**Political economic constraints to climate policy: literature, stylized facts, and a typology of countries**

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## Introduction

Deep decarbonisation to net-zero emissions is needed in the coming decades to avoid catastrophic climate change (Allen, Babiker, et al., 2018). This challenge requires nontrivial social and economic changes to reduce energy demand, phase out fossil fuels and shift towards renewable energy in all regions and countries of the world (Grubler et al., 2018). Whether we aim for stabilising global warming at 2°C, or at the much more stringent target of 1.5°C, coal use without carbon capture must be phased out within the next two decades, with oil and gas following not long after (REF IAMS??).

Despite these demands – which are formally written into the Paris Agreement targets – there have been few signals from countries that they are taking the needed action. Assessments of the Nationally Determined Contributions (NDCs) result in global emissions pathways that far exceed the cumulative emissions budget of the 2°C goal (UNEP, 2018). And even though a large majority of countries have put into place climate targets and legislative measures, effective implementation remains uncertain (Iacobuta, Dubash, Upadhyaya, Deribe, & Höhne, 2018). Global emissions are again on the rise (Quéré et al., 2018).

The economic costs of a transition are one explanation for this gridlock. Socio-temporal ‘trap’ (costs in this generation).

But given co-benefits, and wide support, these seem insufficient to explain the gridlock.

The central problem is the political economy – entrenched social, political and institutional constraints to decarbonisation. Some societies may lack demand for climate policy, due to prevailing consumption norms or the potentially regressive nature of reforms (Vogt-Schilb & Hallegatte, 2017). In other countries, political constraints such as campaign financing or fossil rent distribution shape legislative possibilities (Lockwood, 2015). And in the implementation of reform, institutions may be too fragile, lack enforcement power, or are ‘captured’ by the very interests they are tasked with regulating (Helm, 2010).

Most focus on barriers to behaviour change (<https://www.sciencedirect.com/science/article/abs/pii/S0959378018301109>).

Different political economic issues are judged with varying importance, depending on one’s theoretical perspective and epistemic community (Paterson & P‐Laberge, 2018; Ylä-Anttila et al., 2018). Indeed, the scope of ‘political economic’ determinants is potentially vast, resisting all but the broadest of definitions.

Justify international focus: political economy research mostly cases (all transitions are historical) or involving mid-range theories from comparative studies (Lockwood et al.).

One way to deal with this complexity is a pragmatic focus on the stylized facts: to the best of our knowledge, what national-level constraints can be identified, where do they occur and how are they interrelated?

Such an overview could come from identifying typologies of countries, but thus far we have relied on income, development status and drivers of carbon emissions to group and assess the prospects for countries to pursue mitigation (Lamb et al., 2014; Victor, Gerlagh, & Baiocchi, 2014). Arguably, a much clearer picture global mitigation prospects could be derived from mapping overlapping exposures to social, political and institutional barriers to climate mitigation. To our knowledge, no such typology has been published or assessed.

In this paper we aim to answer the question – *which countries are exposed to social, political and institutional barriers to climate policy?* – with the following four objectives:

* Review the literature on national constraints to climate policy
* Construct a dataset representing social, political and institutional dimensions of constraints
* Construct a typology of countries according to shared exposure to constraints
* Assess the overlap between constraints, available fossil reserves and other bottlenecks in global climate mitigation

## Background and theoretical setting

In the early assessment literature on climate change mitigation, there was surprisingly little discussion of political economic constraints to climate policy. This has recently given way to a greater emphasis. The Intergovernmental Panel on Climate Change (IPCC) reports have traditionally discussed ‘enabling environments’ or ‘enabling conditions’: terms coined by the UNFCCC (2001) to promote the removal of barriers to upscaling ‘environmentally sound technologies’. In AR5, reference to enabling environments is sparse, but largely focused on technology policy and the macroeconomic context. Constraints are conceived of as institutional in nature (e.g. systems of formal and informal rules that determine the playing field for competition), involving social norms and preferences (e.g. consumer demand for low-carbon technologies), or financial considerations (e.g. tax regimes, labour markets) (Gupta et al., 2014; Kolstad et al., 2014; Somanthan et al., 2014).

The IPCC Special Report on 1.5°C reframes enabling conditions as an issue of ‘feasibility’. This is highlighted as a core concept in Cross-Chapter Box 3 (Allen, Dube, et al., 2018), followed by extensive discussion in the Chapter 4 section titled ‘Enabling Rapid and Far-Reaching Change’ (Conick et al., 2018). Several key issues are reviewed: the role of coordinated multi-level governance (local, national, international) in strengthening policy implementation and outcomes; the need to establish institutional capacities such as monitoring, legal frameworks and consultation methods; the importance of public awareness and support; and the potentially adverse distributional consequences of climate policy implementation (Conick et al., 2018).

Recent UNEP Emissions Gap Reports have also given political economic constraints a more prominent position, notably in a chapter on the phase-out of coal (UNEP, 2017), and on fiscal reforms for a low-carbon transition (UNEP, 2018). Again, these underline the need to ensure an equitable distribution of costs, the importance of public support and trust in policy processes, and the likely need to compensate affected industries, regions and workers due to stranded assets and the loss of income.

Overall, the assessment literature provides an unclear picture of political economic constraints, for several reasons. First, no theoretical frameworks are put forth to provide a structure on which to identify and discuss different constraints. Second, the dependent variable at hand is not always clear: are these constraints to climate legislation, policy adoption, policy stringency, or policy outcomes (emissions trends)?

### Political economic frameworks to characterise constraints

Hall (1997) argues that political economy analysis can be broadly categorised into approaches focusing on interests, ideas, or institutions. Interest-based approaches recognise that social and political change has material (e.g. financial) consequences for different actors, such as workers, capitalists, and political agents. Material interests may intersect, stimulating the formation of actor coalitions to push for a common agenda; or they may diverge, resulting in political conflict and struggles over scarce resources. The socio-technical transitions literature argues that industrial interests are often associated with particular technologies (Geels & Schot, 2007). The conflict between incumbent fossil fuel energy producers versus ‘niche’ renewable energy-based entrants is therefore highlighted as a contemporary example of interest-based struggles that spill over into political pressure to block climate reform (Moe, 2015).

Institution-based analysis usually focuses on the organisation and functions of the nation state. In most political economy traditions the state is seen to have a central role in facilitating markets and capital accumulation, namely through the enforcement of contracts and property rights, socialising the costs of unprofitable ventures required for private enterprise (roads, education, public health), and directly facilitating economic activity (Heilbroner, 1985). Both the quality of the institutions that carry out these tasks (i.e. their technical and bureaucratic capability) and their different organisational forms (e.g. exposure to veto players or political cycles) are highly consequential for understanding the constraints to structural change (Lockwood, Kuzemko, Mitchell, & Hoggett, 2016; Roberts et al., 2018).

Idea-based analysis argues that the underlying worldviews and ideologies of actors matter. Certain worldviews can undermine political consensus on important points of policy, such as a pre-disposition towards rationalising the status quo (Jost, Banaji, & Nosek, 2004), or an increasing distrust of ‘elites’ such as scientists and politicians (Lockwood, 2018). But beyond the voting public, the ideas of influential actors (e.g. business leaders and politicians) are argued to be highly consequential for social and political change, since they can be directly implemented into policy (Hall, 1997). The volumes of literature on a post-1980s neoliberal turn in global governance – and its wide-reaching social, economic and political consequences – attests to this claim (Harvey, 2005; Rodrik & World Bank, 2006).

Political economists often argue that ideas, institutions and interests interact in a complex manner, potentially fusing into ‘structures’, ‘complexes’ or ‘regimes’ that are internally consistent and self-reinforcing (Geels, Sovacool, Schwanen, & Sorrell, 2017). A historical perspective is needed to explore the development of these regimes, for instance to uncover how interests have engaged in shaping institutions and propagating discourses in order to consolidate their material position. The dominance of private automobile transport in many countries is one example, itself the result of decades of investment in infrastructure (roads), facilitating institutions (transportation ministries), cultural conditioning (cars as a symbol of freedom and status), and material production supporting a wide array of actors (capitalists, unions, and regional economies) (REF Mattioli et al.). The ‘ways of doing things’ that are established by regimes may be so embedded in daily life as to appear a natural social phenomenon, with alternatives rarely discussed or deemed ‘infeasible’. Dismantling regimes is a very difficult task.

Political economists hold that if transitions are to occur, they need to be animated at multiple scales. [Re-write and go beyond MLP here…] Three levels are discussed in the socio-technical transitions literature: a mid-level ‘regime’ comprising the dominant industrial and institutional configuration; a ‘niche innovation’ level, where small networks of actors try to push new technologies, norms and forms of social organisation into the mainstream; and a ‘socio-technical landscape’ level, which reflects the exogenous context of global norms, technological change and other factors that put pressure on regimes (Geels et al., 2017). When all three levels are aligned a ‘window of opportunity’ emerges, enabling niches to breakthrough and a new regime to form. This perspective underpins the importance of flanking climate policies with a diverse set of interventions and actions that erode the social, political and economic hegemony of a regime, such as bottom-up technology innovation and support (Gallagher, Grubler, Kuhl, Nemet, & Wilson, 2012), norm diffusion (Green, 2018), and so forth.

### Defining the dependent variable

Interests, ideas and institutions provide a basis for exploring socio-economic change and its constraints, but a substantive analytical challenge remains: what is the dependent variable? Following two decades of climate discourse and policy making, there are various examples of target setting, treaty ratification, policy adoption and policy stringency to assess. Arguably, one needs to examine all of these to get a complete picture of whether countries are succeeding or failing in promoting ambitious climate mitigation in line with the Paris Agreement targets.

One approach is to examine trends in national carbon emissions. This is taken by a large volume of well-reviewed studies that aim to uncover the ‘human drivers of carbon emissions’ (Dietz, 2017; Jorgenson et al., 2018; Rosa & Dietz, 2012; Tjernström & Tietenberg, 2008). An advantage is the long and consistent time series of emissions accounts available (Quéré et al., 2018), facilitating quantitative assessments into the influence of various factors. A disadvantage is that current emissions are often the outcome of path dependencies that significantly pre-date contemporary climate concerns, such as early decisions determining the fuel content of national energy systems (Foxon, Pearson, Arapostathis, Carlsson-Hyslop, & Thornton, 2013). And since climate policy implementation has yet to fully manifest in many countries, trends in current emissions are unlikely to be a sound guide to future constraints.

A second option is to examine the adoption of climate targets, legislation and international agreements. These ‘intentions to mitigate’ might include the Nationally Determined Contributions (NDCs: the bottom-up climate commitments by countries to the Paris Agreement), compilations of national targets and legislative measures (Iacobuta et al., 2018), or the commitment of countries to UNFCCC protocols (Bernauer & Böhmelt, 2013). The large variation in country commitments and different types of strategies adopted (e.g. legislation vs. executive targets) attests to the interesting nature of these data. Yet, a clear disadvantage is that intentions often do not reflect outcomes. This is increasingly clear from countries with ambitious targets, such as the UK and Germany, but a poor track record of making progress towards them (REF?).

A third approach is to examine the adoption and stringency of climate policies, particularly ‘flagship’ policies such as carbon taxes, renewable energy tariffs, fossil fuel subsidy reforms, or moratoria on new fossil fuel infrastructure (Compston & Bailey, 2016; Schmidt & Fleig, 2018). For some instruments this has the advantage of enabling assessments of both policy output (adoption) and outcomes (e.g. carbon price levels). However, the variety of instruments available clearly hampers comparative research.

A final approach is to combine policy output and emissions outcomes. The Germanwatch Climate Change Performance Index (CCPI) combines measures of national and international climate policy adoption with recent trends and levels of GHG emissions, energy use and renewable energy penetration (Burck, Hagen, Marten, Höhne, & Bals, 2019). Unfortunately, the multiple underlying dimensions of this data induces problems of interpretability, as well as availability – with only 60 countries available for analysis in the latest iteration.

## Theory and empirics on climate policy constraints

We now turn to the theoretical and empirical literature on constraints to climate policy. Focus is on international studies (comprehensive?) – we try to contextualise these with reference to theoretical literature and case studies.

These are structured into three areas of political economic inquiry, as already established: the role of interests, institutions and ideas. The predominant focus in each case is on constraints to the adoption of climate legislation (broadly interpreted as treaty ratification, target setting, and the establishment of responsible ministries); the adoption of climate policies more specifically (regulations, standards and instruments such as a carbon price); and the stringency of climate policies (primarily the carbon price level, which informs most of the empirical and comparative literature).

### Interests

Fossil electricity utilities are prominently at risk from strong climate policies designed to progressively phase-out of coal, oil and gas use within the next decades. These firms are closely linked to an upstream (often international) chain of production activities that would also bear non-trivial compliance costs, including extraction and mining, transportation (e.g. railways and cargo shipping), and refining. Other energy-intensive industries are also materially exposed to climate policy, such as mining and smelting firms, and chemical and heavy manufacturing industries. These various interest groups are likely to oppose the adoption and stringency of climate policy.

There is mixed evidence in the empirical literature for these effects: both Lachapelle & Paterson (2013) and Fankhauser et al. (2015) find a negative correlation between high shares of fossil fuel exports in GDP and climate legislation adoption, but not a significant relationship. When it comes to the adoption of carbon prices, Dolphin et al. (2016) do find a significant negative effect of high fossil fuel shares in electricity generation (coal and oil, but not gas), as well as the industry share of GDP. The stringency of carbon prices is also influenced by high fossil shares of electricity generation, as shown by Levi et al. (2019) and Dolphin et al. (2016).

Fossil interests may respond to the threat of climate policy with different strategies. Direct opposition to policy adoption (or the roll-back of existing legislation) is one approach. This has been well documented in case studies, such as the carbon tax repeal in Australia (Crowley, 2017) and heavy lobbying against coal regulation in South Africa (Baker, Newell, & Phillips, 2014). Yet, when high political demand for climate policy is perceived, firms may also take a hedging strategy: supporting the adoption of legislation, but pushing for exemptions or a particular instrument in order to minimise compliance costs (Meckling, 2015). This occurred in the case of the EU Emissions Trading Scheme (ETS), where industrial associations representing oil and gas and electric utility interests took a pro-regulation stance, but favoured emissions trading over a carbon tax, due to lower predicted costs (Meckling, 2015).

Other interest groups are also known to have a stake in climate policy, including fossil fuel end-users, environmental NGOs, and nascent low-carbon industrial interests. The former have been extensively discussed in the context of efforts to reform fossil subsidies in the global South, which renders certain consumption behaviours more expensive (e.g. household energy and vehicle use) and can have strong distributional consequences (e.g. impacting upper and middle-classes especially) (Dorband, Jakob, Kalkuhl, & Steckel, 2019; Sovacool, 2017). Since benefiting consumer groups are often politically influential, authors have suggested that fuel subsidies are a visible distribution of rents designed to ‘buy’ their support (Lockwood, 2015; van Beers & Strand, 2013). This to a large extent has can explain the persistent failure of efforts to reform fossil subsidies (Victor, 2009).

Environmental NGOs are vocal proponents of climate policy and are known to support and participate in a wide array of decision making and governance activities (Kuyper, Linnér, & Schroeder, 2018). There is cross-national evidence that the absence of environmental NGOs hinders the adoption of climate legislation (Böhmelt, Böker, & Ward, 2016; Fankhauser et al., 2015). And finally, low-carbon industries (e.g. renewable energy producers) are an interest group that would materially benefit from climate policy; there is emerging evidence from the case study literature that they indeed support and can be decisive for the adoption of climate policies (Meckling, Sterner, & Wagner, 2017; Pahle et al., 2018).

<https://www.tandfonline.com/doi/abs/10.1080/09644016.2012.688359>

<https://books.google.de/books?hl=en&lr=&id=o8I6DAAAQBAJ&oi=fnd&pg=PA9&ots=M-dbBWfFBN&sig=LHGvwivXdXJnj-JUYuTHkzGxovI&redir_esc=y#v=onepage&q&f=false>

### Institutions

Institutions and governance arrangements have important procedural roles in the adoption and implementation of climate policy. Institutions include formal democratic systems such as elected parliaments and the distribution of powers between different government branches, as well as less formal methods of exchange between public and private actors through consultations, lobbying and so forth. Public institutions are also the primary vehicles for monitoring private sector activities and enforcing regulations. Institutional analysis recognises that political struggles are mediated by these arrangements, with manifold consequences for the political economy of climate policy (Lockwood et al., 2016).

The literature to date has focused much attention on the role of democracy. Contra autocratic regimes, democracies are argued to have particular features that favour the adoption of climate policy: they are inclusive and entitle citizens to formulate environmental preferences, and – in principle – they allow the conduct of government to be influenced by these preferences (Böhmelt et al., 2016). Moreover, democratic governments have greater incentives to provision public goods such as climate protection, since these provide social benefits to a wide electorate, in contrast to autocratic regimes, which typically survive by paying off a small ‘selectorate’ (Böhmelt et al., 2016). (As discussed before, this can manifest as fossil fuel subsidies, or ‘negative’ climate policies).

These hypotheses are strongly supported by cross-national evidence showing that higher indexes of democracy and democratic inclusiveness (e.g. strength of civil society, participation and political freedom) correlate with the adoption of climate legislation (Böhmelt et al., 2016; Lachapelle & Paterson, 2013; Obydenkova & Salahodjaev, 2017), and the adoption of carbon prices (Dolphin et al., 2016; Levi et al., 2019). Time-averaged analysis also confirms that the long-term accumulation of democratic norms and apparatus is as important the current status of countries: long periods of autocratic rule leave a legacy that is difficult to shake (Fredriksson & Neumayer, 2013).

The character of democratic institutions are widely considered to matter. Presidential systems appear to offer more ‘veto-points’, or opportunities where interest groups may intervene to prevent the passage of climate legislation.

A related strand of research

Exclusion from democratic decision making could undermine pro-social behaviour and reciprocity (Böhmelt et al., 2016).

* Democracy is moderated by the type of institution: parliamentary vs. executive, electoral cycle, veto points, variety of capitalism, multi-level governance
* Capability: corruption, govt. effectiveness. Strong correlations to GDP, democracy.

Subsidy reform: “A key aspect of political institutions, in the context of explaining energy subsidies, is whether governance is democratic or non-democratic, or rather the degree to which a country is in effect democratic.”

### Ideas

* Public belief
* Perception of impacts
* Political ideology (left/right)

<https://www.mdpi.com/2071-1050/9/5/679/htm>

<https://www.tandfonline.com/doi/abs/10.1080/14693062.2006.9685582>

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| --- | --- | --- |
| Study | Dependent | Constraints and their reported effects on the adoption and stringency of climate legislation and policy |
| (Levi et al., 2019) | Weighted carbon price level (191 jurisdicitons) | - Public belief in human-made climate change (+)  - Coal in energy generation mix (-)  - Share of industry in GDP (+)  - Democracy index score (-)  - Government effectiveness (-)  - Control of corruption (-)  - Multilevel governance (e.g. EU ETS) (-)  - Development level (GDP) (-)  Not:  - Political concentration (veto points)  - Majoritarian voting system  - Oil share of energy generation mix |
| (Dolphin et al., 2016) | Carbon price adoption (136 national + 63 subnational jurisdictions) | - High share of electricity generation from fossil fuels (coal & oil)  - High share of industry in GDP  - Low development level (GDP)  - Low share of trade in GDP  - no EU membership  - Low democracy score  Not:  - Political ideology (Left/Right)  - Institutional capacity (Government effectiveness & Regulatory Quality) |
| Carbon price level (37 national + 24 subnational jurisdictions) | - High share of electricity generation from fossil fuels (coal)  - High share of industry in GDP  - Low development level (GDP)  - no EU membership  Not:  - Trade openness  - Left/right ideology  - Institutional capacity (Government effectiveness & Regulatory Quality) |
| (van Beers & Strand, 2013) | Fossil fuel pricing [i.e. negative carbon prices] |  |
| (Fankhauser et al., 2015) | Adoption of climate legislation within a given year – targets as well as policies (63 national jurisdictions) | - No existing legislation or path dependency (esp. flagship laws)  - Right-political ideology (Anglo-Saxon countries)  - Electoral cycle (in high level of democracy)  - Non-unified government (majorities)  - Low IUCN members (pro-green lobby)  Not:  - Business cycle (economic shocks)  - Left/right ideology (generally)  - Electoral cycle (poor democracies)  - High share of fossil and mining exports in GDP (correlated, not significant) |
| (Böhmelt et al., 2016) | Climate legislation adoption – ratification/contribution/ reporting to UNFCCC (149 national jurisdictions) & emissions | - Low political participation (freedom of speech, assembly, association)  - Low political freedoms (suffrage, elections, women’s political rights, etc.)  - Low strength of civil society (no. established environmental NGOs under IUCN) |
| (Lachapelle & Paterson, 2013) | Climate policy adoption (regulations, incentives, carbon price, voluntary agreements, R&D) | - Democracies more likely to implement policies  - Parliamentary systems more likely than presidential to implement  - Exports of mineral fuels decrease likeliness of climate policy adoption  - Variety of capitalism affects instrument choice  Not:  - propotional representation |
| (Fredriksson & Neumayer, 2013) | Climate legislation adoption –  (CLIMI Index) – incl. targets, institutions, UNFCCC adoption | - Lack of democratic capital, via…  -> Lack of constraints on the executive (checks and balances)  Not: -> free/fair elections |
| (Obydenkova & Salahodjaev, 2017) | Climate legislation adoption (CLIMI Index) – incl. targets, institutions, UNFCCC adoption | - Low social cognitive capital (IQ)  - Democracy |

* Don’t forget the carbon lock-in literature
* Theoretical perspectives in Lachapelle & Paterson 2013

## Analogous literatures

### Constraints to public policy making

Climate change similar to other types of public policy (Fankhauser et al., 2015): requires strong government to withstand interest groups. Climate policy is a public good (Tjernström & Tietenberg, 2008).

<https://journals.sagepub.com/doi/abs/10.1177/106591290305600103>

Hanson, K., Ranson, M.K., Oliveira-Cruz, V., Mills, A., 2003. Expanding access to priority health interventions: A framework for understanding the constraints to scaling-up. J. Int. Dev. 15, 1–14. doi:10.1002/jid.963

Dellepiane-Avellaneda, S., 2009. Review Article: Good Governance, Institutions and Economic Development: Beyond the Conventional Wisdom. Br. J. Polit. Sci. 40, 195. doi:10.1017/S0007123409990287

Easterly, W., Ritzan, J., Woolcock, M., 2006. Social Cohesion, Institutions, and Growth (No. 94).

Holmberg, S., Rothstein, B., Nasiritousi, N., 2009. Quality of Government: What You Get. Annu. Rev. Polit. Sci. 12, 135–161. doi:10.1146/annurev-polisci-100608-104510

- Trust: UNEP Gap Report 2018

- Social cohesion

*Definition: “the nature and extent of social and economic divisions within a society (income, ethnicity, political party, caste, language, …)”. Fewer divisions = fewer “leverage points for individuals, groups, or events to expose and exacerbate social fault lines”*

*Example: right-wing populism and climate change (Lockwood 2018), manifesting in Trump’s withdrawal from the Paris Agreement*

### Non-democratic regimes

<https://www.v-dem.net/en/news-publications/democracy-reports/>

closed autocracy, electoral autocracy, electoral democracy, liberal democracy.

* *Sen Development as freedom (p40): interlocking role of institutions, social cohesion, social provisioning*
* **Also: that provisioning, institutions and cohesion are seen here in an instrumental fashion should not reduce their intrinsic importance as public goods (Sen p37)**

- rentier states

Chayes, S., 2017. When corruption is the operating system: the case of Honduras. Washington, DC.

van der Ploeg, F., 2011. Natural Resources: Curse or Blessing? J. Econ. Lit. 49, 366–420. doi:10.1257/jel.49.2.366

## Stylized facts

### Correlations and overlapping constraints

Tree diagrams?

### Trends and improvements in constraints

“It appears that we cannot expect climate change policies (and perhaps international environmental policies more generally) to improve rapidly in countries that recently experienced democratization. Only over time do democratic principles penetrate a society and its policymaking apparatus sufficiently to have a positive effect.” (Fredriksson & Neumayer, 2013)

See also, corruption in post-communist states: <https://www.tandfonline.com/doi/full/10.1080/1060586X.2014.931683>

* Shouldn’t misunderstand the development process … democratic bias… no slow progress towards democracy, capable institutions and climate-aware citizens … but a landscape of distinct regime types (Levitsky and Way 2002)… punctuated by periodic upheavals, but otherwise quite stable.
* “The assumption that hybrid regimes [partial democracies] are (or should be) moving in a democratic direction lacks empirical foundation… these cases should be conceptualized for what they are: a distinct, nondemocratic regime type.” (Levitsky and Way 2002)

Tobin, P., 2017. Leaders and Laggards: Climate Policy Ambition in Developed States. Glob. Environ. Polit. 17, 28–47. doi:10.1162/GLEP

### Cluster analysis

Correspondence analysis (Koch & Fritz, 2014)

DFMA?? (Fritz & Koch, 2016)

## Discussion

## Conclusion

In the face of these political economic challenges, authors have naturally called for packages of climate reform that address multiple underlying issues. For instance, earmarking carbon tax revenues for public goods and infrastructures could enhance the public acceptability of policies (Jakob et al., 2016), while pragmatic compensation mechanisms may be needed to buy the support of affected interest groups (Vogt-Schilb & Hallegatte, 2017). There is also wide agreement that establishing “enabling environments” and “institutional capacities” are basic pre-conditions for effective climate policy that are currently lacking (Carbon Pricing Leadership Coalition, 2017).

These are sensible and needed prescriptions, but they risk overlooking a larger architecture of constraints. Fossil fuelled economies are naturally resistant to change: they comprise not just the fixed infrastructures that need to be adapted or retired, but also the social and political systems that have co-evolved with them (Geels et al., 2017). These regimes have design features that either preclude the possibilities for reform, or hamstring those agencies that are responsible for implementation. Thus the terminology of ‘weak institutions’ and ‘lacking political will’ masks the *deliberate* nature of such deficiencies (Chayes, 2017). (… research on regimes?)

S. J. Davis and R. H. Socolow, “Commitment accounting of CO2 emissions,” *Environ. Res. Lett.*, vol. 9, no. 8, p. 84018, Aug. 2014.

C. McGlade and P. Ekins, “The geographical distribution of fossil fuels unused when limiting global warming to 2 °C,” *Nature*, vol. 517, no. 7533, pp. 187–190, Jan. 2015.