The impact of electric utility ownership structures on low-carbon investment decision

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Overview

Being the single largest contributor to anthropogenic carbon emissions (Intergovernmental Panel on Climate Change, 2014), electricity generation is at the focus of climate change mitigation efforts in many countries. While a vast literature analyzes policy interventions that aim at shifting electric utilities' investment decisions from high- to low-carbon technologies (Polzin et al., 2019; Schmalensee, 2012), little attention has been paid towards the heterogeneity of power generation actors that are being addressed by these policies (Steffen, 2018). Particularly, state-owned utilities and private-owned utilities often co-exist, even competing for customers in many countries. While economic literature underlined the better commercial performance of private firms (Boardman and Vining, 1989; Dewenter and Malatesta, 2001), and privatization was the general trend in the electricity sector since the 1990s (Holburn and Zelner, 2010; Markard and Truffer, 2006), recently a trend towards new publicly-owned utilities emerged, e.g., in Germany (Bönker et al., 2016). In several countries (e.g. Germany, the UK, and he US), it is being debated whether state-control of utilities can help to effectively achieve the decarbonization of the electricity sector. Theoretical arguments supporting this view refer to the failure of capital markets delivering the patient capital required for large-scale investment in renewables (Mazzucato and Semieniuk, 2017), the difficult enforcement of environmental regulation and contracts (Karplus et al., 2017), and energy system-level constraints (Markard, 2018) that might be easier to overcome for public actors.

However, to date it is unclear whether public utility ownership indeed is conducive to shifting power generation investment towards low-carbon options such as renewables. To fill this gap, this paper studies how utility ownership structure (i.e. public vs. private) affects investment in new power generation capacity in Europe. Drawing on economic theory, we first derive testable hypotheses concerning the tendency of different actors to choose renewables vs. fossil fuel-based technologies. We then test these hypotheses by means of a cross-country/time-series regression analysis, taking the utility company as the unit of analysis. A discussion of implications for research and policy concludes.

Methods

In this study, we consider power generation investment by European Union (EU) utilities during 2005–2016, exploiting the fact that in many EU countries both public and private utilities operate in the same regulatory environment – which included a policy goal to reduce carbon emissions (with the Kyoto protocol in force since 2005), and also explicit national-level targets for increasing the share of renewables (e.g. the EU 20-20-20 targets). We combine the Platts World Electric Power Plants Data Base from S&P with company-level information from ORBIS, leading to observations for 245 utilities across 28 countries for the 12 years under study. Different specifications of our empirical model use both the variance across utilities (within a country) and the variance over time, and control for potential confounding factors such as utility size, country GDP per capita, etc. To assess the effect of state control in greater detail (along our hypothesis), we include further data that describe capital market constraints (using World Economic Forum GCC indices), general climate policy stringency (using indices from the OECD and Germanwatch), and public opinion on climate change mitigation (using Eurobarometer data), amongst others.

Results

We find that across the EU, public utilities show a generally higher likelihood to invest in renewable energy as compared to fossil-fuel-based technologies than private utilities, controlling for country-fixed effects and structural parameters of the utility itself. This effect, however, varies markedly over time, with the share of investment attributed to renewables only being statistically significantly different between public and private utilities since 2011. The analysis of interaction terms along our hypotheses gives no evidence that capital market constraints of private players could explain the pattern observed. Instead, empirical results are in line with explanations that allude towards state-control being used as a complement to other climate policy instruments: Different behaviour of public and private players is particularly pronounced in contexts with a high concern for climate change in the population (and hence electorate), and with a high general climate policy stringency. Thus, we conclude that state-control of utilities should be considered in the context of the broader climate policy mix in a country, and outcomes will differ accordingly.

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