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What makes them believe in the low-carbon energy transition? Exploring corporate perceptions of the credibility of climate policy mixes

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ABSTRACT

The credibility of climate policy has been identified as paramount factor for low-carbon investment and innovation and is thus key to achieving the decarbonization objectives set out in the Paris Agreement. Yet, despite its importance, we have only limited insights at present into how such policy credibility is formed. To address this gap, we explore whether and to what extent corporate perceptions of policy credibility depend on the current policy mix. We draw on the case of the German *Energiewende* and rely on data collected in 2014 in a survey of German manufacturers of renewable power generation technologies. We analyzed the answers of 390 companies using a linear regression model and found that corporate perceptions of policy credibility are mainly shaped by two characteristics of the policy mix: the coherence of policymaking and implementation, and the consistency of the policy mix. Changes in the design of the core demand-pull instrument (in Germany, the Renewable Energy Sources Act, EEG) and the nuclear phase-out policy are also important as are Germany's targets for the expansion of renewable energies. These insights enable us to derive broader policy and research implications concerning climate policy credibility.

1. Introduction

Policy credibility has been identified to be of paramount importance for the low-carbon innovation and long-term investments needed to decarbonize the economy, and achieve the climate targets set out in the Paris Agreement (Bosetti and Victor, 2011; Nemet et al., 2017). Correspondingly, there is an emerging body of literature discussing options for how to strengthen and assess such climate policy credibility (Brunner et al., 2012). However, so far, this literature has mainly focused on institutional design as a determinant of credibility (McGregor et al., 2012; Grosjean et al., 2014), with only limited attention paid to the role of concrete policy action (Nemet et al., 2014; Jakob, 2017).

Credibility has also started to receive greater attention in the context of governing fundamental transformations towards more sustainable modes of production and consumption (Markard et al., 2012; Rogge et al., 2017). In particular, it has been proposed as a key characteristic of policy mixes for sustainability transitions, capturing how believable and reliable a policy mix is (Rogge and Reichardt, 2016). Early empirical work confirms that policy mix credibility is important for low-carbon innovation, but that other aspects also play a key role such as consistency and stability (Reichardt and Rogge, 2016; Uyarra et al., 2016).

However, we have limited empirical insights into how such credibility is related to the policy mix governing the decarbonization of the energy system (Nemet et al., 2014; Nemet et al., 2017). Therefore, in this paper, we take a first step towards closing this research gap by investigating whether and to what extent various aspects of the policy mix are related to corporate perceptions of its overall credibility. Building on Rogge and Reichardt (2016), we develop an analytical framework which differentiates between the *elements* - policy targets, instruments and their design features - and *characteristics* of policy mixes - comprehensiveness, consistency and coherence - as key determinants of credibility.

As a research case, we chose the transition of the German electricity system to renewable energies, the so-called *Energiewende*, as this is ideally suited to provide exploratory insights into a globally relevant phenomenon given Germany's pioneering role in low-carbon energy transitions (Strunz, 2014; Quitzow et al., 2016). Drawing on company survey data, we psychometrically explore the perceptions of German

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manufacturers of renewable power generation technologies regarding the credibility of the corresponding policy mix. We discuss the implications of our findings for the policy design categories developed by Nemet et al. (2017).

The remainder of the paper is structured as follows. In Section 2, we review the literatures on climate policy credibility and on policy mixes for sustainability transitions. Based on this, we develop our analytical framework in Section 3. We then present the research case of the German Energiewende in Section 4 and our methodology in Section 5. Our findings are presented in Section 6, followed by their discussion in Section 7. We close by providing conclusions in Section 8.

2. Literature review

2.1. Climate policy credibility

The notion of policy credibility can be traced back to a seminal article by Kydland and Prescott (1977) and has been applied in various policy fields, such as monetary and fiscal policy (Persson and Tabellini, 1990; Drazen and Masson, 1994) and antitrust policy (Gheventer, 2004). Climate economists have also identified policy credibility as a key area of research (Toman, 1998). For example, Brunner et al. (2012) argue that governments – when faced with a lack of reputation – can deliberately engineer institutional commitment devices to enhance the level of policy commitment. Most recently, Nemet et al. (2017) proposed the following four categories to assess the credibility of the climate targets pledged under the Paris Agreement: institutional, procedural, political and instrumental determinants of credibility.

The increased attention to climate policy credibility is justified by the modeling results that highlight the outstanding relevance of credibility for low-carbon innovation and investment. As shown by Bosetti and Victor (2011), a lack of regulatory credibility significantly increases the costs of climate mitigation, as actors behave in a short-sighted way and make suboptimal investments in R&D and long-lived technologies. This finding is supported by Cian et al. (2012) with regard to the 2020 climate target and by Faehn and Isaksen (2016) for the example of Norway.

However, the definitions of credibility vary across studies, even within the subset dealing with climate policy credibility (Helm, 2003; Brunner et al., 2012; Jakob, 2017; Nemet et al., 2017).[1] Some studies have not explicitly defined policy credibility (Boehmer-Christiansen, 1990; Jacobs, 2016), whereas others use the term fairly loosely, often overlapping it with other concepts (Brunetti et al., 1998; van der Ven, 2015; Faehn and Isaksen, 2016), such as regulatory uncertainty (Engau and Hoffmann, 2009) or predictability (Kemp and Pontoglio, 2011).

More importantly - and despite the recognition of the paramount relevance of climate policy credibility for low-carbon transitions - we know little about how investors form their beliefs concerning the credibility of future policy, leading to calls for empirical research (Nemet et al., 2014; Nemet et al., 2017). In particular, Nemet et al. (2017, p. 55) stress that “understanding interactions among policies and considering policy mixes will be crucial” to future research on climate policy credibility.

2.2. Policy mix research

Policy mixes have been called for to address the multiple market as well as structural and transformational system failures associated with sustainability transitions (Weber and Rohracher, 2012; Rogge and Reichardt, 2016). Therefore, an increasing number of studies have investigated the combination of multiple policies, building on seminal work on smart regulation in environmental policy (Gunningham and Grabosky, 1998; Gunningham and Sinclair, 1999).

This 'first generation' of such policy mix studies focuses on the interaction of policy instruments (Spyridaki and Flamos, 2014) with applications in several environmental policy fields. Examples include climate policy (Sorrell and Sijm, 2003; del Río, 2009), energy efficiency policy (del Río, 2010; Rosenow et al., 2016), renewables policy (Fischer, 2010; Cantner et al., 2016), biodiversity policy (Gunningham and Young, 1997; Ring and Schröter-Schlaack, 2011) and resource efficiency policy (Numata, 2016; Wilts et al., 2016).

The emerging ‘second generation' of policy mix studies pays greater attention to policy strategies, policy processes and policy mix characteristics (Rogge et al., 2017). First, policy strategies with long-term targets and principal plans for their implementation, such as those laid out in the Nationally Determined Contributions (NDCs) under the Paris Agreement, can play an important role in providing direction to transformative change processes (Schmidt et al., 2012; Jakob, 2017). Second, greater attention to politics, learning and the co-evolution of policy mixes and socio-technical systems is seen as an important research avenue (Reichardt et al., 2016; Kern and Rogge, 2017; Edmondson et al., 2018). Finally, it has been argued that policy mix characteristics, such as consistency, coherence, comprehensiveness and credibility, are key to explaining the effectiveness and efficiency of policy mixes (Reichardt and Rogge, 2016; Costantini et al., 2017).

The first insights of these 'second generation' policy mix studies investigating credibility as one driver of low-carbon energy transitions are in line with the model results summarized in Section 2.1 (Bosetti and Victor, 2011; Cian et al., 2012). However, it remains to be investigated what makes a policy mix credible in the first place. This indicates an overlapping research interest in the literatures on climate policy credibility and policy mixes for sustainability transitions.

3. Analytical framework to explore the policy mix determinants of policy credibility

In this paper, we aim to address the identified gap in the literature by exploring whether and to what extent companies’ perceptions of policy credibility depend on specific aspects of the policy mix relevant for the decarbonization of the energy system. We follow Rogge and Reichardt, 2016, who define credibility as “the extent to which the policy mix is believable and reliable” (p. 1627). Based on their extended policy mix concept, we construct an analytical framework that combines policy mix elements and characteristics as determinants of policy credibility (see Fig. 1 and Table 1). In doing so, we focus on the role of credibility as one of multiple policy mix characteristics, and investigate its interrelatedness with other policy mix characteristics and policy mix elements.

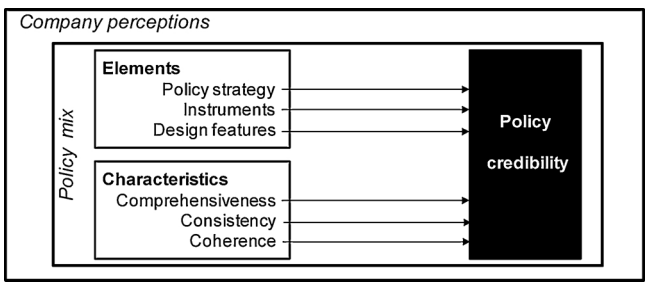

Fig. 1. Analytical framework to explore policy mix determinants of policy credibility.

[1] A compilation of various definitions of credibility (policy, source, institutional and corporate credibility) can be found in Table 2 in Rogge and Dütschke (2017).