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Car manufacturers' changing political strategies on the ZEV mandate

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ABSTRACT

We ask how incumbent car manufacturers and their political coalitions changed their political strategy with respect to the Californian zero emission vehicle mandate over the period 2000–2013. Building on the Corporate Political Activities literature we conceptualize firms' political strategies and their underlying tactics and actions. Our longitudinal case study builds on a dataset comprising governmental reports, documents, and public hearing transcripts, letters from industry, and complementary interviews with stakeholders. We find that car manufacturers became less defensive over time and more proactive and compliant in their political strategies towards the zero emission vehicle mandate. Car manufacturers' coalitions on the other hand, remain relatively defensive in their political actions as they continue to do the manufacturers' "dirty work". We provide insights in the Corporate Political Activities used to influence policymakers. To deal with industry opposition to policy interventions, our research suggests that policy makers might focus their interaction with industry on individual firms instead of industry associations, craft policies that stimulate competition between firms to break apart their closed industry front, and complement technology-forcing policies with demand-pull initiatives.

Introduction

The transition to zero emission vehicles (ZEVs), especially electric vehicles (EVs) and hydrogen fuel cell vehicles (HFCVs),[4] will play an important role in creating more sustainable transportation systems (Sperling and Gordon, 2009; Lutsey and Sperling, 2009; Wang et al., 2008). Because ZEV technologies are radically different from internal combustion engines, the longtime core technology for automotive companies, they constitute competence-destroying innovations to incumbent manufacturers. This competence-destroying nature of EVs and HFCVs reduces car manufacturers' incentive to invest in and commercialize ZEVs (Wesseling et al., 2013). Therefore, policy intervention is important to support a transition towards such sustainable technologies (Van der Vooren et al., 2013; Lutsey and Sperling, 2010).

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[4] For an overview of acronyms see Table A in the Appendix

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However, incumbent car manufacturers have a history of opposing such interventions because it pushes them away from their longtime core technologies (Penna and Geels, 2013; Doyle, 2000; Collantes and Sperling, 2008). Despite their longtime investments in internal combustion engines and because of policy interventions, some car manufacturers have started mass commercializing electric vehicles after 2009 (Wesseling et al., 2013; Wells and Nieuwenhuis, 2012). Our overall hypothesis is that this change in strategy would be supported by a corresponding change in political strategy, i.e. becoming less opposed to ZEV-forcing regulations, which in turn makes it easier for policymakers to implement ZEV policies.

The Corporate Political Activities (CPA) literature studies the political strategies of firms, and the various tactics they employ, to influence policy intervention (Oliver and Holzinger, 2008). CPAs are defined as "corporate attempts to shape government policy in ways favorable to the firm" (Hillman et al., 2004, p. 838; Baysinger, 1984). The term 'actions' is defined more broadly as any corporate response to policy intervention, including both influence and non-influence. We apply the CPA literature's concepts and operationalization methods to study the political strategies, tactics, and actions employed by large car manufacturers *in response to* policy intervention. We add to the CPA literature by (1) applying CPA concepts to sustainable transitions in the transportation sector, which so far has only been studied from different socio-political perspectives (Penna and Geels, 2013), and (2) researching how CPAs change over time, as "[o]ur least complete understandings revolve around the ways that CPA changes over time" (Getz, 1997, p. 64).

We focus on the political strategies of car manufacturers toward the ZEV mandate adopted by the California Air Resources Board (CARB). This mandate, first adopted in 1990, is a radical policy action in the sense that it forces new low and zero emission vehicle technologies into the market (Collantes and Sperling, 2008). In the 1990s, car manufacturers used various tactics to block and modify the ZEV mandate, including information tactics such as lobbying CARB (Collantes and Sperling, 2008), co-constructing the meaning of what ZEV technology is (Fogelberg, 2000), and constituency-building tactics such as the Alliance of Automobile Manufacturers (AAM) hiring "public relations firm Cerrell Associates. . . to turn public sentiment against the ZEV mandate" (Boschert, 2006, p. 18). Because our aim is to study if this defensive political strategy of car manufacturers has changed since the 1990s we focus on the timeframe 2000–2013. During this period four ZEV mandate amendments were adopted.

We investigate the nature and magnitude of the change in the political strategies of large car manufacturers and their coalitions toward the ZEV mandate, distinguishing between individual and collective political strategies of manufacturers. We highlight the types of political tactics and actions that support these strategies. Using these insights, we suggest how policymakers may engage more productively and effectively with businesses to implement policy interventions.

Conceptual framework

The Corporate Political Activities (CPA) literature argues that in strongly regulated environments, firms may strengthen their competitive advantage by engaging in political strategies (Hillman and Hitt, 1999; Oliver and Holzinger, 2008). Consequently, the CPA literature perceives the political environment not just as a set of government-imposed constraints that impose costs on firms, but also as an opportunity set within which firms can exert influence to gain value (Oliver and Holzinger, 2008).

Categorizing political strategies

Firms create value by improving their economic performance through political actions (Lux et al., 2011; Mathur and Singh, 2011; Lawton et al., 2013; Hillman and Hitt, 1999). The Resource Based View perceives the firm's assets as the base of its competitive position and stresses that value arises from using internal resources to exploit opportunities in the firm's environment (Barney, 1991). Accordingly, the CPA literature argues that firms may attempt to shape their political environment to maintain or create value (Oliver and Holzinger, 2008; Buysse and Verbeke, 2003). Value maintenance refers to maintaining the status quo, while value creation refers to exploiting early mover advantages.

Besides value maintenance and creation, the CPA literature tends to differentiate between active influence on, and passive compliance with government regulations (Carroll, 1979; Buysse and Verbeke, 2003; Boddewyn and Brewer, 1994). In line with Oliver and Holzinger (2008, p. 505), we define political compliance strategies as "firm-level actions undertaken in conformity with political requirements and expectations for the purpose of maintaining or creating value by anticipating or adapting to public policy," and political influence strategies as "firm-level actions undertaken for the purpose of mobilizing support for the firm's interests".

Based on the distinction between value creation and maintenance, and compliance and influence, a 2 by 2 matrix of political strategies can be constructed, as shown in Table 1. Compliance strategies focus on (re)shaping the internal resources to comply with existing or anticipated regulations. Firms employing a reactive compliance strategy aim to maintain the value of their resources and competences by aligning them efficiently and effectively with regulatory demands (Carroll, 1979; Buysse and Verbeke, 2003; Oliver and Holzinger, 2008). Firms with an anticipatory compliance strategy anticipate regulatory changes to create value and exploit early-mover advantages by aligning their resources and competences with anticipated regulatory demands (Carroll, 1979; Buysse and Verbeke, 2003; Oliver and Holzinger, 2008). Political influence strategies utilize CPAs to shape regulation, either to maintain value in a defensive political strategy, or to create value in a proactive strategy. Firms engaging in defensive political strategies oppose regulations, like the ZEV mandate, that threaten their firm's value; they are trying to maintain the favorable status quo (Oliver and Holzinger, 2008; Stenzel and Frenzel, 2008; Hillman et al., 2004; Carroll, 1979). Proactive political strategies are intended to shape regulations so that they support the firm's creation of new value and enhance their first mover advantages (Carroll, 1979; Buysse and Verbeke, 2003; Oliver and Holzinger, 2008).

Table 1
Types of political strategies, adapted from Oliver and Holzinger (2008).

		Value perspective	
		Value maintenance	Value creation
Strategic orientation	Compliance	Reactive strategy *Focus on reconfiguring internal processes*	Anticipatory strategy *Focus on scanning the firm's environment*
	Influence	Defensive strategy *Focus on influencing policymakers to retain status quo; opposing policy interventions that change the status quo*	General and Competitive proactive strategy *Focus on influencing policymakers to enact favorable regulatory changes*

Applying this categorization to our case study, car manufacturers that yield value from their core technology resources and competences have incentive to maintain the status quo and may adopt defensive strategies to oppose the ZEV mandate. Nevertheless, strong competition stimulates investments in various sustainable vehicle technologies (Wesseling et al., 2014) and some manufacturers are attempting to create new value and build up a competitive advantage through radical innovations like EVs (Wesseling et al., 2013). By focusing on radical innovation, they try to shift the competitive focus from the incumbent core technology in which they are less successful, to the new technology in which they may have built up competitive advantage (Wesseling et al., 2013). These innovative firms may engage in proactive political strategies towards the ZEV mandate to support the value creating strategies through which they comply with the mandate and further enhance their competitive advantage.

We add to CPA literature by broadening the political strategy typology and distinguish between general proactive CPAs that are technology-neutral and thus benefit all car manufacturers alike, and competitive proactive CPAs that are technology-specific and thus benefit only the car manufacturers investing in this technology. To support their compliance strategy, car manufacturers complying for example through EVs, may competitively lobby in favor of EVs instead of ZEV technologies in general. To further enhance the competitive advantage of their compliance strategy, they may also counter the competitive proactive lobby of car manufacturers in other technology areas. Because different car manufacturers are betting on different technologies and are thus engaged in technological competition (Wesseling et al., 2014), they may also be competing in their proactive political strategies for regulatory support for the technologies they invested in and complying through. Hence, the strong competition in this industry may not only result in competitive compliance strategies (Wesseling et al., 2014; forthcoming), but also in competitive proactive influence strategies.

Over the past 15 years, car manufacturers have become increasingly active in commercializing low and zero emission vehicles, trying to gain a competitive advantage in this field (Wesseling et al., 2013; Pohl and Yarime, 2012; Wells and Nieuwenhuis, 2012). Literature indicates that firms also engage in CPAs to gain competitive advantage (Lux et al., 2011; Mathur and Singh, 2011; Lawton et al., 2013; Hillman et al., 2004). We expect that when car manufacturers have limited access to market-ready compliance technologies, they will protect their incumbent technology investments by opposing technology-forcing regulations that force them away from their incumbent technology. However, as car manufacturers increasingly gain access to these compliance technologies, we expect that they will replace their defensive political influence strategy with a more proactive influence strategy to ease compliance for the technologies they are investing in, thereby reducing their compliance costs and gaining a competitive advantage over rivals that comply through other technologies. Hence, over time, car manufacturers' political strategies will become less defensive to the ZEV mandate and more proactive to support their compliance strategies. Based on these notions we formulate hypothesis 1.

Hypothesis 1. *Throughout the timeframe 2000–2013, car manufacturers became less defensive and more proactive in their political strategies towards the ZEV mandate.*

Tactics underpinning political influence strategies

Public policy making can be described as a market with mutually interdependent policy makers and interest groups (Hillman and Hitt, 1999). Interest groups are dependent on policy makers because they have specific policy preferences. Policy makers on the other hand desire support for their policy like information and legal support to "ensure that their policies are effective and enforceable" (Hultén et al., 2012, p. 354). Moreover, policy makers desire direct personal incentives such as constituent and financial support for their re-election and financing of political campaigns (Hultén et al., 2012, p. 354).

Through various tactics, car manufacturers exploit policy makers' dependence on these resources to effectuate their political influence strategies. We identify information, financial, litigation, constituency-building and political connectedness tactics (Hillman and Hitt, 1999; Mathur and Singh, 2011). Each tactic may encompass different CPAs.

Information tactics aim to provide policymakers with arguments that will affect their policy decisions, like statements on the costs and benefits of policy (Aplin and Hegarty, 1980). This group of CPA tactics includes lobbying,[5] commissioning or

[5] In concurrence with definitions maintained by US state governments, we define *lobbying* broadly to mean directly or indirectly communicating with any government employee for the purpose of influencing legislative or administrative actions (NCSL, 2013). Our definition is not limited to those receiving compensation or reimbursement from a third party to lobby, and/or those officially registered as lobbyists (NCSL, 2013).

conducting research to support arguments, having experts testify in hearings or court, and providing position papers (Hillman and Hitt, 1999; Hillman et al., 2004; Kolk and Pinkse, 2007; Mathur and Singh, 2011).

Financial tactics attempt to influence public policy by providing financial incentives to policymakers (Hillman and Hitt, 1999; Lord, 2000; Aplin and Hegarty, 1980). This tactic includes financial contributions to policymakers, political parties, and Political Action Committees, honoraria for speaking, and paying for travel expenses (Hillman and Hitt, 1999; Lord, 2000; Mathur and Singh, 2011). Information and financial tactics tend to be strongly related, as firms often employ both (Schuler et al., 2002; Ansolabehere et al., 2002).

Litigation tactics, i.e. taking legal action, can be used to challenge public policy in court, but this tactic can only be used when the firm can show reasonable cause to be concerned with the issue (Getz, 1997). If challenged successfully (at the highest court of appeal), policy makers are legally forced to change their policy.

Constituency-building tactics are meant to influence politicians through the votes on which they depend for re-election. Such tactics include advocacy advertising, grassroots mobilization and astroturfing (Hillman and Hitt, 1999; Lord, 2003). Astroturfing refers to fake grassroots mobilization funded by large corporations to create constituency in their favor (Cho et al., 2011).

Political connectedness tactics enhance lobbying by providing firms direct access to relevant policy channels (Oliver and Holzinger, 2008; Mathur and Singh, 2011). Firms often attain these advantages by employing ex-policymakers (Goldman et al., 2009; Faccio et al., 2006; Agrawal and Knoeber, 2001).

Coalitions

CPA tactics are further categorized in terms of individual or collective actions (Hillman et al., 2004; Hillman and Hitt, 1999; Olson, 1965; Yoffie, 1987; Bonardi et al., 2005). Industry associations such as the AAM and Global Automakers (GA) and other lobbying coalitions are collective groups that represent the interests of their members by engaging in political strategies; in this paper we refer to such groups as coalitions. The decision to engage in CPAs individually or collectively has been frequently studied. The main advantages of collective action include reduced cost per firm and the potential for enhanced success as actions are supported by a larger group and therefore carry more weight (Chong, 1991; Jia, 2014; Olson, 1965; Vining et al., 2005). Only Hillman and Hitt (1999) noted that when it comes to opposing sensitive policy issues, like climate change and public health, collective actions limit the exposure and liability of members when coalitions lose a political battle. The ZEV mandate that we study is linked to both climate change and public health, two issues that have become increasingly politically sensitive over recent years (Schmidt et al., 2013), suggesting that opposition against the mandate may come increasingly from coalitions. A disadvantage of collective action is that the individual firm is less able to influence policy to meet its specific individual needs (Hillman and Hitt, 1999; Jia, 2014; Vining et al., 2005), such as promoting specific technologies within the ZEV mandate, implying that competitive proactive CPAs are less expected by coalitions. On these grounds, we formulate hypothesis 2.

Hypothesis 2. Throughout the timeframe 2000–2013, industry associations and lobby coalitions continued to be more defensive in their political strategy than their member car manufacturers by opposing the ZEV mandate more strongly.

Methods

Operationalization

To study the changes in car manufacturers' and coalitions' political strategies, we study all their actions in response to the ZEV mandate over the timeframe 2000–2013. Based on its goal, each action is attributed to a political strategy. The introduction of mandated ZEVs and statements of support, i.e. statements that neither oppose nor shape the mandate, are indicative of a compliance strategy. Because we cannot distinguish between reactive and anticipatory compliance strategies on the basis of these indicators, we refer to them in aggregate as "compliance strategies".

Political influence strategies are operationalized through CPAs. Categorized according to different tactics, Table 2 operationalizes the CPAs included at the outset of this study. CPAs aiming to oppose the ZEV mandate were counted as part of a defensive political influence strategy, while CPAs attempting to influence the ZEV mandate in such a way that it creates value for all car manufacturers or only for a few, were counted as general and competitive proactive strategies respectively. Coalition formation is included as an extra dimension of political influence strategies, and is measured by whether CPAs were conducted individually or collectively.

Finally, we used the number of CPAs by car manufacturers and their coalitions and the organizations they funded to engage in CPAs on their behalf, as complementary indicators for the level of political influence strategy (i.e., many CPAs indicate a stronger political influence strategy, whereas a few indicate little interaction with government and thus more of a compliance strategy).

Data collection

To identify the actions of car manufacturers and their coalitions, we analyzed the content of various data sources, see Table 2 for an overview. CARB has an extensive database of documents related to the ZEV mandate available on their website.

Table 2
Database and operationalization scheme.

Database		Indicators of response actions		Strategy
Interviews	CARB employees (6); EPA employee (1); car manufacturer representatives (7); ZEV advocates (2)	Compliance actions	Sales data Statements of support	Compliance strategy
Public hearings	5 Public hearing transcripts	*Political influence tactics*		
Letters to CARB and EPA	61 Letters to CARB and 22 to letters EPA	Information	Arguments provided, studies commissioned, expert testimonies	Defensive influence strategy
CARB documents	263 Documents, including Final and Initial 'Statements of Reason'; Technical reviews; Litigation documents	Financial	Honoraria for speaking and paying for travel expenses	
Complementary sources	Websites, literature, documents, vehicle-type built data sheets from CARB	Legal	Lawsuits filed	General proactive influence strategy
		Political connectedness	Ex-policymakers and ex-politicians employed	
		Constituency building	Engagement in grassroots mobilization and astroturfing; influencing the public through advertising	Competitive proactive influence strategy

These documents provided a comprehensive database and a good indication of the actions undertaken by industry actors because they cover most issues related to the mandate, including for example litigation and introduction of ZEVs. All these documents related to the timeframe of study were included in our analysis. The "Final Statements of Reason" documents provided the core for the Results section because they incorporate lobbying comments from public hearings and from letters sent to CARB that were not available throughout the entire period of study. We also included letters to the US Environmental Protection Agency (EPA) on their decision to waive federal preemption, which is required for CARB to enforce the ZEV mandate.[6]

A drawback of this database is that it does not include the initial behind-closed-doors lobbying (Interviewee 1). To partially account for this drawback and to collect data on financial[7], political connectedness and constituency-building tactics, we conducted 16 semi-structured interviews with representatives of car manufacturers and their associations, with ZEV advocates and with policymakers, all of whom were frequently involved in the ZEV mandate, to complement our data. We sent the interviewees the results of this study to verify our interpretation of their answers. Although some car manufacturer representatives were reluctant to discuss their influence tactics in-depth, CARB employees and ZEV advocates confronted by these tactics were not. To facilitate candid responses, all interviewees were granted anonymity for this paper.

Complementary data from professional websites, news articles and reports were obtained using snowballing methods. These data were only used to triangulate and uncover the specifics of car manufacturers' and coalitions' actions in response to the ZEV mandate, not to identify new actions.

Methods of analysis

Using content analysis on our database, we identified the actions car manufacturers and their coalitions used in response to the ZEV mandate. Since we applied an existing theoretical framework on political strategies to our data, we used *a priori* coding (Weber, 1990) – based on the previously discussed operationalization categories, to determine what data belonged to which political strategy, i.e. compliance, defensive, general proactive and competitive proactive political strategies. We checked for inter-coder reliability by having another researcher, not involved in the study, check our coding scheme. Our Krippendorff's alpha of 0.878 indicates the two coders have interpreted the data similarly (Krippendorff, 2004). In line with Weber (1990) we left room to slightly revise and tighten up these categories, in case coders disagreed.

To qualitatively study changes in political strategies, all actions – each attributed to a single political strategy – were mapped out over time.

Analysis

Text Box 1 describes the policy processes around the ZEV mandate and summarizes the 2001, 2003, 2008 and 2012 ZEV amendments that are the focus of our analysis. 'The 2001 rulemaking' through 'The 2012 rulemaking' describe the political strategies and associated CPAs of car manufacturers and their coalitions toward the four amendments. These CPAs are summarized in Tables 3 and 4. A fifth subsection provides a longitudinal analysis of the four periods, based on a reflection of the discussed CPAs and based on Figs. 1 and 2 that resulted from our content analysis.

[6] The 2012 ZEV amendments were granted a waiver in 2013; to include CPAs affecting this decision to waive federal pre-emption, our timeframe of study includes 2000–2013.

[7] Because no bills were issued on the ZEV mandate within our timeframe of study, political action committee contributions that firms may use to influence votes in the legislature cannot be used as a data source for financial tactics. Instead, using interviews, we focus on policymakers receiving from car manufacturers honoraria for speaking and getting travel expenses reimbursed.

Text Box 1 The ZEV mandate.

The Federal Clean Air Act provides California the power to issue vehicle emission standards that are more stringent than the federal standards (CARB, 2001a). CARB is the regulatory body that issued the ZEV mandate, which requires car manufacturers to sell low and zero emission vehicles in proportion to their total vehicle sales in California (CARB, 2001a). To meet this mandated level, car manufacturers gain different levels of credit for the different low and zero emission vehicles sold (CARB, 2012a). To enforce these standards, EPA needs to waive federal preemption, as federal law supersedes any state jurisdiction on automotive emissions (EPA, 2006). Over time the ZEV mandate, first issued in 1990, was relaxed through a series of amendments that allow more low and zero emission vehicle technologies to be included against higher credits. The 2012 amendments were the first to increase stringency. To guarantee political support for the amendments, CARB interacts with key stakeholders, including industry representatives, environmental interest groups and municipalities. Section 177 of the Clean Air Act allows other states to adopt California's ZEV standards. Ten states other than California had adopted the 2012 amendments (CARB, 2012a), of which New Mexico withdrew in December 2013.

This study focuses on amendments from 2000 to 2013, including the 2001, 2003, 2008 and 2012 amendments. The 2001 ZEV amendments further relaxed the ZEV mandate and increased flexibility by allowing hybrid electric vehicles (HEVs) and very clean internal combustion engine vehicles to meet part of the ZEV sales requirements. Additionally, credit multipliers were introduced for early introduction, increased range and improved vehicle efficiency, and heavier light trucks, SUVs and minivans were included in the ZEV mandate, because of their increasing market share (Interviewees 2; 3). The 2003 ZEV amendments resulted from lawsuits filed by industry in 2002. The amendments further relaxed and increased flexibility by (1) delaying ZEV requirements by 2 years; (2) including an alternative compliance path whereby a limited number of HFCVs would be sufficient to meet the ZEV requirements; and (3) offering credit multipliers for many ZEV technologies. The 2008 ZEV amendments provided further relaxation and flexibility by: (1) allowing plug-in hybrid electric vehicles (PHEVs) to meet part of the ZEV sales requirements; (2) allowing EVs to comply via the alternative compliance path that previously applied only to HFCVs. The 2012 ZEV amendments, part of CARB's broader program to reduce GHG and local pollutant emissions, represented the first amendments that were more stringent than their predecessor, greatly increasing ZEV sales requirements for model years 2018 through 2025. These amendments included: (1) an option that allowed companies who over-complied with their greenhouse gas emission requirements in the Clean Cars program to offset up to half their ZEV requirement for 2018 through 2021; (2) new, simplified technology categories that replaced old ones; (3) eliminated the advanced internal combustion engine vehicles category; and (4) discontinued the ''travel provision'' for EVs beginning in 2018, whereby car manufacturers could sell EVs in non-California states and earn credit toward the California ZEV requirements (resulting in car manufacturers needing to more than double ZEV sales).

Table 3
Overview of car manufacturers' actions in response to the ZEV mandate and associated waivers of federal preemption.

	2001 Amendments	2003 Amendments	2008 Amendments	2012 Amendments
Defensive actions	Lobbying: 349 comments; made EV demand seem smaller; proposed alternative programs; commissioned studies attacking the mandate; expert testimonies; delayed the regulatory process with multiple requests for data	Lobbying: 87 comments; litigated the ZEV mandate; expert testimonies attacking the mandate; proposed alternative programs; commissioned studies attacking the mandate; delayed the regulatory process with multiple requests for data; (distraction)	Lobbying: 51 comments	Lobbying: 7 comments
General proactive actions	Lobbying: 34 general; commissioned studies for better provisions	Lobbying: 20 general; commissioned studies for better provisions	Lobbying: 34 general; commissioned studies for better provisions	Lobbying: 28 general; commissioned studies for better provisions
Competitive proactive actions	Lobbying: 70 competitive comments; commissioned studies for better provisions	Lobbying: 54 competitive comments; commissioned studies for better provisions	Lobbying: 81 competitive comments; commissioned studies for better provisions	Lobbying: 53 competitive comments; commissioned studies for better provisions
Compliance actions	No statements of support; <20 HFCVs; 2410 EVs; 1.000–26.000 NEVs	6 statements of support on provisions; 20–40 HFCVs; 600 EVs; 1.000–26.000 NEVs	77 statements of support on provisions; 270 HFCVs; ~260 EVs; ~3.000 NEVs	63 statements of support on provisions; 190 HFCVs; ~12.110 EVs;<1.000 NEVs

Table 4
Overview of car-manufacturers-coalitions' actions in response to the ZEV mandate and associated waivers of federal preemption.

	2001 Amendments	2003 Amendments	2008 Amendments	2012 Amendments
Defensive actions	Lobbying: 26 defensive comments; commissioned studies attacking the mandate	Lobbying: 24 defensive comments; commissioned studies attacking the mandate	Lobbying: 16 defensive comments	Lobbying: 53 defensive comments
General proactive actions	Lobbying: 9 proactive comments; commissioned studies attacking the mandate	Lobbying: 1 proactive comment; commissioned studies attacking the mandate	Lobbying: 10 proactive comments	Lobbying: 9 proactive comments
Competitive proactive actions	Lobbying: 8 proactive comments; commissioned studies attacking the mandate	None	Lobbying: 7 proactive comments	Lobbying: 7 proactive comments
Compliance actions	None	None	None	None

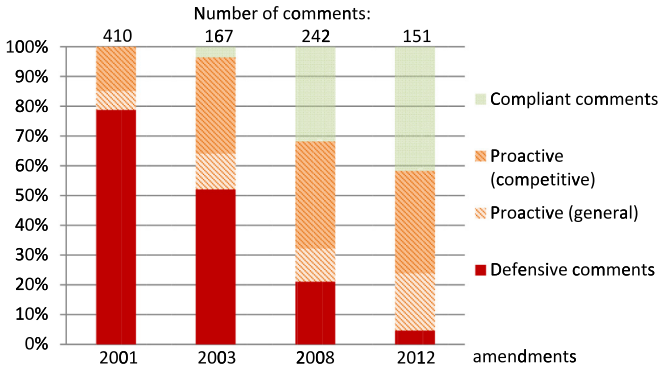

Fig. 1. Changes in car manufacturers' political strategies based on their comments on ZEV amendments, reviews and waiver grants.

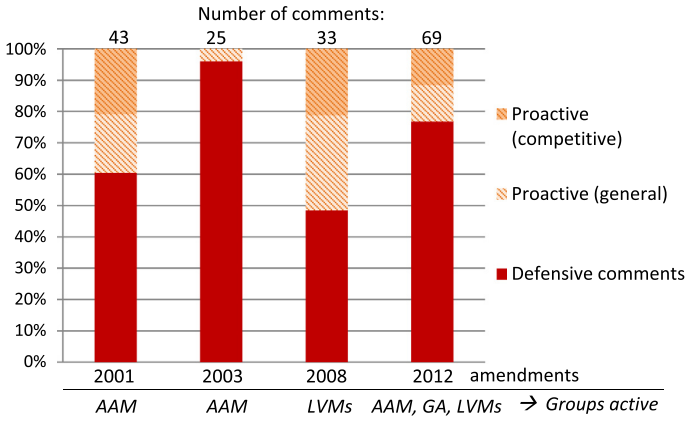

Fig. 2. Changes in political strategies of car manufacturers' coalitions, based on their comments on ZEV amendments, reviews and waiver grants, and an indication of who were lobbying when.

The 2001 rulemaking

The political strategies of car manufacturers and coalitions with respect to the 2001 ZEV amendments were predominantly defensive, as shown in Tables 3 and 4. The following subsections discuss in-depth their defensive, compliance and proactive CPAs.

Defensive CPAs

The defensive strategy comprised only information tactics during this period. One information tactic used by car manufacturers to oppose the mandate was to make EV demand seem smaller (CARB, 2000; Interviewee 2). EV availability was

limited "due to the decision by most manufacturers to curtail production after placing [on the market] the vehicles required for their [agreed-upon 'Memorandum Of Agreement'] demonstration programs" (CARB, 2000, p. 17). To make demand seem smaller, General Motors (GM) reportedly concealed their EV waiting lists (Boschert, 2006). GM and Toyota funded a study that indicated that "the average consumer would not accept a RAV4 EV if it were offered for free" (CARB, 2000, p. 86). These actions made the already small EV demand (Interviewee 2) seem even smaller, and were used as an information tactic to undermine support for the ZEV mandate and to help justify a series of lawsuits against the mandate filed by GM, DaimlerChrysler and several car dealerships in 2001–2002 (Boschert, 2006).

A second information tactic was to propose alternatives to the ZEV mandate. Firstly, car manufacturers and the industry association AAM proposed a "Fair Market Test" to assess whether there would be a realistic prospect for a mass market in EVs, as a precondition for the ZEV mandate (CARB, 2001b). Secondly, industry commissioned consultancy firm AIR to develop an alternative program that would be more cost-effective and result in lower emission than the ZEV mandate (CARB, 2001a). Third, GM suggested an alternative program that focused on conventional vehicles to attain emission targets (CARB, 2001b). Through Sierra Research, another consultancy, car manufacturers also hired experts to testify at the public CARB hearings (CARB, 2001b), representing third information tactic.

As a fourth information tactic, car manufacturers commissioned studies to attack the mandate (Interviewees 2; 3; 5). Two NERA/Sierra studies commissioned by GM argued that the ZEV mandate would result in higher overall fleet emissions, because the ZEV mandate would lead to more expensive new vehicles, leading to higher retention rates of older, more polluting vehicles (NERA and Sierra, 2001; CARB, 2001b). GM continued to conclude that CARB 'exceeded its legislative authority' by adopting a policy (the ZEV mandate) that increased emissions (CARB, 2001a, p. 78). The AAM commissioned a third study that led to 78 lobbying comments attacking CARB's assumptions and the reliability of their data, and demanding more data (CARB, 2001a, 2002b; NERA and Sierra, 2002). These extensive comments suggest an attempt to delay the regulatory process with multiple requests for data, representing a fifth information tactic.

Compliance and proactive CPAs

Car manufacturers' compliance strategies started to diverge as Neighborhood Electric Vehicles (NEVs) emerged as a cheap alternative to EVs and HFCVs in complying with the ZEV mandate (Interviewees 5; 6; CARB, 2004). Consequently, NEVs and EVs became the dominant compliance strategies, as HFCVs were not ready for commercialization (see Table 3). To obtain early NEV credits, Ford and DaimlerChrysler acquired NEV producing companies Th!nk and GEM in 1999 and 2000, respectively (Interviewees 2; 3; 5). Because most NEVs were low speed, limited range EVs, they did not advance the state of EV technology nor market development, and thus CARB proposed to cap NEV credits (CARB, 2001a; Interviewees 5; 6). To support their compliance strategy, the US car manufacturers lobbied proactively to oppose this modification, arguing that they had "invested tens of millions of dollars, time, and effort to build and develop NEVs" (CARB, 2001a, p. 173) and could not change their compliance strategy on short notice. Car manufacturers whose compliance strategy did not focus on NEVs, including Honda, opposed the NEV compliance option, stressing that NEVs did not comply with federal definitions and crash standards (CARB, 2001a). This case of competitive proactive lobbying on NEV credits suggests a strong relation between firms' compliance and political influence strategy.

Other examples of competitive proactive lobbying that underlie the relation between firms' compliance and political influence strategy are related to specific credit provisions and include the following: (1) GM opposing early HEV credits, while Toyota – leading in hybrids – supported them; (2) DaimlerChrysler opposing credits for re-leasing EVs which GM – exploiting these credits – supported; and (3) Toyota opposing credits for longer-range EVs that would benefit others (CARB, 2001a). These instances show how car manufacturers supported modifications that benefited their compliance strategy, while they opposed mandate modifications that yielded competitive advantage to their rivals.

The 2003 rulemaking

During the 2003 rulemaking the share of car manufacturers' proactive CPAs increased, although their strategies remained predominantly defensive (see Table 3). The political strategies of coalitions got even more defensive (see Table 4).

Defensive CPAs

Besides information tactics, car manufacturers also employed litigation tactics. Like with the 2001 rulemaking, the information tactic included commissioning studies to attack the ZEV mandate. One consultancy (AIR) focused on relaxation of the mandate and again proposed an alternative program to the mandate (CARB, 2003a; AIR, 2003). As in 2001, Sierra Research attacked the mandate's underlying assumptions, models and data and delayed the regulatory process with multiple requests for data. However, they now focused more strongly on the legal instead of technical aspects of the ZEV mandate, arguing it was illegitimate and that CARB needed to comply with its legal requirements (CARB, 2004; Sierra, 2003). Expert witnesses were called to oppose the mandate (Lyons, 2003; AIR, 2002).

As a litigation tactic, GM, DaimlerChrysler and dealerships filed three lawsuits (CARB, 2003). This was the only time that dealerships and car manufacturers cooperated to challenge the ZEV mandate. The Inclusion of dealers in the lawsuit allowed the car manufacturers to file the lawsuit in Fresno, known to be a "non-liberal court" (Interviewee 2). In this lawsuit, car manufacturers used ex-CARB employee Tom Austin (employed by consultancy Sierra Research)

to testify against the ZEV mandate (Superior Court, 2002). These lawsuits can be perceived as an effective CPA, because they helped motivate CARB to adopt more relaxed and flexible amendments in 2003 (CARB, 2004, 2002a; Interviewee 2).

EPA did not waive federal pre-emption for the 1998, 2001 and 2003 ZEV amendments until 2006 (EPA, 2006). The AAM opposed a waiver using several legal arguments and by arguing that it would actually increase, not decrease, emissions because of the fleet-turnover effect (AAM, 2006; Interviewee 8). This opposition, together with changes in the ZEV mandate brought about by the lawsuits, significantly delayed the waiver process (Interviewees 2; 7; 8; 9).

Compliance and proactive CPAs

In the period up to the 2003 rulemaking, car manufacturers focused predominantly on NEVs and EVs in complying with the ZEV mandate (see Table 3). However, car manufacturers wanted the option to focus on HFCV commercialization, recognizing that it was further from commercialization (CARB, 2003b), and that they should not be required to pursue both technologies (Interviewees 2; 3). EV supporters on the other hand, argued "that continued development of battery products provides a "safety net" in the event that fuel cell technology encounters impenetrable barriers" (CARB, 2003b, p. 9). Many EV advocates believed that CARB was favoring HFCVs (Interviewees 2; 10), and that car manufacturers used HFCV technology as a defensive distraction tactic to forestall EV commercialization (Interviewees 5; 10). Car manufacturers were proactively lobbying to ease compliance and support their HFCV compliance strategy.

While Ford and DaimlerChrysler continued selling NEVs, GM partnered with NEV companies to build 5.000 NEVs and give them away free, threatening to kill the business case of Ford and DaimlerChrysler and reaping large numbers of ZEV credits (Interviewee 10; O'Dell, 2002). At the same time, GM was "sponsoring a bill in the state Legislature... to restrict NEVs to streets with speed limits of 25 mph or less", which DaimlerChrysler noted "would effectively kill NEVs' usefulness" and was perceived by Sierra Club as "a GM strategy to mess with their competitors" (O'Dell, 2002, p. 1). This example also illustrates how strong competition in new technologies extends to the political spheres.

Another example of a relation between compliance and political influence strategies, was the case of HEVs, which were promoted by Toyota and Honda—leaders in HEV technology—but opposed by GM and DaimlerChrysler. Toyota argued that hybrids would help transition to ZEVs, while GM and DaimlerChrysler countered that their environmental benefits and consumer demand were minimal (CARB, 2004, p. 99). In their commissioned studies, AIR stressed that this category should be expanded to include advanced internal combustion engine vehicles and Sierra concluded that credits for HEVs were disproportionally high (CARB, 2004).

The 2008 rulemaking

Car manufacturers' political strategies became predominantly proactive in their focus, beginning in 2008 (see Table 3). Car manufacturers' increased support for the 2008 amendment reflects a trend towards a more compliance-oriented political strategy.

Defensive CPAs

During the 2008 rulemaking, car manufacturers' defensive political strategy focused on information tactics, specifically lobbying. They argued that the ZEV mandate constituted a premature, short-term and costly technology-forcing policy that would hamper long term commercialization (CARB, 2008). After the 2008 amendments were adopted by CARB, the car industry created a unified campaign through its industry trade associations AAM and Global Automakers, to use legal arguments to oppose EPA granting a waiver for the 2008 ZEV amendments.

Compliance and proactive CPAs

In the period leading up to the 2008 rulemaking, car manufacturers' compliance strategies started to further diverge, as PHEVs emerged as a technological alternative and HFCVs became a more frequently used alternative to EVs (see Table 3). We identified various instances in which car manufacturers' competitive proactive CPAs, including information tactics like lobbying and commissioning studies, show a strong relation to their compliance strategies. Firstly, to support their emerging HFCV compliance strategy, some car manufacturers continued to lobby for better HFCV provisions, contending that HFCV was the most promising ZEV technology, though still technologically immature (CARB, 2006). They argued that to foster technological development, only 30 vehicles per generation per company would need to be built; more would be a waste of resources with no gain in learning (Hermance, 2006; Ford, 2008; CARB, 2008). "So instead of producing 4000 EVs, they wanted to produce 30 test HFCVs," (Interviewee 5) which is much cheaper. Using that argument, their lobby convinced CARB that no additional HFCVs were necessary to comply with the ZEV mandate adopted by ten other states (CARB, 2008), something that was vigorously opposed by NGOs (NRDC et al., 2008).

Secondly, car manufacturers investing in PHEVs also convinced CARB that much like HFCVs, PHEVs were technologically immature and should therefore also be perceived as test vehicles and therefore receive higher credits (CARB, 2008; Ford, 2008). Toyota successfully lobbied for credit for PHEVs with an all-electric-range of as little as 10 miles, arguing that con-

sumers should be allowed to trade off battery costs against range (CARB, 2008, p. 102). Toyota subsequently developed and sold a Prius PHEV with 11 miles of electric range (Toyota, 2013). GM, on the other hand, was unsuccessful in its lobbying to establish a new, higher-credit category for their PHEV[8] Volt, not gaining support for their argument that such vehicles gave higher environmental benefits by overcoming EV range anxiety (GM, 2008).

Thirdly, because no EVs had been introduced since 2003 (CARB, 2013), EV proponents like Nissan successfully argued that EVs, like HFCVs, were also not yet market-ready and should therefore also be able to exploit the less stringent HFCV alternative compliance path, even if EVs received lower credits than HFCVs (Interviewee 6; CARB, 2008).

Fourth, Chrysler commissioned studies on NEV use to argue that because of their environmental benefit and their disproportionately low credits compared to PHEVs, NEV credits should be increased (Chrysler, 2008; GEM, 2005).

CARB caused a split in the car manufacturers' political coalition by granting "Intermediate Volume Manufacturers" (IVMs) a time extension to comply with the mandate's ZEV requirements. The "Large Volume Manufacturers" (LVMs) created an ad hoc lobbying coalition to successfully oppose this time extension, while IVMs, which were less well organized, lobbied in its favor (CARB, 2008; Interviewees 11; 12; 13). Because of this conflict, the AAM and Global Automakers were not involved in lobbying (Interviewees 7; 8).

The 2012 rulemaking

During the 2012 rulemaking car manufacturers' political strategies became even less defensive and more proactive and compliant, see Table 3.

Defensive CPAs

Defensive CPAs comprised the information tactic lobbying, which included only a few defensive comments coming predominantly from coalitions (see Tables 3 and 4). These coalitions' defensive comments focused on the mandate's infeasibility and inconsistency with other parts of the Advanced Clean Cars program. Additionally, car companies voiced their concerns about the rapid ramp up of mandated sales, especially related to required sales in the 10 states outside California beginning in 2018 (CARB, 2012a; Interviewees 6; 12).

In 2013, after issuance of the mandate, with initial sales of Nissan's EV Leaf and GM's PHEV Volt being slower than projected (Voelcker, 2013), many of the companies became increasingly concerned about the mandate. AAM and Global Automakers formed a closed industry front to oppose EPA's decision to waive federal pre-emption. They felt that neither the CARB nor EPA had fully considered the lack of infrastructure and consumer demand for the increasing standards, especially in the ZEV states outside California (GA and AAM, 2013). While the ad hoc coalition of LVMs voiced their collective opposition towards the ZEV mandate, the LVMs individually were more supportive. This underlines how car manufacturers use coalitions to continue opposing the mandate, while supporting it individually.

Compliance and proactive CPAs

In the period preceding the 2012 rulemaking, compliance strategies of car manufacturers focused predominantly on EVs and PHEVs, with increasing USA sales in 2011 (AFDC, 2013). Table 3 shows that NEV and HFCV production to comply with the ZEV mandate decreased during this period. The most important example of proactive competitive lobbying to support a compliance strategy is provided by BMW. BMW convinced CARB to establish a new, more highly credited BEVx category to accommodate their proposed PHEV i3, with much the same arguments as GM used unsuccessfully in 2008 for their PHEV Volt. They asked for additional credit for a vehicle that would have an optional limp-home motorcycle engine to reduce range anxiety (Turrentine et al., 2011; Interviewee 11). BMW argued, based on a study they commissioned that drivers would use their EV more if they had this limp-home capability (Turrentine et al., 2011). BMW was successful, where GM failed, because they posited a vehicle that more closely approximated a pure EV and because they provided more evidence (Interviewees 2; 11; 15). In an attempt to prevent its competitors from yielding a competitive advantage from the BEVx category, Ford opposed it by stressing that the credits are 'overly generous' and provided car manufacturers with an 'escape hatch' from producing pure-ZEVs (CARB, 2012a, p. 50–51).

Another example of car manufacturers trying to reinforce their compliance strategies through competitive proactive strategies is the over-compliance option. This over-compliance option resulted from negotiations between car makers and CARB regarding the California/national corporate average fuel economy and greenhouse gas regulations (CARB, 2012b; Interviewees 2; 6; 14). The intent was to gain support for these regulations from Honda and Hyundai in exchange for the over-compliance option, of which they were the most likely beneficiaries (Interviewees 2; 6). Because of diverging compliance strategies, industry was much divided over the over-compliance provision. The AAM opposed this provision, arguing that it would give a "significant competitive advantage" to car manufacturers with lower average fleet emissions – predominantly those who were not members of AAM (AAM, 2012, p. 13). Not surprisingly, Global Automakers, which included Hyundai and Honda as its members, supported it (Interviewee 7).

[8] We do not distinguish between PHEVs where the internal combustion engine directly drives the wheels and PHEVs where the engine is only used as a generator to power a battery that drives the wheels (sometimes referred to as Extended Range Electric Vehicles), because there are no credit categories in the ZEV mandate that differentiate on this aspect solely.

Car manufacturers linked their general proactive lobby to their defensive lobby arguments, arguing that if the ZEV mandate were to ramp up fast with adoption by other states, that these states should provide more demand-pull and infrastructure support for ZEVs (Interviewees 8; 11; 12; 13). They argued that, like California, these states should adopt a "carrot and stick" approach and complement the ZEV mandate with regulations that provide financial, parking, carpool lane and infrastructure incentives for the technologies they were forcing onto the market. As of 2013, ZEV adopting states have increasingly adopted this "carrot and stick" approach by taking on ZEV supporting initiatives (ZEV workshop, 2013).

Longitudinal analysis of political strategies

We discuss the changes in car manufacturers' and their coalitions' political strategies and underlying actions toward the ZEV mandate in 'Longitudinal analysis of car manufacturers' political strategies' and 'longitudinal analysis of coalitions' political strategies', respectively. Tables 3 and 4 provide an overview of these actions in response to the mandate's successive amendments and their waivers of federal preemption over the timeframe 2000–2013. Reflecting on the types of tactics used by car manufacturers and their coalitions to influence the ZEV mandate, we found that only information and litigation tactics were used. In contrast to the 1990s, no constituency tactics like grassroots mobilization or astroturfing were used by car manufacturers to influence the ZEV mandate during the period 2000–2013 (Interviewees 2; 10). Furthermore, interviewees indicate that political connectedness and financial tactics were not pursued by industry to influence the ZEV mandate, because of CARB's autonomous structure, and because strong legal and political support for its ZEV mandate render such tactics ineffective. Also, state laws discourage the use of financial tactics such as paying travel expenses and honoraria to board members (Interviewees 2; 15; Collantes and Sperling, 2008).

Longitudinal analysis of car manufacturers' political strategies

Table 3 shows that over time, car manufacturers' defensive CPAs became less frequent and less diverse: what started with a plethora of CPAs, like commissioning studies, undermining the regulatory process in various ways, litigation and extensive lobbying, was eventually reduced to an occasional defensive comment. At the same time, the share of proactive CPAs including lobbying and commissioning studies increased. As indicated in the previous sections, competitive proactive CPAs were often used to support the compliance strategies of car manufacturers that diverged and changed over time from NEVs and EVs in the early 2000s, to HFCVs in the mid-2000s, to PHEVs and EVs beginning in the late 2000s (AFDC, 2013).

To study the most frequently used CPA, lobbying, we collected 1140 comments made by car manufacturers and their coalitions throughout the study period. Fig. 1 displays the 970 comments made by individual car manufacturers with regard to the four amendments and their waivers of federal preemption. These comments have been categorized into the political strategies we identified in 'Conceptual framework', i.e. compliant comments of support for the mandate and its provisions, competitive proactive comments, general proactive comments and defensive comments. The figure shows a clear trend from strong defensive lobbying in the early 2000s, towards increasingly proactive and compliant comments, as well as a trend from frequent lobbying to less frequent. These trends were recognized by the interviewees. Even though the 2012 amendments were the first to increase instead of relax the ZEV mandate (Interviewees 2; 3; 6; CARB, 2012a), defensive lobbying reduced even during this period.

This trend in lobbying depicted in Fig. 1 and the trend in CPAs more generally depicted in Table 3, confirms Hypothesis 1: Throughout the timeframe 2000–2013, car manufacturers became less defensive and more proactive in their political strategies towards the ZEV mandate. We thus find a shift in strategy from protecting the status quo towards trying to gain competitive advantage by reducing compliance costs for specific technologies.

Longitudinal analysis of coalitions' political strategies

Table 4 shows the political orientation of the actions undertaken by car manufacturers' political coalitions in response to the ZEV mandate over the timeframe 2000–2013. These coalitions included industry associations and ad hoc lobbying coalitions. The table shows that primarily to oppose the ZEV mandate, coalitions used lobbying and, in the early 2000s, also commissioned studies. Based on the same principles of Figs. 1 and 2 show more insight into the dynamics of lobbying by coalitions. Below the bar chart, Fig. 2 also shows which coalitions affected the various amendments and respective waivers of preemption. The figure shows that there is no trend observable away from defensive towards proactive lobbying. Also, coalitions have never voiced support of the mandate. This finding confirms *Hypothesis 2: Throughout the timeframe 2000–2013, industry associations and lobby coalitions continued to be more defensive in their political strategy than their member car manufacturers by opposing the ZEV mandate more strongly.*

The previous is in line with what CPA literature suggests and what interviewees confirm, that coalitions are primarily used for the defensive "dirty work" because of the politically sensitive nature of the lobbying (Interviewees 2; 3; 6; 7; 16). The industry associations' main job was to combine forces in preventing the EPA from granting a waiver for the ZEV mandate (Interviewee 6), which required the coalitions' legal instead of the car manufacturers' technical expertise (Interviewees 7; 16). Interestingly, the AAM was not involved in the lawsuits against the mandate because not all AAM members agreed on this approach (Interviewees 12; 13). The ad hoc lobbying coalition of Large Volume Manufacturers was formed

to better protect their interests when manufacturer size became a more prominent issue in the 2008 rulemaking (Interviewees 7; 8; 12).

Conclusions and discussion

This research has shed light on the political strategies and underlying CPAs of car manufacturers and their coalitions toward the ZEV mandate over the period 2000–2013. In this case study we found that *'throughout the timeframe 2000–2013, car manufacturers have become less defensive and more proactive in their political strategies towards the ZEV mandate'*. The results indicated that car manufacturers changed their political strategy to support their changing compliance strategy. We also found that *'throughout the timeframe 2000–2013, industry associations and lobby coalitions continued to be more defensive in their political strategy than their member car manufacturers by opposing the ZEV mandate more strongly'* because members use these coalitions to oppose sensitive interventionist policies.

This longitudinal case study adds to CPA literature by showing how firms can change their political strategy over time and that firms combine multiple political strategies at the same time. We documented how car manufacturers' compliance strategies diverged increasingly over time as new low and zero emission vehicle technologies emerged. To support these diverging compliance strategies, car manufacturers changed their political strategy from defensive to proactive – trying to create favorable conditions for the low and zero emission vehicle technologies they were investing in. To gain a competitive advantage over their rivals under the ZEV mandate, they lobbied for mandate provisions favorable to the vehicle technologies they championed, while opposing provisions that were beneficial to the vehicle technologies of their competitors. This competition in proactive political strategies based on the diverging interests of car manufacturers, helped break apart the previously closed industry front of opposition to the mandate. This paper thus provides insights into how competition in compliance and political influence strategies helped break down defensive industry fronts and facilitate a transition towards low and zero emission vehicles.

It should be noted that car manufacturers like GM and Chrysler were hit hard by the recent economic crisis and received governmental support, while other such as Nissan receive large subsidies to develop sustainable technologies. These contextual factors are likely to have influenced both their compliance (affecting what technologies to invest in) and political influence strategies (firms receiving governmental support have less legitimacy to oppose regulation) on the ZEV mandate.

To determine to what extend our case study findings are generalizable, we recommend further research to focus on other instances in which competitive forces may drive apart the industry front of opposition towards policy interventions. Validating this process in for different regulations and in other sectors may provide a better understanding of the role of competition in facilitating implementation of policy interventions. Such understanding may be used by policymakers to affect firms' political strategies, allowing governments to implement policy with less defensive interference by firms. Additionally, car manufacturers may adopt different political strategies for the various regulations they face at different spatial scales. Future research may study to what extend car manufacturers adopt similar political strategies to this wide array of regulations. We also recommend to further study the role of (global) innovation strategies in breaking apart the industry front and causing changes in political influence strategies. Such a study requires extensive data collection on the development and implementation of technologies firms are investing into comply with the technology-forcing regulation.

Policy recommendations

We provide three recommendations for policymakers to reduce industry opposition to their regulations. Given our finding that lobbying coalitions and industry associations are, and over time continue to be, more defensive in their political strategies than individual firms, we suggest that policymakers interact more with individual firms to gain industry support for their regulations. Given a second finding that strong technological competition between car manufacturers drove a wedge between the companies, resulting in competitive proactive CPAs that broke apart the defensive industry front, we recommend that policymakers negotiate preferential treatments of certain technologies over others (i.e. being responsive to their competitive proactive CPAs). In that way, firms can be made to support the regulation if they believe they can gain competitive advantage over their competitors. Thirdly, we highlight the political effectiveness of employing a "carrot and stick" approach that combines technology-forcing with demand-pull policy to diffuse industry opposition. Demand-pull policies, such as financial incentives, create demand for new technologies, encouraging firms to reduce their opposition to the technology-forcing policy.

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Appendix A. Overview of acronyms

Table A
Overview of acronyms, based on CARB (2012, p. 2–3) and CARB (2000).

AAM	Alliance of Automobile Manufacturers
AIR	Air Improvement Resource Inc.
EV	Full-Electric Vehicle or Battery Electric Vehicle
BEVx	Range Extended Battery Electric Vehicle, includes PHEVs with an All Electric Range of at least 75 miles
CARB	California Air Resources Board
CPA	Corporate Political Activity
EPA	United States Environmental Protection Agency
GM	General Motors
HFCV	Hydrogen Fuel Cell Electric Vehicle
IVM	Intermediate Volume Manufacturer
LVM	Large Volume Manufacturer
NEV	Neighborhood Electric Vehicles are low speed EVs that, even though subject to different crash test requirements, qualify as passenger cars under California law
PHEV	Plug-in Hybrid-Electric Vehicle
ZEV	Zero Emission Vehicle

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