		36.00	0.67	5.00	1.00	2.00	0.33	90.00	1.00
WAL	Retail	n/a		28.00	0.67	5.00	1.00	1.00	0.00	100.00	1.00
ANB	Retail	n/a		50.00	1.00	6.00	1.00	5.00	1.00	100.00	1.00
HOM	Retail	n/a		3.00	0.33	1.00	0.00	1.00	0.00	100.00	1.00
PFI	Pharmaceuticals	n/a		125.00	1.00	6.00	1.00	3.00	0.33	6.78	0.00
NOV	Pharmaceuticals	n/a		155.00	1.00	6.00	1.00	3.00	0.33	4.81	0.00
BAY	Pharmaceuticals	n/a		79.00	1.00	6.00	1.00	6.00	1.00	15.00	0.33
GLE	Raw materials	n/a		50.00	1.00	6.00	1.00	2.00	0.33	0.00	0.00
BHP	Raw materials	n/a		25.00	0.67	6.00	1.00	1.00	0.00	0.00	0.00
RIO	Raw materials	n/a		35.00	0.67	6.00	1.00	3.00	0.33	0.00	0.00
ENE	Utilities	n/a		34.00	0.67	6.00	1.00	2.00	0.33	80.34 [18]	1.00
EDF	Utilities	n/a		25.00	0.67	5.00	1.00	1.00	0.00	89.21	1.00
IBE	Utilities	n/a		11.00	0.33	3.00	0.33	2.00	0.33	85.01	1.00

Table continues on the following page

	Condition			IE						IP	
	Indicator	EC2		IE1		IE2				IP1	
	Sub-indicator					IE2a		IE2b			
	Data point	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score	Raw data	Fs score
Company	Sector										
APP	Technology	1.00	0.33	3.17	0.67	O: 2; A: 2 [1]	0.67	4.38	0.67	7.10	0.33
SAM	Technology	0.00	0.00	2.63	0.33	O:2; A:3 [2]	0.33	14.70	1.00	n/a	0.00
MIC	Technology	0.00	0.00	3.17	0.67	O:0; A:7	0.00	13.79	1.00	n/a	0.00
INT	Technology	0.00	0.00	3.17	0.67	O:3; A:8	0.33	21.38	1.00	n/a	0.00
RDS	Energy	8.00	1.00	3.63	1.00	O:3; A:3 [3]	0.33	0.38	0.33	5.54; C [4]	1.00
EXX	Energy	3.00	0.33	3.17	0.67	O: 0; A: 1 [6]	0.00	0.46	0.33	62.1; C [7]	1.00
BP	Energy	6.00	0.67	3.29	0.67	O:2; A:6	0.33	0.19 [8]	0.33	C	1.00
TOY	Car	0.00	0.00	3.50	1.00	O:1; A:2	0.33	3.72	0.67	n/a	0.00
VW	Car	4.00	0.67	2.92	0.33	O:1; A:5	0.00	6.11	0.67	n/a	0.00
FOR	Car	1.00	0.33	3.17	0.67	O:1; A:4 [9]	0.33	4.80	0.67	12.80	0.33
ATT	Telecom	0.00	0.00	3.17	0.67	O:2; A:5	0.33	1.05	0.33	W	0.00
VER	Telecom	0.00	0.00	3.17	0.67	O:2; A:3 [10]	0.67	?	0.00	15.00	0.33
DET	Telecom	0.00	0.00	2.92	0.33	O:3; A:2	0.67	0.11	0.00	n/a	0.00
WAL	Retail	0.00	0.00	3.17	0.67	O:4; A:4 [11]	0.67	0.00	0.00	1.80	0.00
ANB	Retail	0.00	0.00	2.47	0.33	O:1; A:6 [12]	0.00	0.47	0.33	n/a	0.00
HOM	Retail	1.00	0.33	3.17	0.67	O:0; A:2	0.00	1.83	0.33	C	1.00
PFI	Pharmaceuticals	1.00	0.33	3.17	0.67	O:0; A:3	0.00	15.10	1.00	n/a	0.00
NOV	Pharmaceuticals	1.00	0.33	3.29	0.67	O:4; A:2 [13]	0.67	17.28	1.00	n/a	0.00
BAY	Pharmaceuticals	4.00	0.67	2.92	0.33	O:6; A:6 [14]	0.33	18.40	1.00	n/a	0.00
GLE	Raw materials	2.00	0.33	3.29	0.67	O:0; A: 5	0.00	?	0.00	C	1.00
BHP	Raw materials	3.00	0.33	3.72	1.00	O:3; A: 1	0.67	?	0.00	9.07	0.33
RIO	Raw materials	0.00	0.00	3.29 [16]	0.67	O:6; A:2 [17]	0.67	0.20	0.00	99.20	1.00
ENE	Utilities	2.00	0.33	2.77	0.33	O:6; A:2 [19]	0.67	0.05	0.00	n/a	0.00
EDF	Utilities	0.00	0.00	3.57	1.00	O:7; A:0	1.00	0.82	0.33	n/a	0.00
IBE	Utilities	0.00	0.00	2.22	0.33	O:4; A:2 [20]	0.67	0.66	0.33	n/a	0.00

Table continues on the following page

	Condition		
	Indicator	IP2	
	Sub-indicator		
	Data point	Raw data	Fs score
Company	Sector		
APP	Technology	1.50	0.67
SAM	Technology	n/a	0.00
MIC	Technology	n/a	0.00
INT	Technology	n/a	0.00
RDS	Energy	2.50	1.00
EXX	Energy	2.18	1.00
BP	Energy	3.00	1.00
TOY	Car	n/a	0.00
VW	Car	n/a	0.00
FOR	Car	2.00	0.67
ATT	Telecom	3.00	1.00
VER	Telecom	2.33	1.00
DET	Telecom	n/a	0.00
WAL	Retail	3.00	1.00
ANB	Retail	n/a	0.00
HOM	Retail	3.00	1.00
PFI	Pharmaceuticals	n/a	0.00
NOV	Pharmaceuticals	n/a	0.00
BAY	Pharmaceuticals	n/a	0.00
GLE	Raw materials	2.00	0.67
BHP	Raw materials	1.00	0.33
RIO	Raw materials	2.00	0.67
ENE	Utilities	n/a	0.00
EDF	Utilities	n/a	0.00
IBE	Utilities	n/a	0.00

Notes

[1] Because the two articles mentioning growth through Mergers and Acquisitions (M&A) were mostly speculative, Apple receives a fuzzy value of 0.67 rather than 0.33.

[2] The articles that refer to organic growth are generally older (2016-2017) than the articles that refer to M&A-driven growth (2017-2018) as Samsung completed a big $8bn acquisition in late 2017, explaining the fuzzy value of 0.33.

[3] The reports mentioning growth through M&A all refer to Shell's $70bn acquisition of BG group, which is more significant than reports mentioning the company is trying to achieve organic growth as well. Therefore, Shell receives a fuzzy value of 0.33.

[4] The resolution of strength 2 (asking Shell to set targets in line with the Paris Agreement) received minor support, while the resolution of strength 3 (asking Shell to reduce emissions and invest in renewables) was accepted by the board and thereafter withdrawn.

[5] ExxonMobil's revenues are heavily concentrated in North America (46.9%) and Europe (>21%).

[6] Although there is a lack of reports on ExxonMobil's growth strategy, ExxonMobil has traditionally pursued a growth strategy through external acquisitions (Levy 2005), and thus receives a fuzzy value of 0.

[7] Four resolutions of strength 2 received commitment from the board and were withdrawn, while another one was voted upon and received 62.1% of the vote. Some resolutions of strength 3 received >30% of the shareholder vote as well.

[8] BP receives a fuzzy value of 0.33 and not 0 because even though it spends a comparatively small share of its revenue on R&D, it is the only oil company that has ventured into new sectors such as alternative energy in a meaningful way.

[9] While the reports on Ford's growth strategy mention acquisitions much more than organic growth strategies, as those on Volkswagen do, Ford has mostly been involved in small deals, while Volkswagen has been involved in big deals such as buying a controlling stake in Porsche. This explains why Ford receives a fuzzy value of 0.33 while Volkswagen receives a value of 0.

[10] Even though there was one more report on growth through M&A than there were reports of organic growth strategies, Verizon executives have stated that Verizon aims mainly for organic growth, and uses M&A when it fits the company's strategy. Therefore, Verizon receives a fuzzy value of 0.67.

[11] Even though the number of mentions of organic growth strategies and growth through M&A are tied, Walmart executives clarified that the company prefers organic growth but will pursue acquisitions where fitting with the strategy. Therefore, Walmart receives a fuzzy value of 0.67 and not 0.33.

[12] Although Anheuser Busch InBev executives mentioned focusing on organic growth in one report, they were quick to follow-up that M&A remained a core competency. Most reports mention acquisitions as driving AB InBev's growth. Therefore, ANB receives a fuzzy value of 0.

[13] Novartis executives consistently mention their focus is on organic growth, with M&A used as 'bolt-ons' that would immediately reinforce the pipeline. Therefore, Novartis receives a fuzzy value of 0.67.

[14] Although there are as many mentions of organic as there are of external growth in the 20 most relevant articles since 2015, there seems to have been a change in strategy as Werner Baumann replaced Marijn Dekkers as CEO in late summer 2016 and announced an intended €57bn takeover of Monsanto only 3 weeks later. Therefore, Bayer receives a fuzzy value of 0.33.

[15] This massive drop in BHP Billiton's renewable energy used or produced as a share of the total is explained by the spin-off of metal assets which were powered by hydroelectricity into South32 in 2015.

[16] Rio Tinto has headquarters both in the UK and Australia, but the global headquarters are located in the UK. Therefore, the fuzzy score for IE1 is based on the UK's environmental policy stringency.

[17] Rio Tinto has a history of large M&A, but has shifted its focus to organic growth since 2013. Since then, two CEOs have continued this strategy, even as some analysts expected the current CEO to return to M&A. Therefore, it receives a 0.67 fuzzy value.

[18] Not all electricity markets allow customers to choose between electricity suppliers. Only the share of revenue from countries where consumers can choose their electricity provider is categorised as 'direct sales to consumers'.

[19] Enel's executives have consistently made it clear that their growth strategy is focused on organic growth with mid-size 'bolt-on' acquisitions supplementing that in certain markets outside of their core market Europe. Therefore, Enel receives a fuzzy value of 0.67.

[20] Iberdrola's executives have clarified that they focus on organic growth but do seek to grow through acquisitions in regulated markets outside of their core Spanish and Italian markets. Therefore, Iberdrola receives a fuzzy value of 0.67.

The qualitative anchors that were used to determine the fuzzy set scores for each indicator are reported below. For EF1, for example, the fuzzy set score would be 0 if a company gets 19% of its revenue from fossil fuels, 0.33 if it gets 35% from fossil fuels, 0.67 if it gets 70% and 1 if it gets 90% of its revenue from fossil fuels.

Indicator	**Qualitative anchor for 0**	**Qualitative anchor for 0.5**	**Qualitative anchor for 1**
EF1	20	50	80
EF2	100	500	2,000
LT1	5	25	50
LT2	2	15	35
LT3	180	165	150
LT4	0	-2	-5
TN1	1	10	50
TN2	1	4	5
TN3	1	4	5
EC1	10	50	80
EC2	0	4	8
IE1	2	3	3.5
IE2a*	no organic mentions	as many mentions for organic as for external	little M&A mentions
IE2b	0.3	3	10
IP1	5 / W (withdrawn)	20	50 / C (commitment)
IP2	1	1.5	2

*: IE2a is ranked based on qualitative information about TNCs' growth strategies contained in the news reports consulted. No clear qualitative anchors can thus be set. When the fuzzy score is not

very clear from the distribution of organic and external growth strategy mentions, or influenced by a certain statement in a report, further information is provided in a note.

Setting the qualitative anchors is a key step in QCA, as they determine the membership of cases in conditions. They were set by comparing the raw data across all cases, in line with the core idea behind this analysis that companies are most concerned with their position relative to competitors. Policies to reduce greenhouse gas emissions will hurt any company that is exposed to fossil fuels, but a company that is less exposed to fossil fuels than its competitors is expected to be less opposed to such policy as it would in fact strengthen its competitive position. However, there are some points where other decisions about qualitative anchors could be made. Robustness checks were carried out with an adapted dataset, based on these alternative decisions. The results were found to be almost fully robust to these changes. The alternative qualitative anchors are reported in the table below, with 'no change' indicating that the same qualitative anchor was used as in the original analysis.

Indicator	**Qualitative anchor for 0**	**Qualitative anchor for 0.5**	**Qualitative anchor for 1**
EF1	no change	no change	no change
EF2	100	300	500
LT1	10	50	85
LT2	no change	no change	no change
LT3	165	150	100
LT4	0	-3	-10
TN1	no change	no change	no change
TN2	no change	no change	no change
TN3	no change	no change	no change
EC1	20	40	75
EC2	0	2	3
IE1	no change	no change	no change
IE2a	no change	no change	no change
IE2b	no change	no change	no change
IP1	5 / W (withdrawn)	20	50
IP2	no change	no change	no change

The gaps in the raw data for EF1 are too clear to justify alternative positioning of the qualitative anchors. The qualitative anchors for EF2 could be lowered to include all energy and car companies in the set of companies that are fully exposed to fossil fuels, as they are often mentioned together in the literature (e.g. Falkner 2008; Vormedal 2011). The qualitative anchors for LT1 could be placed higher to emphasise whether companies have already adapted to constraints on GHG emissions. The anchors for LT2 are not changed because they already constitute a quite demanding test for the speed of a low-carbon transition. Take the EU's renewable energy targets: they equate to a 7% increase between 2020 and 2030 – less than 1% a year. The anchors for LT3 could be lowered to focus less on how the car companies tested compare to each other and more on how they compare to other sectors. The anchors for TN1, TN2 and TN3 are not changed because there are no other gaps in the raw data where they could justifiably be placed. The anchors for EC1 could be lowered if one expects that whether a company gets a substantial part of its revenue from direct consumer transactions, rather than whether a company is fully based on consumer transactions, is what determines the level of concern about reputational risks. The anchors for EC2 could be lowered if one expects that a smaller amount of controversies would be necessary for a company to take action to reduce its reputational risks. The anchors for IE1 remain unchanged because there are no other gaps in the environmental policy stringency index where they could be placed. The anchors for IE2a also remain unchanged because the fuzzy scores for that indicator are highly based on qualitative information. The raw data on IE2b does not offer other justifiable positions for the qualitative anchors. The anchors for IP1 are changed in the sense that resolutions that are withdrawn after receiving commitment from company management will no longer receive a 1 but a 0.33 score, based on the argument that management would only commit to actions that are not very consequential in terms of costs or (planned) strategy. The anchors for

IP2 stay the same as they are based on certain assumptions on the strength of resolutions, which are commonly accepted.

Appendix III – Disaggregate fuzzy-set scores for all (sub-)indicators and conditions

	Condition			**EF**					**LT**				**TN**
	Indicator	EF1	EF2		LT1	LT2	LT3	LT4		TN1	TN2	TN3	
	Sub-indicator												
Company	Sector												
APP	Technology	0.00	0.33	**0.00**	0.67	1.00	n/a	n/a	**1.00**	0.67	1.00	0.67	**0.67**
SAM	Technology	0.00	0.33	**0.00**	0.00	1.00	n/a	n/a	**0.33**	1.00	1.00	1.00	**1.00**
MIC	Technology	0.00	0.33	**0.00**	1.00	0.33	n/a	n/a	**1.00**	1.00	1.00	0.33	**0.67**
INT	Technology	0.00	0.00	**0.00**	1.00	1.00	n/a	n/a	**1.00**	0.33	0.33	0.67	**0.33**
RDS	Energy	1.00	0.67	**1.00**	0.00	0.00	n/a	n/a	**0.00**	1.00	1.00	0.67	**1.00**
EXX	Energy	0.67	0.67	**0.67**	0.00	0.00	n/a	n/a	**0.00**	1.00	1.00	0.33	**0.67**
BP	Energy	1.00	1.00	**1.00**	0.00	0.00	n/a	n/a	**0.00**	1.00	1.00	0.67	**1.00**
TOY	Car	0.00	0.67	**0.67**	n/a	n/a	0.67	1.00	**1.00**	1.00	1.00	0.33	**0.67**
VW	Car	0.00	0.67	**0.67**	n/a	n/a	1.00	0.67	**1.00**	1.00	1.00	0.33	**0.67**
FOR	Car	0.00	0.67	**0.67**	n/a	n/a	0.00	0.00	**0.00**	1.00	1.00	0.33	**0.67**
ATT	Telecom	0.00	0.00	**0.00**	0.00	0.00	n/a	n/a	**0.00**	1.00	1.00	0.00	**0.00**
VER	Telecom	0.00	0.00	**0.00**	0.00	0.00	n/a	n/a	**0.00**	1.00	1.00	0.00	**0.00**
DET	Telecom	0.00	0.00	**0.00**	0.67	0.67	n/a	n/a	**0.67**	0.67	1.00	0.33	**0.33**
WAL	Retail	0.00	0.00	**0.00**	0.33	0.00	n/a	n/a	**0.33**	0.67	1.00	0.00	**0.00**
ANB	Retail	0.00	0.33	**0.00**	0.33	1.00	n/a	n/a	**1.00**	1.00	1.00	1.00	**1.00**
HOM	Retail	0.00	0.00	**0.00**	0.00	1.00	n/a	n/a	**0.33**	0.33	0.00	0.00	**0.00**
PFI	Pharmaceuticals	0.00	0.00	**0.00**	0.00	0.00	n/a	n/a	**0.00**	1.00	1.00	0.33	**0.67**
NOV	Pharmaceuticals	0.00	0.00	**0.00**	0.67	0.33	n/a	n/a	**0.67**	1.00	1.00	0.33	**0.67**
BAY	Pharmaceuticals	0.00	0.67	**0.67**	0.00	0.00	n/a	n/a	**0.00**	1.00	1.00	1.00	**1.00**
GLE	Raw materials	0.67	1.00	**1.00**	0.33	0.00	n/a	n/a	**0.00**	1.00	1.00	0.33	**0.67**
BHP	Raw materials	0.33	1.00	**0.67**	0.00	0.00	n/a	n/a	**0.00**	0.67	1.00	0.00	**0.00**
RIO	Raw materials	0.00	1.00	**0.67**	1.00	0.67	n/a	n/a	**1.00**	0.67	1.00	0.33	**0.67**
ENE	Utilities	0.67	0.67	**0.67**	0.67	0.33	n/a	n/a	**0.67**	0.67	1.00	0.33	**0.67**
EDF	Utilities	0.00	0.67	**0.00**	1.00	0.67	n/a	n/a	**1.00**	0.67	1.00	0.00	**0.00**
IBE	Utilities	0.67	0.67	**0.67**	0.67	1.00	n/a	n/a	**0.67**	0.33	0.33	0.33	**0.33**

Table continues on the following page

	Condition			**EC**					**IE**			**IP**
	Indicator	EC1	EC2		IE1	IE2				IP1	IP2	
	Sub-indicator						IE2a	IE2b				
Company	Sector											
APP	Technology	1.00	0.33	**0.33**	0.67	0.67	0.67	0.67	**0.67**	0.33	0.67	**0.67**
SAM	Technology	0.67	0.00	**0.00**	0.33	1.00	0.33	1.00	**0.67**	0.00	0.00	**0.00**
MIC	Technology	0.33	0.00	**0.00**	0.67	1.00	0.00	1.00	**1.00**	0.00	0.00	**0.00**
INT	Technology	0.00	0.00	**0.00**	0.67	1.00	0.33	1.00	**1.00**	0.00	0.00	**0.00**
RDS	Energy	1.00	1.00	**1.00**	1.00	0.33	0.33	0.33	**0.67**	1.00	1.00	**1.00**
EXX	Energy	0.67	0.33	**0.33**	0.67	0.33	0.00	0.33	**0.33**	1.00	1.00	**1.00**
BP	Energy	1.00	0.67	**0.67**	0.67	0.33	0.33	0.33	**0.33**	1.00	1.00	**1.00**
TOY	Car	1.00	0.00	**0.00**	1.00	0.67	0.33	0.67	**1.00**	0.00	0.00	**0.00**
VW	Car	1.00	0.67	**0.67**	0.33	0.67	0.00	0.67	**0.67**	0.00	0.00	**0.00**
FOR	Car	1.00	0.33	**0.33**	0.67	0.67	0.33	0.67	**0.67**	0.33	0.67	**0.67**
ATT	Telecom	0.67	0.00	**0.00**	0.67	0.33	0.33	0.33	**0.33**	0.00	1.00	**0.00**
VER	Telecom	0.67	0.00	**0.00**	0.67	0.67	0.67	0.00	**0.67**	0.33	1.00	**0.67**
DET	Telecom	1.00	0.00	**0.00**	0.33	0.67	0.67	0.00	**0.67**	0.00	0.00	**0.00**
WAL	Retail	1.00	0.00	**0.00**	0.67	0.67	0.67	0.00	**0.67**	0.00	1.00	**0.00**
ANB	Retail	1.00	0.00	**0.00**	0.33	0.33	0.00	0.33	**0.33**	0.00	0.00	**0.00**
HOM	Retail	1.00	0.33	**0.33**	0.67	0.33	0.00	0.33	**0.33**	1.00	1.00	**1.00**
PFI	Pharmaceuticals	0.00	0.33	**0.00**	0.67	1.00	0.00	1.00	**1.00**	0.00	0.00	**0.00**
NOV	Pharmaceuticals	0.00	0.33	**0.00**	0.67	1.00	0.67	1.00	**1.00**	0.00	0.00	**0.00**
BAY	Pharmaceuticals	0.33	0.67	**0.00**	0.33	1.00	0.33	1.00	**0.67**	0.00	0.00	**0.00**
GLE	Raw materials	0.00	0.33	**0.00**	0.67	0.00	0.00	0.00	**0.00**	1.00	0.67	**1.00**
BHP	Raw materials	0.00	0.33	**0.00**	1.00	0.67	0.67	0.00	**1.00**	0.33	0.33	**0.33**
RIO	Raw materials	0.00	0.00	**0.00**	0.67	0.67	0.67	0.00	**0.67**	1.00	0.67	**1.00**
ENE	Utilities	1.00	0.33	**0.33**	0.33	0.67	0.67	0.00	**0.67**	0.00	0.00	**0.00**
EDF	Utilities	1.00	0.00	**0.00**	1.00	1.00	1.00	0.33	**1.00**	0.00	0.00	**0.00**
IBE	Utilities	1.00	0.00	**0.00**	0.33	0.67	0.67	0.33	**0.67**	0.00	0.00	**0.00**