

When Is Polycentric Governance Sustainable?

Using Institutional Theory to Identify Endogenous Drivers of Dysfunctional Dynamics

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Abstract

In polycentric governance public and private authorities with overlapping domains of responsibility interact in complex ways that can, in some circumstances, perform well in producing diverse public goods and securing a resilient social order. This paper is part of our broader project comparing the policy performance of different kinds of polycentric governance in different empirical settings. Here we explore a question rarely considered: under what conditions will polycentric governance remain sustainable? Like any form of governance, it has both positive and negative consequences. Its own dynamics generate levels of complexity that may seem overwhelming and unworkable, and yet it also insures that citizens retain access to multiple mechanisms for improving policy outcomes. We identify disturbing “syndromes” that may emerge endogenously from the interplay of bottom-up and top-down dynamics characteristic of polycentric governance, and suggest ways policy actors may counteract these trends towards dysfunctionality.

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In a system of **polycentric governance**, a diverse array of communities and public and private authorities with overlapping domains of responsibility interact in complex and ever-changing ways, and out of these seemingly uncoordinated processes of mutual adjustment emerges a persistent system of social ordering that can support and sustain capacities for individual liberty, group autonomy, and community self-governance. Originally introduced by Ostrom, Tiebout and Warren (1961; hereafter OTW) as a vision of governance that embraced the potentially positive consequences of governmental fragmentation in U.S. metropolitan areas, the best-known application of polycentricity to real-world settings remains the pioneering research of Elinor Ostrom (1990, 2010a) on community-based collective management of natural resources. More recently, scholars and policy advocates studying the range of policy responses to the ongoing challenges posed by global climate change have been inspired by E. Ostrom's preliminary efforts to apply the concept of polycentric governance to those problems (Ostrom 2010b, 2012). In all of these settings a multitude of individual or collective actors, each with a limited range of authority which, to a considerable extent, overlaps with the jurisdiction of other actors, thus requiring community members or public authorities to interact with each other to achieve their own goals.

The core concept of polycentricity is, at heart, simple, but it is manifested in bewildering complexity, and thus this concept is extremely difficult to capture in any single definition. Here are three of what we consider the best definitions, each from one of the Ostroms themselves.

- “The traditional pattern of government in a metropolitan area with its multiplicity of political jurisdictions may more appropriately be conceived as a ‘polycentric political system’. ‘Polycentric’ connotes **many centers of decision-making which are formally independent of each other**. Whether they actually function independently, or instead constitute an interdependent system of relations, is an empirical question in particular cases.” (OTW 1961, 831, bolding added)
- “A **polycentric organization** has been defined as a **pattern of organization** where **many independent elements** are capable of **mutual adjustment** for **ordering their relationships** with one another **within a general system of rules**.” (V. Ostrom 1972, in McGinnis 1999, 73; bolding added)
- “By ‘polycentric’ I mean a system where citizens are **able to organize not just one but multiple governing authorities**, as well as private arrangements, at different scales.” (E. Ostrom 2003, in Cole and McGinnis, eds., 2015, 61 bolding added)

The concept of self-organization lies at the very heart of the concept of polycentric governance. Although the multiplicity of decision centers always seems to be the first thing mentioned by anyone trying to define this term, it's not the sheer number of individuals or authorities involved but rather the way they interact that constitutes the primary driving force for how a PG system operates in practice. In PG, groups organize themselves in order to better accomplish their shared goals, and they often do this without direct intervention by official political authorities. Thus, PG offers a vision of governance that highlights the viability of community-based, bottom-up processes as opposed to the top-down

authoritative decisions of government administrators, who may not have any direct connection to the people whose lives will be shaped by those policies. Yet, as we will argue below, a community's to self-organize is profoundly shaped, and can be either reinforced or undermined, by policies enacted by formal political agents. Still, we expect that for particular social problems and in particular settings of value orientations, social heterogeneity, and rule repertoires, and especially when considering processes occurring over the long-term, a polycentric system infused by bottom-up dynamics will demonstrate superior performance in satisfying societal expectations and preferences than alternative modes of governance.

The line of analysis we develop here is intended to help us move towards answering the following big question: how well can polycentric governance generate effective matches between the functional scope of the jurisdictions of specific authorities and the geographical and temporal extent of the social and ecological processes that governance system is meant to address? We will review important ways in which other scholars have addressed this question, but in this particular paper we are primarily concerned with addressing a question rarely considered in the relevant literatures: under what conditions should we expect that a system of polycentric governance will remain sustainable, versus those conditions under which its very operation may undermine its ability to continue to do so over the long term? In short, our focus will be on dynamic processes endogenous to the operation of PG systems.

In the first section of this paper we summarize the primary benefits different analysts claim can be expected from the operation of a polycentric system of governance, and discuss preliminary results from our ongoing review of research literatures related to the actual performance of polycentric systems of governance in real-world cases, as well as our reasons for encouraging future research on the use of PG as a tool for causal explanations, and less on PG as description or policy advocacy. We next review alternative efforts to identify the key components of PG and specify the framing we have found to be the most useful for our purposes here. In section 3 we provide a preliminary inventory of the transaction costs associated with the processes of self-organization that drive institutional changes within active systems of PG. Variations in these costs will change over time, and the next two sections identify the potential sources of trajectories of institutional change that might lead that PG system towards different modes of dysfunctionality. After briefly reviewing in section 4 insights from the Ostroms concerning the potential vulnerabilities of polycentric systems of governance, in section 5 we draw more widely on concepts developed in a range of institutional theories that serve to complement or complicate the consequences of changing costs of self-organization facing different groups. In section 6 we combine these drivers of endogenous change to identify a series of six negative **syndromes**, or equilibrium traps, into which PG systems may be driven by the unrestricted operation of their internal dynamics. Then, in section 7 we introduce countervailing forces that may oppose further development of these trends, and specify a few modes of behavior by public, political, and professional actors that might strengthen those countervailing forces. We conclude with a brief discussion of remaining challenges and highlight our hopes to more fully integrate the factor of leadership into subsequent analysis of the long-term sustainability of high-performing systems of polycentric governance.

1. Objectives and Initial Observations about Polycentric Governance as a Concept

The Ostroms were not alone in recognizing that most real-world systems of governance are surprisingly complex and yet they tend to share certain characteristics in common. Researchers working in different traditions tend to use distinct names to describe this mode of governance, including **Adaptive governance** (Polanyi 1951, Folke et al. 2005, DeCaro et al. 2017), **Collaborative governance** (Bryson,

Crosby, and Stone 2006, Ansell and Gash 2007, Emerson, Kirk, and Nabatchi 2015), **Cross-sector or network governance** (Goldsmith and Eggers 2004, Feiock 2009, 2013, Scott and Thomas 2017, Swann and Kim 2018), **Multi-level governance** (Hooghe and Marks 2001, 2003); **Functional Overlapping Competing Jurisdictions** (Frey and Eichenberg 1996, 2004), **Marble-cake federalism** (Grodzins 1960, Bohte and Meier 2000), **International regime clusters** (Young 2002, Epstein et al. 2014, Jordan et al. 2018, Blondin and Boin 2020), **Nexus governance** (Villamayor-Tomas et al. 2015, de Loë and Patterson 2018), and sometimes the generic term **complex governance**.

We see polycentric governance (**PG** for short) as a common name for the core mode of governance displayed in these many forms. Elsewhere we report on a systematic investigation of these research literatures, in hopes of discovering both common themes and aspects that may be unique to different policy settings. In all of its forms, polycentric governance requires a never-ending process of learning and adaptation to changing conditions, driven by respectful contestation among individuals and mutual adjustment among interdependent groups pursuing their shared and conflicting interests in endlessly shifting configurations of competition and collaboration.

From reviewing relevant works we have gathered the following list of potentially positive benefits from living under a polycentric system of governance (see also Aligica and Tarko 2012, Carlisle and Gruby 2017, Jordan 2018: 13).

1. Recognizing the ability of many local communities to govern themselves can demonstrate the viability of bottom-up alternatives to top-down government by national governments, many of which show little concern for the welfare of many of their subjects (Ostrom 1990 is the classic statement of the empirical foundations for this normative position)
2. Emergence of orderly patterns of interactions and outcomes (in honor of the continuing influence of Polanyi 1951)
3. Resilience of this emergent order to shocks (if not overwhelming in magnitude, as emphasized in literatures on adaptive governance in general, and governance of complex systems, with particular attention to closely coupled social-environmental systems; see Folke et al. 2005; DeCaro et al 2017)
4. Effective production and provision of diverse public goods (as emphasized by OTW 1961), which may or may not include goods and services requiring systems-level coordination (for positive examples see Pahl-Wostl 2009, Pahl-Wostl and Knieper 2014)
5. Generation and sustainability of rules for resource use that are consistent with local conditions and locally grounded knowledge (as emphasized by E. Ostrom 1990)
6. Sustained capacity for self-governance, insured by frequent participation of all (emphasized by V. Ostrom 1991, 1997, 2008a,b)
7. Foundations for building and reinforcing an overarching system of law, rules, and shared values built on widespread norms of trust and reciprocity (as emphasized in and V. Ostrom 1997, Potette et al. 2010, Aligica 2014)
8. Building and securing a just balance between personal freedom and collective authority, and providing a secure foundation for the continued realization of heterogeneous value systems found in multicultural societies (as emphasized in V. Ostrom 1997, 2008a,b, Aligica 2014, Aligica et al. 2019), thus placing polycentric governance firmly within the context of classical liberalism)
9. Distributed leadership and widespread public entrepreneurship (following the central role of public entrepreneurship throughout the entire careers of both Ostroms (V. Ostrom 1950, 1988, and E. Ostrom 1965, 2006a,b, McGinnis 2005, Aligica 2019)

The normative attraction of polycentric governance is its aspiration that any group of individuals facing a common problem (or sharing an aspiration for mutual gain) should have easy access to multiple means of addressing that problem, and that this right should extend to any others who might be harmed by the collective efforts of the first group. As such, polycentricity stands as a foundation for basic principles of liberty and good governance. However, since each individual has valid interests in many different aspects of social life, each also belongs to multiple social groups. The natural consequence, then, is that a polycentric system of governance may support a potentially overwhelming variety of collective action, for groups of all sizes and potential interests. It is hardly obvious that such pervasive complexity would always be desirable.

When used as a research tool, as a factor contributing to the determination of policy outcomes in real-world cases, the presence of a system of polycentric governance is expected to generate different patterns of policy outcomes than we would observe under any other mode of governance. For example, in comparative analyses of policing services delivered in selected metropolitan areas of the U.S., a Bloomington-based research team demonstrated that citizens living within more polycentric systems of governance expressed higher levels of satisfaction with their sense of physical security and the quality of relations between the police and their local community (see Ostrom 2010 and the papers collected in McGinnis 1999). The concept of polycentric governance remains a foundational principle of the Bloomington School of institutional analysis, or political economy (Mitchell 1988, Aligica and Boetkke 2009, McGinnis 2011, Cole and McGinnis 2015).

For the purposes of this paper, it is critical to keep in mind the distinction between normative expectations of the benefits of polycentric governance and the practical effects of this form of governance on how policy outcomes affect the members of that society. A key puzzle in the literature on polycentric governance remains how well polycentric systems can generate effective matches between the functional scope of the jurisdictions of specific governance entities and the geographical and temporal extent of the ecological processes that need to be monitored and governed (Cole and McGinnis 2015; DeCaro et al. 2017). Ostrom, Tiebout, and Warren did not presume that all polycentric systems were automatically efficient or fair, and they never denied the fundamentally political nature of polycentric governance. The key point was that, within such a system, there would be many opportunities for citizens and officials to negotiate solutions suited to the distinct problems faced by each community. The requisite variety for polycentric governance was sustained by never-ending processes of experimentation catalyzed by public entrepreneurs operating at all scales of organization, from local to national and beyond (V. Ostrom 1988, E. Ostrom 2006, McGinnis 2005, Aligica 2019).

Many claims have been made for PG, but researchers have thus far collected very little direct evidence of their performance, compared to alternative forms of governance. Preliminary conclusions from our ongoing review of the research literatures relevant to PG performance (Baldwin, Thiel, and McGinnis 2020) include that the current literature needs to be enhanced by more explicit attention to the underlying dynamic processes of self-organizing, and their potentially negative consequences. In this paper we introduce an explicit framework focusing on the self-organizing processes that first build and then sustain the operation of systems of PG. We then use that framework to consider the many ways in which development of a system of PG can end up generating both some of the positive ends often posited for it, as well as identifying a few more negative consequences that we argue should be expected to occur in many circumstances.

Our ongoing review of the literature shows that scholarly interest in polycentricity is burgeoning. Analysts have begun to produce many case studies documenting instances of polycentric governance,

with findings that could be described as cautiously optimistic: while polycentric governance is not a panacea, studies do suggest that it offers potential to promote local self-governance and sustainable resource use, at least in some empirical contexts. But there are significant gaps in this literature.

Our preliminary observations include the following:

- Fewer than one third of the papers reviewed so far pay explicit attention to dynamic changes in governance structures or processes.
- Despite an overall orientation toward the benefits of polycentricity, studies do acknowledge the challenges, especially around coordination and capacity. But few studies have explicitly recognized “pathologies” and so we know very little about them.
- Very few studies engage deeply with concepts related to “democratic governance”; they often include a naïve assumption that when decisions are made within local communities that this amounts to “self-governance.” (One anthropologist really questioned this, pointing out that donors and NGOs often set up systems for “local self-governance” that don’t match up with the systems that are traditionally used for local decision making – this can undermine rather than improve democratic governance, even if the decisions are made locally.)
- Also, very few studies have deeply considered the concept of accountability, which is kind of odd considering that accountability and coordination challenges are probably two of the most widely recognized potential pitfalls of polycentricity . . . coordination challenges are written about extensively, but accountability is not – and accountability failures directly undermine democratic self-governance.

In short, very few studies have examined the evolution of polycentric governance systems over time. As a result, it is unclear if the polycentric systems that currently perform well will be able to sustain their high-level performance over time by adapting to changed conditions. In addition, few studies have considered – let alone examined – the potential *negative* consequences of self-organization among multiple, overlapping groups. Our understanding of polycentric governance is thus incomplete, with insufficient attention to dynamic change over time, and too often suffers from a naïve assumption that polycentric governance systems will generally produce positive results.

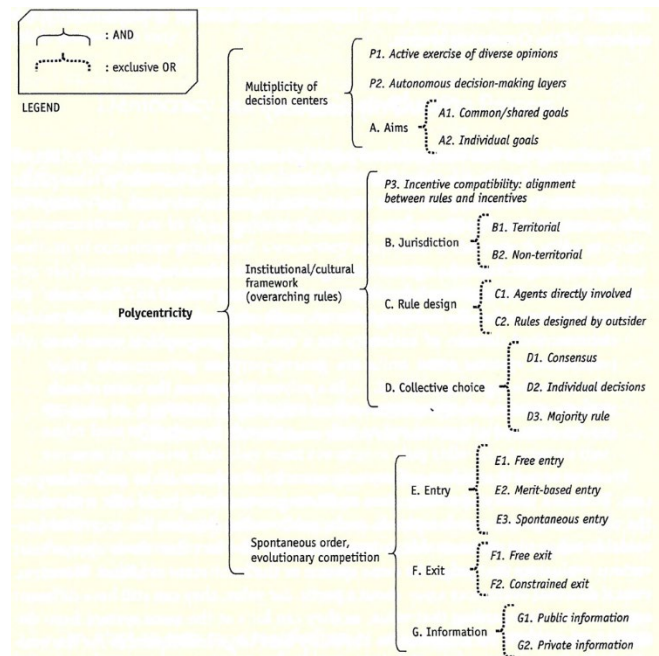
Frankly, institutional analysts know very little about how to evaluate the policy performance of a polycentric system of governance as a whole (Thiel et al. 2019). For example, consider the system of health policy in the United States (see McGinnis 2018). Institutional diversity runs rampant in this policy domain (Elhauge 2010). Public health began as a responsibility of local and state governments, with later involvement by national and global organizations, medical care remains primarily an area of professional expertise and economic transactions (although many treatment facilities are owned by non-profit organizations or local communities), and health insurance began with cooperative-based initiatives, later developed into a major sector of the private insurance industry, and in recent decades significant programs of public assistance have been added to the mix (Sultz and Young 2014). In all of these areas, collaborations among professionals, business leaders, public officials, patients and their advocates have generated an ever-expanding array of treatment regimens, but access to high-quality care varies significantly, and consistently unequal, by age, race, class, gender, and urban/rural location (Wright and Perry 2010). And all of these activities are subject to multiple layers of government regulation and professional oversight (Field 2007).

Compared to other advanced liberal democratic countries, Americans devote a much higher proportion of their economy to health insurance and medical care, and yet their personal health outcomes are

middling in most international comparisons (Gwande 2009, Sultz and Young 2014). This complex conglomeration of health policy domains may look very much like polycentric governance in full bloom, yet it performs poorly on all of the presumed benefits of PG systems, with one exception – it has proven to be stubbornly resilient against all efforts at comprehensive reform (Blumenthal and Marone 2010, Starr 2013). All this leads to a discomfoting question: how could a polycentric system of governance perform so poorly on so many evaluative criteria for so long? (McGinnis 2018) Clearly, much remains to be done in the way of critical evaluation of the performance of polycentric systems as a mode of governance.

2. Identifying the Key Dimensions of Polycentric Governance

Several scholars have offered explicit lists of the key attributes of polycentric governance, in hopes of supporting empirical investigations of its performance in different policy settings. Without claiming to be exhaustive, we would like to highlight a few of these efforts before embarking on our own elaboration of this concept.



Aligica and Tarko (2012) build a nested logical structure to represent connections among over a dozen logically possible combinations of the core components of polycentric governance. It's an impressive effort, and we'd like to summarize it using this figure from a more recent version (Aligica et al. 2019: 146). They begin by identifying three key components: multiplicity of decision centers, an overarching framework of rules, and spontaneous emergence of order through evolutionary competition among potential components of later systems. They then list subcategories of the forms which each of these components may take in different settings, such as the heterogeneity of decision centers, the modes of action dominant within that system's overarching framework, and the costs of entry, exit, and information facing actors in that evolutionary competition. There is an important contribution to this field of study, but since this categorical structure does not directly consider the sources of dynamic transformations from one type to another, we do not find it directly relevant to our current concerns about understanding the ways in which any single example of PG may change its own structure through the continued operation of its own endogenously driven dynamics.

Carilse and Gruby (2017) recently offered an appealing division of aspects of PG into three categories: attributes, enabling conditions, and advantages. This framework is likely to prove useful for organizing empirical case studies, but we again find it lacking for our specific purposes. Their list of enabling conditions is pretty diverse, including opportunities to make use of diverse institutions and modes of participation, but they do not offer a clear rationale for how these conditions are inter-related in practice. Given our interest in the exogenous development of particular PG systems, we wonder how those enabling conditions were themselves initially enabled? And how are they sustained over time? Again, a useful contribution, but we need to find a different starting point for our own line of argument.

Attributes	Enabling Conditions	Advantages:
Multiple overlapping decision-making centers with some autonomy	<ul style="list-style-type: none"> • Employ diverse institutions • Exist at different levels and across jurisdictions • Jurisdiction coterminous with problem boundaries 	<ul style="list-style-type: none"> • Enhanced adaptive capacity
Choose to take account of others through cooperation, competition, conflict, and conflict resolution	<ul style="list-style-type: none"> • Applicable rules and norms structure actions & behaviors • Participation in cross-scale linkages and other mechanisms for learning • Mechanisms for accountability • Variety of formal and informal mechanisms for dispute resolution 	<ul style="list-style-type: none"> • Good institutional fit • Risk Mitigation/ Redundancy

Source: Carilse and Gruby 2017

The European Union stands as an ongoing experiment in innovative institution-creating, and the relative weakness of direction from the top level makes it a potentially strong example of PG in action. In their introduction to a recent edited volume exploring this connection, van Zeven and Bobić (2019), explicitly include access to justice as one of the foundational prerequisites for the continued operation of polycentric governance. But it remains unclear exactly how that concern is manifested in particular modes of self-organization or mutual adjustment within that governance system.

Table 1.1 *Polycentric governance: examples of positive and negative features*

Positive features	Negative features
Ability to innovate and learn: units experiment with new approaches and learn from one another	Bias towards incremental change: arises from the mutual adjustment amongst units (a 'race to the bottom')
Engender greater trust: by tailoring governance to specific circumstances	Lower trust: actors 'shop' amongst domains, provoking a race to the bottom (e.g. carbon leakage)
More robust: if one element or domain fails, others can step in	Less robust: greater vulnerability to external changes, e.g. reductions in funding or political support
Enhanced accountability and legitimacy: acting locally facilitates direct participation	More contested accountability and weaker legitimacy ('who is in charge?')
More inclusive and equitable: by 'over-providing' services, polycentric systems ensure that no one is left behind	Easily dominated by powerful actors who 'game' the system and are unaccountable
Ability to address big challenges through the steady accumulation of marginal changes by each domain	Inability to deliver significant changes (because of free-riding) or address issues that span domains

Source: Jordan et al., 2019: 13.

Another recent volume worth noting is Jordan et al. (2018), which is focused on polycentric dynamics of climate governance. They highlight five “propositions” that they use to organize the findings of empirical studies in the chapters of that volume. These themes highlight the importance of local action, mutual adjustment, experimentation, trust, and overarching rules. They also provide a nicely balanced list of potential positive and negative consequences of PG in action in this policy area, in the table reproduced above.

A particularly active line of investigation is based on the conceptualization of polycentric and related forms of complex governance as forming an “ecology of games” (Lubell 2013, Lubell et al. 2010, 2014, Berado and Lubell 2019). Researchers working in this tradition define specific network-based measures of the number of actors, or decision arenas, or diversity of actors in decision arenas, or the collaborative mechanisms set up by public, private, and community organizations working together to improve conditions in some particular policy setting. They set a great example for future researchers by positing empirical measures and testing explicit propositions, but we question their almost exclusive reliance on measures and propositions related to details of network structure, without taking into account broader aspects of these decision arenas as institutions. For example, they might measure decision center diversity by comparing the number of private, public, and non-profit participants active in different policy forums, but many of the most important institutional components of a PG system can only be described as hybrid forms, each combining functions traditionally assigned exclusively to organizations within public, private, professional, or community sectors.

Another line of research shows a close connection to the end point of the analysis we present here. Sarker (2013) introduced the term “**state-reinforced self-governance**” to the literature as a means to study community-based irrigation systems in Japan. The key point is that communities often require various forms of assistance from national or provincial governments in order to achieve and sustain self-governance. DeCaro et al. (2017) emphasize the legal foundation for inter-local collaboration on water governance in the United States, and conclude that “traditional centers of authority may establish enabling conditions for adaptation using a suite of legal, economic, and democratic tools to legitimize and facilitate self-organization, coordination, and collaboration across scales.” This perspective strongly resonates with our own description of the critical role of external assistance in most processes of self-organizing communities.

Several scholars have considered the extent to which complex forms of governance generate institutional forums organized at the right geographic scale for a particular set of policy problems (Young 2002, Ekstrom and Young 2009, Blondin and Boin 2020), or have the capacity to adjust their policies quickly enough to handle changes in the nature of those problems (Folke et al. 2005, Anderies and Janssen 2013). But instead of focusing on how well a governance system adapts to its environment, we instead direct our attention to the considerably less well-studied topic of endogenously driven institutional change within an operating system of PG. We are particularly interested in exploring the conditions under which the natural operation of PG serves to reinforce or undermine the conditions necessary for the establishment of that system’s structure, continuation of its characteristic processes, and the quality of its outcomes as compared to any particular set of normative criteria. This means that certain closely related questions are held at abeyance during the conduct of the present analytical exercise.

We see our work here as fitting directly within a general perspective on polycentric governance outlined in Thiel et al. (2019). Contributors to that volume were encouraged to conceptualize polycentricity as a lens through which questions of governance processes and their performance in specific empirical

settings can be seen in a new light. Editors of that volume summarized the mode of analysis inspired by looking through that lens as the study of the ways multiple, de facto semi-autonomous decision centers self-organize to provide for collective goods. They encouraged authors of case studies to focus on how these constellations of institutional mechanisms operated in their areas of study and how well they produced outcomes that were deemed socially desirable, and what conditions made that success possible.

The analysis presented here complements perspectives adopted by two chapters from Thiel et al. 2019, which also look at institutional change within, or around, a system of PG governance. In both papers, the authors call for more rigorous research into the empirical conditions that shape the formation, operation, performance, and consequences of governance of the polycentric variety.

Thiel and Moser (2019: 67) note that the characteristics of a system of PG can be treated as either independent or dependent variables, which is consistent with the endogenously-driven dynamics of particular concern for the current paper. They argue that, although PG systems may be most likely to emerge in situations in which heterogeneous communities must cope with a diverse range of social-problem characteristics, the exact forms which any given PG system will take (in terms of typical modes of mutual adjustment, for example) will be shaped by the extent of opportunistic behavior likely to be observed in that community, as well as how frequently problems of joint production of different goods and services arise in that policy sector. Thiel, Pacheco-Vega, and Baldwin (2019: 92) “spell out what it means for the assessment of polycentric governance that its change is evolutionary, variable to relation to level of aggregation at which selection takes place, and path-dependent.” They treat institutional changes within PG as being driven by implicit or explicit negotiations among actors engaged in an action situation (that is, a site of strategic interaction among individual or collective actors). In both chapters the authors pay particular attention to understanding the roles played by three alternative modes of making changes to one’s current institutional setting: exit, voice, and self-organization, the latter described by Thiel et al. (2019: 98) as “establishment of alternative entities for provisioning and producing collective goods in order to replace existing relations with which they were discontent.”

Taken together these chapters bracket the dynamic environment with which we are primarily concerned in the current paper. Thiel and Moser seek to understand the extent to which systems of PG can be said to adapt to, or co-evolve with, the social-problem characteristics found in the external environment of the policy setting to which that system is connected. Thiel, Pacheco-Vega, and Baldwin focus instead on the internal dynamics of PG systems, and raise concerns grounded in the similarity of PG to complex adaptive systems in their tendency to general meaningful modes of order:

The question remains whether certain development paths lead to more desirable lock-in situations than others, what those development paths look like and how we can observe them. Altogether, this raises questions about whether path dependence, associated transaction costs, and tendencies toward incremental change in polycentric governance might entail a serious obstacle to desirable performance of governance. In such situations, more centrally organized governance arrangements may better deal with undesirable lock-in situations. (Thiel, Pacheco-Vega, and Baldwin 2019: 107)

Below we introduce a specific set of potential lock-in situations, or equilibrium traps, into which an active system of PG may fall, if the quasi-automatic processes of incremental adjustment of existing institutional arrangements is allowed to run on by itself, unimpeded by actors trying to consciously guide that system toward a more desirable outcome. Although many researchers use the term

polycentric to refer to a system driven almost (if not completely) entirely dominated by bottom-up processes, we argue instead that certain modes of top-down behavior are inherent in the very processes intrinsic to bottom-up self-organization. We hope to show that at least a limited mode of top-down proactive management of change dynamics is needed to insure the continued integrity of the requisite conditions for PG sustainability.

But the equilibrium exhibited by a healthy system of PG should not be reducible to any kind of lock-in or static conditions. The peculiar nature of dynamic equilibrium in a PG system is worth emphasizing.

As long as a polycentric system is in operation we should expect to observe unending processes of change and renegotiation, as new collective entities are formed, old ones dissolve, and new bargains are arrived at to deal with an unending series of new issues of public policy. If this can be said to be an equilibrium, it is a radically dynamic one, with nothing fixed except the underlying complexity of the system as a whole. (McGinnis 2005, 168, quoted in Thiel, Pacheco-Vega, and Baldwin 2019: 102)

In sum, there are at least three different levels of spatial and temporal aggregation at which institutional changes are selected for (or against) with respect to a system of PG: (1) the micro-level at which individual actors within that system pursue their own interests by negotiating to make changes in their local institutional settings, (2) the meso-level where system-level leaders or governors (if they exist) may act to compensate for emergent dangers to the long-term viability of that PG system resulting from the accumulation of micro-level decisions, and (3) macro-level changes in the effectiveness to which the policy outputs from that PG system constitute a “good fit” to the conditions posed by the nature of the social-problem characteristics prevalent in the environment within which that governance system is operating, compared to other modes of governance. All three levels are worthy of further analysis, but in the remainder of this paper we restrict our attention to that intermediate level at which the emergent properties of accumulated micro-level changes may, or may not, face resistance from actors undertaking proactive efforts to manage the continued viability of the conditions that made it possible for that PG system to emerge, or be established, in the first place.

To move forward on this front, we draw upon the conclusions of Stephan, Marshall, and McGinnis (2019: 41), another chapter in Thiel, et al. (2019). After reviewing a wide variety of definitions offered by different scholars, they converged on the following list of eight core “dimensions of polycentric governance.”

1. Multiple decision centers (which may be of varying sizes and types);
2. De jure independence or de facto autonomy of decision-making authority for each decision center;
3. Overlapping jurisdictions in the range of authority for different decision centers (in addition to spillover effects of outcomes);
4. Multiple processes of mutual adjustment among decision centers (taking each other into account);
5. Low entry and exit costs for organizations or informal groupings;
6. An overarching system of rules (or laws, norms, and shared values);
7. Emergent patterns of behavior, interactions and outcomes across decision centres;
8. A combination of emergent and intentional means of effective coordination at all levels of aggregation, from single decision centers to the system as a whole.

It's important to note that not all researchers using the concept of PG would include all of these factors in their understanding of this term. Dimension 8's requirement of system-level coordination, for example, is rarely found in real-world cases of polycentric governance in action. But since some large-scale public goods can only be produced or provided for if all relevant actors are able to coordinate their contributions to a joint effort, and since Ostrom, Tiebout, and Warren (1961) demonstrated that multiple centers of authority could find ways to coordinate in ways that would provide for the production of public goods and services at all levels of aggregation, it seems natural to expect their aspirations would include examples requiring systemic-level coordination. It would not be quite the same as the kind of coordination that would occur within a top-down system of authority, command, and control, but it would nonetheless serve the same purpose. Instead, systemic-level coordination is more likely to resemble the kind of distributed processes of guidance, control and evaluation of complex human systems examined by contributors to Kaufmann et al. (1986).

As illustrated above, different authors emphasize different factors as being the most important to their understanding of PG, but we concur with the encouragement that Stephen et al. (2018) gave to researchers using this concept to at least consider whether or not all eight of these factors are present in their cases, and if so, what difference they make to that system's performance.

This list mixes together factors that are most closely associated with either the structures, processes, or outcomes generally associated with the concept of polycentric governance. For analytical purposes, structures, processes, and outcomes are often separated and used to distinguish between independent and dependent variables in a particular study. When applied to the concept of polycentric governance, however, these distinctions are deeply problematic. In any *sustainable* polycentric system of governance, its processes *must* generate outcomes that reinforce structural conditions and support continued operation of those same processes. In the long term, the structures, processes, and outcomes of polycentric governance are mutually endogenous and will co-evolve through interwoven trajectories of changes in all three categories of factors. In analyses limited to short time periods, however, structural conditions can be treated as if they were determined exogenously.

Taken together as an interdependent whole, the structure, process, and outcome components of polycentric governance define an idealized vision of polycentric governance. But in practice, there are practical limitations on each dimension. The structural foundation may fail to provide sufficiently autonomous decision units with the right kinds of overlappability to encourage regular means of mutual adjustment, processes and procedures may become too complex to be fully understood by the people operating that system, or citizens who end up being deeply confused about which authority is responsible for fixing unsatisfactory policy outcomes may lose sight of the reasons why their predecessors ever built such a complex system in the first place.

If there are systematic biases in the structures, processes, or outcomes of real-world realizations of polycentric governance, then it may be possible to find ways to counteract, at least partially, the negative consequences of those biases. As institutional analysts, we have begun to explicitly confront the complete spectrum of the ways in which polycentric governance can fail, in hopes that knowing the extent of these dangers may make it easier for citizens living within those systems to realize improvements in their own self-governance, before it is too late to do so.

3. Recognizing the Transaction Costs of Self-Organization and of Polycentric Governance

Our long list of positive benefits of PG given above presumes an idealized vision of the full potential of a complete and “pure” system of polycentric governance. Since bottom-up processes of self-organizing by groups of goal-directed, fallible individuals capable of learning from their experiences remain the primary foundation for PG as it is manifested in real-world situations, we start our analysis there.

Since there is no consensus list of the steps involved in self-organization or collective action, we suggest our own tentative list, subject to further modification in subsequent research.

1. **Identifying** others with similar interests or concerns on selected issues (even if they differ on other matters)
2. **Locating (or constructing)** a place (or other mode of communication) where deliberation via respectful contestation can occur
3. **Agreeing upon** what behaviors are acceptable within that forum or mode of communication (defining **rules of the game**)
4. **Identifying & evaluating** options for appropriate means towards shared goals, including decisions to seek external assistance
5. **Surveying the existing institutional landscape to locate & contact public officials or professional experts** with access to relevant resources or information
6. **Analyzing** the quality and relevance of information or assistance from external parties
7. **Making** collective decisions within the group, through voting or some other form of mutual adjustment,
8. **Coordinating** with external assistants or agents of other decision units willing to work together on common goals
9. **Implementing** a collective decision, even if it has negative effects on reluctant members of a decision unit
10. **Monitoring** to identify individuals or organizational agents whose behavior deviates from group norms or expectations, and to share that information with other interested parties
11. **Ensuring** external assistants (or agents) still respect the values & interests of the core group
12. **Selecting and applying** appropriate sanctions on norm violators or disappointing (especially if duplicitous) agents in ways that might encourage them to correct their misbehavior and improve their performance
13. **Reconsidering & revising** group membership, goals, practices, and agents to realign with core group values and goals
14. **Identifying & integrating** sources of funding for any and all of these endeavors
15. **Repeat (and cycle back to any previous step) as needed.**

We ask the reader to not take this list too literally, since such processes, in actual operation, will likely be considerably messier than might be suggested by this algorithmic representation. We should expect to observe lots of cycling back to previous steps and stalling at others. In sum, the core sequence is one of groups of individuals seeking out others with shared interests and concerns, finding ways to communicate with each other that enable them to deliberate in ways that each remains respectful of the interests of the others, working together to implement their collective decisions, and then evaluating the outcomes and, if necessary, doing it all over again. (This is what is intended by the phrase “respectful contestation” introduced above). In addition, we took pains to highlight the fact that processes of self-organization frequently involve requests for assistance from actors external to the core

group, especially to political leaders or professional experts or other holders of power, influence, or other resources relevant to the achievement of their core objectives. Then, of course, members of that group will need to evaluate how well these external assistants (or agents) were able to help, and to consider where else they might turn for assistance.

If all goes well, in the sense that individuals and groups involved have access to enough information to inform their deliberations, and can draw upon a wide range of potentially relevant sources of assistance, and will have their efforts protected against coercion from those opposing their actions, then something like a process of polycentric governance will be possible. In addition, some groups are likely to have decided to form themselves into formal organizations of diverse types, and these organizations will persist over time and accumulate power and other resources. Thus, no self-organizing group can expect to exist within a vacuum (Cole et al. 2014); instead, their efforts will play out in the context of the then-existing system of power and authority, which will, itself, be the product of previously successful instances of social organization. But a high density of pre-existing institutional arrangements can be positive, because all the decision centers, discussion forums, formal organizations, political agencies, professional associations, non-profits, and other collective entities are there for the use of individuals and groups seeking to achieve their common goals and to realize their shared aspirations. In effect, the structures and processes of polycentric governance constitute an infrastructure for collective action and self-organization. Typically, infrastructures need to be maintained somehow, and by some actors, and later in this analysis this question of long-term maintenance will take center stage.

The potential benefits of self-organization or other forms of collective action to groups contemplating such action are far too numerous for systematic analysis, but we can follow in the tradition of Williamson (1985, 2010) by using the costs of self-organization or collective action as a point of departure for purposes of comparative institutional analysis. In practice, efforts by communities of interest to self-organize themselves to pursue and protect their shared interests are confronted by a wide range of costs, in terms of time, effort, frustration, and money. The following list is not meant to be exhaustive, but only to suggest the multiplicity of sources making self-organizing processes (or any form of collective action) so difficult to achieve.

1. **Search costs** of identifying potential allies or others with similar interests or concerns
2. **Forum search (entry) costs** of locating a place (or communication mode) for respectful contestation
3. **Constitutional choice costs** for arranging for a new forum or means of conducting deliberations
4. **Discussion costs** to agree upon what behaviors are acceptable within that forum (rules of the game)
5. **Search and analytic costs** of identifying & evaluating appropriate means towards shared goals, including potential appeals for external assistance
6. **Evaluation costs** to determine quality and relevance of information from external assistants
7. **Deliberation costs** required for making collective decisions, through processes of mutual adjustment
8. **Coordination costs** involved in mutual adjustments with agents of other units (external)
9. **Authority costs** of implementing a collective decision on reluctant members of that unit
10. **Monitoring costs** to identify members or agents who deviate from group norms or expectations, and to share that information with other interested parties
11. **Accountability costs** to ensure agents still respect the values & interests of the core group
12. **Sanctioning costs** to select and implement formal or informal sanctions on norm violators

13. **Reformability costs** to facilitate revisions to existing practices to realign with relevant societal norms
14. **Provisioning costs** of identifying and integrating sources of funding for these endeavors
15. **Exit costs** to remove oneself from the authority of specific decision units

Participants in self-organized groups will have to find some ways to overcome each and every one of these challenges in the process of their deliberations. Although this list of obstacles may seem overwhelming at first glance, it's worth remembering that successful efforts are taking place every day, around each and every one of us. Over time, those collective efforts which last long enough to become institutionalized in formal organizations or in the normative values which guide individual and societal choices will stand as examples of what can be done, as well as resources which may prove useful in doing what groups need to do.

Given such a long litany of potential costs, we do not think it prudent to seek a formal model of all kinds of transaction costs of collective action. Instead, in the remainder of this paper we introduce a more informal framework that directs attention to the specific kinds of transaction costs that can result in diverting the trajectory of self-organizing processes away from the path that is most likely to generate the full range of positive outcomes posited above. In doing so we uncover several ways in which frictions inherent in self-organizing processes can, over time, divert practical variants of polycentric governance into several disturbing syndromes, dysfunctionalities, or equilibrium traps.

4. How Polycentric Governance Might Get Off Track: Insights from the Ostroms

When a PG system works well, the results can be very positive. Elinor Ostrom (2005) provides an impressive list of the potentially beneficial consequences of a decentralized, polycentric system: effective utilization of local knowledge, inclusion of trustworthy participants in decision-making processes, crafting of resource appropriation and system maintenance rules better adapted to local conditions, lower monitoring and enforcement costs, and sufficient redundancy to buttress a resilient system that can survive a wide range of external shocks.

Yet Ostrom acknowledged that even a polycentric system cannot be considered to be a panacea ideally suited to all governance problems. With particular attention to community-based common resource management regimes, she identified several potential sources of problems with the operation of a system of decentralization based nearly entirely on bottom-up processes. Briefly, her concerns included (Ostrom 2005: 282-3, 272-9):

- Some appropriators will not organize
- Some self-organized efforts will fail
- Local tyrannies
- Stagnation
- Inappropriate discrimination
- Limited access to scientific information
- Conflict among appropriators
- Inability to cope with larger-scale common-pool resources
- Rapid endogenous changes
- Transmission failures from one generation to the next
- Programs relying on blueprint thinking and easy access to external funds

- Corruption and other forms of opportunistic behavior (rent-seeking)
- Lack of large-scale (supportive institutions) institutional arrangements related to
 - reliable information collection, aggregation and dissemination;
 - fair and low cost conflict-resolution mechanisms;
 - educational and extension facilities; and
 - facilities for helping when natural disasters or other major problems occur at a local level.

In his critique of prominent views of federalism, under which lower-level units are presumed to be, ultimately, subservient to decisions made at the national level, Vincent Ostrom (1973) argues strongly in favor of a more polycentric vision. In that article he instead uses the term “highly federalized system,” which he defined as “a political system which has a rich structure of overlapping jurisdictions with substantial autonomy among jurisdictions, substantial degrees of democratic control within jurisdictions, and subject to an enforceable system of constitutional law.” His primary concerns about the potential disadvantages of a highly-federalized system, contrasted to a nation-dominated form of federalism, can be summarized in the following list:

1. “would presumably involve unnecessarily high decision-making costs for a small, isolated political community composed of persons having similar social preferences”
2. “will be subject to higher levels of conflict and political controversy”
3. “will be more subject to recurrent stalemates and less subject to preemptive commitments”
4. “will involve more complex and complicated relationships”
5. “will place a substantial burden upon citizens for a relatively high level of education and information in order to take advantage of the opportunities inherent in such a system”
6. [implies that] “impoverished persons with low educational attainments and poor informational resources will be seriously disadvantaged in comparison to others with higher socioeconomic status”
7. [its viability] “depends upon the wealthy bearing a disproportionate share of the costs for educational and informational facilities for all members of such societies”
8. “will require larger expenditures of time and effort on public decision making”

While admitting that this by no means constitutes a complete inventory of potential flaws, V. Ostrom also noted that “Efforts to eliminate these costs would probably be destructive of essential relationships in [polycentric] federal systems.” In his final major book, Ostrom (1997) elaborated his concerns about the many vulnerabilities that systems of democratic self-governance face in the long-term (see also McGinnis and Ostrom 1999), but sustained attention to the many points he raised there would take us too far away from the primary purpose of the current paper. Instead, the current paper embarks on a more systematic effort to understand the dynamics underlying the formation and maturation or dissolution of systems of polycentric governance.

5. How Polycentric Governance Might Get Off Track: Insights from Institutional Theories

In this section we draw upon relevant works in the literature on institutional theory, broadly understood, to identify a few critical themes in understanding what can go wrong in the processes of self-organization that provide the motive force behind the development and diminishment of PG as a viable and desirable mode of governance.

The first point may seem obvious, but it bears stating directly: **groups will vary in the transaction costs** they face in order to mobilize themselves to address any shared problem or aspiration. The relative advantage held by small, concentrated groups of homogeneous has long been familiar to political economists (Olson 1965), and many other factors contribute to the relative mix of potential benefits and realized costs of collective action for different groups considering similar actions or similar groups considering different kinds of action (see Agrawal 2001, Ostrom 2007).

In addition, successful instances of self-organized collective action will necessarily change the transaction cost profile facing that same group in similar or different situations, as well as other groups facing any kinds of related action, especially ones that might be taken in response to the original success. The direction and magnitude of these changes are impossible to determine in general, because sometimes success breeds success, while other times early successes may make any remaining efforts more difficult to accomplish, simply because the easier problem may have selected for attention because it was relatively easy to solve. But for our purposes, we pay particular attention to the effects on the efforts of other groups to act in response to, or in imitation of, their success. For it is inevitable that **any act of successful collective action will convey external effects** on other actors not directly involved in that process. Some groups will find themselves in a worse position, others may benefit, while still others are unaffected. It's important to keep in mind that collective action can have multiple consequences on different groups. Naturally, negative externalities are likely to prove the most problematic in their effects on other groups' ability to organize to protect their own interests.

In many cases, negative external effects will be minimal, but in other circumstances the whole point of the initial collective action may have been to strengthen that group's ability to prevail in competitions with other groups. In those situations, imposing negative externalities were clearly intentional. Indeed, it is often the case that having an external opponent or enemy as a target of mobilizing effects greatly facilitates the generation of sufficient levels of support for that action. Since humans naturally develop some levels of biases in favor or against different groups over the course of their lives, **negative biases that are shared by group members can greatly facilitate certain kinds of collective action.**

Even if the negative effects on other groups are unintended, they may be significant, and these effects may well accumulate over time. Groups which are able to string together a long series of successful collective action will tend to gain access to more resources than groups who have proven unable to match that record of success. More generally, it is important to realize that **the effects of collective decisions can cumulate over time**, and thereby set up **path dependencies** that will shape the viable ranges of options for later choices.

The distinction between an opponent and an enemy implied above points towards another important point, namely, the critical limits set by the **rules of the game** that are shared by participants in that form of interaction. In particular, the rules of the game set limits on many modes of interaction. Consider the respectful contestation identified above as the core requirement for civil discourse in the service of collective problem-solving. When participants in a game share a common understanding of the rules of

the game, they recognize that while many types of action may be acceptable within those rules, other kinds of action would be considered a violation of those shared rules. When interacting with a group seen as an enemy, it may be easy to justify taking coercive or nefarious actions that would otherwise be seen as unacceptable. The consequences of rule violations within a well-defined game can be catastrophic in the long-run, because it may start a cascade of reciprocal rule violations that end up transforming a rules-constrained game into an all-out fight for domination. When players give in to the temptation to strategically break the rules of the game in order to secure a win, they may do so at the cost of undermining the shared norms and understanding that guided their previous mode of interaction. In these ways relationship among parts of a society can be fundamentally transformed.

Not only do groups contemplating collective action face potential opponents or enemies, they may also make allies or other kinds of cooperative relationships with other players. In the politicized environment of polycentric governance, obtaining the assistance of legitimate public officials may be an especially useful way for groups to pursue their interests. But groups may also identify non-explicitly political groups, such as professional associations, scientists, or other experts from whom they could obtain access to resources critically needed if their self-organizing efforts are to succeed. As noted above in our long list of the steps involved in self-organization, we included several points at which a group considers reaching out to obtain external assistance, and this opportunity is a critical component of political action in all but the most parochial of political settings. As is the need to secure access to relevant information needed to make those evaluations and to fully consider one's options.

Of course, any sort of reliance on external assistance generates its own new levels of concern, since parties will need to find some way to monitor their respective contributions to this relationship, and to select means through which they might sanction their partners, or move on to select some replacement source of assistance. When it comes to political authorities, it is critical to remember that conveying public authority always carries with it the risk of opening up opportunities for those authorities to take opportunistic advantage of their position of authority.

These opportunities are especially open to formal organizations, whether political in nature or not, that have been in place for long periods of time and are generally seen as legitimate. As argued above, formal organizations built up over time will have developed some cost advantages in taking certain kinds of collective action, thus giving them opportunities to take advantage of their position of power. In this way, consideration of primarily bottom-up processes of self-organization will, over time, generate the kinds of gross inequalities of power and access to all kinds of resources that so clearly characterize modern life. Although many critics have questioned the ability of polycentric systems of self-governance to cope with deep asymmetries of power (see Clement 2010), the line of argument presented here includes the potential development of power asymmetries as a natural consequence of self-organization, if carried on for a long enough period of time.

To summarize, we argue that to understand the consequences of the endogenous forces driving processes of self-organization within a system of polycentric governance, analysts need to pay explicit attention to variations in transaction costs, negative externalities imposed on other actors, group biases that can be mobilized to differentially empower different forms of collective action, the cumulative effects of the accumulation of tendencies implicit in the resulting patterns of differential success at self-organization, the imposition of negative externalities and the strategic mobilization of group biases. Repeated violations of the rules of a game may transform that interaction into a full-fledged fight for domination. In addition, we need to recognize the prominent roles played by formal organizations and other forms of external assistance that may be brought into the arena by participants in respectful

contestation or in contests of domination. These powerful actors will have opportunities to strategically exploit their respective positions of power and the resulting patterns of inequalities may be substantial and long-lasting.

Clearly, there are many directions in which polycentric processes of self-organization can lead to normative undesirable and/or practically dysfunctional outcomes, too many to identify in any single formal representation. Further simplification is needed to proceed with this analysis. In the next section we introduce a framework of inter-group relations among groups contained within three broad categories of actors, and use that framework to identify a set of potentially dysfunctional syndromes into which PG system may end manifesting.

6. A Framework for Identifying Dysfunctional Trajectories of Change in Polycentric Governance

In this section we introduce an informal framework of good representative governance in a PG format, and use it to identify six significant departures from that ideal that we interpret as dysfunctional variants of PG. For purposes of simplification, we disaggregate all of society into three broad categories of actors, and specifies the kinds interactions going on within each of these categories, as well as between actors across categories, in both highly functional and badly dysfunctional modes of PG.

Representative Governance in a Liberal Democratic Regime, PG Style

Thus far we have been treating PG as a rather abstract mode of governance, but in this section we further restrict our attention to polycentric governance systems embedded within a liberal democratic regime. If sustainable, that PG system would help maintain the basic requisites of a liberal democratic order, namely, individual freedom balanced against efforts by legitimate public authorities to deliver needed public services and to produce (or arrange for the production of) public goods such as national security, public health and safety, lightly-regulated competitive markets in private goods rooted in secure property rights and regular enforcement of contracts, and an active civil society consisting of a wide range of religious, community-based, and voluntary organizations providing various services to different segments of that community. Individual votes would elect representatives to legislative and executive offices at local, state, and national levels, and those elected officials would need to deliver public services and policy outcomes sufficiently welcomed by their constituents in order to support their re-election. Elected officials would delegate most of the actual implementation of public programs to bureaucratic officials and/or to private organizations specializing in the relevant policy sectors.

Private corporations and other economic organizations would produce the private goods and services purchased by consumers, while remaining accountable for violations of workplace safety and environmental damage regulations. Professional experts would contribute to the formation and implementation of public programs, as would leaders of non-profit organizations committed to providing services to needy segments of the population. News media and other organizations would provide objective information the public needs to oversee the behavior of their elected officials and their implementing agents, without revealing secrets which would undermine law and order or national security. Finally, scientists and other knowledge workers would provide useful information on policy-relevant issues to both public and political leaders, especially information regarding the potential long-term effects of current policies and programs.

This complex array of actors is too complex to consider in its entirety, but for purposes of our analysis it is useful to aggregate them into three broad categories of actors:

1. The public: individual citizens and self-organized groups pursuing their own interests and participating in voting and other civic-related activities; ideally, most citizens would realize that their civic duties extend well beyond voting and would actively participate in local governance activities and peaceful demonstrations, when needed
2. Political officials: Elected or appointed officials assigned specific responsibilities for providing public services, including securing public access to relevant information regarding their activities.
3. Private organizations and Professional Experts: all the individuals or groups who play official or informal roles in helping political officials formulate and implement public programs or providing the public with regular access to information, consumer products, economic or other forms of assistance, increases in scientific knowledge, and new technological innovations.

Within each of these broad actor categories, participants would tend to obey general rules of the game specific to their particular areas of activity. Specifically, members of the public should engage with each other in an attitude of respectful contestation when considering political or civic issues. For political officials the equivalent expectation of the rules of their games is to welcome acts of compromise, as a means of achieving policy decisions through never-ending processes of mutual adjustment. Judges and other legal agents should treat all parties equally before the law, and live up to their own professional standards. In addition, each group of professional experts within the final category would formulate their own expectations regarding professional ethics, and act to hold their members accountable to those standards. This includes producers and other economic organizations, which should produce good products for a fair price and avoid engaging in predatory behavior against their competitors. Political officials would monitor the behavior of economic organizations and other professions, but the primary restrict on overly opportunistic behavior resides in the individuals themselves, and in their commitment to the ethical standards of their own profession. Similarly, political officials should avoid hiding relevant information from the public, even though complete transparency would not be appropriate given privacy protection concerns. Finally, religious leaders and other moral entrepreneurs would share their evaluations of the appropriateness of the behavior of individuals and public officials, and instigate reform campaigns when necessary.

We realize this is asking a lot, but this is essentially the minimal set of regular behaviors needed to establish and maintain a liberal economic order, and a polycentric system of governance should provide all actors plenty of opportunities to gather the information needed to fulfill their duties as well as the means needed to hold others accountable for their violations of this moral order. As we shall see, many things can go wrong along the way.

Triggers and Trajectories Toward the Institutionalization of Dysfunctionality

In the real world, of course, all societies fall short of this ideal in many ways, and in the remainder of this section we show how the potential sources of dysfunctionality of self-organization identified in a previous section can generate trajectories of change. Table 1 summarizes the general steps towards the final realization of six distinct forms of dysfunctionality.

Each of the trajectories starts innocently, with an aspect of self-organizing dynamics that can never be fully eliminated from any real-world manifestation of any kind of governance system. Each of these triggering tendencies or temptation were introduced above, as was our concern that the slow accumulation of any of these tendencies can result in very unfortunate outcomes. The three dots in each cell of the middle column of Table 1 denote the progression of time as specific tendencies or biases continue to accumulate, with the next column on the right consisting of short descriptions of that particular form of trap under which a system of PG might find itself, if those tendencies are allowed to accumulate without any concerted opposition.

Table 1. Syndromes of Dysfunctional PG Dynamics

Triggering Tendency or Temptation	Mode of Accumulation	...	Equilibrium Trap	PG Syndrome
Smaller and short-term changes mean lower transaction costs; and lower negative externalities	Successful groups protect their gains & concentrate on short-term gains; inequities & vulnerabilities accumulate	...	Veto players proliferate and immobilize system, vulnerable to major crises & pent-up pressures from slow drivers	Incrementalism and Scale Mismatches
Partisanship can simplify complex issues to public and facilitate elite coordination in campaigns and governance	Partisanship can become emotional group marker, inducing rapid escalation of even minor disputes	...	Public officials avoid compromise, resulting in gridlock and erosion of shared values and public trust; public service no longer seen as an honorable profession	Symbolic Politics and Hyper-Partisanship
Common biases against “others” help support collective action targeted against them (or affecting them indirectly)	Serial “victims” of dominant groups’ self-organization become profoundly marginalized	...	Racial or other inequality becomes widely accepted as natural, and as a valid basis for resisting reforms	Exclusion and Institutionalized Inequalities
Regulatory authority allows possibility of awarding special privileges to some groups	Regulatory capture by special interests is allowed by officials eager for gain	...	Pervasive corruption poisons political process; scandals rarely result in real reform	Rent-Seeking and Pervasive Corruption
Easy to delegate to others (esp. political leaders) responsibility for addressing big problems	Incentives to accumulate the power needed to match public’s expectations	...	Political officials abuse power, justify goals after the fact, and hide information from public	Over-Centralized & Authoritarian Rule
Public officials often eager to delegate details of program implementation to experts	Officials’ primary desire for cost savings may lead to low oversight of private partners	...	Public policy outcomes do not cohere to a normative vision for society,	Hollowed-Out or Technocratic Governance

To help fill out the stories summarized in each row of Table 1, we provide additional descriptions below.

1. Incrementalism and Scale Mismatches

This syndrome is grounded in the general observation that collective actions involving small numbers of actors considering short-term changes require the expenditure of fewer transaction costs than other situations. Each successful group is likely to work to protect its gains in later interactions, and its very success is likely to give those first movers a lasting advantage over groups later seeking to imitate or to oppose that initially successful group. If some groups tend to succeed more frequently than others, over time substantial inequities in their ability to self-organize are likely to emerge and help continue that

trend. In effect, many groups will achieve a status enabling them to wield a veto against any proposed change that would reduce their position of advantage.

Similarly, as long as evaluations of short-term goals remain easier to evaluate than even more substantial gains in the long-term, then the system as a whole is likely to become vulnerable to pent-up pressures that built up more slowly and were poorly recognized as such. Unless significant efforts are made to limit the proliferation of veto players and/or to provide access to compelling evaluations of the long-term consequences of short-term thinking, this combination of Incrementalism and vulnerability to scale mismatches is likely to remain in place.

2. Symbolic Politics and Hyper-Partisanship

In the idealized liberal democratic system of representative government offered above, voters will need to be able to not only access information about alternative policy options but also develop the skills needed to comprehensively analyze proposals made by competing candidates for electoral office. The development of political parties offering recognizable configurations of policy proposals can greatly reduce the information costs imposed on voters. At the same time, political parties can help coordinate the efforts of elected officials who run under the aegis of that party (Aldrich 1995). These cost efficiencies have combined to make political parties nearly universal component of systems of representative government (even though they may have not been anticipated to play that central a role in governance, as demonstrated by the absence of any provisions on political parties in the U.S. Constitution or the primary sources of those advocating its adoption; see Hamilton et al. 1787–1788).

Despite these advantages, partisan identification can be taken to extremes that undermine its effectiveness as a path towards effective governance. Politicians who owe their continued office-holding to decisions made by party activists may find themselves reluctant to make compromises needed to achieve bipartisan consensus even on vitally important issues of public policies. If, as is the case in the U.S. today, members of the public take their partisan identification as a market of group membership, and the emotional power of this group identity is reinforced by each group's near-exclusive reliance on media sources catering to their pre-conceived opinions, we should expect to see not only gridlock among politicians but also a general erosion of shared values among the public at large, as well as a general distrust of politics as a mode of compromise.

3. Exclusion and Institutionalized Inequalities

Politics of exclusion have their foundation in the ever-present biases of humans towards members of their own group and against outsiders. Although a tendency towards groups-based biases may be inherent in human nature, its emotional power can be greatly reinforced in many ways. The concept of race turns out to be an especially potent tool in the intensification of inter-group conflicts. While development of the first two syndromes may be supported by a general neglect of negative effects on other actors, in this syndrome members of a dominant racial group may come to take particular pleasure in limiting the opportunities made available to members of certain minority groups. Although racial or other group-based inequities are likely to accumulate over time, they will be unable to reach truly repressive consequences unless these biases are reinforced by the actions of political officials and the legal system as a whole. Sadly, that was exactly the case in the U.S. before the Civil War, and afterwards during the Jim Crow era. Many critics claim that the lingering effects of the legal

institutionalization of slavery and discrimination continue to have devastating implications on the lives of African-Americans. Although this extent of inequality may seem inconsistent with any depiction of polycentric governance as fulfilling a normative goal, it is worth noting that perhaps the greatest advocate of the system of democratic governance in the U.S., Alexis de Tocqueville, realized that this positive outcome in practice was available only to the Anglo-Americans still dominant while he visiting in the 1830s. In a famous appendix to *Democracy in America*, Tocqueville saw the injustice of this system's effects on blacks and native Americans. In other words, even a deeply racially bifurcated system of governance may still exhibit many of the benefits claimed for polycentric governance, albeit only for part of the population.

4. Rent-Seeking and Pervasive Corruption

Unfortunately, a potential for rent-seeking is inherent in the very idea of public authority. If political officials are given the authority to set the rules of the game under which economic markets or professional activities must operate, they make themselves vulnerable to temptations offered by special interest groups seeking to shape those rules in ways that best suit their own interests. Since, as noted above, elected officials already face incentives to delegate the details of policy design or implementation to experts in the relevant professions, some degree of "regulatory capture" of regulatory agencies may well be inevitable. Of course, the damage done to the rule of equality before the law or the overall efficiency of the economy or the operation of advanced technologies may be limited by judicious efforts to monitor shady deals and publicize the resulting scandals. But without such concerted opposition, relatively innocent modes of rent-seeking are likely to lead to a pervasive corruption poisoning society as whole, while also contributing to levels of public cynicism inconsistent with a healthy civic society.

5. Over-Centralized and Authoritarian Rule

Not all citizens are likely to be interested in spending most of their times being involved in political or civic activities; nor should we expect them to do so. For many people it will be easier for them to want to delegate civic duties to others, or to defer to the decisions of their chosen political leaders. This does not mean that such individuals will not have high expectations of government services, especially those activities they have come to depend on. Also, public opinion surveys often note a high level of concern with the extent of seemingly pointless debates and partisan gridlock among political elites. From observation of this combination of factors at least some political leaders will conclude that it makes sense for them to centralize more power in their own hands in order to cut through the endless turmoil and simply give the people what they want: more government services for lower costs in taxes and in time expended. Whether these leaders justify their actions by reference to progressive or populist themes, they are likely to end up behaving in ways that violate many of the conventions of politics in normal times. As a consequence, they are likely to hide as much revealing information as possible from public view, in order to lower the chances that their schemes may be discovered and thus face more effective opposition. Recent events in many liberal democratic states have demonstrated the continuing appeal of illiberal themes of more centralized, even autocratic, rule, and we should not expect that systems of polycentric governance, in which politics is necessary a messy and complicated affair, might end up eliciting movements towards more centralized modes of governance.

6. Hollowed-Out or Technocratic Governance

Our final syndrome has its origins in the notion that elected political officials tend to be generalists, rather than specialists in any one policy area. After all, their job as political leaders is to consider the tough questions concerning the appropriate tradeoffs that will need to be made among the wide range of policy problems to which public agencies should give the most attention and resources. In the U.S. especially, but in many liberal democracies, it is quite common for political officials to delegate to bureaucrats (who often are specialists in particular areas of policy) or to professional experts (who by definition specialize in certain topics or skills) the responsibility to help craft the details of legislation or regulations, and especially to oversee the actual implementation of public programs.

A recurring theme in the public administration literature in recent decades has been the attraction to find ways to make governments operate more like private businesses, in the sense of being able to operate at lower costs. (For historical context, see McGinnis and E. Ostrom 2012). This has led to a heavy reliance on diverse forms of networked governance, in which private, professional, and community leaders work closely with public officials to determine and implement public policies, especially at the state and local levels (see Bryson et al. 2006, Ansell and Gash 2007, Feiock 2009, 2013, Goldsmith and Eggers 2014, Emerson et al., 2015, Swann and Kim 2018).

Although collaborative modes of governance do have considerable potential for devising effective policies in many settings, they are not particularly effective at drawing clear connections to the public at large. Instead, the complexity of networked governance makes it very difficult for the beneficiaries of public programs (or the taxpayers paying for those programs) to identify which individual official or agency should be held responsible for the quality of policy outcomes. As a consequence, this mode of governance can come to take on a more technocratic or elitist manner, leaving in its wake concern about a lack of accountability. Furthermore, as public officials become more and more obsessed with finding ways to save money, they may cut programs highly valued by their constituents and lose sight of the sense of public service that likely inspired them to adopt that career path in the first place. In this sense, collaborative governance can lead to a hollowed-out mode of governance in which policy outcomes from different policy areas simply do not cohere in ways that support any easily articulated vision of society's goals. Another frequently used line of criticism is that excessive delegation of public authority to private partners in governance networks has the effect of liberating public officials from their core responsibilities of insuring that their constituents enjoy continued access to high-quality public services.

In preparation for writing this paper, we also considered other forms of dysfunctionality that might plague some forms of polycentric governance, but these six syndromes strike us as being among the most probable and recognizable of the kinds of problems that might arise through the natural operation of this complex and dynamic mode of governance. As should be apparent by now, each of these syndromes emerges through a trajectory of institutional change in which the structural attributes, characteristic modes of mutual adjustment, and policy consequences associated with polycentric governance merge and interact in ways that interweave bottom-up and top-down processes.

In this section we have operated under the assumption that these trajectories, once triggered by one or more of the common tendencies or temptations identified above will be allowed to continue to accumulate effects without facing any concerted opposition. In the next section we examine potential countervailing forces that might act to slow or even reverse movement towards the full realization of any one of these syndromes.

7. Countervailing Forces and Creative Tension in Trajectories of Institutional Change

Although the entries in Table 1 leave much detail to the imagination, it’s worth considering more explicitly the contributions to each potential dysfunction made by three key categories of actors involved in this drama: the public, political officials, and professional experts. The relative importance of each type of actor varies widely across the full set of PG syndromes, but in nearly all cases all three actor types make crucial contributions. This breadth of responsibility shows just difficult it may be to introduce reforms once one or more of these syndromes have fully established themselves.

In Tables 2.1-2.6 we summarize what we see as the primary contribution of each actor category to the six problematic trajectories identified in Table 1, as well as a few actions that those actors might take in hopes of slowing the system’s descent into that particular mode of dysfunctionality.

Table 2.1 Countervailing Forces in Trajectory towards Incrementalism and Scale Mismatches

Incrementalism and Scale Mismatches	Natural Accumulation of Tendencies & Temptations	Proactive Maintenance of Polycentric Governance
<i>Citizens & Self-Organized Groups</i>	Become complacent, reluctance to undertake direct action or make difficult changes to everyday activities; Easy to ignore long-term consequences of short-term solutions	Participate in direct political action, mobilize to insist on needed change; Look beyond short-term outcomes to consider longer term consequences, especially on later generations
<i>Political Leaders & Public Officials</i>	Veto players jealously protect current position and downplay future concerns; Focus on short-term re-election concerns and rely on debt financing for current programs	Scale up successful programs to serve larger populations; Require policy advocates to include honest assessments of likely costs and future consequences in proposals
<i>Private Organizations & Professional Associations</i>	Media cater to prejudices of audience by focusing on short-term entertainment rather than deep analysis; scientists avoid direct involvement in policy	Build new professions of citizen advocates or program navigators to give more beneficiaries access to hidden programs; Economic firms incorporate social responsibility goals into corporate strategies; Scientists publicize long-term consequences of current policies

Table 2.2 Countervailing Forces in Trajectory towards Symbolic Politics & Scale Mismatches

Symbolic Politics and Hyper-Partisanship	Natural Accumulation of Tendencies & Temptations	Proactive Maintenance of Polycentric Governance
<i>Citizens & Self-Organized Groups</i>	Emotional identification with political party, refuse to listen to arguments made by those from the “other” side	Respectfully engage with advocates from “the other side,” acknowledge and reinforce common civic values
<i>Political Leaders & Public Officials</i>	Cater to party extremists, avoid practical compromises, sacrifice common good for partisan advantage	Acknowledge politics requires compromises, demonstrate commitment to public service; resist insistent demands of party extremists when needed
<i>Private Organizations & Professional Associations</i>	Scientists and media shape policy advocacy, science, and news coverage to support partisan positions	Demand that political leaders respect scientific findings, refuse to be co-opted by funding agencies or ideologies

Table 2.3 Countervailing Forces in Trajectory towards Exclusion & Institutionalized Inequality

Exclusion & Institutionalized Inequalities	Natural Accumulation of Tendencies & Temptations	Proactive Maintenance of Polycentric Governance
Citizens & Self-Organized Groups	Reluctance to consider the potential harm of their own actions on others, especially minority groups	Insist on protection of minority rights; seek information on the harm done on others by their own actions
Political Leaders & Public Officials	Write & enforce laws treating social groups differently, reinforce negative images of disadvantaged groups	Facilitate efforts by disadvantaged groups to protect their interests, insist laws treat social groups equally, resist negative images of minorities
Private Organizations & Professional Associations	Media & scientists frame news and research findings to reinforce social prejudices; Resist efforts to increase social diversity within their profession;	Moral entrepreneurs: mobilize for reforms that treat all groups equally

Table 2.4 Countervailing Forces in Trajectory towards Rent-Seeking & Pervasive Corruption

Rent-Seeking & Pervasive Corruption	Natural Accumulation of Tendencies & Temptations	Proactive Maintenance of Polycentric Governance
Citizens & Self-Organized Groups	Focus on political issues with direct impact on their own situation, even if programs waste society's resources	Recognize particularistic benefits (farm subsidies, etc.) can have detrimental effects on society as a whole
Political Leaders & Public Officials	Use policy details to reward special interest groups willing to provide campaign support to them	Protect and encourage whistle-blowers who reveal corrupt or inappropriate deals with private actors
Private Organizations & Professional Associations	Engage with public officials to "capture" (or co-opt) the making and enforcement of all laws and regulations affecting their profession	Acknowledge tradeoffs required when a policy domain has important effects on other parts of society

Table 2.5 Countervailing Forces in Trajectory towards Over-Centralization & Authoritarian Rule

Over-Centralized and Authoritarian Rule	Natural Accumulation of Tendencies & Temptations	Proactive Maintenance of Polycentric Governance
Citizens & Self-Organized Groups	Easy to let others take care of politics, and to raise expectations for more benefits from programs	Demand continued rights of freedom of expression and access to information on public officials
Political Leaders & Public Officials	Follow incentives to accumulate power needed to meet public expectations, and hide as much information as possible	Respect constitutional controls on exercise of power and
Private Organizations & Professional Associations	Prefer stability and predictability of laws and regulations, willing to let political leaders hide information from public	Emphasize their willingness to let public know details about their activities,

Table 2.6 Countervailing Forces in Trajectory towards Hollowed-Out or Technocratic Governance

Hollowed Out or Technocratic Gov.	Natural Accumulation of Tendencies & Temptations	Proactive Maintenance of Polycentric Governance
Citizens & Self-Organized Groups	<ul style="list-style-type: none"> • Defer to experts on technical questions, eagerly adopt new tech and accept its social consequences • Ignore politics as much as possible and take full advantage of public programs as currently operating; reward elected representatives for “bringing pork” back home • Support public officials who allow private parties to determine policy & don’t even try to hold either group accountable • Focus on single-issue politics, don’t consider consequences on other issues, avoid potential compromises 	<ul style="list-style-type: none"> • Insist that tech companies are responsible corporate citizens that respect privacy and other social concerns • Stand up for their values when they are neglected or undermined by public officials • Hold public officials accountable for actions of the private actors to whom they delegate authority, and insist that results serve the public interest • Look beyond narrow interests to consider what’s needed for society as a whole
Political Leaders & Public Officials	<ul style="list-style-type: none"> • Defer to technical experts and avoid dealing with genuine conflicts generated by different technologies • Delegate more and more public authority to private partners in governance, and protect them from public scrutiny; evaluate performance on realizing cost savings, no matter how poor the outcomes otherwise • Avoid confronting really tough, big problems that require coordination of diverse & powerful interests 	<ul style="list-style-type: none"> • Support research and development of new technical capacities to better serve the public interest • Maintain close supervision of all private partners engaged in policy implementation, and publicize any resulting scandals • Articulate the “vision thing” to the public, to put specific controversies in a broader social context
Private Organizations & Professional Associations	<ul style="list-style-type: none"> • Follow professional norms, no matter how far removed from widely shared social norms and values • Partner with public officials and use expertise to implement policies that serve their profession’s interests • Epistemic communities in separate professions govern themselves and ignore consequences on society 	<ul style="list-style-type: none"> • Acknowledge how much their products effect environmental conditions and social interactions • Approach questions of technological impact on society from a humble perspective, and listen to others’ views • Resist temptation to take advantage of their delegated positions of public authority, and provide service to the public as good as they do their most valued customers • Engage in cross-disciplinary research and management teams in order to broaden their horizons

Arranging the tables in this way highlights the ever-present tension between (1) the quasi-automatic process of accumulations of the consequences of actors succumbing to the temptations identified in Table 1, and (2) actions taken by actors in each of the actor categories that could have the effect of slowing or even reversing that direction of movement. In effect, these actors, from any of the three actor categories, could be seen as protecting the continued viability of the infrastructure for collective action that is present in that PG system as it currently operates. If any of the six streams of accumulation push the PG system into any of the six equilibrium traps, then that PG system could no longer fulfill its purpose to offer such resources to all parties within that society. In other words, the PG system as a whole should then be seen as dysfunctional.

We find the idea that primary responsibility for system guidance would not be automatically assigned to those at the top of some governmental hierarchy to be quite revolutionary. Instead, all parties within

that system should share in the joint responsibility for maintenance of the conditions necessary to insure the continued viability of the self-organizing processes required for high-performing systems of polycentric governance. Hood (1986), and other contributors to Kaufmann et al. (1986), describe in some detail the foundation behind establishing this mode of system guidance, control, and evaluation by a distributed array of “partial controllers” acting jointly, whether coherently or at cross-purposes or, more commonly, some combination of both, to nudge the system as a whole to maintain the conditions necessary for its continued operation at a high level of performance. In effect, polycentric governance seems to work best when its components operations are in a state of creative tension, providing a wide range of opportunities for groups to discover their shared interests and pursue them with myriad forms of self-organization and mutual adjustments with other groups doing the same thing.

We won’t go through all six parts of Table 2 in any detail, but we would like to discuss Table 2.1 further to illustrate this mode of analysis. The middle column details how members of each of three actor categories contribute to the slow accumulation of a large number of programs designed to benefit particular groups who act to defend their gains, or tend to ignore longer-term consequences of this kind of shortsighted behavior. For example, since news media face incentives to cater to the tastes of their consumers, they may gradually turn into mechanisms of bias reinforcement rather than providing objective analyses of emerging events.

As shown in the right-hand column, each of these actor types can take actions that could slow or reverse the trends identified in the middle column. Citizens and public groups, for example, could mobilize to insist on reforms needed now to avoid potentially disastrous consequences in the long term. Instead of continuing to design new public programs to address the concerns of small groups of their supporters, political officials could focus on building on successful small-scale programs by scaling them up to serve larger populations, or to serve as guidelines for related programs. Political officials could also require that all policy advocates (including themselves!) routinely include realistic evaluations of the long-term costs or other consequences of their proposals. Scientists are especially well-placed to understand the long-term consequences of current trends, but if they refrain from political involvement, their knowledge is unlikely to be put to good use. Economic firms could emphasize their contributions to long-term improvements in society instead of fixating on their quarterly earnings reports. Finally, professional experts of all kinds could design training programs for new job-seekers to serve as patient advocates or program navigators so that potential beneficiaries of existing assistance programs would be able to take advantage of those opportunities. Too often the application process seems designed to thwart any attempt to even complete the necessary forms (see Herd and Moynihan 2018 on the politics of administrative burdens).

Table 3 provides a few examples of potential warning signs that might be derived from the wide range of potential actions and trends identified in the six parts of Table 2. To continue the incrementalism and scale mismatch example, increasing levels of the complexity of benefit application forms might be taken as a warning that current program recipients are reluctant to allow others to share in their rewards. Or an increase in the frequency of low-probability extreme weather events may be taken as a warning sign that climate change has indeed been slowly building enough momentum to overwhelm current systems of crisis management.

Table 3. Potential Warning Signs of Impending Dysfunctionalities

PG Syndrome	Warning Signs
Incrementalism and Scale Mismatches	<ul style="list-style-type: none"> • Increase in number of veto points in getting new policies enacted and implemented; • Increase in complexity of application procedures for public assistance programs • Increasing frequency of previous rare events, such as extreme weather or migration surges • Decreasing accuracy of long-term budget projections or other likely long-term consequences included in policy proposals or implemented programs
Symbolic Politics and Hyper-Partisanship	<ul style="list-style-type: none"> • Increase in stridency of rhetoric in policy debates, • increase in party consistency in roll call votes, • Decrease in number or frequency of policy forums in which experts or leaders from different policy domains gather to discuss overlapping concerns
Exclusion and Institutionalized Inequalities	<ul style="list-style-type: none"> • Measures of bias in effects of programs on recipients from different social groups, • increased efforts at voter suppression of minority groups, • increases in aggregate measures of income or wealth inequality or • decreases in inter-generational mobility by income or class rank
Rent-Seeking and Pervasive Corruption	<ul style="list-style-type: none"> • Increase in lobbyist participation in drafting laws or regulations, or in support briefs in legal cases, • increase in campaign contributions by special interest groups, • increases in aggregate measures of economic resources “wasted” in rent-seeking related activities
Over-Centralized and Authoritarian Rule	<ul style="list-style-type: none"> • Increased dependence of state and local agencies on funds provided by the central government; • Increase in intrusiveness of laws or regulations on personal or corporate behavior, • increase in number of Freedom of Information act requests denied by courts or ignored by officials,
Hollowed-Out or Technocratic Governance	<ul style="list-style-type: none"> • Higher proportion of technical experts in Congressional hearings or court cases; • increased role of professional associations in standard-setting; • absence of measures taken to insure public access to information on implementation of policies, • Fewer channels to challenge actions of private partners in policy design or implementation

Also, changes in measures of the dynamic balance between the forces of natural accumulation and strategic responses that are observed in a given example of a PG system could be taken as warning that one or the other set of forces is becoming more likely to prevail. These kinds of warning signs might help analysts (or participants) understand what has happened (or what is currently happening) soon enough to take some corrective action. Under the ideal vision of PG, participants in that system should have ready access to potentially effective means of recourse that might prevent an ultimate descent into dysfunctionality. Of course, much work remains to identify and utilize potential warning signs, but this might serve as a useful direction for further consideration.

8. Remaining Challenges

In this concluding section we highlight three important challenges that will need to be overcome if the analytical framework introduced here is to ever be turned into a practical tool for institutional analyses of empirical cases.

Developing Empirical Measures of PG Characteristics, Benefits, and Syndromes

Earlier in this paper we provided lists of the defining characteristics of polycentric governance (as specified in Stephen et al. 2019), and the benefits of polycentric governance claimed by contributors to the literature on this topic (as emphasized by different groups of analysts) as well as the six negative syndromes we identified as equilibrium traps into which particular instances of polycentric governance might fall. All of these factors would need to be measured for analysts to be able to conduct meaningful tests of the policy performance of systems of polycentric governance (see Thiel et al, 2019). In addition,

if the analysis is focused on how institutions change over time, researchers must first specify the starting point of the period of institutional change they are examining, and use those initial conditions to set the context for later measurements of changes from that starting point.

An open question is whether we can devise empirical measures for the six pairs of countervailing forces in operation for trajectories through which a PG system could reach one or more of the equilibrium traps identified above. To do so, would it make more sense to focus on identifying warning signs for each of these potentially developing forms of dysfunctional governance? Or would it be more practical to focus instead on a few of the behaviors listed in Table 2 as contributing towards the strategic management of a PG system to insure it remains sustainable as an infrastructure for collective action? We will be exploring these options in our subsequent research, and welcome any ideas or suggestions along these lines.

Connecting Syndromes to Performance Measures

In addition to these measurement concerns, we also face challenges in more fully developing the theoretical basis of our mode of analysis. For example, each of the six syndromes of PG dysfunctionality we have identified is likely to have a unique profile of impacts on the values of evaluative measures of its performance, which, as noted above, can take on many different forms. We see no reason to presume a simple one-to-one relationship between the deepening of any particular syndrome and the worsening of values on any specific performance measure. Still, there should be some systematic connections between the two, and it would be reasonable to expect that empirical analysis alone could make that connection.

One potential line of development along these lines might have been provided by recent research on dysfunctional institutions of governance. In their introduction to a special issue of *Regulation & Governance* on this topic, Prakash and Potaski (2016) identify four broad reasons why a long-established institution or mode of regulation may become dysfunctional over time: design failure, institutional mismatch, adaptation failure, and capture. We suspect that each of these mechanisms of failure may prove directly relevant to our goal of identifying and measuring degrees of dysfunctionality in governance systems as a whole.

More generally, researchers should also find ways to directly link each of the dimensions of polycentric governance as identified by Stephen, et al. (2019) to evaluative criteria related to each of the benefits claimed by the proponents of PG as a normative ideal. Much work remains to draw rigorously established connections between particular aspects of PG and its performance on specific criteria. We realize that our analysis here adds to the difficulties of establishing those kinds of connections, but researchers should not ignore the possibility that the natural operation of the governance system itself could, in some circumstances, result in a weakening of the very foundation upon which that system was originally established.

Develop a Theory of Strategic Management of the Infrastructures of Polycentric Governance

Finally, we will need to think more carefully about what it might mean to say, as we do above, that political leaders, professional elites, and citizen groups may enact strategies to proactively maintain polycentric governance systems as infrastructures offering groups resources relevant to their ability to successfully self-organize for collective action. Leadership is a concept that is notoriously difficult to

capture in precise definitions or analytical frameworks, but its role is so central to the effective operation of PG systems that it should no longer be neglected by scholars working in that literature.

Polycentric governance is too often presumed to be restricted to bottom-up processes of self-organization, but we hope we have convincingly demonstrated that a more complete view requires equal contributions from the bottom up and from the top down. V. Ostrom (1989a,b, 1997) convincingly demonstrated that the role of comprehensive planning is sharply limited in the polycentric governance tradition because of problems of incomplete information and cognitive limitations. However, if a PG system is to be viable many public entrepreneurs must remain actively engaged in strategic planning and creative implementation at the level of their own organizing efforts (V. Ostrom 1988, McGinnis 2005, Aligica 2019). In effect, public entrepreneurs demonstrate the presence of distributed leadership throughout a system of polycentric governance.

This leadership theme has been implicit throughout our analysis as presented here. One might say that we are asking institutional analysts to put the governance back into polycentric governance, in hopes that our investigation of the many ways public, political, and professional actors may counteract the unfortunate tendency of bottom-up systems of governance to descend into dysfunctionality. It's time we gave the governance part of polycentric governance equal billing with its polycentricity.

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