



Strangers at the gate: the role of multidimensional ideas, policy anomalies and institutional gatekeepers in biofuel policy developments in the USA and European Union

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Published online: 13 April 2019

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Abstract

This article contributes to scholarly understanding of how policy ideas and institutions interact to affect policy change by investigating why legislation mandating the use of biofuels in transport vehicles has been upheld in the USA but scaled back in the European Union. To explain this puzzle, the article advances propositions regarding the role of multidimensional policy ideas, policy anomalies and institutional gatekeepers in legislative agenda-setting. Using structural topic modelling and qualitative methods, the analyses demonstrate that differences in action frames follow from agenda-setting institutions. The corporate structure of the European Commission ensures that EU agenda-setters are reasonably attentive to policy anomalies. By contrast, individuals with agenda-setting authority in the US Congress are liable to discount anomalies by limiting their focus to certain aspects of multidimensional policy issues. Moreover, individuals with gatekeeping authority may prevent repeal bills from accessing the legislative agenda.

Keywords Action frames · Agenda-setting · Institutional gatekeeping · Policy anomalies · Policy change · Policy ideas

Introduction

In the early twenty-first century, the USA and the European Union induced demand for biofuels by requiring their use in the transport sector. In both cases, government initiatives were underwritten by multidimensional ideas that linked biofuels to multiple policy goals, including energy security, reduction in greenhouse gas emissions, rural job creation and economic growth (Mondou et al. 2014; Skogstad 2017). Notwithstanding these multiple rationales, the implementation of obligatory mandates has been controversial.¹ Critics allege that policies requiring biofuels' use in transport fuels have effects that are anomalous

¹ The term “mandate” is used in the USA, while “target” is used in the EU. We use the two terms interchangeably.

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vis-à-vis one or more of their purported benefits. These policy anomalies, which have led to calls for biofuel mandates to be reduced or scrapped altogether, have had different effects in the USA and the EU. In 2015, the EU agreed to scale back the contribution of food-based biofuels to transport fuels (Commission of the European Communities 2015). By contrast, the US legislation that established biofuel mandates in 2007 has remained intact. None of the dozens of bills introduced to reform or repeal the Renewable Fuel Standard had gained the requisite political support as of early 2019.

The contrasting US and EU biofuel developments, as yet unaddressed in the academic literature, raise puzzles about two polities whose fragmented political–institutional frameworks are both conventionally understood to impede departure from the legislative status quo (Tsebelis 2002). What explains change in the EU institutional context but stability in the USA? The solution to the puzzle, we argue, lies in understanding how multidimensional policy ideas, anomaly discourses and agenda-setting institutions interact to facilitate or constrain policy change. In elaborating these causal interactions, we seek to contribute to the broader literature on the role of policy ideas and institutions in processes of policy stasis and change.

We propose that multidimensionality—the extent to which a policy can be understood as accomplishing multiple goals—promotes the mobilization of coalitions in support of policies, but it may also impede efforts to change policy once enacted. Policy stability depends on whether problems associated with the policy, including the anomalies that were not foreseen or expected, are attended to by decision-makers (Hall 1993; Jones 1994). When policies are multidimensional, anomalies concerning certain policy dimensions are liable to be discounted by policymakers whose attention is biased towards policy goals unaffected by anomalies. Although the attentional capacity of all humans is inherently limited, institutional agenda-setters play a crucial role in determining whether lawmaking bodies attend to or discount anomalies that deviate from anticipated outcomes (Jones and Baumgartner 2005). By determining the agenda procedure, actors with agenda-setting authority exercise considerable influence over the outcomes of social choice (Plott and Levine 1978). Moreover, if agenda-setters are empowered with gatekeeping prerogatives, it is they who decide whether an issue is granted access to the legislative agenda at all (Shepsle and Weingast 1987).

These theoretical propositions yield two hypotheses to explain US and EU biofuel policy developments. First, ideas about the multiple benefits of biofuels constituted a rationale for the implementation of obligatory targets for biofuels in both the USA and EU. Second, differences in institutional agenda-setting and gatekeeping procedures have permitted discounting of anomalies associated with biofuels in the USA but not the EU, resulting in legislative policy stability in the US and legislative change in the EU. In the European Union, the corporate structure of the European Commission, we argue, has ensured that authorities with gatekeeping and agenda-setting powers have been attentive to anomalies regarding the negative environmental and social effects of food-based biofuels. We attribute this comparatively wide scope of attention to the parallel information search capabilities of the European Commission directorates. Conversely, the United States Congress bestows gatekeeping and agenda-setting powers unto individual actors, namely the House Speaker and Committee Chairs, whose span of attention is constrained by limitations inherent to serial information processing, on one hand, and the American system of committee specialization, on the other (Jones 1994; Simon 1985). The consequence is that institutional gatekeepers in the USA have both discounted anomalies associated with biofuels and prevented legislators in the parent chambers of Congress from considering proposals to repeal or reform the Renewable Fuel Standard.

We develop our argument as follows. Section 2 outlines our approach to modelling policy stability and change by elaborating upon the concepts of multidimensionality, policy anomalies and institutional gatekeepers. Section 3 describes the quantitative and qualitative methods we use to test our hypotheses. Section 4 provides our analyses of US and EU biofuel policy developments. It begins with an overview of the two jurisdictions' biofuel mandate policies and reports our quantitative results before documenting the role of agenda-setting and gatekeeping in legislative change/stasis in the two polities. Section 5 concludes.

Modelling policy stability and change

The literature on policy stability and change makes use of three closely related concepts. In order from most general to most specific, they are: *veto players*, *agenda-setters* and *gatekeepers*. Veto players are actors whose sanction is required for policy to be enacted (Tsebelis 2002). Agenda-setters are actors tasked with determining the items scheduled for consideration by decision-making bodies (Cobb and Elder 1971). Gatekeepers are actors with powers to determine whether or not a piece of business will be handed to an authoritative group for consideration (Denzau and Mackay 1983). Thus, proposals considered by a committee or legislature are not determined entirely by the present agenda-setter but rather by an antecedent agenda-setter, called a gatekeeper, who has the procedural power not to act, thereby allowing the status quo to remain in effect (Crombez et al. 2006). Both agenda-setters and gatekeepers possess de facto veto power and are thus veto players. However, not all veto players are agenda-setters and not all agenda-setters are gatekeepers.

Having defined these three terms, we are ready to outline a model of policy stability and change. We begin by summarizing the conventional spatial approach used in political science. Next, we integrate insights from multidisciplinary research on policy ideas. Finally, we demonstrate how both conventional and ideational approaches fit with current theories of agenda-setting.

The conventional approach

Conventional approaches to understanding policy stability and change rely on two devices: spatial models of policymakers' preferences and the median voter theorem (Arrow 1951; Black 1958). Figure 1 depicts a standard unidimensional spatial model of policy choice. A single axis represents the amount, level or extent of policy. Points on the axis represent the status quo policy, labelled *SQ*, and the initial preferences of key decision-makers, labelled x_1 and x_2 in this example. The area between a decision-maker's preferred point and the status quo is the decision-maker's *preferred-to-status quo set*. Let decision-maker *L* represent the median voter in the legislature. Let decision-maker *G* represent an actor endowed with gatekeeping authority.

Considering the preferred-to-status quo sets below the axis in Fig. 1, given that the status quo falls between the preferences of the decision-makers, the *winset of the status quo* is "empty"—no proposal can defeat it. One of two things must happen for policy change in this situation. If the gatekeeper loses its veto power, the median preference becomes x_1 . The other possibility is that one of the decision-makers' preferences shifts to the other side of the status quo; for instance, if the gatekeeper's preference shifts to the left of the status quo (say, to position x^*), a winset of the status quo materializes.

Using conventional tools of political science, it is possible to model revisions to mandates/targets in the USA and European Union and thus explain why a reduction in biofuels content requirements was forthcoming in the latter case but not the former. Although the median legislator's preference shifted left of the status quo in both jurisdictions, gatekeepers' preferences shifted left of the status quo only in the EU and not in the USA. Consequently, the European Commission initiated legislation to curtail conventional (food-based) biofuels mandates. Given the median preferences of the EU co-legislators in the European Parliament and Council of Ministers, this legislation was successful. By contrast, several bills proposed by US Members of Congress to revise or revoke the Renewable Fuel Standard were not reported out of committee. The Committee Chairs' effective exercise of gatekeeping powers thereby prevented policy change from the status quo to the median preference in the legislature.

Although illuminating, the above explanation does not say anything about why the median position of the European Commission shifted left of the status quo in the EU, while the preferences of gatekeepers in the USA did not. To answer this question, we require a theory of preference origins and preference change. Enter policy ideas.

Ideas

Conventional models of social choice, like the one presented in Fig. 1, are undergirded by a micro-foundational theory of instrumental rationality. Yet, as noted by Elster (1994), instrumental rationality is silent on why agents prefer a given course of action. Organizational theorists, meanwhile, have long occupied themselves with the ways individuals and groups understand means–ends relationships (Argyris and Schön 1978; March and Olsen 1976). Arguably, the most influential insight gleaned from the organizational literature is that group preferences are determined by “organizational action frames”: that is, a dominant understanding within the organization of policy problems and how to solve them (Schön and Rein 1994: 33). In other words, frames serve as a cognitive link between policy means and policy ends.

The ideational turn in political science and political sociology borrowed heavily from organizational theory. For instance, in a widely read and oft-cited article, Hall (1993) married Argyris and Schön's “orders of learning” to Kuhn's (1962) theory of scientific revolutions to articulate the concept of “policy paradigms”. Defining a policy paradigm as a set of coherent beliefs about problems, goals and appropriate instruments, Hall argued a paradigm is influential because it is largely taken for granted (Hall 1993: 279). In the event of developments anomalous with paradigmatic ideas, policymakers update their beliefs through first- and second-order learning and adjust policy instruments. However, without third-order learning—a fundamental rethinking of appropriate and feasible policy goals—the paradigm itself is not abandoned until new political actors displace those in positions of authority.

Subsequent scholarship on policy ideas has emphasized that ideas matter when actors are unsure of what their preferences ought to be (Béland and Cox 2011). Weyland (2005), for instance, conceives of ideas as heuristics that bypass incomplete information, effectively compensating for unavoidable cognitive deficiencies (cf. Simon 1985). Similarly, Blyth (2007) highlights the importance of ideas in times of crisis, when the old way of doing things is no longer considered instrumentally rational. Both conceptions of policy ideas speak to the staying power of Hall's (1993) notion of policy paradigms, which not only holds that policy preferences are sustained by actors' teleological and etiological

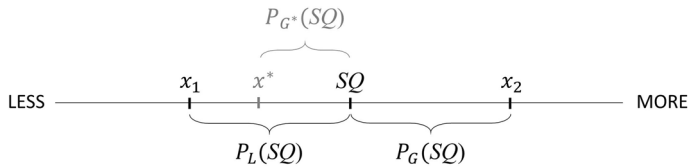


Fig. 1 Spatial model of preference divergence, policy stability and policy change

understandings of how the world works, but also suggests that policy paradigms are undermined by anomalous events or information that contradict actors' worldviews.

While mainstream social science has for the most part accepted the above account of when ideas matter, there is less agreement on how ideas matter. For instance, a preference shift prompted by the negative effects of land use change on food supply and atmospheric greenhouse gases is a plausible explanation for why conventional biofuels targets have been scaled back in the European Union; anomalies have eroded policymakers' confidence in the ability of plant-based biofuels to solve problems. However, this account fails to explain why biofuel blending mandates have been upheld in the USA. Like EU policymakers, US Congressional representatives have been aware of the upward pressure on the price of corn (and, thus, food costs) caused by ethanol blending mandates. It is arguable that American policymakers do not care as much as European policymakers about climate change, but US representatives have certainly been cognisant of other environmental costs of biofuels.² Bipartisan support for Congressional bills to reform or repeal obligatory renewable fuel mandates suggests at least some US legislators have shifted their views about biofuel mandates in the face of evidence that conventional plant-based biofuels may be harmful (see Sect. 4.3). It does not therefore seem convincing to argue that the differences between the two jurisdictions can be explained by an anomaly-induced preference shift in the EU but not the USA. Rather, given that the expression of policy ideas and policy preferences is facilitated and constrained by institutional procedures, a complete explanation should include both cognitive and institutional components.

With respect to cognition, it has long been recognized that action frames need not be shared by all supporters of a policy (Argyris and Schön 1978; Kingdon 1984). Moreover, it is simplistic to assume that public policy is limited to crisp, stable and well-understood means–ends relationships (Lindblom 1959). Rather, a single policy is likely to have multiple effects, unintended as well as intended. Along these lines, Riker (1986: 64) observed that even seemingly simple policy issues have “latent” dimensions that can be exploited by skilful politicians (see also Schneider and Teske 1992: 739). In a similar spirit, Palier (2004) has argued that many policies are “polysemic”: amenable to multiple meanings or understandings. Given that they may encompass several action frames, multidimensional policies often accomplish multiple goals and satisfy multiple values.

When policies are multidimensional, positive (“Downsian”) mobilization in support of a policy is frequently facilitated by multiple rationales—a phenomenon known as “policy bandwagoning” (Downs 1972; Kingdon 1984). Efforts to mobilize opposition to an existing policy, however, are hindered by multidimensionality because opposition is likely to be

² EISA requires the Environmental Protection Agency to report triennially to Congress on the environmental impacts of the RFS, including on air quality, water quality, water availability, soil conservation and biodiversity (see EPA 2011, 2018).

fragmented (Schattschneider 1960). Indeed, when policies are multidimensional, anomalies will not always be weighted equally by decision-makers. Outcomes that do violence to one action frame may do little to undermine another. Accordingly, while some decision-makers may undergo a preference shift and withdraw their support for a policy with the onset of anomalies, so long as there exists a critical mass of authoritative supporters who understand the policy differently, the status quo will be sustained.

With reference to Fig. 1, mobilization in support of policy can be modelled as a preference shift from SQ to x_2 . Countermobilization in the face of anomalies can be modelled as an inverse preference shift (from x_2 to x^* , for example). Yet, so long as the preferences of veto players go unchanged, the policy status quo remains stable. We attribute differences in the development of biofuels policies in the USA and EU to sticky preferences on the part of institutional gatekeepers in the USA. While the preferences of gatekeepers in the EU have both responded to policy anomalies and tracked median preferences in the parent chambers of the EU legislature, the preferences of gatekeepers in the USA have been unresponsive to anomalies and have thus remained favourable towards biofuels blending mandates.

The above argument is consistent with current theories of agenda-setting, which reconcile ideational scholarship with the conventional spatial approach to political science (Baumgartner 2013; Baumgartner and Jones 1993; Kingdon 1984). On one hand, students of agenda-setting recognize that policy frames are inherently unstable, as there is no such thing as complete political equilibrium (Riker 1980). On the other hand, students of agenda-setting are attuned to the fact that majority rule is not characterized by chaos but is rather stable over time (Tullock 1981). The most common and convincing explanation for this puzzle is that policy equilibrium is “structurally-induced”: that is, stability follows from institutional procedures that limit the scope of conflict by keeping certain issue dimensions off the agenda (Shepsle and Weingast 1981).³ Incidentally, multidimensionality is implicit in contemporary theories of agenda-setting. Yet, the agenda-setting literature also offers an institutional explanation for why policy change is not observed despite shifts in the popular bias of society.

Institutions

There are some important institutional differences in the USA and the EU with respect to legislative agenda-setting and gatekeeping powers. In the US Congress, tremendous agenda-setting powers are bestowed upon individuals, namely the House Speaker and the Chairperson of committees to which bills are assigned. The Speaker exercises agenda-setting authority by deciding which committees will review proposals. Committee Chairs exercise gatekeeping authority either by neglecting to place a bill on the committee agenda or by refusing to report a bill out of committee for consideration by the parent chamber (Shepsle and Weingast 1994; Kollman 1997). As noted by Simon (1985), individuals’ scope of attention is inherently limited by the constraints of serial information processing. As compared to parallel information processing systems, wherein units process different

³ In spatial modelling terms, when two or more dimensions of a multidimensional policy are consistent or complementary, the decision is effectively one-dimensional; there is no trade-off between dimensions. When understandings of problems change, however, choices may become multidimensional, as actors are required to trade-off between inconsistent dimensions. Jones (1994) argues that the salient dimension—the dimension to which actors are most attentive—will determine the decision.

pieces of information simultaneously, political actors process discrete pieces of information sequentially in serial information processing systems. As argued by students of agenda-setting, cognitive sources of attention and information bias are only amplified by the American system of committee specialization (Baumgartner and Jones 1993; Jones and Baumgartner 2005).

By contrast, attention and information processing in the EU are hindered neither by serial information processing nor by committee specialization. Indeed, to the extent that an agenda-setting and gatekeeping entity can be identified in the EU, it is the 28-member European Commission. Moreover, the Commission's initiatives are shaped by other EU institutional actors, including the European Council (Princen and Rhinard 2006; Princen 2007; Bouwen 2009; Lupo 2018; Kreppel and Oztas 2017). Agenda-setting also normally entails consultation with the two legislative bodies (Kreppel and Oztas 2017; Nugent and Rhinard 2016).⁴ Both the Council of Ministers and the Parliament can request that the Commission submit a legislative proposal, and sue the Commission should it fail to respond (Bednar, Ferejohn and Garrett 1996; Crombez et al. 2006). Granted, the Commission is not formally obliged to act on such requests, needing only to provide reasons to both bodies for not acting (Nugent and Rhinard 2016). The Commission can, moreover, withdraw its legislative proposal at any time prior to Council adopting it (Ibid.). Thus, the Commission's gatekeeping power can be described as moderate, stopping short of complete discretion over whether or not to initiate legislative proposals.

The explanation for why biofuels blending targets have been eroded in the EU while mandates have been sustained in the USA is likely to hinge on critical institutional differences regarding individual and specialized versus corporate gatekeeping powers. Legislative procedures can also direct decision-makers' attention towards some issue dimensions to the neglect of others. For example, in the EU, because policy frames need to "construct a story about why the issue is European in scope", issue dimensions related to the EU's legal authority are emphasized to the exclusion of those that fall outside its remit (Princen 2007: 32). By contrast, Baumgartner and Jones (1993) argue committee specialization in the US Congress serves to privilege certain policy frames over others (see also Jones 1994). Thus, in the case of policies in support of biofuels—which may satisfy not only environmental goals, but also objectives related to energy security and rural economic development—institutions may grant gatekeeping and agenda-setting authority to actors who may subscribe to a narrow understanding of the policy issue. So while anomalies may shift the median preference of the legislature—a phenomenon known as "coalition drift"—gatekeepers and agenda-setters may be unresponsive to popular demand (cf. Shapiro 1994). Such a gap between the public agenda and discourse, on one hand, and the "institutional" or "formal" agenda and discourse, on the other, is also likely in the EU where decision-makers are less directly accountable to domestic publics than are national governments. Rather than public mobilization, the parameters of agenda-setting and gatekeeping in the EU are more likely to be established by technocratic and political elites (Princen and Rhinard 2006).

Two hypotheses may be advanced to explain US and EU biofuel policy developments. First, biofuels mandates were implemented in both the USA and EU on the basis of ideas about their manifold social, economic and environmental benefits. Legislation passed in

⁴ The Commission is also most successful in its agenda-setting powers, that is, realizing outcomes consistent with its legislative proposals, when the latter are congruent with the policy preferences of legislators in the Parliament and Council (Kreppel and Oztas 2017).

both jurisdictions because the positive valence attached to multiple dimensions of a “poly-semantic” policy enabled institutional agenda-setters to build coalitions in support of biofuel mandates/targets. Second, institutional differences regarding legislative agenda-setting procedures explain why blending requirements have been scaled back in the European Union but not in the USA. In the USA, efforts to repeal the Renewable Fuel Standard have been stymied by institutional gatekeepers whose attention is focused on dimensions of biofuels policies not undermined by anomalies. By contrast, attention of EU Commissioners to the environmental dimension of biofuels policies prompted them to “open the gates” and initiate legislation to curtail biofuels blending requirements in the European Union.

Research methods

We test the two aforementioned hypotheses using a mix of quantitative and qualitative methods. Our quantitative analyses entail a method of unsupervised machine learning developed by Roberts et al. (2014) called *structural topic modelling* (STM), which we use to derive the dimensionality of the institutional discourses surrounding biofuels in the legislative chambers of the USA and European Union over the 1995–2017 period.

Structural topic models provide a statistical basis for drawing inferences about the ways in which US and EU biofuel policy discourses have unfolded over time. The workhorse is an extension of latent Dirichlet allocation, a method of unsupervised machine learning which derives latent variables representative of topical content from text (Blei et al. 2003). A major advantage of unsupervised machine learning is reduced researcher bias, particularly confirmation bias, as researchers do not define the topics. Rather, topics are derived computationally, as probabilities, from distributions of co-occurring words in the sample text.⁵ Although researchers must ultimately assign topic labels, these can be informed by “FREX scores”, which measure the frequency and exclusivity of words germane to a given topic.⁶ Unlike vanilla latent Dirichlet allocation, covariance matrixes are built into structural topic models (Roberts et al. 2014). This feature permits researchers to explore variation in topic proportions that follow from exogenous covariates—in our case, geography and time.

Employing Taddy’s (2012) residual-based procedure for selecting the number of topics, we fit a model to estimate twenty-eight topic proportions from 255 legislative reports (145 EU, 110 USA) containing the terms “biofuel,” “biodiesel,” “ethanol” and “renewable fuel”. To ensure reproducibility and meaningful topics, we employed spectral initialization and fit a sparse additive generative model, known as SAGE (Eisenstein et al. 2011). Stopwords were limited to six frequently used words with little semantic meaning (“chairman”, “committee”, “secretariat”, “secretary,” “etc.” and “commission”). No lower threshold was imposed on word frequency.

Although STM is a powerful methodological tool, our quantitative analysis reveals little about the political significance of multidimensionality, hence the need to supplement computational methods with qualitative methods, such as interviews, that capture how political actors interpret multidimensional ideas and multidimensional policies. Our qualitative

⁵ While researchers can bias results by arbitrarily selecting the number of topics, or by abusing thresholds and stopword filters, a standard procedure is to select the number of topics based on the size of the residual. As for thresholds and stopword filters, a good rule of thumb is to use them sparingly.

⁶ FREX terms for each of the 28 topics in our structural topic model are available in “Appendix”.

analyses derive information from primary and secondary documents, as well as 40 semi-structured interviews conducted by one of the authors between 2011 and 2014. The major primary documents are transcripts of Congressional hearings and reports from government agencies. Media and scholarly accounts comprise the most important secondary documents. Interviewees were selected on the basis of having been identified in primary and secondary accounts as policymakers or their assistants, lobbyists and policy experts. As such, they consisted of government officials, representatives of industry and environmental organizations, and private experts/consultants in the USA and the European Union.⁷ These multiple information sources allowed for cross-verification of information. For example, no information is quoted from an interview in Sect. 4.2 unless it is supported by another source (another interview, or primary or secondary document).

As will become clear in the following section, our quantitative and qualitative methods jointly allow us to test our two hypotheses. Our quantitative analyses map the dimensions of US and EU biofuel discourses over time as they appear in official government documents. Our qualitative analyses enable us to track political processes related to both the establishment of biofuel targets and efforts to reform them.

Biofuel policy developments in the USA and EU

We begin with an overview of the major US and EU biofuels legislative developments. In the USA, although tax exemptions and credits for ethanol date back to the late 1970s, developments in the 1990s signalled an important shift in government support for ethanol as well as biodiesel (US Department of Energy 2018). A 1990 amendment to the Clean Air Act, which required fuels to contain two per cent oxygen in order to control carbon monoxide and ozone problems, provided a major boost to ethanol since it is thirty-five per cent oxygen (Duffield and Collins 2006: 10). The 2005 Energy Policy Act established the Renewable Fuel Standard (RFS), requiring US fuel production to include a minimum amount of renewable fuel by volume each year. Ethanol produced from corn was expected to provide the bulk of the mandated fuel, set at 4 billion gallons in 2007 and reaching 7.5 billion gallons in 2012. The 2005 Energy Policy Act also gave incentives to encourage the production of cellulosic biofuels produced from switchgrass, crop residues and forest residues. In late 2007, with the volumetric requirements of the 2005 RFS having been virtually met, and rising pressure for Congress to do something about several years of rising oil prices, Congress agreed to the Energy Independence and Security Act (EISA) (Grossman 2013). It raised the RFS almost fivefold to 36 billion gallons in 2022 and set an aggressive target for advanced biofuels, including cellulosic fuels.⁸

⁷ The 18 individuals interviewed over the period 2011–2014 about EU biofuel developments consisted of five Commission officials, two EU member state representatives, one staff member to a MEP rapporteur, four representatives of Brussels-based environmental and industry organizations, and two private individuals with expertise on models of biofuels environmental effects. Four of these interviews were conducted by phone; the remainder were in person. Two industry organization officials were interviewed twice over the three-year period. The 22 interviews in Washington, DC, over the period 2011–2013 were with 11 current or former government/political staff, three industry organization representatives, four environmental group representatives, and four arms' length consultants/experts. Two interviews were by phone; the remainder were in person. Most interviews were an hour's length in duration.

⁸ The target increased from 7% of the total RFS in 2010 to 58% of the RFS in 2022 (Bracmort 2018: 1–2). For purposes of meeting annual RFS volumes, the US distinguishes between conventional biofuels (ethanol, biodiesel), advanced biofuel, cellulosic biofuel and biomass-based biodiesel.

In the EU, legislation to support biofuels was implemented in the 2003 Biofuels Directive (Commission of the European Communities 2003a) and the 2003 Fuel Quality Directive (Commission of the European Communities 2003b). The 2003 Biofuels Directive established voluntary renewable fuel blending requirements in member states, while the Fuel Quality Directive established GHG reduction targets for vehicle fuels that were also expected to promote biofuels. Mandatory blending requirements were established in the 2009 Renewable Energy Directive (Commission of the European Communities 2009). Insofar as biofuels were the only available renewable transport fuel, it was expected that the RED target of 10% of transport fuel by 2020 would be met by conventional (food-based) biofuels: that is, ethanol and biodiesel. As in the USA, the EU RED also provided incentives for the production and use of cellulosic and advanced biofuels.

The fate of the 2007 US EISA and 2009 EU RED has subsequently diverged. Since 2010, when the Environmental Protection Agency (EPA) established regulations to put the EISA mandates into effect, multiple bills have been introduced in every Congress to roll back in part or whole the RFS. However, through to early 2019, none of the bills to reform or repeal the RFS made it to the floor of the Congress, all of them dying in the committee to which they were referred. By contrast, the renewable fuel targets established in the 2009 EU RED have been amended. As stand-alone legislation (that is, not part of a broader energy and climate package), the 2015 Directive on Indirect Land-Use Change limited conventional biofuels to 7% of transport fuels by 2020 from a possible 10% target. The food-based EU biofuel cap was affirmed in June 2018 at 2020 levels through to 2030 (Keating and Simon 2018).

We now turn to analysing evidence that tests the two hypotheses we have proffered to explain the US and EU legislative trajectories. We begin with our quantitative analyses, and the evidence they provide regarding the dimensionality of EU and US institutional discourses. We then supplement these analyses with qualitative methods to demonstrate the role of multidimensionality and institutional gatekeeping in policy change and stasis.

Multidimensional and anomaly institutional discourses in USA and EU

Our quantitative analyses of the institutional discourses around biofuels, as captured in Congressional Committee reports in the case of the USA, and European Commission and European Parliament reports in the case of the EU, are presented in Figs. 2, 3 and 4. Figure 2 is a correlation matrix generated using the “stm” R package by Roberts et al. (2014). It presents the results of the structural topic model and depicts how the topics in the discourse hang together over the duration of the 1995–2017 period. The size of each topic is a reflection of its proportion in the sample text. Shade denotes whether the topic is more prevalent in the USA or European Union. Correlations are reported as decimals. Figure 3 presents the results of the structural topic model, aggregated on the three dimensions identified by our qualitative analyses to be salient: the environment, energy security and the economy. Figure 4 presents the salience of different topics associated with policy anomalies over time.

The quantitative analyses provide preliminary evidence in support of our first hypothesis by demonstrating the association of biofuels with multiple dimensions with positive valence. Figure 2 demonstrates the clustering of biofuel discourses in the EU and USA, as well as differences in these discourses in terms of topic (dimension) prevalence. The principal topic around which the US discourse revolves is “fuel oxygenation”, denoting the perceived benefits of ethanol in reducing carbon monoxide emissions and other pollutants.

By contrast, the principal topic around which the EU biofuels revolves is sustainability. While “climate change” is discussed in the USA, and appears to be a characteristically American term, it is not integrated into the discourse. Similarly, topics representative of “job creation”, “cellulosic biofuels”, “certification”, and “advanced fuels” are discussed in committee reports but are not integral to the US discourse, although “rural development” is. The topic representative of “energy security” is discussed in the EU, but the structural topic analyses do not show it to be integral to the European discourse. However, “energy diversification” is.

Figure 3 captures differences in institutional discourses in the two polities over time. It shows that the European Union’s institutional discourse has always been dominated by environmental concerns, although, initially, economic and energy security issues were also somewhat prominent. Although the US institutional discourse was multidimensional early on, economic considerations were dominant from the outset and have retained a rather prevalent position. Nonetheless, the salience of environmental issues has increased over time in the US institutional discourse and has exceeded the salience of the economy in recent years.

Figure 4 reports the salience of topics denoting anomalies associated with biofuel policies over time in the EU and USA. Food prices as an anomaly result from the policy-induced demand for biofuels raising the price of conventional biofuel feedstocks. Besides higher food prices domestically, the topic captures concerns, amidst the 2007–2008 “food versus fuel” crisis of food insecurity in the Global South, where biofuel feedstocks of corn and vegetable oils are basic foodstuffs (Doornbosch and Steenblik 2007). ILUC effects—owing to indirect land use change—are the impacts of biofuels policies on non-agricultural land being converted to agricultural production in order to compensate for existing agricultural land being diverted to biofuel feedstock crops. Contrary to early positive discourses (see below) which associated biofuels with GHG emission reductions and goals of climate change mitigation by replacing fossil fuels, models of ILUC effects show the carbon emitted by land conversion increases the GHGs of conventional biofuels (Doornbosch and Steenblik, 2007; Searchinger et al. 2008).

Figure 4 demonstrates important differences in institutional discourses regarding anomaly topics. It shows that topics representative of concerns over increased food prices and ILUC effects have become increasingly salient in the EU institutional discourse. By contrast, food prices and ILUC concerns are not salient in US Congressional reports.

We have hypothesized that the US and EU biofuel policy ideas and anomaly discourses documented above have shaped policy developments in the two polities. We first proposed that multidimensionality created opportunities for institutional agenda-setters to build political coalitions in support of biofuels’ targets. We then proposed that anomalies, while creating pressures for reform to biofuel policies in both the USA and EU, have been differently mediated by institutional gatekeepers in the two polities. The next section addresses the role of institutional agenda-setters and gatekeepers in US and EU biofuel policy developments.

Multidimensionality, agenda-setting and policy change

In the USA, provisions to support biofuels via a domestic mandate for their use were first introduced by the Republican-controlled Congress and White House in the 2005 Energy Policy Act: a broad-ranging piece of legislation that also included measures to support the petroleum industry. In justifying a biofuels volumetric mandate, biofuels proponents,

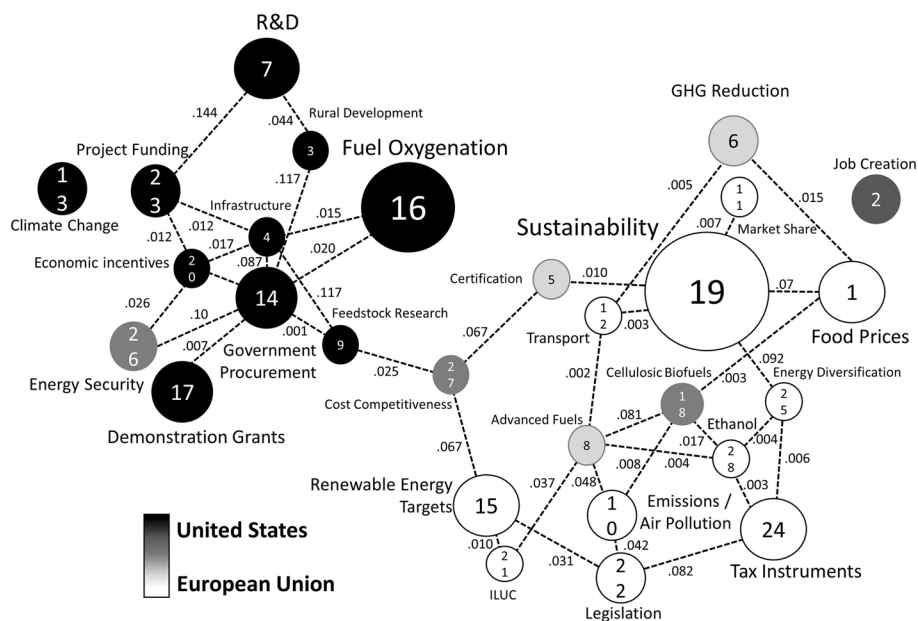


Fig. 2 Topic correlations in the biofuels discourse. *Source:* structural topic model based on US Committee reports, European Commission reports and European Parliament reports pertaining to biofuels. Topic labels are based on FREX scores (see appendix for more information)

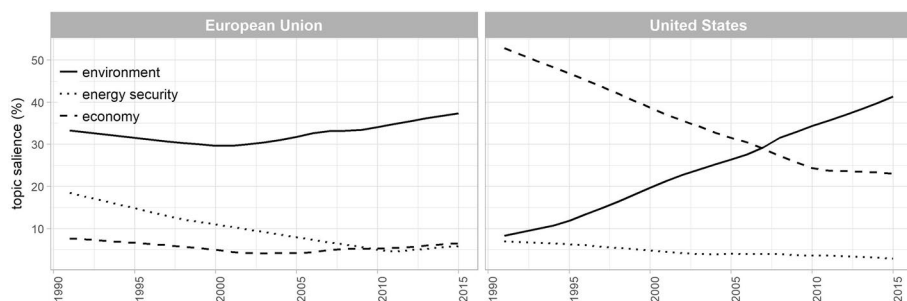


Fig. 3 Topic salience over time, policy goals. *Source:* structural topic model based on US Committee reports, European Commission reports and European Parliament reports pertaining to biofuels. Environmental dimension is an aggregate of topics 6, 10, 13, 16 and 19; energy security is an aggregate of topics 25 and 26; economy dimension is an aggregate of topics 1,2,3,9 and 11. Topic labels are based on FREX scores (see appendix for more information)

including Congressional representatives as well as President Bush, referenced two dimensions: the energy “shock” of high gasoline prices after Hurricane Katrina and economic benefits to rural America (Grossman 2012).⁹ The creation of an additional market for corn

⁹ In an interview on 18 April 2013 in Washington, a former official in the Office of the Energy Secretary described the mid-2000s context as follows: With “gas prices and consumption soaring, and greater dependence on volatile areas of the world for supplies”, there was an “ethanol euphoria” that created “a shared vision across different parties”.

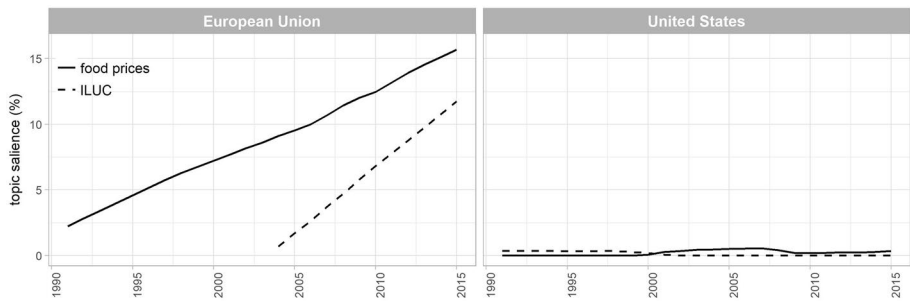


Fig. 4 Topic salience over time, policy anomalies. *Source:* structural topic model based on US Congressional reports, European Commission reports and European Parliament reports pertaining to biofuels. Topic labels are based on FREX scores (see appendix for more information)

and oilseed crops raised farm incomes, while biofuel refineries created jobs in the rural communities where they were located (Mondou et al. 2014). In the lead up to the 2007 EISA legislation that expanded biofuel mandates, both Democratic and Republican Congressional representatives described ethanol as “a transformative technology: it would make the country largely independent of foreign (especially Middle Eastern) oil, would be home-grown, would employ many thousands of Americans, would reduce energy costs in the long run, and would be environmentally superior to fossil fuels”.¹⁰

These multidimensional discourses, articulated and nurtured by a broad coalition comprised of the renewable fuel industry, farm organizations and some environmental organizations, resonated in the 110th Democrat-controlled Congress where they created “a renewable energy bandwagon” and bipartisan support.¹¹ In the words of a representative of the National Corn Growers’ Association: “Before the 2007 bill passed, ethanol was the darling child of every Congressman. People I never knew came up to me in the halls and said they wanted to write an ethanol bill—to do something, even though they did not know anything about it”.¹² Spanning 1000 pages, EISA, like the 2005 Energy Policy Act, was an omnibus piece of legislation that included provisions to increase energy efficiency and renewable energy, of which biofuel mandates were one component. The support of Congress and Republican President Bush for the bill was undoubtedly aided by “stuff in EISA for everybody”¹³ and because “biofuels can be lots of things to lots of people”.¹⁴

¹⁰ As quoted in Grossman (2012, 47). Also see, for example, United States Senate, Hearing before the Committee on Energy and Natural Resources. Biofuels for Energy Security and Transportation Act of 2007. 110th Congress, 1st Session, 17 April.

¹¹ This term was used by an EPA official in an interview in Washington, 11 October 2011, as well as by an official in the Congressional Research Service in an interview on April 19, 2012, in Washington, DC.

¹² Interview conducted 19 April 2012 in Washington, DC.

¹³ This description was provided by a former official in the Bush Administration in an interview in Washington on 11 October 2011. The support of the Senate and President for EISA was only secured when provisions in the bill that would have repealed tax subsidies for oil and gas were removed (Bang 2010: 1651).

¹⁴ This view was expressed by a staffer for the Democratic Chair of the Senate Energy and Natural Resources Committee in an interview in Washington, DC, 7 October 2011.

Multidimensional discourses also featured prominently in biofuel and renewable fuel legislation in the EU. European Commission documents from the late 1990s through to 2008 presented biofuels as a solution to multiple problems—energy security, environmental protection (specifically, reduced greenhouse gas [GHG] emissions and climate change mitigation) and agricultural/rural development (Commission of the European Communities 1997, 2000, 2007). The 2003 EU Biofuels Directive and the 2009 EU RED explicitly state the multidimensional rationales that helped secure inter-party support in the European Parliament and intergovernmental support in the Council of Ministers for the 2009 RED (Skogstad 2017).¹⁵ As with the biofuel mandate provisions in US legislation, the EU RED was part of a broader package of energy and climate measures.

Agenda-setting and gatekeeping were also evident in the treatment of critical discourses that emerged around biofuels and that threatened to derail biofuels mandate legislation in both the EU and USA. Figure 3 shows that the environmental dimension of biofuels, which has been continuously prominent in the EU, achieved the same salience as the economic dimension in the USA in 2007 and has since overtaken the latter. Rather than emphasizing the positive benefits of biofuels relative to fossil fuels, environmental critics have raised concerns about their effects in reducing biodiversity, increasing water pollution (owing to intensive use of chemical fertilizers to produce biofuel feedstock crops), and their potential to induce land use changes that negate biofuels' GHG reduction benefits. In the USA, these concerns were raised by environmental organizations, as well as the Environmental Protection Agency (2007), during the Congressional debates that led to agreement on EISA (Breetz 2017: 29). In the House of Representatives, Speaker Nancy Pelosi is credited with bringing recalcitrant environmental groups on board and securing the support of the Environment Committee. She did so by including provisions in EISA that were designed to promote the more sustainable advanced and cellulosic biofuels whose greenhouse gas (GHG) emission reductions are larger relative to fossil fuels than are those from conventional ethanol.¹⁶ In a display of her "top down management structure" and gatekeeping authority, Nancy Pelosi "instructed" her Democratic colleagues in the House to vote for the bill.¹⁷

In the EU, the Commission sought to defuse environmental critics by agreeing that biofuels' targets and other promotion policies should have no ill effects on land use and demonstrate a positive impact in reducing GHG emissions (Commission of the European Communities 2007). In its role as a corporate agenda-setter, the Commission had to bridge an internal division between the two directorates responsible for proposing the renewable energy directive. The lead Directorate-General (DG) for Energy advocated biofuels targets

¹⁵ See Commission of the European Communities 2003a: Article 4, clause 2; and Commission of the European Communities 2009, Clause (1). The latter states that the promotion of the use of energy from renewable sources is needed to reduce GHG emissions as well as important in "promoting the security of energy supply, promoting technological development and innovation, and providing opportunities for employment and regional development, especially in rural and isolated areas".

¹⁶ Breetz's (2017: 29) attribution of the influence of the Natural Resource Defence Council on Speaker Pelosi was confirmed in two separate interviews conducted by one of the authors with by a former official in the Bush Administration (11 October 2011) and a staff person to a Democrat House Committee Chair on 7 October 2011.

¹⁷ The hyphenated terms were used by two interviewees—one, an assistant to the chair of the Senate Energy and Natural Resources Committee; the other, in the office of the Secretary for Energy at the time EISA passed—in interviews on October 7 and 11, 2011, respectively, in Washington, DC. A staffer for the Senate Energy and Natural Resources Committee stated in an interview with one of the authors in Washington, DC, 7 October 2011: "In the Senate, we were told by the House and the leadership of both chambers to support the House changes [agreed by Speaker Pelosi to secure the support of environmental groups]".

as the most effective way to reduce GHGs in the transport sector; the DG responsible for Climate Action was sceptical of the ability of conventional biofuels to reduce GHG emissions.¹⁸ The European Parliament also insisted that biofuel targets be conditional on biofuels meeting sustainability criteria with respect to land use and GHG savings. The legislation to which the Commission eventually agreed and subsequently proposed to the European Parliament and Council of Ministers was consistent with the compromise inside the Commission. Moreover, it met the European Parliament's demand that biofuels meet environmental sustainability criteria with respect to both GHG savings and direct land use (Skogstad 2017). The RED did not meet environmental critics' demand that biofuels' ILUC effects be included in the calculation of their GHG reductions. However, it did contain a requirement for the Commission to investigate these effects: a provision that opened the gates for the Commission to initiate subsequent legislation in response to biofuel anomalies.

Policy anomalies, institutional gatekeeping and policy change/stasis

We have hypothesized that differences in institutional gatekeeping powers in the USA and EU explain the different trajectories of the 2007 US and 2009 EU biofuels mandate legislation. Specifically, we have posited that the corporate character of institutional gatekeeping in the EU explains why the anomaly discourses in the EU around ILUC and food prices have been attended to via legislative reforms to cap mandates for biofuels made from food crops. By contrast, the individual/specialized character of institutional gatekeeping in the US Congress explains why anomalies have not been attended to through legislative reforms in the USA.

As agenda-setter, the Commission can be credited with “opening the gates” to legislation that dealt with the ILUC effects of biofuel mandates (European Commission 2012). The gates were pried open as a result of provisions in the 2009 RED that asked the Commission to review the negative effects on GHGs which might result from land conversion owing to biofuels, and, if need be, to present a legislative proposal to deal with them while minimising existing investments in biofuel production (European Commission 2012). After its 2010 report acknowledged that ILUC could have an impact on GHG emission savings associated with biofuels (European Commission 2010: 6, 14), the Commission still needed to bridge internal divisions between the Energy and Climate Action DGs on optimal strategies for mitigating ILUC. The Commission's consensual decision-making mode meant that it took some time to forge the consensus that served as the basis for proposed legislation in 2012. Among other things, this legislation put a cap of 5% on the contribution of food-based biofuels towards meeting EU renewable fuel targets (European Commission 2012).

In opening the gates to legislative reform, the Commission both recognized the need to deal with biofuel policy anomalies and ensure they penetrated the EU decision-making discourse. Rather than dictating the substantive impact of these anomalies on legislative reform, its gatekeeping task entailed serving as an interlocutor between the heterogeneous views of member state governments, parliamentarians, and interest groups mobilized around the land use change and GHG effects of conventional biofuels. Although the environmental/ILUC dimension was the dominant institutional action frame in the European Parliament,

¹⁸ Information obtained in an April 2011 interview with a Commission official responsible for drafting the 2009 RED.

divisions on left–right lines and across the two responsible committees (Industry, Research, and Energy; Environment, Public Health and Food Safety) undermined the co-decision authority of the Parliament vis-à-vis the Council of Ministers (Hall 2013; Casinge 2015). There was no single institutional action frame in the Council where EU member states were deeply divided over whether ILUC effects existed, and if they did, how to deal with them, as well as over what constituted an appropriate revised target for food-based biofuels (Humalisto 2015). Member states in the Council of Energy failed to agree on the proposed 2012 directive to cap biofuel targets at 5%, as they did on a subsequent compromise text proposed by the Commission presidency in 2013 to cap conventional biofuels at 7%. But the Commission’s proposed directive did constitute the basis for continuing work inside the Council that eventually produced agreement on reforms to RED in June 2014 (Council of the European Union 2014). Parliament supported the Council consensus, including a 7% cap on conventional biofuels, and approved the ILUC directive in April 2015.

In contrast, biofuel policy anomalies have been far less prominent in the US legislative discourse. Figure 4 shows the lesser salience of ILUC and food price anomalies in the USA compared to the EU. The US legislation requires both direct and significant indirect emissions, including from land use, to be taken into account when calculating whether a biofuel meets the GHG emission reductions specified in the RFS. Once the Environmental Protection Agency ruled in 2010 that multiple biofuels, including conventional ethanol and biodiesel, did so, the salience of ILUC lessened, although it did not completely disappear.¹⁹ Other anomalies, linked to the administrative (in)feasibility of the RFS, have also been aired in the US Congress. As noted above, EISA increased RFS mandates for advanced and cellulosic fuels through to 2022, when they would eventually account for the bulk of renewable fuels as corn ethanol volumetric mandates were capped.²⁰ However, the USA did not produce cellulosic ethanol in 2007. Cellulosic fuel production since then has lagged well behind statutory mandates and is expected to continue to do so through to 2022. The EPA has repeatedly used its authority to reduce the cellulosic mandate: an action that has elicited considerable controversy and Congressional attention.²¹ Another technological/administrative anomaly of the RFS that has elicited reform bills in Congress is the so-called blend wall. The term refers to renewable fuel volumes, as mandated by RFS, rising above domestic consumer demand for gasoline and above the 10 per cent ethanol limit that car manufacturers deemed suitable for most vehicle engines.

As noted earlier, the perceived negative economic effects and technical/administrative shortcomings of the RFS have drawn the attention of Congressional representatives. In the words of an official with the National Corn Growers’ Association, support for biofuels in Congress went from “a very positive situation—‘hey corn guys, I want to make an ethanol bill’—to a very defensive position” after the EISA’s renewable fuel mandates came into effect in 2010.²² A steady slew of bills to reform or repeal the RFS has since been

¹⁹ For example, the 2011 Report of the National Academy of Sciences, which concluded that ILUC effects can occur, was debated in the Subcommittee on Energy and Environment, Committee on Science, Space and Technology (Hearing on Conflicts and Unintended Consequences of Motor Fuel Standards, 2 November 2011; see also Hearing of the House Subcommittee on Energy Policy, Health Care, and Entitlements and the House Committee on Oversight and Government Reform, June 5, 2013).

²⁰ Within the RFS, there are sub-mandates for advanced biofuels, including cellulosic biofuels, biomass-based diesel and other advanced biofuels.

²¹ See, for example, the following hearings: the US Senate Committee on Agriculture, Nutrition and Forestry, on 8 April 2014; the House Subcommittee on Energy Policy, Health and Environment and the Committee on Oversight and Government Reform on 10 December 2014.

²² Information obtained in an interview 19 April 2012, Washington, DC.

introduced, the vast majority by the same House Republicans in successive Congresses. The number of reform/repeal bills peaked in the 113th (January 3, 2013–January 2, 2015) and 114th (January 3, 2015–January 2, 2017) Congresses. The Republicans controlled the House in the 113th Congress, and both the House and Senate in the 114th Congress. Although a few bills have enjoyed bipartisan support, none has been endorsed by Congressional leadership.²³ Close scrutiny of debates around biofuels in Congressional committees with oversight for and/or an interest in the RFS reveals that arguments of reformist proponents have consistently been countered by supporters of US biofuels policies. An illustrative example is the Oversight Hearing on Domestic Renewable Fuels held by the Senate Subcommittee on Clean Air and Nuclear Safety and the Committee on Environment and Public Works on 11 December 2013. While Republican Senator Inhofe from Oklahoma described the RFS as “completely broken”, and Republican Senator Barrasso from Wyoming described it of leaving “a wake of economic and environmental harm”, Democratic Senator Fischer from Nebraska emphasized the RFS’s contribution to ethanol plants and jobs in his state, as well as to reduced dependence on foreign oil. More broadly, proponents of biofuel mandates have reiterated the economic benefits of a domestic biofuels industry, the need to maintain the RFS in order to attract the capital investments required to bring advanced and cellulosic biofuels technologies to commercialization, and the imperative to protect existing jobs.²⁴ They have linked biofuels to the dimension of system-wide goals of economic growth through innovation, something which would cease, they argue, were the RFS to end.

The success of the positive economic discourse to date, including through to the end of the 115th Congress when the Republicans controlled the White House as well as both houses of Congress, is consistent with our proposition regarding the capacity of institutional gatekeepers to direct attention to specific issues in the policy discourse. From the perspective of organizations representing the biofuel sector, it is Senate committee chairs who have been the most important gatekeepers. Urged on by Senators from the mid-west states whose agrarian and rural constituents profit from biofuel mandates, they are seen as pivotal in preventing discourses around biofuel anomalies translating into legislative reforms that advance beyond the committee stage to the parent chambers of Congress.²⁵

In short, legislative stasis in the USA is consistent with our proposition that the vesting of institutional gatekeeping in individual legislators who head up specialized committees impedes the impact of policy anomalies on policy reform. Although institutional issue specialization does not block legislative attention to anomalies, it does appear to impede the institutional permeation of anomaly discourses to the extent needed for legislative change.

²³ A Senate bill to repeal the RFS, the Renewable Fuel Standard Repeal Act, introduced in June 2013, secured bipartisan support. In the 114th and 115th Congresses, Democrat Senator Diane Feinstein and Republican Senator Pat Toomey united behind bills which would have eliminated the corn ethanol mandate while keeping intact the mandates for other biofuels.

²⁴ Illustrative is the testimony of Michael McAdams, President of the Advanced Biofuels Association, to the US Energy and Commerce Subcommittee on Energy and Power on 23 July 2013, when it held hearings with stakeholders to address economic, technological and environmental issues around the RFS.

²⁵ Information obtained by one of the authors in confidential interviews with representatives of biofuel industry groups and the National Corn Growers’ Association in Washington DC in April 2012. At that time, a representative of the National Corn Growers’ Association described “a reluctance on the part of the Republican leadership” to move on bills introduced by Republican members of the House to repeal the RFS. In his (prescient) view, “the dysfunctionality of the Congress” would help to keep the RFS.

Conclusion

We have sought to demonstrate the role of ideas and institutions in biofuels policy developments in the EU and the USA. In so doing, we have shown how institutional agenda-setters in both polities successfully deployed multidimensional ideas to build political coalitions in support of obligatory biofuel targets in the transport sector. We have also documented the anomaly discourses around biofuels in the two jurisdictions and argued that important but underappreciated institutional differences with respect to agenda-setting prerogatives explain why anomaly discourses have been attended to through legislative policy reforms in the EU but not in the USA. Specifically, we have identified the composition of institutional gatekeepers as decisive.

In the EU, the corporate composition of the European Commission requires bridging differences across Commission directorates, such as Energy and Climate Action, which process information in parallel. Parallel information processing increases policymakers' attention to issue dimensions that might otherwise be ignored or overlooked. By contrast, the legislative status quo around biofuel mandates in the USA can be attributed to discourses about the problems associated with food-based biofuels being kept off the legislative agenda by individual gatekeepers, namely the House Speaker and Congressional Committee Chairs. Limited attention and search capabilities endemic to serial information processing, coupled with the system of committee specialization in the US Congress, explain why anomalies have been prevented from permeating the institutional discourse in the USA.

Sceptics of our institutional account may counter that anomaly discourses—especially those concerning the environment—were simply more politically salient in the EU than they were in the USA. Indeed, scientific evidence concerning the contribution of ILUC to GHG emissions was at odds with the EU's self-identity as the global leader on climate change. The greater salience of environmental anomalies may have given EU representatives comparatively greater incentives to reform biofuel targets. However, our analyses indicate the salience of environmental issues has been similarly high in the USA and has increased over time. In any case, the fact remains that corporate gatekeeping structures have afforded EU representatives greater opportunities to act in the face of these anomalies than exist in the American system of specialized gatekeeping.

This article has applied current theory on ideas, institutions and policy change using both conventional (qualitative) and new (quantitative) methods for conducting comparative case study research. Students of agenda-setting conceive of policy preferences in terms of attention to dimensions of conflict (Jones 1994). Structural topic modelling (STM) is one method for operationalizing theoretically salient, but hitherto difficult to observe, variables in the ambit of "political discourse". Our use of STM alongside conventional qualitative methods for uncovering policy discourses (i.e. textual analyses and interviews) is an instructive example, we believe, of how qualitative and quantitative methods can work in tandem to validate theoretical claims regarding policy ideas and policy change.

For over 30 years, it has been recognized that multidimensional policies are ubiquitous, that policies are subject to different interpretations by different actors and that multidimensionality is a critical ingredient in political mobilization (Kingdon 1984; Riker 1982). The subsequent role of multidimensional ideas in legislative policy stasis has been afforded less attention. By drawing together concepts from both the literature on ideas and the literature on institutions—namely policy anomalies, polysemism, structure-induced equilibrium and

institutional gatekeeping—this article has contributed to the understanding of how ideas and institutions interact in legislative policy development.

Appendix

Topic 19: Sustainability

FREX: call, sustain, must, particular, stress, develop, european, sector, import, countri, product, incent, promot, energi, generat, encourag, ensur, second-gener, take, effici, certif, support, biofuel, believ, measur

Topic 16: fuel oxygenation

FREX: gasolin, mtbe, billion, administr, gallon, ethanol, epa, requir, blend, waiver, rfs, renew, mandat, oxygen, percent, program, air, fuel, act, motor, standard, vehicl, bill, year, grant

Topic 7: R&D

FREX: depart, recommend, fund, research, defens, encourag, scienc, altern, militari, technolog, feedstock, million, biomass, demonstr, develop, request, budget, strategi, effort, advanc, support, system, provid, plant, center

Topic 1: Food Prices

FREX: food, sustain, land, countri, criteria, negat, price, impact, product, particular, social, generat, wast, biodivers, biofuel, secur, environment, effect, crop, water, develop, climat, benefit, agricultur, second

Topic 24: Tax Instruments

FREX: excis, tax, duti, oil, reduct, paper, propos, road, transport, european, taxat, rate, sector, reduc, object, promot, altern, pure, white, direct, communiti, biofuel, depend, eec, miner

Topic 17: Demonstration Grants

FREX: hear, busi, small, program, aviat, author, subcommitte, heard, amend, engin, rfcic, invest, held, issu, renew

Topic 14: Government procurement

FREX: ethanol, nation', per, gallon, petroleum, reduc, percent, standard, feder, farm, benefit, provid, testifi, renew, domest

Topic 15: Renewable energy targets

FREX: bioliquid, target, criteria, member, direct, state, electr, set, scheme, sustain, bind, share, sector, renew, achiev

Topic 6: GHG reduction

FREX: greenhous, indirect, land-us, gas, chang, emiss, save, advanc, land, direct, report, iluc, bioliquid, overal, articl

Topic 10: Emissions/Air pollution

FREX: petrol, blend, strategi, limit, emiss, gas, pollut, greenhous, air, higher, specif, direct, fuel, vehicl, vapour

Topic 26: Energy security

FREX: power, sourc, object, energi, hear, farm, farmer, import, senat, small, help, new, hectar, solar, innov

Topic 22: Legislation

FREX: propos, parliament, council, member, posit, target, common, state, set, amend, direct, european, mandatori, text, promot

Topic 23: Project Funding

FREX: section, program, biobas, project, bioenergi, assist, establish, provid, facil, percent, biomass, biorefineri, system, grant, studi

Topic 13: Climate change

FREX: climat, refineri, program, rfs, fund, econom, disproportion, technolog, small, act, ghg, global, chang, new, hardship

Topic 2: Job creation

FREX: chemic, biobas, manufactur, materi, raw, petroleum, industri, process, job, corn, oil, biomass, plant, green, chemistri

Topic 28: Emissions/Air pollution

FREX: altern, offer, materi, can, wast, diesel, car, gasolin, technolog, process, bio-ethanol, will, hydrogen, raw, distribut

Topic 12: Transport

FREX: target, car, base, generat, second, strategi, crop, measur, qualiti, heat, model, technolog

Topic 20: Economic incentives

FREX: credit, biodiesel, mixtur, taxpay, unit, agribiodiesel, diesel, gallon, qualifi, tax, person, sold

Topic 18: Cellulosic biofuels

FREX: celluloss, ethanol, unit, infrastructur, emiss, convent, standard, can, percent, billion, advanc, aviat

Topic 3: Rural development

FREX: research, biobas, agricultur, depart, chemic, biomass, per, rural, process, feder, agenc, product

Topic 21: ILUC

FREX: iluc, assess, sector, reduct, option, bioenergi, oblig, advanc, transport, food-bas, ghg, sustain

Topic 8: Advanced Fuels

FREX: bio, scenario, advanc, share, gaseous, liquid, base, transport, total, iluc, aviat, euco

Topic 5: Certification

FREX: call, certif, note, scheme, land, palm, global, biodivers, deforest, union, social, sustain

Topic 4: Infrastructure

FREX: infrastructur, sulfur, grant, diesel, retail, instal, nation, ethanol, fuel, associ, percent, approxim

Topic 25: Energy diversification

FREX: land, iluc, expect, mtoe, save, report, progress, mha, main, chang, agricultur, biodivers

Topic 9: Feedstock research

FREX: research, amend, bill, center, engin, feedstock, develop, program, studi, bioga, believ, effort

Topic 11: Market Share

FREX: will, share, oil, member, market, achiev, trade, biofuel, state, countri, oblig, region

Topic 27: Cost competitiveness

FREX: crop, scenario, cost, tax, lead, price, estim, exempt, market, measur, share, land

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