Recognizing Varieties of Polycentric Governance:
Can We Develop More Precise Definitions and Distinctions?

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In these pages I outline some ideas towards a formal definition of polycentric governance that might contribute towards its use in empirical research and policy analysis. My core presumption is that there are many different types of polycentricity, and that it can be useful to take account of these differences, while still being able to clearly articulate the core ideas that underlie this concept.

The lack of a formal definition of polycentricity has made it very difficult to engage in systematic empirical analysis of real world cases, since it remains impossible to support consensus on which systems are more polycentric than others, or whether proposed policy interventions will increase or decrease a system's expressed level of polycentricity.

Many important terms used in political economy exhibit sufficient variety that analysts have found it useful to introduce terms that distinguish among these various forms. Democratic theorists attach various adjectives to different kinds of democratic systems (direct, representative, liberal, etc.), economists examine many different kinds of markets (perfectly competitive, oligopolistic, contestable, etc.), and students of American federalism have found it useful to distinguish among historical eras dominated by dual, competitive, cooperative, and a never-ending series of "new" federalisms. Given the centrality of the concept of polycentricity to the research tradition known as the Bloomington School of political economy (Cole and McGinnis 2015), it seems a useful exercise to begin thinking along similar lines.

I begin by insisting on a careful differentiation among the structure, process, and outcomes of polycentric governance. I argue that polycentricity is primarily a matter of structure, and it remains an open question as to how different institutional structures shape processes of interaction and the evaluation of the policy outcomes that emerge from the interactions that occur within structural contexts. I will, however, also suggest that the distinction between structure and process is not always clear-cut, since the repeated occurrence of regular patterns of interaction can, over time, became an important part of the structural context within which later interactions occur. Nonetheless, it should be possible to define different forms of polycentricity based on structural and process considerations, and to leave open to empirical analysis and/or normative evaluation if there is any meaningful relationship between these institutional forms and observed outcomes.

For the purposes of this analysis, let's begin with the following list of characteristics that I have distilled from the many descriptions of polycentric governance by Vincent and Elinor Ostrom and other scholars working in this tradition.

In a polycentric system

1. Multiple centers of authority (or decision units)
2. With overlapping jurisdictions (or areas of responsibility or authority)
3. Located within an overarching system of law (or, more broadly, a shared repertoire of institutions, including laws, rules, norms, and shared understandings)
4. Interact with each other in diverse ways (in order to address common problems and/or realize shared aspirations)
5. And thereby generate a regularized pattern of interactions and order (which either emerges spontaneously or involves some level of coordination).

I have used parentheticals to include alternative terms or phrases that I find to be more useful for my analytical purposes than the terms used by other students of polycentricity.

- First, although Ostrom, Tiebout and Warren wisely chose the phrase "many centers of decision making" to justify their selection of "polycentric" as the summary label, I find it more useful to focus on the fact that in each of these centers someone in authority is making decisions for some definable group.
- Second, the term "jurisdiction" connotes a broad range of impressions, including most powerfully a limited territorial extent or functional scope, but I find it more useful to focus on the range of decisions that each decision unit is responsible for making.
- Third, in place of an overarching legal system, I refer instead to the broader repertoire of formal and informal rules, norms, strategies, and shared understandings available to any group of individuals, as defined by the Crawford-Ostrom grammar of institutions.
- Finally, the parentheticals in 4 and 5 introduce points that I have found it especially useful to emphasize in my own work, namely, the foundational importance of collective action to this perspective on governance and the complex interplay between the leadership of public entrepreneurs and emergent processes characteristic of complex systems (McGinnis 2005).

I propose excluding point 5 from the formal definition of polycentricity, because, as Ostrom, Tiebout and Warren noted in their classic statement of polycentricity in metropolitan governance, an orderly outcome cannot be presumed a priori.

> "Polycentric" connotes many centers of decision making that 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**. To the extent that they take each other into account in competitive relationships, enter into various contractual and cooperative undertakings, or have recourse to central mechanisms to resolve conflicts, the various political jurisdictions in a metropolitan area **may function in a coherent manner** with consistent and predictable patterns of interacting behavior. To the extent that this is so, they may be said to function as a "system." (Ostrom, Tiebout, and Warren, 1961: 831 emphasis added)

Points 1-3 refer to aspects of the basic structure, whereas point 4 concerns the processes through which these decision units interact with each other. I propose using the structural components to define the core concept of polycentricity, and to use different variants of the processes identified in point 4 to distinguish among different types of polycentricity.

A Structural Definition of Polycentric Governance

This leaves us with the following components that define the "core" meaning of polycentricity:

1. Multiple centers of authority (or decision units)
2. With overlapping jurisdictions (or areas of responsibility or authority)
3. Located within an overarching system of law (or, more broadly, a shared repertoire of institutions, including laws, rules, norms, and shared understandings)

These three points include several terms which need to be more formally defined: "centers of authority," "overlapping jurisdictions," and "overarching system of law." There are, of course, many ways in which this might be done, but I propose the following sequence.

I propose taking the term decision unit (or, alternatively, center of authority) as the basic unit upon which a polycentric system must be built. Informally, ***in a decision unit some individuals make collective decisions for themselves and/or for others concerning what resources can be used in what ways, when, and where, and under what restrictions or responsibilities***. Some clarifications are needed:

1. Implicitly there exist broader sets of people, resources, and institutions from which one can select defined groups of individuals, an array of specific resources, and particular institutions, and then constitute a decision unit by combining them together. In formal terms, a decision unit can be defined as a **configuration** of **subsets** drawn from these three broader sets.[1]
2. The conjunction **and/or** is needed because the decision-makers may or may not be members of the group directly affected their decisions, and it may or may not be the case that all members of the affected group are included in the set of active decision-makers. Thus, this formulation allows collective choices to be made by external decision-makers, elite decision-making, and/or decisions taken by the group as a whole.
3. These decision units are the **basic unit** of a polycentric system because that system is defined by the nature of interactions among these units, rather than the direct interactions of the individuals included in these units. In this sense, the institutional collective action perspective developed in Feiock and Scholz (2009) may be an especially appropriate context for understanding polycentric governance.
4. Any one system is likely to include decision units that vary significantly on all dimensions, including the attributes upon which group membership is defined, the level of resources available to different groups, and the rules, norms, and shared understandings most commonly found in different cultures. Thus, there is no reason to presume that a polycentric system must be restricted to groups of homogeneous individuals or organizations.

[1] For this point, which is foundational for my analysis, I draw on Brett Frischmann, Michael Madison, Katherine Strandburg, editors, *Governing Knowledge Commons*, who define a commons in a similarly configural way, as follows: "**Commons** refers to a form of community management or governance. It applies to resources, and involves a group or community of people, but commons does not denote the resources, the community, a place, or a thing. Commons is the institutionalized arrangement of these elements." (p. 8, underlining added)

A decision unit, defined in this manner, can be said to have **jurisdiction** over a range of collective decisions concerning the rules, norms, etc., that govern the use of particular resources that are held to be binding on the members of a definable group. This gives us an opportunity to specify that two jurisdictions **overlap** when they share some of the same people, resources, or institutions in common. In effect, if they overlap on even one of these core constituent parts, connections among all three may arise as a consequence. For example, decision units that share some rights or responsibilities for using or managing similar kinds of resources may well take actions that directly or indirectly impact on each other, even if they share no individuals in common.

As noted above, I prefer the term "**shared institutional repertoire**" to "**overarching system of law**," and this definitional characteristic may be construed to be the same as the broad set of institutions from which the specific institutions relevant to any particular decision unit are drawn. In a way, then, this overarching system of shared institutional understandings amounts to a particular kind of overlap among jurisdictions or decision units.

Defining decision units as the foundational compositional units of a polycentric system in this way suggests one potential way to go about comparing the level or degree of polycentricity found in different systems. First, different systems of governance, or subsystems active in separate policy sectors of a single governance system, could differ in the number of separate decision units that are involved. But this attribute would better be captured by the concept of **multiplicity**, that is, the number of independent or relatively autonomous decision units in a system. Clearly, multiplicity of decision units is only part of the full Ostromian meaning of polycentricity. Just having multiple centers of authority does not automatically fulfill the more demanding conditions clearly articulated in Vincent Ostrom's many discussions of polycentricity.

A second, and perhaps more promising, line of effort to develop comparative measurements of degree or level of polycentricity would be to focus on the extent to which all the decision units encompassed by a single system share (or are drawn from) the same sets of people, resources, and/or institutions. Empirical instances of polycentric systems may vary in the extent to which the decision units that comprise that system include the same decision-makers, or affect many of the same people, or shape patterns of utilization of some of the same resources, or draw upon similar rules, norms, and shared understandings, or any combination of these kinds of overlap. For some purposes it may be useful to define separate indices of overlap for people, resources, and institutions, while for other analyses it may be necessary to construct some composite measure of overlap.

One important example of extensive overlap concerns the relatively isolated and highly resource-dependent communities that are so prominent in the examples of community-based management of common pool resources examined by Elinor Ostrom in *Governing the Commons* and in that literature more broadly.[2] In many cases, basically the same group of people is involved in all aspects of self-governance, from making, monitoring, and enforcing the rules to extracting and consuming the relevant resources, and perhaps even in all aspects of their culture of community life. Complete correspondence of all decision units may never be observed in any real-world setting, but this configuration might be

[2] By no means is Ostrom's research limited to relatively isolated and simple settings – chapter 6 of *Governing the Commons* reports on the subject of her dissertation research, groundwater use in southern California, a system which is in no way either isolated nor simple. Still, the supportive interactions among the design principles she identifies as critical to sustainability can be most clearly discerned in cases that are much simpler than this one.

used as an extreme end-point on a continuum, with the other side consisting of a system in which no decision units overlap in any sense. Frankly, that extreme case is even more difficult to imagine, except for the radical individualism of a Hobbesian state of nature. In mathematics, singletons, or sets including only a single element, are routinely treated as permitted subsets of larger sets, so the definition suggested above may require us to include cases in which all decision units are singletons. Even so, these singletons may exhibit overlaps in the resources they seek to use, and these interactions might serve as the point of initiation of a process of social interaction and collective action that might, eventually, end up in the construction of larger decision units organized in a polycentric manner.

Generally, different groups will be responsible for different tasks and control different resources. Taking this perspective might help policy scholars develop a deeper understanding of mainstream subjects of public policy. For example, one of the reasons the "stages heuristic" remains so important for students of public policy is its basic realization that different groups of policy actors have differential impact on the different stages of public policy, from problem definition, to the generation of alternative policy responses, to the selection or adoption of particular policies, to the legitimation and implementation of policies, and to the evaluation and reform of past policies. Overlapping sets of policy actors may be involved in successive stages, but for many actors there is a particular stage at which they are most likely to be able to directly influence the outcome of that stage, and thereby influence later developments.

At this point, I'm not quite sure how to proceed along these lines, so instead I will move on to the idea of comparing polycentric systems on other grounds.

Bringing Processes Back Into Polycentricity

Paul Dragos Aligica (2014) identifies the error-correcting processes of polycentricity as being central to its effectiveness, and thus an important part of its appeal as a normatively desirable form of governance. So, clearly, it's not enough to stop with an exclusively structural understanding of this concept. As indicated in the initial list offered above, in a polycentric system, decision units interact with each other in diverse ways (in order to address common problems and/or realize shared aspirations). Decision units may adjust to each other in myriad ways, but it might be possible to distinguish among systems of order in which different types of interactions are most prevalent or consequential.

The centrality of processes of interaction among decision units was highlighted in the following statement of Vincent Ostrom:

> "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 199b, p. 73; emphasis added)

The ultimate foundation for this kind of complex system of polycentric governance is the ability of groups of citizens to associate together to undertake a wide variety of tasks with public import, including forming corporations, voluntary associations, or interest groups to lobby their elected representatives. Much of our political discourse (and academic work in political science) obsesses on elections and lobbying and campaign contributions, but most real policy outcomes emerge from other processes, undertaken by other kinds of actors, including by citizens themselves. In short, government is not some kind of disembodied force imposed on us from above; instead it IS us, since processes of

governance are constructed out of the tools that we and others have devised to help us address practical policy problems and to realize our shared aspirations.

In their initial formulation of the concept of polycentric governance, Ostrom, Tiebout and Warren were inspired by looking at the way metropolitan areas in the U.S. tend to be governed, not by a single overarching political center of power, but rather by a fragmented system of different sized communities and public agencies that nonetheless generates recognizable patterns of order that, although they may seem to have emerged spontaneously were instead driven by the efforts of a large number of public entrepreneurs. Ostrom, Tiebout, and Warren discussed a wide range of behaviors that authorities might pursue in pursuit of public purposes: competition, negotiation, contracts, joint production, coordination, dispute resolution. Later researchers and practitioners have generated even more examples of policy instruments, so many as to defy easy categorization or comparative analysis.

The ceaseless innovation that is one of the hallmarks of a polycentric system results in a subtle interweaving of structure and process. Each new institutional innovation, whether in the form of new laws, rules, norms, the establishment of new centers of authority, or even in new understandings of the very concepts of collective decision making or authority, opens up the door for new organizational forms and capabilities, and thereby expands the repertoire of institutional arrangements that can be used by anyone who learns of these innovations.

Since the entire collection of culturally-accessible institutional arrangements is an essential component of the underlying structure of polycentricity, as defined here, the normal operation of polycentric processes generates additional structural elements. On the other hand, some past innovations may be forgotten over time, as rarely used institutional forms fade from active memory, or are actively suppressed by powerful actors. Either way, the very operation of polycentric processes shapes the broader structural context within which these processes occur, and no institutional analysis can be complete without taking account of the ever-present opportunity for significant change or fundamental transformation.

In sum, polycentric governance is driven by deep and complex endogenous forces.

Paul Dragos Aligica (2014) nicely captures the radically dynamic process through which interactions within a polycentric system can generate, regenerate, or transform the structures underlying polycentricity itself.

> Ostrom thought that studying the cases of polycentric order (in economy, law, and politics) reveals that a polycentric order is more than just a series of different centers of decision operating in competition with each other in a specific domain or area. Polycentricity is a complex system of powers, incentives, rules, values, and individual attitudes, all combined in a complex system of relationships at different levels. One may detect very interesting dynamics at work. Market polycentrism seems to entail judicial polycentrism. Judicial polycentrism entails political polycentrism, and in turn political polycentrism entails constitutional polycentrism. Accepting the existence of such a systemic logic, **one may visualize the entire social system as defined by underlying currents originating in pulsating polycentric domains**. Polycentric order in one area entails and produces polycentrism in other areas. A tension is created, pushing change in the direction of more nodes of decision-making. (Aligica 2014: 51, emphasis added)

That for Vincent Ostrom the concept of polycentricity had a breath-taking depth and subtlety is amply demonstrated in these statements:

> Necessary **preconditions for polycentric order for a political system** as a whole include "Polycentricity in the organization of (1) market arrangements; (2) the legal community; (3) constitutional rule; and (4) political conditions [selection of political leadership and formation of political conditions]" (V. Ostrom 1972, in McGinnis 1999b, p. 69, emphasis added; phrase in square brackets from p. 57).
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> [A] "**highly federalized**" political system … 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." (V. Ostrom, 1993: 205, 229, as quoted in McGinnis and E. Ostrom, 2012, p. 22, emphasis added)

To me these quotes suggest that it might be productive to consider the extent to which a polycentric system of order is, or is not, supported by similarly polycentric structures in the subsystems associated with economic, political, legal, scientific-technological, and social activities. By shifting our attention to these modular subsystems, it will be possible to explore connections to well-known examples of institutions studies by scholars in different disciplines.

For example, a market system might be said to be polycentric, in the sense defined above, with the core decision units understood as producers, consumers, and various kinds of intermediaries. However, the primary means of interaction between decision units in a polycentric market is presumed to be economic in nature, primarily in the form of mutually-beneficial and thus voluntary exchanges of private goods and services. Of course, more complex entities such as firms can also be established via contracts between employers and employees, or between stakeholders and corporate executives, but these interactions are also presumed to be voluntary exchanges. In an idealization of the perfectly competitive market, there is no other form of interaction that is relevant.

To me, this suggests that a competitive market can be interpreted as a special case of polycentricity, one in which only a limited range of economic exchange is allowed. It would, of course, be possible to take a broader perspective and to include the public actors responsible for the production and maintenance of the public goods (protection of property rights, legal system, currency, etc.) upon which market actors routinely rely in making their exchanges, but, for most analytical purposes, only voluntary exchanges are allowed in market systems. From this perspective, a market is a polycentric system reduced to a single dimension, a single form of interaction.

Similarly, the standard Weberian ideal type model of bureaucracy envisions a system of interactions dominated by the relationship of authority and obedience to that authority. Social ties should play no role in a purely meritocratic system of bureaucratic efficiency, and bribes for special favors are not permissible forms of interaction in the ideal bureaucratic system. Whether or not all lines of upward authority converge to an ultimate source of sovereignty over that organization, this model of idealized bureaucracy amounts to a polycentric system reduced to a single dimension of permissible interactions.

Other examples could be considered, based on purely legal, familial, cultural or religious bases of interactions, but each of these examples would amount to a pale reflection of the much wider range of possibilities demonstrated in full-scale polycentricity. In a polycentric system as envisioned by the Ostroms, many forms of interaction comfortably co-exist and co-evolve over time.

Appreciating the Polyphonic Expression of Polycentric Governance

In a 1972 convention paper, Vincent Ostrom revisited the analysis that he, Tiebout, and Warren provided in their classic 1961 article on polycentricity in metropolitan governance. After noting that many critics had dismissed their concept as being either a justification for the status quo or as a misleading application of a simple market metaphor, Ostrom ([1972] 1999: 54) admitted that "The task we undertook was more difficult than we had realized. Polycentricity must be applicable to a large range of social tasks if the *governance* of metropolitan areas is to be subject to a polycentric ordering."

Acknowledging that the term polycentricity originated in the work of Michael Polyani (1951), Ostrom suggests that they may not have captured the full scope of the conceptualization offered by that chemist/philosopher:

> Polyani's emphasis upon a general system of rules as providing a framework for ordering relationships in a polycentric system is an issue that was seriously neglectedin Ostrom, Tiebout, and Warren. Our implicit identification of the term *political* with *government* and our identification of the "business" of government with the production and provision of public goods and services led us to gloss over the essential relationship of rules to the structure of political systems. … *Whether the governance of metropolitan areas can be organized as a polycentric system will depend upon whether various aspects of rule making and rule enforcing can be performed in polycentric structures.* (Ostrom [1972] 1999: 58, italics in original)

Earlier in that same paper Ostrom had highlighted the critical importance of rules as constraints on acceptable behavior, and especially on whether or not those rules can be enforced within that system of governance.

> Political relationships always exist as a set of possibilities within a much larger domain of all sets of possibilities inherent in the *potential variety* of human behavior. Social organization occurs when the *potential variety* in human behavior is *constrained* so as to exclude some possibilities and permit other possibilities Decision rules or laws serve as a means for partitioning the set of all possibilities into authorized and proscribed relationships. However, prescribed relationships or unlawful actions are still technically or empirically *possible*. (Ostrom [1972] 1999: 55, italics in original)

To try to more fully capture Vincent Ostrom's expansive vision of polycentric order, I expand upon the concept of "**polyphonic federalism**" introduced by Robert Schapiro (2009) and justified, as follows:

> Polyphony has been defined as "the simultaneous and harmonious combination of a number of individual melodic lines." … One of the central advantages of the metaphor of polyphony is its aurality. It is difficult to imagine two items occupying the same space, without displacing each other or combining into a single new, unified whole. The choice is a marble cake or a stew. Sound, on the other hand, can combine into new melodies, without losing its individual character. … From a polyphonic perspective, federalism is a process that evolves over time, an ongoing relationship among various sources of power. Federalism is best understood not as a static set of power relationships, but as

> the dynamic output of a system in which multiple powers interact with each other. … Polyphony thus highlights the key features of federalism. It shifts the focus away from dualism's concern with protecting state or federal turf. Instead, federalism is about the interaction of multiple independent voices."(pp. 94-95)

In practice, however, Schapiro's application of the metaphor of polyphonic federalism to the U.S. legal system remains limited to a consideration of the simultaneous forms of authority exerted by public authorities and legal actors operating at just two levels: the state and federal (e.g., national) levels. To anyone familiar with the Ostromian understanding of American federalism, this restriction to the interactions among just two or three layers of government agencies is far too simplified, since lots of other kinds of organizations need to be included in any institutional analysis, Including school districts, special tax districts, and other specialized jurisdictions within states, cross-state arrangements such as inter-state compacts for river or water management, or regional transportation authorities that cross state boundaries, etc., and, especially important in the US case, a long tradition of important contributions from private actors, including for-profit firms, professional associations, and nonprofit organizations (including faith-based organizations – FBOs), all of which have been actively engaged in the delivery of public and community services from before the foundation of the American republic.[3]

As introduced and developed by Vincent Ostrom and his many colleagues, polycentricity encompasses the actions of general-purpose and special-purpose political jurisdictions, formal organizations and informal groups, public, private and voluntary organizations, any of which may be operating at scales of aggregation from local to, in some instances, global, and dealing with the entire range of collective action evident in any society.

I have said on occasion that polycentricity can be described, in colloquial terms, as "federalism on steroids," and I am willing to double down on the concept and suggest the phrase "**polyphonic polycentricity**" to denote a full-scale system of polycentric governance that includes, as its critical supporting subsystems, polycentric forms of interactions in political, economic, legal, social, scientific-technological, and cultural realms of activity.

In contrast, markets, bureaucracies, and legal systems stand as single-modal and thereby incomplete realizations of polycentricity, cases for which the phrase "**monophonic polycentricity**" might be used.

I will go further to suggest that single-modal systems of social order (markets, bureaucracies, familial systems, etc.) can serve as a more useful contrast to fully-formed polyphonic polycentricity than the unrealistic notion of "**monocentric governance**" which Vincent Ostrom so frequently uses as a foil against his polycentric interpretation of the American system of political order (see especially V. Ostrom 2008).

[3] Schapiro (2009: 95, note 13, p. 202) quotes a critical assertion of Berman (1983: 10) that "Perhaps the most distinctive characteristic of the Western legal tradition is the coexistence and competition within the same community of diverse jurisdictions and diverse legal systems." When I first had the opportunity to speak with Vincent Ostrom in some detail, he strongly suggested that I consult Berman's book in order to counter my misunderstanding of international order as being constituted by Hobbesian sovereigns interacting within a Westphalian system of competing sovereignties. His antidote to my traditional training in international relations theory had its intended effect, and I have never looked back.

Ostrom defines his intended contrast between these two forms of political order as follows:

> The essential defining characteristic for a monocentric political system is one where the governmental prerogatives for determining, enforcing and altering legal relationships are vested in some single office or decision structure that has an ultimate monopoly over the legitimate exercise of coercive capabilities in some particular society. … The essential defining characteristic of a polycentric political system is one where many officials and decision structures are assigned limited and relatively autonomous prerogatives to determine, enforce and alter legal relationships. (Ostrom [1972] 1999: 55)

To take this notion to its logical extreme, a monocentric system of political order would be one in which there is only a single decision unit ultimately responsible for making all the collective decisions concerning use or management of all kinds of resources that effect the lives of a community of individuals, and which would rely on a single, logically coherent and self-reinforcing system of laws, rules, and norms. Perhaps a monocentric system could be defined as one in which all the formal decision units ultimately draw their authority from a single source of sovereignty, but I find it difficult to imagine that any real-world system, even self-professed totalitarian orders, could ever approach that terrifying vision in any meaningful sense.

However, it would be reasonable to presume that any real-world system of governance might be comprised of political, economic, legal, social, scientific-technological, or cultural subsystems that vary along a continuum ranging from the monophonic polycentricity of a perfectly competitive market or ideally efficient bureaucracy to the other extreme, of a fully-articulated polyphonic polycentricity covering all aspects of social, political, and economic processes.

One might conceptualize the analogue of a "perfectly competitive market" to be a "**perfectly pervasive (or harmoniously polyphonic) polycentric system**," that is, a system in which any subset of community members could, at minimal cost in time and effort, solve any collective action problem they share in common, over any kind of resource, and making use of any type of institutional solution known to mankind. Clearly, such a utopian ideal is, by definition, unrealizable, but it may be a useful concept to develop further.

This analogy between a perfectly competitive market and a perfectly pervasive polyphonic polycentric system of governance is worth a bit more explanation. A perfectly competitive market is an idealized system for the production, exchange, and consumption of private goods, one that will, under the proper conditions, achieve a Pareto optimal equilibrium. Similarly, a perfectly pervasive polyphonic system of governance can be understood as an idealized political-economic-social system for the production, selection, and consumption of all kinds of goods: private goods, public goods, toll goods, common pool resources, and any hybridized combinations thereof. As argued initially by Ostrom, Tiebout, and Warren (1961), this level of complexity may be required if society is to take full advantage of all the efficiencies of scale available for the production, provisioning, and collective consumption of the full panoply of local public goods and services, and the management of common pool resources, and the oversight and regulation of private commerce and market processes.

Comparing Levels of Polycentricity in Different Governance Systems

How could such an obviously impossible ideal ever be useful for empirical analysis or comparative policy design? Fortunately, we have an excellent example at hand, namely, the idealized concept of a "perfectly competitive" market. Real-world markets differ in the extent to which they approximate this ideal, and can often be arrayed on a continuum ranging from fully competitive to monopolistic. Markets also differ in the magnitude of transaction costs that face participants in those markets. Thanks to Coase we know that the case of zero transaction costs is simply not realistic, but practical levels of different kinds of transaction costs can be measured, and will vary widely, from effectively negligible to prohibitively expensive.

Markets also differ in the costs of entry or exit, and Aligica (2014) has used this factor as one of his empirical indicators of the degree of polycentricity in different systems. However, he presumes that changes in these levels can be directly associated with the extent to which that system manifests emergent order or regularity. For me, it remains an open question how the attributes of the outcomes generated by governance systems with higher or lower levels of polycentricity should be evaluated on this or other, ultimately normative grounds.

Economists often argue that, when a real-world market is shown to demonstrate undesirable levels of inefficiency, then an effective response would be to identify "missing markets," perhaps in the generation and distribution of information that would lower transaction costs, and build the institutions needed to fill those gaps in the existing system of markets. Using a similar line of argument, we might argue that in many real-world polycentric settings some groups that are facing an emerging, or even a long-standing, shared problem find it too costly to overcome all of the dilemmas of collective action that would confront them if they were to try to work together to realize the nature of the problem they share, and with whom, communicate with others who are facing or have faced similar problems, devise appropriate resolutions, monitor the implementation of these policy responses, and evaluate the consequences of their policy interventions. Any changes in that system that would lower the costs of any of these steps in the process of collective action can be interpreted as filling gaps in the existing institutional structure, and thereby increasing the effective level of polycentricity in that system (since the revised system would now be able, supposedly, to resolve even more problems than before).

In other words, it may be easier to determine whether a proposed policy or institutional change would increase or decrease the effective level of polycentricity in a specific system rather than comparing the absolute level of polycentricity in different policy sectors or in entirely different governance systems. I would expect, however, that if we could devise a valid measure of the magnitude of gaps in effective collective action, that measure would be related, in a systematic manner, with the normative desirability of the outcomes generated by that system.

Another possible way to distinguish among different types of polycentric systems would relate to the extent of their decomposability (see Simon 1969), or the ease with which related problems that emerge in separate subsystems can be somehow connected together by participants in the overarching system of governance. The lack of any channel to make cross-policy sector connections could be seen as another form of gap in a given system, and filling that gap should move the system in the direction of higher polycentricity.

A polycentric system with many gaps might be described as **sparse** or **patchy**, and one with fewer gaps as **dense** or **fuller or more complete**. Many policy systems comprised of multiple centers of authority seem **fragmented**, and the overall impression they give is one of widespread disarray or a disturbing level of discordance (to draw once again upon the aurality of the polyphony metaphor), rather than of the efficient pursuit of public goods. The U.S. system of health care, both the delivery of care and the payment for health care services, seems fragmented on many, many dimensions.

I would prefer to call such fragmented systems **proto-polycentric**, rather than fully polycentric in the way that Vincent Ostrom would have envisioned. OTW did mention, in passing, area-wide coordination as one of the local public goods that need to be provided, in some way, by an effective system of metropolitan governance. Unfortunately, they did not give this coordination function much emphasis in their analysis, which made it possible for later readers to presume that the order OTW perceived to emerge from polycentric governance was an order that was generated spontaneously. Elsewhere, Vincent Ostrom put considerable emphasis on the pivotal contributions that public entrepreneurs provide to sustain processes of self-governance, making it clear that just having a lot of uncoordinated forms of collective action happening simultaneously was not enough to make a governance system fully polycentric.

I conclude with a few words concerning the relationship between the concepts of **commons** and **polycentricity**. The extremely close connection between these two central concepts within the Bloomington School of political economy was unambiguously demonstrated when Elinor Ostrom, after being awarded the 2009 Nobel Memorial Prize in Economic Sciences for her research on "economic governance, especially the commons," she entitled her Nobel lecture "The Polycentric Governance of Complex Economic Systems" (E Ostrom 2010), even though neither polycentric nor polycentricity appeared in the excellent surveys of her research provided by the Nobel committee (http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2009/).

As noted earlier, my formal definition of a decision unit (the fundamental component of any polycentric system), as a configuration of people, resources, and institutions, was inspired by way in which Frischmann, Madison, and Strandburg (2014) define a commons in a similarly configural manner, as an institutionally defined nexus of people, rules, and resources. It seems clear to me that any polycentric system will contain many such commons, both those which are governing by a system of common property rights (as articulated in Ostrom 1990) or those which remain open access to all. Real-world manifestations of polycentricity will also include many instances of private or public property, each of which can be similarly defined as an institutionally defined configuration of people and resources. Even so, by highlighting the similar logical basis underlying both commons and polycentricity, this method of definition sheds new light on the hidden coherence of the Bloomington School of political economy.

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